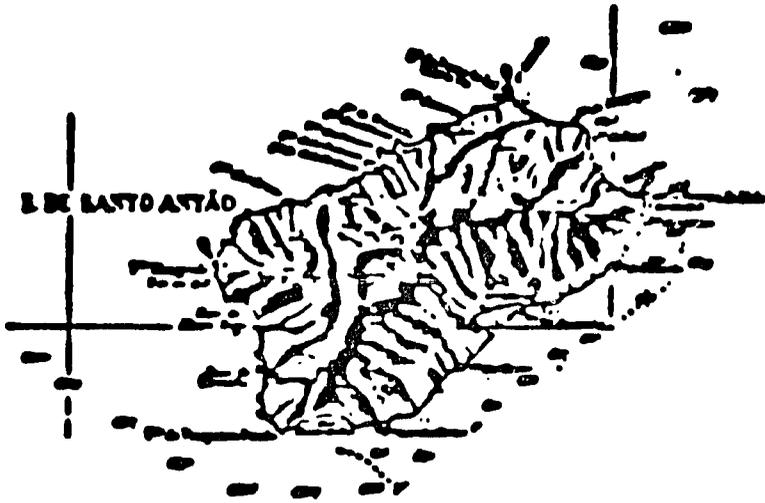
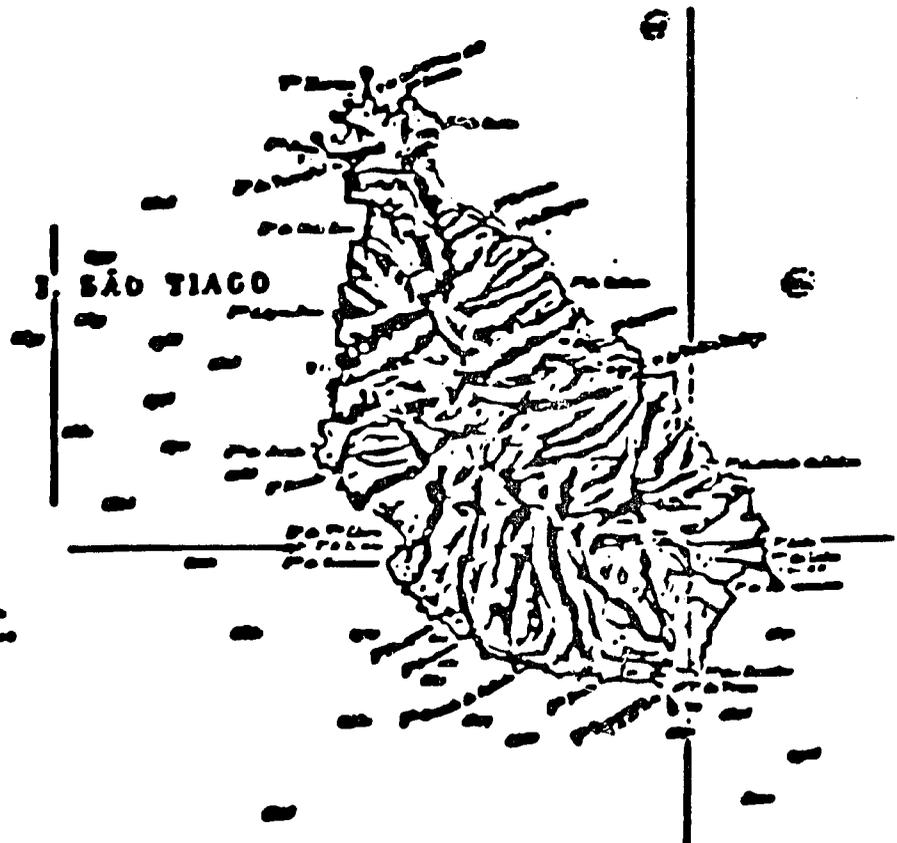


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REPUBLIC OF CAPE VERDE WATERSHED DEVELOPMENT PROJECT

1986 END OF YEAR REPORT
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SHELADIA ASSOCIATES, INC.

CAPE VERDE WATERSHED
DEVELOPMENT PROJECT
(655-0013)

1986 END-OF-YEAR REPORT

SUBMITTED TO THE GOVERNMENT OF CAPE VERDE
AND THE UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT

SHELADIA ASSOCIATES, INC.

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- REFERENCE 1: Orientation Workshop Report (November, 1985)
- REFERENCE 2: Implementation Workshop Report (March, 1986)
- REFERENCE 3: 1st Quarter 1986 Progress Report
- REFERENCE 4: 2nd Quarter 1986 Progress Report
- REFERENCE 5: 3rd Quarter 1986 Progress Report
- REFERENCE 6: 4th Quarter 1986 Progress Report
- REFERENCE 7: Short-Term Technical Assistance Plan

Note: Above references are available at the following offices:

- AID/Washington Cape Verde Desk Officer
- USAID/Praia
- Cape Verde Ministry of Rural Development
and Fisheries, Praia
- Sheladia Associates Incorporated, Riverdale, M.D.

CAPE VERDE WATERSHED DEVELOPMENT PROJECT
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I. BACKGROUND

The Cape Verde Watershed Development Project was authorized in June 1984 by the United States Agency for International Development (USAID) for the purpose of protecting and developing the soil and water resources in 17 designated watersheds (Tarrafal, Cuba, Prata, Principal, San Miguel, Flamengos, Saltos, Santa Cruz, Picos, Seca, Santo Domingos, Cumba, Mangue, Sao Tome-Portete, San Francisco, Sao Felipe, and Tarrafal de Monte Trigo in Santo Antao). The project is an extension of two previous projects (Watershed Management 655-0006 and Food for Development 655-PL01). In combining these two old projects into one, two sources of funding were made available; Development Assistance from Sahel Development Appropriation and monetized food aid from the PL-480 Title II Program (Project ending September 30, 1988). The development assistance funds are being used to finance technical assistance, training, and the purchase of commodities. Funds from the monetization of PL-480 Title II assistance (approximately 15,000 tons of corn/year) are being used to pay rural workers and extensionists, and for local expenses such as the purchase of cement.

The goal of the Cape Verde Watershed Development Project is to stabilize the natural environment and increase agricultural production potential in the project area through a matrix of planned activities which include: 1) The treatment of 7500 hectares with contour furrows; 2) The treatment of 1000 hectares with rock-stabilized structures; 3) The construction of 2600 check dams; 4) The construction of 10 subterranean catchment dams; 5) The installation of 4000 meters of embankment groins; 6) The incorporation of biologic control measures such as tree and congo bean planting; 7) The training of 6 technicians in U.S. degree programs; 8) The support of a rural extension program, 9) The support of community-based SWC maintenance committees; 10) The fostering of coordinated research and extension in soil and water research utilization; 11) The institutionalization of a hydrological monitoring system, 12) The construction of an office and warehouse; and 13) The refinement of watershed development plans. These planned outputs were established in the 1984 USAID Project Paper and serve now in 1987 as a general operations guideline.

The bread and butter of the Watershed Development Project are 4,000 workers constructing physical and biologic SWC control measures. Technical assistance, training, and commodities are added condiments, spread over the project area to improve overall project planning and management, and improve individual project design and execution. In 1986 197,738,000\$00 Cape Verdean escudos (\$2,535,102 US dollars) was budgeted for local salaries (82%) and purchase of cement and supplies (18%). Actual expenditures were close to budgeted according to a preliminary MDRP Department of Studies and Planning report. The 1987 budget is approximately 25% less than the 1986 budget reflecting closer alignment to expected receipts from monetized PL-480 Title II food aid and delayed start-up of work crews in 1987.

Sheladia Associates, Inc. was selected in October 1985 to provide long and short-term technical assistance to the project. The long-term team including a Soil and Water Conservation Engineer, a Forester, an Extensionist, and the Team Leader/Watershed Specialist arriving in Cape Verde in January 1986. Prior to arriving in Cape Verde the Sheladia team spent two months in language training and participated in a three day project orientation workshop (see Reference 1).

Four quarterly progress reports in 1986 served as the mechanism through which Sheladia Associates summarized, in detail, tasks and accomplishments of both short- and long-term project specialists (References 3-6). Individual tasks for long-term specialists and short-term technical assistance needs were defined in a project implementation workshop held in March 1986 (Reference 2). The workshop was also served as a forum for discussing technical watershed development issues with a round table of Ministry of Rural Development and Fisheries technicians.

II. SHORT-TERM TECHNICAL ASSISTANCE

Five short-term technical specialists, including two extensionists, an information systems specialist, an irrigation engineer, and an erosion specialist assisted the project in 1986 (Individual specialist reports included in references 4-6).

Briefly summarized; Herbert Bedolfe, extensionist, in Cape Verde for two months (June 6-August 1, 1986) analyzed the idea of community based maintenance of SWC structures and developed two strategies for accomplishing this. He participated as well in teaching farmers and extensionists basic SWC principles.

John Bellknap, information systems specialist, in Cape Verde for three weeks (June 7-27, 1986) analyzed computer needs for the MDRP's Department of Studies and Planning, the Department of Soil Conservation, Forestry, and Rural Engineering, and the Office of the Minister. Mr. Bellknap submitted a complete equipment list to USAID for three computer systems (2 IBM-PC compatibles; 1 Apple MacIntosh) which was later approved and forwarded to the project purchasing agent.

Marvin Redditt, irrigation engineer, in Cape Verde for two months (June 11-August 6, 1986), assessed irrigation needs and potential in the project area, identified some recurrent irrigation problems, and assisted in training farmers and extensionist in some fundamental irrigation principles.

Dr Darryl Norton, Erosion Specialist, in Cape Verde for four weeks (September 12-October 8, 1986), analyzed the appropriateness of several erosion models for Cape Verde, and set up a series of field erosion plots designed to help evaluate the effectiveness of different land management schemes. He coordinated his work closely with Forestry Service and FAO technicians who established 3 gaged experimental watersheds at Fontes.

Aspasia Thaisen, community development extensionist, worked for ten weeks during the 3rd quarter surveying women and children needs in the project area. She later prepared a series of public health handouts which were used during a three week training course she conducted for women extensionists, nutritionists, and community development organizers.

Short-term technical specialists will be playing a strong role in 1987 designing check and catchment dams, analyzing hydrologic data, determining irrigation water use, training computer operators, and studying erosion rates (Reference 7, Short-term Technical Assistance Plan).

III. SOIL AND WATER CONSERVATION ENGINEERING

The Sheladia long-term technical assistance team was involved in roughly 4 major disciplines in 1986: project planning, forestry, extension and community development, and engineering. Engineering fell short in 1986. The engineering advisor left Cape Verde on July 02, 1986 after only five months in country. His replacement under a subcontract with Oregon State University is due to arrive in March 1987. A senior short-term civil engineer arrived in Jan 1987 to design several priority projects awaiting engineering survey and design. As these priority projects, (a large gabion check dam, a subsurface dam, a series of small check dams along a highly degraded channel, a salt-water intrusion dam, and a gated dam near the mouth of Ribeira Seca) are designed, the traditional assumptions and equations used to determine the forces acting on SWC structures in Cape Verde will be analyzed to see if improvements can be made in foundation and structural design. A strong possibility exists that an engineering evaluation systems approach to these matters will evolve during 1987.

IV. WATERSHED MANAGEMENT

Project Planning

Project watershed planning came to fruition in the 4th quarter as individual watershed budgets and construction and planting plans were presented to MDRP and the National Assembly for approval for each watershed. A construction, employment, and financial plan was developed which determined projected monthly levels of employment and expenditures, while quantifying the planned number of SWC structures to be built. The plans formulated were later refined in a series of meetings with project zone technicians responsible for 2-3 watersheds. Employment needs and monthly budgets for a given matrix of SWC activities were quantified using a Lotus 1-2-3 program in an attempt to efficiently allocate resources throughout the calendar year. These general plans are being refined and planned activities are being mapped, together serving as the basis for a phased master watershed development plan for the entire project area.

In order to keep closer control over project commodities, a computerized system was developed to catalog equipment, supplies, and parts as they arrive and clear customs. An attempt is being made as well to track location and end use of project commodities in order to improve resource utilization. The construction of some of the larger SWC structures has continued to be delayed due to the shortage of heavy transport. The shortage of pick-ups for zone coordinators has been a constant problem, hopefully solved in the 2nd quarter 1987.

Despite these equipment and logistical problems, the main business of the Watershed Development Project continues on a good steady course. Heavy trucks are borrowed or rented, technicians double up, and foremen do a lot of walking. The senior foremen now have motorcycles which will help improve coordination between the SWC offices in San Felipe and the field.

Data Collection and Analysis

The strengthening of Data Collection and Analysis (DC&A) activities under the project is being approached in two ways. To begin with project foremen and zone coordinators are required to fill out detailed time sheets and production reports, which when consolidated and analyzed, reveal much useful information in analyzing production cost for a given activity. Two technicians from the Department of Soil Conservation, Forestry, and Rural Engineering have been working with the Sheladia technical team learning the basics of the Apple MacIntosh word processing and spread sheet programs. Apple Multiplan was used to consolidate accounting reports of all structures built in the project watersheds since USAID began funding this type of work in 1976. The project will continue to update this master file of completed projects as production reports come in, continuing to take it a step further. Production reporting for individual projects will be computerized and analyzed starting in the 1st quarter 1987. This will give engineers and planners a clearer idea of the costs involved in constructing rock wall terraces, gabion/rock/or masonry check dams, reservoirs, and subsurface catchment dams.

The project is also involved in expanding water resource monitoring by working closely with the agricultural research institute (INIA) in basic surface water hydrology and with FAO in studying fluvial processes at the 3 experimental watersheds at Fontes. Recording raingages, water level recorders, and velocity meters have been ordered to enlarge the hydrologic monitoring network managed by the hydrology department at INIA. Short-term hydrologists and erosion specialists have either started their work or will be returning to Cape Verde to assist in data collection after instruments are installed. Hydrologic investigations of the experimental watersheds at Fontes were strengthened by incorporating field size erosion plots to measure erosion rates as a function of land management. Just as important as collecting new data is the analysis and dissemination of old data. Data and reports tend to be scattered about and WDP specialist coming to Cape Verde are required to search for and consolidate existing data

into their work and present their findings in such a way as to assist engineers and planners in solving practical problems such as the design of a spillway, or a retaining wall. Priority DC&A areas are surface water hydrology, erosion, and irrigation water use. Oregon State University will play a key role in 1987 in analyzing and consolidating hydrometeorological data as part of a remote sensing effort to analyze basin characteristics and fluid processes through indirect methods.

Remote Sensing

The project initially plans to analyze satellite imagery of the project area in June and November, 1987 and if possible purchase and analyze previous Landsat images to discern changes in land use patterns over the past 10-15 years. This is contingent on whether the project area is clear enough to effectively use the imagery for project planning and evaluation. An alternative to conducting a satellite survey of the project area is to do a low level aerial survey to replace the flawed and difficult to obtain aerial photographs taken by a French financed mission in 1979. Oregon State University is well equipped to complete this type of assignment and interpret the aerial photographs to produce an assortment of vegetation, slope, and land use thematic maps using computer assisted technology. A workshop at Oregon State University in March 1987 is being organized to determine remote sensing needs under the project and plan an aerial photo mission over Santiago in June 1987. Results of this activity should include an increased capability by the MDRP in collecting, interpreting and utilizing remote sensing information.

V. FORESTRY

Vegetative Soil and Water Conservation Measures

The selection of species planted in the Project area was based on FAO species trials and the experience of MDRP Forestry Division.

In agricultural areas, the land owner usually decides which species are to be planted on his land. The preferred species is Prosopis juliflora, even though it competes vigorously with crops. The main reasons for selecting this species are that it is easy to establish and produces excellent fuelwood.

Atriplex spp. and Casuarina spp. were planted along the coast in areas subject to strong sea breezes. As sites improved inland, a wider variety of species were planted. These included Acacia bivensoa, A. cyanophylla, A. cyclops, A. holosericea, Atriplex spp., Casuarina spp., Grivellea robusta, Melia azadirachta, Parkinsonia aculeata, Prosopis juliflora, Tamarindus indica, Zizyphus mauritiana, Ceratonia siliqua and Cajanus cajan.

There were approximately 588,000 trees and forage plants planted in the Project area.

Planting densities varied with the species and area. In arid zones along the coast and other areas which were devoted solely to forestry, trees were planted at 5 meter spacing for a density of 400 plants per hectare. In more humid upland areas, trees were planted at 3 meter spacing. Atriplex was planted at a density of approximately 800 per hectare.

In agricultural areas, spacing depended upon the preference of the land owner. In many areas, trees were planted along rock retaining walls at 10 to 15 meter intervals.

Three basic types of planting site preparations were used;

1. Crescent shaped catchment basins
2. Contour furrows
3. Planting in simple pits

In arid zones, catchment basins and contour furrows are necessary to collect enough water for the trees to survive. Considerable time was spent inspecting site preparation work to be sure that these mini-catchments were well constructed, large enough and properly aligned on the terrain to collect as much runoff as possible.

In the more humid areas, trees were planted in simple pits in small areas unsuitable for agriculture. In agricultural areas, trees were planted in simple pits along the bases of existing rock contour walls which had been constructed across some of the slopes.

FAO Forestry Project leaflets illustrating simple planting techniques were distributed throughout the Project area. The quality of planting was very good in most watersheds. The main problems encountered were rough handling of plants during transport, planting more than one tree per pit and planting seedlings without removing the plastic nursery bags.

Planting begins immediately after the first rain which provides sufficient moisture to the soil. It is important to transfer the trees to temporary nurseries located close to the planting sites and be prepared to start immediately after the first rains. In years of low rainfall, it is necessary to plant as fast as possible because the soil will dry out rapidly. In years with abundant rain, many roads become impassable making it very difficult to transport plants.

There were small nurseries in project watersheds which produced trees. In perspective this is close to the number of trees planted by the Forestry Service in Santiago in 1986. Planting stock was also obtained from MDRP. Due to the lack of trained personnel and the travel time involved, it was difficult to control the quality of operations at the many small nurseries scattered throughout the watersheds. Even with these problems it is better to have the nurseries located close to the planting sites. This eliminates many logistic problems when roads are washed out and trucks are in short supply.

To help solve some of the problems, a training course for nursery workers has been organized for the second week of January. Approximately 15 people will be trained by MDRP Forestry Division nursery staff. They will receive instructions in practical nursery operations, simple reporting and inventory procedures. The objective is to provide at least one trained nursery supervisor for each project watershed.

Applied Experimentation

Based on the results of FAO species trials, Atriplex spp. was planted in coastal areas, rather than Prosopis juliflora which has not been doing well on the more difficult sites subject to strong sea winds. Approximately 30,000 Atriplex plants were planted in these areas and are doing well. It is planned to increase these plantings in 1987 and obtain seed of other Atriplex species for trial.

Some 3,000 Parkinsonia aculeata seedlings were planted at 0.5 meter spacing along the downhill side of rock wall terraces in Mangué. The objective is to grow a dense hedge which can be trimmed to provide fodder and which will protect the terraces.

In some areas, Cajanus cajan was seeded between trees to provide additional ground cover as the trees develop. Basically, two methods were tried. One was direct seeding mixed with trees in small areas not normally used for agriculture. The sites are not very good and the Cajanus is developing slowly, but it is surviving and should improve with the next rains.

Seeding was also carried out in contour furrows dug across areas normally planted with corn. The land owners allowed tree planting in the furrows at 10 meter spacing. The interval between trees was seeded with Cajanus.

In cases where, land owners prefer widely spaced trees (10 , 15 or 20 meters apart), the seeding of Cajanus provides additional ground cover, forage and beans. Where land owners do not want trees, seeding of Cajanus provides an alternative to tree planting.

Mapping in Project Watersheds

Most of the areas planted last year have been sketched on field maps. The mapping of areas planted in previous years was delayed by an accident which caused a shortage of transport and by the lack of a technician to do the field work.

A new technician has been assigned to the Project and provided with a small motorcycle. He will visit the various watersheds to map areas planted in previous years. The information will be transferred to the office base maps which will provide a permanent record of the plantings. The year, type of planting and major species will be recorded. The same color code system being used by MDRP Forestry Division will be adopted.

In-Country Training Sessions

During the year, a one day training session for Project extension trainees was organized in co-operation with the MDRP Forestry Division extension staff. They demonstrated planting site preparation techniques and gave a presentation on nursery practices. Shortly before the planting season, the Forestry extensionists gave a demonstration of tree planting techniques.

On the job training for foremen at project work sites was provided as required. The foremen were supplied with the Forestry Division's site preparation manual and the quality of site preparation work was inspected frequently during the year.

Project Planning and Implementation

The progress of planting site preparation was monitored to determine if sufficient labor was being used to complete the scheduled work before the first rains. At first, it was difficult to obtain accurate information concerning the status of site preparation work because the records kept by foremen in the field were incomplete and usually sent in late. During the year, the situation improved and reasonable estimates of the amount of completed work were obtained. In some watersheds, the information was obtained too late to change the work program because most of the labor force had been committed to other types of projects.

Nurseries were inspected at various times during the year to obtain an accurate inventory of the planting stock available. During these visits suggestions for improvements were made. A training course for nursery supervisors is planned for early 1987. With additional trained personnel, the quality of nursery operations should be much improved.

During December, the 1987 forestry plan was completed. A method for estimating manpower requirements for forestry projects was developed using the Microsoft Multiplan program for Apple Macintosh.

Based on the number of trees to be planted in a watershed and production estimates from past experience, the program produces estimates of the number of workers required for planting site preparation, nursery work, planting, and plantation maintenance and protection. These estimates include starting and completion dates for the various activities.

Progress will be monitored throughout the year to determine if the project is being kept on schedule.

VI. EXTENSION AND COMMUNITY DEVELOPMENT

Rural Assistance Program (RAP) Philosophy

The Rural Assistance Program (RAP) under the Watershed Development Project is a continuation of the extension component created under the original Watershed Management Project (655-0006). The basic philosophy of the RAP can be summarized by five tenets:

- A. Establishment of male and female extension teams in each Watershed area.
- B. Each RAP Extensionist must be a resident of the zone in which he/she works.
- C. There exist a rigorous selection of RAP personnel.
- D. Provision of continuous in-service training to RAP Extension Personnel.
- E. Direct Supervision on a minimal bi-weekly basis.

Recruitment and Training

At the beginning of 1986 four male Extension Agents were employed by the RAP. More than eighty male and female candidates were interviewed to participate in an "Introductory course to Agriculture and Soil/Water Conservation (SWC)" in June, 1986. Twenty-six people were selected to participate in the course and of this total eight were eventually deselected from the program. In July, 1986 thirteen RAP Extensionists participated in a three-day introductory course on "Small-Farm Irrigation". A course for female Extension Agents was held in September-October in the areas of Health, Nutrition, and Hygiene. For this course more than thirty female candidates were interviewed to fill five RAP Vacancies. Twenty-two women participated in this course (five women already employed by RAP, ten possible Extension Agent candidates, and seven women invited to participate from other Cape Verdean Institutions). Currently, twelve women and thirteen men are active RAP Extension Agents.

A total of ten one-day in-service training sessions were conducted for RAP Extensionists from August to December, 1986. A detailed list of the topics covered in these sessions can be found in the 1986 Quarterly Progress Reports.

Extension Methods

The principal Extension methods and tools utilized by RAP personnel in Cape Verde are:

- Individual farmer and/or home visits
- Meetings (to obtain information, to provide information, to involve community members in the decision making process, to motivate and mobilize community members)
- Method Demonstrations (example: how to plant a citrus tree)
- Result Demonstrations (example: on-farm trials to show farmers improved cultural practices in vegetables production)
- Group Visits (i.e. farmer group visits to the National Agricultural Research Station (INIA-Sao Jorge)
- Campaigns (i.e. horticultural crops production campaign, pigeon pea planting campaign)

RAP Program Accomplishments in the areas of:

A. SWC Construction and Maintenance

RAP Extensionists are trained to provide direct in-the-field technical assistance to MDRP workers and crew foremen in the following areas: Layout and construction of micro-basins (calderas), contour rock wall terraces (arretos), contour ditches (banquetas), and small check dams (socialcos). RAP Extensionists provided technical training to MDRP workers and foremen in SWC techniques in all WDP Watersheds (except Ribeira Principal) in 1986.

B. Community Work Fronts

RAP Extensionists surveyed more than 500 individual families in nine WDP areas in 1986. It is estimated that approximately 15 to 20 Community Work Front crews (15 to 30 people in each crew) will be initiated in these areas in 1987. RAP Extensionists will provide direct technical assistance and training to these newly formed groups.

C. Horticultural Crops Production

RAP personnel trained farmers in seedbed preparation and planting, transplanting techniques, efficient water usage, and improved cultural practices for the following vegetable crops; tomatoes, onions, peppers, cabbage, potatoes, carrots, turnips, cucumbers. More than sixty individual result demonstrations in horticultural crop production techniques were established in twelve WDP Watersheds.

D. Health, Nutrition, Hygiene

Female RAP Extensionists conducted activities on diarrhea treatment and oral rehydration techniques, collaboration with PMI-PF (Maternal-Child Care and Family Planning Program); child vaccination programs and medical control records for pregnant women; and patient referral to local Health Posts for cases of infectious disease. A formalized work calendar for Health, Nutrition, and Hygiene has been elaborated for 1987.

E. Reforestation

In three Watersheds, RAP Extensionists supervised local forestry nurseries in 1986. All Extensionists participated in the following reforestation campaign activities in 1986: Forestry tree species distribution; Technical assistance on tree planting techniques; and Quality control supervision of work crews. RAP personnel also conducted a total of 54 Method Demonstrations on "How to plant a forestry tree", to a total of 952 participants.

F. Fruit Tree Production

RAP personnel participated in the distribution and planting of 546 citrus trees in ten Watersheds (grafted trees were provided by WDP nurseries run by Extensionists in Flamngos, Saltos, and Sao Miguel Watersheds). Farmers requested an additional quantity of 574 citrus trees in 1986. RAP Extensionists conducted 253 Method Demonstrations on citrus production techniques for 688 participants in 1986.

G. Forage Pastures Production and Storage

Extensionists in Sao Francisco Watershed collaborated with FAO and MDRP Division of Animal Husbandry in the harvest and storage of seed of three pasture varieties. Other Extensionists conducted motivational meetings to encourage farmers to correctly harvest and store available straw and pastures.

H. Self Help Community Projects

Cement and stone were provided to the community of Saltos Watershed for the construction of 300 meters of lined irrigation canal. The community (14 beneficiaries) provided 100% of the labor and enough sand and stone to complete the work. Ten additional self help projects have been identified for implementation in 1987, if funding is available. In all cases the community requests material support (mainly cement) and is mobilized by the RAP Extensionist to contribute 100% of the labor.

I. Fuel Conserving Cookstoves

One "LORENA" (sand-clay) improved cookstove was built in Saltos Watershed with disappointing results. Clay was scarce, trials to determine the best sand/clay ratio were arduous, and the prototype stove developed a large fissure after two days of use. A second reinforced cement stove was built following the basic design for the BANFORA stove (developed in Mali and promoted in the Prodesa Project in Santa Catarina District). To increase stove efficiency, this second prototype was provided with entrance and chimney dampers and with a baffle to direct heat to the bottom of the second pot. The BANFORA stove is expensive to build, but preliminary trials indicate it is about twice as efficient as the traditional three rock hearth. The technical skills required to build it are rapidly learned by Cape Verdean stonemasons.

J. Preliminary Research Trials in Dryland Agriculture Included:

1. Increase maize yields on slopes protected by contour rock wall terraces (CRWT).

CRWT spaced at 4.5 to 5 meter intervals on land with average slope of 48% in Boca Larga, Lower Picos Watershed, produced 1,728 Kg./ha. of grain (182 litros of grain per litro of land) as compared with test plots with no SWC protection (average land slope of 35%) which produced 740Kg./ha. (79 litros per litro of land). It is hoped that these preliminary research trials can be replicated in other Watersheds in 1987.

2. Congo bean (pigeon pea) planting for soil stabilization and grain yield.

Four thousand bagged congo bean plants were seeded and transplanted by RAP Extensionists and local farmers. Data collected in late October and early November indicated the following:

<u>Type of Planting</u>	<u>ave # nodes per plant</u>	<u>ave. hgt. (M)</u>	<u># Trials</u>
Bagged Seedlings	36	1.54	6
Direct Seeded Plants	20	0.92	3

Grain yield data will be collected in early 1987. Bagged seedlings are considerably more expensive to produce than direct seeded plants, but they could provide benefit as a strip crop on excessively steep slopes where rock walled terraces are widely spaced.

K. Community Participation

From July through November, 1986, RAP Extensionists conducted 102 meetings with the average 28 farmers participating to inform, motivate, and mobilize the rural populace directly affected by the WDP. Results of these activities are summarized below:

<u>MONTH</u>	<u>TOTAL # MEETINGS</u>	<u>TOTAL # PARTICIPANTS</u>	<u>MAIN TOPICS</u>
July	16	455	SWC pesticides use irrigation efficiency
August	16	548	citrus planting potato planting locust control
September	11	366	reforestation horticultural campaign maintenance of SWC structures
October	25	645	horticultural campaign human nutrition stream flow diversion for irrigation
November	34	839	same as October plus: pasture harvest and storage personal hygiene

Collaboration with Food Crops Research Project-INIA

Bi-monthly meetings and/or field visits were held with INIA Technicians to study the possibility of conducting on-farm research and/or variety trials. INIA has offered to help monitor irrigation water salinity problems and to study percolation losses along unlined irrigation canals.

Integration of the RAP into The National Extension Service (DGER)

RAP Extensionists coordinated activities with DGER Extensionists in Sta. Catarina, Sta. Cruz and Tarrafal District during 1986. Preliminary meetings with the DGER Director have been held to study partial or complete integration of RAP personnel into the DGER once the WDP terminates. This issue should be resolved during the 2nd Rural Extension Seminar to be held in February, 1987.

LIST OF ACRONYMS

CRWT	Contour Rock-Wall Terrace
DC&A	Data Collection and Analysis
DGER	National Extension Service
E/CD	Extension/Community Development
FAO	Food and Agriculture Organization
INIA	National Institute for Agrarian Studies
MDRP	Ministry Of Rural Development and Fisheries
PMI-PF	Maternal-Child Care and Family Planning Program
RAP	Rural Assistance Program
SWC	Soil and Water Conservation
USAID	United States Agency for International Development
WDP	Watershed Development Project