

EVALUATION
GAMBIA SOIL AND WATER MANAGEMENT PROJECT(635-0202)
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ACRONYMS

AA	Agriculture Assistant Extension Service
BS	Bachelor Of Science Degree
DOA	Department Of Agriculture
DRCDC	District Resource Conservation And Development Committee
FAO	Food And Agricultural Organization Of The United Nations
GARD	Gambia Agricultural Research And Diversification Project
GOTG	Government Of The Gambia
MFC	Mixed Farming Center
MOA	Ministry Of Agriculture
MS	Master Of Science Degree
OMVG	Gambia River Basin Development Organization
OJT	On-the-Job Training
PACD	Project Assistance Completion Date
PP	Project Paper
PPMU	Program Planning And Monitoring Unit Of MOA
PVO	Private Voluntary Organization
REDSO/WCA	Regional AID Office/West And Central Africa
SCS	Soil Conservation Service
SWM	Soil And Water Management
SWMU	Soil And Water Management Unit
TA	Technical Assistance
USDA	US Department Of Agriculture
VRCDC	Village Resource Conservation And Development Committee
WRCDC	Watershed Resource Conservation And Development Committee

Evaluation
Gambia Soil And Water Management Project
(635-0202)

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Gambia Soil And Water Management
Project (635-0202) Evaluation
October, 1985

1.0 Executive Summary

1.1 Background

The Soil and Water Management Unit (SWMU) was formed in 1978. A USAID grant of \$2,747,000 provided commodities, training and technical assistance through a Soil Conservation Service (SCS) PASA to The Gambian Ministry of Agriculture (MOA). The project was an institution building activity which through the development of the SWMU would (as stated in the Project Paper) 1) halt and reverse environmental deterioration due to inadequate cultivation methods, 2) increase/stabilize agricultural production and 3) improve the institutional capability of GOAG to deliver educational, technical, and material services in soil and water conservation to rural populations.

The project was conceived in three phases (10 years). In Phase I AID was to provide SCS technical assistance, commodities and training to establish the SWMU as a functioning, effective and integrated part of the MOA. Phase II was envisaged as a transfer of leadership from expatriate to Gambian technicians. Phase III - the necessity of which was to be determined by this evaluation - was to have been a honing and perfecting of the SWMU as a nationally established unit.

1.2 Progress Achieved

Several errors in project design prevented the fluid implementation of Phases I and II. Principally, the time required to identify candidates for long-term training and an over estimation of the level of education of employees available as counterparts to the SCS specialists resulted in the inefficient use of these three specialists who were provided at project on-set. While a concerted effort was being made by these specialists to identify Gambian participants - this being done through joint work on field surveys - the project was not perceived in its early years as being very productive. Between 1979 and 1982, the SWMU was formed, participants were identified and sent for long term training (1 MS, 8 BS, 10 2-year technical), and technical manuals were produced as specified in the project paper.

A 1982 evaluation made specific recommendations which resulted in the scaling down of SCS technical assistance (TA) from three to one individual and increased training for Gambian staff. In 1983 an SCS engineer with an extremely practical orientation joined the project. The SWMU began field work with villagers in soil and water conservation methods in 1984. To date about 500 hectares of land have been improved by project activities. These field activities include salt intrusion barriers, water retention structures, contour berms on upland soils, and water diversions. These activities are all planned and implemented in collaboration with farmer groups and extension service agents. The work performed has been impressive, technically correct, and has engaged farmers and extension workers to a high degree.

The SWMU has also undertaken soil surveys on 11,500 hectares for FAO, Mixed Farming Centers, (MFC) OMVG and the Forestry Department. They have conducted extension agent training in conservation methods and will begin working with Gambia College to include soil and water management in their curriculum.

1.3 Major Conclusions And Recommendations

After a slow start the SWMU is now well on its way to becoming a productive and important service agency to the farmers of the Gambia. By the PACD this project will be more or less on schedule for achieving proposed project outputs with the notable exception that returning participants will not have benefitted from on-the-job training (OJT) envisaged in the project paper. (See 3.32 Training.) The evaluation team cannot over-emphasize the importance of this OJT in forming an effective SWMU.

Recommendation

USAID should consider a no-cost extension of the project from PACD 12/87 to 9/88. Concurrently, USAID should extend the services of the PASA SCS engineer from 11/86 to 6/88 if possible. This would enable all of the long-term participants to return to the Gambia and receive on-the-job training for at least one full work season. If the PASA SCS contract is not extended neither of the two returning SWMU engineers will benefit from on-the-job training.

Another current shortcoming of the project is the lack of budgetary support by the GOTG. Budget allocations have remained static since 1982 despite yearly petitions for changes in budget line items. Chronic shortages of money for fuel and per diems have hampered field work and this will become a greater problem as participants return from training and field work increases. This lack of GOTG budgetary support does not seem to reflect a lack of interest on the part of the GOTG toward the SWMU but rather it is symptomatic of a greater and pervasive problem in the government of not being able to meet recurrent costs.

Recommendation

USAID should for the duration of the project assist the GOTG in meeting recurrent costs of the SWMU. USAID should intervene on behalf of the SWMU in a discussion with the appropriate GOTG officials to assure as much budgetary support as possible in the future.

The Soil and Water Management Unit has the potential of making real improvements in Gambian agricultural production. Due to the slow take-off of this project and the length of time needed to train SWMU staff, continued USAID support is needed to meld these individuals into a

functioning and efficient service. The original PP was correct to assume that the institutional capability of the SWMU would need to be developed over 10 plus years.

Recommendation

USAID should continue to support the SWMU in what was conceived in the original PP as Phase III. Phase III is necessary to hone the skills of the SWMU professionals returning from training and to fully develop the SWMU as a service agency. This would ideally include the provision of short-term TA, some commodities, training and perhaps some budgetary support.

1.4 Lessons Learned

The ideal role of long-term TA is in counterpart training. The project did not synchronize the identification, training and return of GOTG staff with the long-term SCS TA provided. This resulted in a less than optimal level of productivity in the first years of the project and a clear necessity to prolong project activities until much needed on-the-job training could be accomplished.

The project has increased food production significantly through interventions which require minimal amounts of capital and technical investments. The project interventions also conform to the existing farming systems and the socio-economic milieu and they are relatively inexpensive to maintain. Pump irrigation, on the other hand, requires high fixed and recurrent costs, sustained levels of technical input and large changes in the existing socio-economic situation. As irrigation is being considered more and more in the Gambia, this project becomes important as an alternative.

2.0 Project Statistics

Project Title:	Gambia Soil and Water Management
Project Number:	635-0202
Agency:	Ministry of Agriculture
Account:	Sahel Development Funds
Authorized LOP:	\$2,747,000
Initial Obligation:	March, 1978
PACD:	December, 1987

3.0 EVALUATION TEXT

3.1 Background

3.11 Evaluation Rationale

This evaluation was called for in both the 1977 Project Paper (PP) and the 1982 evaluation. Beyond monitoring the achievement of project objectives to date, this evaluation is supposed to recommend subsequent USAID involvement for the third phase, 1987-92. Currently the PACD is December 1987. The evaluation has been conducted by REDSO/WCA's water

resources engineer, Dan Jenkins, and regional agronomist, Diana McLean with important inputs from the Soil and Water Management Unit (SWMU), the Ministry of Agriculture, and participating farmers and agricultural extension agents.

3.12 Project Description

The Soil and Water Management Project (635-0202) began on March 28, 1978. The project grant provided \$2,747,000 to (as stated in the PP) 1) halt and reverse environmental deterioration due to the inadequacy of traditional cultivation practices; 2) increase/stabilize production of food, forage, wood and cash crops and reduce susceptibility to drought and other weather variations; and 3) develop the institutional capacity of GOTG to deliver educational, technical and material services in soil and water management to the rural population.

Specifically, the project purposes aimed to:

- 1) Establish a soil and water management unit within the Ministry of Agriculture, patterned after the USDA Soil Conservation Service (SCS);
- 2) Develop technology for improved agricultural/pastoral methods consistent with Gambian abilities and resources; and
- 3) Train Gambian soil and water management specialists and agricultural assistants to apply solutions to soil and water problems at national and village levels.

The project was conceived in three phases. Phase I (three years) provided for three SCS specialists, commodities and training and was to have established the SWMU as a functioning, effective and integrated part of the MOA. Long term participants were to have been identified, trained (1 year to a BS level), and returned for on-the-job training. Technical manuals in soil and water management were to have been developed, soil, water and vegetation surveys completed, and field activities begun in villages. Assistance was to have been given to Gambia College in agricultural assistant training.

By Phase II (two years) all Gambian staff were to have been integrated into the SWMU and 5 divisional field offices were to have been established. This phase was to have marked a shift from expatriate to Gambian supervision of SWMU activities. The necessity of a third phase (five years) was to be determined in Phase II. In the third phase short-term technical and other support would meld the Gambian staff into a cohesive, effective service agency.

3.13 Project Progress

The project was unable to fluidly accomplish Phases I and II as described in the PP for a number of reasons. First of all there were the nearly inevitable delays in recruiting the three full-time SCS specialists foreseen in the project. Beyond late recruitment of TA, there were conceptual problems which delayed implementation. Apparently since the initial design began in 1976, there was not a clear understanding among all MOA officials as to the institutional placement of the SWMU. This situation may have been exacerbated by the fact that the upper echelons

of the MOA involved in initial design discussions were not retained in the same positions during implementation. It appears that the initial SCS chief of party supported the formation of an autonomous, country-wide department within the MOA which would function administratively at a much higher level than the service unit which was envisaged by some MOA officials. Indeed, these questions of institutional placement within the MOA comprise part of a larger issue of government-wide reorganization. How these questions are ultimately resolved is somewhat out of the scope of this project. Currently, the SWMU is one of the units within the Department of Agriculture (DOA).

Recommendation

All parties should arrive at a clear understanding of the role and specific duties of the SWMU within the GOTG.

Another problem encountered in implementing Phase I was the dearth of Gambian counterparts available and qualified for long-term training. It proved impossible to train 8 Gambians to a BS level in the one year of training provided. Candidates for training also had to be screened carefully to match aptitude and interests with training positions. To accomplish this Gambian staff rotated work assignments with the SCS conservation engineer, plant ecologist and soil scientist. They were assigned to training slots after being evaluated. These delays in selecting trainees were unavoidable for proper project implementation. They should preferably have been foreseen in project design.

In 1982 a project evaluation determined that:

1. The design concept was basically sound and the need for the SWMU evident; implementation was, however, behind schedule.
2. The SWMU had been established and was formally incorporated into the GOTG in 1982.
3. The SWMU was well-staffed; candidates for training had been identified.
4. Vehicles, equipment, supplies, and offices had been acquired.
5. Soil surveys, a technical guide, a soils handbook, and a collection of plants had been completed.
6. The large proportion of SCS TA during the first phase of the project was not advisable, as Gambian counterparts were not available.
7. More training was warranted.

These final points were perhaps the most critical project design errors. The most valuable use of TA is in counterpart training. It would have been far more beneficial to have synchronized the arrival of the SCS long-term TA with the return of participants from training. The actual productive work which was performed in the 7 person-years of long-term TA does not seem to justify the expense involved as compared to the use of these specialists in true counterpart training. A more detailed description of their work follows in this report.

As a result of the 1982 evaluation, long-term TA was reduced in the project and Gambians were sent to long-term training for sufficient time to acquire their degrees. In 1983 the replacement SCS chief of party

arrived in the Gambia. In part because of his very practical field orientation and in part because of previous experience gained by SWMU staff, field activities with farmers in soil and water management began in earnest. Conservation measures - salinity barriers, water retention structures, contour berms, and water diversions - have shown immediate and broad success. These activities are described in detail in this report.

In addition to SWM works, the SWMU has conducted detailed soil surveys on over 11,500 hectares in the Gambia. This work was requested by FAO, Mixed Farming Centers, OMVG and the Forestry Department. Their services in soil surveys are envisaged for other organizations and projects.

With the advent of the GARD project, these relationships should be expanded and tightened. For example, the SWMU range conservationist and the forester should be well-informed of GARD activities. The GARD project should receive field information from SWMU on needed areas of research, responses to interventions, etc. It is hoped that SWMU will also continue to develop relationships with the Ministry of Water Resources and the Environment.

Training has also gotten well underway (see 3.32 Training). Eight trainees have been sent to the U.S. for BS degrees in agronomy, soils, forestry, range management, and engineering. One MS degree was awarded in resource management; this individual has since retired from MOA. Ten general agriculturalists were trained in a 2-year program in Nigeria for use as AA's in the project. Unfortunately, four of these individuals have been assigned to other MOA divisions where they are of no benefit to the project under which they were trained.

The SWMU is also becoming increasingly involved in extension agent training. They have conducted a 3-day training module for 33 agricultural assistants and are beginning to work with Gambia College to develop soil and water management courses in their curriculum.

This leads into the symbiotic relationship which is developing between the SWMU and the extension service. The SWMU left to its own devices cannot tackle the amount of conservation activities which are continually and increasingly being requested. The SWMU has begun to train agricultural assistants in many of the simpler techniques of SWM. In the future they will call upon the SWMU only for assistance on the more technical problems. Coordinating activities and training others are the only practical mechanisms for accomplishing the vast amount of work needed in the Gambia. The SWMU could increase its effectiveness also by coordinating more with PVO's, other MOA agencies, and private sources in training and technical assistance at the village level.

Recommendation

The SWMU should coordinate its activities with PVO's, GOTG agencies, and other groups doing improvements on agricultural land.

As the SWMU has become more and more visibly productive, MOA appreciation for its potential has increased. To date, however, neither the Minister

nor the Permanent Secretary of the MOA has visited project activities. These visits should be encouraged.

Recommendation

USAID should encourage the Minister of Agriculture, the Permanent Secretary and other GOTG officials to visit the project.

One of the major constraints currently facing the project is the lack of GOTG budgetary support. This lack of support has not been perceived as coming from a lack of GOTG interest in SWMU activities. Rather it is evidence of a larger and more pervasive problem in the Gambian government of meeting recurrent costs. Since 1982 when the SWMU was first included in the national budget, the amount allocated remained static despite yearly requests for line item changes and modest increases. The motor pool, the number of professionals returning from training, and field activities have all increased since that time thus requiring adjustments in the annual budget allocation. Field activities have already suffered from this lack of operating funds as fuel and per diems have been most affected. Until such time as the GOTG can assume these relatively modest but crucial expenses, USAID should devise a means for doing so.

Recommendation

USAID should for the duration of the project assist the GOTG in meeting recurrent costs of the SWMU. USAID should intervene on behalf of the SWMU in a discussion with the appropriate GOTG officials to assure as much budgetary support as possible in the future.

The project has a responsibility to inform GOTG officials as to the benefits which can be gained through investments in the SWMU. This becomes particularly interesting when one considers the impetus in the GOTG to support irrigation projects in The Gambia. An economic analysis showing the high returning of the water retention structures is found in Annex 4.1. It is not within the scope of the SWMU to perform economic analyses for all of the conservation activities. SWMU staff can, however, assist the PPMU - perhaps under the auspices of the GARD project - to prepare more of these analyses. It seems self-evident that the reclaimed land developed using these simple, relatively inexpensive means would return more per capital investment than the highly controversial, technology dependent irrigation schemes currently under study in the Gambia.

Recommendation

PPMU - perhaps under the auspices of the GARD project - should conduct economic analyses of conservation works installed by the SWMU. The SWMU should assist in this process by keeping records of expenditures, land brought into production, etc.

3.14 Future AID Interventions

The Project Report envisaged the project, being carried out in three phases over a period of about ten years. The evaluation team believes more time is needed. Principal needs after completion of Phase II will be periodic short term technical assistance from SCS in the areas of soil science, engineering, and conservation planning. The SWMU needs the support and guidance of two person-months per year (5 years) in engineering and soil science and two person-months per year (2 years) in conservation planning for a total of 24 person months.

If the past is used as a guide to the future it is also likely that the project will need outside help for recurrent costs. Based on past operating expenses and projected future operation it is estimated that operating expenses between 1987 and 1992 will be about \$60,000 per year.

A third component needed in Phase III is short term training of SWMU personnel in the form of very specific short courses, workshops, etc in the specialties being applied in the project. SCS would be instrumental in helping SWMU identify and screen these courses in the U.S. while SWMU and AID/Banjul could identify courses in West Africa and possibly Europe.

Recommendation

USAID should continue to support the SWMU in what was conceived in the original PP as Phase III. Phase III is necessary to hone the skills of the SWMU professionals returning from training and to fully develop the SWMU as a service agency. This would ideally include the provision of short-term TA, some commodities, training and perhaps some budgetary support.

3.2 PROJECT INPUTS

3.21 SCS Technical Assistance

The primary input by SCS to the project has been the provision of four long-term technical assistants and three short-term consultants. For the sake of simplicity, the evaluators have described project activities roughly in two spans of time: In the first (1979-82) a team leader engineer (3 years), a plant ecologist (2 years) and soil scientist (2 years) were recruited for the project. As described earlier, these specialists were involved in setting up the SWMU unit, screening training candidates, and providing basic training to SWMU staff in their specializations. The plant ecologist conducted a national survey and collection of Gambian flora; it is currently being reviewed at SCS headquarters in Washington, D.C. The soil scientist conducted a soil survey in the Gambia. On-the-job training was well received by SWMU staff.

As a result of the desire of USAID and the MOA to steer the SWMU in a more practical, service orientation, the chief of party was replaced. It is at this point (1983) that one could consider the second span of activities as beginning.

Harvey Metz, the current SCS technical advisor, arrived in 1983. He and the current Director of the SWMU have contributed immensely to the reorientation of the SWMU to conduct field work. Their work has been excellent by any standard or perspective of judgment. The SCS engineer was responsible for the design of all the soil conservation works completed to date. He has done an excellent job immersing his counterparts in all phases of the work, trying with the SWMU Director to develop some institutional integrity and direction.

Aside from Metz's input, SCS/Washington assisted the unit in developing a slide show and brochure to promote the Unit's programs. These were not available for review during this evaluation. SCS/Columbus assisted SWMU to set up a soil survey program and evaluated the on-going project during February - March 1985. SCS headquarters/Washington is currently preparing the final manuscript for the hydrology manual, which hopefully will be printed in metric units as a result of this evaluation.

In summary, SCS technical support in the project has been adequate. The synchronization of Phase I TA with counterparts was less than optimal. The scale-down of SCS TA from three to one specialist and the change in orientation which paralleled the arrival of the Phase II team leader has been extremely successful. The only shortcoming is that the two Gambian engineers being trained were not able to participate in these works.

3.22 Training: Eight Gambians were sent to the U.S. for BS degrees; they will have all returned by late 1987. One received an MS degree. Ten Gambians received a 2-year technical degree in agriculture in Nigeria. In-country and some on-the-job training have been conducted in The Gambia. The major discussion of training appears in the outputs analysis.

3.23 Commodities: The SWMU has received operating support from USAID and FAO. USAID provided the following support since the project began:

1. 4 new vehicles
2. two tractors
3. two disc plows
4. two trailers
5. one loader
6. one leveling blade
7. spare parts for the above equipment
8. fuel
9. 72 different items of field equipment for the engineering, soils and forestry sections
10. miscellaneous office supplies and machine repairs

OMVG/FAO provided the following commodities which were for direct use in commissioned soil surveys:

1. two vehicles
2. fuel to carry out the soil survey
3. spare parts for the two vehicles
4. night allowance for the soil survey party
5. wages for laborers

6. the needed equipment and supplies for the soil survey team to carry out the soil survey program.

In order to continue operating at their full potential it will be necessary to recognize and relieve future constraints. Probable future constraints identified by the evaluation team are listed and discussed below:

1. Equipment

- a) Tractors: equipped with disc plows and trailers are essential in constructing contour berms, dikes and water diversions. In order to continue operating at full potential, accounting for returning trainees and accelerating demand, the SWMU will need two new tractor sets.
- b) Vehicles: The SWMU will need an additional two 4WD vehicles for transport to work sites. Current vehicles have been under heavy use for 6 years and maintenance costs and repairs are increasing. A new 4-wheel drive vehicle was to have been provided to the SWMU by the GOTG in September 1985. So far there is no evidence it is forthcoming
- c) Calculators: The SWMU is not equipped with adequate calculators for engineering work. Two Hewlett-Packard 15C calculators should be procured for use by the engineers returning from training. These calculators are programmable, can be carried in the pocket and batteries last several years. They cost less than \$100 and are eminently appropriate for the design work being undertaken.
- d) Aerial Photos: Aerial photos are an indispensable tool for the type of work being done by SWMU. It is the understanding of the evaluators that OMVG has complete coverage of the Gambia in stereo pairs at a scale of 1:10,000. AID should do whatever is necessary to provide SWMU with four sets of these photos. The only way to justify the cost of comprehensive air photo coverage of this nature is making them available to all potential users. It is unlikely that anyone has as much immediate need or could benefit more from this coverage than the SWMU.

Recommendation

The Project should acquire two tractor/trailer/disc plow sets, two new 4WD vehicles, two Hewlett - Packard 15C calculators, and four sets of OMVG aerial photos.

- 3.24 Construction: USAID built three houses under the project for use by the three SCS TA. When TA was scaled down from three to one individual, two of the houses were transferred for use by TA in the AID Mixed Farming Project.

Achievement of Project Outputs

3.31 Formation of SWMU

The SWMU over the course of the project has developed from a good idea with general support in the GOTG to a unit within the Department of Agriculture. It was formally included in the national budget in 1982. When all staff return from long-term training the SWMU will be comprised of 8 professionals, 6-10 technicians (AA level), and field and office support.

The SWMU has recently been installed in more spacious though still modest surroundings at Yundum - a growing necessity as staff return from training. The office work environment is adequate and improvements are being made for storage space.

The SWMU is forging symbiotic relationships with other agencies; this is one way of extending conservation technology with minimal staff. To date the SWMU has conducted soil surveys for FAO, Mixed Farming Centers, OMVG, and the Forestry Department. The SWMU has provided classroom training for 3 days to 33 agricultural assistants (AA) as part of their extension service training and are preparing a 2 week training course for 30 AA's in December, 1985 in conjunction with FAO. They are planning to develop soil and water management courses for use in the Gambia College curriculum. The evaluation team did not interview Gambia College officials, so the extent of SWMU involvement has not been defined.

Further collaboration is expected in the future with PVO's and other organizations as the field work being installed and the enthusiasm of participating villagers win converts to conservation methods. Freedom From Hunger Campaign, Save The Children, Catholic Relief Services, and other organizations stand to benefit greatly from the services of the SWMU.

3.32 TRAINING

The project places a very large emphasis on both formal and on-the-job training. As noted in the 1982 evaluation, formal training got off to a slow start due to a lack of qualified Gambian candidates. The original PP over estimated the level of training of available GOTG staff. This was later resolved by increasing the amount of time allocated to long term training thereby permitting able Gambians with less formal education to qualify. Candidates for training were identified by the SCS TA through evaluation of their aptitude in plant ecology, soil science and engineering by rotational assignments through each department. This was a very prudent though time-consuming exercise. The evaluation team did not have access to individual's training records to determine the success or failure of long-term training under the project. However, the criteria used to select candidates and the universities and disciplines selected should assure that graduates return to the SWMU with adequate general background in conservation planning and some degree of technical specialization.

The delay in identifying participants and the lengthening of training time mean that Gambians in training are not able to receive as much of the essential on-the-job training as would be preferable. Indeed one of the strengths of the project design was recognition that formal training without follow-up on-the-job training cannot qualify a participant to undertake the types of soil and water conservation measures being implemented. Each long-term trainee is required to apprentice with the SCS in the US; this initial field experience needs to be backed up by supervised field work in the Gambia.

Annex 4.7, a bar chart of long-term training, points out the problem of providing adequate OJT. For example, the soil and water conservation engineer is scheduled to finish formal training and return to the SWMU in late 1986. The SCS technical advisor in soil and water conservation engineering is scheduled to depart September, 1986. In order to provide OJT so essential for the agricultural engineer, it would be necessary to extend the SCS contract to the end of the project (PACD 12/87). Moreover, it would be preferable to extend the project to the end of FY 88 (with the PASA SCS contract through 6/88) in order to take advantage of the fall/summer work season and to provide OJT for the second engineer who will be returning late 1987. (See Annex 4.2 on training issues related to institutionalization and continuation of SWMU activities).

Recommendation

USAID should consider a no-cost extension of the project from PACD 12/87 to 9/88. Concurrently, USAID should extend the services of the PASA SCS engineer from 11/86 to 6/88 if possible. This would enable all of the long-term participants to return to the Gambia and receive on-the-job training for at least one full work season. If the PASA SCS contract is not extended neither of the two returning SWMU engineers will benefit from OTJ training.

Ten Gambians received a 2-year technical degree in general agriculture from Ahmadu-Bello University in Nigeria. This is a technical degree which upgrades AA's considerably. These individuals were to have returned to work as AA's in the SWMU; five were to have been permanently based in rural areas to assist extension agents in conservation activities. It has been unfortunate that 4 of these AA's trained under the project have been assigned to other agencies within the MOA. In addition, the one MS level participant, the former project director, left the SWMU shortly after receiving his degree.

Recommendation

Future training agreements between the GOTG and USAID should stipulate the return and use of participants for project related activities. Also, all parties should agree as to the assignment of the 10 AA's already trained under the project.

Recognizing that linkage with agricultural extension is essential in large scale implementation of soil and water conservation works, the SWMU is working directly with regional and village agricultural extension agents. The agents are trained by becoming actively involved in technical planning and implementation. Many agents will be able to continue similar work with minimal backing by the SWMU. The SWMU has conducted a 3-day formal training session for 33 agricultural assistants (AA's) at Jenoi. The SWMU is developing a 2-week training course for 30 AA's at FAO's request; this will take place in December, 1985. The SWMU is currently working with Gambia College to develop a curriculum which includes soil and water conservation training; SWMU staff may assist in teaching short courses.

Recommendation

The SWMU should continue to develop training for agricultural assistants - both formally and OJT - as a major activity.

3.33 SOIL AND WATER CONSERVATION WORKS

A specific purpose of the project was to develop technology for improved agricultural/pastoral methods consistent with Gambian abilities and resources. During the second phase of the project (since 1984) four specific types of soil and water conservation techniques have been tested and implemented on a fairly large scale. These techniques were selected from existing technology and designed to fit the physical and socio-economic situation in The Gambia. To date about 500 hectares of land have been improved by project activities.

Some of this land has been reclaimed by the use of salt intrusion barriers, where agricultural production was nil or negligible in recent years. Other works, such as the installation of water retention structures, allow for a significant yield increase and reduction of risk on lands which were already in production. Project works are located in areas well distributed across the country. Projects are active in about 14 villages and their satellites. Area farmers and extension agents seeing and hearing of the works have precipitated a demand for SWMU intervention which far exceeds the present capability of the SWMU.

The methods used by SWMU to organize farmers to conduct conservation activities is praiseworthy. Through extended visits with village leaders, the value of the work is explained and interest is solicited. Villages involved form Village Resource Conservation and Development Committees (VRCDC's), comprised of both men and women. They function as autonomous groups, establishing their own regulations and presenting group decisions. The SWMU and the agricultural assistants collaborate fully with the VRCDC's to carry-out conservation activities, instilling a sense of ownership and responsibility of the structures to the villagers. Where watersheds are being developed, these VRCDC's come together to form Watershed RCDC's (WRCDC'S), and ultimately District RCDC's (DRCDC's). Such coordinated planning is the ultimate goal of the SWMU up to the National RCDC level. To date, some minor technical and socioeconomic problems have been encountered, most of which are being resolved by the SWMU.

The four types of works currently being extended are: a) water retention structures, b) contour berms with contour cultivation, c) water diversions, and d) salinity barriers, each of which is described below.

Water Retention Structures: There are many long, narrow, flat bottomed natural drainage ways in The Gambia. They may be several kilometers long and a hundred or more meters wide and have mild slopes. A small channel may be present in the lower reaches, but upper reaches have no channel and water moves as a shallow sheet along the bottom after heavy rains.

These drainage ways are one of the principal areas for traditional rice production in The Gambia. When rainfall is adequate in timing and intensity the bottoms stay saturated or wet during the growing season. However, due to the vagaries of rainfall this is rarely the case, and production is usually limited or fails due to extended drought or sometimes excessive water velocity after a heavy rain.

To ameliorate this situation the SWMU is constructing earth-fill water retention structures across the drainage ways at key locations. The structures are between one and two meters high, and hold back between 0.5 and 1.0 meters (depth) of water. The outlets or spillways are broad, vegetated floodways graded around the ends of the barrage in stable soil. Earth for construction is moved with a tractor and trailer, but loading, unloading and shaping is done manually by participant farmers.

In the absence of these structures runoff moves through the drainage ways very quickly, disappearing several hours or days after a storm. The fast runoff does not provide time for the water to infiltrate into the soil, and also carries away top soil and nutrients. The structures capture the water, prevent run-off of soil and nutrients and make them available to crops directly above the barrage. The increased infiltration also serves to raise the water table downstream from the barrage, which benefits an equal area below the barrage by sub-irrigation.

These water retention structures have proven extremely effective in increasing rice yields and reducing risks in traditional rice production. Because of the immediate and evident benefits farmers have accepted them wholeheartedly and have shown great enthusiasm in organizing themselves (with the help of the SWMU) and providing necessary labor. To date, there have been no real technical problems in design, construction and operation of the structures. There have been 9 water retention dikes built, which provide direct benefit to 125 hectares of riceland. (See Annex 4.1 for an ex post economic analysis showing the high returns to investment in these type structures.)

Contour Berms: This technique is used to conserve soil and water on upland cropping areas where slope and erosion potential are significant. First, a general reconnaissance is made of the farmlands to be protected and the surrounding area. Special note is made of slopes, natural drainage ways, soils, existing and potential erosion, and good locations for drainage. Sloping contours are surveyed and staked out in key locations according to the gradient, lay of the land and location of natural drainage outlets. A sloping contour is a line on the ground surface that follows around a hill side, but falls on a constant slope of 10 or 20 centimeters every 100 meters. Once the sloping contours are

stake' out a small berm or dike is built along them using a tractor and disk plow. The berms are built to a height of about 30 centimeters and are well rounded for stability. They are spaced between 30 and 100 meters, depending on natural slope and soil condition.

The purpose of the contour berms is to intercept water and stop soil erosion above and between them. The berms catch the water and soil and allow the water to infiltrate. If rainfall is intense, excess water is conveyed at a non-erosive rate along the contour berm and emptied into a wooded area or an uncropped drainage way stabilized with permanent vegetation. The contour berms are also used as guides to allow farmers to practice contour plowing between them. The contour plowing, which is not practiced traditionally in The Gambia, serves to reduce runoff and erosion, and increase infiltration between the contour berms. Contour berms are also being used on the marshes above the water retention structures. These berms effectively reduce siltation of rice fields by intercepting sand and silt washing down from upland areas.

The effectiveness of the contour berms and contour plowing is not as immediately evident to farmers as the water retention structures. This is particularly true in a year of good rainfall like last year, when crops received adequate moisture. For this reason farmers have been somewhat slow to recognize the benefits of contour berms and to adapt contour plowing between them. Farmer comprehension runs from the extremes of immediate understanding and adaptation to continuing up/down slope plowing, and in some cases actually plowing out the berms. This is not surprising in that it took soil conservation and extension efforts about 2 generations to get contour farming techniques adapted in America.

A particular problem with the contour berms has been path and track crossings leading to and between villages. The tracks tend to collect water and become drainage ways and points of intense erosion. Efforts are being made to get villagers to re-route their tracks around berms, but this has thus far proved to be unsuccessful. Foot and wheel traffic over the berms prevents growth of vegetation and soon creates low spots allowing water to cut through, the track then becoming an eroding floodway. Recognizing this problem the SWMU is currently developing appropriate alternative technical solutions. They plan to stabilize the berms where tracks cross by using rock or wood covered with stable soil and by appropriate shaping and grading on the upper side to convey water away from the crossing.

As stated above, the benefits from contour farming may not be dramatically visible the first year. Contour farming techniques reverse a slow process of top soil loss. Each year a small amount of water and soil is retained that would have otherwise been lost. This increases plant biomass production, which in turn increases soil organic matter, infiltration rate and soil stability. In order to see the real benefits one must compare a field after 10 or 20 years of contour farming to an adjacent field without it.

To date the SWMU has constructed about 65 kilometers of contour berms which are providing direct benefit to about 325 hectares of land. The

annual benefits in crop yield and reduction of risk per hectare will increase with time, assuming the proper maintenance of contour berms and use of contour plowing.

Water Diversions: Many villages have complained of flooding from intense runoff from adjacent cropland. This problem is increased because tracks leading into the villages serve to collect and convey runoff. As part of the contour berm program, many villages have been directly benefitted by construction of diversions to guide the water safely around the village. The diversions are usually in the form of a graded swale or grassed waterway that intercepts the water and conveys it to a safe outlet. The villagers (who are also the participant farmers) immediately recognize the benefits of these diversions. The SWMU is using the diversions as a training tool as well as a carrot in extending the benefits and maintenance of contour berms and contour plowing. To date, about four kilometers of diversion channels are protecting four project villages.

Salt Water Barriers: In the western half of The Gambia there are many locations where small watersheds (drainage ways) intersect the tidal flats of the Gambia River. Saline water from the main river moves up these drainage ways to some point below which crops cannot be produced. During long periods of drought the salt water may move even further inland, destroying land that had previously been cropped. Frequently, these lowlands are some of the most productive for rice if they can be protected from salt intrusion.

The SWMU has reclaimed and protected substantial areas from salt intrusion by building small earth embankments. The embankments are similar in size and construction to the water retention barrages, except their purpose is to prevent saline water from moving into the cropped area at high tide, as well as to retain fresh water in the cropped area. The barriers are equipped with a small pipe outlet. The outlet pipe is fitted with a fixed crest concrete box drop inlet on the upstream side to maintain optimum water level in the upper pool (at the elevation of the box rim). Excess flood flows are passed around the ends of the embankments through graded earth spillways similar to the water retention structures. In most cases water retention structures are built upstream from the salinity barriers in order to reduce peak runoff and maintain a high water table maximizing their effectiveness.

Farmers are very enthusiastic and receptive to the salinity barriers; they have seen land come into production immediately which may have been fallow for years, or never under production. To date, two salinity barriers have been built, reclaiming about 30 hectares of land which before could not be cropped. (See Annex 4.1 for an economic analysis showing the high returns resulting from investments in these type of structures.)

A word should be said regarding the rate of progress in construction of conservation works. The project paper correctly states that the number of hectares under protection shouldn't be used as a strict guide to success or failure at this point in time. The 1982 evaluation noted a paucity of conservation works on the ground. Since 1983 the project has certainly equalled or exceeded project paper expectations for implementing effective conservation works. This large spurt of success

in Phase II can be attributed to two factors. First are the knowledge, dedication and energy of the Project Director and the SCS Technical Advisor. There is no question that their capabilities, enthusiasm and collaborative work style have played a major role in project progress.

A second factor is the exponential nature of growth inherent in the project. The first phase was mostly start-up, learning, training and planning. Gradually, appropriate techniques are developed, trainees return and become competent at implementing what they have learned. The SWMU is in an ongoing process of working with and training agricultural assistants throughout the country, who in turn begin implementing with SWMU technical support. And the works themselves become more effective with age if properly maintained.

1.34 SOIL SURVEYS

Soils in the Gambia were described in the initial years of the project and a valuable descriptive handbook was developed. Since that time the SWMU has mapped 11,500 hectares at the request of various organizations. FAO requested a soil survey for the fertilizer trials they conduct on Mixed Farming Centers. Land has been surveyed for the Forestry Department for woodlots. OMVG has had 7000 hectares mapped for future irrigation activities.

Both OMVG and the GARD project intend to use SWMU soil surveyors for successful implementation of their activities. There has been a stated interest by the GOTG in mapping the Gambia in its entirety. An estimated 30 person years would be required to do this.

Recommendation

The evaluators advise that the SWMU concentrate their mapping efforts on focussed areas of potential high benefit. With present SWMU staff a national soil survey cannot be fully embarked upon without taking valuable soil scientists away from more important duties. If a national soil survey is required, additional soil scientists should be funded from other sources, working under the surveillance of the SWMU.

The soils division of the SWMU is capable of classifying soils based on physical and chemical characteristics. Chemical analyses are the responsibility of the Soils Laboratory within the DOA. The soils laboratory will be receiving some support from the GARD project and should be in a better position to support SWMU's analytical needs.

The soils division of the SWMU has benefitted from periodic consultancies by SCS soil scientists. As the second participant trainee in soil science does not return to the Gambia until late 1986, periodic visits would continue to be of benefit in developing the SWMU. This should be considered as an input into a Phase III of this project.

3.35 PUBLICATIONS

Phase I of the project produced two manuals: "Soils Handbook of the Gambia", and "Handbook of Conservation Practices". A third based on a collection of Gambian plants by the SCS plant ecologist is currently under review in SCS headquarters/Washington. The Soils Handbook is a comprehensive volume which classifies and describes all the soils of the Gambia, describing fertility, erodability, infiltration and drainage characteristics, texture and land use capability. The handbook also gives soil surveys for four of the project watersheds. The Soils Handbook does not include soil maps. The evaluation team found the Soils Handbook to be a necessary and well executed piece of work. The "Handbook of Conservation Practices" describes seven techniques, with standards and specifications, for soil and water conservation. These techniques were taken directly from U.S. standards with little thought of suitability to the Gambian situation. Many of the techniques and standards are beyond the physical or financial capability of the typical Gambian farmer.

During Phase II of the project the SWMU has produced "Engineering Field Manual for Conservation Practices" which covers basic surveying, runoff estimation, and design and construction of grassed waterways. The evaluation team also reviewed a draft just completed for agricultural hydrology. Both the above publications are made to the format and specifications of standard U.S. Soil Conservation Service handbooks but modified where necessary to fit the Gambian situation. The SCS hydrology techniques presented in the manual are recognized worldwide for estimating runoff from small rural watersheds. The method uses soil types and cover as one parameter for estimating runoff, and the SWMU has made a significant contribution by classifying Gambian soils for runoff potential in this manual.

One serious oversight in the manuals produced to date is that data and calculations are in English units. The Gambia is officially on the metric system, and the English units in the manual present a serious constraint to present and future use.

Recommendation:

Prepare future manuals and any new editions of existing manuals in metric units.

The SWMU is also developing some field manuals tailored specifically to the works being undertaken. In other words, they are using the lessons learned in the soil and water conservation works construction to produce field manuals so others can successfully undertake the work being done. This is particularly applicable since the SWMU is currently training agricultural extension agents to do soil conservation works. These manuals will supersede the "Handbook of Conservation Practices" produced in Phase I. The manuals were not completed to an extent that the evaluation team could review them, but the idea is fully supported.

The SWMU plans to develop some very simple brochures or leaflets, mostly pictures, to be used by extension agents for explaining and selling simple techniques such as contour plowing, maintenance of grassed

waterways and contour berms. These publications will be aimed at teaching farmers. The evaluative team strongly endorses this idea and recommends AID back the endeavor in any way necessary.

With the completion of the above-mentioned publications, the project shall have concluded its obligation to provide informative technical manuals. In addition to publications, an SCS consultant is developing a slide presentation to be used for public relations and training. The slide presentation is currently undergoing review in SCS headquarters in Washington, D.C.

Another public relations technique which the evaluators would like to encourage is the use of T-shirts and farm caps for participating farmers and extension agents. This not only promotes a certain solidarity among project participants but creates opportunities to proselytize for project activities.

Recommendation

SWMU should publicize the wisdom of soil and water conservation and their capabilities through the media and by other means.

3.4 Summary Conclusions

The Gambia Soil and Water Management Project (635-0202) is successfully progressing toward meeting project objectives. The project is behind schedule, however, due to delays in recruitment of SCS technical assistance, in identifying SWMU Gambian counterparts, and in the return of participants from long-term U.S. training. The SWMU has progressed from a formative stage to an implementation stage and is now actively conducting soil and water conservation activities with farmers across the Gambia. These activities have already proven to be highly successful in reclaiming and upgrading farmland. The SWMU also has a much needed capacity to conduct soil surveys in the Gambia.

Due to the delayed return of SWMU staff from long-term training, it is recommended that the project be extended concurrently with the extension of the contract of the SCS technical advisor. This would permit all SWMU staff to return to the Gambia and receive important on-the-job training.

The other current shortcoming of the project is a lack of GOTG budgetary support. SWMU field work has suffered as the budgetary restraints affect fuel, vehicle maintenance and night allowances. The evaluation team recognizes that this is a pervasive problem in the GOTG which affects many government agencies. The team recommends that USAID take measures to assure operating expenses for the SWMU.

This project aims to develop an institutional capacity in the GOTG in soil and water conservation. The SWMU has been in existence only since project on-set. It is realistic to expect that the institution would need to receive external support for 10-15 years in order to fully function. The evaluation team recommends that USAID consider continued support to the SWMU for 4-5 years beyond the PACD. This support would

provide some short-term SCS technical assistance, some precise technical training, and perhaps some equipment and budgetary support. (Please see Annex 4.2 for detailed discussion on institutionalization/sustainability issues).

The final comment which the evaluators wish to underscore is the importance of performing economic analyses on SWMU conservation activities. These analyses are not within the scope of the SWMU but could be performed by PPMU or another organization. The information to be gained by conducting these analyses would be valuable to the GOTG and donor agencies in deciding where wise investments can be made in agriculture.

LIST OF RECOMMENDATIONS

Recommendation #1

USAID should consider a no-cost extension of the project from PACD 12/87 to 9/88. Concurrently, USAID should extend the services of the PASA SCS engineer from 11/86 to 6/88 if possible. This would enable all of the long-term participants to return to the Gambia and receive on-the-job training for at least one full work season. If the PASA SCS contract is not extended neither of the two returning SWMU engineers will benefit from on-the-job training.

Recommendation #2

USAID should for the duration of the project assist the GOTG in meeting recurrent costs of the SWMU. USAID should intervene on behalf of the SWMU in a discussion with the appropriate GOTG officials to assure as much budgetary support as possible in the future.

Recommendation #3

USAID should continue to support the SWMU in what was conceived in the original PP as Phase III. Phase III is necessary to hone the skills of the SWMU professionals returning from training and to fully develop the SWMU as a service agency. This would ideally include the provision of short-term TA, some commodities, training and perhaps some budgetary support.

Recommendation #4

All parties should arrive at a clear understanding of the role and specific duties of the SWMU within the GOTG.

Recommendation #5

The SWMU should coordinate its activities with PVO's, GOTG agencies, and other groups doing improvements on agricultural land.

Recommendation # 6

USAID should encourage the Minister of Agriculture, the Permanent Secretary, and other GOTG officials to visit the project.

Recommendation #7

PPMU - perhaps under the auspices of the GARD project - should conduct economic analyses of conservation works installed by the SWMU. The SWMU should assist in this process by keeping records of expenditures, land brought into production, etc.

Recommendation # 8

The project should acquire two tractor/trailer/disc plow sets, two new 4WD vehicles, two Hewlett-Packard 15C calculators, and four sets of OMVG aerial photos.

Recommendation # 9

Future training agreements between the GOTG and USAID should stipulate the return and use of participants for project related activities. Also, all parties should agree as to the assignment of the 10 AA's already trained under the Project.

Recommendation # 10

The SWMU should continue to develop training for agricultural assistants - both formally and OJT - as a major activity.

Recommendation # 11

The evaluators advise that the SWMU concentrate their mapping efforts on focussed areas of potential high benefit. With present SWMU staff a national soil survey cannot be fully embarked upon without taking valuable soil scientists away from more important duties. If a national soil survey is required, additional soil scientists should be funded from other sources, working under the surveillance of the SWMU.

Recommendation # 12

The SWMU should prepare future manuals and any new editions of existing manuals in metric units.

Recommendation # 13

SWMU should publicize the wisdom of soil and water conservation and their capabilities through the media and by other means.

Annex 4.1
Economic Analysis Of Improved Swamp Rice Production ¹

I. Introduction

This evaluation report and other technical reports prepared by various consultants indicate that high economic returns should be expected from investments made in improving traditional swamp rice production. The Soil and Water Management unit (SWMU), utilizing village labor and the technical expertise of the Unit's personnel are constructing earthen water retention structures and antisalinity structures to improve traditional swamp rice land. Farmers have seen the benefit of these structures through dramatically increased rice yields and are willing to contribute their labor during the dry season when these structures are constructed and when labor demand in their other farming operations is virtually nil.

This ex post analysis quantifies the cost and benefits of eight water retention structures covering 111 hectares built by SWMU. Relatively detailed data such as man-days of village labor, staff time, and fuel required to complete the structures was kept, as were changes in rice yield resulting from the project.

II. Internal Rate Of Return (IRR)

Indeed the analysis in Table 4.1 confirms the judgments of technical experts that investments in water retention and antisalinity structures do yield substantial benefits. The IRR is calculated to be approximately 42 percent even using relatively conservative estimates of yields from those actually reported by field staff. A sensitivity analysis indicates that with benefits decreased by 10 percent and 20 percent, the IRR is still 34 and 26 percent respectively. This may seem to be a usually high return but given the low level of capital and technical inputs required for these structures it is not surprising. The following paragraphs discuss the assumptions made with respect to the output and input projections.

A. Output/Project Benefits

The technicians from SWMU kept relatively good records on the increase in yields resulting from the project based on farmer interviews and in some cases on actual measurements of yields before and after the structures were built. It is estimated that the average yield on the 111 hectares was approximately .59 tons per hectare before the structures were built and 3.1 tons per hectare after water could be controlled and salt intrusion contained, resulting in an incremental yield of 2.5 tons per hectare. To be conservative however, the analysis assumes a gradual increase in incremental yield to the 2.5 ton per hectare level in year 3. The analysis does assume however that once

¹ This Analysis was conducted by Thomas Hobgood, ADO, OAR/Banjul

farmers see that the structures are working increased inputs will be applied resulting in an incremental yield increase of 3.0 tons per hectare by year 5. This is still relatively conservative when compared to yields in irrigated areas of between 4 and 5 tons per hectare.

The economic value of rice was taken from the World Bank estimates used in their 1984 economic analysis of the Agricultural Development Project II (ADPII). These are estimates of the full value at the farmgate. Economic value at the farmgate was calculated by starting with the international prices and then subtracting the real costs for transport, processing, and distribution from the farm to Banjul.

B. Inputs/Costs

Inputs included in this analysis are farm labor, and the cash cost of seed, fertilizer, and project costs associated with building the eight structures. Project costs included the SWMU staff time, fuel, technical assistance, and equipment/material costs. Village labor used to build the structures was valued at zero since the construction takes place in the dry season when the labor would otherwise not be utilized for productive purposes. Both the labor and cash costs included are only the increments in costs required to achieve the incremental rice output. Farmer labor for rice production was valued at 5.50 Dalasis per man-day, an estimate of the agricultural wages in rural areas during the peak agricultural season. The economic value of fertilizer was taken from the World Bank estimates used in their economic analysis of the ADPII project. While farmers in traditional swamp areas use little if any fertilizer it has been observed in this project and others that once improvements are made and water is controlled farmers do use greater quantities of fertilizer.

II. Conclusion

Given the objective of the Gambian Government to increase food production, increased efforts should be made to improve swamp rice production. The Soil and Water Management Project has shown that with minimal capital investments in earthworks, annual yield increases in swamp rice production are dramatic. These interventions fit into the existing farming systems, are socially acceptable to and indeed socially supported by the rural population, and require almost no recurrent cost support. This is in contrast to irrigated rice production where large capital investments and intensive management skills are required. Increased investments by the GOTG and donors to improve the large area under swamp rice cultivation (approximately 10-15 thousand hectares compared to an irrigated area of approximately 2 thousand hectares) will definitely result in positive economic and social returns.

Table 4.1
ECONOMIC ANALYSIS IMPROVED SWAMP RICE

YEARS	1	2	3	4	5	6	7	8	9	10
INCREMENTAL RICE OUTPUT										
TOTAL AREA (ha)	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00
YIELD/HA (ton/ha)	1.50	2.00	2.50	2.50	3.00	3.00	3.00	3.00	3.00	3.00
TOTAL OUTPUT	166.50	222.00	277.50	277.50	333.00	333.00	333.00	333.00	333.00	333.00
DAL/TON (Dal 000)	0.52	0.48	0.55	0.61	0.65	0.69	0.73	0.73	0.72	0.72
TOTAL INCOME (Dal 000)	86.41	107.45	153.74	170.39	215.45	229.10	241.76	241.43	241.09	240.43
TOTAL INCOME (-10%)	77.77	96.70	138.36	153.35	193.91	206.19	217.58	217.28	216.98	216.38
TOTAL INCOME (-20%)	69.13	85.96	122.99	136.31	172.36	183.28	193.41	193.14	192.87	192.34
INCREMENTAL CASH COSTS										
LABOR (Dal 000)	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02
SEED (Dal 000)	2.33	3.11	3.89	3.89	4.66	4.66	4.66	4.66	4.66	4.66
FERTILIZER COSTS										
QUANTITY (tons)	4.16	5.55	6.94	6.94	8.33	8.33	8.33	8.33	8.33	8.33
COST/TON (Dal 000)	1.00	1.10	1.10	1.10	1.20	1.20	1.20	1.20	1.20	1.20
VALUE (Dal 000)	4.16	6.11	7.63	7.63	9.99	9.99	9.99	9.99	9.99	9.99
TOTAL INCREMENTAL CASH COSTS	71.51	74.23	76.53	76.53	79.67	79.67	79.67	79.67	79.67	79.67
PROJECT COSTS										
STAFF COSTS	29.00									
FUEL	24.70									
VILLAGE LABOR	0.00									
TECH ASSISTANCE	127.50									
EQUIPMENT	36.98									
TOTAL PROJECT COSTS	218.18									
NET BENEFITS	-203.27	33.22	77.20	93.85	135.78	149.43	162.09	161.75	161.42	160.76
NET BENEFITS (-10%)	-211.91	22.47	61.83	76.81	114.24	126.52	137.91	137.61	137.31	136.71
NET BENEFITS (-20%)	-220.56	11.73	46.45	59.77	92.69	103.61	113.74	113.47	113.20	112.67
		10 YEARS		20 YEARS						
NPV @ 15%		284.32		482.24						
NPV @ 15% (-10%)		198.44		366.68						
NPV @ 15% (-20%)		112.56		251.13						
IRR		42%		44%						
IRR (-10%)		34%		37%						
IRR (-20%)		26%		30%						

YEARS	11	12	13	14	15	16	17	18	19	20
INCREMENTAL RICE OUTPUT										
TOTAL AREA (ha)	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00	111.00
YIELD/HA (ton/ha)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
TOTAL OUTPUT	333.00	333.00	333.00	333.00	333.00	333.00	333.00	333.00	333.00	333.00
DAL/TON (Dal 000)	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
TOTAL INCOME (Dal 000)	239.76	239.09	239.09	239.09	239.09	239.09	239.09	239.09	239.09	239.09
TOTAL INCOME (-10%)	215.78	215.18	215.18	215.18	215.18	215.18	215.18	215.18	215.18	215.18
TOTAL INCOME (-20%)	191.81	191.28	191.28	191.28	191.28	191.28	191.28	191.28	191.28	191.28
INCREMENTAL CASH COSTS										
LABOR (Dal 000)	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02	65.02
SEED (Dal 000)	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66
FERTILIZER COSTS										
QUANTITY (tons)	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8.33
COST/TON (Dal 000)	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
VALUE (Dal 000)	9.99	9.99	9.99	9.99	9.99	9.99	9.99	9.99	9.99	9.99
TOTAL INCREMENTAL CASH COSTS	79.67	79.67	79.67	79.67	79.67	79.67	79.67	79.67	79.67	79.67
PROJECT COSTS										
STAFF COSTS										
FUEL										
VILLAGE LABOR										
TECH ASSISTANCE										
EQUIPMENT										
TOTAL PROJECT COSTS										
NET BENEFITS	160.09	159.42	159.42	159.42	159.42	159.42	159.42	159.42	159.42	159.42
NET BENEFITS (-10%)	136.11	135.51	135.51	135.51	135.51	135.51	135.51	135.51	135.51	135.51
NET BENEFITS (-20%)	112.14	111.60	111.60	111.60	111.60	111.60	111.60	111.60	111.60	111.60

The Long-term Sustainability And Continuation of
Soil And Water Management Activities^{1/}

I. Overview

The economic benefits of the Soil and Water Management Project activities have been established. Similarly, the operational efficiency and competency of the Soil and Water Management Unit are apparent. What is not certain, however, is the continued existence of the Unit or the ability of the Unit to maintain a certain level of services, after the AID funded project is finished. It is necessary to assess the sustainability of the soil and water conservation and management activities over the long term and identify impediments and possible solutions.

Several factors will determine the future of the Soil and Water Management activities. These include the level of appreciation of the activities by farmers, extension agents, and local and national politicians, the availability of funds, and the capability of the Unit to continue to provide services. While a well trained, enthusiastic cadre has been developed and even now plan and execute its work with little or no supervision and guidance, apathy and even hostility toward the Unit is also prevalent among certain high level civil servants. It is the latter that have to be overcome if the project activities are to be funded by the GOTG at a level that allows the Unit to function adequately.

The AID funded project was aimed at developing the capability to arrest deterioration of the soils and stabilize food production through proper management of soil and water. A further aim was to institutionalize this capability. As the evaluation shows, the project has attained those two objectives to a limited extent.

The true test of whether institutionalization has succeeded will be the ability of the Unit to justify its continued existence and to command the resources it needs. With the whole civil service being faced with budget cuts, the competition among and within Ministries and Departments for available resources will be great. It is here that the support of senior civil servants and politicians at all levels and strong leadership in the Unit will make a difference. On the positive side the Project is well received by the villagers and local government authorities. There is real grassroots participation in the planning and execution of activities. District commissioners and regional and local chiefs support project activities both morally and financially. In one watershed the District Commissioner encouraged villagers to meet, discuss their problems, and plan activities to resolve them. He then tapped funds at his disposal to help finance Soil and Water Management Unit (SWMU) activities in the affected areas. Farmers willingly contribute labor and feed and house SWMU agents. Local politicians

1/ This Annex was prepared by AID/Banjul staff in collaboration with the SWMU.

have not missed the opportunity for publicizing their contribution to the well being of their constituencies. This suggests that it is possible to enter into more formal arrangements among villagers, local political leaders, and the Soil and Water Management Unit for cost sharing in watershed development and management. This sort of arrangement would make it possible to do more. However, it cannot be seen as a substitute for fully funding the SWMU. Funding will depend on the goodwill of the Ministry officials and the priority given to SWMU. This could be a problem.

The Department of Agriculture prioritizes the whole range of activities of its different sections, among which is the SWMU. Those favored get funded. There was dissatisfaction with the design and implementation of the project at both the Department and Ministerial levels. Some saw it as a separate extension service. Others saw it as a marginal activity. This is due in part to a lack of understanding about what the Unit is doing. But there is also evidence of professional jealousy and a desire to exercise more control over the Unit. These are obstacles that SWMU will have to overcome if it is to command any importance i.e. an operating budget. Without the support at the highest levels of the Department the Unit might not get the resources needed, the cadre might become disillusioned, and the Unit could be dispersed. This could happen despite the broad based support and demand for the project in the rural areas.

To avoid this situation, SWMU will have to continue to educate all concerned decision makers. This could be done by wider distribution of reports, special seminars, and scheduled field trips and demonstrations. Once the senior civil servants and politicians see structures in use, talk to villagers, and local and district politicians, and understand what the project is doing they will become more supportive, especially if their views are sought and they can become a participants. Thus, the SWMU must promote itself. Equally as important to the Units survival is the ability to prepare sound technical and financial proposals to support budget requests and to defend and even lobby for these requests. While the Unit can prepare proposals and is getting better all the time, it is less effective in getting the funds requested. However, there is evidence that SWMU realizes the necessity of fighting for its budget. During the past year it requested additional funds for travel and pursued it right to the office of the Vice President of the Republic. The supplementary budget was approved. The proposed incorporation of budget hearings in the GOTG budget process gives hope that annual budget requests of the SWMU will at least be reviewed and analyzed.

As regards the leadership of SWMU, there have been three directors in two years. The most recently appointed director has just returned from training in the U.S.. He is a mid level civil servant who is technically competent and has administrative experience. He is well received and commands the respect of his cadre.

The Unit has six sections, soils, engineering, forestry, range, agronomy, and planning. These sections are led by technicians trained by the project. (See attachment 1 to this Annex for detailed description of the SWMU organizational structure). These

section leaders have mutual respect for one another and the Unit director. They form a highly motivated group that actively involves local extension agents and village elders in all aspects of field work. The process by which the SWMU involves extension agents and villagers in analyzing and prioritizing its activities is discussed in Attachment 1 to this annex. As discussed in the following section this process needs to be formalized in the form of policy and procedure manuals to serve as a guide after formal project assistance ends.

While there are obstacles to overcome, the SWMU is well trained, functioning well, has much support, and is learning to fight for and obtain the resources it requires. There is evidence that even if the SWMU were to disappear and the cadre reassigned the activities would be continued by extension agents applying the techniques developed by the Unit. These techniques are being built into the curriculum of the training for agricultural and livestock agents at Gambia College. Villages and local politicians will continue to request services and contribute labor, materials, and funds to SWMU activities. Given this situation it is not unreasonable to expect SWMU activities to continue long after AID financing is finished.

However, in order to improve the chances the SWMU will continue to exist as a viable organizational Unit within Department of Agriculture, there are specific activities which should be completed before formal project assistance ends. These are discussed in the following section.

II. Specific Steps Towards Institutionalization

There are several activities that if accomplished before the PACD, could substantially further the institutionalization objectives of the project. Examples include: (A) completion of technical and procedures manuals; (B) training programs to provide in-service training and supply of additional trained staff; (C) establishment of additional civil service positions for SWMU and (D) the provision of material support.

A. Manuals - in sum, by the current PACD the Project will have completed only about one half of the manuals needed for continued support of the program:

1. The engineering field manual will still be incomplete;
2. The conservation planning manual will be just commencing. The reason for this is that the Gambian conservationist returns from training in late 1986 and he needs one year of field work prior to commencing work on the manual;
3. The conservation practices manual for agricultural assistants is partly done as of mid-1986 and should be completed by April 1987.
4. The national soil survey manual is underway and should be completed by December 1987.

5. The forestry manual showing agricultural assistants what trees to put where for conservation purposes has not yet commenced and cannot be completed with resources currently available to the project.
6. Work on the policy and procedures management manual for the Soil and Water Management Unit has begun but it will not be completed by the current PACD.

B. Trained Staff and Training Programs - the Project will have completed training for all core Unit staff and some will have worked with the Project Advisor. There is however a need for additional long term training to accommodate the proposed expansion of the Unit's activities. The regionally funded Sabel Human Resources Development Project can provide additional training and the current planning exercise for that Project is to take these additional training needs into account.

The major training problem is that the majority of the SWMU staff have just returned from degree training. Experience with those members of the Unit who have returned from degree training highlights the necessity for these people to have one or two seasons of on-the-job training in The Gambia before they are effective. By working closely with the technical advisor after their return they are able to adapt and apply what they have learned to conditions in The Gambia. The two engineers, two agronomists, and one soil scientist who has just returned will not have the opportunity for enough on-the-job training before the PACD.

C. Additional Civil Service Positions For SWMU currently there are only four civil service positions within the SWMU. The rest of the professional staff have been seconded from other sections or Departments with the Ministry of Agriculture. In addition, several professionals who have returned from training and assumed responsible positions as head of sections within the SWMU are at lower grades than some of the people they are suppose to be supervising. This situation will not likely be solved by the PACD.

D. Material Support - the primary material item needed is a soils laboratory. Neither the project nor the GOTG have the necessary resources to establish a fully functioning laboratory. The existing Ministry of Agriculture laboratory faces personnel and management difficulties in addition to equipment shortages. The Gambia Agricultural Research and Diversification Project (GARD) is assisting the soil laboratory by providing short-term technical assistance and training to improve its management and technical operations. The GARD project will also provide equipment. A second major problem is lack of budgetary support from the Ministry at the same level as other ministerial Units for such things as gasoline and per diem moneys for field work. This has been discussed at length in the previous section.

III Recommendations

A. Consolidate support from Ministry of Agriculture and other Government Agencies

As discussed in the Overview this project, particularly in its first years, was not well understood and as a result not favorably viewed by senior managers within the Ministry of Agriculture. However, as the project has entered its action phase during the past three years there is evidence that the project's perception by senior officials is beginning to change significantly. Indeed, the President of the Republic has stated that he wants to see SWMU activities expanded to every district in the country.

The Unit should therefore continue the process which it has already begun of promoting itself by getting senior officials to visit the project activities, conducting seminars, getting the media's attention, and distributing widely its reports. As support continues to build and is eventually consolidated the project will likely receive the resources it needs from the GOTG to continue operating.

B. The Project should be extended through FY 1988. As noted in the text of the evaluation and this annex the following activities which are key to the sustainability of the Project could be accomplished if the Project were extended from December 30, 1987 to September 31, 1988:

- (1) The project staff who have just returned from training would have one more dry season to work with the technical advisor and have the on-the-job training which is absolutely key in enabling them to apply their training effectively in the field;
- (2) The technical advisor and the staff could complete the technical and policy and procedure manuals which will formalize the Unit's operations and serve as critical guidelines for the Unit after formal assistance ends; and
- (3) An extension would give the Unit's staff additional time to continue building the support it requires and to make arrangements and proposals to other projects for additional but limited short-term training and technical assistance it will require beyond September 1988.
- (4) The staff and technical advisor working through the Ministry of Agriculture would have additional time to work with officials from the Ministry of Finance and the Establishment Office to review the Civil Service status and requirements of the SWMU.

Attachment 1 To Annex 4.2

PLANNING WORKING POLICY, AND ORGANIZATIONAL STRUCTURE OF THE SWMU

The SWMU Policy is not to force its beliefs on others, but rather to help others see the problem for themselves and work out a solution together. With this policy, the Unit has generated an excellent working relationship with the farmers and local government officials.

The Units method of operation starts with an annual plan of operation (APO). This APO lists the goals and objectives the Unit wants to accomplish in the coming year, the Unit's APO is prepared by the entire Unit staff. Knowing the goals and objectives of the Unit, each section then prepares an A.P.O. for their section.

The Unit receives farmers' request through the extension service. The Unit has developed a "request for service form" which is supplied to all Agricultural Station officers. When a village or Agricultural officer needs assistance, the form is filled out, and mailed to the Unit, signed by the Station officer.

Once a request is received, the Unit then contacts the Agricultural Assistant and jointly discuss the problems and possible solutions with the applicants. The request is then filed until it receives a priority.

About the first week in October, all applications are given a priority and a given time period in which the Unit will spend on the project. Priorities are determined by the severity of erosion, amount of land benefited, number of families benefited etc. The amount of time spent on a project is determined by the Unit's work load, availability of funds and work force.

In the past 2 years, the SWMU has had excellent working relations with the extension service wherever they did extensive conservation work. The Agricultural Assistants have become very supportive of the Unit once they have understood the purpose in the total agricultural development program of The Gambia. Before work begins, the Unit and the extension service meet with the farmers and discuss how the work is to be completed and in what time frame. When this is agreed upon, the work begins under the supervision of the SWMU and extension service.

To gain financial support, the Unit has contacted local governments. The Unit has received moral support from all five Divisional Commissioners, but financial support from only Western Division. It is hoped that the other four divisions will also contribute financial support once they realize the benefits received.

In the best interest of the G.O.T.G. and the SWMU to improve the educational delivery system, the Unit and The Gambia College have joined efforts to provide Soil and Water Management courses to the Agricultural Assistant students attending the college. The Unit has

also provided classroom training as well as field training to the extension services and plans to intensify this activity in the future.

I. SOIL SURVEY RESPONSIBILITY

1. Provide the GOTG a detailed soil survey of the country.
2. Provide the leadership in training all SWMU and GOTG Officials in soil properties.
3. Conduct a detailed soil survey on all SWMU project areas.
4. Provide soils information for all projects or groups as requested.
5. Update soils survey procedures and terminology as needed to comply with local and international standards.
6. Work with the soils laboratory to obtain correct soil analysis.
7. Assist the Unit head in making sound management policies and procedures as it pertains to soil surveys.

II ENGINEERING SECTION RESPONSIBILITY

1. Conduct preliminary Engineering surveys for all planned work of the SWMU projects.
2. Provide proper design for all structures according to SWMU guidelines.
3. Provide leadership in applying proper construction supervision to all field personnel applying conservation practices.
4. Provide training to SWMU staff, GOTG officials, and other project personnel on Conservation Engineering.
5. Provide follow up and recommend changes on technical material to verify and improve proper engineering designs and procedures as adapted to local conditions.
6. Assist the Unit Head in making sound management policies and procedures as it pertains to engineering.
7. And all other duties assigned by the Unit head.

III RANGE SECTION

1. Develop an inventorying and monitoring system for the Nation's Rangelands.
2. Design and develop grazing systems for Soil and Water Management Unit's conservation area;

3. Provide the leadership in training of SWMU staff and other GOTC officials in rangeland conservation.
4. Develop technical standards and specifications for range conservation and management.
5. Assist the SWMU head in making sound management policies and procedures as pertaining to range management.
6. Assist the planning staff in coming up with a conservation plan.
7. Responsible for carrying out all other duties as assigned by the SWMU head.

IV RESPONSIBILITY OF THE PLANNING SECTION

1. Evaluation of current requests.
2. Reconnaissance Survey/selection of work sites.
3. Liaise with extension services.
4. Develop information program on Soil and Water management through the Extension Aids Unit.
5. Preparation of conservation plans upon request from the various sections.
6. Evaluation of completed projects.
7. All data collection and record keeping.
8. Assist the Unit head in making sound management policies.
9. And all other duties assigned by the Unit head.

VI FORESTRY SECTION

1. Liaise with the Forestry Department in coordinating Forestry policies with conservation principles.
2. Responsible for recommending and selecting adaptable tree species as applied to soil conservation.
3. Responsible for assisting the planning staff in adopting proper tree species and sites for woodlots, food and timber production.
4. Provide the leadership in training of SWMU staff and other GOTC officials in forestry conservation.
5. Develop technical standards and specifications for forestry conservation and management.
6. Assist the SWMU head in making sound management policies and procedures as pertaining to forestry management.

7. Responsible for carrying out all other duties as assigned by the SWMU head.

LOGISTIC NEEDS

- 1a Double the operating budget for 10 vehicles from D25,000 to D50,000.
- b. Increase maintenance and spare parts for 10 vehicles from D24,000 to D40,000.
2. 2 new vehicles to replace the 2 old land rovers.
3. Need for additional storage space.
4. Fund for office supplies/equipment.
5. Night allowance - D20,000.
6. Additional trained people for back-up support of existing technical staff.
7. Need an Executive Officer to take care of administrative matters.
8. Competent soil lab.

HS

ANNEX 4.4
EVALUATION ITINERARY

DATE

October 17	Team arrives in Banjul from REDSO/WCA.
October 18	Team meets with USAID/Banjul staff to discuss and plan evaluation.
October 19	Team meets John Fye, SWMU Director and Harvey Metz, SCS Technical Advisor and hold preliminary discussions of the project.
October 21	Team meets Mr. Sankung Janneh, Director of Agriculture and Mr. Sampo Ceesay, Assistant Director of Agriculture, to discuss the project.
October 22	Team travels with J. Fye and H. Metz to Tendaba and visits projects at Beeta, meets chief at Kalaji, visits Jarrol and Wassadu.
October 23	Team visits Sintet and Kangnamudu watershed and travels to Sapu via Jassong.
October 24	Team travels to Basse via Sare N'Gai and visits projects in Fatoto.
October 25	Team visits Alunghari Selfhelp Project and Jahally Pacharr Irrigation project and returns to Banjul
October 26 - November 1	Team prepares evaluation in Banjul.

SCOPE OF WORK
FOR THE EVALUATION OF THE
SOIL AND WATER MANAGEMENT PROJECT 635-0202

I. Background

The Soil and Water Management Project began on March 28, 1978. The Project grant provided \$2,747,000 to 1) halt and reverse environmental deterioration due to the inadequacy of traditional cultivation practices; 2) increase food, forage, wood and cash crops; 3) reduce susceptibility to drought or weather variations; and 4) develop the institutional capability to deliver educational, technical and material services to rural populations.

The following made up the specific purposes of the Project:

- A. Establish a soil and water management unit within the Ministry of Agriculture and Natural Resources.
- B. Develop technology for improved agricultural pastoral methods consistent with Gambian abilities and resources.
- C. Train Gambian soil and water management specialists and agricultural assistants to functional levels of competence in developing solutions to soil and water problems.

An evaluation was carried out in January 1982 to assess the appropriateness and performance of the Project, and it revealed the following:

- A. The design concept is sound but implementation is behind original schedule.
- B. While the technical or development impact could not be measured, progress was evidenced by the establishment of the Soil and Water Management Unit (SWMU) in the Department of Agriculture, complete with financial warrant and budget system.
- C. The Unit was well staffed.
- D. Vehicles, equipment, supplies, and offices had been acquired.
- E. Soil surveys, a technical guide, soils handbook and a checklist of plants have been completed.
- F. There was too much technical assistance (TA) at the beginning.

There were several recommendations:

- A. Evaluate the in 1985.
- B. Reduce TA and increase training.
- C. Establish demonstration sites for soil and water management practices near Banjul to train all units of the Government of The Gambia (GOTG) as necessary.
- D. Negotiate an amendment to the PROAG to lay out the detailed activities and responsibilities of the SWMU, the GOTG, and AID.

We are now past the mid-1985 period recommended for an evaluation. It is now appropriate to assess the Project and determine what has been accomplished and what remains to be done.

II. Purpose

The purpose of the evaluation is a comprehensive assessment of the Project that will:

- A. measure the extent to which the Project purposes have been achieved;
- B. describe the impact of the Project activities on the Department of Agriculture and Gambian farmers;
- C. analyze the impact of the Project's contribution to increased food production, farm income, and reduced or reversed deterioration of the soil;
- D. evaluate the adequacy of the institutional arrangements for execution of Project activities;
- E. point out constraints to project implementation and set forth recommendations for ameliorating or removing problem constraints; and
- F. determine farmers' understanding and appreciation of soil/water management techniques.

The evaluation team will: 1) determine if the level of support given to the SWMU is appropriate and sufficient to develop the capability to reverse soil degradation or at least prevent or slow further deterioration; 2) recommend priority areas for concentrating remaining resources for the life of the Project; 3) estimate the level of competence that can be expected in the SWMU by the end of the Project and recommend future activities for improvement of institutional capability; 4) assess the performance of both the SWMU and the Soil Conservation Service/technical assistance to the Project; and 5) recommend what aspects of the Project should be integrated into other programs and how it should be done,

III. Work Plan and Outputs

A four person team, will begin the evaluation with a review of project documents including the Project Paper, the 1982 evaluation, progress reports, and other pertinent information. This will be followed up by reviews of work plans, financial records, special reports of short-term consultants and working documents covering various stages of development of Project activities. Interviews with GOTG officials, the technical assistants and farmers will complete this comprehensive look at the Project.

There will be five areas of inquiry:

1. impact of Project on GOTG and farmers;
2. efficiency of delivery of goods and services;
3. attainment of Project purpose;
4. adequacy/appropriateness of Project design; and
5. integration of SWMU activities into ongoing programs (research and extension).

It is understood that recommendations for improvement will follow as warranted. The team will consist of four persons as follows:

- A. Agronomist
- B. Civil or Agricultural Engineer
- C. Economist
- D. Management Specialist

The evaluation will be conducted October 1-31, 1985.

IV. Qualifications and Specific Responsibilities for Each Team Member

A. Agronomist - Degree in soil or crop science with minimum of 5 years experience in agricultural production, research, and/or teaching. Must have at least 2 years experience in African agriculture. Must have worked on evaluation teams for agricultural projects.

Duties:

- 1) determine, along with the Engineer, if the proper techniques for slowing surface runoff for better water retention in soils for crop growth are being employed;
- 2) measure the difference between farms using the techniques and those not using them; and

- 3) evaluate crop yields and measure any increases due to improved techniques.
- B. Engineer - Degree in civil or agricultural engineering with a minimum of 5 years professional experience in developing countries, two of which must be in Africa. This experience must include work in irrigation structures, hydrology, erosion control, water management, and training.

Duties:

- 1) Evaluate the techniques, quality, and effectiveness of the construction of berms, contours, terraces, and drainage structures built by the Project.

- C. Economist: M.S. Economics. Ten years professional experience, three of which must have been in agriculture development in Africa. Knowledge of the Sahel and its economic situation is preferred. The Economist must have experience in project management and evaluation.

Duties:

- 1) Assess the extension program for the SWMU activities to include numbers of beneficiaries, farmer reaction to techniques, training of agents, and utility of services by SWMU.
- 2) Assess Department of Agriculture's ability to sustain SWMU after AID funds are no longer available, including the cost of providing services and how these can be financed in the future.

- D. Management Specialist: An advanced degree in a field related to organization management or development with 5 years experience in institution building in LDC's, preferably the Sahel. The candidate should have experience in staff training and development team building and management by objectives as well as project design and evaluation.

Duties:

1. Assess the impact of the Project on Department of Agriculture's extension program, in service training, data collection, analysis, reporting, and planning and execution of programs in soil and water management.
2. Assess the PASA's success as well as abilities to implement the Project, paying special attention to project implementation management.
3. Assess coordination and communication between contractor, GOTG, and USAID.

4. Assess the level of understanding, appreciation, and support given SWMU by the Department of Agriculture as demonstrated by budget support, broad application of technology, and inclusion of technology in in-service training.
5. The team leader for the evaluation will be the most senior of the four persons. He or she will assume the additional tasks of speaker for the team, organizing the team's activities and presenting the final report. The final report will be due 30 days after the beginning of the contract period.

ANNEX 4.1
EVALUATION ITINERARY

DATE

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ANNEX 4.5

THE REPUBLIC OF THE GAMBIA
SOIL AND WATER MANAGEMENT UNIT
PROGRESS REPORT
July 1, 1984 - June 30, 1985

GENERAL

The Soil and Water Management Unit (SWMA) has completed its first year of conservation application field work. The unit is very proud of its accomplishments, considering that a great deal of field training was conducted during the application period.

The unit's main objective this past year has been to: 1. Begin developing a team of soil and water management experts for The Gambian Government, Minister of Agriculture. 2. Begin the development of a national soil survey program for The Gambia. 3. Develop an information program to inform farmers and other government agencies of the activities of the SWMU. And 4. Develop a system for requesting services of the unit and a system for delivering those services.

ACCOMPLISHMENTS

The unit has made a giant step forward in developing the unit's expertise in soil and water management techniques.

The new employees received a two week training course in soils, soil and water management practices, and working as a unit. The entire staff of the SWMA participated in a work load planning exercise in which they planned the annual plan of operation.

The field work started in January and was still in progress at the end of this fiscal year, June 30, 1985.

The Unit has worked with 14 villages this past year in establishing soil and water conservation practices. These villages are as follows:

- | | |
|-------------------|---------------|
| 1. Sulukoba | 8. Sintet |
| 2. Fototo | 9. Niani Beri |
| 3. Sare n' gai | 10. Beeta |
| 4. Sukuta | 11. Wassadu |
| 5. N'geyen Sanyal | 12. Kalagi |
| 6. Jassong | 13. Jarrol |
| 7. Kansambou | 14. Busonga |

The following practices were constructed at the 14 villages:

1. 182 contour berms for a total length of 57,614 meters which directly benefited 280 ha.
2. 11 dikes were built to reclaim 124 ha of swamp rice land.
3. Six diversions were built to protect crop land and villages for a total length of 2330 meters.

4. One waterway was constructed (remaining scheduled waterways have been delayed until the rains begin).

A total of 3,323 farmer working days were used to complete the above conservation practices.

The soil survey section of the SWMU received assistance from Mr. Keith Huffman, soil scientist, /USDA. Mr. Huffman assisted the unit in developing a plan of action and working towards the completion of:

1. The review of soil map units placed in the land capability classification system.
2. Test the classification of soil series placed in soil taxonomy with current field/laboratory data.
3. Test and refine agronomic interpretation for important crops for all map units.
4. Evaluate t/k factors for all soil series.
5. Place all known soil map units in a hydrologic group.
6. Assist in the development of an initial long range plan to complete a detailed soil survey for The Gambia.

In addition, the soil survey section, under the direction of John Eye, accomplished the following:

1. Sample surveying of Mixed Farming Centers used by FAO for trails.
2. Woodlot soil surveying for the forestry woodlot program throughout The Gambia.
3. Spot soil surveying sites for the SWMA project area.
4. Detail soil surveying for irrigation of approximately 7,800 ha as part of the OMVG pedological studies of the River Gambian basin. This contract is to continue upon the availability of funds as there is a considerably large area within the project yet to be surveyed. Upon completion of this OMVG contract, the two Toyota vehicles and equipment supplied will be handed over to the SWMU. The report for the first phase of this survey is presently being compiled.

Mr. Joe Larson, information specialist, SCS, Washington, assisted the Unit in developing a slide show about the Unit's activities, a slide show on the soil survey program, and a brochure on the Unit's programs.

Mr. Larson also worked with EAU, the Gambian college, and book productions on development of information for the unit.

The unit was successful in organizing the first soil and water management district in The Gambia. The district was established to bring all villagers together within a watershed for the purpose of solving their own problems as a group rather than as individuals. It also serves as a means for the SWMU to pass information to the farmers, as well as a means of receiving local input into SWMA activities in their areas.

The unit has developed a request form for the agricultural assistants or other agencies to use when requesting services from the unit. When these request forms are returned, the unit sets priorities and plans the work schedule for the coming season.

TRAVEL OUTSIDE THE GAMBIA

On July 30th John Fye, Sammy Davis, and Harvey Metz traveled to Kenya to observe soil and water activities in that country. The team had an opportunity to meet with government officials, as well as visit and review many projects. Projects visited included range renovation, terracing of cropland, water harvesting, and many other systems and materials used in Kenya.

On the 1st of September John Fye traveled to Praia, Cape Verde to attend a two week seminar on soil and water conservation sponsored by the Sahel Institute. John presented a paper at the seminar entitled "An Assessment of Studies and Research in Soil and Water Conservation in The Gambia."

SHORT TERM ASSISTANCE

Mrs. Gail Osborn-Roane, program specialist with the SCS, Washington, visited the SWMU from September 21 through the 28th. Her mission was to become familiar with the unit's activities in The Gambia.

Mr. Keith Huffman, soil scientist with SCS, Columbus, Ohio, assisted the soil survey section from February 11 through March 26. His mission was to assist the SWMU set up a soil survey program and evaluate the on-going program.

Mr. Joe Larson, information specialist with SCS, Washington, assisted the unit from April 1st through May 10th. Joe was requested to assist the unit in setting up an information program.

The unit has requested the assistance of a hydrologist to help in preparing a new hydrology section for the engineering field manual.

OUTSIDE SUPPORT

The SWMU received operating support from USAID/FAO this past fiscal year. USAID provided the following support:

1. one new vehicle
2. two tractors

PROGRESS REPORT

4.

3. two Hsc plows
4. two trailers
5. one loader
6. one leveling blade
7. spare parts for the above equipment
8. 4,151 liters petrol, 2,336 liters diesel
9. 72 different items of field equipment for the engineering soils and forestry sections
10. miscellaneous office supplies and machine repairs

OMVG/FAO provided the following support:

1. two vehicles
2. fuel to carry out the soil survey
3. spare parts for the two vehicles
4. night allowance for the soil survey party
5. wages for the labors
6. the needed equipment and supplies for the soil survey team to carry out the soil survey program

PERSONNEL

The ten USAID sponsored conservation assistants returned from their studies in Nigeria. All ten students received their higher diploma in general agriculture. The director of agriculture has assigned them as follows:

1. Famara S. Badjie to the department of water resources
2. Nyada Yoba Baldeh to the training unit
3. Babou Camara to the soil and water management unit
4. Dembo Jaiteh to extension
5. Dodou P. Jallow to the soil and water management unit
6. Sheriff S. Kolley to the cotton project
7. Kebba Manku to the soil and water management unit
8. Ebrima Saidu to the soil and water management unit
9. Yaya Sarr to the soil and water management unit
10. Ebrima M. Senghore to the soil and water management unit

Matarr A.M. Cham has returned to The Gambia from his studies in the U.S. He did not receive a B.S. degree in forestry as planned due to health problems.

Sisswa Gassama returned from New Mexico State University with a B.S. in range management. Mr. Gassama is awaiting his transfer from the department of animal health to the department of agriculture.

Mr. Sammy Davis has announced his retirement from the department of agriculture. He has accepted a job with a private firm. Mr. John Fye will assume the duties as acting head of the unit.

M.B. Jagne and Ousman Sarr have been transferred to the SWMU from extension.

VISITORS

The SWMU conducted several tours of the project sites in the Sintet and Wassadu areas. These tours were requested by U.S. Ambassador Hennemeyer, USAID, Under Secretary of Agriculture, Galendou Gorre-ndiaye, and members of the Mixed Farming Project.

The Banjul American Embassy School also visited the unit and were shown how slope, mulch, and different soils produce runoff and erosion.

The unit has made great progress this past year. However, it will need to concentrate and strengthen certain aspects of its program. Items needing attention are:

1. more on-the-job training of its personnel
2. farmer education
3. extension training
4. grade school education
5. information

The unit is developing into an excellent working team and should improve rapidly when the five participants return from the U.S. This will give the unit a team of engineers, soil and water conservationists, and soil scientists that will compliment each other, as well as other departments within The Gambian government.

LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date 1988
Date of this Summary June 1977

Project Title: GAMBIA SOIL AND WATER MANAGEMENT

	NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
DEVELOPMENT HYPOTHESES	<p>Program Goal: The broader objective to which this project contributes:</p> <p>a) Halt/reverse environmental deterioration due to inadequacy of traditional agricultural/pastoral methods.</p> <p>b) Increase/stabilize production of food/forage/wood/cash crops; reduce susceptibility to drought, other weather variations.</p> <p>c) Improve institutional capability of GOTC to deliver educational, technical material services to rural population.</p>	<p>Measures of Goal Achievement:</p> <p>a) Reduced soil compaction, surface run-off and erosion on cultivated lands.</p> <p>b) Adoption of techniques to utilize animal manures, crop residues etc., to improve soil conditions.</p> <p>c) Reduction of burning of animal manures and plant residue.</p> <p>d) Aggregate agricultural production increases or decreases less than previously anticipated under adverse conditions.</p> <p>e) Villagers and farmers recognize value of the services provided and request assistance from the</p>	<p>a) Field observations by specialists.</p> <p>b) Observations of field AA's</p> <p>c) National production estimates.</p> <p>d) Requests for services received from villages and farmers.</p>	<p>Concerning long term value of program/project:</p> <p>a) Proper soil/water management is an essential foundation of overall agricultural development program and desired environmental quality.</p> <p>b) Appropriate soil/water management technology can be developed in the Gambian cultural context.</p> <p>c) Soil/water management is and will remain a high priority of GOTC.</p>
	<p>Project Purpose:</p> <p>a) Establish a soil and water management unit within Ministry of Agriculture and National Resources.</p> <p>b) Develop technology for improved agriculture/pastoral methods consistent with Gambian abilities and resources.</p> <p>c) Train Gambian soil and water management specialists and Agricultural Assistants to functional levels of competence in developing solutions to soil and water problems.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>a) Unit under Gambian direction comprising 10-15 trained specialists.</p> <p>b) Soil/water technical manual printed and adopted by MAMR.</p> <p>c) Appropriate soil/water management courses in operation within MAMR training program.</p> <p>d) Village planning and action process developed and documented in training aids and technical manuals.</p>	<p>a) MAMR Budget.</p> <p>b) AID evaluation of unit's activities and effectiveness.</p> <p>c) Technical reviews of soil/water management by USDA-SCS.</p> <p>d) Interviews with graduates of training programs.</p>	<p>Affecting purpose to goal link:</p> <p>a) MAMR and GOTC will provide adequate policy direction, budgetary support and coordination to enable unit to operate effectively.</p> <p>b) Soil/water management technology developed will be achievable within the financial, physical, mechanization and cultural means of Gambian farmers.</p> <p>c) Appropriate techniques and concepts will be accepted by Gambian farmers as being in their own best interests.</p>
MANAGEABLE INTEREST	<p>Outputs:</p> <p>a) Functioning, trained soil/water management staff, both at headquarters and in field.</p> <p>b) Soil/water management manual to document technology and action process.</p> <p>c) Resource inventories, (soil, vegetative, hydrologic surveys) for selected villages as basis for soil/water management planning.</p>	<p>Magnitude of Outputs necessary and sufficient to achieve purpose.</p> <p>a) Manual printed and distributed in adequate quantity for users.</p> <p>b) 10-15 villages assisted with village planning and action process.</p> <p>c) 3-4 Administrative leaders trained.</p> <p>8-10 technical specialists trained on the job.</p> <p>8 specialists completed academic training in US.</p> <p>100-125 Agricultural Assistants trained in general concepts.</p>	<p>a) Visit cooperating villages to evaluate extent of acceptance.</p> <p>b) Feedback from Agricultural Assistants on value and utility of technical manual.</p> <p>c) Training certificate received training records, Student's evaluations of courses</p>	<p>Affecting output to purpose link:</p> <p>a) Technical capability for development of manual will exist in unit staff as supplemented by short-term consultants.</p> <p>b) Village planning and action process can gradually overcome the conservatism and reluctance to adopt new techniques characteristic of Gambian villagers.</p> <p>c) Agricultural Assistants will find soil/water management technology a useful and valuable addition to their</p>
	<p>Inputs: Activities and Types of Resources</p> <p>a) Expatriate team of interdisciplinary specialists (conservation planner, soil scientist, plant ecologist).</p> <p>b) Short-term consultants.</p> <p>c) Long-term training abroad.</p> <p>d) Local training.</p> <p>e) Commodities and misc. supplies.</p> <p>f) Housing of US team.</p>	<p>Level of Effort/Expenditure for each activity.</p> <p>a) 3 US technical staff for 3 years (9 M/Y Phase I) = \$720,000; (4 M/Y Phase II)=\$360,000.</p> <p>b) 24 man/months of short-term consultants Phase I = \$180,000; 12 m/m Phase II \$102,000; 48 m/m Phase III \$450,000.</p> <p>c) Funding for 8 Gambians to be trained abroad Phase I, 4 in Phase II = \$128,000.</p> <p>d) On-site efforts of US team to produce local training in-puts.</p> <p>e) Commodities: vehicles, office and lab. equipment, household furnishings, technical library, \$71,500, total.</p> <p>f) Construction of 3 houses - \$180,000</p>	<p>a) AID Controller Records</p> <p>b) Project records and reports.</p> <p>c) GOTC/MAMR Budgets/Reports</p>	<p>Affecting input to output link: technical skills.</p> <p>a) MAMR will recruit and assign qualified staff to SWMU.</p> <p>b) US team leader and MAMR officials can select qualified candidates and arrange appropriate training program.</p> <p>c) Adequate supplies, commodities, and equipment can be scheduled, purchased and delivered on-site on a timely basis.</p> <p>d) GOTC can and will provide in-puts (including personnel, maintenance and support) as shown in project description and financial plan.</p>

ANNEX 4.7

LONG TERM TRAINING

PARTICIPANT	DISCIPLINE	81	82	83	84	85	86	87	88	COMMENTS	
Samuel Davis	Resource Mgt.				(XXXXXXXXXX)	M.S.				Retired from GOTG	
Sidi N. Jarju	Ag. Eng. (Mech.)								(XXXXXXXXXXXXXXXXXXXXXXXXXXXX)	B.S.	Needs OJT
John S. Fye	Soil Science				(XXXXXXXXXXXXXXXXXX)	B.S.				Received BS and OJT.	
Sissano S. Gassama	Range Science				(XXXXXXXXXXXXXXXXXXXX)	B.S.				Returned to SWMU	
Matarr Cham	Forestry				(XXXXXXXXXXXXXXXXXX)					BS not complete	
Ebrima O. Sonko	Ag. Eng. (S & W)				(XXXXXXXXXXXXXXXXXXXX)	B.S.				Needs OJT	
Sulayman Secka	Agronomy				(XXXXXXXXXXXXXXXXXXXX)	B.S.				Scheduled return 1986	
Kabir S. Sonko	Agronomy				(XXXXXXXXXXXXXXXXXXXX)	B.S.				Scheduled return 1986	
Keba Bojang	Soil Science				(XXXXXXXXXXXXXXXXXXXX)	B.S.				Scheduled return 1986	
Famara S. Badjie	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Dept of Water Resources	
Nyada Baldeh	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Training Unit	
Babou Camara	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	
Diabo Jaiteh	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Secunded to Extension	
Dodou Jallow	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	
Sheriff Kulley	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Secunded to Cotton Proj.	
Kebba Manka	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	
Ebrima Saidy	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	
Yaya Sarr	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	
Ebrima Senghore	General Ag.				(XXXXXXXXXXXXXX)	2 yr diploma (Nigeria)				Returned to SWMU.	

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