

PD-ABY-223

PROMESA

Proyecto de Mejoramiento de Semillas

HURRICANE MITCH SUPPLEMENTAL

FINAL REPORT

Submitted to the

United States Agency for International Development

Under Modification No. 07 of Contract No. 524-C-00-98-00025-00

Development Alternatives Incorporated (DAI)
7250 Woodmont Avenue, Suite 200
Bethesda MD 20814

June 7, 2002



A



June 12, 2002

Mr. Paul Crawford
USAID/MANAGUA
AMEMB, MANAGUA, USAID
Unit 2712 Box 9
APO AA 34021

Subject: Mitch Supplemental Final Report
Reference: Modification No. 07 of Contract No. 524-C-00-98-00025-00

Dear Paul:

Pursuant to the referenced contract requirement, Development Alternatives, Inc. (DAI) herewith submits its Final Report on PROMESA's activities to implement a portion of USAID's Mitch Reconstruction program. These activities, funded by a \$625,000 grant from the Central America and Caribbean Emergency Disaster Recovery Fund (CACEDRF), were discreet and additive to the original contract.

Should you have any technical questions regarding this submission, please do not hesitate to call me at 270-9730. Questions of a contractual nature may be referred to Daniel Brown, Senior Contract Administrator (301) 215-7031.

Sincerely,


King Bash
Chief of Party
PROMESA/DAI



Enclosure: As stated

- Vanessa Morales, USAID Mission Contract Specialist
- Marilyn Zak, USAID Mission Director
- Rodger Garner, USAID Deputy Mission Director
- Raymond Baum, USAID Mission
- Leonard Fagot, USAID Mission
- Daniel Brown, DAI, Sr. Contracts Administrator
- Michael Bursum, DAI Associate
- James Chapman, DAI Sr. Development Specialist
- Max Goldensohn, DAI Vice President, Agriculture and Economics

B

**HURRICANE MITCH SUPPLEMENTAL
FINAL REPORT**

Table of Contents

Executive Summary	2
1 Seed Policies Favoring Private Investment	3
1.1 PVP	4
1.2 CONASEM	6
1.3 Accreditation	8
1.4 Harmonization	10
2 Biotechnology	13
2.1 Biotechnology Education Program	14
2.2 Biosafety Advisory Commission	19
2.3 Field Tests of Agricultural Biotech Products	23
3 New Variety Promotion	24
3.1 Variety Demonstrations, Field Days, and Seminars	24
3.2 Market Development	28
Conclusions	32
Appendix	38

EXECUTIVE SUMMARY

Under Modification No. 07 of Contract No. 524-C-00-98-00025-00, Development Alternatives, Inc.'s Seed Improvement Project (PROMESA - Proyecto de Mejoramiento de Semillas) was contracted to implement a portion of USAID's Mitch Reconstruction program. PROMESA's original mandate was to strengthen the legal and administrative framework of the seed industry, emphasizing the role of the private sector as producers, marketers, and developers of improved varieties and hybrids. Modification No. 07 of the PROMESA contract stipulated that the original scope of work of the PROMESA project would be expanded to include the following five initiatives:

- Promotion of plant variety protection (PVP) policies that encourage the development of new plant materials by protecting the intellectual property rights of plant breeders;
- Advocacy to revise the National Seed Law to provide a regulatory framework that encourages the development and use of improved varieties;
- Coordination with other seed programs in Central America to harmonize seed laws and regulations;
- Dissemination of information on biotech plant products to facilitate the formation of regulatory policies based on scientific and economic criteria; and
- Promotion of improved varieties and hybrids for use in small farmer development programs.

PROMESA organized these initiatives into three components: Seed Policy Initiatives, Agricultural Biotechnology, and New Variety Promotion. The activities of these components, which were funded by a \$625,000 grant from the Central America and Caribbean Emergency Disaster Recovery Fund (CACEDRF), were discreet and additive to the original contract.

Seed Policy Initiatives – The first component - advocating for seed policies that favor private investment and facilitate international trade - included the following objectives:

- Implementation of a plant variety protection (PVP) law that encourages the development of new plant materials;
- Establishment of a National Seed Council (CONASEM) to serve as a national forum to lobby for revision of the National Seed Law to provide a regulatory framework that encourages the development and use of improved varieties;

- Implementation of an accreditation system to govern private sector seed certification, seed testing, and variety validation trials; and
- Harmonization of seed trade laws and regulations in Central America.

Agricultural Biotechnology – The second component - advocating for an agricultural biotechnology regulatory framework - included the following objectives:

- Dissemination of information on biotech plant products to encourage the adoption of regulatory policies based on scientific and economic criteria;
- Establishment of an Agricultural Biosafety Commission; and
- Approval of field testing of at least one plant biotechnology product.

New Variety Promotion – The third component - promoting new varieties and hybrids-emphasized on-farm demonstrations of varieties available from other countries. The objectives of this component were to:

- Define and institutionalize systems for rapid screening and release of improved varieties;
- Encourage seed companies to release and promote new varieties;
- Promote certified seed of improved varieties and hybrids to rural development programs.
- Provide technical support to individual seed producers, processors and marketers developing strategic, marketing and business plans.
- Promote the use of registered seed by providing market information and encouraging INTA to increase production and sales of registered and hybrid parent seed.
- Provide targeted business planning assistance to seed companies.

1. Seed Policy Initiatives

Agricultural and economic policies influence seed market efficiency ^{by providing} ~~through the~~ incentives of economic agents operating in the sector. Policies favoring efficiency also favor foreign investment. As MAG-FOR liberalizes the seed policy environment, and the success of its liberal approach becomes apparent in the increased use of certified seed, it will help MAG-FOR realize its desire to adopt progressive policies in other agricultural industries.

The primary objective of PROMESA's Mitch Supplemental policy program was to strengthen the legal and administrative framework of the seed industry, emphasizing the role of the private sector in seed production, marketing, and new variety development. The program was designed to assist MAG-FOR in developing a policy framework that favors private sector-led development of the national seed system and increases the efficiency of national seed markets.

An important corollary to this work was preventing policies that would retard the development of efficient markets. For example, PROMESA helped thwart an attempt by environmental activist groups to draft an "Access to Genetic Resources Law" that would have given the Ministerio del Ambiente y Recursos Naturales (MARENA), rather than MAG-FOR, regulatory authority over agricultural biotech products. Other examples of

counter-productive legislation and court challenges pending consideration by the GON legislative assembly and courts include:

- Biodiversity Law The PVP law provides intellectual property rights to new and distinct, genetically improved and stable varieties. The draft Bio-diversity law would provide indigenous groups with intellectual property rights over unimproved native plants, thereby prohibiting plant breeders from obtaining rights to any improvements that they made using those original indigenous varieties.
- Código Penal The draft penal code (Código Penal) under consideration by the National Assembly inappropriately redefines intellectual property rights, including those of plant breeders.

1.1 Plant Variety Protection

On October 20, 1999 the Nicaraguan legislature passed a plant variety protection (PVP) law to bring the nation into compliance with international practices and standards of plant variety protection and stimulate crop research. The PVP law and its administrative regulations are designed to protect the intellectual property rights of plant breeders and the institutions they work for, so that they can reap benefits from their investments in technological innovation. They provide incentives for seed companies and crop research centers, including INTA, to develop and release new plant varieties for small farmers. The legal and administrative frameworks are now in place.

PVP Seminar In early August, 2000, PROMESA sponsored a seminar – “Foro Nacional sobre PVP” - at the Universidad Nacional Agraria for 65 members of the academic community, to explain the PVP law and its potential benefits to crop breeders and farmers. One environmental conservation group, in particular, argued against PVP, alleging a bias toward agribusiness, and ignoring the property rights of indigenous groups over unimproved native plants. Rights over native plants are not registered or regulated by PVP, which simply provides property rights protection for new, different, uniform and stable cultivars resulting from a deliberate process of plant genetic manipulation, but also resulting from serendipitous discovery. The scientists and academics participating in the seminar eventually agreed that the PVP law, if properly applied, will stimulate agricultural research in Nicaragua. Their conclusions appeared in popular press publications.

Variety Descriptors Beginning in July, 2000, PROMESA held a series of meetings between crop breeders, biologists, and PVP regulators to identify variety descriptors indicating uniqueness, uniformity, and stability.

PVP/IPR Training Thomas Moore University. The course established a core group of lawyers, policy-makers, and businessmen who understand Nicaragua's IPR laws and implications. This is particularly important for creating a market-oriented policy environment, including IPR protection, for the new government administration.

Public Meetings on PVP and UPOV Politicians, journalists, the agribusiness community, scientists, environmental protection groups, and members of the general public joined

the debate over the potential benefits and risks of PVP. In January 2001, Nicaragua joined UPOV.

PVP Qualifying Committee MIFIC and MAG-FOR appointed their members to a PVP Qualifying Committee. The first eight applications for PVP protection are in various stages of assessment and approval.

Plant Variety Protection			
RESULT NO. 1A: PVP Law Implemented (Mitch funded)			
Indicator 1A-a Increase in the number of applications for PVP registrations			
Unit of Measure: Number (cumulative)			
	1999	2000	2001
Planned	N/A	1	5
Actual	N/A	1	8

Targets	Activities	Results	Status
A PVP law and regulatory framework that encourages plant breeding and investment in crop research by protecting the intellectual property rights of plant breeders.	PVP Seminar (Foro Nacional sobre PVP) August 8, 2000 at the Universidad Agraria, for 65 private sector participants.	IPR/PVP protection stimulates seed trade and investment	Completed
	Assisted INTA and seed companies filing for PVP registration.	8 new applications submitted by INTA and seed companies for PVP registration.	Ongoing (PROMESA II)
A PVP office that efficiently registers and assists in protecting and encouraging the development of new plant varieties	Equipped PVP offices in MAG-FOR and MIFIC, and trained staff.	PVP offices in MIFIC and MAG-FOR equipped, trained, and operating in coordination.	Completed
	Technical support to MAG-FOR and MIFIC to define norms, standards, and procedures.	PVP Committee processing applications for plant variety protection.	Completed
	Audit/review by the International Union of Variety Protection (UPOV). Feb. 2002.	Nicaragua joins UPOV as 49th member.	Completed
	PVP meeting for UCA, UNA, and UNAAN scientists.	INTA, university and seed companies applying for PVP registration.	Ongoing (PROMESA II)
PVP law widely debated among politicians, the agribusiness community, academia, and members of the general public.	PVP law published and distributed.	PVP benefits widely understood by the agricultural community.	Completed
	IPR course at Thomas Moore University, Oct.-Nov. 2001.	Academic community publicly supports initiative to modify draft biodiversity legislation and assign primary responsibility for technical evaluations and regulatory control over PVP and agricultural biotechnology regulation to MAG-FOR.	Completed
		Core group of 6 lawyers and agricultural professionals trained.	Completed
PVP procedures defined	Variety descriptor seminar for 20 UNA, UNAAN, and INTA crop scientists, July 2000. Training on Variety Characterization October 30, 2000 CNIA-INTA 30 people INTA & UNA staff	Morphological variety descriptors for nine important crops defined.	Completed

1.2 CONASEM

Mitch disaster relief funds were used to convene the National Seed Council (CONASEM), which was formally established in 2001 to provide a forum for seed policy debate and action. CONASEM consists of nine members from public institutions and three from the private sector. PROMESA continues supporting CONASEM, which is becoming increasingly effective, and advocating for seed policies that favor investment. These support activities include:

- Identifying and addressing the factors constraining seed sector development;
- Anticipating the potential impact of agricultural policies on the seed industry;
- Identifying industry-wide policy strategies to stimulate seed sales and attract private investment.

Once CONASEM began meeting on a regular basis, PROMESA provided technical and legal support to its subcommittees, holding workshops to analyze seed policies and presenting recommendations to high-level decision-makers.

In October 2001, PROMESA II helped organize certified seed producers in northern Nicaragua into the Asociación de Productores de Semilla del Norte (APROSEN). APROSEN applied for legal status as seed production and marketing cooperative and is currently awaiting approval from the National Assembly.

PROMESA also assisted ASORESEM represent the interests of seed companies in CONASEM and advocated for the permanent representation of APROSEN, ASES, ANIFODA, COAPROSEC, UCA and banking institutions/financial institutions in CONASEM.

CONASEM			
RESULT NO. 1E: Private Sector Involved in Formation of Seed Policy (Mitch funded)			
Indicator 1E-a CONASEM established and functioning with private sector participation.			
Unit of Measure: Benchmarks met.			
	1999	2000	2001
Planned			
1. Nicaragua joins UPOV			<i>January</i>
2. CONASEM established and functioning.			<i>March</i>
3. Additional agricultural inputs exempt from import taxes.	N/A	N/A	<i>April</i>
4. New policies for stimulating seed industry development defined.			<i>July</i>
Actual			
1. Nicaragua joins UPOV			Completed (see PVP above)
2. CONASEM established and functioning.			Pending
3. Additional agricultural inputs exempt from import taxes.			Completed
4. New policies for stimulating seed industry development defined.			Completed

Targets	Activities	Results	Status
National Seed Council operating, with regulations approved.	Meeting to install the National Seed Council in accordance with the Seed Law and three meetings to prepare its internal regulations. April-June 2001.	CONASEM members appointed and officially convened in April 2001. CONASEM internal regulations defined and approved.	Completed Completed
National Seed law and regulations revised to provide a regulatory framework that encourages the use of certified seed. Preliminary proposal of a new Seed Law.	Establishment of work groups of private sector participants to identify problems with the current Seed Law and regulations. May 2000 Workshop to develop a final proposal for a new Seed Law and regulations, and its presentation to MAG-FOR.	Policy advocacy activities lead to the revision of the National Seed Law	Ongoing (PROMESA II)
MAG-FOR policy dept. informed of opportunities and constraints in the National Seed Sector.	Public and private sector representatives discuss seed promotion strategies to expand seed markets.	MAG-FOR redesigns PTA program to develop a market-driven seed sector.	Completed
Wider private sector participation in discussions of alternative solutions involving: - Policy formulation - Seed service accreditation - Promotion of usage of certified seed	Workshop on commercial seed markets, with the participation of international, seed companies and the MAG-FOR. April 2000 Conference: "Strategies for the Development of the Nicaraguan Seed Industry" with active participation by private sector. May 2000 Meetings with the Council on Production of the National Assembly and party leaders. National and international seed companies identify opportunities and constraints to seed industry development.	See policy advocacy results above.	Ongoing (PROMESA II) Ongoing (PROMESA II) Ongoing (PROMESA II) Ongoing (PROMESA II)
Unified and coordinated set of work plans and programs related to seed promotion, specifying the activities and contributions of MAGFOR, INTA and PROMESA.	Presentations to PTA explaining PROMESA activities. Assist PTA in developing proposals for donors. Supply of statistical analyses and information to PTA team to evaluate and assess agricultural production and seed industry in Nicaragua. Inform INTA and MAG-FOR on the need for a National Seed Plan Ensure participation of seed companies and distributors in seed sector assessment and plan.	PTA developing a 3-year plan coordinating seed activities of MAG-FOR and INTA.	Completed

1.3 Private Seed Service Accreditation

Currently, the private seed sector depends on MAG-FOR for seed certification and quality control services. MAG-FOR technicians supervise certified seed production. MAG-FOR laboratories conduct seed analyses. INTA conducts variety validation trials of new varieties. As seed markets continue to grow, however, MAG-FOR will be unable to inspect widely dispersed seed production areas, and the demand for seed services will exceed its capabilities.

In anticipation of a rapid increase in the demand for seed certification, and a declining budget for MAG-FOR seed services, PROMESA assisted MAG-FOR in training private seed production inspectors in 2000. As a result, hundreds of seed producers in northern departments grew certified seed on more than 1,000 manzanas in 2000. This program was an appropriate response to the current seed scarcity; it also set an important precedent for MAG-FOR to accredit private field inspectors.

As seed demand increases and seed companies mature, MAG-FOR will have to relinquish its control over selected seed industry services so as to avoid "bottlenecks" in seed regulatory procedures. The 1998 Seed Law authorizes MAG-FOR to accredit: (1) laboratories to test seed quality, and (2) crop research organizations to conduct new variety validation trials.

In the long-term, accreditation will result in seed certification by private seed companies, and in MAG-FOR regulating truth-in-advertising, rather than continuing its current role as guarantor of seed quality. Accreditation will stimulate seed production for both national and regional markets. It will allow seed companies to validate varieties and test seed faster, and at lower cost. It will provide incentives for seed companies to establish internal quality control systems that will, in the long run, generate competitive advantages in national and international markets.

Mitch disaster relief funds were used to assist MAG-FOR design a program to accredit individuals and organizations to validate new varieties to local conditions, test seed quality, and certify seed. When it is implemented, the system will result in a network of private seed services that expands or contracts according to market demand, and encourages the seed sector to regulate itself.

In 2000 MAG-FOR, in consultation with the private seed sector, defined procedures for accrediting seed laboratories to analyze seed quality, crop research centers to conduct variety validation trials, and field inspectors to supervise certified seed production. PROMESA held a series of workshops to define the new procedures. These procedures indicate the degree to which MAG-FOR intends to delegate authority to the private seed sector. PROMESA helped MAG-FOR prepare to implement the program by:

- Developing procedural manuals for companies soliciting accreditation;
- Providing workshops and targeted technical support to help seed laboratories, crop research centers, and seed companies meet accreditation requirements; and
- Training private individuals and companies to certify seed.

Despite delays in approval by, and coordination between MAG-FOR and MIFIC, both the accrediting agency (DGS) and potential accreditees (private seed laboratories, crop research centers, and seed companies) are prepared to implement the program. MAG-FOR has defined its administrative and "audit" procedures. PROMESA helped two seed laboratories (INTA, UNA), and four seed companies (SAGSA, EAGE, UNICAFE, ANAR) develop accreditation quality-control manuals for their internal operations. Having defined the quality control procedures they need for accreditation, PROMESA II then conducted mock audits of the six organizations to prepare them for future audits by DGS. The accreditation program is fully defined. MAG-FOR and MIFIC have agreed to manage the accreditation program. MAG-FOR has defined its administrative and audit procedures. Six organizations have prepared quality-control manuals and run successful mock audits. All that is lacking is official MAG-FOR/MIFIC approval to implement the accreditation system.

Once MAG-FOR approves the system, six seed organizations will apply for accreditation. PROMESA II will assist MAG-FOR in conducting audits of accreditation applicants. We will also assist DGS in publishing accreditation standards and procedures, and distributing them to seed organizations. PROMESA II's target is the accreditation of at least four seed laboratories, crop research centers, and seed companies before the end of the project.

ACCREDITATION			
RESULT NO. 1C: Seed Policies Enhanced (Mitch funded)			
Indicator 1C-a: Private seed services accredited			
Unit of Measure: Private organizations providing commercial seed services (cumulative)			
	1999	2000	2001
Planned			
1. Seed labs and crop research centers accredited.	0	0	2
2. Private seed organizations define control procedures for seed field inspections.	0	0	4
Actual			
1. Seed labs and crop research centers accredited.	0	0	Pending
2. Private seed organizations define control procedures for seed field inspections.	0	0	6

Targets	Activities	Results	Status
Accreditation standards and procedures developed for companies soliciting accreditation.	Seminar to define accreditation application requirements, control procedures, and standards. (Normas de Certificación de Semilla) July 28, 2000	Accreditation system designed, procedures defined, standards set, and accreditation requirements defined.	Completed
	Assisted MAG- FOR's Direccion General de Semillas in preparing accreditation quality control audit questionnaire and "mock audits".	Accreditation quality control system functioning.	Completed
Private individuals and companies trained to certify seed.	Conducted 4 workshops* and provided individual technical assistance to help seed laboratories, crop research centers, and seed companies meet accreditation requirements.	Six seed organizations ready for accreditation.	Completed
	Assisted seed companies seeking accreditation to develop quality-control manuals for their internal operations.	Internal seed quality control systems defined for individual seed companies, laboratories, and crop research centers.	Completed
Privatization of selected MAG-FOR seed services that the private sector can provide on a sustainable basis.	Meetings between MAG-FOR and MIFIC to: (1) Establish institutional coordination between MIFIC and MAG-FOR, and define inter-institutional operating framework; and (2) Coordinate the accreditation responsibilities of the two institutions	DGS accreditors prepared to implement the accreditation system.	Pending Approval
MIFIC defines accreditation regulations and procedures.		Formal agreement between MAG-FOR and MIFIC to share accreditation responsibilities.	Pending Approval
*July 11-14, 2000, 25 participants; December 3-6, 2000, 22 participants; January 25-27, 2001, 18 participants; May 31-June 2, 2001, 26 participants.			

1.4 Seed Trade Harmonization

In November 1999, MAG-FOR signed a regional agreement harmonizing seed laws and regulations: the Regional Harmonization of Field Trials and Laboratory Standards for Seed Varieties. Harmonizing seed laws and regulations, standardizing seed quality categories, and accepting seed certified by other official seed agencies will stimulate regional seed trade and encourage seed companies to produce for regional markets.

MIFIC subsequently expanded the regional seed trade harmonization program, to include a proposal to reduce registration fees and a reduction in phytosanitary and tariff barriers. This broader initiative would be managed by the Union Aduanero Centroamericano, and would harmonize regulations for other products, as well.

Harmonized phytosanitary and tariff regulations being negotiated at the regional level are beyond the scope of PROMESA II. The outcome of UAC negotiations will have a greater impact than our original harmonization program, but its implementation will be delayed. The UAC negotiations have until January 2003 to reach an accord, at which time negotiations will end and the regional phytosanitary standards and tariff regulations originally proposed at the beginning of the negotiations will automatically go into effect at the regional level.

Stimulating Regional Seed Trade - Harmonizing the seed laws and regulations, and standardizing seed quality categories in Central America, will stimulate regional seed trade and encourage seed companies to produce for regional markets. Official approval of the harmonized regulations will not, however, necessarily lead to their implementation. *Harmonized seed standards already exist on an official level in Nicaragua, and seed companies should be able to market certified seed of basic grain and oilseed crops within the region with only minimal phytosanitary testing.* Nevertheless, MAG-FOR's Plant Health Department nevertheless continues to test seed imported from other Central American countries. If the UAC negotiations establish harmonized phytosanitary regulations and seed tariffs before project close-down, PROMESA II will conduct training courses for GON agencies, such as customs agents, on the new regulations and their application, and publish and disseminate the new regulations to seed producer and trade organizations.

Streamlined Variety Validations -The 1998 National Seed Law requires validation testing for basic grain and oilseed varieties before their commercial release, thereby delaying and increasing the costs of early stages of the variety introduction process are protracted. At INTA, which conducts most of the validation trials, testing takes place in an environment where a large portfolio of varieties are in various stages of development, and where it is difficult to measure changes in the number of varieties moving through the development and validation pipeline.

MAG-FOR recognizes the need to streamline variety validation procedures. The 1999 Regional Harmonization of Field Trials and Laboratory Standards for Seed Varieties included streamlined variety validation procedures. The new procedures still require several years of variety testing, however, including two years in regional trials and at least one crop cycle in the major areas where the crop is produced in Nicaragua. Implementation of these procedures is blocked by the Seed Law, which requires at least three years of validation trials in Nicaragua, but the pending UAC agreement will supercede the validation process defined in the Seed Law.

Tariff Reductions - PROMESA assisted the MAG-FOR in reducing tariffs on imported seed, planting materials, and seed-related products. MAG-FOR wants additional liberalization of its agricultural policy environment, and PROMESA II is positioned to assist in defining the future policy environment within which the seed industry operates. PROMESA II will help MAG-FOR review and adopt new progressive policies.

Black Bean Exports to Mexico - Mexico's TLC with Nicaragua calls for an annual quota of 4,000 tons of black beans, but Mexico's phytosanitary restrictions prevented grain dealers from using the quota. Mexico called for a phytosanitary risk assessment of Nicaraguan black bean production areas. DGPSA's assessment was accepted by its Mexican counterpart organization. The restrictions were not removed, however, and the ban on Nicaraguan black beans continued.

In 2000, PROMESA sent a trade mission to meet with Mexican grain traders and regulatory institutions. This resulted in an official change in Mexico's phytosanitary policies, allowing Mexican grain traders to import black beans from Nicaragua. To test whether the new regulations are actually in effect, PROMESA is helping Agronegsa export an initial shipment of black beans to Mexico. PROMESA-II will continue supporting MAG-FOR's effort to encourage implementation by:

NO!

- Reviewing current trade regulations and tariffs and determining the extent to which they are being implemented in Nicaragua;
- Publishing the harmonized seed regulations and disseminating them to seed producers and trade organizations;
- Developing a management information system for DGPSA that makes it more efficient and transparent;

Regional Seed Trade Harmonization			
RESULT NO. 1D-1: Regional Seed Laws Harmonized (Mitch funded)			
Indicator 1D1-a: MAG-FOR implements Phytosanitary, seed certification, PVP and variety registration regulations "harmonized" in the 1999 regional seed policy agreement.			
Unit of Measure: Benchmark results ¹			
	1999	2000	2001
Planned			
1. Harmonized Phytosanitary and variety registration regulations approved.		June	
2. Harmonized Phytosanitary and variety registration regulations published.			May
Actual			
1. Harmonized Phytosanitary and variety registration regulations approved.		December	
2. Harmonized Phytosanitary and variety registration regulations published.			Pending

Targets	Activities	Results	Status
Elimination of variety registration fees for imported seed and standardization of registration costs for seed companies and new varieties.	Meetings with MIFIC and MAG-FOR/DGPSA's Salud Animal y Sanidad Vegetal to prepare for harmonization negotiations with the Union Aduanero Centroamericano.	MIFIC approves reductions in tariffs on imports of seed-related materials.	Pending approval by National Assembly

¹ This benchmark result indicates official acceptance and implementation of the 1999 regional seed harmonization agreement concerning Phytosanitary, seed certification, and variety registration procedures.

2. Agricultural Biotechnology

The United States Department of State, USAID, DAI, and PROMESA have long recognized the potential benefits of agricultural biotech products to Nicaragua, particularly for small farmers, including:

- Lowering production costs by reducing the requirements for complementary production inputs;
- Increasing crop yields and improving the quality of food products;
- Reducing post-harvest losses and improving food processing characteristics; and
- Reducing the environmental impact of agricultural production and slowing the advance of the agricultural frontier by increasing yields and farm profits.

Despite its potential benefits for agricultural development, some environmental protection advocacy groups view biotechnology as a threat. PROMESA concurs with these groups when they call on the Nicaraguan government to take a proactive role in regulating biotechnology, based on cautious, science-based evaluations of biotech products. Some of the recommendations of these environmental protection advocacy groups are, however, inappropriate. MARENA's draft Biodiversity legislation, for example, would remove regulatory control over agricultural biotech products from MAG-FOR. As drafted, the law also takes phytosanitary regulatory authority and the authority to approve the introduction of new crop varieties, away from MAG-FOR and vests it in MARENA.

The Biodiversity Law would also hamper crop research by requiring that all new varieties and hybrids - not just biotech products but any seed that enters Nicaragua - pass environmental impact analysis and be approved by MARENA. This is overzealous - particularly with respect to non-biotech varieties - and would reduce farmers' access to new varieties. It also provides indigenous groups with intellectual property rights over unimproved native plants, thereby prohibiting breeders from obtaining ownership rights over new varieties developed using indigenous varieties, and creating an obstacle to crop research in this country.

For the most part, MAG-FOR regulatory authorities have remained passive, taking a wait-and-see attitude to the public debate over biotechnology. Seed importers also avoided negative publicity by withdrawing from the public debate over biotechnology. These factors have resulted in delays in research and missed opportunities for agricultural development.

Meanwhile, the threat of unregulated introductions of biotech seeds continues to grow. MAG-FOR still has not determined how to regulate the introduction of agricultural biotech products. Without a regulatory framework to evaluate them on a case-by-case basis, the unchecked introduction of biotech products becomes increasingly likely.

The urgent need for a regulatory framework is exacerbated by the recent passage of the *Ley de Contencioso Administrativo*, which was adopted to streamline bureaucratic decision-making. It requires administrators of the national government to process applications within 30 days; if they do not respond within that period, the application is approved by default. This new law, which came into effect in May 2001, will require

MAG-FOR to deliver its response within 30 days. If an application to introduce agricultural biotech products for testing or release is approved, the applicant can proceed. But if the application is rejected, MAG-FOR must justify its decision. The World Trade Organization, to which Nicaragua is a member, requires a technical justification for denying such applications, and provides legal recourse to applicants who believe their requests were unjustifiably denied or inadequately substantiated. MAG-FOR has no regulatory guidelines or technical evaluation criteria to substantiate its decisions.

To address this situation, PROMESA undertook a biotech program, financed by USAID's Mitch Reconstruction Program, with two interrelated components:

- Conducting a biotechnology education program to inform targeted public and private sector decision-makers and stakeholders, and the general public of the potential benefits and risks of biotech plant products; and
- Advocating for the implementation of an agricultural biotechnology regulatory framework, which includes the establishment of a National Biosafety Commission to regulate the introduction, testing and release of agricultural biotech products into Nicaragua.

Resolving the debate over biotechnology is beyond the scope of PROMESA. The biotechnology program is **not** designed to promote any particular biotechnological innovation or even biotechnology in general. Its purpose is to educate public decision-makers, producers, agribusiness, and consumers on the potential benefits and risks of biotechnology, and to stimulate scientific inquiry that will guide the definition of policies related to the importation, testing and distribution of GMO seeds to producers.

2.1 Biotechnology Education Program

The biotech information program of the agricultural biotechnology component has been successful in increasing awareness of the potential benefits and risks of agricultural biotech products and in changing attitudes towards such products. The information program targets two audiences: (1) policy-makers, agricultural technicians, universities, media and producer organizations, and (2) the general public. The technical audience receives detailed and technical information through seminars, workshops and our bi-monthly bulletin, *Biotecnología*. It also gets customized technical information (see attached). The general public receives information through weekly press releases in the Science and Technology section of the Sunday edition of *El Nuevo Diario*. Both the bi-monthly bulletins and weekly press releases provide balanced and scientifically based information on biotechnology.

Prior to the initiation of the information program in August 2000, mass media coverage of biotechnology was limited to sensationalist 'news' generated by environmentalist groups in Europe and the United States, and picked up by the local media. Once our information program got underway, it met with strong opposition from two local environmentalist and consumer advocacy organizations: the Centro Humboldt and the Liga por la Defensa del Consumidor (LIDECONIC). Centro Humboldt is funded by organizations such as GTZ, DANDINA, HIVOS, Terre des Hommes, and OXFAM. LIDECONIC is a member of Consumers International, a London-based umbrella group

of consumer organizations with over 40 years campaigning experience, with a regional office in Costa Rica.

From the outset, it has been a hard for some Nicaraguans to set aside their mistrust of American motives and consider the potential benefits GM products can offer Nicaragua. Some view U.S. policy toward Nicaragua as a series of interventions, citing William Walker's political aspirations in the 1850s, Gen. Sandino's struggle against U.S. Marines in the 1920s and early 1930s, U.S. support for the Somoza regime, and U.S. backing of the Contras in the 1980s as proof of continued U.S. meddling in their affairs. The recent presidential elections, in which Daniel Ortega lost by a remarkably slim margin indicates that many segments of Nicaraguan society are still steeped in the anti-imperialist rhetoric of the seventies.

Opponents to GMOs tap into this sentiment, presenting GMOs as an attempt by U.S. companies like Monsanto to steal the genetic resources of the Nicaraguan people, and make farmers dependent on U.S. products. Despite these attitudes, PROMESA II's campaign was successful in changing the opinions of the agricultural sector – particularly field technicians - toward agricultural biotech products. It also changed the terms of the GM debate from "Frankenfoods" scare tactics to more reasoned arguments.

Soon after our weekly articles and bi-monthly bulletins started appearing, two of the primary organizations opposing biotechnology - Centro Humboldt and the Liga en la Defensa del Consumidor Nicaragüense (LIDOCONIC) – launched a campaign to discredit PROMESA and frighten the general public. Their initial strategy was to create a popular groundswell against GMOs, based upon fear and misinformation, thus making the issue a political hot potato that politicians would be reluctant to address or support. This strategy was untenable, however, in the face of PROMESA's continual flow of accurate, science-based information through newspaper articles, biotech bulletins, seminars and workshops.

In some rural areas, Centro Humboldt and LIDOCONIC nevertheless succeeded in convincing some farmers that transgenic seed causes fish heads to grow from corn plants, and similarly absurd arguments. Their strategy backfired, however, when these assertions were published in the national press. Biotech opponents also lost credibility with the 3,000 "technical" readers who receive PROMESA's biotech bulletin. The bulletin presents our 'technical' audience with objective accounts of how biotechnology can be used to combat hunger and stimulate economic development in Nicaragua, while acknowledging potential risks that must be minimized through the establishment of an agricultural biotech regulatory framework. In order not to alienate this crucial audience, Centro Humboldt and LIDOCONIC abandoned their Frankenfoods strategy, and responded to PROMESA's campaign with more sophisticated and scientific arguments.

Since PROMESA began publishing the biotech bulletin, circulation has climbed from 100 in August 2000, to 4,000 in May 2002. This growth is demand-driven. Requests from policy-makers, agricultural technicians, academics, producer organizations, NGOs and others continue to increase circulation. During the past five months, for example, requests for the bulletin increased circulation from 2,000 to 4,000. The fact that we have not received negative feedback, like angry letters to the editor, attest to its credibility with policy-makers, technicians and the agricultural community in general.

The shift in the GMO debate toward a more sophisticated and balanced discussion based on scientific considerations is further evidenced by media coverage. La Prensa and El Nuevo Diario have abandoned unscientific, sensationalist assertions in favor of more informative and professional articles that focus on the real benefits and risks of agricultural biotechnology. We have not won the hearts and minds of the media, but we made them report more responsibly on the implications of biotechnology for Nicaragua.

The increasingly sophisticated and professional tone of the GMO debate paves the way for the establishment of a National Biosafety Commission, which may be the next focus of the GMO debate. Having adopted more sophisticated arguments against GM products, Centro Humboldt and LIDECONIC may even support the establishment of the commission if they feel they will be able to influence its decisions- i.e., to invoke the precautionary principle. While a National Biosafety Commission has not been established, PROMESA has been instrumental in assuring that all the necessary mechanisms needed for its establishment are in place, and for encouraging MAG-FOR to take action.

Were it not for the consistent flow of balanced, scientifically based information disseminated by PROMESA and PROMESA II through its bulletin, newspaper articles and biotech debates, the scare tactics of Centro Humboldt and the Liga en Defensa del Consumidor campaigns in Nicaragua would have been as successful as in other countries.

These two organizations are pressuring the Bolaños administration to take a stance on transgenics. PROMESA II is the only voice challenging the misinformation campaign of the radical environmentalists. We are searching for an appropriate organization to continue disseminating accurate information on biotechnology following project closedown in August. Unchallenged, the Centro Humboldt and LIDECONIC will revert to its scare tactics and may eventually be successful.

PROMESA II will continue publishing its twice-monthly biotech bulletin, which provides balanced scientific and market information on biotechnology. The primary focus of the bulletin is on the results of ongoing biotech research and product innovations. It also summarizes news on biotech industry developments and highlights of the international debate on biotechnology.

The activities in this component are expected to result in the establishment and proper functioning of a regulatory framework to govern biotechnology, reducing its potential risks while providing future access to its benefits.

Biotechnology Education Program			
RESULT 2.1 Public Aware of Benefits and Risks of Agricultural Biotechnology (Mitch funded)²			
Indicator 2.1-a: Agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins			
Indicator 2.1-a: Newspaper articles appearing in La Prensa and El Nuevo Diario on agricultural biotechnology, both for and against it			
	1999	2000	2001
Planned			
1. Agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins.	N/A	1,000	2,000
2. Newspaper articles appearing in La Prensa and El Nuevo Diario on agricultural biotechnology, both for and against it.	N/A	100	250
Actual			
1. Agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins.	N/A	1,500	3,000
2. Newspaper articles appearing in La Prensa and El Nuevo Diario on agricultural biotechnology, both for and against it.	N/A	160	TBD

Targets	Activities	Results	Status
Greater understanding on the part of Nicaraguan producers and consumers of the potential benefits and risks of agricultural biotechnology.	<p>Published weekly agricultural biotechnology related articles in El Nuevo Diario.</p> <p>Participated in 3 radio discussions on biotechnology.</p> <p>Organized 2 agricultural biotech debates (UCA and UNAAN Leon). August 2001</p> <p>Assist UCA in organizing its Nicaragua Biotechnology Conference. April 2002</p>	<p>The level of the public debate on the merits and risks of biotechnology is increasingly well-informed, and based on technical considerations rather than political agendas and misinformation:</p> <ul style="list-style-type: none"> - 35,000 families received supplements in the newspapers - 185,000 people covered by radio broadcasts - 3,000 bi-monthly bulletins distributed - 300,000 people read articles on Biotechnology products from the press conference. - 1000 agricultural technicians informed. 	Completed

² These result and indicators are taken from RAISE ICQ Contract PCE-I-00-99-00002-00, Task Order No. 802, which redefined the biotechnology component of the Mitch Supplemental to include a result and two indicators for the Biotechnology Education Program.

<p>Disseminate knowledge of biotech plant products and facilitate a decision-making process based on scientific and economic criteria.</p>	<p>Biotech Seminar (OVGM) April 11-14/2001 Montelimar 33 people (Ana Maria Peralta, Ariel Alvarez, Joseph Cortes)</p> <p>Seed National Conference May 23-25/2001 Montelimar 90 people (Biotech: Monsanto's Juan Manuel de la Fuente & Pedro M. Calderon, Jorge Huete)</p> <p>Curso de Gerenciamiento de Procesos y Acreditación en Semillas August 15-18/2000 Montelimar 35 people (Joseph Cortes)</p> <p>Biotech workshop September 6 & 7, 2000 Camara de Comercio 65 people (Ana Maria Peralta)</p> <p>Agricultural Biotechnology Workshop for farmers September 11, 2000 Holiday Inn 30 people (Ana Maria Peralta)</p> <p>Biotech Workshop September 12, 2000 UCA 50 people Ana María Peralta</p> <p>Meeting with DGPSA & DGS staff September 13, 2000 Restaurante Delicias del Bosque 15 people Ana Maria Peralta, Joseph Cortes, King Bash</p> <p>Workshop (Análisis sobre Ante-proyecto de Ley de Bio-diversidad) March 29, 2001 UNA 40 people José René Orue & Julio Munguía</p>	<p>Public and private sector decision-makers and stakeholders, including future representatives to the National Biosafety Committee, seed producers & marketers, and private and public sector agricultural technicians, informed of the potential benefits and risks of biotech plant products and the need to establish a regulatory framework based on scientific and economic criteria.</p>	<p>Completed</p>
<p>1 person prepared and provided with the necessary contacts to carry out a Biotechnology course for Nicaragua</p>	<p>Study tour to Costa Rica to observe the research and management of biotechnological plant material products</p>	<p>Conducted biotechnology seminar evaluating the potential benefits and risks of agricultural biotechnology in Nicaragua. April 2001</p>	<p>Completed</p>

2.2 National Biosafety Commission

Regulatory institutions like MAG-FOR, MARENA, and MIFIC focus on different aspects of agricultural biotechnology. To streamline the regulatory processes to evaluate biotech products for importation and sale, these institutions need to share objective, technical information about the new technologies. They need a commission consisting of representatives of public and private institutions to integrate the technical, biological, agronomic, and environmental considerations used to assess the potential impacts of these new technologies, and provide scientifically-valid regulations to govern the testing and introduction of agricultural biotech products.

In September 2000, PROMESA analyzed the legal and technical basis for establishing a National Biosafety Commission, and submitted its report and recommendations to MAG-FOR. To build support for establishing a Biosafety Commission, we also sponsored 14 technicians from MAG-FOR, MARENA, MIFIC, MINSA, UNA and UCA to participate in an agricultural biotech conference in El Salvador in September.

PROMESA advocated for approval and implementation of an agricultural biotechnology regulatory framework, including the establishment of a National Biosafety Commission. Both proponents and opponents of biotechnology will benefit from the regulatory framework. The Biosafety Commission will be responsible for ensuring environmental protection, while providing access to appropriate agricultural biotech products.

The National Biosafety Commission will be composed of representatives from these and other public and private institutions. Among its objectives will be to: (a) review the potential benefits and risks of introducing plant biotech products; (b) advise public decision-makers; and (c) inform the public on agricultural biotechnology. PROMESA expects the commission to be dominated by public and academic institutions, but private companies will serve as important sources of information. The commission will concern itself exclusively with agricultural biotechnology.

MAG-FOR can establish the Biosafety Commission by changing the regulations of the Ley de Salud Animal y Sanidad Vegetal. To date, however, MAG-FOR has not proposed these to the Asesoria Legal de la Presidencia. With PROMESA support, agricultural universities - particularly UCA - are taking leading roles in advocating for the new regulations, as well as in educating students, the agricultural community, and the general public on biotechnology. This is important for the sustainability of the agricultural biotech initiative, since groups at the local level will need to continue advocating for biotechnology after PROMESA ends.

PROMESA's biotech program activities began in 2000, by:

- Conducting an inventory of the physical and human capital needed to regulate testing and introductions of agricultural biotech products;
- Assessing the legal framework needed to reduce risks and ensure Biosafety;
- Attending an international biotechnology seminar in El Salvador;
- Conducting a training seminar for representatives of the organizations that will be involved in evaluating the potential benefits and risks of introducing agricultural biotech products into Nicaragua; and
- Drafting a proposal for regulating agricultural biotech products.

Ongoing technical assistance to MAG-FOR in evaluating the current legal framework and technical capabilities for regulating agricultural biotech products included:

1. Upgrading the technical capabilities needed for biotech regulation;
2. Developing and advocating the adoption of a proposal to establish a commission to regulate the risk analysis of agricultural biotech products;
3. Publishing information on biotechnology in bulletins and the mass media;
4. Coordinating with biologists in Nicaraguan universities.

Our institutional counterparts in the biotech program were, and continue to be the Dirección General de Semilla, ANIFODA, and Crop Life (formerly Global Crop Protection Federation), an international lobby organization financed by multinational crop protection and biotechnology companies.

The legal basis of our proposal to regulate the risk analysis of agricultural biotech products relies on the Ley Basica de Salud Animal and Sanidad Vegetal (No. 291) and its Regulations; and the Ley de Normalización Técnica y la Calidad. The law provides protection for national agricultural resources, guidelines for emergency activities, inspection, certification and risk analysis requirements for some agricultural products, guidelines for the prevention, control, and eradication of pests and diseases, and the introduction of exotic and quarantined pests and diseases. The regulations that accompany Ley 291 define the authority of MAG-FOR's DGPSA (Dirección General de Protección y Sanidad Agropecuaria over agricultural biosafety issues, and inter-institutional coordination requirements.

PROMESA and its counterparts propose to incorporate 13 definitions and a chapter on "Risk Analysis of Genetically Modified Organisms" into the regulations in order to define regulatory procedures and establish a scientific commission to advise MAG-FOR on biotechnology. It defines the composition of the multi-sectoral commission, its regulatory role and responsibilities, and describes its procedures based on technical guidelines. The regulations will cover applications for confined testing, field testing, evaluation of cultivars and seed multiplication, and initial domestic production or importation of agricultural biotech products for direct consumption or processing.

If our proposal is approved, organizations with agricultural biotech products will submit applications and supporting documentation to DGPSA, which will deliver them to the Biosafety Commission. The Commission will analyze the applications and submit its recommendations to the Minister of MAG-FOR. It could recommend approval or denial, or require the applicant to submit additional information. The Minister of MAG-FOR will make his decision based on the Commission's recommendation, as well as economic and political criteria. DGPSA will submit the Minister's decisions to the official Gaceta of the national government. The focus of the commission will therefore be agricultural biotech products to be introduced for testing or release in Nicaragua.

The commission will consist of representatives from MAG-FOR, MIFIC, MINSA, MARENA, INTA, the Centro de Biología Molecular of the Universidad Centroamericano (CBM UCA), the Laboratorio de Cultivo de Tejidos of the Universidad Nacional Autónoma de Nicaragua in Leon (LCT UNAN Leon), and the Laboratorio de Biología Molecular at the Universidad Nacional Agraria (LBM UNA). The Commission's limited advisory authority will depend on the Minister of MAG-FOR, who will make the decision whether, and under what conditions, these products can enter the country.

The primary functions of the Biosafety Commission will be to:

- Analyze applications to introduce agricultural biotech products for testing or release; this analysis will be conducted on a case-by-case basis;
- Advise the Minister of MAG-FOR to either accept or reject these applications;
- Advising applicants when additional information is required to evaluate applications;
- Solicit the advice of relevant experts; and
- Advise government institutions on biosafety regulatory activities concerning agricultural biotech products;

A combination of current conditions favors the establishment of the Biosafety Commission:

- Agricultural community – particularly technicians – are increasingly knowledgeable about biotechnology, and attracted to its potential benefits to small farmers;
- CONASEM was recently reactivated;
- Anti-biotechnology environmental groups are quiescent after the election, in which the leftists lost;
- Jorge Salazar, a proponent of modern agricultural technologies like biotechnology, is Minister of MARENA;
- Magda Lanusa, a vociferous opponent of PVP and biotechnology, was fired from Centro Humboldt;
- Jorge Huete has returned from sabbatical at Harvard University to lead the UCA's microbiology program and attract biotech companies to Nicaragua to conduct research.

PROMESA II will continue to advocate for the commission's establishment, and to ensure that its internal regulations are consistent with scientifically valid objectives. But the establishment of the commission will not guarantee its effectiveness or sustainability.

The commission will be unofficially convened when members of approximately five ministries and universities meet to discuss the role of the commission. The commission will be officially convened when participating institutions name their representatives and hold its first meeting, in which it defines its internal regulations.

National Biosafety Commission			
RESULT NO. 1B: Nicaragua Open to Biotech Opportunities (Mitch funded)			
Indicator 1B-a: National Biosafety Commission established and functioning.			
Unit of Measure: Benchmark activity deadlines met.			
	1999	2000	2001
Planned		June	
1. Legal and technical rationale completed for establishing a National Biosafety Commission.			
2. National Biosafety Commission officially convened and operating.			May
Actual		December	
1. Legal and technical rationale completed for establishing a National Biosafety Commission.			
2. National Biosafety Commission officially convened and operating.			Pending

Targets	Activities	Results	Status
National Biosafety Commission established to review the potential benefits and risks of introducing plant biotech products; advise public decision-makers; and inform the public on agricultural biotechnology.	. 3 meetings - 2 with ANAR members and 1 with the board of directors of ANIFODA - to inform them of the advantages of establishing a Agricultural Biosafety Commission. March 2002	Lobby ANAR, ANIFODA, and MAG-FOR to push for the establishment of a Agricultural Biosafety Commission	Pending
Key public sector decision-makers know they need a Biosafety Commission.	Business breakfast with MAG-FOR Minister (Tema: Anteproyecto de Ley de Biodiversidad) May 2001. Holiday Inn	Key public sector decision-makers agree, in principal, to establish a Biosafety Commission.	Completed
Scientifically valid regulations defined to protect biosafety.	Prepared and submitted to MAG-FOR draft proposal on legal and technical frameworks for the introduction and use of agricultural biotech products in Nicaragua. April 2001	Representatives of MIFIC, MINSA, MAG-FOR, and seed companies agree on the need to define a regulatory framework for biotechnology. Agricultural biotech legal and technical frameworks defined.	Completed
Training for Future Biosafety Commission members underway prior to the Commission's establishment.	A 5-day National Course for 15 participants on "Genetic Transformation of Plants: Biosecurity and risk evaluation." UCA/PROMESA Biotech Workshop for Future Members of the Biosafety Commission.	18 future representatives to the National Biosafety Committee trained to evaluate agricultural biotech products.	Completed Pending
A study tour of Costa Rica & Argentina or the USA to observe in situ the research and management of Biotechnological plant material products for the 10 members of the National Biosafety Commission and 2 people from PROMESA II	Study tour to Mexico to observe research and management of biotechnological plant material products for the ministers of MAG-FOR and MARENA and their advisors. March 2001.		Pending
Disseminate knowledge of biotech plant products and facilitate a decision-making process based on scientific and economic criteria.	Biotech Seminar (OVGM) April 11-14/2001 Montelimar 33 people Seed National Conference May 23-25/2001 Montelimar 90 people Curso de Gerenciamiento de Procesos y Acreditación en Semillas August 15-18/2000 Montelimar 35 people	Public and private sector decision-makers and stakeholders, including future representatives to the National Biosafety Committee, seed producers & marketers, and private and public sector agricultural technicians, informed of the potential benefits and risks of biotech plant products and the need to establish a regulatory framework based on scientific and economic criteria.	Completed

Biotech workshop September 6 & 7, 2000 Camara de Comercio 65 people		
Agricultural Biotechnology Workshop for farmers September 11, 2000 Holiday Inn 30 people		
Biotech Workshop September 12, 2000 UCA 50 people		
Meeting with DGPSA & DGS staff September 13, 2000 Restaurante Delicias del Bosque 15 people		
Workshop (Análisis sobre Anteproyecto de Ley de Biodiversidad) March 29, 2001 UNA 40 people		

2.3 Field Tests of Agricultural Biotech Products

The establishment of a National Biosafety Commission is a necessary condition for conducting field tests of agricultural biotech products.

Biotechnology Education Program			
RESULT NO. 1B: Nicaragua Open to Biotech Opportunities (Mitch funded)			
Indicator 1B-b: Field tests of agricultural biotech products completed.			
Unit of Measure: Number of field tests of agricultural biotech products. (cumulative)			
	1999	2000	2001
Planned			
Field tests of ag biotech seed products approved.	0	0	1 (June)
Actual			
Field tests of ag biotech seed products approved.	0	0	Incomplete

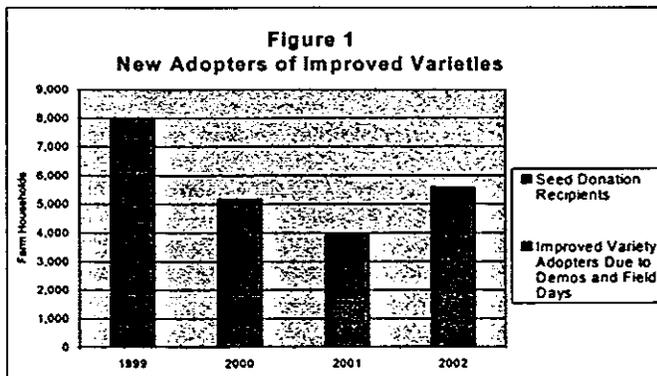
3. New Variety Promotion

Historically, the major Nicaraguan seed companies imported seed and sold it to large, modern farmers. Prior to PROMESA, most GON and NGO seed programs encouraged artisanal seed production for small farmers. Artisanal seed programs were designed to help small farmers produce their own seed using low-cost seed production and processing methods. Artisanal seed producers serve a useful function by providing seed to their local communities; but there are only limited opportunities to market seed outside their communities, where their reputations as seed producers are unknown. These programs are important to subsistence farming systems, but are poorly suited for introducing improved varieties and hybrids with high yield potential.

Commercial seed companies, on the other hand, have clearly defined quality standards and incentives to introduce new seed products that meet these standards. Important sales opportunities for seed and complementary production inputs exist in small farmer markets, for companies that can expand and manage distribution systems to small farmers. To stimulate the introduction of new varieties, PROMESA and MAG-FOR joined forces with seed farmers to promote certified seed and extend seed distribution systems to small farmer markets. This coordinated effort resulted in a series of initiatives that increase the role of the private sector in seed policy definition, streamline regulatory procedures, and encourage self-regulation by the seed industry.

3.1 Variety Demonstrations, Field Days, Seed Fairs, and Seminars

The adoption of improved varieties is often the first in a series of investments in sustainable agricultural practices that increase farm production and income. By raising farm profits, improved varieties create incentives to invest in other sustainable agricultural practices. In the short term, using improved varieties increases farm income by increasing production. In the long term, improved varieties lower per-unit production costs. They also diversify the sources of income by increasing yields and reducing the area required for on-farm consumption.



Variety demonstrations, field days, and seed donations are complementary and synergistic. To estimate their impact on new variety adoption rates, PROMESA considered two types of beneficiaries: early adopters and seed donation recipients. Variety demonstration and field day participants tend to be early adopters, who are relatively good

farmers with grain yields higher than the national average. After participating in demonstrations and field days, they decide whether to adopt new varieties by buying certified seed. Seed donation recipients, on the other hand, tend to farm in marginal areas, and their yields are lower than the national average. Their decisions to adopt the donated, improved varieties are based upon the scarcity of traditional varieties, rather than the merits of improved varieties.

The rate of adoption of seed donation recipients is rapid, but the immediate impact of donations tends to disappear quickly, and recipients revert to planting farm-saved seed instead of purchasing certified seed.³ Seed recipients nevertheless have a positive demonstration effect on other farmers.

³ We assume that donation recipients plant three-quarters of a manzana in improved maize and another three-quarters in improved beans in the first year. The area of improved maize varieties drops 50 percent in each subsequent year, and 25 percent annually for beans, until the initial productivity boost disappears and farmers revert back to native, farm-saved varieties.

The adoption of new varieties as a result of variety demonstrations and field days, on the other hand, begins slowly and gradually increases, as shown in Figure 1. Early adopters begin the process cautiously.⁴

The best way to change farmers' behavior and convince them to buy certified maize seed, for example, is to hold field days to demonstrate new varieties and hybrids under typical soil and water conditions, using the management practices common used by local farmers. PROMESA's national on-farm demonstration program showed farmers the stress tolerance and yield performance of hybrids and varieties. It compared adaptability across locations, and verified validation trials conducted by INTA.

To stimulate discussions, field days were limited to about 40 farmers and agricultural technicians. Field days for regulatory agencies and media tended to be larger.

MITCH IR 2.0: Economic livelihood of farmers and micro-entrepreneurs in Mitch-affected areas restored. (Mitch funded)						
Indicator 2.0-A: Number of farmers, laborers, and micro-entrepreneurs who receive benefits from USAID reconstruction assistance.						
Unit of Measure: Number of individuals/households. (cumulative)						
	1999		2000		2001	
	Male	Female	Male	Female	Male	Female
Planned	700	300	7,500	5,000	8,000	8,000
Actual	5,600	2,400	7,890	5,260	8,409	8,408
Variety Demonstrations, Field Days, Seed Fairs, and Seminars						
Targets	Activities	Results				Status
Certified seed promoted through on-farm demonstrations, media, Seed Fairs and other activities.	Hired a senior maize breeder to conduct field days with farmers and win support of NGO field technicians.	More than 40,000 new users of certified seed during 1999-2001;				Completed
	Established over 300 variety demonstrations with PVO/NGOs, gremios, and cooperatives.	An estimated 24,000 adopting certified seed on the basis of variety demonstrations and field days.				Completed
	Conducted 49 field days attended by 1,506 farmers to promote new maize, beans, sorghum, and sesame varieties.	3 seed companies and 18 NGOs establish field day programs. ⁵				Completed

drops 50 percent in each subsequent year, and 25 percent annually for beans, until the initial productivity boost disappears and farmers revert back to native, farm-saved varieties.

⁴ We assume that only 10 percent of demonstration and field day participants adopt improved varieties the year after their participation. They begin by planting improved varieties on only ½ mz., increasing to one manzana in the second year, and increasing the area 25% annually before stabilizing at 1.56 mz. In the 4th year.. Another 10 percent of participants adopt improved maize varieties and another 20 percent adopt new bean varieties in each of the following three years. The area planted in improved varieties by these second-wave adopters grows at the same rate.

	<p>Distributed technical information among participants at field days: list of seed suppliers, information about varieties.</p> <p>Held National Seed Fair for seed companies and NGO programs with more than 700 participants. March 2001.</p> <p>Assisted Nueva Guinean and Jalapan local government officials, INTA, MAG-FOR, PVO's, and NGO's organize regional seed fairs.</p> <p>Held Regional seed fair in Nueva Guinea (400 participants), and held conference on the advantages of using improved seed (150 producer-participants) November 2001.</p> <p>Held field day and conferences in Jalapa. 70 participants. September 2001.</p> <p>Conducted 3 regional workshops on hybrid maize: -March 6 2001, Sebaco, 22 people, -March 7 2001, Managua, 40 people, -March 8 2001: Leon, 28 people</p>	<p>World Relief promotes maize hybrid that out-performs OP varieties.</p>	<p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p>
<p>Farmers, government and seed industry technicians understand the importance of using certified seed of improved varieties</p>	<p>Conducted 4 workshops in Nueva Guinea, Jalapa, Managua (FCR), and Esteli to discuss the costs and benefits of using certified seed, and the experience of small farmer development programs.</p> <p>Broadcasted radio advertisements for certified seed during baseball games and peak hours for small farmers.</p> <p>Produced video on hybrid maize seed performance in hillsides of Totogalpa. Field days for seed industry and NGO technicians to meet with seed producers, INTA and MAGFOR.in Carazo, Esteli, Matagalpa, Nueva Segovia.</p>	<p>Wide recognition by policy-makers of the role of certified seed in agricultural development.</p>	<p>Completed</p>

	Jinotega, Occidente, Boaco, Chontales, Rivas, Nueva Guinea, and Jalapa.		
Farmers and seed technicians have improved access to technical information about improved seed and modern production practices.	<p>Conducted:</p> <p>3 seminars for NGO field technicians on hybrid maize;</p> <p>1 workshop on establishing demonstration trials;</p> <p>2 workshops on conducting field days;</p> <p>3 seminars on field data collection;</p> <p>1 seminar on data analysis.</p> <p>Published three manuals (500 each) on certified seed production of:</p> <ul style="list-style-type: none"> - maize seed - bean seed - sesame seed <p>Held potato seed production conference and field day at ECAGE's Seed Course for technicians. 20 participants. August 2001.</p> <p>Annual publication and dissemination of lists of seed suppliers for 2001 season.</p>	<p>Farmers and seed technicians have improved access to technical information about improved seed and modern grain production practices.</p> <p>Farmers know where to buy certified seed.</p>	<p>Completed</p> <p>Completed</p>
	Analyze farm survey data to measure the relationship between yields, yield variability and the use of improved seed.	Farm survey data provides valuable seed market information.	Ongoing (PROMESA II)

3.2. Environmentally Sustainable Market Development

PROMESA and MAG-FOR are working to increase small farmers' access to certified seed of improved varieties. The importance of non-certified, farm-saved seed of traditional varieties for subsistence farmers in marginal production areas must, however, be acknowledged. Substituting traditional varieties with certified seed is not recommended for all farming systems. It is increasingly evident, however, that increasing farm income, sustaining agricultural growth, and protecting the natural environment will require extensive use of certified seed to increase and diversify the sources of farm income.

The use of improved varieties and appropriate hillside farming techniques are critical components to environmentally sustainable agricultural development strategies to increase farm incomes and slow the advance of the agricultural frontier. Certified seed

of improved varieties increases yields and reduces per-unit production costs. The profits generated by certified seed provide surplus income and creates incentives to invest in sustainable agricultural practices.

Subsistence farmers practicing slash-and-burn methods in mountainous northern and central regions of Nicaragua are denuding the hillsides, leaching nutrients from the soil, increasing their vulnerability to erosion, and causing mudslides and floods. These environmentally unsustainable production practices trap farmers at the subsistence level. *The cycle of land clearing and nutrient depletion results in families abandoning their farms and either moving to urban centers or increasingly marginal and environmentally fragile areas.*

The long-term solutions to this cycle of environmental damage and rural poverty may be to stop farming in the hillsides, or switch to production of high-value perennials, vegetables and specialty crops. Unfortunately, however, high-value crops require long-term technical support and investment in production and marketing infrastructure. Few farmers can make the leap directly from subsistence to high-value crop production. The transition from subsistence to high-yielding grain crop production is a less radical and more realistic alternative.

In the short-term, the use of improved varieties allows small farmers to increase their incomes and devote fewer resources to food crop production. Surplus income generated from improved varieties, combined with environmentally sound techniques such as cover crops, live barriers, contour plowing, and minimum tillage, enable hillside farmers to reduce production risks, generate increased income using sustainable methods, break out of the poverty cycle and slow the advance of the agricultural frontier.

MAG-FOR's plans for seed sector development call for seed companies to develop private distribution systems to sell seed directly to farmers. Progress to date has been slow. NGO, PVO and government programs remain important players in seed markets serving as intermediaries between seed companies and farmers. They buy both certified and non-certified seed and distribute it to small farmers.

PROMESA encourages NGOs, donors, and government programs to use commercial seed distribution systems, rather than bypassing them.⁶ Nevertheless, donor, NGO and public sector seed demand represents approximately 20-30 percent of national sales, creating major distortions in seed markets. Despite their temporary and unpredictable nature, many seed companies rely upon these sales. *The influence of donors, NGOs and the public sector on seed markets will eventually diminish as seed companies improve their marketing programs and establish distribution systems to small farmers.* PROMESA was designed to accelerate this transition, which is summarized in a set of flow-charts in Appendix 1.

⁶ The "Libra por Libra" program is also expected to stimulate the development of commercial distribution systems to small farmers. The details of this program are under discussion, however; so we will describe this program, and its anticipated impact, in the next quarterly report.

PROMESA's seed marketing program was organized around four sets of activities: promotion, investment, registered seed, and producer organizations – each of which is described below.

Promotion - The first set of activities were conducted to demonstrate new seed products and increase demand. Promotional activities included:

- On-farm demonstrations to compare new and traditional varieties and hybrids;
- Field days for farmers to compare the performance of traditional, improved, and experimental varieties and hybrids;
- Training for seed company and NGO technicians to establish on-farm demonstrations and collecting field data;
- Video demonstrating the benefits of hybrid maize seed to small farmers;
- Posters, radio announcements, and banners advertising certified seed; and
- Support to the black bean export program begun under PROMESA.

Investment - The second set of activities was designed to increase investment in the seed sector by strengthening linkages between national and international seed companies. Activities included:

- Trade missions to other Central American countries to facilitate seed trade and encourage new distribution relationships; and
- Meetings between seed companies and rural seed dealers.

Registered Seed – Seed companies need adequate supplies of registered seed to multiply into certified seed. PROMESA provided technical support to INTA's registered seed program, and encouraged INTA to produce seed under production contracts. Specific investment promotion activities included:

- Assistance in registering new INTA seed products for commercial release and PVP protection;
- Technical support in producing registered seed and parent lines for hybrid maize seed to sell to seed companies, which will subsequently multiply it into certified seed; and
- Encouraging INTA to establish production contracts for registered seed.

Seed Producer Organizations - PROMESA provided technical support to seed producer organizations in the Occidente where large farmers produce most of the certified maize seed using modern methods, and in Northern and Central regions where small farmers produce most of the certified bean seed using traditional methods. PROMESA's business management, seed production, and marketing support to seed producer organizations included:

- Regional seed fairs where seed producer organizations sell seed directly to farmers;
- Timely seed market information;
- Workshops on business and marketing;
- Training in seed marketing and distribution;
- Seminars on seed production and processing;
- Seed product information for rural seed dealers;

- Assistance in establishing joint ventures and distribution relationships with foreign seed companies; and
- Assisting seed producer organizations represent their members in the National Seed Council (CONASEM).

This program, and others like it, led to small seed producers organizing to offer marketing services. Several organizations of small seed producers in Carazo have defined their management control systems and applied for legal status as cooperatives. This event provided these organizations with market information, industry contacts, and helped them define their marketing strategies. These activities can serve as a model for expanded organizational development efforts.

A newly-established regional seed association – APROSEN – has the potential to become an aggressive proponent for small seed producers. ASORESEM, the RSA in the Occidente, has defined its niche as a proponent of farmers producing and marketing seed under their own brand names. The role of APROSUR, the RSA in Carazo, is evolving as groups of small seed producers, trained and financed by INTA, establish seed production and marketing cooperatives, and join APROSUR.

Strategic Alliances - The national seed industry is growing and consolidating. Seed companies, in particular, are forming strategic alliances to increase efficiency, and cut costs by specializing in different stages of the seed production, processing, and distribution process. If this consolidation process results in delivering seed directly to farmers, instead of relying on government and donor programs, domestic seed companies will be sustainable and competitive in foreign markets.

Environmentally Sustainable Market Development						
MITCH IR 2.1: Economic livelihood of farmers and micro-entrepreneurs in Mitch-affected areas restored. (Mitch funded)						
Indicator 1.2-a: Farmers/households in Mitch-affected areas adopting environmentally sustainable agricultural practices.⁷						
Unit of Measure: Number of individuals/households. (cumulative)						
	1999		2000		2001	
	Male	Female	Male	Female	Male	Female
Planned	700	300	7,500	5,000	8,000	8,000
Actual	5,600	2,400	7,890	5,260	8,409	8,408

⁷ This indicator measures the "penetration" of improved varieties in Nicaraguan seed markets. It calculates market share as the proportion of small farmers who report using improved varieties registered at MAG-FOR.

Targets	Activities	Results	Status
Five seed production contracts signed between NGOs and producers of improved seed varieties.	Conducted meetings between seed industry participants, NGOs, PVOs, and INTA to determine seed needs and sources of improved seed varieties;	6 NGO's signed contracts with 9 seed companies for the 2000 season (ECAGE, ASORESEM, COOPPAMAT, UCOOM, APROSEC, ASOPROL, SEMSA, VICENTE Alegre ETC..	Completed
	Assisted MAG-FOR preparing a potato production rehabilitation program.	PCI signed contracts with COOPPAMAT for bean seed in 2000 and for potato seed in 2001 50 Mzs.	Completed
Strengthen Commercial linkages	<p>22 ATP2 companies met with seed companies: May 2001, Camera de Comercio.</p> <p>Held 1st Annual "Seed roundtable" at PROMESA March 2000. \$ 350,000 seed sales under contract between seed companies and NGOs</p> <p>Held 2nd Annual "Seed Roundtable" (Camara de Comercio de Nicaragua; June 1, 2001; 60 people)</p> <p>See National and regional seed fairs in Variety Demonstrations, Field Days, Seed Fairs, and Seminars above.</p>	<p>Linkages between NGOs and seed companies strengthened;</p> <p>Linkages between MAG-FOR and INTA strengthened.</p> <p>During 2001, seed companies were able to competitively sell certified seed at BAGSA .</p>	Completed
Improved coordination between NGOs, PVOs, seed producers, gremios, and INTA.			
Improved distribution channels and increased use of improved seed.			

Conclusions and Recommendations

Development of a Modern Seed System

The CACEDRF funded PROMESA's Mitch Supplemental Program, including activities designed to help Nicaragua modernize its national seed system, increase its use of improved varieties and hybrids, and compete in global agricultural markets. To be competitive, farmers need to upgrade their production methods by adopting new technologies, including the best seed technologies available from international seed companies and crop research organizations. Using natural comparative advantages in land and labor costs, Nicaraguan seed companies can produce and market some types of seed at competitive prices. Other types will have to be imported.

Development programs that promote traditional seed production methods will retain an important role in ensuring community seed supplies to small farmers in remote areas.

but they will not help Nicaraguan farmers compete in commercial markets. On the contrary, seed regulations designed to protect small farmers from seed companies will constrain agricultural and economic development. Competitive forces operating in transparent, efficient seed markets, where seed companies compete for sales to well-informed farmers, tend to make these markets self-regulating, and determine the appropriate use of certified and artisanal seed, with minimal regulatory intervention. The role for public regulatory institutions diminishes as the national seed system matures.

PROMESA's Mitch Supplemental Program, in coordination with PROMESA's ongoing, core project activities, created a more effective national seed system during the life of the Mitch Supplemental program by fostering four conditions needed for the development of an efficient seed industry:

1. Seed markets operating with transparency and efficiency;
2. MAG-FOR accrediting private seed services;
3. MAG-FOR implementing regionally harmonized seed trade regulations; and
4. National Biosafety Advisory Commission established and operating.

Summary of Indicators and Targets

PROMESA successfully completed or surpassed 8 of the 14 indicators and 13 of its 19 targets. These include four successful policy initiatives.

Transparency - The first, and most important, condition is transparency in seed market transactions. Transparent markets are more effective in attracting investment and encouraging seed companies to enter new markets. To guarantee transparency, the 1998 Seed Law establishes a Consejo Nacional de Semillas (CONASEM) to serve as a forum for both private and public stakeholders to participate in seed policy analysis.

The establishment of CONASEM (Consejo Nacional de Semillas), is an indicator of development of a national seed system. But before CONASEM can serve as an effective forum for seed policy debates, its members must convene, approve its internal procedures, and appoint subcommittees to conduct business. PROMESA assisted DGS in drafting internal regulations for CONASEM, and submitting them to MAG-FOR in 2000. An ad hoc committee of CONASEM members reviewed and approved the draft regulations. In April 2001, MAG-FOR convened CONASEM.

Indicator 1E-a CONASEM established and functioning with private sector participation.

- (Target: Nicaragua joins UPOV Actual: **Completed**)
- (Target: Additional agricultural inputs exempt from import taxes Actual: **Completed**)
- (Target: New policies for stimulating seed industry development defined. Actual: **Completed**)

Effective PVP systems provide incentives for plant breeders and seed companies to develop new varieties. PVP is an important element of the market environment, providing incentives for seed companies to release and promote new varieties. It stimulates crop research and accelerates the distribution of proprietary seed products.

which results in increased seed production and marketing. It is a necessary condition for foreign seed companies to market proprietary seed products without losing ownership control. PVP is therefore consistent with increased competition in seed markets and increased seed alternatives for farmers.

The first phase of PROMESA's PVP program was completed when Nicaragua joined UPOV in August 2001. MAG-FOR and MIFIC procedures for PVP registration are well defined, and these institutions are fulfilling their roles effectively. The second phase includes: (1) defining variety descriptors to test whether varieties are new, homogeneous, stable, and different; (2) providing ongoing assistance to MAG-FOR and MIFIC in implementing the PVP program; (3) technical support to UPOV to audit the new program; and (4) helping seed companies register their varieties for protection, and (5) advocating for crop research centers to share PVP benefits with plant breeders.

Indicator 1A-a Increase in the number of applications for PVP registrations

- (Target: 5 applications for PVP registrations. Actual: 8)

Accreditation - The second condition for seed industry development is the privatization of seed services that the private sector can provide more efficiently than public institutions. Accreditation of seed companies to certify seed, crop research centers to "validate" new varieties and hybrids, and seed laboratories to test seed quality will increase the seed market efficiency. It will also allow MAG-FOR to concentrate its resources on services that the private sector cannot offer, like ensuring that seed is properly tagged and adopting private sector-oriented policies that stimulate trade and investment. Once approved and implemented, the accreditation system will be less expensive than public seed services, and more responsive to market conditions.

Indicator 1C-a: Private seed services accredited.

- (Target: 4 private seed organizations define control procedures for seed field inspections. Actual: 6)

Harmonized Trade Regulations - The third condition needed for seed system development is appropriate trade regulations. Nicaragua has comparative advantages in seed production. Harmonized seed trade regulations will allow Nicaraguan seed companies to enter foreign markets where they can develop competitive advantages. PROMESA helped MAG-FOR negotiate with the UAC to implement these seed regulations on the regional level.

Indicator 1D1-a: MAG-FOR implements Phytosanitary, seed certification, PVP, and variety registration regulations "harmonized" in the 1999 regional seed policy agreement.

- (Target: Harmonized Phytosanitary and variety registration regulations approved. Actual: Completed)

Biotech Seed Products - A necessary condition for competitiveness in global markets is a regulatory environment that facilitates the introduction of new technologies. Agricultural biotech products are an example of technologies that can help make Nicaraguan farmers more competitive. Biotechnology offers powerful tools for developing new varieties with competitive advantages in high-value markets.

The introduction of new seed technologies can, however, disrupt the competitive environment, and cause changes that can reduce market efficiency and transparency. Public regulatory institutions can play important roles during these technology transitions. An indicator of the Nicaraguan government's receptivity to new seed technologies is its dilemma over the establishment of a National Biosafety Commission to regulate testing and releases of agricultural biotech products. Environmental protection concerns and consumer skepticism toward biotechnology call for a transparent, participatory, science-based approach to biotech regulation. PROMESA's biotech education program focuses on public information and education to address these concerns and inform both policy-makers and the general public of the potential benefits and risks the technology offers. In anticipation of GON approval, PROMESA has put all the mechanisms in place for the establishment of a National Biosafety Commission.

Indicator 1B-a: National Biosafety Commission established and functioning.

- (Target: Legal and technical rationale completed for establishing a National Biosafety Commission. Actual: **Completed**)

Indicator 2.1-a: Agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins

- (2000/01 Target: **1,000** agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins. Actual: **1,500**)
- (2001/02 Target: **2,000** agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins. Actual: **3,000**)
- (2000/01 Target: **100** Newspaper articles in La Prensa and El Nuevo Diario on agricultural biotechnology, both for and against it. Actual: **160**)

New Variety Promotion - Variety trials and field days provide the basis of virtually all seed marketing programs throughout the world. They demonstrate how new varieties and hybrids perform under typical growing conditions, and provide forums for farmers to share information. PROMESA's variety promotion strategy emphasizes collaboration between counterpart organizations. Collaboration between INTA, NGOs, SPOs, seed companies, and private sector technical assistance companies in planting variety demonstrations and conducting field days significantly reduces costs to individual organizations and improves communications between suppliers, farmers, and agricultural technicians, thereby increasing technology transfer.

Indicator 2.0-A: Number of farmers, laborers, and micro-entrepreneurs who receive benefits from USAID reconstruction assistance.

- (1999 Target: **1,000** farmers, laborers, and micro-entrepreneurs receive benefits from USAID reconstruction assistance. Actual: **8,000**)
- (2000 Target: **12,500** farmers, laborers, and micro-entrepreneurs receive benefits from USAID reconstruction assistance. Actual: **13,150**)
- (2001 Target: **16,000** farmers, laborers, and micro-entrepreneurs receive benefits from USAID reconstruction assistance. Actual: **16,817**)

Environmentally Sustainable Agricultural Practices - Technologies that increase productivity provide incentives to invest in farm infrastructure and conserve the natural resources used in production. Intensive farming based on a solid foundation of certified

seed can help to mitigate inefficient, extensive agriculture that is practiced on an advancing "agricultural frontier" where land is plentiful and initially more fertile.

Agricultural productivity depends on natural resources like soil quality, rainfall, and groundwater. It also depends on the use of production inputs like as fertilizer, pesticides, credit, and high-quality seed. Certified seed is not a panacea or guarantee of high productivity, but under typical conditions, it raises yields significantly; and its affects increase dramatically when it is used in combination with complementary production inputs.

Productivity also depends on crop management strategies. During the past decade, Nicaraguan farmers have adopted low-input, extensive management strategies, particularly for grain production. According to Nittlapan surveys, there are 205,000 farmers using extensive methods, compared to 44,000 using intensive methods. Increased national grain and oilseed production was primarily due to increased production area, rather than to higher yields.

Production increases during the 1990s were purchased at high cost to the environment. Extensive production methods caused erosion, accelerated the advance of the agricultural frontier and, ultimately, reduced the sustainability of agriculture, particularly hillside farming. Farmers need better access to intensive production methods that take advantage of the synergistic affects of production inputs.

Indicator 1.2-a: Farmers/households in Mitch-affected areas adopting environmentally sustainable agricultural practices.⁸

- (1999 Target: 1,000 farmers in Mitch-affected areas adopting environmentally sustainable agricultural practices. Actual: 8,000)
- (2000 Target: 12,500 farmers in Mitch-affected areas adopting environmentally sustainable agricultural practices. Actual: 13,150)
- (2001 Target: 16,000 farmers in Mitch-affected areas adopting environmentally sustainable agricultural practices. Actual: 16,817)

Need for GON Decisions and Action – PROMESA's Mitch Supplemental Program was successful in defining the procedures, educating decision-makers, and ensuring that all the mechanisms are in place for these competitive conditions to be met. Ultimately, however, it is up to the GON to implement policies that will modernize the national seed system and make Nicaragua competitive in international markets.

By the end of 2001, six targets were pending further GON decisions before the can be completed. The first two pending indicators – the establishment and functioning of CONASEM, and 250 newspaper articles on biotechnology – were partially met. CONASEM was convened in 2001, but it did not become an effective forum for seed policy discussions until early 2002, shortly after PROMESA's Mitch Supplemental program ended. An estimated 200 newspaper articles on biotechnology were published during the project period, representing 80 percent of the targeted 250 articles.

⁸ This indicator measures the "penetration" of improved varieties in Nicaraguan seed markets. It calculates market share as the proportion of small farmers who report using improved varieties registered at MAG-FOR.

Indicator 1E-a CONASEM established and functioning with private sector participation.

- (Target: CONASEM established and functioning. Pending)

Indicator 2.1-a: Agricultural technicians, farmers, and policy-makers receiving twice-monthly biotech bulletins

- (2001/02 Target: 250 Newspaper articles appearing in La Prensa and El Nuevo Diario on agricultural biotechnology, both for and against it. Actual 200)

Follow-up activities needed to achieve the four remaining indicators and targets pending government decisions were included in PROMESA II's work plan. Two of these indicators are closely related, and the second depends on the completion of the first: the establishment of a Biosafety Commission to advise MAG-FOR on the potential environmental risks of introducing agricultural biotech products, and field tests of biotech products approved for introduction.

Indicator 1B-a: National Biosafety Commission established and functioning.

- (Target: National Biosafety Commission officially convened and operating. Actual: Pending)

Indicator 1B-b: Field tests of agricultural biotech products completed.

- (Target: Field tests of agricultural biotech seed products approved. Actual: Incomplete)

The remaining two indicators are pending decisions at the inter-ministerial and international levels. MAG-FOR and MIFIC are negotiating authority and responsibility for the seed service accreditation program. PROMESA helped MAG-FOR design the program, assisted MIFIC in evaluating the technical and legal aspects of the program, and provided technical assistance to seed organizations seeking accreditation, which are now ready and waiting for the "audits" on which accreditation will be based.

The program advocating for the harmonization of seed regulations at the regional, Central American level was so successful that MAG-FOR and MIFIC decided to address the issue at the Union Aduanero Centroamericano (UAC). Negotiations are underway to standardize seed regulations throughout Central America, creating a single regional market, stimulating investment, and encouraging foreign seed companies to establish operations in Nicaragua. UAC negotiations are lengthy and protracted, however, and were not concluded when the Mitch Supplemental Program ended.

Indicator 1C-a: Private seed services accredited.

- (Target: Seed labs and crop research centers accredited Pending)

Indicator 1D1-a: MAG-FOR implements Phytosanitary, seed certification, PVP and variety registration regulations "harmonized" in 1999 regional seed policy agreement.

- (Target: Harmonized Phytosanitary and variety registration regulations published. Actual: Pending)

Appendix 1

