PROJECT COMPLETION REPORT
Region: LCR
Country: Nicaragua
Project ID: GEF MSP P061316
Grant No. TF024107

GEF Medium-Size Project:

Grant for the Renewable Energy and Forest Conservation Project: Sustainable Harvest and Processing of Coffee and Allspice

January 2006

Central America Country Management Unit
Environmentally and Socially Sustainable Development Sector Management Unit
Latin America and the Caribbean Region
The World Bank Group

MSP Completion Report

I. Basic Data

(1) Date of Preparation of Completion Report: December 2006

(2) Project Title: Nicaragua Grant for the Renewable Energy and Forest Conservation Project: Sustainable Harvest and Processing of Coffee and Allspice.
Grant No. TF024107
Project Number: P061316

(3) GEF Allocation: $750,000 (MSP + PDF A)

(3a) Period of Project Implementation: August 2000 – September 2004

(4) Grant Recipient: Mesoamerican Development Institute Corp.
669 Stevens St.
Lowell, MA 01851-4519
Tel: (978) 937 – 3460
E-mail: mesoamerican@juno.com

(5) World Bank Task Manager/Task Team: The project had three Task Team Leaders (TTLs) over the five years of project implementation: Paula Agostini (LCSES); Jeanette Ramirez (LCSES); and Zhong Tong (LCSES). The Task Team included: Irani Escolano (LCSPT); Manuel Vargas (LCSFM); Juan Pablo Ruiz (LCSEN); Mariangeles Sabella (LCRVP); Juan Morelli and Mario Castejón (FAO); and Peter Agnew (consultant).

(6) Overall Project Goals and Objectives (include any changes in the objectives):
The project was an innovative and technologically challenging project from its conceptual phase as it involved the introduction of technology in numerous and often remote locations. From the beginning, its goals and objectives were ambitious and made more challenging by the need to coordinate the organizations involved. While the scope of the project was adjusted, the development objectives remained unchanged.

The **development objective** of the project was to promote the use of renewable energy in biodiversity-friendly agro-industrial processes in rural Nicaragua. This would significantly increase revenue through value-added processes and direct exportation of processed coffee and allspice.

The **global environmental objectives** were to: (i) remove barriers to successful implementation of renewable energy technology for these agro-industrial applications, thereby reducing CO2 emissions and eliminating a significant contributor to deforestation, and (ii) reduce pressure on the natural habitats in the BOSAWAS Reserve by strengthening opportunities for sustainable land use management in its buffer zone

(7) Financial Information:

The MSP project was budgeted at US$2,169,000 including US$750,000 in GEF funds (MSP + PDF A) and US$1,444,000 in cofinancing. Changes in the original financing plan for the project (in US$) are reflected below.

Components	Original GEF Proposed	Actual GEF Financed	% Budget	Original Other Proposed	Actual Other Financed	Total Proposed	Total Financed
Capacity Building/Training	$193,700	253,249	130.7	---------	674,000	193,7000	927,249
Marketing Program	$211,700	133,833	63.2	$564,000	126,500	775,700	260,333
Configuration/Design and Operation Plan	$255,700	251,739	98.4	$700,000	42,375	955,700	294,114
Land Use and Socio-Economic Monitoring	$63,900	83,179	130.1	$180,000	16,000	243,900	102,179
PDF-A	$25,000	25,000				25,000	25,000
Sub-Total	$750,000	750,000	100	$1,444,000	858,875	2,194,000	1,608,875

Co-financing Partners:

1. *Oikocredit:* Provided $400,000 credit line for cooperatives interested in purchasing Solar Trade Solar/Biomass Coffee Drying Systems. This credit line was not used during project implementation.

2. *World Resources Institute/Boston University (WRI):* Contributed $120,000 for market research, manufacturing, and for the financial analysis for solar dryer.

3. *Horizonte Tres Mil (Austrian Development Agency):* Provided $50,000 to San Isidro Cooperative for construction of the processing facility.

4. *Inter-American Foundation:* Provided $156,375 for equipment, market study, credit programs, operational cost and study tours. This amount is not included in the above figure as it became available after project commencement.

5. *USDA Forest Service:* Provided $16,000 for biodiversity study and related in-country workshops.

6. *AVINA Foundation:* Contributed $100,000 for field trials of equipment to meet market requirements for coffee production.

7. *Canadian Wilderness Video:* Provided US$16,500 for training and promotion materials.

II. Project Impact Analysis

(1) Project Impacts

The project development objective did not change from project appraisal to project closing. While the project had relatively little impact on the promotion of renewable energy in agro-industrial production, it achieved some success in reducing agricultural impacts on the BOSAWAS Reserve. Project impact was also reduced due to delays in project implementation. Unforeseen complications in project design and implementation hindered the project's potential.

(1a) To what extent have the objectives been met?:

Objective: Promote the use of renewable energy in the development of biodiversity friendly agro-industrial processes in rural Nicaragua that will provide significant increases in revenue through value-added processes and direct exportation and marketing of processed coffee and allspice. Rating for this objective: *Unsatisfactory.*

Siuna Allspice Component: The project experienced difficulties in meeting this first objective. The solar panels that were to provide electricity for the oil processing plant were found to provide insufficient electrical output and were judged inappropriate for the long rainy season that is typical for the area. The solar panels had to be replaced by a more powerful combustion engine that runs on diesel fuel or bio-fuels such as vegetable or palm oils. The burning of fuels for allspice processing will significantly reduce the intended environmental benefits of the original project design and may create negative effects of air, soil, and water pollution. (See Environmental Impact section below.) The economic benefits foreseen through the value-added production will also be reduced given expenditures related to the purchase of fuel for the processing plant.

The potential for value-added processing still exists, much as it did before the project. However, as of project closing, the processing equipment had not yet been delivered to the site, no essential oil had been produced, and no sales contracts for exportation had been secured. Marketing for the product has been conducted to some degree by the US-based recipient; however, no relationship between purchasers and beneficiaries has been established.

Boaco Coffee Component: This component was partially successful in meeting the first objective. The project was successful in obtaining both Organic Coffee and Fair Trade certification for the cooperative. The project had planned for the installation of 10 solar drying systems and related processing equipment for a combined drying and processing capacity of 30,000 quintals (qq.; 1 quintal = 100 lbs.) of coffee. Two of the original cooperatives withdrew from the project due to funding delays and fear of commitment to the leasing agreement for the solar dryers. The project coverage was reduced to one system, which was installed with the San Isidro Cooperative in Boaco. The system operates mainly on energy provided by the solar panels but relies on some on-grid electricity to run three cooling fans. It was noted during a supervision mission in October 2004 that the solar dryer was not being used due to inconsistent quality of output, extended production time requirements, and other

technical difficulties. The technicians who were originally trained through the project in the maintenance of the dryer have since left the cooperative. The president of the cooperative stated that the dryer was not used during the 2004 harvest season. (See Cost Effectiveness section below.)

Due to these complications, revenues for the cooperative thus far have not increased. One sale of 160 quintals was made to the Inter-American Coffee Company in San Francisco. Further direct exports have been solicited through the US-based grant recipient but no sales are pending.

Objective: Remove barriers to successful implementation of renewable energy technology for these agro-industrial applications, thereby reducing CO_2 emissions and eliminating a significant contributor to deforestation (i.e., the use of wood to dry coffee and allspice harvests). Rating for this objective: *Unsatisfactory.*

Siuna Allspice Component: Allspice berries from Siuna have traditionally been sold fresh to intermediaries who transport the product to Managua. There was no practice of drying berries locally. Since berries were not dried locally, it is not clear whether this wood was ever used to dry allspice; in short, this may not have posed a serious threat to the reserve. However, training in plantation management and harvesting techniques appear to have contributed to improved management of the reserve. There remains the potential that once installed, the agro-industrial technology with the new fuel-consuming configuration will actually increase CO_2 emissions.

Boaco Coffee Component: The San Isidro Cooperative has not benefited from the installation of the solar dryer. The dryer was not used in 2004 and the cooperative continues to utilize the outdoor patio drying system upon which it has traditionally relied. No firewood was used for drying in the San Isidro Cooperative; therefore, the technology has not contributed to a reduction in CO_2 emissions or deforestation. Because the dryer has processed only 500 qq. of dried coffee since its installation, the cooperative is considering terminating the lease of the solar dryer.

Objective: Reduce pressure on the natural habitats in the BOSAWAS Reserve by strengthening opportunities for sustainable land use management in its buffer zone. The overall rating for this objective is: *Satisfactory.*

Siuna Allspice Component: The project's technical outreach efforts reached approximately 54 families in 14 communities of the BOSAWAS buffer zone. The techniques of sustainable farming, plantation management, and harvesting have been adapted by most of the communities and have resulted in reduced pressure on the forest and natural habitats, and less encroachment into the reserve. A broader understanding of the relationship between sustainable land use and economic activity in the buffer zone communities has benefited the Reserve. In addition, the relationship among the buffer zone communities, COOPESIUNA, and the Ministry of Environment and Natural Resources has been strengthened and will lead to further cooperation.

(1.a) Review of Objectives and Indicators.
(Objectives and indicators taken from project brief)

Objectives	**Indicator**	**Achievement**
1. Promote the use of renewable energy in the development of biodiversity friendly agro-industrial processes in rural Nicaragua that will provide significant increases in revenue through value-added processes and direct exportation and marketing of processed coffee and allspice.	1.1 Increase in revenues (50%) for the cooperatives through the value-added of cost-effective solar drying systems and the direct export and marketing of biodiversity friendly coffee and allspice oil (sustainably produced and solar processed) in the international specialty market. 1.2 Percentage of shareholders that remains on their original parcel by third year of project (85%).	1.1 San Isidro Cooperative has made one sale of coffee marketed as Café Solar (160 quintals at US$78/quintal). As processing for allspice oil extraction has yet to begin, pending the arrival of equipment, revenues have not increased and entry into the international specialty market has not been achieved for COOPESIUNA. 1.2 The actual percentage of families remaining on their original parcel may be higher than this number.
2. Remove barriers to successful implementation of renewable energy technology for these agro-industrial applications, thereby reducing CO_2 emissions and eliminating a significant contributor to deforestation: the use of wood to dry the coffee and allspice harvest.	2.1 Reduction of CO_2 emissions in target zone through use of solar-based drying systems as compared to baseline. Over the life of the project, combined drying capacity represents estimated savings of 222 hectares of clear-cut forest over conventional dryers, with a corresponding 80,994 MT reduction of CO_2 emissions. 2.2 Solar coffee drying could be expanded by a factor of 10 in 6 years to the nearly 100 coffee producing cooperatives in the areas surrounding the three coffee target sites, providing a reduction of CO_2 emissions of nearly 270,000 MT per year.	2.1 This indicator is based on data for the original 10 solar dryer systems foreseen in the project brief. No information has been provided regarding the monitoring of CO_2 reductions from the one solar dryer in operation. Estimated hectares of savings in clear-cut forest attributed to the performance of the solar dryer have not been shown through monitoring. 2.2 There has been no expansion of the project to cooperatives in surrounding areas. Two cooperatives, in El Cua and Aranjuez, withdrew from the project.
3. Reduce pressure on the natural habitats in the BOSAWAS Reserve by strengthening opportunities for sustainable land use management in its buffer zone (OP#3)	3.1 Deforestation rate in the BOSAWAS Reserve lowered as a result of reduced extraction of trees to fuel allspice and coffee processing. 3.2 For life of project, up to 126 hectares added from 15,000 new allspice trees, as well as new temperate, citrus fruits, and other appropriate species, corresponding to an estimated 45,513 MT carbon sink. 3.3 For future expansion in the 14 communities near the allspice target site,	3.1 No monitoring documentation demonstrating a reduction in the extraction of trees has been provided. 3.2 Significant planting of allspice and other tree species has been achieved (over 50,000 trees planted). 3.3 Training in land use, plantation management, and crop diversification and

	up to 699 ha. added from 50,000 new allspice trees as well as additional temperate, citrus fruits, and other appropriate species, corresponding to an estimated 84,286 MT carbon sink over the next 3 to 6 years.	cultivation was carried out in 14 communities and reached 54 families of the cooperative. No estimate has been given in terms of metric tons of carbon sequestered as a direct result of the project.

(1.b) Performance Indicators Achieved (Indicators taken from Project Brief)

Anticipated Project Outcomes	**Indicators**	**Level of Achievement**
1. Information and capacity barriers removed in pilot zone through completion of technical training and capacity building program.	1.1 Ability of trained operators to operate and maintain dryers and processing equipment, as measured by processing throughput. 1.2 Ability of trained installation and repair team to install and service systems without outside assistance by year three. 1.3 Ability of trained managers and administrators to manage the enterprise without outside assistance by year three.	1.1 Despite several trainings in Costa Rica, the management of San Isidro Cooperative is unable to maintain the dryer and is no longer using it. 1.2 The management of San Isidro Cooperative is unable to maintain the dryer and is no longer using it. 1.3 San Isidro has gained experience through the administration of the project. COOPESIUNA has gained less experience, but has improved its administrative capacity.
Revenues for producers increased and market for solar processed coffee and allspice essential oil on the international market expanded.	2.1 Increase in revenue for coffee and allspice producers through the value-added of processing, and direct export and marketing of biodiversity friendly (shade grown and solar processed) coffee and allspice essential oil. Increase of revenue in excess of 50%. 2.2 10 to 16 containers of coffee exported and marketed as solar-dried or café solar; 1,000 lbs. of allspice essential oil extracted from leaves and berries.	2.1 Limited increase in revenue. 2.2 Less than one container of solar-dried coffee has been sold (160 quintals) and no essential oil has been produced or sold.
3. Renewable energy technology for coffee and allspice drying with sufficient technical training and support services introduced in the BOSAWAS buffer zone.	3.1 Installation of 10 solar drying systems and related processing equipment for a combined drying and processing capacity of 30,000 qq. per season (coffee) and 2,000 lbs. per season (allspice essential oil) by the third year of the project.	3.1 The one solar dryer that has been installed is no longer in operation.
4. Fewer people engaged in unsustainable natural	4.1 A decrease in the number of people engaged in destruction of BOSAWAS forest for fuel to process coffee and	4.1 Training provided through the project has changed destructive harvesting practices and improved agricultural

resource uses in the BOSAWAS Reserve.	forest for fuel to process coffee and allspice.	practices and improved agricultural techniques in the buffer zone.
5. Greater knowledge of the benefits to the climate and biodiversity from sustainable production of systems and of the relationship of allspice habitat to biodiversity through implementation of the project's monitoring and information system.	5.1 Annual reports issued by the monitoring and information system during the life of the project. 5.2 Relationship of allspice habitat and biodiversity measured in both the proposed sustainable production system and in its natural habitat in the buffer zone and Reserve.	5.1 Reports have been thorough and timely. 5.2 The study has been carried out and will provide useful information to the community and the Reserve administration.

(1.c) Institutional Impact

The farmer to farmer field exchange program (*Programa Campesino a Campesino*, or PCaC) of the National Union of Farmers and Ranchers (*Unión Nacional de Agricultores y Ganaderos*, or UNAG) was the local partnering agency with responsibility for much of the training and workshops. In 2001, PCaC legally gained increased responsibility for project management and decision-making through revised institutional arrangements. At this time, a Steering Committee comprised of members of each cooperative, representatives of PCaC, and project management from MDI was formed to oversee the project. This increased participation allowed PCaC and the cooperatives greater experience with project management. PCaC also benefited by developing stronger relationships with other agencies working with cooperatives in both Siuna and Boaco.

The project had positive impacts on the institutional capacity of the cooperatives involved in project implementation. The assistance provided through the project was important in establishing the legal status for the cooperatives. The administrative capacity of COOPESIUNA and San Isidro Cooperative has improved, both in terms of technical and administrative capacity. The organic coffee certification received by 130 coffee producers and the Fair Trade certification for San Isidro Cooperative have enabled the cooperative to begin a new line of environmentally-friendly coffee with potential entry into international markets. The Boaco processing center funded by the *Horizonte Tres Mil* (Austrian Development Agency) will also have a positive impact on the production and processing capacity of San Isidro Cooperative.

One activity which could have strengthened the participating institutions was not undertaken. A study tour to essential oil production facilities in the US were not realized for members of COOPESIUNA. Also, increased involvement of the cooperatives' staff in the management and decision-making for this project, beyond the input of the Steering Committee, might have offered opportunity for institutional growth. The inclusion of a local counterpart in the marketing aspects of the project could have contributed to the project outcomes, increased sustainability, and made a significant institutional impact.

(1.d) Economic Impact

The project's economic impact can only be measured in potential. This potential is contingent upon marketing efforts, further project development, and timely delivery of equipment.

The Organic Coffee and Fair Trade certification will benefit San Isidro Cooperative once the marketing obstacles have been overcome. However, making the yearly payment of fees for these certifications will prove to be a financial strain on the cooperative in the short term. The cooperative is currently operating at a loss and is considering a merger with a larger cooperative that has already overcome these challenges. The cost of the lease of the solar dryer created a financial impact on the cooperative which has yet to be resolved. (See Cost Effectiveness section below.)

COOPESIUNA also expects medium-term economic benefits from future production. An analysis of the essential oil produced from locally harvested allspice conducted by a US company confirms its high quality. The marketing study for the project shows large potential sales in several market areas, given reliable output. This high quality output is dependent upon the arrival of the processing equipment, its production capacity, adequate training in its maintenance and operation for local operators, and the success of ongoing and future marketing efforts. Much has yet to be done to recuperate the cooperative's investment in the project.

(1.e) Social Impact

The project achieved limited social impacts in the communities that received training. Fifty-four families in 14 communities in the Siuna area received training in land use and plantation management practices. 170 families received similar training in the Boaco area. PCaC reported a total of 24 training events with a total of 779 participants. The methodology taught at these events will be incorporated into local agricultural production and disseminated further as the cooperatives grow.

The project had a positive impact in terms of gender equity in that women participated heavily in the trainings and many are owners and producers. Furthermore, COOPECRECER, a separate women's cooperative for production of roasted coffee for the local and national market, was legally established with the assistance of MDI's legal representative as a result of the project.

(1.f) Environmental Impact

The project achieved mixed environmental impacts. As a result of the project: (i) San Isidro Cooperative is now certified in Organic Coffee and Free Trade production. This has institutionalized environmentally friendly cultivation methods and ensures a more sustainable livelihood for all cooperative members; (ii) COOPESIUNA has benefited from training in plantation management, land use and cultivation practices delivered through the project. Despite some setbacks, the techniques taught by the Forestry Specialist for the project have reached all 14 communities of the region and the 54 families involved in allspice collection

for COOPESIUNA;[1] and (iii) the final biodiversity report, *An Evaluation of the Contribution of Cultivated Allspice (Pimienta Dioca) to Biodiversity*, carried out by the project, has made a great contribution to the knowledge of human impact on local flora and fauna. By disseminating the results of the study, there is now an increased awareness of the relationship between integrated plantation management and increased biodiversity. It will remain a valuable resource for future projects in the area.

An important oversight was made in the design and construction of the processing facilities in Boaco and Siuna. For the San Isidro Cooperative in Boaco, no plan was devised for the treatment or disposal of coffee pulp residue from processing. Coffee pup residues are accumulating behind the facility and threaten local water sources. The cooperative is investigating the use of the residue as fuel for outdoor stoves. Construction of the processing facility in Siuna is now completed, but it also lacks a plan for solid waste management. As of January 2005, no plans had been devised to resolve these problems. This project was designed before procedures were established to apply Bank safeguard policies to GEF-financed Medium-Sized Projects. If the current procedures were applied, this kind of issue would have been identified at an earlier stage of the project and could have been avoided.

Furthermore, the project failed to foresee several technical problems that may lead to increased environmental impacts. Increased threats to the BOSAWAS Reserve's buffer zone and its communities include: (i) water and soil contamination as no arrangements were made to deal with the solid and liquid residues from allspice processing; (ii) the solar energy complement to the allspice processing equipment has been replaced by a combustion engine. The system now relies on vegetable oil or diesel fuel, which will increase air, soil, water, and noise pollution; and (iii) the proposed vegetable oil to run the equipment would be extracted from local palms; the effects of this on their population, and consequently on biodiversity and the environment, is unknown.

(2) Project Sustainability:

Project sustainability is rated as unlikely. Certain sub-components are likely to be maintained in the long-term. For instance, the project was able to create local producer alliances, which will allow each community to continue addressing its objectives.

Boaco Coffee Component: The San Isidro Cooperative has received both Organic Coffee certification and Fair Trade certification for its 130 producers. Another 25 are in the transition process toward certification. It is possible that this certification will allow the cooperative to grow and compete in the international market. The only obstacle to this goal is the cooperative's limited marketing ability in arranging and securing sales of their product. Market exploration is now being initiated directly from the cooperative's office in Boaco.

However, it is unlikely that the San Isidro Cooperative will continue with the lease of the solar dryer. During preparation of this Project Completion Note, an interview was held with

[1] The harvesting tool prototypes for sustainable collection of allspice have been removed from the project and the continued work of the ecologist in the buffer zone communities is uncertain.

the San Isidro Cooperative President and Production Manager regarding this issue. The cooperative has been operating at losses in excess of US$15,000 per year and is concerned about the current lease it has with the grant recipient for the solar dryer.[2] As the cooperative is not using the solar dryer and lacks value-added sales, it cannot afford to continue with lease payments. An official decision will soon be made by the cooperative's board to return the solar dryer and free the cooperative of the remaining US$28,000 in payments as provided in the agreement.

Technical complications, lengthy production time, capacity limitations, and inconsistent quality have forced the cooperative to abandon the dryer's use. The Inter-American Coffee Company noted the lack of quality of coffee produced under the project. The quality of coffee produced by the dryer is dependent upon the constant oversight of highly trained technicians who are familiar with the technology and standards of the international market. The cooperative remains reliant on traditional patio drying which has been shown to be a more sustainable methodology given the local climate, ample manpower, and limited capacity.

Siuna Allspice component: COOPESIUNA has benefited through this project by gaining the support of several national and international organizations. With the assistance of PCaC, a group of organizations interested in supporting the cooperative now meets regularly and is designing a second phase of the project. The organizations include: the Inter-American Foundation, the United Nations Industrial Development Organization, the United Nations Development Program, the National Union of Farmers and Ranchers, and the non-governmental organization *Mundo Justo*.

(3) Replication Potential:

The project goals and objectives demonstrate the feasible direction for small rural agricultural cooperatives to compete in the global markets. Despite project setbacks, there are some potential replications identified.

Siuna Allspice Component: With the help of UNDP and UNIDO, COOPESIUNA is creating new production forecasts and looking into direct marketing possibilities. Discussions are underway with PCaC and UNAG to bring similar on-site processing technology to cooperatives in Rosita and Bonanza. A manufacturer for the boiler system and extraction equipment has been identified in Managua. The techniques of sustainable farming, plantation management, and harvesting are certain to be replicated, as it is knowledge based and now incorporated into the cooperative's methodology. This includes crop diversification, nursery production, and seed sharing, which have already become common practice.

Boaco Coffee Component: It is likely that the certification process will be replicated, as it is a goal of many coffee-producing cooperatives. The San Isidro Cooperative has set an example for other cooperatives seeking certification and has already spoken of this process and its achievement at national events.

(4) Stakeholder Involvement:

[2] The cooperative has a US$40,000 lease for a solar dryer, of which US$12,000 has been paid to date.

The organizational structure of the cooperatives ensures a certain level of stakeholder involvement at the local level. The voting power of the members and full participation in trainings and meetings meant that all beneficiaries were consulted and involved in the project at the local level.

Stakeholder involvement at the organizational coordination level was an issue that had to be addressed early on in the project. The redefining of the project and subsequent formation of the Steering Committee were effective at achieving a higher degree of stakeholder involvement at this level. While improvements were made in the hierarchy of decision-making, UNAG, PCaC, and both cooperatives each expressed frustration towards the grant recipient (Mesoamerican Development Institute, or MDI) with the division of responsibilities and sharing of information. Much of the negotiation involved in the project, including the market study, processing equipment, and negotiations with the Bank and other financiers, occurred without adequate stakeholder notification or inclusion. For example, the market study did not adequately reflect local conditions. Furthermore, the results were not shared with the local cooperatives regarding the formulation of a marketing plan. National partners and local stakeholders viewed this as a lack of transparency on the part of MDI, which led to feelings of marginalization by project stakeholders and beneficiaries.

(5) Monitoring and Evaluation:

Monitoring and evaluation of the project was unsatisfactory, both in terms of activities carried out by the grant recipient and by the Bank. First, for an effective monitoring of the project's global objective indicators, the project should obtained baseline values at the early stage of the project implementation.

Second, the physical distance between the grant recipient in Massachusetts and the project sites in rural parts of northeastern Nicaragua created an especially challenging environment in which the project was to operate. Increased supervision and joint missions could have effectively resolved many of the issues which evolved over time.

(6) Cost Effectiveness:

It is possible that cost effectiveness could have increased had a Nicaraguan institution been selected to implement the project. Similarly, project activities could have been carried out in a more cost-effective manner had the recipient been Nicaraguan-based and funds been managed in-country. Operational and travel costs for the grant recipient, along with transaction time for inter-institutional arrangements, resulted in high costs and caused unnecessary delays.

(7) Institutional Capacity/Partner Assessment

Coordination, communication, and management problems prevented the project from achieving its development objectives. Communication problems related to financial management and an understanding of the Bank's procurement policies led to disbursement delays from the Bank to the grant recipient, MDI. This led to further disbursement delays and

a lack of project funds at the local level. Such delays might have been avoided by committing more resources at the preparation stage to an institutional analysis so that the capabilities of all of the partners and their respective roles could have been more clearly defined. This problem was exacerbated by the lack of a representative from the recipient in country to explain the situation and mitigate the consequences.

(8) Grant Recipient and Bank Performance: The performance of the grant recipient and the Bank was unsatisfactory.

Grant Recipient: The President and Vice President of the Mesoamerican Development Institute (MDI) were also the President and Vice President of Solar Trade Corporation of Massachusetts, the manufacturer with the patent for the solar dryers. This fact was discovered during the project completion mission. This presents a potential conflict of interest as the original project design included the purchase of 10 solar dryers from the firm at a cost of US$40,000 per solar dryer from the Solar Trade Corporation. MDI did not disclose this information to the Bank during project preparation or project implementation.

The external auditor Ciulla, Dixon & Dale, LLC repeatedly issued clean opinions on the financial statements of MDI and the project. However, during a Bank supervision mission to the MDI headquarters in Lowell, Massachusetts, it was found that their reporting system could not produce the full complement of financial monitoring reports. While the totals transferred as indicated in the wire transfers matched the total invoices and receipts, several attempts to trace individual transaction amounts were not successful. At that time, the mission concluded that no specific serious problems with respect to the use of funds were identified. The mission made recommendations to improve the capacity of MDI in financial accounting and reporting, internal control, and procurement. For the latter, the mission recommended that MDI share with the Bank TORs and procurement documents prior to carrying out such actions. However, the Bank did not receive requests for no objection for any procurement actions relating to the purchase of the solar dryers.

MDI's poor performance was further affected by its lack of presence in Nicaragua. A legal representative for MDI was based in Managua, Nicaragua throughout project implementation for limited functions such as signing contracts. However, the representative was not responsible for monitoring project activities or project consultations. This created a communication barrier that led to a breakdown of trust among organizations involved. The stress on the relationships among stakeholders was never truly remedied.

Breakdown of trust among the recipient, the national organization, and the cooperatives resulted in hindering effective communication and information exchange, as reflected in the redefined institutional arrangements requested by the Bank in 2001. Much of the information regarding project implementation was shared only between the Bank and MDI and was never shared among project stakeholders and agencies at the national and local levels. The Bank often had difficulty in obtaining timely responses to requests for information from the recipient.

World Bank: Problems with the project's original design could have been detected with stronger project preparation. The Bank team should have known that a foreign-based non-governmental organization with limited local presence could not facilitate local ownership of the project. The Bank policy did not require preliminary financial and procurement reviews for GEF-financed Medium-Sized Projects. Although there was no violation of the policies, it was only during a supervision mission during project implementation to MDI offices in Massachusetts that the Bank discovered that the grant recipient's administrative and financial capacity was inadequate for managing projects.

Furthermore, despite questions as to relatively complex fiduciary arrangements on the project and a decision that the project would require higher-than-normal supervision, the Bank performance on project supervision was less than satisfactory. Project supervision was likewise affected by changes in task management during project implementation; there were three Bank task managers over the four years of project implementation. Poor communication between Bank staff and a general lack of information sharing between task managers limited supervision effectiveness.

Bank supervision missions to Nicaragua were adequate in number, albeit inadequate in their scope and depth of investigation. Visits to the remote project site of Siuna were few given the distance and time involved to arrive at the project site; more visits were made to Boaco to view the implementation of the coffee component. Task Managers relied on reports from the implementing agency to verify progress made against project indicators. These reports often conflicted with statements from local organizations. Only late in project implementation did the Bank realize that, apart from periodic visits from US-based staff, MDI's sole representation in country was the organization's legal advisor.

This is one of the first GEF-financed Medium-Sized Projects implemented under the then-new GEF-financed program. Inherently, it encountered many issues which had not been resolved. A close supervision by the Bank team may have helped to address some of the management issues. However, supervision resources were inadequate to make more frequent supervision missions. In retrospect, project supervision should have been made by Bank staff in the Bank's country office.

III. Main Lessons

- Assessment of recipient agency's management capacity

No institutional assessment or financial management assessment was done prior to project approval. The lack of understanding of the grant recipient's capacity led to serious misunderstandings and disbursement delays that hampered the entire project. The timely and streamlined release of funds was crucial for project implementation.

- Bank supervision and continuity

The project had three task team leaders in five years, all based in Bank headquarters. Extra attention in needed when passing supervision from one task team leader to another. Furthermore, evidence from other GEF-financed Medium-Sized Projects (MSPs) indicates that MSPs with (i) new partners and (ii) implemented in remote areas require increased

supervision time. In this case, there was relatively little hand-over between task team leaders, and the task team did not pay sufficient attention to activities in the field. In retrospect, the project should have been supervised from staff in the World Bank country office in Managua.

- Relation between grant recipients and local communities

To improve project performance, it is recommended that grant recipients be based in the country where project activities are being undertaken. The grant recipient for complicated projects requiring direct communication with stakeholders should be highly accessible and represented locally throughout project implementation.

- Local ownership and contracting

This project would have benefited from the delegation of more responsibility to local communities. Local cooperatives would have benefited from increased involvement in the negotiation and procurement of equipment as it was vital to project success and sustainability. Ownership is especially important in projects undertaken in remote areas where knowledge of local conditions and capacity is critical.

- Project implementation arrangements

Poor communication and a lack of accountability significantly affected project implementation. The distance between MDI headquarters and communities in rural Nicaragua was too great to overcome by infrequent visits, and without strong local support from, communication breakdowns led to a lack of confidence by beneficiaries. Strong local support should be carefully incorporated into initial project design. This would ensure that information is shared, and would encourage the active participation of project beneficiaries much.

- Procurement policy

Procurement difficulties hampered project performance; the prior review process should have been more explicit in the Grant Agreement as well as in Operations Manuals for the project.

- Capacity building for cooperatives

Bank supervision missions found that the rural cooperatives, principally COOPESIUNA, required significant assistance to improve project management capacity. Technological barriers as well as administrative capacity hindered their ability to fully participate in project management. Close monitoring of capacity building activities should be a priority in future projects.

- Use of appropriate technology and project design

Limitations of introduced technologies should be carefully examined before project implementation. In short, projects should not finance technologies whose local suitability and sustainability are in question. Furthermore, infrastructure limitations – particularly road access and communication in rural areas – should be assessed to determine of project design is feasible.

IV. Financial Management Status

Financial management of the project was unsatisfactory throughout project implementation. As indicated above, an independent audit report by Ciulla, Smith and Dale, P.C. (World Bank–approved CPA firm) of August 14, 2001 found that MDI maintained effective internal controls. Despite this finding, the grant recipient's capacity for procurement and financial management was limited. This was noted in the report of the Bank supervision mission to MDI offices in 2001[3]. Arrangements were agreed upon to bring the financial management and procurement procedures up to Bank standards. However, project reports prepared three years later continued to note problems with project management and compliance with Bank fiduciary policies.

Financial management problems arose during project implementation due to a misunderstanding by the recipient of the Bank's procurement policies. Before the recipient was to utilize spend project funds from the first tranche, no-objections were to be issued by the Bank relating to: (i) review and approval of the business plans; (ii) amended Operational Plan and cost structures; (iii) new institutional arrangements; and (iv) Operational Manual amended and approved by the World Bank. A lack of understanding of the need for Bank oversight of these matters led to a number of unapproved expenditures from the Special Account, which in turn led to disbursement delays and the aforementioned implementation problems in the subsequent months. The timely use of project funds was critical for project implementation, as objectives were tied to agricultural harvest and weather cycles. Closer financial management supervision and more general project supervision by the Bank was required.

The final audit report from MDI remains pending.

[3] A fiduciary Supervision Mission carried out in December 2001 noted that MDI staff "limited to the two principals with no additional technical or administrative support, facilities are minimal, records poorly maintained and incomplete, and internal controls are insufficient".