

NICARAGUA FORESTRY ACTIVITY PERFORMANCE EVALUATION

MAY 18, 2012

Prepared by:

Michael Ketover

DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the Millennium Challenge Corporation or the United States Government.

CONTENTS

Executive Summary	i
I. Background and Project Description	1
A. Introduction	1
B. Project Activities	2
C. Background	3
D. Program Logic	4
E. Intended Benefits	5
F. Projected Results	5
II. Methodology and Data	5
A. Evaluation Strategy	5
B. Data	6
III. Findings and Analysis	7
A. Program Logic	7
B. Economic Assumptions	10
C. Economic Results	12
D. Implementation Factors	15
E. Range of Impacts	16
IV. Lessons Learned	19
V. Recommendations	20
VI. Conclusions	21
Annex A - People Consulted	22
Annex B - Literature and Data Reviewed	23
Annex C - Forestry Evaluation's Technical Criticisms	25
Annex D - Compact's Expectations related to Environmental Impacts	26

EXECUTIVE SUMMARY

Introduction/Background: In July 2005, the Millennium Challenge Corporation signed a five-year, \$175 million Compact with the Government of Nicaragua to reduce transportation costs, improve access to markets, strengthen property rights, increase investments, and raise incomes for farms and rural businesses. The MCC Compact in Nicaragua entered into force in May 2006, formally initiating the 5-year timeline for project implementation. Conditions leading up to, during, and following municipal elections of November 2008 were inconsistent with MCC’s eligibility criteria. In June 2009, the MCC Board terminated a portion of MCC’s compact, reducing compact funding from \$175 million to \$113.5 million.

The compact identified low-value rural business and farm activities as a major constraint to economic growth, and the Rural Business Development Project was established to address this. The general objective of the Forestry Activity was to increase the value-added of forestry-related farms and businesses in León-Chinandega by linking producers, suppliers, service providers, processors, marketing agents, and investors. Additionally, the Project expected to address the region’s persistent deforestation and water supply constraints to farming and other productive activities, especially the poor communities in the northern highlands. Overall, the Project intended to develop higher-profit agriculture and agribusiness enterprises in northwest Nicaragua and assist to sustain these enterprises by linking and coordinating businesses throughout the farm to market value chain.

MCA-Nicaragua and then another implementer provided grants and technical assistance to individuals to develop and partially finance business plans in the forestry sector so that beneficiaries could establish tree plantations from seedlings, maintain and manage the young trees, harvest the wood when ready, sell this wood as a component of the value chain, plant more seedlings, etc. Prior to and during these activities, referred to as tree planting campaigns, high-quality tree seeds were obtained, seeds were planted in tree nurseries, seedlings were maintained, seedlings were transported to the beneficiaries, etc. Technical staff made visits to the tree plantations and provided technical support, training, and follow-up visits, and later assisted beneficiaries to obtain legal title to the reforested parcels as required by Nicaraguan law. Four campaigns took place: 2007 – 08; 2008 – 09, 2009 – 10, and 2010 – 11.

The Forestry Activity was one of four “conglomerates” within the Rural Business Development Project. The other three conglomerates were Agriculture, Livestock, and Non-Agriculture, which included tourism and artisan support. The forestry activity of the Rural Business Development Project began in 2006. MCC expended US\$32 million on the Rural Business Development Project. For the forestry activities, MCC expended US\$7.5 million.

Evaluation Strategy: The focus of this performance evaluation was whether or not the Project’s program logic was sound and successful and had the intended benefits related to generating economic growth. The evaluation sought to determine if the Project did what it was designed to do, and whether it had unintended benefits. This Performance Evaluation employed qualitative methods to assess the degree to which activities were undertaken and implemented; the achievement of outputs, outcomes and impacts; and prospects for sustainability.

Key Findings:

1. The wide-ranging compact language led to overly inclusive activities, which led to complicated logistics that overwhelmed MCA-Nicaragua when it implemented the first two tree-planting campaigns in-house and then inundated the new implementer for the next two tree planting campaigns.
2. The planned watershed activities were cancelled.
3. The ambitious reforestation target was not met.
4. Numerous technical miscues were identified during the first two tree planting campaigns but were not adequately addressed during the last two tree planting campaigns.
5. Obtaining title to the participants' parcels was an unplanned for and time-consuming task performed by the implementer's technical forestry staff, taking them from their main function of providing technical support.
6. The planned value chain remains incipient and largely undeveloped.
7. Forestry-related businesses are not established.

The complete findings with analysis can be found in Section III.

Lessons Learned:

- Developing more specific logic for the Forestry Activity at the Compact's outset could have resulted in the refinement or limitation of certain implemented activities.
- Planting a seed to harvest wood to link to a value chain (as an order for sale of wood) is a very ambitious proposition for a short-term intervention. Including and considering explicit program assumptions at the outset related to (1) the weather, (2) experience levels of producers on small parcels, (3) the amount of time it takes to grow and harvest the wood, (4) the time needed to add value to the wood, and (5) the challenges inherent to linking into fledgling value chains, likely would have led to stronger results.
- Certain technical lessons learned from the first two tree planting campaigns were not incorporated into next two campaigns with respect to (1) the timing of the delivery of the seedlings for planting and replanting, (2) the suitability of the land proposed for the tree plantations, (3) the self-selection of the plantations in terms of climate, soil, and access to markets, and (4) the continued use of certain tree species with known lower survivability rates.
- It is difficult for farmers with little or no tree planting experience to achieve commercial success rates for planting trees. Low-input agroforestry plantation systems can be particularly useful with smaller parcel holders with fewer resources and minimal tree planting experience, especially with those who tallied less than 50% survival rates.
- Requiring titled land before beneficiaries submitted their business plans would have facilitated compliance with Nicaraguan commercial tree plantation law and permitted the technical staff to address the numerous technical forestry issues.

Recommendations:

LOGIC:

- Articulate the intervention's activities more clearly in the Compact.
- Develop more explicit program logic and assumptions from the outset for future tree plantation-to-market value chain activities.
- Develop risk mitigation strategies for priority risks such as uncertain weather.

PROGRAM CRITERIA:

- Minimize certain cost elements in designing the nature and scope of future forestry activities (i.e. design the intervention for fewer, less disperse plantations; larger target parcels; promote fewer, less complicated tree species; require title prior to submission of the business plan).

MONITORING:

- If forestry conglomerates remain a goal, consider reducing certain numerical monitoring targets to enhance Activity's efforts to develop critical masses of concentrated tree plantations. This could increase the number and quality of technical support visits, improve Activity monitoring, and facilitate local partnerships for producers.
- Disaggregate the reported data for "jobs created" among the Project's distinct components.

Conclusions: The scope of the Rural Business Development Project's Forestry Activity, as articulated in the Compact, was too broad and unspecific. This resulted in complicated logistics and concomitant low survival rates of trees. After four tree-planting campaigns from 2007-2010, MCC did not substantially achieve its objective to increase the value-added of forestry-related farms and businesses in León-Chinandega. This Activity did not address, as planned, the region's persistent deforestation and water supply constraints to farming and other productive activities.

Even with the cancellation of the planned watershed activities, the Activity implementer was logistically challenged with concurrent activities: training thousands of tree-planting novices in the entire range of tree plantation technical activities in 23 municipalities with less than a dozen technicians, working to obtain titles for the beneficiaries' plots, attempting to strengthen (and establish) value chains for the proposed wood products, etc. The evaluation did not find any evidence of supply orders or sales with wood harvested from this Activity, and the associated value chains remain fledgling in the target region. The final 27% reforestation rate cannot be considered a cost effective investment.

I. BACKGROUND AND PROJECT DESCRIPTION



A. Introduction: In July 2005, the Millennium Challenge Corporation signed a five-year, \$175 million Compact with the Government of Nicaragua to reduce transportation costs, improve access to markets, strengthen property rights, increase investments, and raise incomes for farms and rural businesses. The MCC Compact in Nicaragua entered into force in May 2006, formally initiating the 5-year timeline for project implementation.¹ The compact identified low-value rural business and farm activities as a major constraint to economic growth, and the Rural Business Development Project was established to address this. The Forestry Activity of the Rural

Business Development Project began in 2006. MCC expended US\$32 million on the Rural Business Development Project. For the forestry activities, MCC expended US\$7.5 million.

The Rural Business Development Project's overall objective was to support services that would help develop higher-profit agriculture and agribusiness enterprises in northwest Nicaragua.² The Project planned to focus on reaching poor farmers who required more help in making the transition into business. In addition, the Project would sustain these enterprises by linking and coordinating businesses throughout the farm to market value chain - producers, entrepreneurs, buyers, service providers, and investors. Investments in public goods such as applied research and investment promotion promised to attract investment and expand productivity in the region. The Forestry Activity was one of four "conglomerates" within the Rural Business Development Project.³ The other three conglomerates were Agriculture, Livestock, and Non-Agriculture, which included tourism and artisan support.

¹ Conditions leading up to, during, and following municipal elections of November 2008 were inconsistent with MCC's eligibility criteria. In June 2009, the MCC Board terminated a portion of MCC's compact, reducing compact funding from \$175 million to \$113.5 million.

² The Project had three components: Rural Business Development Services; Technical and Financial Assistance; and Grants to Improve Water Supply for Farming and Forest Production.

³ Stakeholders envisioned conglomerates as clusters or groupings of beneficiaries - the critical mass needed to sustain the forestry-related economic activities.

B. Project Activities: The general objective of the Forestry Activity was to increase the value-added of forestry-related farms and businesses in León-Chinandega by linking producers, suppliers, service providers, processors, and marketing agents.⁴ Additionally, the Project was designed to address the region’s persistent deforestation and water supply constraints to farming and other productive activities, especially the poor communities in the northern highlands. On the ground, this translated into developing a Forestry Conglomerate and strengthening (or creating) Tree Plantation-to-Market Value Chains in the region.

- Forestry Activity Components**
- Competitive selection process to solicit proposals for investments in forestry
 - Forestry Conglomerate
 - Tree plantation-to-market value chain
 - Institutional strengthening

MCA-Nicaragua and another implementer provided grants and technical assistance to individuals to develop and partially finance business plans in the forestry sector so that beneficiaries could establish tree plantations from seedlings, maintain and manage the young trees, harvest the wood when ready, sell this wood as a component of the value chain,

The Plan for the Forestry Activity

Work with over 3,500 farmers to:

- 1) develop business plans;
- 2) invest grant money;
- 3) produce prime material (outplant seedlings, maintain young trees, prune, harvest wood, replant, etc.);
- 4) add-value (make charcoal, furniture, and patio bars from the wood);
- 5) organize and strengthen existing or new value chains; and
- 6) link into these value chains to sell products

Sources: Compact; Monitoring and Evaluation Plan (2010)

plant more seedlings, etc. Prior to and during these activities, referred to as tree planting campaigns, high-quality tree seeds were obtained, seeds were planted in tree nurseries, seedlings were maintained, seedlings were transported to the beneficiaries, etc. Technical staff made visits to the tree plantations and provided technical support, training, and follow-up visits, and later assisted beneficiaries to obtain legal title to the reforested parcels as required by Nicaraguan law. Four campaigns took place: 2007 – 08; 2008 – 09, 2009 – 10, and 2010 – 11.

MCA-Nicaragua attempted to manage the technical operations in-house for the first two planting campaigns. After two challenging years in terms of unexpected weather and very broad scope of the project, MCA-Nicaragua contracted with a forestry implementer called GFA to manage the operations and reporting for the next two tree planting campaigns.

Concurrently, the project was exploring market interest, business viability, and service linkage possibilities for these proposed products to establish or strengthen the value chain. The value chain component contemplated that businesses would purchase the wood from

⁴ According to Compact Schedule 3-1, this Project was to focus on working with women as producers since women were “less likely to participate in existing agricultural or forestry organizations in the region, receive technical assistance or credit, or plant higher profit-yielding crops.”

these plantations to be used to make furniture, to construct *ranchos tipicos* (outdoor patio eating/drinking areas), and for charcoal. The third activity element was an institutional strengthening component.

The Project component that dealt with watersheds was to develop a watershed management action plan for the region and to provide grants to improve the water supply for irrigation to facilitate higher value, sustainable agriculture and forestry in the upper watershed areas of the region. This watershed component expected to address several decades of consequences in this region that reduced tropical dry forests to 18% of the land, with the rest converted to agricultural land use and livestock, including crops for export (cotton, sugarcane and bananas) that promoted a heavy use of agrochemicals.⁵

The watershed management action plan was developed and certain watershed areas were prioritized, as contemplated in the original design, but due to reasons discussed below, in 2008 MCA-Nicaragua suspended its watershed activities related to improvement of water supply without expected results in the field.

C. Background: The Activity expected trees to be planted on almost 7000 hectares (10,000 *manzanas*)⁶ by farmers with modest tree planting experience. MCC used a commercial standard survivability rate of 68% in order to arrive at an ERR for this activity of 10%. For the 2007 and 2008 tree planting campaigns, the implementer increased the minimum size of area to be planted per beneficiary from three *manzanas* to six *manzanas*. The 10,000 *manzana* target was met during the course of the Project – 10,434 *manzanas* reported.⁷ According to the implementer, 10-12 forestry technicians were on staff during the final two and a half years of tree planting campaigns and responsible for providing technical and logistical support to plantations in 23 municipalities in two departments of Nicaragua.

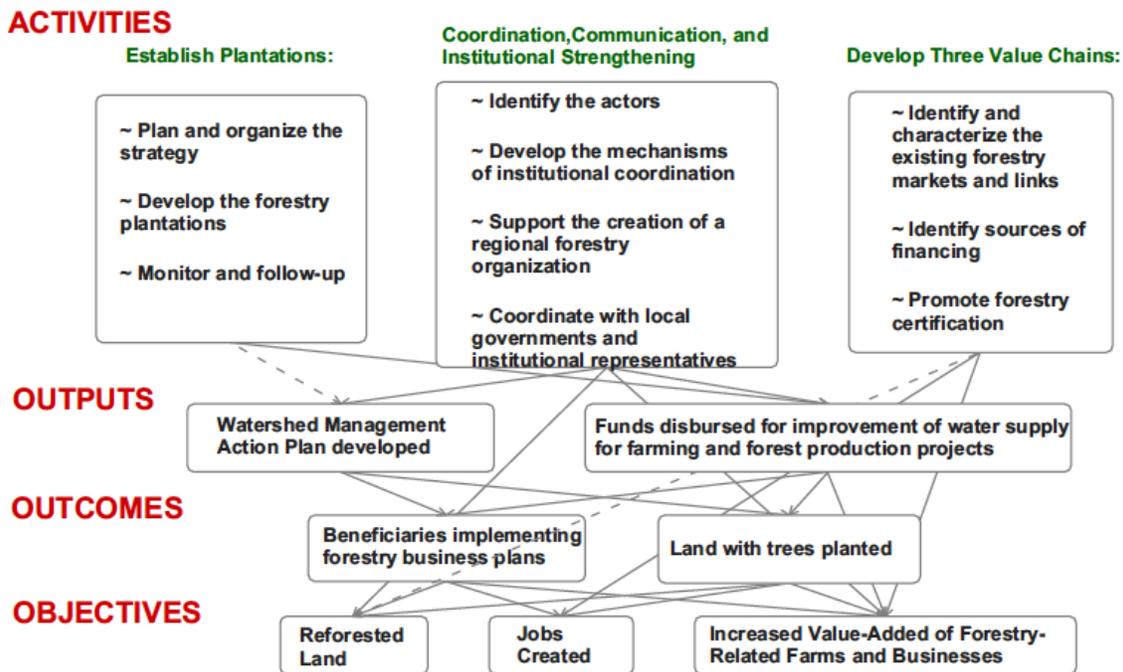
⁵ See Compact. See also, Final Report, "Consulting Services for the Inventory and Assessment of Forest Plantations in the Western Region during the 2007-2008 Forestry Campaigns, Serafín Filomeno, February 2009.

⁶ The conversion rate is 1.43 *manzanas* in 1 hectare. 10,000 *manzanas* is about 1.7 acres.

⁷ Several stakeholders opined that this rather bold target caused the Project to spread its resources too thinly in too dispersed locations during the implementation of activities.

D. Program Logic: Based on implementation described in the previous sections, program logic is as follows:

Figure 1: Forestry Activity Program Logic



Sources: GFA Consulting Group, Sustainable Forestry Strategy, April 2009, pages 6-7 (activities); Compact; Monitoring and Evaluation Plan 2010

Assumptions: No explicit program-related assumptions were developed for the forestry activities, according to compact documents. The Economic Rationale section of the original ERR for the Rural Business Development Project notes that the specific activities for the “Improvement of Water Supply Activities” were to be determined over the course of the Project. Activities were required to achieve at least a 10% economic rate of return - an explicit economic assumption.⁸

The original sensitivity analysis excluded the watershed management component, addressing prices for and amounts of land allocated to crops in the Agriculture component. The ERR for the Forestry Project makes parametric assumptions related to growth of the trees, costs, inputs, size and composition of area planted, etc.⁹

The implementer that took over after a year and a half of forestry activities developed basic programmatic assumptions, in collaboration with MCA-Nicaragua, related to possible

⁸ Since 10 percent is the minimum, the expected actual average economic rate of return was to exceed 10%. ERR for the Rural Business Development Project was estimated to be 18 percent, calculated as a weighted average of the Rural Business Development Project (16%) and Improvement of Water Supply (10%) activities. See EER 2005. Note that the average of 16 plus 10, even if weighted, cannot equal 18%.

⁹ Forestry Activity ERR, May 20, 2011.

conditions for the Forestry Activity.¹⁰ The assumptions developed were (1) that natural or human-caused events did not occur that would “drastically” affect the plantations; (2) that there would be a “sufficient supply of services and supplies delivered on time”; and (3) that MCA-Nicaragua continued to pay [the implementer]. Listing these assumptions without considering mitigation turned out to be an inadequate exercise, to be discussed below.

E. Intended Benefits: The principal direct beneficiaries for this Project were relatively poor households employed in agriculture or with small farms. Agribusinesses and other micro, small- and medium-sized enterprises were also expected to benefit from new or expanded market opportunities created under the activity. The Compact stated that the Project Activities related to grants for improving water supply would expand income growth benefits to some of the poorest households in the region while protecting agricultural enterprises from future resource degradation.

F. Projected Results: See Table 1.

Table 1: Forestry Activity Indicators	Compact Targets
Number of beneficiaries implementing forestry business plans	3,588
Number of <i>manzanas</i> reforested	7,500
Number of <i>manzanas</i> with trees planted	10,000
Development of Watershed Management Action Plan	1
Funds disbursed for improvement of water supply for farming and forest production projects	US\$7.5 million
Number of jobs created *	7,000

The Forestry Activity was combined with the agriculture, livestock and other activities in terms of the indicator for number of jobs created (7,000 total).

Source: MCC Indicator Tracking Table, July 2011;

* The target for this indicator was not disaggregated.

II. METHODOLOGY AND DATA

Evaluation Strategy: The focus of this performance evaluation was whether or not the Forestry Activity’s program logic was sound and successful and had the intended benefits related to generating economic growth. The evaluation sought to determine if the Forestry Activity did what it was designed to do, and whether it had unintended benefits.

¹⁰ GFA: Informe de Incepción (Inception Report), September 2008.

The evaluation delved into the components of the logic and sought evidence to (1) confirm whether planned activities were undertaken as planned and fully implemented; (2) analyze whether the initial assumptions made about conditions that could affect the progress or success of the activities held true; (3) assess whether the implemented activities achieved their targeted objectives, outputs, outcomes, and impacts related to increasing the value-added of forestry-related farms and businesses in Leon/Chinandega; (4) determine whether activities and outcomes have been and will continue to be sustained, and the likelihood that they will be sustained over the short-and long-term, and (5) whether the project was cost effective.¹¹

This Performance Evaluation employed qualitative methods to assess the degree to which activities were undertaken and implemented; achievement of outputs, outcomes and impacts; and prospects for sustainability. Qualitative approaches included interviews (structured and unstructured) with key informants, listed in Annex A. Qualitative methods supplied information on the nature and content of this Activity to contextualize numerical evaluation results, and provided insights into program implementation. Rigorous analysis of qualitative data was done using content analysis and analytical induction.¹² The absence of a counterfactual precludes a quantitative measure of program impact.

Documents, data, and literature reviewed are listed in Annex B.

Data: Data related to progress towards meeting the Forestry Activity indicators is found in the Indicator Tracking Table from April 2011. See Table 2, next page.

At the conclusion of this Activity, MCA-Nicaragua contracted an independent forestry expert to assess certain technical components of the Forestry Activity and to comment on the ERR. That technical evaluation performed four months of fieldwork and assessed more than 9,000 trees on 432 parcels in 23 municipalities with a team of twelve forestry technicians and experts. This work covered approximately 1200 *manzanas*, 12% of the Forestry Activity's reported planted area. The final report was submitted to MCA-Nicaragua in August 2011. This evaluation used the recent data from this technical evaluation for certain sections of this report, including tree survivability rates. See Table 3, next page.

¹¹ The evaluation assessed the soundness of certain ex-ante participant selection criteria, including income levels of farmers and size of parcels required; certain screening procedures, including whether farmers needed land titles for the new or existing tree plantations supported by this activity; and project requirements, including replanting dead seedlings, definition of commercial practices, etc.

¹² As used in performance evaluations, analytic induction requires an additional inquiry step once the initial hypothesis or findings are developed, to search the data for falsifying evidence, and to modify the findings accordingly. Content analysis summarizes narrative content by counting various aspects of the content, analyzing written words to produce numbers and percentages, when appropriate.

Table 2: Reported Results Forestry Activity Indicators	Compact Targets	Percentage Completed
Number of beneficiaries implementing forestry business plans	3,588	58.8%
Number of <i>manzanas</i> reforested	7,500	38.7% ¹³
Number of <i>manzanas</i> with trees planted	10,000	102.3%
Development of Watershed Management Action Plan	1	100%
Funds disbursed for improvement of water supply for farming and forest production projects	US\$7.5 million	88.8%
Number of jobs created *	7,000	146.7%

By the end of the Project, of the total 10,434 *manzanas* planted, 6027 *manzanas* were found standing by the forestry evaluator and his team of field researchers. 10% totally died (survival 0%), 5% were within the range of 0.1-24%, 27% survived within the range of 25-49%, 37% survived from 50-74% y 26% were within the range of 75-99%.

Source: MCC Indicator Tracking Table, July 2011;

* The target for this indicator was not disaggregated.

Table 3. Tree Survival Rates						
Tree Planting Campaign	Survival Rate per Manzana					Total Manzanas
	75-99%	50-74.9%	25-49.9%	0.1-24.9%	0%	
2007	163,31	518,78	289,10	3,20	258,87	1233,26
2008	975,12	1357,80	953,72	102,47	429,16	3818,27
2009	1002,34	821,72	800,58	59,69	193,26	2877,60
2010	456,33	967,12	578,03	338,81	165,33	2505,61
Total	2597,10	3665,41	2621,44	504,17	1046,62	10434,73

Source: Forestry Final Report 2011; MCA-Nicaragua data, 2007, 2008, 2009, 2010

¹³ For MCC, reforestation ultimately meant survivability greater than 68%. MCC determined the final reforestation rate to be 27%, which is different than the 38.7% data from the ITT.

III. FINDINGS AND ANALYSIS

A. PROGRAM LOGIC

A1. Program Logic Is Found in Implementing Plans – The evaluation did not find evidence of clear and well-conceived program logic for the Forestry Activity in Compact documentation. While program logic was not readily available in compact documents, program logic was found in the implementation plans for forestry activities, made more explicit over two years into Forestry Activity operations, as detailed in Section ID. The Program Logic section of the Monitoring and Evaluation Plan focused on agriculture activities and the Compact’s Schedule 3 included the competitive selection process to solicit proposals for forestry grants but does not detail program logic.

A2. Wide-ranging Compact Language Led to Overly Inclusive Activities and Complicated Logistics – Most stakeholders characterized the logical framework’s planned activities in the Compact as ambitious, excessive, and logistically complicated. Overall, interviews with Project managers and implementers offered relatively consistent responses related to the wide range of planned activities to develop the forestry conglomerate and coordinate the tree plantation-to-market value chain. For example, a senior MCC official characterized the forestry activities as “the least focused, by far, of the [Rural Business Development] Project.” Likewise, a Nicaraguan program designer noted that the logistics of this forestry activity were the most complicated of all Compact activities. A former MCA-Nicaragua staff characterized the proposed watershed activities as “very complicated and the most time consuming for the Compact’s term.” The forestry expert added that “the weakest links in this [forestry conglomerate] process” were the great distances between parcels that precluded development of forestry conglomerates (that require a certain concentration of tree plantations to facilitate business and lower transaction costs and transportation). This comment speaks to faulty program logic.

Literature related to value chains and wood notes that many steps are required for production as the first link on the chain, and states that considerable time is needed to harvest and adequately dry wood to sell in other links of the value chains, especially for hardwood furniture.¹⁴ One international expert in value chains opined that creating the prime material (wood) for eventual sale in the value chain is “inconceivable” in a 5-year implementation period. The forestry expert agreed that the term of the Activity was too short to see any plantation-to-market links (i.e. market orders or supply contracts for the wood) established. Several interviewees concurred that a forestry activity should have a longer timetable than 5 years; especially since several of the target species are not harvested for 20-25 years.

The overly ambitious activities within the Forestry Activity’s logical framework led to very complicated logistics, which negatively impacted success rates on some activities. This was likely due to wide-ranging Compact language that led to broad activities that ranged from finding the tree seeds to maintaining young tree seedlings to filling supply orders and selling

¹⁴ See The Global Wood Value Chain, Rapheal Kaplinsky, Olga Memedovic, et al, UN Industrial Development Organization, 2003. See also, Successful Practices In Value Chain Development Marcos Arocha of Austin Associates for USAID, Dec. 2008.

the wood. From a seed to a sold piece of furniture in 5 years is a very ambitious undertaking. The scope of the planned activities was too broad and overly inclusive.

A3. No Evidence Was Found of Assumptions about Possible Conditions That Might Affect the Forestry Activities – Although it did include assumptions related to agriculture, the Assumptions section of the Monitoring and Evaluation Plan lacked explicit assumptions about conditions that could affect the progress or success of this Activity. No other evidence of MCC-developed assumptions was found during this evaluation. A project designer noted that MCA-Nicaragua paid considerably more attention to the agricultural component than the forestry component of this Activity likely due to more familiarity with the agriculture conglomerate. Development and discussion of assumptions related to Forestry Activity uncertainties would have assisted the Project deal with challenges related to for example, the weather, experience levels of producers, and time needed to harvest the wood in order to link it to the value chains.

Specifically, the program logic lacked assumptions about the weather, about experience levels of producers on small parcels, about the amount of time it would take to grow and harvest the wood, the time needed to add value to the wood, and the challenges inherent to linking into fledgling value chains, all of which played significant roles in the low survivability rates of the tree seedlings. Unusual weather and untimely delivery of seedlings did play particularly important roles in low survivability rates of tree seedlings in the four campaigns from 2007-2010. In 2007 and 2010 there were hurricanes and floods, while 2008 and 2009 had moderate to low precipitation and higher than normal temperatures (drought).¹⁵

MCC and MCA-Nicaragua, the implementer, and the forestry expert often discussed the issue of survivability rates during the course of this activity, but much of the discussion occurred after trees died. According to one former MCA-Nicaragua official, “We were too general when we established indicators for the forestry activities without knowing the complications of forestry operations.” One implication of this was that the targets for reforestation were set too high. Another MCA-Nicaragua official stated, “Not including mortality rate indicators was definitely missing from the beginning.” While one MCA-Nicaragua official insisted that cooperating weather was included as an assumption in the 2010 Monitoring and Evaluation Plan, this evaluation found no evidence to support this statement.

Whether measuring seedling survivability as another performance indicator was needed from the outset remains an open question. In hindsight, however, one can argue that what was lacking was not necessarily another indicator, but an assumption and the subsequent discussion related to a least one important unknown: the weather. Identifying this assumption at the outset is paramount to any forestry activity, and while the implementer included it as an assumption and a risk in its operations plan, this was after two tranches of seedlings delivery and decisions to delay deliveries due to the weather. According to the forestry expert, in northwest Nicaragua trees need to be planted in two well-defined periods and the Project’s decision to delay delivery of the plants for planting and re-planting due to the weather was the key contributing factor to low survivability rates on some farms throughout the course of the Project, not only the first two years. The discussion

¹⁵ The first plantings in the wet years were beneficial, but the years with low rainfall held moderate to high risk of mortality. For the second planting season each of the four years were high risk.

surrounding what to do in case of bad weather could have engendered strategies to mitigate the very low survival rates during the entire course of this activity.¹⁶

A4. Watershed Activities Cancelled – Income growth for farmers from improved and more consistent water supply and expected environmental impacts¹⁷ were not realized when the watershed component was cancelled. According to the Compact, “Improvement of Water Supply Activities” to improve the water supply for irrigation or facilitate higher value, sustainable agriculture or forestry in the upper watershed areas of the region were to be determined over the course of the Project. Although a watershed management plan was developed that identified and prioritized watershed areas, this evaluation found no evidence that the forestry activities accomplished watershed-related activities that improved water supplies. When asked why this was not implemented, stakeholders offered several answers. The implementer said, “The ERR did not meet the required 8-10% threshold so the watershed activities were cancelled.” The former MCA-Nicaragua Director confirmed this.

MCA-Nicaragua officials offered other reasons: following the news that MCC was partially suspending operations in Nicaragua after the 2008 Nicaraguan Presidential elections, MCA-Nicaragua offered a public procurement opportunity to construct a dam or reservoir, but not one entity responded to the procurement opportunity. Another MCA-Nicaragua staff member added, “So much was going on at the time, therefore we decided to move the funds for the planned watershed activities over to the Forestry Project.” The former MCA-Nicaragua Director suggested that at the time the Compact was developed, local Project designers were thinking of “expensive, grandiose dams” when what was likely more useful in the relatively sparsely populated northwest region would have been inexpensive cement reservoirs next to rivers with PVC pipes. He reasoned, “While building a dam for 10,000 people might have resulted in a profitable rate of economic return, building it in less populated areas in rural northwest Nicaragua would not.”

B. ECONOMIC ASSUMPTIONS

B1. ERRs Did Not Include Quantifiable Environmental Benefits – MCC excluded environmental and social benefits from the Rural Business Development’s initial ERR and the Forestry Activity ERR calculations. This is not uncommon, as forestry functions such as soil and water conservation, animal and plant biodiversity, regulation of micro-climate, and carbon storage that contribute to the well-being of local, regional and global population are often not included in the market economy.¹⁸ Some researchers argue that the conservation

¹⁶ The implementer prepared a more detailed risk assessment and opportunity/threat analysis as part of its Inception Report, but during the last two campaigns the implementer continued to plant in many municipalities, continued with several species that had poor survivability in the first two campaigns that are well known to be difficult to manage, and again delayed the delivery of plants due to the weather. Also, MCA-Nicaragua developed a proposal for New Strategy for the Rural Business Development Project in November 2007 that identified the risk from weather but did not explore risk mitigation strategies.

¹⁷ These environmental impacts were to address consequences from Nicaragua’s high regional rates of deforestation, such as decreased soil productivity, severe erosion, and flooding. See Annex D for additional comments related to the Compact’s expectations related to the environment.

and management of these goods and services are of little or no economic interest to some entities seeking higher rates of economic return.¹⁹ This evaluation does not advocate for or dismiss action to reduce net carbon dioxide emissions as part of tree planting activities, but raises the issue of quantifying environmental services as meriting further consideration.

Most tropical hardwood species used for furniture or lumber have become rare in natural forests in northwest Nicaragua, and their slow growth rates and late maturities make them less suitable for plantations established by entities requiring higher rates of return, like MCC. For a generic tropical (or sub-tropical) plantation project such as this Activity, the least cost CO₂ sequestration option would likely be planting fast growing species only, such as eucalyptus for pulpwood or firewood production.²⁰ The cost differential of removing a ton of CO₂ between a project involving plantations of fast growing species and one involving the plantation of mixed native hardwood species could be compensated by MCC funds, thereby decreasing the economic gap between these sequestration projects, perhaps similar to how producer's cost of changing production can be partially offset with grants from the MCC in a "cost-sharing" scenario.

The implementer advocated to include payments for environmental services in the ERR and told the evaluator it provided an ERR to MCC that included economic benefits of environmental services. Assorted examples of possibly quantifiable economic benefits suggested by interviewees were: protection of a water source, soil conservation, self-use of wood by farmers (no sale), feeding leaves to cattle, and carbon capture. MCC used an ERR without calculations for environmental benefits, to the chagrin of the implementer and several MCA-Nicaragua staff, due to the difficulties in quantifying costs and benefits. MCA-Nicaragua went ahead and identified market demand for carbon anyway, reporting its calculation of 1241 tons per year in the final edition of its magazine.²¹

B2. ERR's Assumptions for Prices of Key Wood Species Could Have Been More Specific – The ERR for this Activity included assumptions for prices of wood from several planted tree species, using data provided by the implementer. The 2011 Forestry Evaluation also inventoried local markets for wood prices and found some differences in the values used in the implementer's ERR. It also noted that wood from several tree species had different values based on the age and quality of the wood, which was not taken into consideration in the implementer's proposed ERR or MCC's calculated ERR.

The ERR assumed that benefits, in the form of increased income per *manzana*, would begin to occur after 12 months of project intervention. Harvesting species planted during this

¹⁹ See NOAA Coastal Service Center, Restoration Economics, Environmental Valuation: Principles, Techniques, and Applications, see also United Nations FAO, Can the instruments linked to the Convention on climate change foster a sustainable forest management in Africa? 2001.

²⁰ A permanent, diverse, sustainably managed forest is often a determinant for the biological diversity of animal and plant species, which require a long-term, dynamic mix of native species and for specific human activities. See, for example, Low-Carbon Development for Mexico, Todd M. Johnson, et al. Mexico: Estudio sobre la Disminucion de Emisiones de Carbono (MEDEC), 2009.

²¹ La Cuenta Informa, CRM Cumplió, Edición Final, May 2011, page 19.

Activity, however, increased income would not occur for at least six years, and in six years with only one species (eucalyptus) only.

B3. Demanding Decision Measure – ERRs were calculated for the RBD Project at the outset without including the Forestry Activities. While an ERR was not calculated for the forestry activity, a minimum of 10% had to be reached. The ERR for the Forestry Activity was finalized in May 2011 in order to permit “MCA-N to begin reporting on the “number of manzanas reforested indicator,”²² with refined parametric assumptions. MCC revised several aspects of the recalculated ERR, such as the growth table for one of the species (teak), harvest schedule for teak, harvest and transportation costs, survival rate between thinning, and labor and maintenance/vigilance cost and schedule. With these changes, the survivability rate at year two, in order to arrive at an ERR of 10%, was 68%.

MCC’s selection of a 68% survivability rate with a majority of inexperienced tree planters on self-selected parcels that did not conform to commercial standards caused much consternation at MCA-Nicaragua. The forestry expert stated that some commercial plantations accept a 50% survival rate in their business plans for some species, but felt that MCC’s insistence on 68% for all species “was too high.” MCC’s selection of this 68% survivability rate (and the implementers’ contractual obligation to meet its contractual standards) with many inexperienced tree planters on self-selected parcels that did not conform to commercial standards resulted in low reforestation (27%).

“Discounting project impacts such as carbon sequestration is a fundamental necessity.”

- Discounting Costs And Benefits In Carbon Sequestration Projects, Boscolo, et al, Environment Discussion Paper No. 41, February 1998 (USAID funded)

B4. Selection of Discount Rate – When weighing the benefits and costs of tree planting and other longer-term environmental management programs, the selection of a discount rate is a key consideration. A number of reasonable decision measures (i.e. internal rate of return, benefit-cost ratio) depend critically on the chosen discount rate. Lower discount rates can encourage some longer-term programs.²³ Although the selection of a discount rate is often a source of controversy for projects with longer-term environmental considerations, this evaluation did not locate evidence that lowering the discount rate was considered for this Activity. Conversely, the Forestry Activity’s ERR mentioned the option of adding the risk of “trees dying from natural cause” to the discount rate, however, which would have increased the required ERR hurdle rate.

C. ECONOMIC RESULTS

C1. Forestry-Related Businesses Are Not Yet Created – The forestry conglomerate was expected to be a hub of economic development in the region, but this is not yet the case. This evaluation found no evidence of any newly planted wood that was harvested from this Activity and then linked to the supply chain with an actual order. Some charcoal has been

²² Lola Hermosillo, MCC, email, May 24, 2011.

²³ NOAA Coastal Service Center, Restoration Economics, Discounting and Time Preference, www.csc.noaa.gov/coastal/economics/discounting.htm

repackaged, branded, and sold, but that charcoal came from older eucalyptus trees planted with earlier (not MCC) projects, not newly harvested wood. The *ranchos tipicos* were apparently constructed with older, previously planted eucalyptus wood, also. The evaluation found no evidence that the beneficiary tree farmers have increased their incomes due to the Project's forestry activities, yet.

C2. Value Chain Remains Incipient – As noted previously, the objective of the Rural Business Development Project was to create conditions that facilitated and supported private business initiatives in the northwest Nicaragua to improve employment and incomes of small and medium producers via the development of conglomerates (clusters). These clusters were considered essential because they would enable businesses to access a critical mass of production, supply, services, processing, and marketing along the value chain.

Several interviewees described both the market intelligence and the value chains in northwest Nicaragua for wood as in embryonic or rudimentary stages, however. Recent market intelligence for Nicaragua does not mention wood or wood products as leading investment sectors.²⁴

The Softer Metric: Non-Economic Benefits:

When asked during interviews to list positive impacts from the Project, many interviewees opined that even in the worst cases a few trees remain on the farms, whether the estimates of economic return rates were met or not. This, several advocated, was a positive impact.

A few stakeholders highlighted the issue that technical tree planting capacities were built in thousands of small farmers, including women, who had never planted trees before. This is worth noting because in northwest Nicaragua women have not traditionally participated in forestry activities.

Several Project beneficiaries felt that the charcoal value chain has the strongest potential.²⁵ Several stakeholders concurred. Many stakeholders acknowledged that the furniture chain would require considerable integration into the teak and pochote plantations to take advantage of the thinnings from those plantations. In any event, the consensus was that specific technical support would be required to develop each of these value chains.²⁶ Importantly, AFOCNIC, the newly established forestry association, is trying to organize the formation of networks of producers in order to form value chains for charcoal and wood furniture.

²⁴ Doing Business in Nicaragua: 2011 Country Commercial Guide for U.S. Companies, U.S. Department Of State And U.S. and Foreign Commercial Service, 2010, chapter 4.

²⁵ The implementer noted that locally the market for charcoal depends on the lowest price, not the quality of the product. GFA, Close of Environmental Component Report, Feb 2011.

²⁶ Several interviewees remarked that in rural northwest Nicaragua, the socio-economic environment is not conducive for higher production of products from wood other than charcoal, that access to rural finance for forestry projects does not exist (agriculture and livestock credit is more readily available), and that income from non-commercial, individual tree plantations will be minimal. Other stakeholders contended that the upgraded roads (financed as part of this MCC Compact) leading to other markets have begun to change these perceptions and realities.

C3. The Activity Was Not Cost Effective? – Most analysts would not characterize an Activity with a final 27% reforestation rate as a cost effective investment. Several stakeholders emphasized that the only consistent means of determining cost effectiveness is via the ERR. Without verified sales (to improve incomes) that can be attributed to the few years of project work, this inquiry is premature.

Alternatively, since approximately 10,000 *manzanas* of planted trees now exist at a total cost of US\$7.5 million spent on the Forestry Activity, one can ask whether US\$750 per *manzana* is cost effective? With only 2925 *manzanas* were reforested, the cost per *manzana* reforested is \$2564. This assessment requires further investigation to determine the values of surviving species on parcels, quality of wood, and access to the value chains, outside the scope of this review.

Cost-benefit analysis requires monetization of all effects caused by a project. One MCA-N official strenuously argued that the costs of the implementer should not be included in calculating ERR, a proposition this evaluator rejects. Some federal agencies include environmental services in their cost-benefit analysis, but MCC calculated its forestry ERRs without their inclusion.²⁷

C4. Jobs Were Created – By March 2011, the Indicator Tracking Table reported that the Rural Business Development Project had created 146.73% of the planned 7,000 jobs. These numbers were not disaggregated for the Forestry Activities from the agriculture, livestock, non-agriculture, and investment promotion components; therefore the evaluation cannot assess how many people were employed due to the activity. The implementer, however, reported 3159 jobs created (120 in the production of the seedlings and in 3,039 in preparing land for planting) by March 2011.²⁸ This evaluation did not quantify the amount of future jobs.

At the outset, most of the needed jobs related to the Forestry Activity were tasks related to preparing the land, out-planting the seedlings, and maintaining the seedlings, including weeding, watering, pruning, and thinning. The implementer provided estimates of the number of work days needed for the tasks; for example, 66 days per *manzana* per year is estimated for the first year of a plantation. The second and third years the tasks change as the trees mature, until year 6 when a portion of the eucalyptus tree, as an example of the fastest growing species promoted, can be harvested for the first time (it can be harvested again at 12 years; 15 years is the final cut after which a seedling should be replanted.) Work involving harvesting wood would not start for at least six years (eucalyptus only); for most of the trees pruning and thinning is needed for at least 20 years.

The Forestry Activity's creation of jobs objective created employment opportunities on the tree plantations that were similar in terms of remuneration and the probability that the jobs

²⁷ Other federal institutions incorporate economic benefits of environmental services in their metrics, such as the National Office of Oceans and Atmosphere (NOAA)'s Office of National Marine Sanctuaries and NOAA's Coastal Service Center.

²⁸ GFA: Forestry Conglomerate Strategy and Progress Presentation, March 2011, page 9.

will be accessible for the poorest inhabitants of the targeted regions. Without food provided, the wage paid in northwest Nicaragua is about US\$5-6 for the six-hour day²⁹. Field workers in this region of Nicaragua are paid a set rate from 5am until mid-day for agricultural manual labor, and according to the implementer this is what the workers earned for the jobs created for this Activity. This is double Nicaragua's minimum wage: of US\$2.61 per day (59 Nicaraguan *Cordobas* per day) for a day of agriculture and livestock work. More detailed data related to jobs were not collected via the monitoring of this Activity. This evaluation did not assess the quality of the jobs created.

D. RANGE OF IMPACTS

D1. Forestry Association Formed – AFOCNIC (Asociación Forestal del Occidente de Nicaragua) exists as a fledgling local forestry association as a result of this Activity but its future as both a value chain organizer and a provider of plantation technical support is uncertain. The Activity created this organization to support Project field activities, and funded an attorney to legalize the association under Nicaraguan law, draft by-laws, etc. One important function this organization of forest producers could serve is to organize and strengthen the networks and trade associations related to the value chains (carpentry, charcoal producers, *rancho típico* producers, wood furniture networks, artisans). It has begun this organizing task, a good first step in the formation of any forestry conglomerate. Several stakeholders noted, however, that presently the association lacks the necessary market intelligence to move forward the value chains.

AFOCNIC has been adopted by a Costa Rican-based organization called the Tropical Agricultural Research and Education Center (CATIE is the Spanish acronym) and has signed an agreement for funding for at least for the next three years.³⁰ CATIE, through its unit called Forests and Forestry Management in Central America (FINFOR), plans to provide technical support to AFOCNIC and follow up on MCA-Nicaragua's forestry work in the region, focusing more on agro-forestry plantation management. According to AFOCNIC president, also a tree planting Activity beneficiary, his organization's short-term goal is to train local technicians to support the thousands of farmers with new tree plantations who "desperately need the technical support." One staff member of the implementer agrees that AFOCNIC lacks the knowledge and experience to provide technical assistance, and that its members need to actively pursue technical training opportunities and organizational development. Another implementer was less sanguine and offered that with MCA-Nicaragua's closing, AFOCNIC "queda sin nada [is left without anything]."

D2. Safer Pest Management Practices Promoted – The Rural Business Development Project's environmental training, especially regarding integrated pest management and proper use of highly toxic pesticides, reached producers, an important achievement in an area with historically indiscriminate use of highly toxic pesticides, especially with growing

²⁹ Interview with implementer.

³⁰ AFOCNIC, through contacts made via the implementer, established a working agreement with FINFOR (Forests and Forest Management in Central America), a unit of the Tropical Agricultural Research and Education Center (CATIE) based in Costa Rica. CATIE's strategies somewhat coincided with those of MCA-Nicaragua, especially in the development of plantations. CATIE also promotes integrated agroforestry systems in addition to tree plantations.

cotton.

In order to address a Condition Precedent dealing with highly toxic agrochemicals, one of the Project's first tasks was to draft a plan of use for pesticides (for both the agriculture and forestry conglomerates). The Project also updated a guide for regarding the safe use of Pesticides every project year. While one highly toxic pesticide was approved for limited use, the permitted product was approved by MCC. The close attention paid to safety and health is noteworthy.

D3. Carbon Credits Sold – In 2010, MCA-Nicaragua signed an agreement with a non-governmental organization (NGO) in Leon that agreed to buy carbon credits for parcels in Leon with native trees planted by MCA-Nicaragua beneficiary farmers.³¹ The NGO paid and continues to pay participating farmers \$80 per year per *manzana* planted with native species, held to a 75% survivability standard, and for parcels within the Municipality of Leon. 43 farmers were participating by October 2010.

From the Activity's outset and throughout the course of four years of implementation, no evidence was found during the evaluation that the Forestry Project pursued this possibility that tree plantations could provide opportunities to take advantage of absorbed carbon dioxide, despite the fact that the NGO in Leon had quantified and purchased carbon credits from a small number of beneficiaries.³²

E. IMPLEMENTATION FACTORS

E1. Ambitious Reforestation Target Selected – As stated previously, the Activity expected trees to be planted on approximately 6,880 hectares (10,000 *manzanas*) by farmers with modest, if any, tree planting experience and expected approximately 75% (7,500 of the 10,000 *manzanas*) to be “reforested” based on certain survivability rates and economic internal rates of return. When the Project closed, based on the ERR, MCC considered only 27% as reforested.³³ This speaks to the challenges inherent to aiming for larger targets with many inexperienced producers.

Moreover, the scope of this Activity was so broad (from seed to a sold piece of furniture) that neither MCA-N nor GFA could successfully implement it. Ultimately, it did not matter

³¹ Agreement between MCA-Nicaragua and Fundacion DIA (Desarrollo Integral Asociado), Leon, Nicaragua, August 2009.

³² According to literature, carbon offsets purchased from international reforestation projects represent only a fraction of global carbon markets due a clean development mechanism under the Kyoto Protocol that has not allowed industrialized countries to buy many carbon credits from projects in developing countries, apparently due to rigorous verification related to emissions testing. Nevertheless, in Leon, Nicaragua, Fundacion DIA presently buys the credits from former Project beneficiaries.

³³ This failure to meet the target is partially explained in the implementer's 2010 report on meeting indicators and appears to have been a regular topic of discussion between MCC, MCA-Nicaragua, and the implementer during the Project. This topic has been the source of consternation for several stakeholders and evoked the most emotion from stakeholders during the course of the evaluation.

that MCA-N contracted an experienced forestry project implementer after two years of mediocre in-house results.³⁴ Important programmatic assumptions dealing with the weather or the inexperience of farmers were not established when developing the Activity's indicators, so this Activity was doomed for failure from the outset.

According to local stakeholders, tree planting was not a significant part of the livestock and crops cultures of the region. This was a contributing factor to the low survivability of the trees. One project implementer made a comment reflective of several stakeholders interviewed, noting that most farmers in northwest Nicaragua started with “zero tree planting experience, maybe a few eucalyptus trees, nothing more.” This lack of participant's silviculture experience was confirmed in the technical forestry evaluation. During the 2007 tree planting campaign, for example, micro-producers (farmers) dedicated to basic grains (corn, beans, sorghum) accounted for 28.3% of the participants. 56.1% were small producers of the same crops, for a dominating total of 84.6%. Medium producers dedicated to industrial crops (sugarcane, sorghum, peanuts) and large private producers (industrial crops plus livestock) accounted for the rest (15.6%). Not surprisingly, the producers with less experience with tree plantations lost the most trees.³⁵ However, it should be noted that, although there was not a culture based forest sustainable management of the resource, there were small and micro-producers who had benefited from previous eucalyptus planting experiences for firewood in at least seven out of the 23 municipalities.³⁶

“This inventory found that there is little knowledge of forest plantation management among producers ... putting at risk the [Project's] investment. Field operations including leaf management, pruning, and thinning are not being done by the producers.”

- Forestry Expert
Final Report 2011

E2. Participant Selection Criteria Allowing Farmers with Limited Silviculture Experience and Small Parcels to Participate in the Activity Was Not Adequately Adjusted – Although it increased its criteria for a minimum size of target farms after 18 months from 3 to 6 *manzanas*, the project continued to serve mostly poorer farmers with smaller parcels, less tree planting experience, and fewer resources to maintain the trees, while at the same time holding farmers to a survivability rate of 68%.

Several Project stakeholders felt that the Project erred when it held these tree-farming “novatos [rookies]” to a commercial survivability rate. Reflecting the general sentiment of stakeholders involved in operations, one implementer recalled, “The first two years we had

“When the Project started, the poorest farmers with the smallest areas lost the most trees. This should not have been a surprise.”

- former Project implementer

ere in 2008 and 2009, where the total area planted more 50%. The lowest survival campaign was in 2007, followed by the 2010 season. See Tree Survival Rate Chart, page 6.

³⁵ Inventory and Assessment of Forest Plantations in the Western Region during the 2007-2010 Forestry Campaigns, Serafín Filomeno, July 2011, page 15.

³⁶ Filomeno, July 2011, page 14.

plenty of farmers working with seedlings on their tiny plots, but we had no standards regarding where to plant, which species, or adequate climatic conditions. Even worse, we were competing with subsistence agriculture³⁷ in many cases.” The forestry expert noted the “limited potential of many of the beneficiaries involved, mostly producers of basic grains on very small areas with scarce resources, which ultimately adversely affected the final results of the campaign.”³⁸ According to the implementers, several MCA-Nicaragua officials, and the forestry expert, the Project’s small and disperse parcels did not meet commercial standards in terms of technical expertise, workforce to maintain the seedlings, proper climatic conditions, or quality of soil.³⁹

According to the implementer’s final 2011 report, during the last two planting campaigns, farmers with areas between 1 and 3 *manzanas* had survival rates less than 50% and that 85% of the cancelled business plans had trees planted on 1-3 *manzanas*. The forestry expert’s 2011 final report found that the farmers’ lack of knowledge in the management of forest plantations was a key limiting factor to the success of Project activities related to producing wood for the value chains.⁴⁰

E3. Business Plans Did Not Require Land Titles Before Submission – Nicaraguan forestry law requires a tree plantation to be registered before the wood can be legally harvested, transported, and sold. The Activity’s participant screening procedures, however, did not include whether farmers had registered land titles for the new or existing tree plantations supported by this activity, which was apparently a condition precedent for a tree farm to receive registration. This can be characterized as an oversight. The implementer estimates that about one-third of the participants had title beforehand. This resulted in considerable opportunity costs, effort and expense to register farmers’ titles after trees were planted to comply with Nicaragua law.

The Activity began property registration efforts in 2010. The implementer used its field technicians to transport farmers in its project vehicles to the government institution in order to register the titles to their land, taking both parties away from the technical work on the

³⁷ It was reported but not verified by this evaluation that some farmers chose their worst land to plant the trees, since the best land went to edible crops. This, of course, negatively impacts survivability. One farmer told an implementer that he decided to plant beans when his first group of tree seedlings died because the trees were competing with space on his farm with the red beans. Another farmer admitted to the former MCC-Nicaragua Country Representative that he only agreed to plant tree seeds because they came with free bean seeds and he had lost his bean seed crop in the poor weather. This practice was confirmed in the forestry evaluation.

³⁸ Filomeno, July 2011, page 80.

³⁹ The forestry expert stated that some commercial plantations accept a 50% survival rate in their business plans for some species.

⁴⁰ Filomeno, July 2011, pages 86-7.

plantations.⁴¹ This resulted in considerable effort and expense (gas, technicians' time, opportunity costs away from farms, etc.) to register farmers' tree plantations to comply with Nicaragua law after the trees were planted. The farmers, mostly farmers with smaller parcels, that do not yet have legal title to their land continue to wait on the registration of their tree plantation, but can harvest the wood for self-use, which apparently does not require the registration.

E4. Technical Miscues Reported But Not Addressed – According to the forestry expert, technical lessons learned from the first 18 months of activities were not incorporated into next two years of operating plans with respect to (1) the timing of the delivery of the seedlings for planting and replanting, (2) the suitability of the land proposed for the tree plantations, (3) the selection of the plantations in terms of climate, soil, and access to markets,⁴² and (4) the continued use of certain tree species with known lower survivability rates.⁴³ The forestry expert noted instances of the implementer's technical incompetence, but based on the qualitative data, this evaluation identifies the over-broad scope of the Activity as a significant contributing factor to the implementer's inability or failure to more actively incorporate lessons learned.

The 2011 technical forestry evaluation explains at length its issues with several decisions made by the implementer. This performance evaluation does not re-hash these technical arguments (developed over four months of field work with a technical team of 12 persons), and cites the technical 2011 Forestry Final Report for further review. See Annex C for highlights of certain technical lessons learned from the first 18 months of activities.

Several stakeholders in Nicaragua mentioned that they felt that technical expertise related to establishing and managing tree plantations was not readily available at MCC. One MCC official noted that when MCC contracted a forestry expert for this Activity, however, local stakeholders complained that the skill set was not a good match.

IV. LESSONS LEARNED

⁴¹ According to the implementer, 130 plantation profiles were submitted to the government institution by December 2010. In many cases, the implementers' technicians then brought staff from the government institution to do a field visit of the farmer's property, required before the plantation could be registered. 112 plantations were visited and endorsed by the government institution due to the implementer's efforts. Of these, 60 tree plantations with clean titles paid the registration fee.

⁴² Each producer should be required to develop a farm plan with the site and area to plant, the status of the soil (depth, structure, and texture), define the timetable for planting and management, and define the requirements necessary. Site selection by the producer usually requires specialized technical assistance. Also, each producer should tie his or her business plan according to market research and identification of the value chain and products. See Filomeno, July 2011, pages 86-7.

⁴³ Two species used (cedar and mahogany) are known to have serious insect problems in the region.

- The Activity’s logistics were too complicated, overwhelming MCA-Nicaragua when it implemented the first two tree-planting campaigns in-house and then inundating the new implementer for the next two tree planting campaigns.
- Developing more specific logic for the Forestry Activity at the Compact’s outset could have resulted in refinement or limitation of certain implemented activities.
- Planting a seed to harvest wood to link to a value chain (as an order for sale of wood) is a very ambitious proposition.
- It is difficult for farmers with little or no tree planting experience to achieve commercial success rates for planting trees.
- Including explicit program assumptions about (1) the weather, (2) experience levels of producers on small parcels, (3) the amount of time it takes to grow and harvest the wood, (4) the time needed to add value to the wood, and (5) the challenges inherent to linking into fledgling value chains likely would have led to stronger results.
- Requiring titled land before beneficiaries submitted their business plans would have facilitated compliance with Nicaraguan commercial tree plantation law; obtaining title was a time-consuming task performed by the implementer’s technical forestry staff.
- Certain technical lessons learned from the first two tree planting campaigns were not incorporated into next two campaigns with respect to (1) the timing of the delivery of the seedlings for planting and replanting, (2) the suitability of the land proposed for the tree plantations, (3) the self-selection of the plantations in terms of climate, soil, and access to markets, and (4) the continued use of certain tree species with known lower survivability rates.
- Regarding the selection of species, heed the counsel from the forestry expert who opines that native species such as Laurel, Madera Negra, and Black Guanacaste showed vigorous natural regeneration and were more hardy than certain newly planted tree seedlings on beneficiaries’ tree farms, and would be useful in future mixed tree plantations.

V. RECOMMENDATIONS

LOGIC:

- Articulate the intervention’s activities more clearly in the Compact.
- Develop more explicit program logic and assumptions for future tree plantation-to-market value chain activities from the outset.
- Develop risk mitigation strategies for priority risks such as uncertain weather.

MONITORING:

- If forestry conglomerates remain a goal, consider reducing certain numerical monitoring targets to enhance Activity’s efforts to develop critical masses of concentrated tree plantations. This could increase the number and quality of technical support visits, improve Activity monitoring, and facilitate local partnerships for producers.
- Disaggregate the reported data for “jobs created” among the Project’s distinct components.

PROGRAM CRITERIA:

- Minimize certain cost elements in designing the nature and scope of future forestry activities (i.e. design intervention on fewer, less disperse plantations; larger target

parcels; promote fewer, less complicated tree species; require title to submit business plan).

- Consider incorporating relevant aspects of agro-forestry systems that systematically integrate trees for harvest with fruit trees, forage trees for livestock, and faster growing, easier-to-plant multi-use, often leguminous trees foil soil improvement, with annual or bi-annual crops, used by both commercial and non-profit organizations.

QUANTIFYING VALUE OF ENVIRONMENTAL SERVICES:

- If other forestry activities are envisioned, consider the development of guidelines for selecting an appropriate discount rate to permit forest-related interventions that can have positive economic rates of return to contribute to economic development, including afforestation, reforestation, and avoidance of deforestation activities.
- Reconsider quantifying the economic benefits of environmental services for estimates of economic internal rates of return, especially for forestry activities in the tropics and sub-tropics.

VI. CONCLUSIONS

The scope of the Rural Business Development Project's Forestry Activity, as articulated in the Compact, was too broad and unspecific. This resulted in complicated logistics and concomitant low survival rates of trees. After four tree-planting campaigns from 2007-2010, MCC did not substantially achieve its objective to increase the value-added of forestry-related farms and businesses in León-Chinandega. This Activity did not address, as planned, the region's persistent deforestation and water supply constraints to farming and other productive activities.

Even with the cancellation of the planned watershed activities, the Activity implementer was logistically challenged with concurrent activities: training thousands of tree-planting novices in the entire range of tree plantation technical activities in 23 municipalities with less than a dozen technicians, working to obtain titles for the beneficiaries' plots, attempting to strengthen (and establish) value chains for the proposed wood products, etc. The evaluation did not find any evidence of supply orders or sales with wood harvested from this Activity, and the associated value chains remain fledgling in the target region. The final 27% reforestation rate cannot be considered a cost effective investment.

Annex A

People Consulted

MCC:

Lola Hermosillo, MCC Monitoring and Evaluation
Eddy Jerez, former MCC Deputy Director
Jack Molyneaux, MCC Director of Impact Evaluations (re: scope and methodology)
Steve Marma, former MCC-Nicaragua Country Representative

MCA:

Ignacio Velez, MCA-Nicaragua Director
Carmen Salgado, MCA-Nicaragua Director of Monitoring and Evaluation
Claudia Paniagua, MCA-Nicaragua, Monitoring and Evaluation
Juan Sebastian Chamorro, former MCA-Nicaragua Director
Juan Manuel Sanchez Ramirez, former MCA-Nicaragua Counsel and Chief of Staff
Edgar Sotomayor, former MCA-Nicaragua Operations Manager
Maritza Rivera, former MCA-Nicaragua Director of Environmental and Social Impacts

Implementer:

Nancy Zamora, GFA Group, Escazu, Costa Rica
Marina Flores, current CATIE/FINFOR staff; former GFA staff

Others:

Rodrigo Rojas, Nicaragua Commercial Specialist, US Commercial Service
Serafin Filomeno, Forestry Expert
Orlando Cisneros, Secretary of AFOCNIC (forestry association) and Activity beneficiary
Fernando Palacios, Ministry of Natural Resources and Environment, Protected Areas Coordinator
Engelsberth Gómez, ProNicaragua Regional Development and Market Intelligence Director
Erika Vohman, Director Maya Nut Institute (formerly the Equilibrium Fund)

Annex B

Literature and Data Review

MCC Nicaragua website (www.mcc.gov/pages/countries/overview/nicaragua)

- Nicaragua Compact Document
- Summary of Nicaragua Compact Document
- MCC's Economic Rates of Return for Nicaragua Compact
- MCC Scorecard/Nicaragua FY11
- Nicaragua M&E Plan 2010
- MCC Project Evaluation Indicators for Nicaragua Compact
- Indicator Tracking Table, July 11, 2011
- Basis Brief, March 2010
- MCC Nicaragua Quarterly Status Report, March 2011
- MCC Final Investment Memo for Rural Business Development, 2005
- MCC Rural Business Development ERR, 2005
- Lola Hermosillo email re: Forestry ERR, May 24, 2011
- MCC Nicaragua Forestry ERR, May 20, 2011
- Interim Impact Evaluation for Rural Development Project, Toledo and Carter, March 2010

MCA-Nicaragua website (www.cuentadelmilenio.org.ni/)

- MCA-Nicaragua Annual Reports
- MCA-Nicaragua 2007 Forestry Campaign Results, Dec 2008
- MCA-Nicaragua Proposal for New Strategy for Rural Business Development Project, November 2007
- MCA-Nicaragua Strategy and Action Plan for Management of RBD Services, May 2007
- MCA-Nicaragua Forestry Conglomerate Business Plans and Beneficiaries Spreadsheet 2010
- MCA-Nicaragua Expenditures Table for Forestry Conglomerate, Dec. 2010
- MCA-Nicaragua Forestry Conglomerate Contributions Chart, 2010
- MCA-Nicaragua, Feb 2010 Rubros Silvio-energeticos
- MCA-Nicaragua, Feb 2010 Rubros Maderas Preciosas y Industriales
- MCA-Nicaragua Environmental Action Plan Final May 15, 2007
- MCA-Nicaragua Close-Out Report for Compact's Environmental and Social Impacts, March 2011
- MCA-Nicaragua Pest and Disease Management Plan, 2007
- MCA-Nicaragua Forestry Indicators and Beneficiaries Spreadsheet, 2007-2010
- Agreement between MCA-Nicaragua and Fundacion DIA, August 2009

GFA documents:

- GFA contract: Consulting Services for Forestry Value Chain and Cluster Development in the Departments of Leon and Chinandega, Contract CRM/DG/DAF/LI/C/RBD/0608/00913, July 2008
- GFA: Informe de Incepcion (Inception Report), September 2008
- GFA: Informes Annual (Annual Reports), July 2009, July 2010, May 2011
- GFA: Prendimiento Reports (Re: Survivability), Feb 2010, March 2010
- GFA: Density Report, Dec. 2008
- GFA: Value Chain Report Dec. 2008
- GFA: Gender Report, October 2008,
- GFA: Close of Gender Component Report, Feb. 2011
- GFA: Close of Environmental Component Report Feb. 2011
- GFA: Carbon Value Chain Progress Report, May 2011
- GFA: Forestry Conglomerate Strategy and Progress Presentation, Jan 2011
- GFA: Forestry Conglomerate Strategy and Progress Presentation, March 2011
- GFA: Forestry Conglomerate Sustainability Strategy April 2009
- GFA: Forestry Conglomerate Strategy Implementation Jan 2008
- GFA: Informe de Justificacion Cumplimiento Indicadores del Contrato (Justification Report for Meeting Contractual Performance Indicators), June 2011
- Email from Nancy Zamora, GFA, Aug 2011

Other Sources:

- Final Report, "Consulting Services for the Inventory and Assessment of Forest Plantations in the Western Region during the 2007-2010 Forestry Campaigns, Serafín Filomeno Alves-Milho, July 22, 2011
- Final Report, "Consulting Services for the Inventory and Assessment of Forest Plantations in the Western Region during the 2007-2008 Forestry Campaigns, Serafín Filomeno Alves-Milho, February 2009.
- Nicaragua Fact Sheet, U.S. Department of Commerce, International Trade Administration and the Association of American Chambers of Commerce in Latin America, January 2008 update
- Ease of Doing Business in Nicaragua ([www.doingbusiness.org /data/exploreeconomies /nicaragua/](http://www.doingbusiness.org/data/exploreeconomies/nicaragua/))
- Doing Business in Nicaragua: 2011 Country Commercial Guide for U.S. Companies, U.S. Department Of State And U.S. and Foreign Commercial Service, 2010.
- Nicaragua Minimum Salary Tables, August 2010
- The Global Wood Value Chain, Kaplinsky, Rapheal, Olga Memedovic, et al, UN Industrial Development Organization, 2003.
- Successful Practices In Value Chain Development Arocha, Marcos of Austin Associates for USAID, Dec. 2008.
- United Nations FAO, Can the instruments linked to the Convention on climate change foster a sustainable forest management in Africa? 2001.
- Discounting Costs And Benefits In Carbon Sequestration Projects, Boscolo, Marco, Jeffrey Vincent, and Theodore Panayotou, Environment Discussion Paper No. 41, February 1998 (USAID funded)
- Low-Carbon Development for Mexico, Johnson, Todd M.. Claudio Alatorre, Zayra Romo, Feng Liu. Mexico: Estudio sobre la Disminucion de Emisiones de Carbono (MEDEC), 2009.
- Financing Environmental Services: The Costa Rican Experience and its Implications. Chomitz, K., Brenes, E., and Constantino, L., The Science of the Total Environment, 1999.
- Forestry Sector Interventions. Geller, Scott, United Nations Development Program, Sustainable Energy and Environment Division's Program on Forests, 2000.
- NOAA Office of Program Planning and Integration, Economics and Social Sciences: NOAA Coastal Service Center, Restoration Economics, Discounting and Time Preference; www.csc.noaa.gov/coastal/economics/discounting.htm
- NOAA Coastal Service Center, Restoration Economics, Environmental Valuation: Principles, Techniques, and Applications www.csc.noaa.gov/coastal/economics/envvaluation.htm
- NOAA Office of Program Planning and Integration, Economics and Social Sciences: www.ppi.noaa.gov/economics/ & www.ppi.noaa.gov/economics/data-and-tools/
- Mozambique Compact, Monitoring and Evaluation Plan Amendment, 2010
- www.globalgreencarbon.com

Annex C

Forestry Activity Inventory and Diagnostic

Selected Technical Criticisms

- In the face of climatic constraints, the implementer did not correctly set appropriate timetables for planting, re-planting, and plant delivery, even after seeing how delaying due to weather produced poor results in the first two campaigns.
- The implementer did not establish compliance and implementation standards of performance for each field activity that the producer had to do, especially selection of site for tree farm.
- Implementer continued to promote planting of two slow growing trees (red cedar and mahogany, 20-25 years to harvest) with well-known low survivability rates even on commercial farms.
- Implementer continued to promote planting of two species known to require special care and management by the producer (teak and pochote).
- Other species such as Black Laurel, Black Guanacaste and Madero Negro (Glyricida Sepium) demonstrated impressive natural regeneration on the plots and could be promoted for mixed forestry plantations. Additionally, Glyricida Sepium and Moringa were being used as fodder for livestock in the area and could have been promoted by the Activity.

Source: Serafin Filomena, Final Report: Servicios de Consultoría para el Inventario y Diagnóstico de Plantaciones Forestales en la Región de Occidente durante la Campaña Forestales (2007 -10), July 2011

<http://www.cuentademilenio.org.ni/cedoc/08mye/15%20Monitoreo/17%20InforFinEvalIndepCapanna%202011/10%20Informe%20Final%20Evaluacion%20Plantaciones%20Forestales%20CRM%20julio%202011.pdf>

Annex D

Nicaragua Compact's Expectations related to the Environment

Once the watershed activity was cancelled, the funds from the watershed component were moved to support ongoing forestry activities, focused on working with farmers to establish legal tree plantations to provide the wood as part of their business plans. When the Activity's watershed component ended, it appears that most of the conservation benefits envisioned in the Compact disappeared and that the positive environmental impacts expected to address consequences from Nicaragua's high regional rates of deforestation, such as decreased soil productivity, severe erosion, and flooding, were not realized.

Notable is one missed opportunity: planned watershed activities in the Estero Real estuary, one of the most important ecosystems in Central America for shrimp production, habitat for endangered species and migratory birds, and natural flood control, did not occur.

**Leon and Chinandega
Environmental Situation Analysis:**

- *Deforestation* via conversion of forest soils for agricultural and energy (burning wood) purposes, including the destruction of mangroves in the coastal zone for development of shrimp farming;
- Indiscriminate use of *agrochemicals* (fertilizers, herbicides, pesticides) for agro-industry and livestock;
- *Fires* in remaining forest areas, including protected areas to 'prepare' the soil for agriculture, before the honey harvest, or the capture of iguanas for food; and
- *Mono-culture* in the agro-industry.

- MCA-Nicaragua, Watershed Strategy and Action Plan, 2007

endangered species and migratory birds, and natural flood control, did not occur.

One implementer complained that when the Project's watershed component ended, "virtually all of the conservation benefits envisioned in the Compact disappeared, resulting in pseudo-commercial tree farms with minimal assistance to the region's natural systems."

The Forestry Activity called its tree planting work "reforestation" although planting rows of trees on tree plantations for future harvest is not usually characterized as reforestation. Clearly, commercial

tree farms have income motive and therefore provide fewer positive environmental impacts than what most forestry organizations would label as reforestation, especially with respect to watershed management, erosion control, soil improvement, or improving biodiversity by re-creating native habitat.

Today, certain projects with a focus on afforestation/ reforestation (A/R), avoided deforestation (REDD), and improved/sustainable forest management seek to be competitive forestry business enterprises and expect to generate a profit.