



**SELECTED ALTERNATIVES FOR
IRRIGATED AGRICULTURAL
DEVELOPMENT IN
AZUA VALLEY,
DOMINICAN REPUBLIC**



WATER MANAGEMENT SYNTHESIS PROJECT

WMS REPORT 28

SELECTED ALTERNATIVES FOR IRRIGATED AGRICULTURAL
DEVELOPMENT IN AZUA VALLEY, DOMINICAN REPUBLIC

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WMS Report 28

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WATER MANAGEMENT SYNTHESIS PROJECT

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TABLE OF CONTENTS

	<u>Page</u>
SCOPE OF EFFORT.....	1
OUR APPROACH.....	2
THE PROPOSAL AREA.....	3
The Azua Valley and its Agriculture.....	3
A Reconnaissance of Azua Valley.....	6
COMPLEMENTARY INVESTMENT PROJECT FOR THE YSURA RESETTLEMENT AREAS.	8
General Information.....	8
Project Components and Characteristics.....	9
ADDITIONAL OPTIONS FOR IMPROVING IRRIGATED AGRICULTURAL PRODUCTION IN THE AZUA VALLEY.....	15
On-Farm Water Management Project.....	15
Puerto Viejo Rehabilitation.....	17
Azua Valley Phase II (VA-2) Irrigation System.....	18
SUMMARY OF ALTERNATIVES.....	19
PROJECT DEVELOPMENT TEAMS.....	20
Immediate Funding.....	20
Agribusiness and Marketing.....	20
On-Farm Water Management Development Project.....	21
APPENDICES.....	22
Glossary.....	22
Additional Readings.....	23

SCOPE OF EFFORT

Discussions among personnel in USAID/Dominican Republic and USAID/Washington led to a request for the Water Management Synthesis II (WMSII) Project to send a two-man team to the Dominican Republic for two weeks to:

1. Survey the Azua irrigation system and assess the technical and managerial problems that limit farm productivity there. Particular attention was to be given to assessing the needs of private landowners versus agrarian-reform settlements.
2. Describe categories of problems, such as organizational infrastructure, water delivery, and technology; and recommend the type of investigation needed to fully diagnose problems, including the kinds of experimental methods and the time required to conduct the investigation.
3. Prepare a preliminary description of the activities that might be included in a project to address the problems identified in Azua.
4. Prepare a detailed scope of work for a following team of experts after reviewing previous studies of the production and irrigation problems in Azua. These experts will then comprehensively define the production and irrigation problems and their solutions.
5. Prepare a draft report containing all findings and recommendations and submit it to USAID/DR before departure.

OUR APPROACH

Our foremost consideration was the development of the agricultural potential in Azua Valley, particularly irrigated agriculture. We viewed development strategies in terms of their potential for enhancing the farmers' ability to become more productive. Since many farmers in the Azua Valley are asentados (people who farm government-owned lands and receive irrigation water from publicly-funded pumps and canals), we focused on public sector efforts and proposed programs for assisting farmers. However, we also tried to investigate alternatives that assist farmers, both asentados and those with land outside public project areas, through non-government (private sector) sponsored programs.

We were asked to respond to two concurrent requests, both of which concerned agricultural growth potential in Azua Valley:

- 1) The proposal for complementary investments in the Government of the Dominican Republic (GODR) reform areas in Azua.
- 2) USAID requested that the team investigate and suggest additional activities that might contribute to agricultural growth in the region, including publicly-sponsored projects and private sector contributions.

The recently implemented On-Farm Water Management Project (OFWMP) can be used to provide much of the detailed information for operating and maintaining the irrigation and drainage facilities. Even more importantly, the OFWMP should provide guidelines and demonstrations to encourage farmer participation in constructing, operating and maintaining the farm delivery (quaternary) channels and farm drains. Alternatives for enhancing the effectiveness of the OFWMP have been sought.

We view the OFWMP as a key asset in achieving the agricultural potential of Azua Valley, as well as providing insights that may enhance the productivity of irrigated agriculture throughout the country.

THE PROPOSAL AREA

THE AZUA VALLEY AND ITS AGRICULTURE

The Azua Valley is located approximately 100 kilometers west of Santo Domingo in the southwest region of the country. On the northeast edge of the valley lies the city of Azua, the provincial capital. The area is semi-arid with an average annual rainfall somewhere near 400 mm (approximately 16 inches). The valley is somewhat fan-shaped and is bordered on three sides by hills and mountains and by the Caribbean Sea to the south (Figure 1).

In the mountains north of the Azua Valley runs the Yaque del Sur River. The Yaque del Sur supplies the water for an irrigation system sponsored by the National Hydraulic Resources Institute (INDRHI) which was designed to distribute water throughout the Azua Valley. The valley covers almost 20,000 hectares. Of this amount, some 12,000 hectares are irrigable lands under the potential influence of Phase I (VA-I) of INDRHI's Azua Valley Irrigation Project (Figure 2). The GODR plans to extend this canal system east of Azua city under Phase II (VA-2), which would irrigate another 5,280 hectares.

Because of its location south of the Yaque del Sur River, the Azua Valley is often referred to in GODR development projects by the acronym YSURA--Yaque del Sur-Azua. The Dominican Agricultural Institute (IAD) refers to its overall activities in the Azua Valley as the YSURA Project.

In recent years, several descriptions of the Azua Valley and of GODR development efforts there have been prepared. These include historical accounts of IAD's land resettlement efforts as well as INDRHI's irrigation and drainage programs. Some papers also explore private agricultural activities. A partial listing of these documents is provided at the end of this report.

Several of these documents discuss problems related to rising water tables in the southern portions of the Azua Valley where the land gently slopes toward the sea. These lower areas have been damaged in recent years from the effects of rising water tables resulting from (1) poor management of the INDRHI irrigation canal system during the first several years after it began service; and (2) Hurricane David, which compounded the problem with devastating rainfall in September 1979.

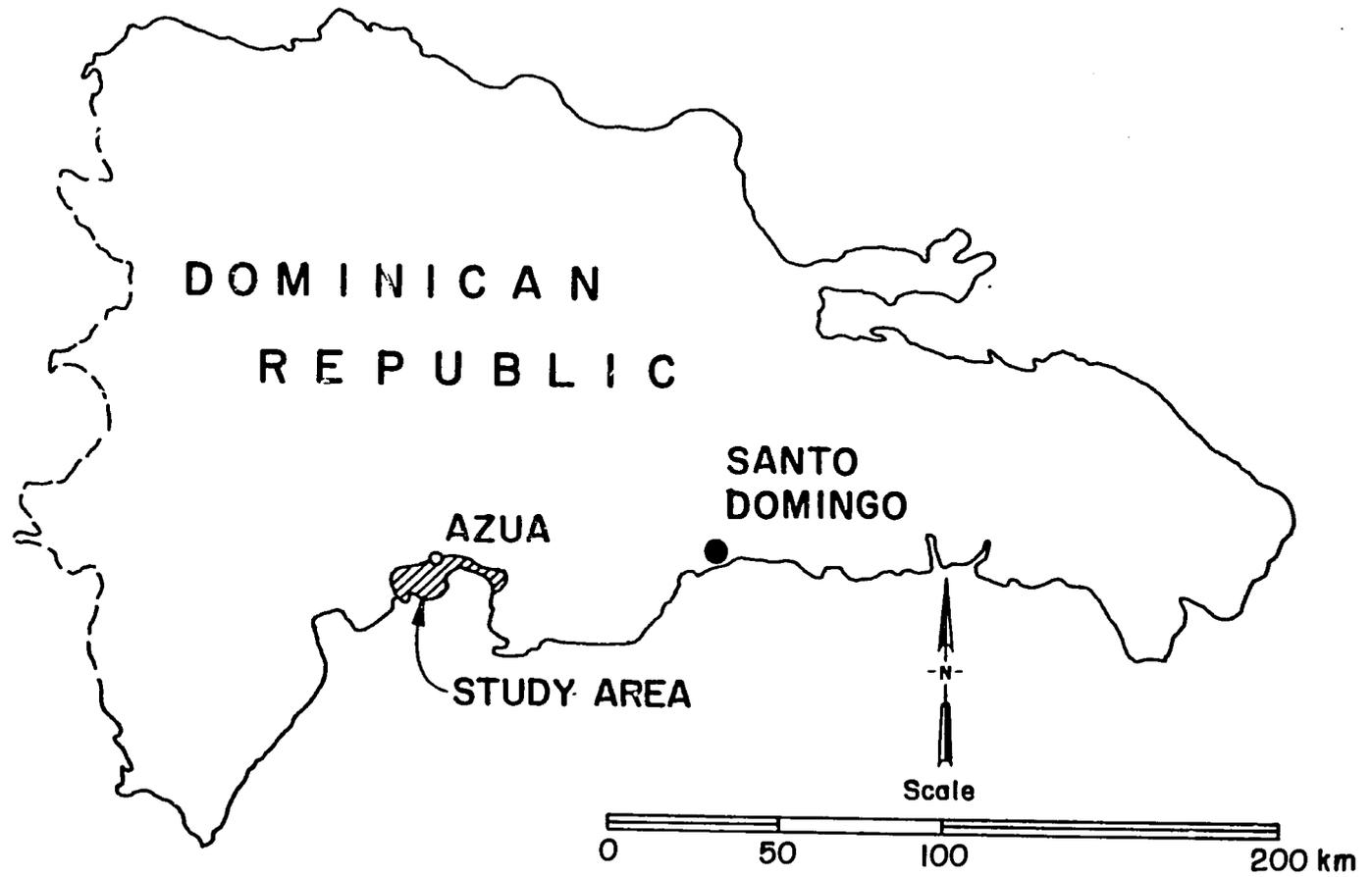


Figure 1. Azua Valley, Dominican Republic.

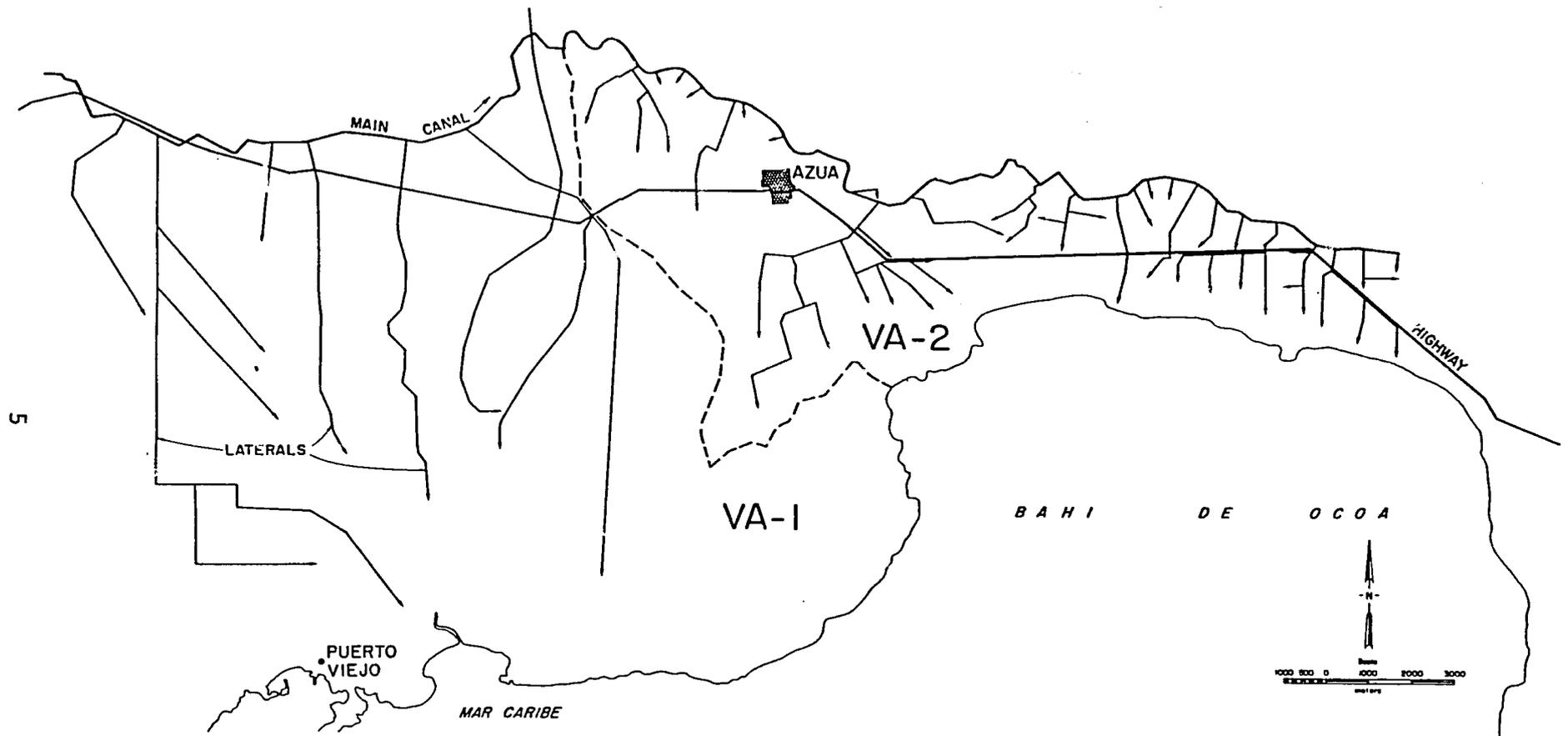


Figure 2. Azua Valley irrigation and drainage system.

In the last two years, however, INDRHI has taken steps to improve system management, resulting in a decrease in excess water flowing through the system; water which had previously been a source for groundwater aquifers. This agency has also constructed a number of open collection drains to carry excess water to the sea. In addition, the Dominican Agricultural Institute has rehabilitated and placed into service approximately 34 electric pumping stations, formerly the only source of irrigation water for settlement areas. These pumps have helped decrease the incidence and severity of high water tables in lower areas, although some sites still need rehabilitation to be fully productive.

An example of how dramatically some water-table levels have been reduced comes from the Arid Zone Agricultural Research Center (CIAZA). The technician directing CIAZA's activities indicated that the experiment station no longer suffers from high sub-surface waters. In fact, the portions of the experiment station which had a water table ten centimeters below the ground surface two years ago now have a water-table depth of five meters.

A RECONNAISSANCE OF AZUA VALLEY

A reconnaissance of the Azua Valley shows that the lands have high potential for agricultural productivity. Much of the land waterlogged as a result of Hurricane David and earlier irrigation management practices is being rapidly reclaimed. Those lands in the southeast still in need of reclamation will be aided at least partially when the construction of open drains is completed in 1985 under an Inter-American Development Bank loan.

The main canal and six laterals contained in Phase I (VA-1) have been lined with concrete. Only a fraction of the tertiary channels, which originate from the laterals, have been completed. Most of the quaternary (farm delivery) channels need to be more adequately constructed, as do the farm drains for routing water into the sub-mains and mains of the open drain system.

In March 1984, INDRHI completed the designs for the Phase II (VA-2) irrigation and drainage networks. They are presently seeking funds for the necessary construction.

In producing high cash value crops, the timeliness of agricultural inputs largely dictates the resulting yields; particularly since many of these crops are highly sensitive and responsive to inputs. Certainly the timeliness of irrigation water deliveries in arid lands is crucial. Inquiries on this matter indicate that there are difficulties at times, and in some areas, in obtaining water from the laterals when needed. In fact, pump irrigation may be necessary as insurance for producing an adequate crop, unless the management of irrigation deliveries improves.

A loan agreement between GODR and USAID for on-farm water management has recently been implemented. A technical assistance contract with expatriates stationed in Santo Domingo, Santiago, and Azua is likely to be awarded in a few months. The project areas are Santiago and Azua Valley. The On-Farm Water Management Project should prove to be a tremendous boon to the agricultural development of both areas. We believe that certain aspects of the OFWMP will have direct bearing on the options presented in this paper.

In the private development of the agricultural potential in Azua Valley, two basic approaches are practiced: (1) private companies grow crops on private land; and (2) private agribusiness/marketing firms contract with land holders--either asentados or other farmers in the area to grow crops. Some companies do both. With these developments already underway in Azua, tremendous potential for expanding similar activities exists. Some of these approaches can be highly effective in teaching good crop production management practices to farmers having very small land holdings.

An old port named Puerto Viejo exists near the southwestern corner of Azua Valley. This port could prove advantageous for export marketing, particularly of fresh produce. The Government of the Dominican Republic has explored the possibility of rehabilitating this port facility and asphaltting the present gravel road to the port.

The Secretariat of Agriculture (SEA) of the GODR recently forwarded a proposal to USAID for a complementary investment project for the land resettlement areas in the YSURA Project. The activities presented in that proposal would benefit the agricultural development of a significant portion of the irrigated lands. One major thrust of the team's efforts was a review of the SEA proposal.

COMPLEMENTARY INVESTMENT PROJECT FOR THE YSURA RESETTLEMENT AREAS

The following is a narrative summary of the proposed Complementary Investment Project for the YSURA Land Reform Project prepared by ODESIA, the technical, agricultural planning section of the Secretariat of Agriculture. The proposal is dated May 1984. The project is directed to strengthen the fourteen land reform areas in the Azua Valley operated by the Dominican Agricultural Institute.

GENERAL INFORMATION

The proposed complementary investment project consists of six main components, described later, and details four general objectives which the project would seek to reach. They are:

- 1) Increase the agricultural production and productivity of YSURA settlements;
- 2) Improve the standard of living for settled farmers (asentados);
- 3) Create new employment, primarily through construction activities; and
- 4) Provide foreign exchange savings by increasing the production of crops otherwise imported.

In addition, the project document identifies the following specific goals:

- 1) Reclaim 20,000 flooded tareas (1,258 ha), making them productive;
- 2) Rehabilitate 40,000 tareas (2,516 ha) that currently have drainage and salinity problems;
- 3) Guarantee technical assistance to the 2,515 farmers now settled;
- 4) Provide credit to farmers on more than 90,000 tareas (5,600 ha), that are currently under cultivation so they can grow two crops a year;
- 5) Create through the construction of irrigation and drainage infrastructure some 2,300 new jobs; and

- 6) Settle approximately 1,300 additional families.

The YSURA Project, under the control and direction of the Dominican Agricultural Institute, covers 121,000 tareas (7,610 ha) in the Azua Valley. This area is subdivided into 14 land reform settlements (Figure 3). The proposed project should put together an input package that would strengthen the beneficiaries.

The prepared proposal covers two years and represents a total investment of 19.84 million pesos. Of this total, the document proposes that 82 percent be expended in the first year (approximately 16.24 million pesos). The proposal indicates the GODR would provide 6.0 million pesos of the total project costs, and USAID would fund the remainder.

The project document mentions two items that are not fully explained. One is the goal of creating 2,300 new jobs in the area. The only indication is that they would stem from the construction of the project. The other item concerns settling 1,300 additional families within the YSURA Project. What areas they would occupy and how they would affect the current system are not presented.

PROJECT COMPONENTS AND CHARACTERISTICS

The proposed SEA project has six major components. These are farm irrigation and drainage, agricultural credit, machinery and equipment, technical assistance, CIAZA support, and installing a small, electrical power system. Table 1 provides information on the overall project, its components, and associated costs.

Irrigation and Drainage

This component proposes constructing a farm-level irrigation and drainage infrastructure throughout the YSURA Project. Rather than provide funds for this activity immediately, we propose that the criteria for constructing farm-level channels be developed under the OFWMP. Then, when farmer participation has been successfully demonstrated, the construction throughout Azua Valley (and in other irrigated regions in the Dominican Republic) could be part of a new On-Farm Water Management Development Project (OFWMDP), which would start in 1987 or later.

Agricultural Credit

The SEA proposal includes 7.5 million pesos for agricultural credit to asentados. Apparently, the project goal is to provide enough working capital for two crops a year for some 90,000 tareas (5,600 ha). Currently, there are not enough funds available to provide credit of any kind. All credit transactions would be

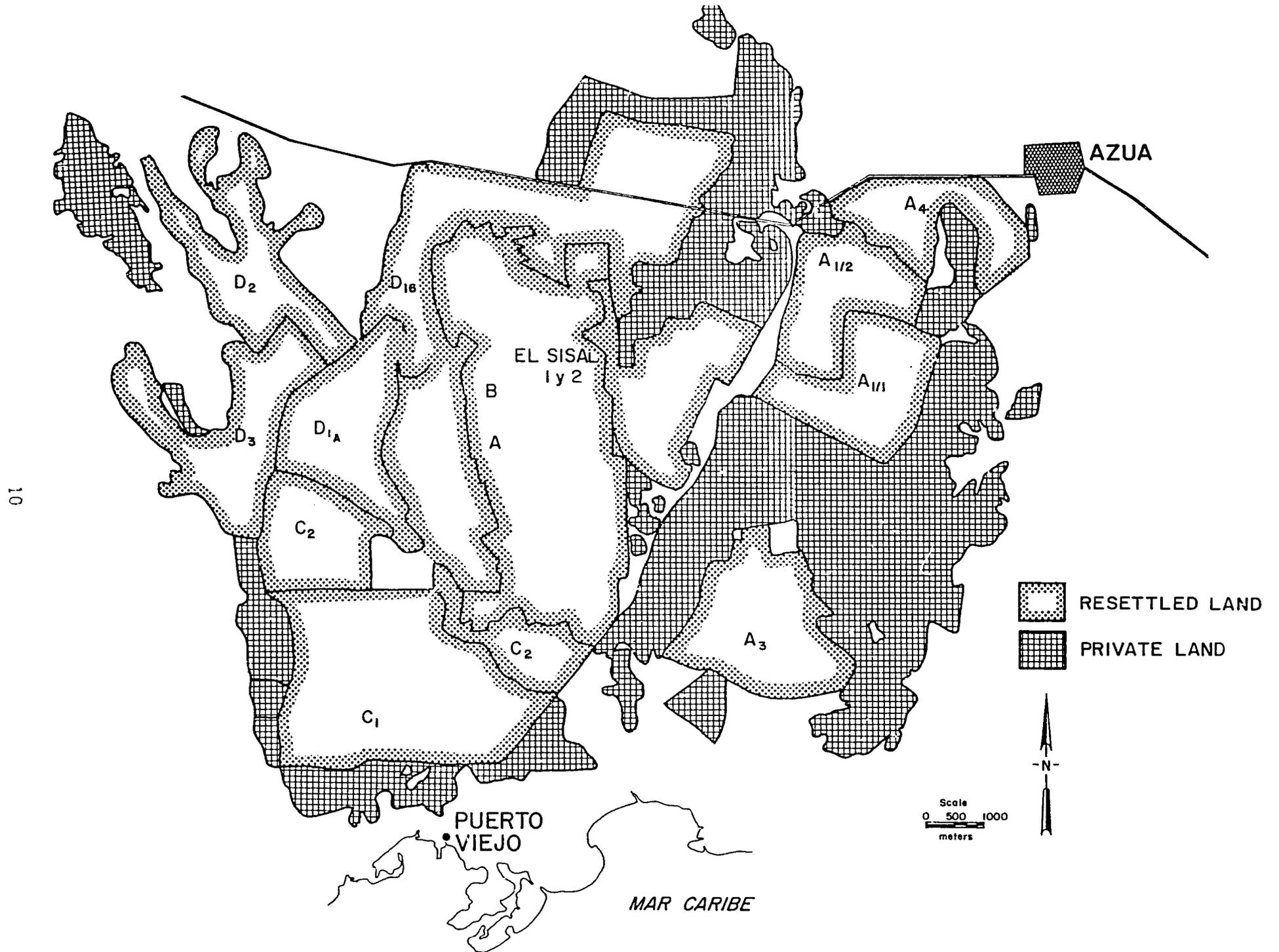


Figure 3. Land Resettlements in Azua Valley, Dominican Republic

Table 1. Summary of the Complementary Investment Project by Components and Activities

Components and Activities	Estimated Costs (R.D.* Pesos)	
Irrigation & Drainage		
Farm-level infrastructure	5,500,000	
Drains	<u>2,200,000</u>	
TOTAL		7,700,000
Agricultural Credit		7,500,000
Machinery & Equipment		
Heavy equipment	942,000	
Farming equipment	448,500	
Light equipment	359,500	
Operation costs	<u>250,000</u>	
TOTAL		2,000,000
Technical Assistance		
Local personnel	312,000	
Expatriate personnel	156,000	
Training--local and foreign	450,000	
Training--producers	250,000	
Vehicles	280,000	
Applied research	20,000	
Operating costs	200,000	
Other	<u>332,000</u>	
TOTAL		2,000,000
CIAZA		
Laboratory & equipment	205,000	
Classroom & dormitory	200,000	
Vehicles	75,000	
Travel & maintenance	<u>20,000</u>	
TOTAL		500,000
Electric Power System		140,000
GRAND TOTAL		<u>R.D. \$ 19,840,000</u>

* R.D. = Republica Dominicana

channeled through the Agricultural Bank (BAGRICOLA) and guaranteed by the Dominican Agricultural Institute. The proposal does not specify the location of the 90,000 areas.

There seems to be little doubt that asentados would willingly use credit if it were available. Many of them are already utilizing the credit offered them by private agro-industries, with whom they often contract to produce certain commodities. The extent to which asentados in the designated area would take advantage of credit for growing two crops a year is unknown and needs to be explored. Also, the intricacies of credit requirements for land reform asentados, the speed with which credit actually is available after its request, and other factors should be examined to determine if the current credit mechanism will allow the credit goal to be met--should it be selected as a viable alternative for consideration.

Machinery and Equipment

The project proposes to acquire three types of machinery and equipment: 1) heavy equipment (front-end loader, grader, etc.) to construct the farm-level irrigation and drainage works; 2) farming machinery and implements (tractors, planters, etc.) used to strengthen the GODR's agricultural mechanization program, PROSEMA, in Azua; and 3) light equipment (trucks, jeeps, and motorcycles) for project personnel to use. Fuel, maintenance, and parts for the machinery are included in the cost estimates. The total projected cost is 2.0 million pesos.

The funding of the equipment partly hinges on the other project components. For example, a decision to fund construction may necessitate purchasing heavy equipment. Likewise, increased technical assistance could increase the demand for mechanized assistance in land preparation through current GODR programs. We suggest that each category of equipment be considered on its own merits in light of whether or not it would facilitate the timely and appropriate execution of desired project elements.

Technical Assistance

The technical assistance portion of the proposed project can be broken into several activities: personnel, training, research, equipment, and support services (travel, operational costs, and fuel). SEA proposes to acquire 15 additional technicians to serve the 14 settlement areas in the YSURA Project and to send three individuals abroad for master's degrees. The personnel portion also contains funding for two expatriate advisers to assist in technical assistance and training activities. Furthermore, cost estimates for this component include purchasing

10 pick-up trucks and 20 motorcycles for technical personnel. Research is a very small portion of the technical assistance and is to be applied, though no details are given.

The objective of the proposed technical assistance is to "guarantee" technical assistance to the 2,515 asentados currently on YSURA Project land so that they can increase agricultural production and farm-generated income.

This component should be further studied prior to any funding decision. Apparently, the current proposal is partly designed to augment the Dominican Agricultural Institute's extension and training activities among asentados by increasing the number of technicians serving the area. However, we recommend that the extension portions of this component, including inputs from expatriate advisers, be considered within the framework of a more comprehensive extension/training/applied research project that USAID could support.

We suggest that training selected individuals in foreign master's degree programs be considered carefully. Such programs are costly, long-term, and offer few immediate returns. We suggest that formal education abroad be considered only if it constitutes an integral part of a well-planned, multi-phased program of technical assistance. Even so, perhaps the most necessary and most enduring training for such individuals would be in extension or agricultural education methods and procedures, rather than technical agriculture. Extension and agricultural education studies are weak in most universities throughout Latin America.

An alternative to the long-term training of a few people would be a well-planned program of short-term, in-country training for many individuals. A variety of courses taught by national and expatriate instructors could be offered to personnel involved in technical assistance in the Azua Valley. Short-term courses could include instruction in technical agriculture, irrigation, teaching methods, and other subjects to help implement effective technical assistance programs for YSURA asentados as well as independent farmers in the Azua Valley.

Strengthening CIAZA

Strengthening the Arid Zone Agricultural Research Center (CIAZA), located within the YSURA Project, is the objective of the fifth project component. The project document designates 0.5 million pesos primarily to construct a laboratory and a combination classroom and dormitory facility at CIAZA's headquarters. Funds are also identified to equip the new facilities and to purchase five pick-up trucks (including fuel and maintenance) for use by CIAZA personnel in research and extension.

Consideration should be given to the request for building the facilities identified by SEA in its proposal. The USAID On-Farm Water Management Project (OFWMP), soon to be implemented, calls for a water management center to be located at the CIAZA. A good laboratory facility that is adequately furnished and supplied would be indispensable to much of the research undertaken by CIAZA or the OFWMP. Likewise, classroom facilities are badly needed for many training activities; as is dormitory space where farmers can stay for courses that take two or more days. The classrooms should be adequately equipped with an array of proper hardware--from individual chair-desks to chalkboards to media equipment, as well as the necessary expendable supplies. Such items should be maintained and controlled.

Electrical Power System

The proposed project requests assistance in installing a limited electrical system for the housing center in Zone D-1 of the YSURA Project. The center consists of 353 homes. The project proposes expending 140,000 pesos to install a primary power line plus connections for each household.

The foregoing is all the detail given concerning this component. Its consideration depends heavily upon USAID policy at the Mission level. It does not directly support agriculture in the YSURA Project. On the other hand, for a modest capital outlay, its implementation would directly benefit a number of small farmers and households in the Azua Valley.

ADDITIONAL OPTIONS FOR IMPROVING IRRIGATED AGRICULTURE IN AZUA VALLEY

ON-FARM WATER MANAGEMENT PROJECT

A five-year, \$19 million (U.S. dollars) loan project called On-Farm Water Management (USAID Project No. 517-0159) has recently been implemented in the Dominican Republic. The National Hydraulic Resources Institute (INDRHI) will implement the project for the Government of the Dominican Republic with other GODR agencies cooperating.

The major focus of the project will be establishing two centers for water management, one near Santiago and the other in Azua Valley. The centers will conduct technical field studies, demonstrate improved water management practices, organize and assist water users' associations, and provide training opportunities for many individuals involved in developing irrigated agriculture. In addition, the project will establish a credit program for financing land leveling, crop production, and marketing. A summary of the major project activities, along with the budgeted, equivalent U.S. dollar amounts, is shown in Table 2.

In the Azua Valley, the main canal and six laterals under Phase I (VA-1) have been concrete-lined. However, only a fraction of the tertiary channels connecting the laterals to the quaternary (on-farm) channels have been concrete-lined. There would be a tremendous advantage in implementing the On-Farm Water Management Project after the tertiary channels were constructed so that OFWM personnel could immediately organize water users' groups to construct quaternary channels and farms drains. Otherwise, this activity would have to wait for completion of the tertiary channels. INDRHI estimates that it would cost 6,760,000 pesos to construct the remaining tertiary channels under Phase I (VA-1). A similar USAID loan project in northeast Thailand has been reduced to a construction project because of the time required to rehabilitate the canals and laterals and then construct the tertiary channels.

Table 2. On-Farm Water Management Project Activities

Activity	AID (U.S. \$)	GODR (U.S. \$)	TOTAL U.S. \$	
			AID	GODR
Centers for Water Management			\$2,897,000	\$1,388,900
Technical Field Studies				
- Irrigation parameters	\$ 680,000	\$237,900		
- Delivery system	\$1,435,000	\$109,400		
- Water user association development	\$ 935,000	\$ 80,400		
			\$3,068,000	\$ 427,700
Demonstration & Training				
- Demonstration	\$1,945,000	\$120,000		
- Training	<u>\$2,474,000</u>	<u>\$541,800</u>		
			\$4,419,000	\$ 661,000
Credit			\$ 86,000	\$3,000,000

One of the most important activities of the OFWMP will be developing and organizing water users' groups and associations. This activity has proven highly significant in other countries as a means of gaining farmer participation in the layout, construction and maintenance of farm water delivery and removal channels. An important measure of the OFWMP's success will be the ability of Water Management Center personnel to mobilize farmers for improving their portion of the irrigation system. If successful, the process could be replicated on all quaternary and farm drain channels in Azua Valley and other irrigated regions in the Dominican Republic. Such a large-scale project should not be designed until after the OFWMP has been underway for a few years.

Another important OFWMP activity will be operating the delivery system, consisting of the main canal, a lateral, and the associated tertiary and quaternary channels. The assurance of receiving irrigation water on time is a farmer's major consideration when deciding whether or not to risk producing high cash value crops.

The USAID, centrally-funded, Water Management Synthesis II (WMSII) Project has a program called Main System Management which is under the leadership of Dr. Wynn R. Walker of Utah State University. This program could cooperate with the OFWMP to program the entire Phase I irrigation network (main canal, six laterals, and tertiary channels) so that water deliveries arrive on time in Azua Valley. Similar programs are under way in northeast Thailand and India (and soon Sri Lanka) under the Main System Management program. Timely water supplies could be a major achievement for the OFWMP that would substantially facilitate the adoption of other improved on-farm irrigation practices.

Presently, the main and sub-main drains are under construction in Azua Valley for Phase I (VA-1). These drains will be completed in another year using loan funds from the Inter-American Development Bank. Now, many of the waterlogged areas have significantly recovered, but the lower lands in the southeast still require reclamation measures. As a component of their field activities, the OFWMP could include a drainage study to evaluate alternative drainage measures, such as the open drains soon to be constructed, pump irrigation and drainage, and tile drainage.

Lastly, the OFWMP personnel should establish the equipment, personnel and budget requirements needed to adequately maintain the entire irrigation and drainage system. It is likely that there will be some equipment needs that could be incorporated into a future loan project.

PUERTO VIEJO REHABILITATION

At the southwestern corner of the project lies Puerto Viejo. Puerto Viejo could be used after rehabilitation to export agricultural produce directly to the U.S.A. and other countries, or to ship produce by small boats to the larger port facilities at Santo Domingo. The Secretariat of Public Works (SEOPC) has recently estimated the cost of rehabilitating Puerto Viejo as U.S. \$45,000 for equipment and R.D. \$460,000 for construction (Table 3).

In addition, the road into the port needs improvement. The present asphalt road from the Main Road in Azua Valley to CIAZA needs repairs, and the road from CIAZA to Puerto Viejo has a good base but needs asphaltting. The total estimated cost for road improvements is 1,805,000 pesos.

Table 3. Estimated Costs for Rehabilitating Puerto Viejo.

Item	Cost
Port Equipment (U.S. \$45,000)	R.D. \$ 125,000
Port Construction (rehabilitation)	R.D. \$ 460,000
Port Road (12.4 km)	R.D. <u>\$1,805,000</u>
TOTAL	R.D. \$2,390,000

AZUA VALLEY PHASE II (VA-2) IRRIGATION SYSTEM

The design of facilities for the second phase of the irrigation system in Azua Valley was completed in March 1984. As of that date, the total estimated construction cost for canals, laterals, drains, rehabilitation of wells, and land preparation was 31,492,000 pesos. Apparently the GODR has not yet obtained funds for this construction.

There are a couple of conditions that would make investing in the construction of Phase II very worthwhile. The first condition would be achieving improved irrigation water management, including the timely delivery of water to individual farms under the OFWMP. Secondly, agricultural production in Phase I farmlands would have to significantly increase as a result of these improved practices. Then Phase II could be undertaken as a demonstration of how structural development and management should be incorporated into an integrated irrigation project from the outset.

SUMMARY OF ALTERNATIVES

Table 4 summarizes the various options discussed. Each option is listed as to whether it should be considered for (a) immediate funding; (b) accomplishment under the recently implemented On-Farm Water Management Project; (c) inclusion under a new project, the "On-Farm Water Management Development Project"; or (d) inclusion in a future loan project by any international donor.

Table 4. Summary of Selected Options for Improving Irrigated Agricultural Production in Azua Valley

Selected Alternatives	Cost (R.D. pesos)	Immediate Funding	OFWMP*	OFWMDP**	Future Loan
<u>SEA Proposal</u>					
Farm irrigation & drainage	7,700,000		1***	2****	
Credit	7,500,000	2			
Machinery	2,000,000	2			
CIAZA bldgs.	500,000	2			
Electricity	140,000	2			
Technical assistance	<u>2,000,000</u>		1	2	
TOTAL	19,840,000				
<u>A-1 Tertiary</u>	6,760,000	2			
<u>Main System Management</u>			2		
<u>Irrigation & Drainage Maintenance</u>			1	1	
<u>Puerto Viejo</u>					
Equipment	125,000	2			
Construction	460,000	2			
Port road	<u>1,805,000</u>	2			
TOTAL	2,390,000				
<u>VA-2 Irrigation System</u>	31,492,000				2

* OFWMP - On-Farm Water Management Project (USAID No. 517-0159)

** OFWMDP - On-Farm Water Management Development Project; to be developed during course of OFWMP.

*** 1 - Develop criteria for implementing particular option.
 **** 2 - Implement option.

PROJECT DEVELOPMENT TEAMS

IMMEDIATE FUNDING

Those alternatives selected by USAID/Dominican Republic for immediate funding can likely be handled by USAID/DR staff, except for the rehabilitation of Puerto Viejo discussed in the next section. For example, if funds were provided for completing the tertiary channels under Phase I (VA-1), then a local engineer could establish with INDRHI engineers the scope of work, and verify when the work is completed. The same operation could be used for the components of the SEA proposal, such as the buildings at CIAZA, electricity for homes in a land resettlement area, machinery, and equipment.

AGRI-BUSINESS AND MARKETING

The question of renovating the Puerto Viejo dock facilities and paving the road entering the port is a matter for close scrutiny by third-party advisers. We suggest that a selected team of three individuals perform this task. One team member ought to have considerable experience in the engineering, design, and construction of port and road facilities. This individual would survey existing facilities and conditions, assess the adequacy of any plans that the GODR may already have for upgrading those facilities, make recommendations detailing the measures required if facilities are renovated and improved, and provide cost projections and other pertinent information for all activities recommended.

The second member of the suggested team would determine how extensively port and road facilities at Puerto Viejo would be used if they existed and their viability. To date, private industries have been operating extensively in the Azua Valley with small land holders without the benefit of a nearby port. Should Puerto Viejo become available, would it actually benefit agricultural growth in the Azua region? The individual selected for this assignment must be able to assess the current agri-industry climate in the country and in the Azua Valley, determine the attractiveness of Azua Valley to private agricultural enterprise, identify constraints to private agri-industry investment and suggest remedies, and demonstrate the effect that a renovated port with adequate road access could have on private investment in Azua Valley.

Since most of the potential for production increases in Azua Valley (by asentados as well as the private producers) is related to private industry, the third member of the proposed team should be well acquainted with businesses that deal in cash crops.

The market opportunities for fresh fruit and vegetable export ought to be thoroughly explored to determine if such crops would be attractive to potential exporting companies and if they could be produced in sufficient quantities in Azua Valley. Also, what would be the most successful operation for export companies to follow. This individual would work closely with the business analyst. However, this team member would focus heavily on marketing channels (the pros and cons of sea versus overland transportation), marketing options (fresh perishables vs. staple crops), and models for private business interaction with individual private producers, many of whom may be small-holders. This individual should endeavor to discover the most appropriate means for establishing successful agri-business investment in the area. Findings should also identify the positive and negative impacts that increased activity by private enterprise may have on all categories of farmers in the Azua Valley.

ON-FARM WATER MANAGEMENT DEVELOPMENT PROJECT

This proposed project would grow out of the implemented OFWMP. Consequently, the scope for such a project probably cannot be delineated until 1987. Typically, such projects consist of organizing and mobilizing farmer resources to improve and maintain their portion of the irrigation and drainage network, water management and agricultural production extension activities, improved operation and maintenance of the total irrigation system, and improved organizational arrangements between water users and government agencies.

A project design team usually consists of one or two water management specialists, an irrigation engineer knowledgeable in operation and maintenance, an agronomist, an agricultural extension specialist, an agricultural economist, and a social scientist experienced with irrigation water users' organizations.

APPENDICES

GLOSSARY

- Asentado - a person who farms government-owned land and receives irrigation water from publicly-funded pumps and canals
- Tarea - a unit of measure; 15.9 tareas = 1 hectare
- BAGRICOLA - Banco Agrícola
- CIAZA - Centro de Investigación Agrícola para Zonas Áridas (Arid Zone Agricultural Research Center)
- GODR - Government of the Dominican Republic
- IAD - Instituto Agrario Dominicano (Dominican Agricultural Institute)
- INDHRI - Instituto Nacional de Recursos Hidráulicos (National Hydraulic Resources Institute)
- ODESIA - Oficina para el Desarrollo Integral Agropecuario del Valle de Azua
- OFWMDP - On-Farm Water Management Development Project
- OFWMP - On-Farm Water Management Project
- PROSEMA - Proyecto de Servicios y Maquinarias Agrícolas
- R.D. - República Dominicana
- SEA - Secretaría de Estado de Agricultura (Secretariat of Agriculture)
- SEOPC - Secretaría de Estado de Obras Públicas y Comunicación
- YSURA - Yaque del Sur - Azua

ADDITIONAL READINGS

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