

Document of
The World Bank

Report No: ICR3261

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-41270; IDA-H5370; TF-99911)

ON A
CREDIT, GRANT AND TRUST FUND
IN THE AMOUNT OF XDR 14.45 MILLION
(US\$24.05 MILLION EQUIVALENT)

TO THE
REPUBLIC OF NICARAGUA

FOR THE
SECOND AGRICULTURAL TECHNOLOGY PROJECT

December 30, 2014

Agriculture Global Practice
Central America Country Management Unit
Latin America and Caribbean Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective August 27, 2014)
Currency Unit = Cordoba
C 24.90 = US\$ 1
US\$ 1.53 = SDR 1

FISCAL YEAR
January 1 - December 31

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing
AM	Aide Memoire
BP	Banco Producamos
CDPs	Cooperative Development Plans
CGS	National Genetic Seed Center
CNIAB	National Center for Agricultural Research and Biotechnology
CPS	Country Partnership Strategy
DGSPA	General Directorate of Animal Sanitary Protection
DR-CAFTA	Dominican Republic-Central America Free Trade Agreements
FAT	Technical Assistance Fund
FCR	<i>Fondo de Credito Rural</i> (Rural Credit Fund)
FUNICA	Nicaraguan Foundation for Agricultural and Forestry Technological Development
GAFSP	Global Agriculture and Food Security Program
GDP	Gross Domestic Product
GoN	Government of Nicaragua
INAFOR	National Forestry Institute
INATEC	National Technological Institute
INIDE	National Institute of Development
INTA	Nicaraguan Institute of Agricultural Technology
IP	Indigenous Peoples
IPDP	Indigenous Peoples Development Plan
IPP	Indigenous Peoples Plan
IPSA	Animal Sanitation and Protection Institute
MAG	Ministry of Agriculture and Livestock
MANOP	Operating Manual
M&E	Monitoring and Evaluation
NDP	National Development Plan
NGO	Non-Governmental Organization
NHDP	National Human Development Plan
NSS	National Seed System
PAD	Project Appraisal Document

PDO	Project Development Objective
PER	Public Expenditure Review
PRORURAL	Sector-Wide Rural Development Program
PTA-II	Second Agricultural Technology Project
SA	Social Assessment
SIAF	Integrated System of Financial Administration
SISEVA	Planning and Monitoring System
TA	Technical Assistance
TF	Trust Fund
WB	World Bank

Vice President: Jorge Familiar
 Country Director: Humberto López
 Sr. Global Practice Director: Juergen Voegele
 Practice Manager: Laurent Msellati
 Project Team Leader: Augusto García
 ICR Team Leader: Katie Kennedy Freeman
 ICR Main Author: Katie Kennedy Freeman

NICARAGUA
Second Agricultural Technology Project

Contents

1. Project Context, Development Objectives and Design	1
2. Key Factors Affecting Implementation and Outcomes	6
3. Assessment of Outcomes	13
4. Assessment of Risk to Development Outcome	18
5. Assessment of Bank and Borrower Performance.....	19
6. Lessons Learned.....	21
7. Comments on Issues Raised by Borrower/Implementing Agencies	22
Annex 1. Project Costs and Financing	23
Annex 2. Outputs by Component.....	25
Annex 3. Economic and Financial Analysis	31
Annex 4: Impact Evaluation Summary and INTA Surveys	41
Annex 5. Bank Lending and Implementation Support/Supervision Processes	45
Annex 6. Stakeholder Workshop Report and Results	48
Annex 7: Summary of PRORURAL Program and Mid-Term Evaluation:	52
Annex 8. Summary of Borrower's ICR and/or Comments on Draft ICR.....	56
Annex 9. Response from Borrower on the ICR	Error! Bookmark not defined.
Annex 10. List of Supporting Documents.....	65

A. Basic Information

Country:	Nicaragua	Project Name:	Second Agricultural Technology Project
Project ID:	P087046	L/C/TF Number(s):	IDA-41270,IDA-H5370,TF-99911
ICR Date:	12/18/2014	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	REPUBLIC OF NICARAGUA
Original Total Commitment:	XDR 8.30M	Disbursed Amount:	XDR 14.34M
Revised Amount:	XDR 14.34M		

Environmental Category: B

Implementing Agencies:

INTA

National Forestry Institute (INAFOR)

MAGFOR

FUNICA

INATEC

Banco Produzcamos

Cofinanciers and Other External Partners:

International Fund for Agriculture Development (IFAD)

Canada - Department of Foreign Affairs, Trade and Development

B. Key Dates

Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	11/02/2004	Effectiveness:	09/15/2006	09/15/2006
Appraisal:	09/06/2005	Restructuring(s):		09/01/2009 05/10/2010 12/10/2010 02/28/2012 09/26/2012 11/11/2013
Approval:	11/29/2005	Mid-term Review:	12/09/2008	12/09/2008
		Closing:	03/31/2010	06/30/2014

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes:	Satisfactory
Risk to Development Outcome:	Moderate

Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Satisfactory	Government:	Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Satisfactory	Overall Borrower Performance:	Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators

Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Moderately Satisfactory		

D. Sector and Theme Codes

	Original	Actual
Sector Code (as % of total Bank financing)		
Agricultural extension and research	71	71
Central government administration	20	20
Forestry	9	9
Theme Code (as % of total Bank financing)		
Environmental policies and institutions	14	14
Indigenous peoples	14	14
Nutrition and food security	14	14
Rural markets	29	29
Rural services and infrastructure	29	29

E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Jorge Familiar Calderon	Pamela Cox
Country Director:	J. Humberto Lopez	Jane Armitage

Practice Manager/Manager:	Laurent Msellati	John Redwood
Project Team Leader:	Augusto Garcia	Pierre Werbrouck
ICR Team Leader:	Katie Kennedy Freeman	
ICR Primary Author:	Katie Kennedy Freeman	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

To increase agricultural productivity by providing rural households and communities with broader access to sustainable agriculture, forestry and natural resource management service, technology and innovations, in line with the Recipient's PRORURAL program.

Revised Project Development Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 : Value quantitative or Qualitative)	At least 50% of the 50,400 farmers (25,200 farmers)participating in agricultural and forestry extension services have adopted at least two new production and/or processing technologies			
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	This target was surpassed (132% achieved) by the time of the closing of the original credit (12/31/2013). 95% of 35,000 farmers served by INTA adopted at least two production and/or processing technologies.			
Indicator 2 : Value quantitative or Qualitative)	Productivity Indices of participating farmers have increased on average by at least 15 percent			
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	This target was surpassed (106% achieved). 2013 Impact Evaluation showed 60% increases in productivity, and INTA 2013 surveys showed overall average of 16%, with significantly higher productivity for some varieties.			
Indicator 3 : Value quantitative or Qualitative)	At least 80 percent of the project stakeholders express satisfaction with the research and agricultural services received			
	9%	80%		82%

Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (102% achieved). Results according to the 2013 INTA survey showed producers expressed satisfaction with the assistance received.			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	At least 50,400 rural producers receive technical assistance, of which at least 35,000 are involved through INTA, 15,200 through FAT and 200 through INAFOR.			
Value (quantitative or Qualitative)	0	50,400		70,806
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (140% achieved). Producers benefitted from technical assistance provided by INTA (69,973 beneficiaries, 41,983 men and 27,990 women), INAFOR (833 beneficiaries). FAT-FUNICA provided TA to 7,142 beneficiaries until December 2009.			
Indicator 2 :	INTA's innovation technology portfolio is increased by 42 validated technologies supporting export commodities, food safety and food security, and environmental sustainability.			
Value (quantitative or Qualitative)	134	176		193
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (140% achieved). 59 new validated technologies were included in INTA's catalog.			
Indicator 3 :	Annual foundation and registered seed production of food grains exceeds 230 metric tons, while vegetable, pasture and tuber seed production covers more than 230 ha.			
Value (quantitative or Qualitative)	200 metric tons of basic grain. 100 Ha of other crops	232 MT 230 Ha		369 MT 230 Ha
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target of MT surpassed (160% achieved), target for Ha met (100% achieved).			
Indicator 4 :	At least 2,500 producers are trained in food processing, and/or business administration and marketing.			
Value (quantitative or Qualitative)	0	2,500		3,204

Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (128% achieved).			
Indicator 5 :	30% of the producer organizations that participate in TA activities through FAT-FUNICA have access to finance and are linked to product markets.			
Value (quantitative or Qualitative)	0	30%		38%
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (127% achieved). Activities were completed with FAT-FUNICA as of December 31st, 2009.			
Indicator 6 :	National forest inventory and valuation exercise completed and information made available for planning and management of forestry sector.			
Value (quantitative or Qualitative)	None	Completed		Completed
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target achieved (100%). Ultimately the national forest inventory and valuation exercise was completed with donor funds under PRORURAL (instead of PTA-II, due to Bank procurement rules). PTA-II instead provided institutional strengthening to INAFOR.			
Indicator 7 :	On average, at least 80% of the Government institutions involved and participating donors rate PRORURAL'S implementation and monitoring arrangements as satisfactory.			
Value (quantitative or Qualitative)	0	80%		100%
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (125% achieved). According to PRORURAL mid-term evaluation (2012) and the last PRORURAL Mesa (October, 2013), PRORURAL implementation arrangements were rated Satisfactory by Government institutions and donors.			
Indicator 8 :	The Planning, Monitoring and Evaluation unit of MAGFOR is fully operational and producing regular reports.			
Value (quantitative or Qualitative)	None	Completed		Completed
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target achieved (100%). The unit that supports the M&E system (SISEVA) is fully operational and has prepared PRORURAL annual operational plans and reports as required over the last 7 years.			
Indicator 9 :	The technical/non-technical staff ratio of MAGFOR, INTA, INAFOR and FUNICA has increased.			
Value (quantitative)	MAGFOR 45/55 % INTA 49/51 %	MAGFOR 55/45 %		MAGFOR 58/42 % INTA 60/40 %

or Qualitative)	INAFOR 63/37% FUNICA 54/46 %	INTA 60/40 % INAFOR 67/33 % FUNICA 62/38%		INAFOR 67/33 % FUNICA 60/40%
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	On average, the target has been surpassed. MAGFOR, INTA and INAFOR all surpassed the targets. FUNICA fell slightly short of target, in large part because their involvement in the project ended in December 2009.			
Indicator 10 :	10 additional forest management plans (FMPs) are approved.			
Value (quantitative or Qualitative)	0	10		88
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (880% achieved). Cumulatively, INAFOR reported 70 FMP approved in 2012 and 18 FMP in 2013.			
Indicator 11 :	The Government budget integrates 75 percent of MAGFOR, INAFOR and INTA's salaries and operating costs (partially financed under the project).			
Value (quantitative or Qualitative)	0	75%		100%
Date achieved	11/29/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (125% achieved). 100% of staff that was initially paid by the project is now fully absorbed in the fiscal payroll by the Ministry of Finance.			
Indicator 12 :	1,200 producers specialized in Certified Seed production (10% Indigenous Population and 20% Women)			
Value (quantitative or Qualitative)	0	1,200 producers, of which 240 are women (20%) and 120 are indigenous (10%).		1435 producers, of which 185 are women (12%), 118 are indigenous (98%).
Date achieved	11/29/2005	12/31/2013		06/30/2014
Comments (incl. % achievement)	Target surpassed for total number of producers specialized in Certified Seed production (120% achieved). Targets for number of women fell short by 23% (55 women) and 2% (2 people).			
Indicator 13 :	31 organizations have started to implement their Cooperative Development Plans (CDPs) within the context of this project.			
Value (quantitative or Qualitative)	0	31		39
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	Target surpassed (126% achieved). 39 CDPs were financed by the project. Some organizations were able to present two CDPs in different sowing seasons.			
Indicator 14 :	\$4,443,842.00 placed and \$3,984,149.00 returned for the production and processing of certified seed			

Value (quantitative or Qualitative)	0	4,443,842.00 placed		3.1 million placed
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	89% achieved. Due to project implementation delays the target value of \$4.4 million could not be placed and \$3.1 million was allocated for the Line of credit component of the AF. The remaining funds were reallocated to Component3.			
Indicator 15 :	National Genetic Seed Center operating and with a storage capacity for foundation, genetic, and registered seed of at least 1806 MT.			
Value (quantitative or Qualitative)	0	1806 MT		1806 MT
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	Target achieved. By the end of the project, the National Genetic Seed Center was operating with 1806 MT of storage capacity.			
Indicator 16 :	Upon project completion, 3,581 ha per year have been inspected for the production of certified seed.			
Value (quantitative or Qualitative)	1,180 Ha/year	3,581 Ha/year		3,583 Ha/year
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	Target achieved.			
Indicator 17 :	20% of INTA's indigenous people clients are women.			
Value (quantitative or Qualitative)	0	20%		54%
Date achieved	11/01/2005	03/15/2010		12/31/2013
Comments (incl. % achievement)	Target surpassed (207% achieved.) Out of 637 indigenous INTA beneficiaries, 347 are women.			
Indicator 18 :	Cumulative incremental production of genetic, foundation and registered basic-grains seed reaches 1,166 MT by end-project in AF areas.			
Value (quantitative or Qualitative)	369 MT	1,166 MT		829
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	The indicator fell short of the target by 24% (76% achieved).			
Indicator 19 :	Cumulative incremental production of certified basic grains seed reaches 4,852 MT by end-project in AF areas (Maize 2,364 MT, Rice 864 MT and Beans 1,625 MT)			
Value (quantitative)	1,806 MT (overall) Maize 206 MT	4,852 MT (overall) Maize 2,364 MT		4,728 (overall) Maize 448 MT

or Qualitative)	Rice 560 MT Beans 1,040 MT	Rice 864 MT Beans 1,625 MT		Rice 1,000 MT Beans 3,280 MT
Date achieved	04/19/2010	12/31/2013		06/30/2014
Comments (incl. % achievement)	Overall, the project achieved 98% of the target, 19% for Maize, 115% for Rice and 202% for beans. The shift towards bean production was due to increased demand of the product.			

G. Ratings of Project Performance in ISRs

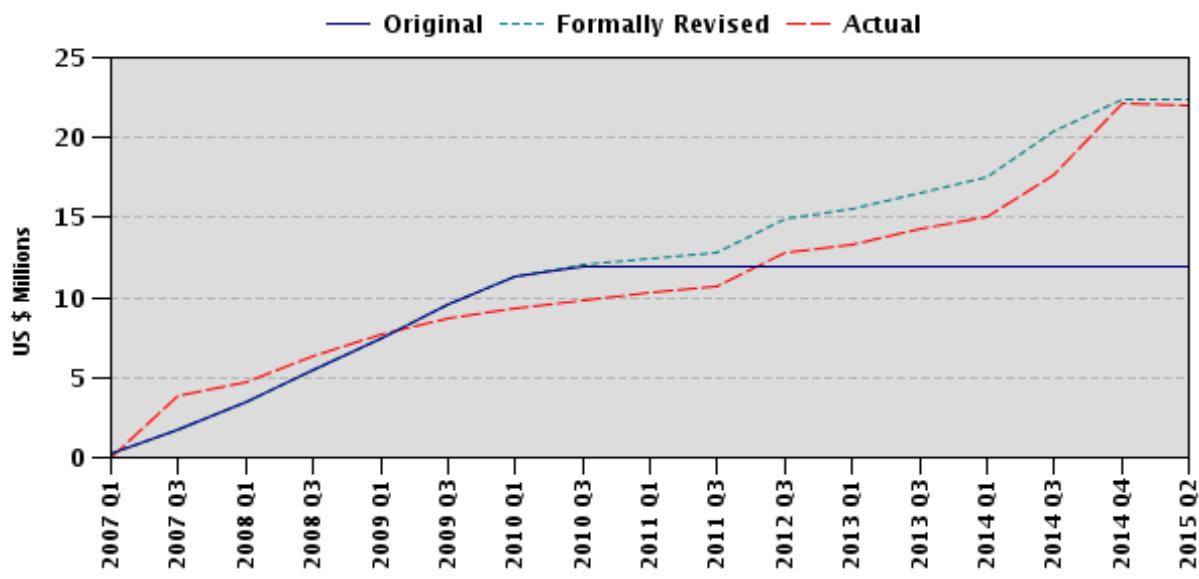
No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	02/08/2006	Satisfactory	Satisfactory	0.00
2	05/03/2006	Satisfactory	Satisfactory	0.00
3	06/19/2006	Satisfactory	Moderately Satisfactory	0.00
4	10/17/2006	Satisfactory	Satisfactory	1.99
5	03/29/2007	Satisfactory	Satisfactory	3.84
6	06/13/2007	Satisfactory	Satisfactory	3.84
7	10/20/2007	Satisfactory	Satisfactory	4.68
8	04/29/2008	Satisfactory	Satisfactory	6.39
9	10/17/2008	Satisfactory	Satisfactory	7.66
10	03/25/2009	Satisfactory	Satisfactory	8.74
11	10/26/2009	Satisfactory	Satisfactory	9.26
12	01/26/2010	Satisfactory	Satisfactory	9.49
13	04/01/2010	Satisfactory	Moderately Satisfactory	9.87
14	06/30/2010	Satisfactory	Moderately Satisfactory	10.09
15	02/26/2011	Satisfactory	Moderately Satisfactory	10.74
16	12/20/2011	Satisfactory	Moderately Satisfactory	12.31
17	06/30/2012	Satisfactory	Moderately Satisfactory	13.01
18	02/07/2013	Moderately Satisfactory	Moderately Satisfactory	13.93
19	12/03/2013	Moderately Satisfactory	Moderately Satisfactory	15.70
20	07/01/2014	Satisfactory	Satisfactory	22.13

H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		DO	IP		
09/01/2009	N	S	S	9.26	i) Reallocation of proceeds, and (ii) extension of the closing date of the Credit Agreement until December 31st, 2010.

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		DO	IP		
05/10/2010	N	S	MS	9.87	Approval of IDA Grant H-537-NI for US\$10 M.
12/10/2010	N	S	MS	10.37	(i) Reallocation of proceeds, and (ii) extension of the closing date of the Credit agreement until December 31, 2013.
02/28/2012	N	S	MS	12.80	Change in the implementing agency for Component 1.C (b): "The provision of sub credits to finance the carrying out of Cooperative Development Plans" of the Additional Financing to ATP II, from the Rural Credit Fund (FCR) to the newly created <i>Banco Producamos</i> (BP).
09/26/2012	N	S	MS	13.26	Include two additional activities under the TF: (i) carry out two post census studies; and (ii) produce and publish dissemination materials on the Census. The changes were financed with the cost savings under TF 099911.
11/11/2013	N	MS	MS	15.70	(i) Reallocation of proceeds of the Credit No. 4127-NI, and (ii) Reallocation of proceeds and first extension of the closing date of the IDA Grant H-537-NI, until June 30, 2014.

I. Disbursement Profile



1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

1. *At appraisal, rural poverty in Nicaragua was 64 percent and the economy was largely dependent on agriculture, but agricultural practices were not supported by technology or innovation.* At the time, Nicaragua's per capita GDP was the second lowest in Latin America, with 46 percent of people living in poverty, 15 percent in extreme poverty, and poverty in the rural areas (64 percent) was more than double that of the urban areas (29 percent). Nicaragua had successfully returned to stability and growth after a decade of internal armed conflict, and agriculture was contributing substantially to this growth. At the time, Nicaragua was one of the most agriculture-dependent economies in Latin America, with the sector accounting for roughly 20 percent of GDP and 40 percent of employment, but this growth was not supported by technology or increased production, and came instead from exploitation of marginal lands. In addition, the share of total public expenditure allocated to increasing productivity in rural areas had been declining and was not commensurate with the challenges of combating pervasive rural poverty¹.

2. *Nicaragua's ratification of the Dominican Republic-Central America Free Trade Agreements provided an opportunity for Nicaragua to boost agricultural growth, but this needed sector modernization.* In 2005, there was consensus that in order to grow, Nicaragua needed to economically integrate with its neighbors. The same year Nicaragua ratified the Dominican Republic-Central America Free Trade Agreements (DR-CAFTA), which studies showed was likely to have positive impacts on trade and investment through increased access to markets. The ratification provided Nicaragua with an opportunity to transition from traditional to higher-value diversified commodities, and the opportunity to create export growth and jobs. However, it simultaneously posed a clear challenge to small and indigenous farmers in an environment of increased competition. In order to be effective and take advantage of opportunities the transition required clear policies, strong institutions, increased capacity to provide agricultural research and extension services, increased effectiveness of public spending, and support to the agriculture sector.

3. *The National Human Development Plan (NHDP) 2005-2009 prioritized economic growth, specifically in agriculture, but the capacity of sector institutions to execute this plan was weak.* Prompted by regional opportunities and national challenges, the Government of Nicaragua (GoN) drafted the National Development Plan 2005-2009 (NDP), which prioritized economic growth, specifically in the agriculture sector, through increased use of technology for agricultural production. In the agriculture sector, four institutions were responsible for executing NDP priorities: the Ministry of Agriculture, Livestock and Forestry (MAGFOR, now MAG), the National Institute for Agricultural Technology (INTA), the National Forestry Institute (INAFOR) and the Rural Development Institute (IDR)². A 1998 regulation defined the roles and responsibilities of the public institutions in the sector making MAG the lead agency for formulating policies and strategies for agricultural and forestry development. However, inter-institutional coordination was difficult and MAG faced challenges with institutional capacity and its coordination role.

¹ Public expenditure to increase rural productivity was roughly 20 percent of GDP in 1999 and around 12 percent in 2004 (about US\$50 million, and about 1.2 percent of GDP in 2003).

² INTA was responsible for state agricultural technology and INAFOR was responsible for generating statistical information about the forestry sector and administering the National Forest Registry and Inventory. IDR was in charge of executing strategies, and programs in rural development, but was not included in the project design.

4. ***Prompted by lack of donor coordination and the need to coordinate public sector institutions, the preparation of the Second Agricultural Technology Project (PTA-II) provoked the creation of a sector-wide platform: the Productive Rural Development Program (PRORURAL).*** At appraisal, donors were notoriously uncoordinated in Nicaragua. Impelled by the need for better coordination by donors and sector implementing agencies, the GoN used the preparation of the NDP and PTA-II to leverage donor funding and launch the sector-wide Productive Rural Development Program, *PRORURAL*. The program was intended to support coordination of Government institutions and donors for sustainable agriculture and forestry programs for the period 2005-2009 (in 2010 it was extended, and became *PRORURAL-Incluyente*). Under PRORURAL, institutions and donors cooperated under joint objectives of gaining efficiency and increasing overall effectiveness. The main components of PRORURAL were: (i) technical innovation; (ii) food safety and animal health; (iii) sustainable forest development; (iv) financial support services; (v) infrastructure; (vi) institutional modernization and strengthening; and (vii) forest and agricultural policy. The Project would finance various activities within these components. More information on PRORURAL is included in Annex 9.

5. ***In 2007/2008, in response to the Global Food Crisis, and aligned with the objectives of PRORURAL, the GoN requested an Additional Financing (AF) in the amount of US\$10 million to scale up component 1.3 of PTA-II in order to strengthen the National Seed System (NSS).*** The AF was one of two World Bank-supported projects requested by the GoN in response to the crisis: the Emergency Food Price Response Project (approved in January 2009) was meant to bring relief to the most immediate food and input needs; and the PTA-II AF was meant to provide support to strengthen the NSS, provide credit to producers, and improve seed certification processes. The NSS was part of the new strategy under PRORURAL to address structural problems in Nicaraguan agriculture, including low productivity, food insecurity, and vulnerability to shocks. At the time of the request for the AF, Nicaragua's overall productivity had increased due to larger areas planted, but the productivity of crops was still low and only 12 percent of farmers were using certified seeds. According to FAO data at the time, farmers using certified seeds had the potential to increase yields by up to 30 percent, which would prove critical to respond to the Global Food Crisis.

Rationale for Bank engagement

6. ***The Project was driven by Nicaragua's pervasive rural poverty, and built on other Bank operations in.*** At the time of appraisal, the Project was fully aligned with the objectives of the then-current IDA Interim Strategy Note (Report No 32570-NI) approved by the Board on August 4, 2005, which sought to promote growth and poverty reduction, specifically in rural Nicaragua where poverty was most severe. It was also closely aligned with the GoN's NDP, and aimed to further the Plan's objectives. The Bank was in a unique position to execute this Project as it built on the experience and groundwork of other World Bank operations, specifically the Project's predecessor, the first Agriculture Technology Project (PTA-I), but also the Sustainable Forestry Investment Promotion Project and the Atlantic Biological Corridor Project.

7. ***Preparation of PTA-II helped leverage additional donor funding under PRORURAL and provided a framework for donor and institutional coordination.*** During the preparation of PTA-II, the World Bank team seized the opportunity to leverage the PTA-II project preparation to secure additional funding for the sector and to coordinate sector institutions for a more efficient implementation across multiple donor projects. The total cost of PRORURAL was an estimated US\$411.5 million for the period 2005-09 (US\$83million/year), of which 50 percent would be financed with external grants and loans. What began as a US\$12 million dollar

PTA-II project, by appraisal managed to leverage an additional US\$37.1 million in pledges from Finland, Sweden and Switzerland towards the sector-wide PRORURAL³. PTA-II objectives were fully aligned with PRORURAL supporting its implementation through: (i) upgrading the quality of the GoN's fiduciary and safeguards systems; and (ii) providing financing elements previously financed under PTA-I.

8. ***The AF directly responded to GoN request to help mitigate the impacts of the 2007/2008 Global Food Price Crisis.*** At the time of the AF, the Global Food Crisis stressed national systems, and exposed shortages in certified seeds and shortcomings in the GoN's ability to support a dynamic NSS. The changes introduced by the AF were consistent with the FY08-FY12 Country Partnership Strategy (CPS) (Report 39637-NI, dated October 11, 2007) and aligned with the following strategic objectives: (i) reactivating the economy, stimulating productivity and competitiveness; and (ii) infrastructure and sustainable development. The AF was also integrated in the CPS Progress Report, then under preparation.

1.2 Original Project Development Objective (PDO) and Key Indicators

9. The Project Development Objective (PDO) in the original and AF credit agreements was to “*increase agricultural productivity by providing rural households and communities with broader access to sustainable agriculture, forestry and natural resource management service, technology and innovations, in line with the Recipient’s PRORURAL program*⁴.

10. The PAD states the key indicators as follows:

- INTA innovation technology portfolio increased by 42 validated technologies supporting export commodities, food safety and security, and environmental sustainability.
- At least 50 percent of farmers participating in agricultural and forestry extension services have adopted at least two new production and/or processing technologies.
- Productivity indices of participating farmers have increased on average by 15 percent.
- At least 80 percent of the Project stakeholders express satisfaction with the research and extension services received.
- Planning, Monitoring and Evaluation unit of MAGFOR is fully operational and producing regular reports.
- 100 percent of salaries and operating costs financed under the Project are paid with domestic resources by 2010.

1.3 Revised PDO and Key Indicators, and reasons/justification

11. The original PDO as stated in the legal agreements was not changed.

12. At the time of the AF (May 10th, 2010), one Intermediate Results Indicator was changed.

³ The financing gap was later raised from additional donors.

⁴ The PDO in the legal agreements differs slightly from the PAD version and the AF paper, which was to “*provide rural households and communities with broader access to sustainable agricultural, forestry and natural resource management services and innovations, thereby stimulating higher agricultural productivity.*” This ICR will examine the achievements of the PTA II against the PDO as included in the credit agreements.

Table 1: Changed Indicator:

Original Credit: Annual foundation and registered seed production of food grains exceeds 230 metric tons, while basic and registered vegetable, pasture and tuber seed production covers more than 230ha.	Additional Financing: Cumulative incremental production of genetic, foundation and registered basic grains seed reaches 1,166 metric tons (MTs) by end-project in AF areas.
	Additional Financing: Cumulative incremental production of certified basic grains seed reaches 4,852 MT by end-project in AF areas.

13. Five additional indicators were added:

- 1,200 producers specialized in Certified Seed production (10% Indigenous Population and 20% Women)
- 31 organizations have started to implement their Cooperative Development Plans (CDPs) within the context of this project.
- \$4,443,842.00 placed and \$3,984,149.00 returned for the production and processing of certified seed
- National Genetic Seed Center operating and with a storage capacity for foundation, genetic, and registered seed of at least 1806 MT.
- Upon project completion, 3,581 ha per year have been inspected for the production of certified seed.

1.4 Main Beneficiaries

14. **Original Credit:** The direct beneficiaries under Component I were the minimum of 50,400 small farmers (35,000 through INTA, 15,200 through FAT-FUNICA and 200 through INAFOR) who benefitted from technical assistance for the use and adoption of new technologies; extension services aimed to increase production; trainings in food processing and business; access to finance and links to productive markets; and better information on forestry and seeds. In addition, the Project aimed to benefit MAG, INTA and INAFOR through institutional strengthening and capacity building activities under Component II, specifically providing trainings, development of new systems, construction of infrastructure and support for salaries. The Project also targeted IPs across the country, but specifically in the North Atlantic Autonomous Region (RAAN) where the Project had three offices to provide public extension services designed to serve the indigenous groups in Waspan, Siuna and Rosita (Miskitos and Mayagnas). In addition, INTA was tasked with ensuring that 20 percent of all indigenous clients were women.

15. **Additional Financing:** The direct beneficiaries of the AF were the minimum of 1,200 small and medium producers (10 percent indigenous and 20 percent women) grouped into 31 seed growers organizations. These 1,200 farmers would be trained in agronomic techniques for the production of certified staple seed under Component I of the AF. In addition, 31 cooperatives would receive assistance to develop CDPs, helping them to increase their capacity, production of certified staple seed, and access to finance through *Banco Producamos* (BP) credit lines (Component II, AF). INTA/ National Center for Agricultural Research and Bio-technology (CNIAB) and MAG/General Directorate of Plant Safety and Seeds (DGPSA, later renamed Animal Sanitation and Protection Institute – IPSA) would benefit from institutional strengthening for the NSS; INTA/CNIAB would strengthen their capacity for the collection, preservation and use of genetic resources; and MAG/IPSA would enhance their seed certification capabilities. The AF also targeted IPs in the municipalities of Siuna, Rosita and Puerto Cabezas, selected due to their proximity to the activities of MAG and INTA, their level of community organization, and the ongoing reconstruction efforts after Hurricane Felix.

1.5 Original Components

16. ***Second Agricultural Technology Project:*** The original Project had two components intended to (i) enhance agricultural and technology innovation and adoption; and (ii) strengthen and modernize the institutions involved in PRORURAL. A detailed description of each component can be found in Annex 2.

17. ***Component I: Innovation and adoption of agricultural and forestry technology (US\$25 M, or 86.4 percent of total Project cost with IDA contribution of US\$9 M),*** sought to accelerate the generation and transfer of relevant technology, with an increased focus on marketing, competitiveness, sustainability and natural resources management. From the outset, INTA, INAFOR and FUNICA were the institutions in charge of providing services for the following sub-components: (i) agricultural research and development; (ii) technical assistance and extension services; (iii) foundation seed production and certification; (iv) post-harvest technical assistance and market development; (v) certification, training and dissemination activities; (vi) adoption and innovation of forest technology; and (vii) competitive grants for technical assistance and sustainable forest management.

18. ***Component II: Institutional modernization and strengthening (US\$3.9 M or 13.6 percent of total Project cost with IDA contribution of US\$3 M)*** aimed to finance improvements in the GoN's capacity to formulate sector policies and strategies and carry out the administrative and financial coordination needed to implement PRORURAL activities. Sub-components: (i) MAG Institutional Strengthening; (ii) INTA Institutional Strengthening; and (iii) INAFOR Institutional Strengthening. Importantly, MAG's capacity to formulate strategies, plans and programs and to implement administrative, procurement and financial management would be strengthened. MAG would also develop a financial monitoring and reporting system compatible with national budget procedures, and a Learning, Impact Evaluation and Monitoring System (SISEVA, for its Spanish acronym) to help harmonize and align donor financing.

1.6 Revised Components

19. ***Additional Financing (AF):*** The AF, approved on May 10th, 2010, introduced three additional components, summarized below (see also Annex 2):

20. ***Component AF-1: Capacity development for the production, organization and management of certified seeds enterprises (US\$1.73 M),*** comprised of two sub-components: (i) fostering certified seed production capacity, managed by INTA (US\$ 0.95M); and (ii) strengthening the organizational, managerial and marketing skills of seed cooperatives and producers' organizations, under the responsibility of the National Technological Institute, INATEC (US\$ 0.78M).

21. ***Component AF-2: Organization and establishment of a line of credit for the production, processing and marketing of certified seed (US\$3.51 M).*** During AF preparation, it was evident that financing for certified seed production was very limited. For various reasons (lack of collateral, transaction costs, sub-sector complexity, physical presence, etc.) commercial banks did not offer credit for seed production, which affected producer's access to inputs and thus their overall productivity. Component AF-2 intended to pioneer rural financing for seed production.

22. ***Component AF-3: Strengthening of public sector services within the National Seed System (US\$4.01 M).*** This component would help strengthen the NSS through two sub-components: (i) strengthening INTA's CNIAB, and (ii) strengthening the public sector Seed Certification Agency, DGPSA (renamed IPSA).

1.7 Other significant changes

23. ***Canada Trust Funding:***

- a) *Effectiveness of Trust Fund:* On June 28th, 2011, the Canadian Department of Foreign Affairs, Trade and Development Department provided a US\$2.05 million grant under its Canada Trust Fund (TF-99911) to support the National Institute of Development (INIDE) in the preparation of an Agricultural Census Database.
- b) *Restructuring of Trust Fund:* On September 26th, 2012 the original activities planned under this TF were completed and the TF was restructured to include two additional activities: (i) two post census studies; and (ii) the production and publication of dissemination materials on the Census. The new activities were intended to complement the broader series of post census thematic studies, the results of the Agricultural Public Expenditure Review (PER) carried out between 2011 and 2013(P127573) and the preparation of PRORURAL's mid-term independent evaluation.

24. ***Project Restructuring:***

- a) *September 1st, 2009:* to (i) reallocate proceeds of Credit No.4127-NI; and (ii) extend the closing date of the Credit until December 31, 2010, in order to ensure timely implementation of the activities.
- b) *May 10th, 2010:* Approval of IDA Grant H-537-NI (AF) for US\$10 M.
- c) *December 21th, 2010:* to (i) reallocate proceeds of Credit No.4127-NI; and (ii) extend the closing date of the Credit until December 31, 2013. This was necessary to address continued budgetary restrictions that impeded full execution.
- d) *February 28th, 2012:* The implementation arrangements were restructured due to a change in the financial sector. The AF was restructured to change the implementing agency for Component 1.C (b) of the Project: "The provision of sub credits to finance the carrying out of CDPs". The Implementing Institution was changed from the Rural Credit Fund (FCR for its Spanish acronym) to the newly created BP.
- e) *November 11th, 2013:* to (i) reallocate proceeds of Credit No. 4127-NI; and (ii) reallocate proceeds and extend the closing date of IDA Grant H-537-NI until June 30, 2014. This was necessary to: (a) disburse on the credit lines managed by BP; (b) disburse the US\$2M of works underway at INTA's research facilities; and (c) complete ongoing procurement processes under other components.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

25. ***Soundness of background analysis:*** The Project was prepared by a large and experienced team working in conjunction with MAG, and drew heavily on the lessons learned during the implementation of PTA-I. Mostly notably, the Project looked at the way that PTA-I evolved in technology development, institutional capacity building, and policy environment and dialogue. PTA-II incorporated PTA-I lessons specifically on the incorporation of technology throughout the value chain, and the addition of incentive

mechanisms to encourage the adoption of new technologies. It also incorporated lessons on the difficulty of working with cumbersome administrative processes, the need for harmonizing sector interventions and the importance of building an M&E system. Finally, in the constantly changing political environment, the Project also drew on lessons learned about the importance of a flexible communication strategy to ensure that the Project's work had transparency, and achieved support at the level of policy-makers and farmers.

26. ***Assessment of project design:*** The numerous lessons learned from the PTA-I project laid the groundwork for PTA-II and its AF, and were diligently embedded in the design of both projects. The PDO was well crafted and designed in line with the GoN's priorities, and remained unchanged for the AF. The PDO included alignment with PRORURAL as a key success factor, and this ensured the Project retained close association with PRORURAL objectives. In addition, the Results Framework (RF) was precise, and the indicators captured the most salient outputs related to each component. Indicators were aligned with activities and objectives under each component, and assigned specific implementing agencies responsibility for monitoring their relevant indicators. From inception, the Project also built M&E capacity of the relevant agencies, which further strengthened the Project's monitoring and reporting.

27. ***Implementing arrangements:*** The original Credit was designed to incorporate multiple implementing institutions across the agriculture sector: MAG was the major implementing institution and was expected to coordinate closely with INTA, INAFOR, and FUNICA⁵. The AF maintained MAG as the primary implementing institution, coordinating closely with INTA, INATEC and BP⁶. The arrangements were complex, and changed between original credit and the AF. These arrangements provided opportunities for the Project to improve capacity across several institutions, while also implying that Project success depended on effective, cross-sector coordination. This assumption was tenuous, but the project anticipated the risk and incorporated multiple instruments to ensure that this planned coordination occurred.

28. ***Project response to GoN urgent requests:*** Urgent Government requests arose in two instances during implementation and the Project design shifted to respond to both. In 2011, the National Agricultural Census was a strong priority for the GoN, but there was no funding to do it. The Project already had a significant role in the sector, and secured a trust fund from the Canadian government to implement the census. The trust fund design incorporated multiple partners, and the Project's role was to support data collection in the field. The second request was during the Global Food Price Crisis, and the Project responded with the development of the AF. Both responses demonstrated a foundation of strong partnership and a project design that allowed for flexibility to meet urgent Government needs.

29. ***Donor coordination under PRORURAL:*** At the time of the original Credit design, there were 17 international cooperation agencies supporting PRORURAL, and the GoN had signed a code of conduct with several (Japan, Switzerland, Sweden, Denmark, Finland, IICA, FAO, World Bank, IADB). PTA-II was designed to build capacity of agriculture sector institutions to implement PRORURAL, and its design provided for regular meetings and communication among donors, as well as joint supervision missions when relevant.

30. ***Design of a credit line for seed producers under the AF:*** The AF's line of rural credit for seed producers was designed to solve a major sector challenge: access to rural agricultural finance for seed

⁵ These Implementing Institutions are all included in Article III of the original credit legal agreement.

⁶ These Implementing Institutions are all included in Article III of the AF legal agreement.

producers. The AF's design pioneered a new credit product for seed producers executed by FCR (later changed to BP). The design of the AF was built on assumptions about the capacity of the seed producers to apply for credit, and ultimately overestimated their ability to do this within the AF's timeframe.

31. ***Linking seed production to markets under the AF:*** The AF provided training on certified seed production to boost productivity for enhanced food security and income. In part because it was designed in the context of the Global Food Price Crisis, it assumed a large market demand for certified seeds and prioritized seed production, but it was not strong on market linkages. While the design did include activities for training in marketing and business, this training proved insufficient for seed producers trying to access markets.

32. ***Risk assessment:*** The PAD rated the overall risk as “Moderate” and stated that as the Project was a follow-up to PTA-I, most risk factors were adequately addressed. The most relevant risks and corresponding mitigating measures are summarized below:

- a) ***Changes in Government administration could deemphasize PRORURAL:*** The PAD highlighted the risk that a change in Government administration would also bring about changes in development priorities and ultimately affect the relevance of PRORURAL’s objectives. The team mitigated this risk through an ongoing dialogue with the GoN to ensure that project priorities remained valid. When the Administration changed in 2007 and Daniel Ortega took office the relevance of PRORURAL and its development objectives was re-emphasized and scaled-up to lay the groundwork for what would later (2010) become the larger PRORURAL-*Incluyente* (PRORURAL-Inclusive). This was a relevant accomplishment for the sector and meant that PTA-II remained aligned with Government priorities.
- b) ***Capacity of MAG to coordinate implementation arrangements and fulfill its mandate.*** Because MAG was the primary implementing institution for PTA-II, there was concern over the institution’s capacity to coordinate other institutions and donors to achieve the Project’s results. Specific concerns included the lack of qualified staff and the potential failure to launch an M&E system. The Project put mitigation measures in place to safeguard against these risks, including: a) increased support to MAG to streamline coordination; b) close coordination with PRORURAL donors to provide training to increase MAG’s capacity over time; and c) close follow-up and supervision of MAG’s activities to establish M&E and integrated financial systems.
- c) ***Complexity of institutional implementation arrangements:*** Because implementation arrangements spanned across several Government institutions, there was a risk that the division of responsibilities of too complex and could result in overlaps and duplication of roles. The Project sought to mitigate these risks through close collaboration among implementing agencies and building systems (like SISEVA) that allowed for a more systematic approach. In spite of these efforts, inter-institutional coordination did prove a challenging aspect of the Project, causing delays in implementation, particularly at the early stages in Project implementation.
- d) ***Restructuring of the agriculture public sector:*** The AF also faced risks, the largest being the on-going restructuring of the agricultural public sector at the time and the establishment of a new bank, BP, taking over FCR’s portfolio. The AF took action to mitigate these risks by: (i) including language in the Grant Agreement that would require the GoN to retain essential managerial and technical staff assigned to the proposed AF; and (ii) including a covenant in the Grant Agreement, stating that in the case of FCR’s absorption into a State-owned development bank, the World Bank would review the impact of such takeover and recommend appropriate actions. Ultimately, the transition meant the legal agreement needed to be amended, contingent on establishing that BP was able to take over the

implementation and financial role of FCR. After a comprehensive and lengthy legal and operational assessment, BP was formally permitted to take the role of the FCR and become the implementing institution of the AF's credit line. Ultimately, the mitigation measures facilitated the amendment of the legal agreement, but the change process itself delayed AF effectiveness by over a year.

2.2 Implementation

33. Implementation progress was Satisfactory from 2006 to 2010, became Moderately Satisfactory from mid-2010 to 2013, and was upgraded to Satisfactory in the final ISR. Despite institutional weaknesses and changes in sector policy during implementation, the strong coordination and good supervision led to the achievement of the PDO and intermediate results by both the original Credit and the AF, which ultimately contributed to substantial change in rural Nicaragua.

Several factors positively impacted implementation:

34. ***Continued Government support of the sector:*** Through the joint conception of the PRORURAL Program, the Bank and GoN built a strong platform to support the agriculture sector. This support continued with the change of Government Administration in Nicaragua in 2007 and advent of the more comprehensive PRORURAL-Incluyente in 2010. GoN's strong support for sector change helped PTA-II to achieve its PDO, and demonstrated ongoing national commitment to coordination and capacity building within the sector.

35. ***Donor coordination under PRORURAL:*** Following PTA-II effectiveness, the World Bank team led coordination efforts with other donors, helping to align efforts under PRORURAL. The World Bank teams planned joint supervision missions with other donors to supervise PRORURAL, promoting coherence and alignment among donors and strengthening the management capacity of the Government. Donor coordination proved especially useful in the development of INAFOR's forest inventory. When World Bank procurement rules complicated the acquisition of services needed to develop the inventory (an intermediate project indicator), the activity was funded by PRORURAL's Common Fund (*Fondo Comun*), and the PTA-II funding was used for institutional strengthening of INAFOR. The AF also promoted donor coordination to support GoN's efforts to establish a NSS, including €10.5M European Commission funding for a seed production and processing project, and a US\$2.7M Spanish Government/FAO project to strengthen the National Basic Grain Production Strategy for Food Security in Nicaragua. Although coordination of the seed program proved challenging given the different donors and number of activities, donor coordination contributed positively to the implementation of PTA-II and strengthened PRORURAL overall.

36. ***Capacity building and strengthening of MAG:*** There was initial concern over the leverage and capacity of MAG to execute the Project. However, the experience gained coordinating the implementing institutions, developing SISEVA, and coordinating the PRORURAL program helped MAG grow in its ability to lead the sector. In the final years of Project/AF implementation, MAG had put in place a financial management system, had extensively reviewed the safeguard policies, and had improved the ratio of technical staff in the relevant agencies such that implementation was improved. Even in the face of staff turnover, these systems and mechanisms allowed for continuity and MAG retained the capacity built by the Project.

Despite overall positive results, several factors adversely impacted Project implementation:

37. ***Seed producer organizations and credit line:*** One of the key factors that affected PTA II-AF implementation was the methodology used for the selection of beneficiary seed producer organizations. During Project preparation, cooperatives which had been deemed eligible to access credit, proved not to have strong capacity, thus representing an important lending risk for BP and causing credit delays. This resulted in time-consuming reforms of the Operations Manual, mainly to ease collateral requirements. Additionally, many of the pre-selected organizations did not meet the expected legal, administrative and technical requirements to be considered credit worthy and able to implement certified seed production activities.

38. For the cooperatives that did qualify, to minimize the risks of granting them credit, each approved credit was designed to disburse in three tranches. In May, 2014, with the AF closing date approaching, there were 13 credits still not fully disbursed. GoN requested and received the Bank's No Objection to continue to disburse the remaining tranches of these 13 credits into the grace period. At the closing of the credit, many cooperative groups, largely located in areas with little irrigation, were concerned about the impact of the 2014 drought affecting all of Central America, while BP was concerned that the cooperatives would not request the remaining tranches of the approved credit. However, as of September 30th, 2014 all approved credit tranches had been disbursed and at the time of ICR conclusion, BP was collecting payments from those cooperatives.

39. ***Elimination of FUNICA from the AF:*** Under the original Credit, FUNICA, a public/private organization with ties to academia and a track record of providing strong services, administered the competitive funds for technical assistance under Component I. Activities managed by FUNICA were some of the most advanced at the time of AF preparation and FUNICA was originally included in AF design. However, since GoN wanted only public sector entities as implementing agencies, FUNICA was ultimately removed from the design of the AF. Its earmarked activities - the capacity building and financial and marketing skills of seed cooperatives - were transferred to another institution (INATEC) with no experience in such activities. This impacted on the AF in two primary ways:

- ***Seed Cooperatives Accessing Credit:*** The design of the AF had foreseen the challenges related to seed cooperatives accessing credit, and had included a capacity building component to strengthen cooperatives. However, since INATEC lacked FUNICA's specific skills, capacity building for the cooperatives did not go as planned, and did not mitigate the defined risk as intended.
- ***Seed Cooperatives Accessing Markets:*** The AF was prepared at the time of the Global Food Price Crisis when there was a deficit of seed, and specifically bean seed. At the time, Nicaragua was the largest supplier of basic grains to Central America, and the AF assumed that the seed produced would be sold into the market. A market did ultimately emerge (and actually grew due to increasing demand from Venezuela for Nicaragua basic grains) with small farmers meeting challenges connecting to the market. Feedback during stakeholder workshops suggested that farmers needed more technical assistance to gain access to local and export markets, as well as better price information. The AF anticipated and planned for some of these issues but due to the weakness of INATEC, implementation and outcomes were not as strong as originally planned.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

40. ***M&E design:*** The RF (detailed in Annex 3 of the PAD) was well designed: each of the indicators was directly linked to a Project outcome, adequately measured progress towards the overall PDO, and the

framework succeeded in measuring the direct outcomes of the Project. The original Project's M&E plan included the following actions:

- a) Creation of a centralized M&E system for the PRORURAL program –SISEVA;
- b) A Planning, Strategy and Rural Development Unit at MAG that would be responsible for managing SISEVA, which would track indicators included in PTA-II's RF, as well as other indicators relevant to PRORURAL;
- c) A plan for each implementing institution to monitor qualitative and quantitative indicators, while MAG's M&E unit would provide overall analysis and summary reports; and
- d) An impact evaluation led by an independent agency to assess overall Project implementation, process, outcomes and impact.

41. ***Implementation and use:***

- *SISEVA*: In 2010, MAG led the contracting, design and development of SISEVA, and designed project indicators and associated monitoring tools. At the time of the AF, a monitoring module was designed specifically for tracking seed certification. The system not only improved coordination and monitoring activities within PTA-II and PRORURAL, it also helped to modernize overall agriculture sector planning and monitoring. At the time of this ICR the system was widely used by PRORURAL-*Incluyente* and was evolving to reflect recent adjustments to the program regarding the updated NDP.

- *Impact Evaluation*: In 2013 an independent impact evaluation examined project process, outcomes and impact of PTA-II. This impact evaluation serves as an important basis for the development of future projects. Results of this exercise are summarized in section 3.2 “Achievement of Program Development Objective”, and an overall summary is included in Annex 5.

2.4 Safeguard and Fiduciary Compliance

42. ***Safeguards compliance:*** The Project was classified as Category B, and triggered the following policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Pest Management (OP/BP 4.09); and Indigenous Peoples (OP/BP 4.10).

43. ***Environmental Safeguards:*** Overall, Environmental Safeguard compliance throughout the Project was rated “Satisfactory” by the Bank Safeguards specialist. As noted in the January and June 2014 Aide Memoires (AMs), the Project did not have any major negative environmental impacts and no evidence was seen of any indirect environmental harm caused by Project activities. In fact, the Project created positive environmental externalities: good environmental and land conservation practices were implemented and Integrated Crop Management and Integrated Pest Management systems were put in place for adequate pest control. The single environmental issue present during the Project was the lack of proper disposal of the plastic containers for pesticides. This risk was ultimately mitigated through training programs for the cooperatives on proper disposal, and putting systems in place at the municipal level.

44. ***Social Safeguards:*** The final ISR rating on safeguards was “Satisfactory”. No specific management actions relating to this Safeguard Policy were identified by any World Bank mission. The PTA-II involved the preparation of a simplified Indigenous Peoples Development Plan (IPDP), carrying out social assessments and

consultations, and preparing an IP Participation Plan, all of which were consistent with Safeguard Policy OP4.10.

45. **Procurement:** The final ISR rates the management of procurement processes as “Moderately Satisfactory.” Three ex-post procurement reviews were conducted during Project implementation (2012, 2013 and 2014). The ex-post reports and the supervision missions’ Aide Memoires included recommendations that helped improve the management of procurement processes, including: (i) preparation and monitoring of the Procurement Plan in the Bank’s Procurement Plan Management System (SEPA); (ii) consideration of the Procurement Special Provisions, included in the Loan Agreement, to avoid procedures incompatible with Bank Guidelines; (iii) avoiding the inclusion of requirements not specified in the Bank Guidelines to the bidding documents; and (iv) continued training of procurement staff. These recommendations were included in the action plans of the ex-post reports which were monitored during Project implementation. No fraud and corruption issues were found during project execution, but weaknesses in coordination between technical and procurement teams, as well as to contracts management persisted throughout project implementation.

46. **Financial Management (FM):** The final ISR rated FM as “Moderately Satisfactory”. During the life of the Project, the implementing agencies demonstrated an inconsistent FM performance, largely due to two factors: (i) lack of adequate inter-agency coordination; and (ii) the challenges MAG faced in getting timely and reliable information from the other implementing agencies, and its lack of a legal mandate to demand this information. All of the audits carried out during the life of the Project were clean, but both auditors and supervisors detected administrative weaknesses in the internal control system. In general, implementing agencies were slow to comply with audit recommendations, and required much supervision and support. In addition, there were issues with disbursements following the Project’s budget and timeline, and MAG was not proactive in streamlining processes to budget for timely implementation of activities. To improve this situation, MAG hired an accountant to help consolidate budget reporting from the implementing agencies. The penultimate ISR rating improved from MU to MS, reflecting timely submission of financial management reports, broad compliance with FM action plans and improved asset control. However, contracting of the final project audit was delayed and the audit report was submitted to the Bank four months overdue. At the time of ICR finalization, this audit was still under review.

2.5 Post-completion Operation and Next Phase

47. **BP credit line for seed producers:** An important post-completion effort involved ensuring the total allocation of the AF’s line of credit described above. Between May and June 2014, the World Bank agreed that the final disbursement under the AF’s credit line would be transferred to beneficiary cooperatives from July-September 2014. As of September, 2014, all such credit funding had been allocated, and in October and November, 2014, BP had started collecting payments on those credits. As of November 30th, 2014, BP had a total of outstanding credits of approximately US\$1.8 M, with a repaid amount of US\$803,000 and a default rate of 23.26 percent. The line of revolving credit was designed to be self-sustaining, and BP will continue providing seed producers credit after project completion.

48. **Follow-on operation - Nicaragua Caribbean Coast Food Security Project.** Important gains were made under PTA-II, but despite this, critical gaps in productivity and market linkages remain in rural Nicaragua. The above project, under development since November, 2014, is a Global Agriculture and Food Security Program (GAFSP) operation intended to scale up PTA-II activities by supporting the links between

markets and smallholder producers in the Caribbean coast region (particularly indigenous and Afro-descendant farmers), and strengthening value chains.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

49. ***The Project Development Objective was and remains highly relevant and continues to be aligned with the NHDP and the PRORURAL-I platform.*** Agriculture continues to be a top Government priority as emphasized in the National Human Development Plan (NHDP) 2012-2016. Within the NHDP, PRORURAL-I, continues to define the agriculture sector's food security framework, and continues to focus on activities supported under PTA-II, such as: (i) continued capital asset formation through a combination of grants and loans to strengthen production capacity; (ii) technical assistance to build human capital; (iii) agricultural services, and organizational support; and (iv) links with other programs to improve rural livelihoods, increase food availability, and reduce malnutrition and poverty. The PDO was highly relevant when designed, remained unchanged through the AF, and continues to reflect sector priorities. The RF indicators were well aligned with the PDO, and succeeded in measuring results.

50. ***The project design and implementation strategy remains relevant, aligned with the FY13-FY17 CPS and is considered in new projects.*** Agriculture remains one of the main drivers of economic growth in Nicaragua, representing 21.5 percent of GDP, contributing to 32.3 percent of all exports and employing more than 30 percent of the labor force (more than twice the average of 15 percent for the region.) However, low productivity remains a challenge for both exports and food security.

- *Design:* The CPS recognizes opportunities for transformation that highlight the successes under the PTA-II project, including: technological innovation, business development services, and increasing access to rural finance services. PTA-II design proved to meet a crucial need in the agriculture sector, through a dual strategy: targeting small producers while simultaneously strengthening public sector institutions.

- *Implementation:* The CPS also highlighted the possibility for transformation by extending extension services complemented by innovations, as was done under PTA-II implementation. The Project's implementation strategy met some challenges, specifically related to the capacity of institutions, but this was mitigated over time through simultaneous capacity building under the original Credit and the AF. The preparation of new projects also incorporates these elements. Specifically, the GAFSP project under preparation (December 2014) will scale-up PTA-II activities to the Caribbean coast reflecting the PTA-II design and implementation strategy.

3.2 Achievement of Program Development Objective

51. ***The PDO has been substantially achieved.*** By the end of the Project, PTA II had achieved its PDO and increased agricultural productivity by providing rural households and communities broader access to services, technology and innovations, in line with the GoN's PRORURAL program. An Impact Evaluation completed in 2013 by Cabal, S.A (hereafter abbreviated "2013 IE") and surveys conducted by INTA in 2013 both independently confirm the significant impacts of the Project on productivity, incomes and increased

access to services. A description of the methodology used and a full summary of the 2013 IE and 2013 INTA surveys can be found in Annex 6.

52. ***Increase in agricultural productivity:*** Project interventions helped farmers to increase their productivity and incomes. The Project increased average annual seed availability to 369 MT per year (surpassing target production of 230 MT per year) and increased the number of ha dedicated to the production of basic and registered vegetables and tubers to 230 ha (achieving the target). In addition, the cumulative incremental seed production was increased from 1,806 MT at baseline to 4,728 MT by the time of preparation of the ICR (against a target of 4,852 MT). The 2013 INTA surveys showed an overall average increase of productivity of 16 percent, broken down by average increases in productivity of maize (15 percent), bean (18 percent) and rice (14 percent over national average). However, several varieties out-performed the others, yielding up to a 66 percent increase in maize (with INTA H-991), a 108 percent increase in beans (INTA Pueblo Nuevo) and an 80 percent increase in rice (INTA Dorado e INTA N-1.) The 2013 IE found that PTA-II beneficiaries, on average, produce more per area than non-PTA-II beneficiaries, noting that farmers participating in the Project had a productivity index of 60 percent higher (for beans, rice and maize) than those not benefitting from the Project. The 2013 IE also found that PTA-II beneficiaries increased the number of crops planted (81 percent plan more than two crops, versus only 74 percent of the control group), thereby diversifying income sources. Incomes have also increased. The 2013 IE showed that the average annual gross incomes of PTA-II beneficiaries were 43 percent higher than those of non-participating producers.

53. ***Increased access to technology and innovation:*** Technology development was a key contributor to increasing agricultural productivity under PTA-II. INTA's Research and Development Unit performed beyond expectation, validating 59 new technologies that helped farmers to be more productive. The Project focused on the quality and relevance of the technologies adopted, and helped to raise awareness on the importance of improved, quality technology throughout the value chain. The Project made important efforts to ensure that all sectors of the community, including women and indigenous people, benefitted from new technologies and were able to access appropriate extension services.

54. At Project closing, 95 percent of farmers had adopted at least two technologies. Overall, 33,250 farmers participated in agriculture and forestry extension services and adopted at least two new technologies, against an original target of 25,200 farmers. The most widely adopted technologies were integrated crop management (81 percent), environmental management practices (70 percent), varieties and hybrids (67 percent) and post-harvest practices (49 percent) (INTA, 2013). The 2013 IE found that beneficiary farmers of PTA-II were three times more likely to have incorporated technology than the control group. In addition, beneficiary farmers received significantly more technical assistance than non-beneficiary farmers (88.2 percent versus 23.5 percent) and more training (61.8 percent versus 17.6 percent).

55. The impact of this increased access to technology was evident on family farms, specifically in diversification of crops, more animals, more farm tools and better farm management, all of which contributed to increased productivity. Nearly all farmers included under PTA-II had introduced technological innovation in the production of corn and beans, primarily in soil preparation (47 percent), seeding and / or transplantation (12.7 percent), fertilization (11.9 percent), control of pests and diseases (7.1 percent) and soil conservation works and water (6.5 percent). According to the 2013 IE, none of the farmers under the Project used burning as a soil management technique, as compared to 20 percent in the control group. These differences are similar for other technologies, including: use of certified seed, fertilizers, control of pest and disease and post-harvest

handling. The Project also helped identify 160 new forestry seed sources (against a target of 125) and provided farmers access to them. In a 2013 satisfaction survey conducted by INTA, the majority of producers expressed their satisfaction with the technological changes under the Project (82 percent, against an 80 percent target).

56. ***Increased access to services:*** The Project overall increased access to broader services, including technical assistance and training, laboratory facilities, seed production and storage capacity, and forestry management, all in coordination with PRORURAL. Some key services strengthened were as follows:

- ***Technical assistance and training:*** The Project offered targeted training, technical assistance and capacity building, all geared towards boosting productivity. The original credit provided 70,806 producers with technical assistance. This included: 11 producer organizations trained by INTA to provide extension services in their regions (surpassing a target of seven); 3,204 producers trained in food processing and/or business administration (surpassing the target of 2,500); and 38 percent of organizations supported by FAT-FUNICA who did not have access to finance and are now linked to productive markets (surpassing a target of 30 percent). In addition, the AF provided training to 1,435 producers (against a target of 1,200) for the production of certified seeds and provided assistance to 41 seed producer organizations to develop managerial skills of new seed enterprises and implement CDPs (surpassing the target of 31 producer groups.)
- ***Forest management services:*** The Project collaborated with FAO under PRORURAL to support the development of the forest inventory. Ultimately, the funding for the INAFOR forest inventory came from FAO and funding from the PTA-II project was used to conduct institutional strengthening of INAFOR. This partnership demonstrated the intended donor coordination under PRORURAL.
- ***Laboratories and infrastructure for storage, processing and analysis of seed quality:*** The AF, in collaboration with other donors under PRORURAL, strengthened public services within the NSS and built laboratories in intervention areas to certify the quality of basic grains and seeds, providing producers better access to these services. In addition, the Project constructed infrastructure for the storage of genetic material, processing and analysis of seed quality of basic grains.
- ***Seed certification and storage capacity:*** At Appraisal, the National Genetic Seed Center (CGS) had virtually no operating storage capacity, but by project end the AF investment had helped increase storage capacity to 1,806 metric tons. Seed storage capacity benefits all producers, helping them maintain inventory even in the face of climatological events that can suddenly deplete seed storage and threaten food security. In addition, the Project provided training and technical assistance to qualify 1,435 producers in certified seed production (surpassing a target of 1,200.)
- ***Credit line with BP:*** At the time of the AF, rural financing for seed production was very limited and there were few precedents for providing small-scale financing to producer groups. The AF, through BP, extended credit to seed producer cooperatives, totaling approximately US\$2.6 million dollars. This credit was the first of its kind and marked a first step in provision of finance to small producers.

57. ***Institutional strengthening and capacity building:*** To facilitate increased access to services and innovations and achieve the PDO it was necessary to build capacity both within the Project implementing agencies, as well as within producer organizations themselves. A major achievement of the PTA-II project was to strengthen its implementing institutions and beneficiary organizations, especially their capacity to

collaborate across institutions and donors under PRORURAL. The Project successfully strengthened MAG, INTA, INAFOR, INATEC, FUNICA, and BP. This included new systems (M&E, financial, environmental), staff training and capacity building, and program staff salaries incorporated into the fiscal payroll.

58. ***Overachievement of targets:*** In addition to substantially achieving the PDO, the Project also significantly exceeded all of its Outcome Indicators, and met or exceeded nearly all of the Results Indicators. This was due in part to the extension of the closing date of the Project, which allowed Project results to be realized and measured before closing. Institutional strengthening also played a role in the overachievement of targets. Implementing institutions that at Project Appraisal demonstrated little capacity, gained it over the course of implementation of the Project, thus increasing their potential for impact in the sector.

3.3 Efficiency

59. ***An economic and financial analysis was performed to evaluate the economic efficiency of the Project through a cost-benefit analysis, using actual project outputs and costs.*** The analysis used data from Project monitoring reports, from the final impact evaluation conducted in 2013 and from data collected during the predecessor project, PTA-I. The assessment also compared the Net Present Value (NPV) and Internal Economic Rate of Return (IERR) to the estimates done at the appraisal of PTA II. This analysis uses the same cost-benefit analysis as the ex-ante analysis, with some adjustments to methodology as described in Annex 4.

60. ***Summary results of the economic and financial analysis:***

- a) Calculated actual IERR of the Project (using the cost of the IDA grant and credit US\$22.5 million) was 43.2 percent;
- b) The marginal contribution of the extension component, based on the production value of maize and beans, was estimated to be US\$45.7 million;
- c) The marginal contribution of the seed production program, based on production value, was estimated to be US\$ 2.1 million
- d) The estimated NPV of the Project (2006-2014) was 14.8 million, discounted at a rate of 8 percent (MHCP, 2012).

61. ***Both the IERR and the NPV values are significantly higher than estimated at appraisal.*** At appraisal, the ERR was estimated to be 17 percent, with an estimated NPV (with 12 percent as the social discount rate) of US\$51.9 million. Ex-post discounted net economic benefits are more than double what was estimated at appraisal. This difference is largely explained by two factors: 1) the difference in discount rate between the PAD (12 percent) and the 2011 official rate of 8 percent, and 2) the Project's performance surpassing many of the expected targets, specifically extension services, where 24.5 percent more farmers received benefits than what was anticipated in the ex-ante analysis. In addition, the Project surpassed nearly all indicators while spending 14 percent less than projected at Appraisal (US\$34.58M versus US\$40.25M).

3.4 Justification of Overall Outcome Rating

Rating: Satisfactory

62. The overall outcome rating of Satisfactory is based on the Satisfactory achievement of the following:

- *PDO achievement:* Substantial. The project achieved the PDO, based on data from ISRs, Government reporting, and the 2013 Impact Evaluation. All outcome indicators and nearly all intermediate indicators were met or exceeded.
- *Relevance of objectives, design and implementation:* High Relevance. The Project's objectives, design and methodology were highly relevant, and have continued to be relevant to the sector, as evidenced by: a) its continued alignment with PRORURAL, the NHDP and the FY13-FY17 CPS for Nicaragua; b) the fact that other projects under development build on PTA-II and expand PRORURAL's activities; and c) strong Government commitment, adequate inter-institutional coordination, and significant additional resources leveraged under the PRORURAL platform.
- *Efficiency:* Satisfactory. Good indicators of economic and fiscal efficiency and sustainability of project impact.

3.5 Overarching Themes, Other Outcomes and Impacts

63. ***Gender:*** PTA-II incorporated and updated INTA's gender policy and strategy, which was then implemented across MAGFOR, INTA and INAFOR. INTA recognized that women as producers needed agricultural technology adapted to their specific constraints, and applied this gender approach to all extension services. Throughout the Project, women were involved in decision-making about production activities, management of natural resources and in food, fruit and dairy processing and other market-related activities. The Project surpassed the target indicator of 20 percent of women producers specializing in certified seed production and by the end of the Project, 37 percent of the Project's total beneficiaries were women.

64. ***Indigenous Peoples (IPs):*** The Project undertook special measures to ensure the participation of IP in project components. Measures included: (i) strengthening INTA's regional offices by contracting more agricultural technicians and extension agents locally and making TA accessible to IPs; (ii) use of bilingual radio stations and materials in native languages as a part of the promotional effort, and participation in community festivals and fairs as part of the awareness strategy; (iii) training and disseminating information in indigenous languages; and (iv) increasing emphasis on research, development and dissemination of improved sustainable indigenous technologies. In addition, specific measures were put in place to ensure that IPs were included in extension services and the credit line. Specifically, BP's eligibility criteria took into account cultural and organizational aspects of producers from indigenous territories. In the case of communal property, BP assessed the credit eligibility criteria to adapt them to cultural customs and traditions. In addition, BP assigned a professional to the indigenous project area to follow-up on activities and to promote access to financial services in indigenous communities. This ultimately resulted in indigenous cooperatives receiving credit lines from the Project.

65. ***Institutional Change/Strengthening:*** PTA-II activities strengthened the implementing institutions capacity to implement not only the activities under PTA-II, but also the activities under the broader PRORURAL agenda. PTA-II helped the institutions increase the ratios between technical and non-technical staff⁷ and supported the incorporation of staff paid by the Project, meeting the target of 100 percent of Project staff of MAG and INTA paid through fiscal payroll of the Ministry of Finance. In addition, the development

of the coordinated SISEVA system was one of the strongest contributions of the PTA-II project to PRORURAL, allowing for coordinated monitoring activities across institutions.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

66. ***Stakeholder and beneficiary workshops:*** In September 2014, two months after project closing, the Bank team conducted stakeholder and beneficiary workshops in Managua and Jinotega, respectively. The stakeholder workshop included all of the participating implementation agencies, and the beneficiary workshop included farmers who benefitted from farmer field schools, credit lines and PTA-II technical assistance. The beneficiary workshops provided the Bank team with a clear indication of the Project's impact, both at the institutional level and at field-farmer level. The participants from stakeholder institutions clearly expressed the value of the institutional capacity building under PTA-II in strengthening their respective services. They also highlighted the Project's importance in increasing their available technologies and extension. In addition, they emphasized how the increased availability of infrastructure for certified seed analysis, processing and storage was a key element for increasing basic grain productivity.

67. ***BP Credit Line:*** Stakeholders specifically mentioned the positive impact of the available credit line with BP under the AF. The impact was threefold. First, it allowed BP to become an active lender in the certified seed sub-sector. Second, it provided competitive lending conditions to producer groups who had previously not been incorporated into the formal financial sector. Third, it provided seed producers with a revolving financing mechanism that could reach other farmers interested in growing, processing and commercializing certified seeds.

68. ***Seed commercialization remains a challenge:*** Despite these institutional improvements, the beneficiary workshop highlighted that certified seed commercialization continues to be a challenge for them. Even after Project interventions, cooperatives lack robust storage capacities, which ultimately leads them to an immediate liquidation of production volumes. This leaves the organizations with little negotiating capacity with a market that has more leverage and control for establishing prices. Based on this feedback from beneficiaries, and looking into the future, this could be ameliorated by allowing the revolving credit line to finance cooperatives with seed collecting capital and/or storage facilities that can anticipate better prices. A full detailed description of the feedback from the Institutional and Beneficiary Stakeholder workshops can be found in Annex 8.

4. Assessment of Risk to Development Outcome

Rating: Moderate

69. ***Sustainability of outcomes:*** The risk to development outcome is rated "Moderate" considering the GoN has a long-term vision for sustaining the priorities in the sector. In addition, there are several factors contributing to the sustainability of outcomes under the original Credit: (i) increased donor coordination and institutional coordination across the sector under the PRORURAL-I platform; (ii) increased technical and operational capacity of the institutions in the sector to better manage their programs, including improved systems, manuals and technical training; and (iii) new technologies adopted under the Project will continue to bolster production capacity of small farmers even after Project closing. The factors contributing to sustainability under the AF are twofold: 1) capacity building support provided to seed cooperatives and their

CDPs, which provide guides for continued development; and 2) the ongoing implementation of the revolving fund for seed credit.

70. ***Remaining risks:*** Although multiple mechanisms were put in place for the continued sustainability of Project outcomes, some of them still face risks, specifically: (i) the rotating credit fund under BP and guaranteeing their continued ability to provide credit to seed cooperatives; and, (ii) seed cooperatives still face challenges to access seed markets to commercialize their seed products.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Moderately Satisfactory

71. ***The PDO was aligned with the World Bank's FY08-FY12 CPS for Nicaragua and with the country's NDP, and the original Project design built on lessons learned from PTA-I.*** The Project also contributed to, and benefitted from, the strength of the GoN's PRORURAL platform. The RF was well aligned with the PDO, and aptly measured project outputs and results. The institutional arrangements for implementation were complex, but this ultimately led to better sector-wide coordination and capacity building of the implementing institutions, and the positive impacts of these arrangements prevailed.

72. ***The AF was well designed and built on the success of the certified seed activity under the original Credit.*** However, the effectiveness of the AF had to be delayed due to two foreseen, but underestimated factors:

- ***The change from FCR to BP.*** As mentioned in Section 2.1, the AF underestimated the risk of this change in the financial sector. As a result of the change, the legal agreement of the AF needed to be amended before it became effective, contingent on BP's ability to take over the implementation and financial role of FCR. After a lengthy and comprehensive legal and operational assessment by the World Bank team, BP was formally permitted to take the role of the FCR and become the implementing institution of the credit line included in the AF.
- ***Application of World Bank policies.*** At the time of the AF, the World Bank required the application of OP8.30, which governed loans available to Financial Intermediaries and carried requirements about what could be loaned to farmers, and how. The background research to inform how this policy would be applied proved cumbersome, and further delayed the signing and effectiveness of the AF. More on this issue can be found in Annex III of the AF Restructuring paper.

73. As a result of the delay in signing and effectiveness of the AF described above, ensuring Quality at Entry is rated "Moderately Satisfactory".

(b) Quality of Supervision

Rating: Satisfactory

74. ***World Bank supervision missions were conducted every six months, were appropriately staffed with key specialists and provided essential and targeted advice and observations, as evidenced by the AMs.*** The

World Bank teams responded adequately to issues as they arose. The disbursement and FM teams were heavily involved in implementation and conducted extra trainings with the GoN teams, particularly during the supervision of the AF. The Procurement team joined supervision missions, and was actively involved throughout implementation. In addition, the Procurement team supervised the preparation of all tenders (worth over US\$5M) before the preparation of the AF, so that upon effectiveness proceeds could be disbursed swiftly. The social safeguards were continuously supervised, especially given the activities built to reach indigenous populations. In addition, the multiple, well-timed restructurings succeeded in addressing bottlenecks and obstacles, and were a testament to the responsiveness of the World Bank team.

(c) Justification of Rating for Overall Bank Performance

Rating: *Satisfactory*

75. Overall, the Project was aligned with Government priorities and designed to satisfy specific and urgent needs in the sector. While it was designed with a level of complexity that made implementation and supervision difficult, World Bank teams worked together to ensure that obstacles were adequately addressed, and provided continued assistance through supervision activities. The World Bank's performance was rated Moderately Satisfactory for ensuring Quality at Entry and Satisfactory for the general task of supervision. Given that the Outcome/Achievement of the PDO is rated Satisfactory, overall World Bank performance rating is Satisfactory.

5.2 Borrower Performance

(a) Government Performance

Rating: *Satisfactory*

76. ***The Government's performance is rated Satisfactory based on its sustained commitment to the PTA-II PDO achievement and continued support to the sector objectives under PRORURAL Incluyente.*** Although the Project experienced some delays due to institutional reforms, specifically in the financial sector, and the AF experienced some weakness in implementing institutions due to the exclusion of FUNICA, the Governments' overall commitment boosted implementation performance. Its further commitment to the AF in the face of the Global Food Price Crisis demonstrated the depth of its commitment to the objectives and the needs of the sector. The Borrower ultimately provided only 45 percent of what was promised at Appraisal in counterpart funding (US\$3.25 vs. US\$7.25M), but despite this, succeeded in meeting Project Objectives.

(b) Implementing Agencies Performance⁸

Rating: *Moderately Satisfactory*

77. **MAG:** *Satisfactory.* MAG's position as leading institution within the agreed implementation arrangements posed difficulties, specifically monitoring and collecting financial information about Project activities from other implementing institutions, and due to this the Project experienced delays at several points during implementation. However, MAG's overall Project management improved during the last stage of implementation and overall coordination was strengthened.

⁸ Assessed against the implementing agencies as specified in the legal agreement

78. **INTA:** *Satisfactory.* Overall, INTA was successful in accomplishing its role of delivering basic and registered seeds to producers and contributing to the introduction of new technologies. Over the course of the Project, INTA surpassed its targets, and supported nearly 70,000 farmers with technical assistance.

79. **BANCO PRODUZCAMOS:** *Moderately Satisfactory.* Through the Project, BP enhanced its capacity for inter-institutional coordination, and continues to leverage this for continued lending to the sector. Because BP was newly created, the learning curve was steep, and credits to seed cooperatives were disbursed slowly due to low capacity within the seed cooperatives and BP's lack of experience. At the time of writing of this ICR, BP was collecting funds and had recuperated a total of US\$803,000 (against a target of US\$4M).

80. **INAFOR:** *Satisfactory.* Early in the Project many of INAFOR's activities were significantly delayed, and the World Bank team required INAFOR to provide specific update reports prior to the Midterm Review (MTR). However, after the MTR implementation improved and INAFOR activities brought important technical knowledge to the forestry sector, specifically through the publication of technical manuals. It ultimately surpassed its goal of approval of Forest Management plans to achieve 880 percent of the target.

81. **FUNICA:** *Satisfactory.* FUNICA provided matching grants to fund technical assistance and extension proposals, and did so through a private sector approach. The overall performance of FUNICA was solid throughout the implementation stage.

82. **INATEC:** *Moderately Unsatisfactory.* INATEC replaced FUNICA in the AF to conduct financial and marketing trainings with seed cooperatives. However, INATEC did not have the initial capacity to carry out these activities, and although its personnel received capacity building trainings during the implementation of the AF, their performance ultimately weakened Component I (capacity building) under the AF.

(c) Justification of Rating for Overall Borrower Performance

Rating: Satisfactory

83. The Government's performance is rated Satisfactory, and the overall performance of the implementing institutions is rated Moderately Satisfactory. Given the overall performance of the Project and the Satisfactory rating for achievement of the PDO, the Borrower performance is rated "Satisfactory".

6. Lessons Learned

84. ***A sector wide platform to coordinate donors and public sector institutions can promote efficient sector investment and long-term strategic planning, but brings coordination challenges.*** By using PTA-II preparation as a platform, the Bank was able to convene donors and institutions around a set of shared priorities under PRORURAL. The PRORURAL Mid-term evaluation (detailed in Annex 9) highlighted that among the program's many accomplishments, some of the strongest were: (i) a continued alignment with the GoN's NHDP; (ii) a feedback loop that incorporated relevant experiences and lessons learned; and (iii) the strengthening of a number of GoN's and donor processes. While this platform faced coordination and capacity challenges between donors and institutions, it was able to put collaborative knowledge sharing and M&E systems in place to successfully mitigate these challenges, and ultimately developed one of the only long-term, sector-wide, Government-led agriculture coordination platforms in the world.

85. ***On-farm diversification contributes to boosting incomes.*** The 2013 IE undertaken for PTA-II demonstrated that incomes increased for farmers who diversified their crops. The assessment found that the producers who were planting three or more crops had incomes almost four times that of those who were planting just one crop. Lessons learned from other projects in the region show that diversification helps to manage risk and allows for seasonal rotations. Providing technical assistance and inputs for several crops will give producers the option to diversity and increase their incomes.

86. ***When designing a program for certified seeds to increase production, target markets, storage facilities and marketing skills for increased production need to be considered.*** Although farmers increased their production under the Project, there was an overall concern about the market for the additional production. In the 2013 IE, 49 percent of all of the farmers surveyed said that they were selling their crops on a dirt road, and this was the same for the PTA-II beneficiaries and the control group. In addition, 56 percent of both groups said that they sell their crop to a middleman outside their zone. In addition, beneficiary workshops revealed that farmers would have liked more access to seed storage and to training for marketing their seeds. Linking the increased production of certified seeds to secured markets, and pairing this with seed storage and marketing skills, can help to ensure the intended benefits of the Project.

87. ***Well-aligned incentives for rural extension agents are needed to ensure proper delivery of technical assistance.*** The 2013 IE found that where incentives were not well aligned for extension agents, they lacked the motivation and incentives to promote the Project to beneficiary communities. INTA surveys additionally found that roughly 15 percent of extension agents lacked mobilization. Aligning incentives will ensure that extension agents are delivering quality, timely support to beneficiary communities.

88. ***Seed cooperatives selected for credit should have proven ability in both capacity and infrastructure to ensure the most effective use of credit lines.*** One of the main challenges with the program under BP was the timely delivery of the credit, in part due to delays in requisite documentation to issue credit lines. This caused delays in the extension of the credit line, and increased the transaction costs from BP's side. Additional training and capacity building for farmers' cooperatives, some specifically dedicated to helping educate producer groups on the documentation necessary for a credit analysis would improve processing times. In addition, none of the seed cooperatives had infrastructure for storing seeds. Beneficiary workshops revealed that lack of storage meant Seed Cooperatives had little negotiating capacity, and with additional infrastructure they could have fetched better prices for a faster and less risky loan payback.

7. Comments on Issues Raised by Borrower/Implementing Agencies

89. The Borrower, together with the primary implementing institution (MAG), confirmed its agreement with the ICR conclusions and ratings (formal response in Annex 9), and noted the Satisfactory rating was a result of the enormous effort of all involved institutions. The response reiterated that the objectives of the Project were aligned with the current PRORURAL-I, and that the Project was influential across the sector through: a) its support for increased access to agriculture services and increased producer incomes, and b) its technical and administrative institutional capacity building. It also noted that the multitude of lessons learned during the course of the Project, specifically related to design, operation and evaluation, will continue to be central to their institutional capacity for future projects.

Annex 1. Project Costs and Financing

(a) ATP II Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
A. Innovation and Adoption of Agricultural and Forestry Technology	23.9	21.7	90.8%
B. Institutional Modernization and Strengthening	3.6	4.52	126%
Total Baseline Cost	27.5	26.22	95%
Physical Contingencies	.01	0.00	0.00
Price Contingencies	.0018	0.00	0.00
Total Project Costs	.014	0.00	0.00
Total	28.00	26.22	108.4%

(b) AF Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Capacity development for the production, organization and management of certified seeds enterprises	1.73	1.73	100%
Establishment of a credit line for the production, processing and marketing of certified seed	3.51	3.13	89%
Strengthening of public services within the National Seed System	4.01	4.69	116%
Project Management	0.5	0.5	100%
Total Financing	9.75	10.05	103%

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower	Counterpart	7.25	3.25*	45%
International Development Association (IDA) - Credit 4127	Credit	12.00	11.94	100%
IDA Grant - H-537	Grant	9.2	9.08	99%
Canadian TF - 99911	Grant	2.05	2.04	100%
International Fund for Agriculture Development	Grant/Loan	8.25	7.57	92%
Local Farmer Organizations	Counterpart	1.50	0.70	.00
Total		40.25	34.58	86%

*The figure is preliminary based on MAG systems.

Annex 2. Outputs by Component

Original Credit: Cr. 4127-0-NI

2.1 Component I: Innovation and Adoption of Agricultural and Forestry Technology: 86.4 percent of total Project cost (IDA contribution: US\$ 9.0 M). The main objective of this component was to accelerate relevant technology generation and transfer, with an increased focus on marketing, competitiveness, sustainability and natural resources management. From Project outset, INTA, INAFOR and FUNICA were the institutions in charge of providing services for the following activities: (i) agricultural research and development; (ii) technical assistance and extension services; (iii) seed production and certification; (iv) post-harvest and marketing services; (v) certification, training and dissemination activities; (vi) adoption and innovation of forest technology; and (vii) competitive grants for technical assistance and sustainable forest management.

2.2 Agricultural Research and Development (US\$3M, INTA): Under this activity, it was expected that INTA would develop and validate 45 additional new technologies with a focus on products and techniques with a competitive edge in domestic and export markets, as well as on important crops for food security. Ultimately, INTA surpassed the target and registered 59 new technologies, focusing on the generation of genetic material adapted to climate change (2013 IE). This activity also aimed to consolidate efforts on collaborative research with international centers, universities and private firms, focused on tangible outputs from INTA focused on food with high-nutrient value for food security. This focus resulted in new connections forged with international research institutions to support the work of INTA. It also resulted in the increase of technical staff and technical capabilities within INTA.

2.3 Technical assistance and extension services (US\$9M, INTA): The project aimed to improve the model of the extension services provided, and provide technical assistance and agricultural extension services to an additional 35,000 farmers throughout the country. This was done through models of public extension (targeting poor families and farmers located in marginal areas with insufficient incomes and limited access to services, specifically indigenous farmers) and private extension (focused on small and medium farmers located in zones with productive potential who engage in commercial agriculture). This would be accomplished by 140 extension agents working from 20 offices, with several located in RAAN. The intention of the reform of extension services was to develop different methods to approach extension that better met farmers' needs. According to the 2013 IE, the model of communitarian promotion devised under this component helped to reach more than 50,000 farmers, through a combination of public and private extension models. The model of multiplication of services – training promoters to ultimately train farmers – proved a valuable way of providing extension services.

2.4 Seed Production and Certification (US\$1.2M, INTA): The seed production and certification component addressed public sector weakness to produce fountain and registered seed (certified commercial seed is the responsibility of the private sector). This activity would help INTA to produce high quality seeds and address weaknesses observed in the INTA seed unit. Activities focused on improving seed quality norms, legally protecting varieties, and enhancing the market intelligence of the seed unit. In the original credit, an indicator was included to track this activity: annual foundation and registered seed production of food grains exceeds 230 metric tons, while basic and registered vegetable, pasture and tuber seed production covers more

than 230ha. By the time of the AF this activity was fully satisfactory and the target had been achieved. At the time of the AF, this original indicator was revised to instead include: 1) Cumulative incremental production of genetic, foundation and registered basic- grains seed reaches 1,166 MT by end-project in AF areas and 2) Cumulative incremental production of certified basic seed reaches 4,852 MT by end-project in AF areas (206 MT maize, 560MT Rice and 1,040 dry MT red beans). By the end of the project, the project succeeded in producing 4,852 MT of certified seed (Maize 448, Rice 1000, Beans 3,280).

2.5 *Market development and post-harvest technical assistance (US\$5M, INTA)*. The main activities included under this activity were aimed at addressing farmers' needs in post-harvest handling and marketing. The Project financed consultants, salaries of technical staff and operating costs of the post-harvest and marketing unit. Under this activity, INTA provided provide training for producer groups, with a special focus on women in processing of agricultural products, establishing and managing small enterprises, and facilitating the link between sellers and buyers. The project indicator tracked INTA's success in providing training, and in the end INTA trained more than 69,000 beneficiaries, 1,200 specifically many in marketing and food safety. The 2013 IE concluded that 52 percent of the producers considered the existence of a new buyer the principal change in their traditional commercialization activities. In addition, 24 percent of these credit INTA with creating these new market opportunities. Ultimately, eight out of ten farmers were satisfied with the changes in market opportunities.

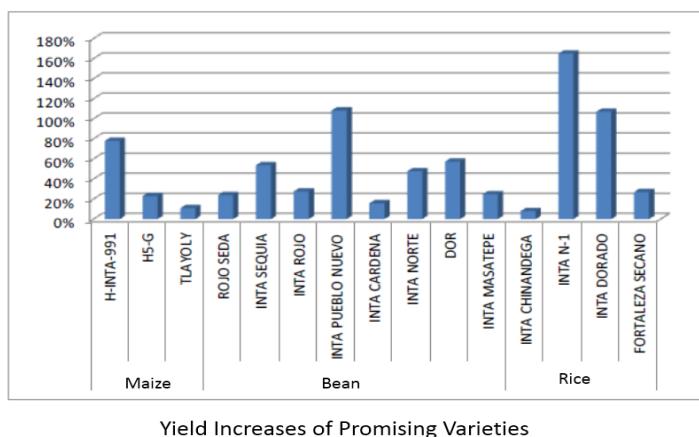
2.6 *Certification, training and dissemination (US\$0.9M)*. This activity was intended to support the corresponding unit at INTA by building its capacity as a certifying body for private training and technical assistance providers. The Project funded training, salaries of technical staff and dissemination services of the training and dissemination unit of INTA. Ultimately, INTA succeeded in surpassing their training targets under the project. In addition, according to the 2013 IE, 49.4 percent and 46.6 percent of bean and corn producers respectively, consider INTA as their first option as a dissemination channel for new technologies, prices and other relevant information.

2.7 *Innovation and adoption of forestry technology (US\$.05M, INAFOR)*. The main objective of the sub-component was to improve the development, conservation and preservation of forest resources in the country. This component specifically financed consulting services, equipment, training, salaries of technical staff, and operating costs for the first two years of INAFOR's participation in the Project. The activity had three specific goals: 1) Rehabilitation of the Center for Genetic Improvement and the Forest Seeds Bank 2) Transfer of forest production technologies and 3) National forest assessment.

2.8 Ultimately, the project achieved the rehabilitation of the forest seeds bank, and surpassed the Project target of 125 seed sources identified, and ultimately achieved 160. In addition, the project achieved transfer of production technologies. According to interviews carried out by the independent evaluation at INAFOR genetic center, 326 agricultural and forest producers received comprehensive training in forest and agro-forestry management. The 4 trainers in charge of replicating these capacities building sessions received their training in China, Colombia, Chile, México and Cuba. Ultimately, due to World Bank procurement restrictions, the national forest assessment was not financed through IDA. Instead, it was financed through the PRORURAL common fund, and supported by FAO technical assistance. At Project close, approximately 30,000 Ha of broad-leaf and coniferous forests are currently under sustainable forest management plans authorized and monitored by INAFOR through its technical staff and the system of independent Forest Regents (*Regentes Forestales*), as per the Forest Law.

2.9 *Administration of Competitive funds for technical assistance (FAT) (US\$8.9M, FUNICA)*. This sub-component was financed entirely by IFAD. This activity included the provision of matching grants to fund technical assistance and extension proposals submitted by applicants under competitive procedures open to producers, producer groups, research institutions, universities, the private sector, NGOs and other institutions active in agricultural research, extension and innovative forestry technology. This activity was successful at the time of the preparation of the AF, but due to disputes over FUNICA's status and the ability to include a public/private organization in the institutional arrangements, FUNICA was removed from the AF.

2.10 *Increases in Productivity*: Overall, this component helped to support increases of productivity of 15 percent on average, and much higher for choice varieties. The below chart shows increases during project implementation for the most promising varieties of seeds (INTA 2013).



2.10 **Component II: Institutional Modernization and Strengthening: 13.6 percent of total Project cost (IDA contribution: US\$ 3.0M)**. The objective of this component was to improve the Government's capacity to formulate sector policies and strategies and carry out the administrative and financial coordination needed to implement the activities under PRORURAL. The component had three sub-components: (i) MAG Institutional Strengthening, (ii) INTA Institutional Strengthening and (iii) INAFOR Institutional Strengthening.

2.11 *MAG Institutional Strengthening (US\$6M)*: This component aimed to strengthen MAG in five key areas: (i) policy dialogue (ii) planning, monitoring and impact evaluation (iii) financial management and procurement (iv) coordination with other agencies and (v) information and communication. Throughout the Project, MAG benefitted from institutional strengthening, specifically staff training, payroll support for staff, financial and procurement training, and monitoring and evaluation support. One of the main successes supported by PTA-II was the design and creation of a Planning and Monitoring System (SISEVA) for the PRORURAL sector-wide approach program, under the leadership of MAG. This system allowed MAG to improve its planning, monitoring and impact evaluation across the sector. In addition, the Project supported MAG's development of a financial monitoring reporting system, which is compatible with National budget procedures. In addition, throughout the original credit and the AF, MAG's capacity to lead the inter-institutional coordination grew, and this helped to support activities under the Project. In addition, the communications campaign around PRORURAL was successful in promoting and sustaining the platform. The

success of both the coordination and communication was evidenced by MAG's ability to secure additional resources and support for the continuation of PRORURAL-I, as well as its ability to focus donors and institutions on the objectives of PRORURAL-I. Going forward, MAG will leverage the institutional strength to continue to provide organization and leadership in the sector, and the benefits will extend to projects outside of PTA-II.

2.12 INTA Institutional Strengthening (US\$1.6M): This activity financed equipment, software and training, and salaries of technical staff to strengthen the (i) procurement, finance and accounting unit; and (ii) the planning and monitoring and evaluation unit. With Project support, INTA successfully created a procurement, finance and accounting unit and a planning and M&E unit, which ultimately helped INTA expand its services. The Project also helped to improve local capacities at administrative and technician level, including increased ration of technical staff, specifically for the implementation of field schools, technical assistance and seed inventories, and was able to provide research and extension services across the country. The costs of these services have been progressively absorbed into the fiscal payroll and will be sustained beyond the life of the Project. The impact of the additional technologies, training and seed inventories have built lasting capacity within INTA, and have impact beyond the direct beneficiaries of the Project.

2.13 INAFOR Institutional Strengthening (US\$6M): This activity was meant to strengthen INAFOR in multiple ways: a) its ability to mobilize resources b) promotion of activities related to conservation and preservation of forests c) preparation of operational manuals d) capacity for monitoring to reduce illegal activities e) a communications strategy and f) improve the administrative and financial capacity. The Project financed training, consultancies, communication systems (radio announcements), computer equipment and operating costs. At appraisal, there was concern over INAFOR's capacity to implement forestry management plans under the Project. However, during the Project INAFOR staff received trainings, including on forestry permits, nursery and community forestry management, and the Project supported improvements in the INAFOR central building and the acquisition of new measurement equipment to oversee forest management. The institutional also increased technical staff ratios to improve planning, and M&E. By the end of the Project, INAFOR has significantly improved its capacity to provide technical assistance to forest producers and to enforce the Forest Regency System (*Sistema de Regencia Forestal*), and exceeded the original Project target for number of forest management plans prepared. INAFOR also enhanced its ability to manage forest resources and deliver services as mandated by the Law of Conservation, Promotion and Development of the Forestry Sector (Law 462).

Outputs by Component: AF (H-537-0-NI)

2.14 Component I: Capacity development for the production, organization and management of certified seeds enterprises (US\$ 1.73 M). It is comprised of two subcomponents; (I.A) Fostering certified seed production capacity, in charge of INTA (US\$ 0.95M), and (I.B) Strengthening the organizational, managerial and marketing skills of seed cooperatives and producers' organizations, responsibility of INATEC (originally intended for FUNICA) (US\$ 0.78M).

2.15 Fostering Certified Seed Production Capacity: This activity adopted a three-tier extension approach, whereby seed specialists (tier 1) assisted field extension agents (tier 2) by providing on-the-job training and solving specific problems relating to seed production and quality control. In turn, field extension agents would supervise and assist farmer promoters (tier 3), updating them with specific knowledge on seed production and

overseeing the process. Promoters would then support seed production activities of individual members of the seed cooperatives. It was executed through two methodologies: Farmer Field Schools (FFS) and Farmer to Farmer (FtoF). Both methodologies were intended to provide farmers hands-on-training to allow them to increase their production of certified seed. Ultimately this activity had three targets: a) to increase the cumulative incremental production of genetic, foundation and registered basic- grains seed to 1,166 MT, broken down by maize and beans b) cumulative incremental production of certified basic grains seed reaches 4,852 MT by end-project in AF areas and c) certify 1,200 producers in certified seed production (10% indigenous and 20% women.)

2.16 Ultimately while the cumulative incremental production of seeds has increased, by the time of project close, it had not quite met the target. Ultimately there were 3,713 MT produced, against a target of 4,852. This was broken down by 450 MT of Maize (against a target of 2,364), 1,480 MT of rice (against a target of 864 MT) and 3,760 MT of beans (against a target of 1,652.) The quantities produced of each was largely dependent on the market price at the time, and the large fluctuation of bean prices lead to a significant overachievement of the target. Although overall target was not met, at project close there were an additional 1,978 MTs being produced, and after project close the overall achievement reached 5,691, surpassing the target. In addition, 1,435 producer were certified in seed production (against a target of 1,200), 185 of which were women, and 118 of which were indigenous.

2.17 *Strengthening Seed Cooperatives:* - The activity was intended to help existing seed cooperatives improve their business and management skills to successfully expand seed production and distribution. In order to do this, the activity funded INATEC to provide technical assistance to cooperatives to improve their skills and prepare CDPs. This activity ultimately achieved its target, and 31 cooperatives were supported, and 39 CDPs were prepared (some cooperatives prepared more than one plan.)

2.18 An unexpected co-benefit of this component was the simultaneous strengthening of INATEC as an institution. Because INATEC replaced FUNICA as the implementing institution for the development of the CDPs under the AF, there were resources allocated to provide INATEC technical assistance to gain expertise in activities related to the CDPs, such as certification, labeling and packaging of certified seeds, design of facilities for processing and handling of seeds, technical and management consultancies, dissemination, market forecasting, and marketing of certified seeds. INATEC received substantial support, and significantly improved its technical and institutional capacity.

2.19 Component II: Organization and establishment of a line of credit for the production, processing and marketing of certified seed (US\$ 3.51 M). During the preparation process of the AF, it was evident that financing for certified seed production was very limited. For various reasons (lack of collaterals, transaction costs, sub-sector complexity, physical presence, etc.) commercial banks did not offer credit for seed production. This component was designed to allow the FCR to provide credit to seed producers. However, during the preparation of the AF, FCR became BP and the Grant Agreement was rewritten and the project was restricted to allow for this change in implementing institution. This component was designed according to the World Bank's OP 8.30 (Restructuring Paper, Annex 2), as requirement at the time, to ensure there would be no adverse impacts on the financial sector.

2.20 This component would provide loans to seed cooperatives for (i) twelve-month maturity loans for certified seed production, processing, and post-harvest activities; (ii) six-month maturity loans for collecting, storing, and marketing, and (iii) up to five year loans for equipment and machinery. The target for lending by BP was US\$3.13 M extended as credit, and US\$3.9 M returned by Project close. By June 30th, 2014, a total of US\$3,13 M had been extended in credit, but only US\$586k had been paid back to BP. This gap was largely due to delays encountered to make the line of credit operational. Issues like the change of line of credit management from the FCR to BP led to a comprehensive legal analysis from WB staff in order to ensure a smooth transition towards the newly created financial entity. As of September 30th, 2014 all of the tranches of approved credit had been disbursed and at the time of the writing of this ICR, BP was collecting had recuperated a total of US\$803,000, and was seeing a default rate of approximately 23%.

2.21 One unexpected co-benefit of this component was the simultaneous strengthening of BP as an institution. BP was created at the time of the AF, and had no previous experience working with cooperatives or small farmers. By participating in the project, BP gained experience working with seed producers, which they have later transferred to other credit lines. In addition, the project helped them built capacity for inter-institutional coordination with other public institutions participating in the project.

2.22 **Component III: Strengthening of Public-sector Services within the National Seed System (US\$ 4.01M).** This component would contribute to strengthening (A) INTA's National Center for Agricultural Research and Bio-technology (CNIAB) to strengthen the capacity for the collection, preservation, and use of genetic resources and the production of genetic, foundation and registered seeds at CNIAB (US\$3.01 M) and (B) the public sector Seed Certification Agency, the General Directorate of Plant Safety and Seeds (DGPSA, now IPSA) to increase its seed inspection capacity (US\$1 M). The component was implemented by INTA (Subcomponent A) and by MAGFOR/DGPSA (now IPSA) (Subcomponent B). The main targets under this component were: (i) after three years of project implementation, a Genetic Seed Center (CGS by its Spanish acronym) is fully operational and with a storage capacity of 1,806 metric tons of foundation, genetic and registered seed and; (ii) after three years of project implementation, 3,581 hectares of foundation, registered and certified seeds of rice, beans, corn and sorghum in the target territories for certified seed production have been duly inspected.

2.23 By the end of the project, both of the objectives under Component III had been achieved. The project supported the development of INTA's Seed Genetic Center through Goods and Works, and specifically financed cold storage capacity, strengthen capacity for conservation of germplasm collections, processing plant for registered seed, expanded drying facilities, greenhouses and improved laboratory facilities and equipment to characterize genetic material and perform genetic and phytosanitary seed quality analysis. This infrastructure enhancement allowed INTA to operationalize 1,806 metric tons of seed storage, including a seed processing plant with a capacity of 14 metric tons per day. These improvements enhanced the seed processing and analysis services received by the AF cooperatives, as well as improved services available to the sector overall. In addition, the Project strengthened three phytosanitary diagnostic laboratories and increased the number of technical staff at IPSA. Overall, IPSA inspected an area of 3,583 hectares for certified seed production (out of a target 3,581). As a result of this strengthening, IPSA was able to decrease the costs of seed inspections, and thus certified seed production, and by certifying seeds locally there were reductions in the losses due to lab analysis.

Annex 3. Economic and Financial Analysis

3.1 Overall, PTA-II contributed significantly to increased welfare throughout the country. The original objective of the PTA-II project was to increase agricultural productivity by providing rural households and communities with broader access to sustainable agriculture, forestry and natural resource management service, technology and innovations. This was done by strengthening the public institutions capabilities to conduct research and to delivering extension services to rural producers. The improvements in Agricultural technology and services aimed to increase productivity and create economic conditions to increasing food security, nutrition and income. As are result of increased productivity and associated increased incomes, the project aimed to contribute to reducing extreme poverty (ensuring food security) and reducing general poverty (through incrementing income) rates in rural areas.

3.2 At the time of appraisal, a detailed economic and financial analysis was done based on a simple cost-benefit analysis to estimate Net Present Values (NPV) and Internal Rates of Return (IRR) of the increased productivity due to project activities. The original analysis was intended to provide a framework for INTA research planners, managers and scientists to gauge the impact of their work in terms of costs and benefits. This was intended to lead to a more efficient allocation of scarce resources and to the selection and design of research and extension (R&E) activities that better contribute to the welfare of Nicaraguans.

3.3 The PAD analysis indicated that since most of the project investments would directly support Research and Extension, all of the benefits were calculated based on the relevant crops and production systems. The expected benefits were. (i)strengthened public institutions and technical capacity; (ii)the adoption of new production, marketing, management, and post-harvest technologies directly benefiting approximately 50,400 poor farmers; (iii)new products, process and market opportunities, increased exports, improved quality, and adequate alternatives for economic development; and (iv) the introduction of environmentally friendly and sustainable production practices.

3.4 The PAD analysis also confirmed that the project was financially and economically viable. The fiscal analysis confirmed that (i)the improved technologies would be highly attractive to beneficiaries since their income would be substantially increased; (ii)positive impacts would be attainable in all different regions and agro-ecological zones; and (iii)marginal returns to labor through improved production practices compares positively with the opportunity cost of family labor for the regions. The Economic analysis confirmed benefits in terms of on-farm production.

3.5 Using the PAD Financial and Economic analysis as a guide for purposes of comparability, this ICR analysis also used a simple cost-benefit analysis to calculate the Net Present Value (NPV), and the Economic Internal Rate of Returns (EIRR). Since the project was designed to increase productivity costs, the increase, combined with the cost of production, will allow for the evaluation of the economic impact of the project based on its marginal contribution to increased productivity. This analysis provides participating organizations a comparison between model targets asserted in the PAD, and real achievements after project close. It also provides a quantification of the impact of the project in terms of cost and benefits, and has the potential to guide future operations as to efficient allocation of resources in the design of Research and Extension activities to improve productivity and incomes in Nicaragua.

3.6 One key difference between the ex-ante assessment in the PAD and the ICR analysis is that the projected target population shifted during the implementation period - from those ready to integrate to export markets (as assumed in the PAD), to those producers linked to domestic markets and subsistence production (as seen during project implementation). This difference is important to understand from the perspective of income generation potential. The ex-ante evaluation used an export approach, while the ex-post analysis reflected the change in project emphasis on staple crops, primarily the production of corn and beans, and included a larger group of beneficiaries. Beyond the analysis included here, further specific analysis might focus on the economic contribution of the project to specific skills to either individual (producers, promoters) or collective level (cooperatives, associations).

3.7 This analysis was conducted using project reports, final project Impact Evaluations and national and international databases for food prices.

3.8 The analysis showed that the project yielded several positive externalities, such as improvements in the environment (mainly attributable to the 88 Forest Management Plans supported by INAFOR), better production and soil management practices (through improved access to technical assistance and technologies), improvement in human capital (farmers learned skills through trainings and farmer field schools), entrepreneurship (farmers boosted marketing skills through targeted trainings) and better health, due to better nutrition (assumed by using increased yields as a proxy.) The ex-ante analysis described the possible positive externalities of extension services, but did not quantify them. Similarly, this analysis recognizes these additional positive externalities, but focuses on the project levels outputs, and specifically defines economic outputs in relation to the PDO. The analysis focuses on yields as the key output of the extension component and seed availability as key output of research and innovation process.

Main Assumptions

3.9 The analysis is based on the concept of “marginal contribution” for calculating economic benefits. In both project components of PTA-II, the marginal contribution was calculated: increase in yields of bean and maize producers and the increase in seed production above 230 MT. The first key assumption is that all producers that adopted two or more technologies are also those who have increased their maize and beans yields. The economic impact of the extension component is calculated based on this population. A complementary assumption is using the average increment of beans and maize yields for this population.

3.10 The analysis used the annual wholesale prices for beans and maize. Prices were converted to US dollars using the national average exchange rate from the Central Bank of Nicaragua.

3.11 In the case of seed productions since there was an aggregated number, (includes maize, beans and rice), an average prices for seed was used for calculating the production value. This average might be lower than real prices, since red beans have duplicated its price to consumer, as consequence seed price have increment its prices as well. Data for seed production was obtained from every PRORURAL Report form 2007 to 2014.

3.12 A discount rate of 8% was used for calculating the Net Present Value. This is different than the discount rate used in the PAD ex-ante assessment (12 %); however, this is the official number: 8% was the discount rate for investment and projects defined by the MHCP in 2011.⁹

Summary of Benefits and Costs

3.13 The first component of the analysis is the marginal contribution of the PTA-II's research and extension activity. PRORURAL, the guiding structure for policy in the Agriculture sector in Nicaragua, designates national assistance targets for family farms, specifically including smallholder and subsistence farmers. As a result of this national-level emphasis, grains are the key components of the production system. For the analysis, it was necessary to calculate the average marginal contribution in productivity as result of the extension and research component of PTA-II. The project research was to generate new technologies and breeds for maize, beans and rice production and the extension component serviced to provide this research to small holder farmers. This analysis uses the new seed varieties produced and incorporated on farms to quantify the research and extension component of the project.

3.14 The second key component of the analysis is the number of producers adopting two or more technologies, since those ones are who will obtain marginal increases in maize and beans yields. The data used in this analysis was obtained from project reporting (through the ISRs, series 1-20).

3.15 The third component of the analysis is the marginal production of grain seeds for sowing. According to ISR indicators, the program will increase seed production above 230 TM; thus, only the marginal production of seed is part of the economic analysis. The seed production was obtained from every annual report form 2006 to 2013.

3.16 All the costs of the PTA II project (including Bank, Government and Grant contributions) are included in the analysis, from 2006 to 2014. Doing this analysis on the basis of only IDA funding, or IDA and Government funding (but no grant funding), would yield even higher results.

3.17 Most of the project indicators have been achieved under the project, and these achievements form the basis of the analysis:

- a.) A total of 70,806 producers received technical assistance in several topics including production technology and administration
- b.) An estimated 51,560 producers have adopted two or more technologies to increase production.
- c.) The yield of maize increased by approximately 336.4 kg/ha between 2005 and 2013. The yield of beans increased on average by 150kg/ha during this same time. This data was obtained from contrasting the 2005 National Survey for Impact Evaluation (PTA I) and the 2013 Impact Evaluation (PTA II).
- d.) The seed production was cumulatively increased by 2,610 MT, which translated into annual average increase of 326.3 MT.

⁹ MHCP (2011) Tasa Social de Descuento Nicaragua. Dirección General de Inversiones Públicas. Ministerio de Hacienda y Crédito Público

- e.) In order to achieve these specific production targets, the institutional framework became more coordinated efficient to reaching more producers through extension services.

Financial Analysis

3.18 The ex-ante economic and financial analysis included in the PAD was performed with a methodology that included specific farm analysis from INTA and FUNICA. Fifteen farms that received technical assistance for watershed management were analyzed in terms of crop production, and cost and use of labor and capital. Based on that, the increase of yields and profits were calculated. The model assumes that labor was not a constraint and the effects of increases were phased out in four year. Based on the economic results of these 15 farms, the NPV was calculated and used as an input for the Economic Analysis.

3.19 By 2014 there are necessary key changes in the application of this methodology. Ultimately it was not possible to access data from these 15 specific farms, given there was no systematic follow up with them. An alternative solution was employed in this analysis: specifically to build the marginal contribution of the project. In this case, the analysis used the national-level survey done for the Impact Evaluation of PTA II (2012)¹⁰ and the national-level survey for the Impact Evaluation of PTA I (2005)¹¹. This has the advantages of identifying changes specifically in PTA-II beneficiaries and avoiding using more general national averages.

3.20 The 2012 survey characterized PTA II beneficiaries as producing mainly staples, at least 72 % of producers are grain producers, producing mainly maize and beans. Production of other crops, including rice, cassava and sorghum, accounts for 12.5 - 15 % of total producers, meaning that at least 85 % of producers do not produce these crops. Fewer than 10% of farmers produce other crops not included here. In the case of animal production, Cabal (2012) reports that 31.3 % of producers do not report having cattle and 68.4% report having one or fewer cows. The case with pigs is similar - 36.2 % do not report having any pigs and 73.8 % report one or fewer pigs.

Table A5.1. Crops Planted by PTA II beneficiaries.

Rank	Crop	Frequency	Fr %	Area (ha)
1	Maize	385	78.7	0.91
2	Red Beans	355	72.6	0.91
3	Rice	75	15.3	0.84
4	Cassava	64	13.1	0.35
5	Sorghum	61	12.5	2.04
6	Plantains	42	8.6	0.42
7	Pineapple	41	8.4	1.33
8	Tomato	38	7.8	0.42
9	Sesame	31	6.3	1.33
10	Bell Pepper	24	4.9	1.40

Cabal 2012

¹⁰ CABAL (2013) Informe final estudio de Evaluación de Impacto del Proyecto PTAII

¹¹ Nitlapán (2005) Estudio de evaluación de impactos del programa nacional de tecnología sobre la problemática técnica de los productores agropecuarios”

3.21 Given this, maize and beans are the key products for analyzing PTA-II's economic impacts. This idea is strengthened by the fact that one of the key results of the research component is related to availability of grains seeds for production. The difference in yields between 2005 and 2012 increased the value of production by US\$98.1 per producer for maize production and US\$114.8 per producer for bean production. A family with both products increased their value of production by approximately US\$ 212.8, representing 13.1 % of average total gross income reported in 2012 evaluation (US\$ 1,623.4).

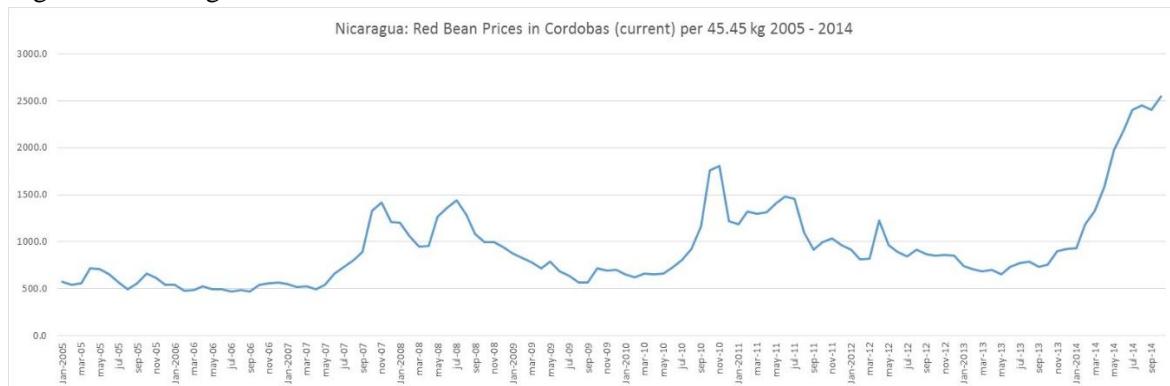
Table A5.2. Comparison of yields in grains production between beneficiaries of PTA II and I (per producer)

	2005 (kg/ha)	2012 (kg/ha)	Difference (kg/ha)	Area (kg/ha)	Production Value (US\$)
Maize	995.7	1332.7	337.1	0.91	98.1
Beans	814.5	964.0	149.4	0.91	114.8

Based on Nitlapan (2005), Cabal (2012) y FAO-GIEWS 2014.

The ex-ante did not include red beans in the financial analysis, however, prices and production of beans in the period 2008 – 2014 a key driver of impact (Figure A5.1). This is an important element, since a key assumption of the ex-ante assessment was that prices would not change in real terms in a period of 25 years.

Fig. A5.1 Nicaragua: Red Beans Prices 2005-2014.



Based on FAO GIEWS (2014)

3.22 The ex-ante analysis in the PAD was based on a model that assumed that producers without technology (i.e., without project intervention) would achieve 1,327 kg/ha of maize; however, Cabal (2012) indicated that ultimately they only achieved 1,197 kg/ha. This is similar with the PAD's beneficiary calculations: the model projected yields around 2,264 kg/ha and the final average achieved fell short of that. The ex-ante analysis calculates marginal increases in labor, most of them related to horticulture and export production, indeed maize was the only crop with negative marginal returns to labor.

Economic Analysis

3.23 The economic analysis combines the results of two key components: extension and research. In the first case, the public institutions become more efficient and coordinated in order to reach a higher amount of producers. The main goal of extension is the technological change that happens when a producer adopt new technologies and improves his/her productivity. The adoption process is based on the results from a production cycle, once producers tested a technology and incorporate it to his/her production system. Between 2007 and 2014, 70,806 producers received technical assistance (National INTA surveys) and around 51,560 producers adopted two or more technologies (ISRs).

3.24 Based on the marginal increase in the production of beans and maize, the marginal contribution to production was estimated, and based on average wholesale prices a production value was calculated. The number of maize and beans producers was estimated based on the values included in the PTA II final evaluation. As a general result, PTA II contributes to national production of grains with an estimated 57,359 MT of maize and 23,453 MT of red beans (table A5.4).

3.25 The second component is related to research and technology development. Seed production is a process that guarantees the availability of seed for grain production (first component in this economic assessment). PTA II supported INTA to help improve production and distribution systems. According to National Policy of Food Security, this is a key contributing element for ensuring food production and availability, and specifically in the case of beans, which have suffered price volatility. In general terms, PTA II contributed to the increase in grain seeds available by a volume of 2,610.1 metric tons (table A5.5).

3.26 All of the available funds were disbursed under loans IDA 41270 and IDA H5370 for a total amount of US\$ 22.5 million dollars. The Canadian Trust Fund was not included in this total, as it was not included in the ex-ante analysis, and undertook an activity (the Agriculture Census) outside the scope of the PDO. In order to calculate the NPV a discount rate of 8% was used and, as result, the NPV was estimated to be US\$14.8 million as the net contribution of the project from 2006 to 2014. The estimated EIRR was set at 43.2 % (rate where the NPV = 0). Both results are higher than initial estimations (table A5.6.)

Table A6.1. Contribution of Extension Component to the Economic Benefits of PTA II.

	2007	2008	2009	2010	2011	2012	2013	2014	Accumulated
Producers adopted two or more technology	7,600	13,880	20,160	26,440	32,720	39,000	45,280	51,560	51,560
Marginal Contribution to Maize production (TM)	1,842	3,364	4,887	6,409	7,931	9,453	10,975	12,498	57,359
Production Value of the Marginal Contribution to Maize production (US\$)	616,926	1,067,037	2,023,840	2,114,021	3,535,776	2,996,837	4,097,185	4,458,163	20,909,785
Marginal Contribution to beans production (TM)	753.1	1,375.4	1,997.8	2,620.1	3,242.4	3,864.7	4,487.0	5,109.3	23,450
Production Value of the Marginal Contribution to Beans production (US\$)	724,738	1,763,260	1,539,607	2,624,296	3,841,321	3,257,648	2,962,472	8,085,948	24,799,291
Marginal Contribution of the extension program (US\$ Million)	1.3	2.8	3.6	4.7	7.4	6.3	7.1	12.5	45.7

Table 5. Contribution of Seed Production Component to the Economic Benefits of PTA II.

	2007	2008	2009	2010	2011	2012	2013	2014	Accumulated
Marginal Contribution to seed production, over 230 MT. (TM)	0.0	69.0	374.1	616.2	479.0	0.0	76.4	995.5	2,610.1
Marginal Contribution to seed production, over 230 MT (US\$ million)	0.0	0.1	0.3	0.5	0.4	0.0	0.1	0.8	2.1

Table A6.2. Estimation of NPV and EIRR of the PTA II 2006- 2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Discount Rate	NPV
PTA II Marginal Contribution (Extension and Seed production) US\$ Million	0	1.3	2.9	3.9	5.2	7.8	6.3	7.1	13.3		
Annual Cost of the project US\$ Million	3.8	2.3	2.6	0.7	0.9	1.4	1.7	2.9	6.1		
Cash Flows	-3.8	-1.0	0.3	3.1	4.3	6.3	4.6	4.3	7.2		
Net Present Value	-3.84	-0.92	0.28	2.48	3.19	4.31	2.88	2.48	3.90	0.08	14.8
EIRR	-3.84	-0.92	0.28	2.48	3.19	4.31	2.88	2.48	3.90	0.432	0.000

Annex 4. Impact Evaluation Summary and INTA Surveys

4.1 Objectives of the Impact Evaluation: In 2013, an Impact Evaluation was carried out by an independent consulting firm (CABAL S.A) to assess the major impacts of the Project on individual beneficiaries and stakeholder institutions. The impact assessment was intended to examine how the results of the project contributed to achieving the project development objectives, such as increasing agricultural productivity, improving the welfare of rural households, greater resilience against production risks, and contributions towards poverty reduction and food security.

4.2 Methodology:

4.3 Beneficiaries: Because there was no baseline, this study created a "counterfactual" to compare a sample of producers / who participated in the project and received technical assistance (called "Treatment Group") with a sample of producers / as non-participants and received technical assistance (called "Control Group"). The treatment of both groups maintained other variables (location, ecological conditions, etc.) as similar as possible.

4.4 Considering a population of approximately 50,400 beneficiaries / as PTA II Project, a random sample of 500 surveys for the "treatment group" under the assumptions of a 95 percent reliability and an accuracy of 4.4 percent based sampling frames, with project beneficiary lists provided by MAG. The other half of 500 producers of the "control group" was chosen from the database of the last National Agricultural Census for the 2011. For a statistically consistent selection of the groups in their statistical units that have national representation, producers were chosen (treatments and controls), living in the same geographical areas, same sex and retain proportionality in the size of its agricultural unit and the educational level (as control variables for the sample design).

4.5 Institutional: The assessment of management capacity PRORURAL institutions was based on several methods of collecting qualitative information, namely a) collection and review of secondary information b)review of various information systems which feed on indicators and reporting progress and level of impact of the project at different stages of implementation, including SISEVA c)review reports of internal and external evaluation d) review policies e)collection of primary information and f) focus groups of officials.

4.6 Results: The evaluation confirms that the PTA-II has been successful in meeting its goals and indicators.

4.7 Institutional: Regarding the institutional component, 100 percent of salaries and operating costs initially funded by the project are now undertaken by national funds. 50 percent of staff are women, and there are no differences between the wages of men and women performing similar tasks. However, substantive positions are dominated by men. One of the identified weaknesses is that neither INTA nor INAFOR have a specialized unit or personnel to formulate projects. Generally, staff believe that they are adequately qualified for their positions, but think that their wages are low and

existing infrastructure needs improvement. There is an adequate conceptual framework for conducting policy development sector. The policies are better targeted to the poorest and most vulnerable; following the updated guidelines of NHDP. Sector coordination has improved with PRORURAL, but there is still a need to improve coordination within institutions in the sector.

4.8 **Monitoring:** Progress and challenges are identified in the operation of SISEVA. The main challenge is the coordination of the system at field level to allow budget tracking across institutions. In addition, the SIAF, developed more than a decade to track PRORURAL budget, is not compatible with SISEVA, so there are still differences in the financial information that is recorded between current and spent. However, SISEVA improves the monitoring system so that it can provide feedback to the implementation of the POA.

4.9 **Beneficiaries:** There were large impacts for PTA II beneficiaries, as evidenced by the greater sustainability of their agricultural activities with a greater diversification of crops, more animals and agricultural technologies and generally better farm management practices. Almost all of the producers included under the PTA-II have introduced technological innovations. The majority of farmers expressed their satisfaction with the technological changes (82 percent) and with the technical assistance received from INTA.

4.10 **Technology:** INTA accomplished the goal of generating new technologies, specifically on the generation of genetic material adapted to changes in climate and disease tolerant options in the areas of pest management, alternative water harvesting, and green manures.

4.11 **Crops:** The most widely grown crops on the farms are corn and beans. Secondary crops are cassava, sorghum and rice. The average is 1.4 mz in area corn, 1.39 mz in beans, and 1.1 mz in cassava. Sorghum is grown in farms with an average area of 3 mz. Overall, there is little change in land use, with a slight decrease in dry areas and increased grasses grown in the last five years. The average productivity of beans are 13.7 qq / mz and corn 19.6 qq / mz. In 2012, the primary problem that affected the production was the lack of rain due to drought. A secondary problem affecting production was presence of pests and diseases.

4.12 **Incomes:** The average annual gross income of beneficiaries of PTA-II producers is about 43 percent higher than the average annual gross income of non-beneficiary producers, and therefore, differences in income because of the production unit between the means of these two groups are statistically significant.

4.13 Considering the whole sample, the average annual gross income of families in the Pacific, is 27 percent greater than those living in the Central North Atlantic. If the producer is male, the average annual gross income is 129 percent higher than that of the female producers. And finally, if the producer does not belong to an indigenous group, the average annual gross income is 204 percent higher than those who said they belong to an indigenous people.

4.14 In both groups (PTA-II beneficiaries and non-beneficiaries), income increases when producers diversify. Producers who grow three crops or more are 3.7 times more income than those who sow a crop. While this trend is observed in all farmers diversify, when producers are PTA and plant more than one crop, the average income is higher than when not PTA.

4.15 **Food Safety:** The food consumption profile of the treatment and control groups is very similar and therefore, although there are differences in annual gross income, these differences do not translate into a better diet. The PTA- II is focused on segments of predominantly small farmers who grow maize, beans and cassava, all essential food of the rural diet. According to the survey, the ten foods most consumed by households of farmers in the last 15 days were: (a) rice grain, (b) gooseflesh or chicken, (c) maize grain, (d) beans, (e) vegetable oil, (f) sugar, (g) pasteurized milk, (h) fresh cheese, curds, cream, (i) chicken eggs and (j) ground coffee or coffee beans. Using the quantities of consumed food and their purchase prices to construct a proxy for value added per capita food consumption for each household using the same methodology LSMS, it is possible to make a comparison with the last official value of the poverty line 2009. 36 percent of the surveyed farmers (about four out of ten) of both PTA-II beneficiary group and the control group are below the official value of the measurement of the line of extreme poverty in Nicaragua.

4.16 **Objectives of the INTA surveys:** In 2013, INTA conducted surveys to assess the impact of the INTA services on beneficiaries. Specifically:

1. Check the effective coverage of the services provided by the INTA
2. Determine the extent to which producers benefit from agricultural technology
3. Determine the degree of satisfaction of beneficiaries for services received from INTA.
4. Quantify the productivity growth of the beneficiaries of INTA, in staple crops (maize, beans, rice and sorghum).
5. Identify the factors that influence adoption of new technologies.

4.17 **Methodology:** The population was the group of 27,019 registered producers in the Public Technical Assistance services database being provided with service by 153 extension workers spread across 22 offices Technological Innovation, in 123 municipalities and 1,200 communities in Nicaragua. The survey was conducted on a representative nationwide sample of producers, estimated by Stratified Random Sampling (SRS), the resulting sample size was 394, which was expanded to 402 to eliminate any inconsistencies. To determine the sample size the following mathematical expression (Gomez, 1977) was used where:

$$n = \frac{k^2 * p * q * N}{(e^2 * (N-1)) + k^2 * p * q}$$

n: is the size of the population or universe (27,019 producers (as) of ATP, 2012).

k: confidence level of 95.5%.

e: sampling error is 5%

p: is the proportion of individuals who are satisfied with the services received 80%

q: is the proportion of individuals who do not have that feature, ie 20%, is 1-p.

n: the sample size (394 surveys to conduct).

4.18 The indicators evaluated were:

1. Satisfaction of the beneficiaries with the services provided by INTA
2. Confirmation that 100% of the 27,019 beneficiaries registered in the databases of 2012 received extension services in the form of Public Technical Assistance (ATP).
3. Productivity growth
4. Application of technologies

4.19 Results:

- In 2012 INTA provided agricultural extension services to farmers and producers 49,975 (27,019 in the form of Technical Assistance Public and 22,956 through the Technical Assistance Collaborative);
- The producers are satisfied with services received.
- 62% of the promoters said they were accompanied by the extension in visits and training. The study revealed remarkable leadership the promoters in the communities, which is reflected in the improvement of the quality of transfer services;
- The application of technologies by the beneficiaries of INTA nationally is good, 94% of beneficiaries used two more technologies; with no significant difference by sex.
- The study reveals improvement in productivity, the effect is greater on producers and producers who use varieties and hybrids of basic grains, receive training and applied technology management practices and soil conservation and water.
- The effectiveness of the technologies developed by the INTA field level shown in yield increases achieved by producers and producers who planted maize varieties INTA H-991 and HS-5G (with increases of 66 and 26% respectively), and those who sow improved bean varieties: RED SILK (24%), INTA PUEBLO NUEVO (108%), INTA SARDINIA (16%), INTA DROUGHT (54%), RED INTA (28%), DOR (57 %) and INTA MASATEPE (25%) and improved rice INTA Dorado and INTA N-1 with increases of over 80% yields the national average (22.6 quintals per hectare of rice, 22.5 and 12 quintals of maize varieties quintals of beans according to the MAG).

4.20 Factors affecting institutional effectiveness:

1. Lack of mobilization in approximately 15 percent of extension;
2. Failure in the organizational structure to ensure the technical quality of the services provided by the institution;
3. Technicians frequently do not keep agreements made (technical visits and training events previously established dates), with producers and producers at the field level.

Annex 5. Bank Lending and Implementation Support/Supervision Processes

a) Task Team Members:

Names	Title	Unit	Responsibility/ Specialty
Lending			
Carlos Enrique Arce	Senior Economist	AES - HIS	
Pierpaolo Biagi	Consultant	LCSR - HIS	
Ema Budinich	Consultant	LCSPP - HIS	
Robert W. Crown	Consultant	SASGP - HIS	
Carolina J. Cuba Hammond	Senior Program Assistant	GSURR	
Luz Meza-Bartrina	Senior Counsel	LEGAM	
Norman Bentley Piccioni	Senior Rural Development Specialist	GFADR	
Francisco J. Pichon	Sr Natural Resources Mgmt. Specialist	AFTA1 - HIS	
Gunars H. Platais	Senior Environmental Economist	GENDR	
Martin Raine	Sector Leader	LCSSD - HIS	
Ricardo L. B. Tarifa	Forestry Spec.	LCSR - HIS	
Luis Tineo	Senior Operations Officer	GCCDR	
Manuel Antonio Vargas Madrigal	Lead Financial Management Specialist	GGODR	

Supervision/ICR			
Etel Patricia Bereslawski Aberboj	Senior Procurement Specialist	GGODR	
Francisco Berrios	Consultant	LCSR - HIS	
Edward William Bresnyan	Senior Rural Development Specialist	GFADR	

Indira Janaki Ekanayake	Sr Agriculturist	GFADR	
Irani G. Escolano	Procurement Specialist	LCSPT - HIS	
Raul Fajardo	Consultant	LCSR - HIS	
Beatriz Elena Franco	Program Assistant	LCC1A	
Augusto Garcia	Senior Operations Officer	GFADR	
Alexandra Christina Horst	Jr Professional Officer	GFADR	
Patricia E. Parera	E T Consultant	HRDSO	
Ana Francisca Ramirez Copelos	Junior Professional Associate	LCSR - HIS	
Enrique Antonio Roman	Financial Management Specialist	GGODR	
Carlos Francisco Siezar	E T Consultant	LCCNI	
Samuel Taffesse	Senior Operations Officer	GFADR	
Manuel Antonio Vargas Madrigal	Lead Financial Management Spec	GGODR	
Kimberly Vilar	Social Development Specialist	GSURR	
Pierre Werbrouck	Consultant	GFADR	
Katie Kennedy Freeman	Agriculture Economist	GFADR	
Francisco Rodriguez	Procurement Specialist	GGODR	
Linda Castillo	Team Assistant	LCCNI	
Wilhelmus Gerardus Janssen	Lead Agriculturist	GFADR	
Ana Patricia Urbina	Operations Consultant		
Hans Thiel	Senior Forestry Officer- FAO TCIO		
Leonel Estrada	Procurement Specialist		
Luz Marina Bojorge	ETC		
Marco Antonio Rosa	STC-Business Plans		
Marco Zambrano	Environmental Specialist		

Staff time and cost:

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY04		11.89
FY05		188.20
FY06		56.60
FY07		0.00
FY08		0.00
	Total:	256.69
Supervision/ICR		
FY04		0.00
FY05		0.00
FY06		80.54
FY07		143.13
FY08		132.25
	Total:	355.92

Annex 6. Stakeholder Workshop Report and Results

6.1 Stakeholder Workshop Results: The Project carried out two final workshops to discuss project benefits, impacts, challenges and lessons learned. One was held on September 24th 2014 with the implementing government institutions, and a second one was organized in Jinotega on September 25th 2014 with project beneficiaries, such as cooperatives, producer association and field technicians from public institutions. Below are the main results from these events.

Institutions from the Government of Nicaragua:

6.2 Project successes:

- **IPSA:** The institutional capacity building was the largest success for IPSA. They specifically sighted enhancement of technical assistance services in terms of geographical coverage. Specifically, the seeds department within the institution received important support. The construction of labs at the field level was transformation for the institutions. The two biggest achievements in terms of outcomes are that producers now have access to lab services for seed analysis, and can obtain results in a timely manner.
- **INTA:** Among the many successes were that INTA a) managed to deliver basic and registered seeds to producers and b) contributed to the development of different technologies. As a result, farmers now have a broad number of technologies that are available for application at farm level. Labs for seed analysis were built and equipped. More than 75 thousand farmers were supported with technical assistance services.
- **MAG:** Its leadership during project implementation, both for PTA II and FA was consolidated. The creation of the environmental and social manual received important inputs from MAG. A number of training sessions for staff was also considered valuable. The organization and leadership during all of the different committees was highly relevant. This allowed for prompt decision making during the different stages of the project. The design and implementation of the SISEVA is considered one of the main accomplishments. The transition of project personnel to MAG staff brought an important degree of stability for the institution.
- **INATEC:** Led the different planning and institutional coordination that ensured beneficiaries participation. The provision of technical assistance by INATEC contributed to cooperative strengthening in areas such as: financial management, accounting, organization and legal aspects.
- **BANCO PRODUZCAMOS:** Managing the line of credit allowed BP to adopt a different credit approach for other productive sectors. This included the necessary upgrades in their credit analysis as well as in their information systems targeted for certified seed lending. Through this project, BP enhanced their inter-institutional skills that are now useful for other credit lines managed by the Government.
- **INAFOR:** The implementation of the indigenous people plan was highly regarded by INAFOR. The publication of forestry related technical manuals allowed for increased knowledge of their staff. The institution was also strengthened in terms of infrastructure and equipment.

6.3 Project Challenges:

- **IPSA;** Despite progress on seed certification, processing and storage capacities are still a challenge. Seed certification services were offered from Managua and now producers have these services closer to their territory.
- **INTA:** Institutional coordination remains a challenge. Having a broad number of available technologies (180) implies to implement a downsizing exercise in order to assess how many have realistic implementation possibilities by farmers. Properly execute the indigenous plans.
- **MAG:** To guarantee the delivery of services for the agricultural sector through a modern and strong institution. To maintain a sound and effective follow-up for financial aspects was also crucial. The amendment for the credit manual was an important milestone in itself, since it allowed to ramp up the line of credit component.
- **INATEC:** The integration of indigenous cooperatives to become project beneficiaries. Compliance with cooperatives legal aspects was a remarkable challenge. Inatec's integration to the rural and agro-cooperative sectors.
- **BANCO PRODUZCAMOS:** One of the main challenges was to have a timely delivery of all the requisites and documentation that BP requested prior to the credit analysis. To launch a lending product that was suitable for certified seed production.
- **INAFOR:** There is a consensus in INAFOR that the process to obtain no objections from the Bank was considered time consuming. In addition, delays for technical assistance on topics related to safeguards.

6.4 Lessons Learned:

- **IPSA:** Throughout a project process it is absolutely necessary to strengthen alliance models with institutions, aiming for project complementarity.
- **INTA:** Consider to institutionalize the social and environmental component. PDC preparation must encompass a long term approach. The possibilities for lasting and sustainable results can only be achieved in a long time perspective.
- **MAG:** They value a return to an inter-institutional model which helps to achieve project indicators. Field schools (ECAs) and rural promoting, has rendered valuable results for ensuring project sustainability.
- **INATEC:** Constant monitoring of cooperatives, allowed creating the conditions for them to become credit-worthy institutions. Currently, INATEC houses an environmental management unit where the obtained experiences are shared with other initiatives. The experiences gained during PDC preparation can be included in the curriculum of the agricultural sector training programs.
- **BANCO PRODUZCAMOS:** An internal learning process for a particular lending product and client segment.
- **INAFOR:** They consider valuable to include an induction program on topics such as safeguards. This is deemed necessary for INAFOR new project pipeline.

Beneficiary Institutions:

6.5 Benefits:

- **COOPERATIVE COPROPAN:** One of the benefits presented by this organization was that they experienced an increase in their seed production capacity. The training sessions in production and administrative matters was also considered relevant. The access to a credit facility allowed this institution to obtain enhanced seeds that are a basic input to reach higher production yields, which in turn leads to a better income. They were able to attain and keep enhanced genetic material for future production cycles.
- **COOPERATIVE SAMARIA:** This organization considers that the different project initiatives led to an appropriation culture amongst the members of the organization. This fact allowed SAMARIA to increase its member's base. Another aspect that was perceived as a benefit is the fact that they enhanced their certified seed commercialization skills and knowledge. In addition, institutional aspects such as organizational and legal structures were also strengthened.
- **COOPERATIVE BLANCA ARAUZ:** Having access to credit resulted in better quality of life for this organization. Their income levels increased since they were able to apply better inputs (fertilizers, biochemical) to their crops, thus increasing the production yields of certified seeds. Cooperative members consider that the technical assistance received by their cooperative was of high quality.

6.6 Impacts of the Project:

- **COOPERATIVE SAMARIA:** The acquired technical knowledge is highly valued by this organization. With project support, they have gained relevant expertise in financial resource management, as well as commercialization skills. They also mention that they consolidated their inter-institutional relations with the different Government institutions that participated in the project. As an organization, they consider that the fact of benefitting from a line of credit with proper conditions has made them appreciate this facility and it helped create a credit-payment culture amongst members.
- **COOPERATIVE BLANCA ARAUZ:** They consider that the capacity development process, both at organizational level and at individual level resulted in important benefits in terms of producer cohesion; which is a relevant strength to develop agricultural cooperatives.
- **COOPERATIVE SOPROCON:** As an immediate project impact, this organization was able to reach a higher production volume and better yields. In the medium term, cooperative members perceive their organization to be more sustainable. For the long term, an eventual continuity as beneficiaries of an agricultural development project would further stimulate their production capabilities. They highlight the importance of access to credit and technical assistance in favorable conditions.
- **COOPREVIDA:** Their skills and knowledge for growing corn certified seed have been improved. Access to credit has increased production volume and yields, rendering in higher incomes at family level.

6.7 Recommendations to Improve the Outcomes of the Projects:

- **INATEC:** The commercialization stage continuously posed challenges. Cooperatives lack robust storage capacities, which lead to an immediate liquidation of production volumes. This leaves the organizations with little negotiating capacity with a market that has more leverage and control for establishing prices. One recommendation is that the revolving credit line should finance cooperatives with seed collecting capital and/or storage facilities that can anticipate better prices.
- **COOPERATIVE SOPROCON:** Soil analysis could have been part of project support. Access to this technology could have allowed producers to know first-hand the type of nutrients requirement their farm requires. With this information available, the producer knows exactly the dosage of fertilizers needed for the plants, thus reducing unnecessary expenses. There is still a lot to be done in the area of developing genetic material. Certified seed market investigation is a strategic area that future projects should help achieve. SOPROCON also considers that available financing for seed collecting and storage purpose is of paramount importance to hedge against price volatility.
- **SAMARIA:** The possibility of soil analysis in different production areas, would have allowed to know their exact nutrient demands. Beneficiaries of PTA II FA could have gained valuable information if this technology would have been available through the project. To mitigate climate change, producers consider that efforts for soil and water conservation would have been an important asset for the project.
- **COOPREVIDA:** This organization considers that additional training to assess the members of the certified seeds value chain would have been relevant. Future credit disbursements should be programmed in a timely manner, in such a way that the production cycles are not affected by unexpected delays caused by administrative credit requirements.

Annex 7: Summary of PRORURAL Program and Mid-Term Evaluation:

7.1 In 2005, based on the National Development Plan 2005-2009, the four institutions that comprised the agricultural and rural public sector prepared a sector-wide Productive Rural Development Program known as PRORURAL. This program, originally envisioned for the period 2005-2009, was intended to support improved coordination and complement international cooperation assistance in sustainable agriculture and forestry. By the planned end of PRORURAL (2009), it was expected that increased rural productivity, food security and sustainable natural resource management would have contributed to the increased livelihoods of about 400,000 rural households.

7.2 The main components of PRORURAL were: (1) Technical Innovation; (2) Food Safety and Animal Health; (3) Sustainable Forest Development; (4) Financial Support Services; (5) Infrastructure; (6) Institutional Modernization and Strengthening; and (7) Forest and Agricultural Policy and Strategy. The PTA-II project supported the long-term PRORURAL program by: (i) financing some specific elements of PRORURAL (already supported under ATP-I), while (ii) institutionally strengthening the Government to help it both to comply with fiduciary and safeguard aspects as well as to develop a PRORURAL monitoring and evaluation system. The estimated cost of PRORURAL was US\$411.5 million for the period 2005-09 (US\$83million/year), of which about 50 percent was financed with fiscal and external sources (grants and loans). At the time of PTA-II Appraisal, the Government had also requested that the international community align external resources under PRORURAL. A breakdown of the estimated budget follows:

PRORURAL – 2006-2009

No.	Components	Investments			Financing the Gap						Financing Gap	
		Total	With Financing	W/out Financing	PTA-II				Common Fund	IADB	Total	
					IDA	IFAD	GoN	Total				
1	Technical Innovation	29.5	3.3	-26.2	8.7		6.3	15.0	6.1		21.1	-5.1
1.1	Competitive Funds	18.1	0.0	-18.1		8.2		8.2	2.5		10.7	-7.4
2	Food Safety and Animal Health	38.0	23.7	-14.3				0.0	2.5		2.5	-11.8
3	Sustainable Forest Development	23.3	1.8	-21.5	0.4			0.4	7.1		7.5	-14.0
4	Financial Support Services	145.4	112.9	-32.5				0.0			0.0	-32.5
5	Infrastructure	70.0	14.5	-55.5				0.0			0.0	-55.5
6	Institutional Modernization	81.5	35.2	-46.3	2.5		0.5	3.0	10.5		13.5	-32.8

	and Strengthening											
7	Forest and Agricultural Policy and Strategy	5.7	2.2	-3.5	0.4		0.4	0.8	3.0		3.8	0.3
	Total MTEF Demand	411.5	193.6	-217.9	12.0	8.2	7.2	27.4	31.7	25.0	84.1	-133.8
	%		47%	-53%	6%	4%	3%	13%	15%	11%	39%	61%

IADB Funds are to be distributed US \$15 million to IDR and US \$ 10.0 million to the other institutions of the SPAR.

7.3 In 2007, the Administration changed and Daniel Ortega took office. There was some concern over the reprioritization of the program with the Government change, but ultimately the program was continued under the new administration. In the same year several activities changed, including the inclusion of three National Programs: (i) Food National Program (PNA), (ii) Agro industrial National Program (PNAIR), and (iii) Forestry National Program (PNF). For the enhancement of financial services, PRORURAL also included the participation of the Rural Credit Fund (*Fondo de Crédito Rural* (FCR)). These changes were part of a transition from a PRORURAL that focused on support to free-trade agreements opportunities in agricultural, to a PRORURAL focused on supporting food security efforts by prioritizing small, low-income producers. Despite the changes, the initial objective of PRORURAL remained consistent. In 2008 a mid-term evaluation was conducted for PRORURAL and found the program to be an overall success in achieving its objectives.

7.4 In 2009, coinciding with the closing of the first phase of PRORURAL, the Government undertook a realignment of the rural development strategy, and harmonized it with the National Human Development Plan (NHDP) overarching objectives. This marked the birth of PRORURAL *Incluyente*, 2010-2014. Its complement of *Incluyente* (Inclusive), went beyond a productive approach. It was designed to also support non-agricultural activities that enhance rural livelihoods. It prioritizes families from micro and small producers belonging to different ethnicities, and included other aspects, like gender, natural resource management, local consumption and exports of surpluses. Its new strategy was based on strategic actions that included: agro-forestry public policies, sound and timely provision of technical assistance, organization for producing and commercializing activities, product quality and certification, adding value to agricultural production, phytosanitary certifications and other services that consolidate the public roles and responsibilities outlined in the different legislations and institutional roles of public entities.

The below table describes commitment by donors to **PRORURAL-I, 2010-2014**.

Cooperation/ Agency Name Project/Program	Approved Amount (2010-2014) US\$ M)	Disbursements (between 2010 - 2012)	To be disbursed until end of 2014 US\$ M
A) Grants			27.92
Switzerland, Finland, Spain, Canada (2010-2014)	29.0	18.6	10.4
PROCAVAL/2008-2015, IDAF	4.5	1.6	2.8

Cooperation/ Agency Name Project/Program	Approved Amount (2010-2014) US\$ M)	Disbursements (between 2010 - 2012)	To be disbursed until end of 2014 US\$ M
Japan-JICA, Technology outreach 2007-2012	2.5	1.9	0.5
Community Partnerships. JICA	1.1	0.7	0.4
Urban Agriculture /FAO/2010-2012	0.99	0.57	0.42
EU/ Grant/ Seed /2011-2014	14.5	1.39	13.1
Finland/Biotechnology /2007.2012	1.0	0.7	0.3
Institutional Strengthening Project	22.0 (Euros)		
B) Loans			25.29
Agricultural Technology Program /WB /2006- 2010	12.6	11.3	1.29
Additional Financing World Bank	1.0	0.1	0.9
PPA/IDB. 2008-2013	20.0	6.9	13.0
National Agricultural Technology Project , IFAD - 2006-2013/ Loan	15.3	12.4	2.9
PROCAVAL/CABEL/2011-2017	8.0	0.8	7.2
Total			53.21

7.4 A mid-term evaluation was conducted in 2012 to examine the successes of PRORURAL-I. Overall, the analysis showed that the performance of PRORURAL-I was considered "satisfactory". Further analysis identified and documented achievements and challenges in the design and implementation of PRORURAL I during the period 2010-2012. The various achievements also reflect different types of challenges, including:

- Nicaragua is one of the few countries in the world that is showing a medium-term commitment to continuously implement a sectorial approach to agriculture, since it is in a second stage, after six years of starting;
- Many actors (at different levels) recognize that PRORURAL I has managed to articulate a good sector strategy and has generated an important share of value added;
- The Government, with the support cooperation agencies, has made progressive and significant improvements: has maintained an alignment with the NHDP (2008-2012), has incorporated the relevant experiences that resulted from implementation, and contributed to the strengthening of certain processes in managing systems into a coherent sectorial approach;
- Overall, there is evidence of progress in PRORURAL I (and its 3 national programs) towards meeting sectorial and institutional goals (especially at the product level). In addition, opportunities to maintain this trend through 2014 are clearly identified; if the commitment and focus of effort intensifies. Although there is limited data to measure progress in terms of increased incomes, poverty reduction, and better management of natural resources, different pieces of evidence show a positive trend. Improved systems evaluations are urgent to have a more comprehensive assessment, including gender issues in all programs. There is positive indication for the restoration of rights to target vulnerable groups: the poor, women, ethnic groups (especially in the Caribbean Coast);
- The valuation analysis according to the 5 evaluation criteria (relevance, effectiveness, efficiency, impact and sustainability) generally show a positive trend with respect to the achievement of outputs;

- Sectorial management systems show greater challenges that deserve more support, given the lack of ownership at various levels and lack of institutionalization of many processes of planning, budgeting, monitoring / sectorial assessments, given the institutional bias.
- Implementing institutions of PRORURAL I have shown positive progress at both central and territorial level, as well as presenting a trend towards greater involvement of the territories;
- The spaces of dialogue between the Government and the private sector have made progress, as a base to promote the National Production Plan and to promote public-private partnerships. In addition, the coordination and partnership efforts with municipalities must be strengthened.
- In general terms, the arrangements for spaces of dialogue between the Government and cooperation are working positively; although there are several ways to strengthen and empower these dialogue forums in order to achieve more strategic and concrete results.

Annex 8. Summary of Borrower's ICR and/or Comments on Draft ICR

Original Project, PTA II:

Development Objective (PDO) and indicators of the project

The PTA-II Development Goal (PDO) is *to provide rural households and communities wider access to agricultural services, forestry and natural resources management, and innovations to promote greater agricultural productivity.* Project objectives are aligned with the objectives of PRORURAL promote development and improve access to agricultural technology as key factors in agricultural development.

Direct beneficiaries

The direct beneficiaries of PTA-II, derive from Component I: Innovation and Adoption of Agricultural and Forestry Technology. This component established a goal to directly benefit an estimated 50,400 farmers through transfer, acceptance and adoption of new technologies, and new approaches and modalities of technical assistance. The project established goals and technical assistance to producers, of which at least 35,000 are involved with INTA; 15,200 with FAT 200 with INAFOR. During the life of the Project, INTA benefitted 69,973 producers (41,983 men and 27,990 women) and INAFOR benefitted 833 producers with forest permits.

At least 2,500 farmers were trained in food processing and / or business administration and marketing. During the project life INTA was able to train 3,204 farmers on the issue of food processing, management and marketing business. Also INTA certified at least seven service providers according to accepted standards and established an operational system of accreditation. 30 percent of producer organizations involved in activities under the AF have access to financing and are linked to the relevant product markets. During the project life INTA benefitted 54 percent of indigenous women in the target population of indigenous communities. 20 percent of customers of the indigenous population of INTA are women.

Project Implementation

In September 2009, the World Bank approved a request from the Ministry of Finance to extend the term of the project until December 2010 and re-categorize expenses allowed to execute the remaining project funds without affecting goals and objectives of the project.

Evaluation of project results:

Whereas before 2005, the policy for the agricultural sector was in its infancy, and there was no space for policy dialogue, the PTA-II managed to open these spaces and strengthen the policy of agricultural sector to respond to the needs of time. Therefore PTA-II is a project framed within the national plans (NHDP), and policies in the agricultural sector, and this makes it relevant.

INTA, through technical assistance has managed to be the main promoter of technological change. Second to INTA are cooperatives and NGOs. INTA has accomplished the goal of generating new technologies. INTA has done important work in updating technologies, focusing on the generation of genetic material adapted to changes in climate and disease tolerant search options. In addition,

INTA's work on pest management, alternative water harvesting, and green manures has been important.

Achievement of objectives and indicators:

Regarding the institutional component, 100% of salaries and operating costs are funded by the project now undertaken by national funds. 50% of staff are women, and there are no differences between the wages of men and women performing similar tasks; However, the substantive positions are dominated by men. An identified weakness is that neither INTA nor INAFOR have a specialized unit or personnel to formulate projects. Generally, the staff believes that it is adequately qualified for their positions, but thinks that their wages are low and infrastructure should be improvement. Most of the assets acquired by the PTA-II are becoming obsolete.

There is an adequate conceptual framework for conducting policy development in the sector. The policies are better targeted to the poorest and most vulnerable, following the guidelines of NHDP that have been recently updated. The functional structure of the institutions has been modified to respond to PRORURAL. MAG still provides leadership to the sector, although they still do not do joint financial planning with MCHP. In general, the Government needs better coordination with sector institutions outside the public sector.

PTA II had a positive impact on farming families, as evidenced by the greater sustainability of their agricultural activities with a greater diversification of crops, more animals and agricultural implements and generally better farm management technology. Almost all of the producers supported by the PTA-II have introduced technological innovations. 82 percent of farmers expressed their satisfaction with the INTA services (against an 80 percent target.)

The average annual gross income of beneficiary farmers PTA-II is about 43% higher than the average annual gross income of not eligible producers. Therefore, differences in income because of the production unit between the means of these two groups are statistically significant.

On the issue of food security, the most widely grown crops in the farms are corn and beans. In the background is cassava, sorghum and rice. The average is 1.4 mz area in maize; 1.39 mz in beans and cassava 1.1 mz. Sorghum is grown in farms with an average area of 3 mz. Overall, there is little change in land use, with a slight decrease in areas descaso and increased grasses grown in the last five years.

In terms of performance the average productivity of beans are 13.7 qq / mz and corn 19.6 qq / mz. In the last farming season, the first problem that affected the production was the lack of rain in drought. The second was the presence of pests or diseases.

Regarding the strengthening of institutional capacities, staff of the Center for Genetic Improvement and Forest Seed Bank has received training on issues of: Breeding Forestry, Forest Seed Biology, Forest Plantations and Forest Nurseries. It has 4 professional technicians with excellent ability in management and production of forest seeds, nursery management and forest plantations. The same for a period of approximately five years have been trained abroad as China, Colombia, Chile, Mexico and Cuba.

Based on the results of PTA-II, it was concluded that the PDO was achieved. This was a major breakthrough for the agricultural sector in terms of coverage of agricultural services and economic performance of farming families.

The impact on farming; PTA-II families evidenced by the greater sustainability of their agricultural activities with a greater diversification of crops, more animals and agricultural implements and generally better farm management technology. Almost all of the properties addressed by the PTA-II have introduced technological innovations on their crops of corn and beans. The main tasks are related to soil preparation (47%), seeding and / or transplantation (12.7%), fertilization (11.9%), control of pests and diseases (7.1%) and soil conservation works and water (6.5%). 100% of the farms in the treatment group used no stubble burning as part of land preparation activities, and instead, only 20% of the control group does not use burning as a management practice. The majority of farmers expressed their satisfaction with the technological changes (96% and 94% bean corn respectively). On technical assistance, INTA is the main promoter of technological change (70%). A second source of promotion are cooperatives and NGO s.

Under the PTA-II beneficiaries incomes have shown that it increases when the producer diversifies. Producers who grow three crops or more are 3.7 times more income than those who sow a crop. This trend is observed for all farmers diversify and plant more than one crop.

The activities of the MAG PTA-II strengthened their capacity to develop policies, strategies, plans, programs, implement administrative, procurement and financial management. MAG now has the personnel, procedures, methodologies and institutional experience to coordinate activities with other public sector institutions under a shared agricultural strategy. The unit of planning, monitoring and evaluation of MAG was installed and is now working. MAG has sufficient administrative capacity to manage and monitor external resources from donors and the National Treasury.

In forestry, an important achievement was the to move from a historical production of the last ten years of less than 100 kilograms of seeds of 13 tree species, to a production of 2,500 kilograms with 47 tree species.

With the bank of seed production, it was possible to supply the demand of the National Reforestation Campaign, meaning the establishment of an annual average (2007- 2012) of 508 nurseries nationwide, with an average production of 9.85 million plants. With the constant production of plants established during the period 2007 - 2012 at the National Reforestation Campaign, 77.860 hectares representing 97% of a five-year goal of 80,000 acres, through effective coordination between the public and private sector.

With PTA-II institutional strengthening, MAG strengthened its ability to develop policies, strategies, plans and programs and achieving and implementing administrative, procurement and financial management. Now MAG has the personnel, procedures, methodologies and institutional experience to coordinate the activities of public sector institutions under the Agricultural PRORURAL Inclusive approach.

Additional Financing:

Direct Beneficiaries

The direct beneficiaries of AF were 1,289 small and medium producers (10% indigenous and 15% females) grouped into 31 seed growers organizations. These producers are geographically located within the (original) intervention areas of the project; Departments of Jinotega, Matagalpa, Boaco, Chontales, New Guinea (RAAS), Siuna, Rosita and Puerto Cabezas (RAAN). These producer organizations are financed their CDPs, which contributed to the achievement of the goal of the production of certified staple grain.

The 1,289 farmers were trained in agronomic and teaching techniques under methodologies Field Schools (FFS) for the production of certified staple grain, taking as a basis the practices of integrated crop and pest management, and protection measures and environmental and social safeguards. Assuming an average of 4 members per family is estimated that the FA-PTA-II able to benefit some 5,156 people in the areas of influence of the project.

Key factors affecting project implementation and results.

One of the key factors affecting project implementation was the level of consistency used for the pre-selection of seed grower organizations that participated in the project.

In the preparation phase of project design, it was assumed that category A and B cooperatives met eligibility for access to credit, this assumption was not very accurate. This became a critical risk for financial services, causing delays in the placement of the portfolio in the first two years of the project, which led to a sharp drop in projected recovery and increasing the bottom line of credit. Most pre-selected organizations did not meet the expectations of meeting the administrative and technical requirements, legal to be eligible to credit and developing stages of the production of certified seed.

The change/transition from the *Fondo de Credito Rural* Rural Credit Fund (FCR) to *Banco Producamos* (BP), represents a risk related to a restructuring process of public sector entities experienced during project execution. The risks in the project design were partly identified and mitigated, however, the issue of marketing and markets certified staple grain were not considered as critical factors, and these were not fully mitigated.

Project Implementation

Minor changes were made to the original design focused mainly on the operation of component II of the Project. The changes were:

- (i) Reforming the rules of the credit facility to improve access to finance for small and medium producers. Adjustments to the eligibility requirements were made, allowing dynamic actions of Component II.
- (ii) Reforming the rules of the credit line for improving the structure of the credit committee. A restructuring was carried out on the credit committee for expanding coverage and members

designated national coordinating committee as the body responsible for approving proposals and credits to be awarded on seed organizations.

- (iii) The establishment and implementation of the Project Technical Committee, which was composed of a technical representative of the implementing institutions. This committee is responsible for creating and securing the conditions for seed growers organizations conduct their proposals or requests for credit by investment plans known as Cooperative Development Plans (CDPs).

Basically these three (3) actions in conjunction with the implementation strategy included in the document, the length of time the project, all were actions taken into consideration to reduce risks and achieve goals and reach the FA-PTA-II indicators. This strategic approach was based mainly on the results of technical analysis which showed low levels accurately implementing the project presented in the month of September 2013 (29 months after project effectiveness have been fulfilled).

Evaluation of project results

The AF managed to meet its objectives as it created and improved conditions for small and medium producers to have better access to services. It helped the delivery of technical assistance provided by the state, capacity building, credit investments in construction and seed availability.

Similarly, the FA-PTA-II strengthened public services within the National Seed System (SNS). In the territories of influence, laboratories were built to certify the quality of basic grains and seeds. At INTA (Managua), an important infrastructure for the storage of genetic material, processing and analysis of quality seed for basic grain production was erected.

In this particular, we consider the contribution made by the project to be aligned with the strategic guidelines established by the National Human Development Programme (NHDP). It contributed to reduce poverty levels in the country, ensured food production and improved productivity in the production of basic grains. Currently, the agricultural sector has technical-and scientific capabilities that serve producers and companies that require certification services and processing of certified seeds. With respect to project design, we note that the integration of credit, cooperatives capacity building and technical services are consistent and conducive to strengthening the supply of seeds. These three services simultaneously managed to improve productive performance and access to markets for certified seed.

In terms of implementation of its three components, the AF managed to create and improve the conditions of the seed grower organizations, small and medium producers putting available a line of credit for the production of certified seeds, service laboratories, seed processing plants, and facilitating certification services in the field.

In this context, we can say that the legacy of the AF leaves important teachings. Its contribution to the country was crucial, since it enabled Government structures specialized in agriculture, learn a method of coordination and work on common stock, with significant results in the field of food production. The main achievements expressed to have built a productive socio-platform support for

the production of certified seed, and improve the physical conditions of the General Directorate of Protection and Animal Health (DGPSA) no Animal Sanitation and Protection Institute (IPSA).

On the path of profitable growth, the AF created the conditions for opening a process in two main directions: a) the ability to produce seeds b) strengthening the business skills of cooperatives, seed grower organizations and capabilities; which increased the possibility to access financial resources.

The intervention model was based on an effective inter-agency coordination led by MAG. As for managerial communication mechanisms for decision-making; the Interagency Coordinating Committee and the Technical Committee of the PTA FA II, permitted a good level of communication, coordination and institutional integration. This comprehensive model of MAG increased its leadership in agriculture as a public regulatory body.

With the development of Component I, the PTA-II AF managed to improve the business skills of 31 organizations and 1,289 small and medium capacities and seed producers. It, allowed producers to access financial resources for the production of certified seed. These organizations implemented an important workflow associated with the establishment and increase of production, which is highly important to maintain the seed production base in the country. No.1 box, the level of achievement of the goals and indicators set out in part I of the project to June 30, 2014 is shown.

The PTA-II AF, with the implementation of the Component II, made available to the guilds of seed growers Organizations, an amount of US \$ 3.13 million for the production of certified seed, thus contributing to the establishment of a credit line with accessible conditions for certified seed producers.

With the line of credit, between 2013 and 2014, 39 Cooperative Development Plans (CDPs were able to obtain financing.) This resulted in the production of 2,922 metric tons of certified staple grain. The project helped boost the production of certified staple grain seeds in the country, consolidating a process of recognition and performance amongst the institutions that make up the National Seed System (SNS).

At July 31, 2014, loan recoveries reached US\$760,522.03. This fact indicates that organizations of seed growers have managed to produce albeit with some setbacks. However, there is evidence that farmers are fulfilling their credit commitments.

Component III PTA-II AF: It aimed at strengthening the capacities of public services within the National Seed System (SNS) -- to enhance the productive infrastructure of the country, regarding improvements of the installed capacities to effectively test seed quality.

In this case, three (3) seed quality laboratories were constructed (Siuna, New Guinea and Matagalpa). INTA / NCAR capabilities were also strengthened with the construction of an industrial plant for the processing of certified seeds and higher categories. Seed processing conditions were expanded and this enabled to install a genetic center for production, testing and storage of seeds with a capacity of 1,806 metric tons.

The FA-PTA-II helped improve the infrastructure in areas of the country that produce certified staple grain. Similarly, the project contributed to improve conditions and capacities for genetic analysis of seed varieties, production, processing and storage in the Nicaraguan Center for Agricultural Research (NCAR) INTA.

Lessons Learned

PTA II AF helped to integrate fully and be aligned within the focus of PRORURAL I. It allowed for intersectoral coordination, much necessary for the implementation of the components. Participating institutions strengthen their role and identity. It also proved that public institutions could play an effective and responsible role. In the formulation and design of new proposals, in-depth studies are needed to test the validity of the assumptions on which the action is based. On the other hand, a context analysis with both positive and negative variations, could identify mitigation actions. In that sense, the FA-PTA-II should have established mechanisms and actions under PRORURAL I and particularly in the PNA will facilitate the implementation of incentives for the purchase of certified seed.

- For new project, planning, it is important to prepare a results framework with outcome and impact indicators.
- It was probably necessary to include a capacity building component for MAG and BP that allowed them for better monitoring and evaluation of the financial services .
- A baseline study should be performed once the target population has been identified and largely provide information on the status of indicators, changes in the intervention strategy and visible future, the possible risks in the project can be found.
- In the process of capacity development, the use of methodologies related to Field Schools (FFS) and Rural Extension is an effective means to transfer more knowledge and technical capabilities to producers.
- It is worth noting for its relevance and impact, the expected benefits of credit by seed producers; This has to do with financial viability in relation to the marketing of certified seed.
- Ensuring the sale of production of certified seed, should make the leap from intentions to, pre contract, adding legal certainty in the granting of credit, and therefore minimizing the credit risk.
- The credit model requires systematic monitoring processes and capacity building for cooperatives in order to develop better credit application skills.
- Future projects should include a chapter on gender strategy. It should include indicators in which women integration is highly visible.

Annex 9. Response from Borrower on the ICR



Gobierno de Reconciliación
y Unidad Nacional
El Pueblo, Presidente!

NICARAGUA
2014
HACIENDO
Patria!

Managua, 17 de Diciembre 2014.
MAG-DVM-AYMV-157-12-2014.

Señor
Augusto García Barea
Gerente de Proyectos
Unidad de Agricultura y Desarrollo Rural
Región Latinoamérica y El Caribe
Banco Mundial
Su Despacho

**Referencia: Opinión sobre la Ejecución del PTAII
(Préstamo 4127-0-NI y Donación H-537-0-NI).**

Tengo el agrado de dirigirme a usted en relación al informe de cierre del Segundo Proyecto de Tecnología Agrícola (PTAII).

Como Ministerio Agropecuario identificamos que el informe describe los logros y resultados alcanzados en cuanto al cumplimiento de los indicadores, metas y el objetivo de desarrollo (ODP) definido en el diseño original del documento del proyecto (PAD), que contribuyó en gran medida al fortalecimiento del Sector Agropecuario bajo la implementación del enfoque de PRORURAL Incluyente.

El objetivo del PTAII se encuentra alineado con los objetivos del PRORURAL Incluyente, en la promoción del desarrollo y en la mejora del acceso a tecnología como factores claves del desarrollo agrícola en nuestro País. El aporte del PTAII fue de gran importancia para el sector en cuanto a la cobertura de los servicios agropecuarios y los resultados económicos de las familias productoras.

Es importante reconocer el efecto positivo del proyecto en el fortalecimiento de capacidades técnicas y administrativas de las Instituciones del sector agropecuario, que permitió asegurar la calidad y la cobertura de los servicios públicos agropecuarios en el país.

Con la implementación del Proyecto, el sector agropecuario logró cambios significativos en el fortalecimiento organizacional de protagonistas, transferencia de tecnologías agropecuarias y forestales, crédito para la producción de semillas, ampliación de los servicios de certificación de semillas, modernización de infraestructura productiva y fortalecimiento institucional.



CRISTIANA, SOCIALISTA, SOLIDARIA!
MINISTERIO AGROPECUARIO - MAG
DESPACHO VICEMINISTRA
Kilometro 8 ½ carretera hacia Masaya/ Tel: 2276020 -
www.magfor.gob.ni



Gobierno de Reconciliación
y Unidad Nacional
El Pueblo, Presidente!

NICARAGUA
2014
HACIENDO
Patria!

Managua, 17 de Diciembre 2014.
MAG-DVM-AYMV-157-12-2014.

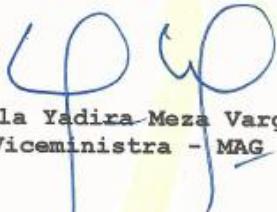
Consideramos que el desempeño del proyecto es satisfactorio y es el resultado de los esfuerzos realizados por todos los protagonistas ejecutores en pro de cumplir con los resultados y las metas del Proyecto.

El proyecto también generó lecciones aprendidas en cuanto a la gerencia de proyectos bajo el enfoque del PRORURAL Incluyente, durante el diseño, operación y evaluación del proyecto, siendo de gran importancia y fortaleza institucional para la gestión de futuros proyectos.

Finalmente compartimos que es valioso este intercambio, que forma parte de la revisión fluida y pertinente del informe de cierre del proyecto.

Sin otro particular, le expreso mis sinceros saludos.

Atentamente,


Ángela Yadira Meza Vargas

Viceministra - MAG

Cc: Cro. Edward Centeno - Ministro.
Cra. Ana Marcia Zeledón - Secretaria General.
Archivo/Cronológico.


FAMILIA Y
COMUNIDAD
EN
VICTORIAS!

CRISTIANA, SOCIALISTA, SOLIDARIA!
MINISTERIO AGROPECUARIO - MAG
DESPACHO VICEMINISTRA
Kilometro 8 ½ carretera hacia Masaya/ Tel: 2276020 -
www.magfor.gob.ni

Annex 10. List of Supporting Documents

Anderson, K. and A. Valdés (2008) *Distortions of Agricultural Incentives in Latin America*. The World Bank. Washington, D.C.

FUNICA/Unión Europea, 2012. “Estado actual, oportunidades y propuestas de acción del sector agropecuario y forestal en Nicaragua”. Managua, Nicaragua.

Government of Nicaragua. 2011. “Censo Agropecuario”. Managua, Nicaragua.

Government of Nicaragua. 2013. “Nicaragua National Human Development Plan”. Managua, Nicaragua.

International Fund for Agricultural Development (2012). “Country Strategy Paper”. (COSOP).

INTA (2013). Beneficiary Surveys

Nitlapan. Estudio de evaluación de impactos del programa nacional de tecnología sobre la problemática técnica de los productores agropecuarios, 2005.

World Bank. 2008. *Nicaragua: Poverty Assessment*. Washington, D.C.

World Bank. 2012. *Country Partnership Strategy (2012-2017)*. Washington, D.C.

World Bank. 2006. *DR-CAFTA: Challenges and Opportunities for Central America*. Washington, DC.

World Bank, 2009. Country Note on Climate Change Actions in Agriculture: Nicaragua. Washington, DC.

