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USAID/Dominican Republic

PROJECT ASSISTANCE COMPLETION REPORT

NATURAL RESOURCES MANAGEMENT PROJECT

517-0126

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Project Activities Completion Report

Natural Resources Management Project

(517-0126)

I. PROJECT OBJECTIVES

The Natural Resources Management (NARMA) Project began 8/31/81 with two objectives: (1) to strengthen the GODR's capability to promote the effective management of the country's natural resources; and (2) to establish a soil and water conservation model that could be used to slow the degradation of the nation's natural resources.

The original objectives were revised 2/2/87 by PIL No. 27 to read: "develop the field and institutional conditions necessary to address the problems of protecting the country's soil and water resources". The revised specific objective was to strengthen the GODR's capability to develop and implement a soil and water conservation model in high priority watersheds which includes both public and private sector organizations in its implementation.

II. PROJECT COMPONENTS

The NARMA Project contained 16 distinct components. These were divided among the two major objectives as follows:

A. Institutional Strengthening

1.1 Strengthen natural resources planning through
- 1.1.1 Improved cartography capabilities.
- 1.1.2 Erosion/Water quality monitoring
- 1.1.3 Agricultural zoning studies
- 1.1.4 Marketing studies
- 1.1.5 Small farmer association studies

1.2 Strengthen national and watershed management planning
1.3 Strengthen agroforestry and forest management planning
1.4 Strengthen rural road construction planning
1.5 Strengthen natural resources legislation and policy development
1.6 Strengthen environmental education programs.
1.7 Strengthen interagency administration.

B. Soil and Water Conservation

2.1 Soil survey and interpretation.
2.1 Farm conservation planning.
2.3 Credit and incentive packages.
2.4 Watershed protection (forestry and reforestation).
2.5 Hillside farming systems research.

III. PRESENT STATUS OF PROJECT

Virtually all project specific activities ceased upon the termination of AID financing. The planning, and environmental monitoring activities ceased except for the minor input of the project office into the Secretariat's annual budget submission. The environmental education and natural resource inventory activities continue to limp along, but with little support from within the Secretariat. Eight of the 14 IBM personal computers purchased by the Project have been distributed to the Secretariat of Agriculture's regional offices in an attempt to establish a computerized national agricultural data collection system. The cartographic equipment was transferred to the Military Cartographic Institute which receives technical support from the Inter-American Geodetic Survey and is better staffed to utilize its capabilities.

At the field level, soil and water conservation activities continue, but at reduced levels. This will change dramatically upon the initiation of the follow-on Natural Resources Investment Fund project which will be implemented by a local development association, the Development Association of San José de Ocoa. The Secretary of Agriculture is assisting this project by loaning the Association three NARMA Project jeeps, the NARMA Project's offices in San José de Ocoa, and fourteen of the Project's technical staff who were stationed in San José de Ocoa. This project will finance the continuation of the NARMA Project's soil conservation and reforestation activities, and the construction of small scale, gravity fed irrigation systems in the Ocoa and Nizao river watersheds. Farm conservation planning will continue to be an integral activity for involving small hillside farmers in soil conservation and sustainable farming programs. Research on hillside farming methods has been discontinued by the Secretariat of Agriculture, nor will it be a component of this follow-on project. One university-led research program, financed under a grant from the AID/Science Advisor, will continue to developed information on erosion levels under different hillside farming systems.

IV. PROJECT ACCOMPLISHMENTS

The Project achieved its two principal objectives, and the majority of its original targets. These achievements are listed in detail in Annex 1. The Project (1) did strengthen the GODR's capability to promote the effective management of the country's natural recourses; and (2) did develop an effective soil and water conservation model which could be replicated throughout the country. However, the Secretariat of Agriculture has virtually discontinued the natural resources management/conservation activities begun under the NARMA Project because of its limited budget resources. Instead it has elected to provide staff, some vehicles and office space to the Development Association of San José de Ocoa to continue work begun under the NARMA Project in the Ocoa and Nizao watersheds.

A. Institutional Strengthening

The Project developed within the Secretariat of Agriculture the capability to develop and implement watershed management plans. This was accomplished through the provision of 651 person months of technical assistance, 166 person months of short term training and 36 person years of long term training in natural resources planning and management (See Annex D). The Project provided the Secretariat with the equipment needed to develop and maintain an information base on the country's natural resources which could be used for resource management decisions. Project activities initiated the collection of much base line information (i.e. updated 1:40,000 aerial photos of the entire country) which was used for early resource management work, and could be used to measure changes in the country's resource base. However, the Project had limited success stimulating an awareness among GODR leadership that the conservation of natural resources is important and merits the government's long term support. For this reason, many activities begun by the Project were discontinued once direct AID assistance ended.

B. Soil and Water Conservation

The Project developed a soil and water conservation model which incorporated local interests into the planning process. This was achieved through the creation of "Watershed Development Committees" which were composed of representatives from the various interest groups, and whose function was to work with the Project's field offices in establishing intervention priorities and monitoring project progress. This model proved effective for identifying local concerns, and for defining local priorities in terms of watershed conservation interventions. In addition, these committees monitored the use of project resources (equipment and funds), and helped insure that these resources were used to implement the agreed upon activities.

V. LESSONS LEARNED

A. Institutional Strengthening

Solving natural resource management problems requires long term financial and administrative commitments by the participating institutions. Therefore, institutional strengthening efforts must focus on those organizations which possess the stable leadership and financial wherewithal to address natural resource management problems. If these organizations lack either the stable leadership or secure funding sources, their ability to effective implement long range natural resource conservation programs will be severely jeopardized. Therefore, projects of this type must develop these characteristics before terminating if the activities they begin are to continue after the project's termination. More specifically:

> Natural resource management projects must have a **minimum 7 - 10 year lifetime**. This longer than traditional life of project is required to firmly establish the planning and implementation mechanisms, and demonstrate the technical and economic feasibility of the recommended interventions.

Project leadership must be committed to the long term efforts required by these projects. In the Dominican Republic, the frequent change of government leadership virtually precludes government organizations from being directly responsible for implementing projects of this type.

Projects need to be field oriented, and promote collaboration between non government and government organizations in their implementation. Locally based, non government organizations generally lack the technical expertise and financing needed to effectively implement these projects. Conversely, government organizations generally lack the desire or felt need to achieve significant results at the field level. Since natural resource conservation projects offer few immediate results, they generate little political support.

B. Soil and Water Conservation

The NARMA Project was designed under the premise that hillside farmers were the chief contributor to soil erosion, when in fact soil erosion is both a natural process and caused by farming, road building, and deforestation. Experience gained under the NARMA project suggests that small farmers cause less erosion than either natural causes and road building. For example, geologists estimate that 20 - 40% of the Dominican Republic's erosion derives from natural processes rather than being man caused. Similarly, geologists and geomorphologists estimate that improper road construction and road maintenance cause between 30 - 50 percent of the country's erosion. Finally, small farmers and deforestation account 10 - 30 percent.

Since the NARMA Project dealt with the small farmer produced erosion and only superficially treated road caused erosion, the lessons learned relate to this causative factor only. The specific lessons learned are listed as recommendations in the next section.

VI. RECOMMENDATIONS

A. Emphasize environmental education at the beginning of a natural resources conservation project, and follow with specific, proven technical packages. People's ideas and ways of thinking must change before they will accept new technical ideas and practices. Education programs can create a basis for understanding the technical packages and accelerate their adoption. Under the NARMA project, radio programs proved effective for introducing soil conservation and natural resource conservation ideas.

B. Technical packages need to offer short term income generating potential. Farmers need to perceive and realize an economic benefit from the increased work or modified behavior required by the new technical packages.

C. Utilize the para-technician concept in soil conservation and sustainable hillside farming systems programs. Make local farm leaders project para-technicians because they can extend information and practices to neighboring farmers much more effectively than outsiders.

D. Work with farmer associations rather than individuals. Require individuals interested in participating in the program to get their neighbors or association members to also participate. This requires fewer technical personnel, creates positive peer pressure within participating groups, and results in a much greater impact. This practice is difficult to implement until the project has demonstrated the economic benefits of the recommended practices. Once the benefits are demonstrated it becomes the "cost of admission" for new participants.

E. Seek methods for intensifying cultivation of the valley floors and less steep areas within the watersheds, and encourage farmers to plant permanent crops on hillside lands. The NARMA project accomplished this by introducing small, gravity fed irrigation systems into mountain farming communities. This work required a series of agreements between the farmers controlling the less steep lands (flatland farmers) and the hillside farmers. In these agreements, the flatland farmers agreed to distribute half their land among the hillside farmers in return for access to the irrigation system. The hillside farmers agreed to plant permanent tree crops or reforest their lands, and protect the hillsides from fire and other shifting agriculturists. The irrigation systems permitted more intensive cultivation of non traditional, higher value crops, and increased <u>all</u> participating farmers' incomes an average of five times. (See Beto Brunn's Evaluation of the Impact of Irrigation Systems in the Ocoa Watershed, February, 1988).

F. In the Dominican Republic, it is essential to utilize the capabilities of local development associations, community associations, and other non government organizations in the definition of project priorities, the allocation and control of project resources, and the implementation of field activities. Such groups have a direct stake in the success of these projects because they are more closely associated with the interests and needs of the watershed communities. The experience gained under the NARMA project demonstrated that these groups, because of this interest, monitor and control the use of project resource better than regional or national government agencies.

VII. <u>POST PROJECT MONITORING AND ADDITIONAL INVESTMENTS</u>

A. <u>Monitoring</u>

Given the virtual cessation of all project activities upon the termination of direct AID funds, USAID/DR does not foresee any need to continue monitoring the Secretariat of Agriculture's natural resource activities. The Project's computer equipment is being used by the Secretariat of Agriculture to link its regional offices and central offices in an attempt to establish a

nationwide agricultural information system. These efforts will be monitored by the AID funded Agricultural Policy Analysis Project (517-0156). The cartographic equipment financed by AID is now being used by the Military Cartographic Institute under the supervision of the Inter-American Geodetic Survey unit. USAID will monitor the follow-on Investment Fund in Natural Resources Project to determine if the lessons learned on a small scale under the NARMA Project can be applied to a larger area.

B. Additional Investments

USAID/DR, in discussions with the Secretary of Agriculture, agreed to reprogram the NARMA Project's remaining RD$2,415,000 for the Natural Resources Investment Fund project which will be implemented by the Development Association of San José de Ocoa. This project will provide some follow-on to field activities begun by the NARMA project in the Ocoa and Nizao watersheds. It will also receive an additional programming of RD$5.0 million over its 4 year LOP from PL-480 local currencies. Other than this project, USAID/DR plans no further investments in these type of projects at this time.

A N N E X A

Natural Resources Managment Project
Planned vs Actual Achievements

Output/Activity	Original LOP Target	Revised Targets	Actual Achievements
1.0 Institutional Strengthening			
1.1 Strengthen Natural Resources Planning			
1.1.1 Cartography			
a. Update Aerial Photo Base for entire country 1:40,000 scale			Completed
b. Develop Standard Cartographic Bases			
1) 1:250,000 for entire country			Completed
2) 1:50,000 for entire country			Completed
c. Develop Working Maps for Watersheds			
2) 1:50,000 for Watersheds	4	4	5
3) 1:20,000 for Watersheds	4	4	2
d. Install Cartographic capability within Dept. Inventory, SURENA			Completed
1.1.2 Erosion/Water Quality Monitoring			
a. Stream Monitoring Stations	12	4	2
b. Soil Erosion Plots			
Permanent	12	2	2
Portable	0	26	11
c. Climate Recording Stations	4	4	3
1.1.3 Agricultural Zoning Studies			
Watersheds studied	4	4	5
1.1.4 Marketing Studies of major agricultural crops produced	12	1	1
1.1.5 Small Farmer Association Studies	2	2	3
1.2 Develop National and Watershed Management Plans			
a. 20 Year Natural Resources Management Strategy			Incomplete
b. National Plan for Environmental Education			Completed
c. Develop watershed management plans	4	4	3

Output/Activity	Original LOP Target	Revised Targets	Actual Achievements
1.3 Agroforestry & Forest Management Planning			
a. Forestry short courses	10	1	1
b. Develop National Forestry Management Plan			Completed
c. Develop Feasibility studies for forest management of natural forest stands.	2	2	2
1.4 Road Construction Planning			
a. Publish road maintenance manual			Completed
b. Sponsor road maintenance workshops	3	3	3
1.5 Natural Resource Legislation & Policy			
a. Synopsize legislation governing the use, management and preservation of natural resources:			Completed
b. Develop Operations Manual for SURENA			Not Done
c. Sponsor policy workshops	3	3	3
d. Recommend legislative changes			Not Done
1.6 Strengthen Environmental Education			
a. National Plan for Environmental Education			Completed
b. Develop public media programs, announcements, and documentaries	2	2	3
c. Elementary/Secondary school teachers/community leaders trained.	1,500	1,500	3,240
d. Farmers trained in soil conservation.	5,000	5,000	10,194
e. Soil conservation workshops	225	225	310
f. Short courses presented for school teachers and community leaders.	75	75	113
g. Develop local soil conservation training materials			Completed
h. Develop and print/publish environmental education materials			Completed
i. Construct National Environmental Education Training Center			Completed
1.7 Strengthen Interagency Administration			
a. Establish computer based information system			Completed
b. Facilitate interagency administration of natural resources among SURENA, SEA, DGF and INDRHI.			Incomplete
c. Reorganize SURENA for improved of resources.			Completed
d. Establish two watershed management offices			Completed

Output/Activity	Original LOP Target	Revised Targets	Actual Achievements
2.0 Soil and Water Conservation			
2.1 Soil Survey and Interpretation			
Soils surveys completed with interpretations for watersheds.	4	4	5
2.2 Farm Conservation			
a. Train Soil Conservation Paratechnicians	20	20	32
b. Farm Plans Developed	3,000	2,500	2,443
c. Area under soil conservation practices (ha)	0	2,000	2,913
c. Soil interpretation technical guides developed	2	2	2
d. Small scale irrigation systems designed	0	10	16
e. Small scale irrigation systems installed	0	10	6
f. Area under irrigation (ha)	0	500	294
2.3 Incentive Packages			
a. Disburse cash incentive payments to farmers	$2,100,000	$438,000	$438,000
b. Distribute free trees to farmers	200,000	200,000	893,000
c. University scholarships to outstanding paratechnicians	0	0	8
2.4 Watershed Protection			
a. Area reforested (ha)	800	1,500	1,760
b. Tree nurseries constructed	2	2	14
c. Seedlings produced/distributed to farmers (thousands)	1,600	1,000	893
d. Seedlings purchased from commercial nurseries (thousands)	0	0	1,600
2.5 Hillside Farming Systems Research			
a. Establish permanent, on-farm, farming systems trials	10	2	2
b. On-farm research trials installed demonstrating conservation tillage and agroforestry systems.	0	150	248
c. Develop and Publish extension pamphlets on soil. conservation/farming systems	0	20	2

A N N E X B

Natural Resources Management Project
Summary of AID Project Expenditures[1]

(US Dollars)

Budget Category	Amount Obligated	Amount Committed	Amount Disbursed to U.S. Suppliers & Contractors	Amount Disbursed to GOIR & Local Contractors
1. Technical Assistance	2,594,615	2,426,946	2,151,321	4,426
2. Vehicles	277,000	277,000	0	90,401
3. Equipment & Materials	1,162,000	1,105,421	237,464	747,229
4. Aerial Photos	618,000	616,611	568,611	47,810
5. Training	1,514,007	1,555,231	997,606	397,567
6. Credit	721,000	430,898	0	430,898
7. Cash Incentives	438,000	437,818	0	437,818
8. In-Kind Incentives	500,000	0	0	0
9. Nurseries	351,000	50,802	0	50,802
10. Technical Services	2,051,000	425,159	0	425,159
11. Operating Costs	750,000	523,074	0	523,074
TOTAL	$10,976,622	$8,139,062	$3,862,669	$3,155,184

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[1]Obligations are according to the revised financial plan in PIL No. 27 dated 2/2/87. Expenditures are as of 12/31/88.

A N N E X C

Natural Resources Management Project
Summary of GODR Counterpart Project Expenditures

(RD$)

Category	Expenditures
1. Personnel	6,563,346
2. Vehicles	279,338
3. Equipment & Materials	1,563,628
4. Training	146,998
5. Credit	400,000
6. Operating Costs	1,629,403
7. Nurseries	198,276
TOTAL	RD$10,780,989

A N N E X D

Natural Resources Management Project
Summary of Project Inputs

I. TECHNICAL ASSISTANCE/TECHNICAL SERVICES: The Project financed both technical assistance and technical services. Technical assistance refers to the provision of expertise to either GODR or NGO organizations to strengthen their capabilities to carry out specific tasks. Technical services refers to the provision of expertise to produce a specific product.

A. Technical Assistance

1. Michigan State University/Ohio State University: 251 person weeks

Area of Assistance	Person Weeks
Soil & Water Conservation Monitoring	49
Administrative Training	16
Environmental Law	22
Forestry Management	63
Cartography/Remote Sensing	18
Environmental Education	24
Marketing	8
Agricultural Zoning	26
Natural Resources Economics	25

2. University of Kentucky: 125 person weeks

The University of Kentucky provided Dr. Grant who was the long term resident advisor to the Hillside Farming Systems Research component.

3. U.S. Soil Conservation Service (PASA): 66 person weeks

The U.S. Soil Conservation Service provided short term advisory assistance in soil surveying, soil conservation, irrigation system development, road building and maintenance, and check dam construction.

4. Texas Soil Conservation Service (PASA): 283 person weeks

The Texas Soil Conservation Service, through the U.S.D.A.'s Office of International Cooperative Development, provided the services of Dr. Gary Kemph as the project's long term advisor.

5. Other Short Term TA Services: 82 person weeks

a. U.S.D.A. (PASA): 8 person weeks to conduct a mid-project evaluation in 1984.

b. RONCO Consulting Corporation: 23 person weeks to conduct mid project evaluation in 1986.

c. Clapp & Mayne Inc.: 12 person weeks to assist the Subsecretariat for Natural Resources to reorganize its office functions according to the recommendations of the 1986 mid project evaluation.

d. RONCO Consulting Corporation: 20 person weeks to help redefine the project's focus and plans according to the 1986 mid-project evaluation's recommendations.

f. Pan American Development Foundation: 19 person weeks to assist in the organization and planning of field programs, evaluate the cost effectiveness of selected interventions, and to help develop a local currency follow-on project to continue selected NARMA project activities through local PVO organizations.

B. Technical Services

1. Teledyne Geotronics Co. was contracted to update the aerial photo base (1:40,000) for the entire country.

2. Agrohorti S.A. was contracted to conduct base line studies of physical and social condition in the Nizao and Rio Grande del Medio river watersheds to provide the basis for the development of watershed management plans. Agrohorti was also contracted to reforest 1,000 hectares of state land in the upper Las Cuevas river watershed.

3. Desagro S.A. was contracted to conduct base line studies of the physical and social conditions in the Chacuey, Guayubin and Maguaca river watersheds to provide the basis for the development of watershed management plans.

4. Riegos Victor Kohn C. A. was contracted to design irrigation systems for "Los Corozos, Sabana Larga, and Arroyo Corozo" areas in the Ocoa watershed, and the "La Guama and El Pinar" areas in the Las Cuevas watershed.

5. The consortium E.D.H-Agridesa-Hidroservice was contracted to design irrigation systems for the "El Cercado, El Memizo and El Naranjal" areas in the Ocoa watershed, and the "Las Mesetas" area in the Las Cuevas watershed.

6. The consortium Conagrodom-Tahal was contracted to design an irrigation system for the Arroyo Palma area in the Ocoa watershed.

II. TRAINING

A. Long Term

Area of Training	Number of People MS	Ph.D.	Total
Agricultural Economics:	3	1	4
Environmental Education:	3		3
Agronomy/Crop Science:	1		1
Natural Resources Management:	9		9
Range Management:	1	—	1
Total	17	1	18

B. Short Term

The Project provided 102 people with 579 person weeks of short term training.

Areas of Training	Number of People
Cartography:	35
Forestry/Agroforestry:	4
Natural Resources Management:	21
Soil Conservation:	17
Irrigation:	6
Wildlands Management:	6
Environmental Communications:	9
Computerized Data Management:	1
Crop Production/Agriculture:	3

III. EQUIPMENT

The equipment listed below is the equipment actually purchased with project funds either directly by AID from U.S. sources, by MSU under their technical assistance contract, or by SEA from local suppliers.

Type of Equipment	Cost
Cartographic Equipment	145,990
Computer Equipment	151,077
Soil Testing Equipment	38,636
Water Quality Monitoring Equipment	27,154
Electrical Generator for Environmental Education Center	12,200
Nursery Equipment	6,105
Forestry Equipment	1,296
Research Supplies	7,170
Irrigation Equipment	
Total	**$389,628**