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On-Farm Seed Project Final Report

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Winrock International Institute for Agricultural Development

in cooperation with

The Center for PVO/University Collaboration in Development

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Acronyms

AFSI	African Food Systems Initiative
AID/PVC	Agency for International Development Office of Private and Voluntary Cooperation
APCD	Associate Peace Corps Director
CCF	Christian Children's Fund
CIAT/SADCC	Centro Internacional de Agricultura Tropical (in the Southern Africa region)
CONGAD	Conseil d'organisations nongouvernementales d'appui au dévelopement
CRS	Catholic Relief Services
CTA	Center for Agricultural and Rural Cooperation
CUSO	Canadian Universities Service Overseas
FAO	Food and Agriculture Organization
FVA/PVC	United States Agency of International Development Bureau for Food and Voluntary Assistance, Private and Voluntary Cooperation
FFHC	Freedom From Hunger Campaign
FFHC/WRP	Freedom form Hunger Campaign/Women's Rice Project
ICMG	in-country matching grant
INTSORMIL	International Sorghum and Millet Collaborative Research Program
ISRA	Institut Sénégalais de Recherche Agricole
MIS	management information systems
MSU	Mississippi State University
NGO	nongovernmental organization
OFPEP	On-farm Productivity Enhancement Project
OFSP	On-farm Seed Project
PC	United States Peace Corps
PCV	Peace Corps Volunteer
PVO	private, voluntary organization
RRA	Rapid Rural Appraisal
SCF	Save the Children Federation
WVI	World Vision International

I. Background to Grant and Project Context

A. Purpose, Approach, and Special Capability

The On-Farm Seed Project (OFSP) was a collaborative effort by Winrock International Institute for Agricultural Development (Winrock), the Center for PVO/University Collaboration in Development (PVO/University Center), various private voluntary organizations (PVOs), the U.S. Peace Corps, and Mississippi State University (MSU) to implement an innovative project to reach small farmers. This project combined the strength of PVOs and the Peace Corps in the field with the experience of MSU in seed technology, collaboration by the Center for PVO/University Collaboration in Development (PVO/University Center) and leadership by Winrock. USAID supported OFSP through a matching grant that includes contributions from Winrock International, the Center, and MSU. The project assisted the seed-related programs of PVOs and the Peace Corps in Senegal and The Gambia using a process approach that adapts technical assistance to the needs expressed by small farmers.

Winrock's organizational mission is to reduce poverty and hunger in the world through sustainable agricultural and rural development. Winrock helps people in developing areas to strengthen their agricultural research and extension systems, develop their human resources, institute appropriate food and agricultural policies, manage their renewable resources, and improve their agricultural production systems.

A subcontractor in the project, the PVO/University Center provided a forum for information sharing and exchange among universities and PVOs involved in international agricultural research and development. This growing network comprised 16 universities and 16 PVOs, including institutions involved in OFSP. These included Winrock, Catholic Relief Services (CRS), Save the Children Federation (SCF), World Vision International (WVI), and MSU.

The Center was a catalyst in the creation of OFSP, providing a forum in which PVO and university interaction led to the development of a concept paper and later to the initiation of OFSP. The Center's role in OFSP was to facilitate collaboration and communication among the organizations involved in the project, and to publish *Seed Sowers/Les Semeurs*, the OFSP newsletter, which is written by Winrock field and headquarters staff (see appendix A).

The rationale for the project arose from estimates by MSU, a world authority on agricultural seeds, that more than 90% of the crops in developing countries are sown from seed stocks selected and saved by farmers. Inadequate methods for selecting and saving seed diminish the potential benefits of adopting superior seed varieties, impede the introduction of nontraditional crops, and restrict the range of crops planted. In light of mounting pressures on food supplies and the need to generate income, such problems could not be ignored. OFSP was designed to help farmers improve their practices of seed selection, production, and storage.

Farmers have been growing and saving seed of traditional food crops, such as millet, for centuries. Given the opportunity, they can learn and adopt ways to maintain varietal purity in the seeds they produce, maintain high rates of germination in the seeds they store, and reduce incidence of seed-borne diseases. A survey conducted by World Vision in the Louga region of Senegal, using a questionnaire developed by OFSP, provided much needed insight into farmers' seed practices for traditional crops.

Through this and other informal surveys of the activities of small farmers in Senegal and The Gambia, the OFSP staff learned of several seed-related needs. Reduced rainfall in recent years necessitated a switch to earlier-maturing crop varieties. Crop-storage losses of 30% are routine for both individual and group peanut stocks and can be as high as 100%. Farmers appreciate the advantages of improved seed but often are not able to obtain such seed locally. PVOs in Senegal and The Gambia have been involved in community storage of seed and food grains, and their workers need more training, training materials, and technical assistance to enhance their ongoing activities.

Both women and men are involved in agricultural production, so both were involved in OFSP field activities. Depending on the ethnic group and agroclimatic zone, women and men play differing roles in crop and seed production. On-farm seed demonstrations conducted with groups of female and male farmers have shown the potential for significant yield increases that benefit both women and men farmers.

B. Resources Available

Support and commitment to the seed sector came from several sources in Senegal and The Gambia. In The Gambia, OFSP collaborated often on a cost-share basis with many NGOs that have established seed-production field activities. OFSP enhanced NGO field activities by providing training and technical assistance that they would not otherwise have. In addition, OFSP provided links with national, regional, and international sources of information, technology, and seed.

The government of Senegal supports an agriculture research institute and a national seed program. OFSP supplemented the activities of the national agricultural research and national seed systems by introducing new, appropriate varieties and developing new technologies through the participation of the extension staff of PVOs, NGOs, and Peace Corps Volunteers who were implementing seed improvement activities at the village level.

OFSP contributed significantly to the design of the Peace Corps African Food Systems Initiative (AFSI) program in Senegal which focuses on seed production and storage. OFSP's assistance to PVOs, NGOs, and the Peace Corps enhanced their existing activities through training and technical assistance. Catholic Relief Services, which has established 250 seed and cereal storage facilities, collaborated with OFSP in the field. OFSP worked with the extension staff of several local NGOs to assist their seed production and storage activities with farmers.

II. PVO Approach

A. Project Goal, Purpose, and Objective

Goal: The goal of OFSP was to improve the nutrition, income, and well-being of small farmers and the food supply for urban consumers in The Gambia and Senegal

Purpose: Its purpose was to identify and to promote among small farmers improved methods of selection, production, saving, and distribution of seeds and vegetative planting materials by small farmers. Project objectives also included improving methods for on-farm seed grain storage.

Objective: The project sought to develop a cadre of personnel from nongovernmental organizations (NGOs), government and farmer groups who are trained in seed production and could plan and manage the technical and training aspects of local seed-enterprise development within each country. This cadre was composed of PVO and NGO staff, government extension personnel, U.S. Peace Corps Volunteers, and farmers who were trained by extension workers and Peace Corps Volunteers in Senegal and The Gambia.

B. Approach, Methodology, and Strategy

The approach of OFSP was innovative in two ways. First, it used a process approach to project design and implementation by which technical assistance was based on assessments of local needs and data collected in the field. Feedback from farmers and field collaborators is incorporated into the design of ongoing project activities. Second, it is collaborative -- all field operations are implemented through organizations that are already in the field, i.e., PVOs, NGOs, and Peace Corps. The OFSP approach is described in Appendix B.

OFSP was designed to enhance the seed programs of collaborating organizations, not to duplicate or compete with them. OFSP provided a service to PVOs, NGOs and the Peace Corps in program planning, training, and technical assistance on-site in conjunction with current and planned field activities of its collaborators.

The collective resources of Winrock, the PVO/University Center, and the field project enabled the OFSP to link regional and local groups with national agricultural research institutions (such as ISRA in Senegal) and international information networks, such as the Collaborative Research Support Programs (CRSPs). Through OFSP project collaborators had access to INTSORMIL and Mississippi State University's Seed Technology Laboratory, a leading institution, worldwide, in seed technology.

In Senegal and The Gambia, both men and women participate in seed production and storage activities. Their roles vary depending on the crop, agroclimatic zone, and ethnic

group; for example, in the Nioro area of Senegal, men plow, plant, and cultivate peanuts and millet, and women harvest, store, and process the crops. Rice production practices vary widely. For example, in Mandinka ethnic areas of The Gambia, women are responsible for all phases of production and storage. Women grow contract rice-seed for Save the Children in The Gambia. In the Diola ethnic areas of Senegal, men plow fields for rice then women plant, harvest, and store the rice crop.

OFSP helped farmers gain access to better seeds by improving their systems of selecting, producing, storing, and distributing seed. OFSP staff members worked with project collaborators to develop field demonstrations that are intended to help farmers learn ways of incorporating improved varieties and modified cultural practices into their traditional production systems. In the process, the farmers shared indigenous knowledge and skills with other farmers and OFSP, learned about new varieties and technologies, and were challenged and encouraged to review and revise, if necessary, their assumptions about selecting, producing, and storing seed.

OFSP's strategy included the following steps:

1. identify international, national, and local NGOs involved in agricultural activities that could benefit from OFSP assistance in developing or improving seed-production through training and technical assistance;

2. discuss traditional seed-production and -storage systems, including division of labor by gender, with local farmers and extension agents; document the information gathered;

3. develop training programs for extension agents working with local seed producers;

4. identify appropriate or improved seed varieties and(or) modified seed practices adapted to local conditions;

5. conduct demonstrations with farmers to create awareness of and demand for improved seeds, thus stimulating local seed production; and

6. review results of and farmer reactions to the demonstration and modify the activity accordingly.

III. Review and Analysis of Project Results

A. Summary of Activities June 1, 1991-September 30, 1992

The activities reported in this section cover the period from June 1, 1991 through the 3-month extension period to the end of September 1992. The reporting period includes two agricultural seasons, i.e., activities completed in 1991 after the last reporting period and activities completed through the end of the project in 1992. The OFSP continued to provide program planning, technical assistance, and field visits to help improve and fine tune the seed related activities. The project's role in providing training diminished over the last year as staff of collaborating NGOs, trained by OFSP, carried out their own training programs.

1. Senegal

The provision of OFSP services to the Peace Corps rice program in Senegal developed momentum through the dedicated work of the Peace Corps Volunteers and the technical support of Alphonse Faye of the OFSP. Importantly they followed the participatory approach in gathering information before undertaking participatory demonstrations with women. The detailed information gathering was important for making program decisions and for measuring the impact of OFSP approach.

As part of the institutionalization process of the Peace Corps program in Senegal, OFSP phased out formal training of Volunteers but field visits and technical assistance were maintained. OFSP experienced volunteers took over the role of training new volunteers, using information derived from the detailed baseline studies carried out earlier.

In 1991, two different rice activities were underway through OFSP with Peace Corps Senegal: baseline information gathering and participatory demonstrations. Earlier, Julia Gamble and John McPeak had carried out extensive information gathering activities on women's role in rice production practices in the departments of Sedhiou and Kolda (see map, Appendix C). This information provided the basis for the development of rice demonstrations in the area. Many of the same women who had participated in the information gathering also attended. Improved varieties, improved nursery-bed management, and transplanting younger seedlings were demonstrated in the plots. These topics were discussed in female farmer training sessions in 11 villages with 60 women, each of whom had demonstration plots. The results of these demonstrations convinced farmers to use the improved varieties and modified practices. Yield increases of greater than 20% (compared to control plots) were obtained in 65% of the demonstrations.

In April 1992, a Peace Corps Rice Conference was held to review the previous years' activities, hold technical discussions, and plan the upcoming season's activities. The conference included participants from the Peace Corps Senegal and representatives from Peace Corps The Gambia, Peace Corps Guinea Bissau, Freedom From Hunger Campaign The Gambia, and The French Volunteer Service. Each department produced a document that detailed the results of last year's information gathering and demonstrations in Kolda and Sedhiou. This kind of conference was important in that work experiences in different

agro-ecological zones and countries can be shared among participants and applied where appropriate.

Based on the information gathered in 1991, participatory demonstrations were undertaken in 1992 with women in all the departments. Improved varieties and modified practices were introduced for transplanted rice as well as for direct seeding practices. The following tabulation provides details of this activity.

Table 1. Rice participatory demonstrations undertaken in Senegal, 1992.

Departments	Demonstrations	Women
Kolda	13	135
Sedhiou	6	23
Nioro du Rip	4	31
Foundiougne	13	69
Total	36	258

The On-farm Seed Project began collaborating with the WVI program in Senegal in 1990. The agricultural season of 1992 marked the second year for a collaborative seed program with millet and cowpeas that included WVI and OFSP as well as the government seed service.

Previous training of trainers with WVI staff and bush consultants (contact farmers) resulted in 1300 farmers trained in 407 villages in the Louga and Thies regions. There was one OFSP training program for new WVI staff. Field visits were also conducted late in the agricultural season. The program included production of improved seed in demonstration plots on 224 ha of millet and 132 ha of cowpeas. Certified seed production was carried out on 58 ha of millet and 30 ha of cowpeas. The production results were impressive despite marginal rainfall. About 25 metric tons of improved varieties of millet and cowpea were stored by farmers in 1991. In addition, WVI purchased 2 metric tons of millet and cowpea seed from contract growers in 1991, which was then conditioned in Bambay and resold to farmers in 1992.

Seed demonstrations and multiplication activities were continued in 1992. Demonstrations for production of improved seed were made on 209 ha of millet and 25 ha of cowpeas. Certified seed production is being carried out on 58 ha for millet and 30 ha for cowpeas. A new innovation by WVI was to translate seed technical bulletins into several local languages. In addition, contact farmers are being used as part of a team for training government extension workers.

The OFSP worked with the Christian Childrens Fund (CCF) agricultural program in five villages in the Thies and Mbour regions. In collaboration with CCF staff, a farmer survey was carried out in 1991 to identify seed related practices and problems in millet production. As a result of the findings, farmer training and field visits were carried out with CCF staff. In this activity 10 contact farmers in each of the five villages were trained on improved methods of farmer seed production and selection. In the first year CCF staff

reported that a "seed awareness" had been created among the 50 participating farmers. This awareness includes knowledge on screening of seed, planting seed plots in the field, thinning, disease identification, and plant selection for seed at harvest.

In 1992 activities continued with the same 50 farmers in 5 villages. The CCF representative in each village monitors the implementation of the training from the previous year in improved seed practices by the farmer.

2. The Gambia

Save the Children Federation USA The Gambia has had an active rice seed multiplication program for many years. The OFSP provided seed related services to the project. In 1991, collaboration with SCF continued for a second year. Specifically, OFSP worked with female farmers in rice demonstrations. A series of training/planning workshops were conducted through the season with field visits in September and October. Peace Corps volunteers collaborating with SCF participated in the visits. The number of rice demonstrations were more than doubled from 38 to 100 involving 100 women and 2 men in 20 villages. The rice demonstrations involved row seeding of an improved rice variety combined with early weeding.

The results gathered from 68 demonstrations revealed that 54% of the demonstrations yielded better than the control; 8% were worse and 29% failed due to poor rains. The trials with the 4 row prototype seeder provided by the OFSP generated considerable interest among male farmers. The weight of the seeder and the inadequate front wheel will require modification before further use. In addition, rice seed multiplication with individual contractors (.25 ha each) was expanded from 16 farmers on 3 ha to 117 farmers on 21 ha.

At the beginning of the 1992 season the OFSP participated in two planning workshops with SCF in order to facilitate better program planning and implementation at the village and program level. The workshops assisted field staff to develop village plans that outlined objectives, activities, and indicators that were based on previous activities in the village. The OFSP contributed to this approach and considered it a significant step in the right direction for participatory program planning, implementation, and data collection. In 1992, activities are underway in 19 villages with 175 seed multipliers. Rice demonstrations have been reduced to 41, but informal demonstrations, called promotions, were initiated with 1,058 women.

Previous efforts of the OFSP with Freedom From Hunger Campaign (FFHC) -- Women's Rice Project focused on technical topics of rice production. 1991 marked the beginning of OFSP assistance in the assessment of the technical and extension aspects of their program. This effort was undertaken through field visits and a series of meetings at the conclusion of the season to evaluate results, and determine new directions for their rice activities with women. These meetings involved 10 field staff and 3 program staff.

FFHC participated in the testing of two prototype rice seeders with women farmers. In addition the OFSP had introduced them to a farmer in Senegal that was providing training to women in animal traction. The 4-row seeder proved to be too heavy for the women to use, but the 1-row hand-pulled seeder looked promising.

In 1992 the OFSP participated in planning workshops based upon 1991 assessments in preparation for rice demonstrations with women.

The On-Farm Seed Project's work continued with the Peace Corps, agriculture program in The Gambia. The primary focus of the Peace Corps program is gardening and agroforestry. Volunteers had, however, expressed an interest in rice extension as a secondary activity. This resulted in a 2-day in-service training activity presented in April 1991.

There were at least two positive results of this in-service training provided to six Peace Corps volunteers. Two volunteers collaborated with SCF in rice demonstration and seed multiplication activities with women in several villages in the North Bank Division. Two volunteers on the south bank undertook a rice study with 22 women farmers to provide a basis for future rice activities.

The two volunteers working with SCF were quite successful in extending improved rice practices because of the volunteers close integration with the village. After demonstrating the row seeding technique, one female volunteer witnessed 12 women convincing their husbands to row seed their rice fields. The two volunteers on the south bank successfully produced a report on traditional rice practices that will guide the activities of future PCVs in the area.

In September 1991 a 20-day basic training program in traditional rice production and participatory extension was provided to 6 agriculture and 10 agroforestry volunteers that had recently arrived in The Gambia.

In addition, the Associate Peace Corps Director (APCD) and four volunteers participated in the Senegal Rice Conference in April 1992. In September 1992 a basic 2-day rice training session was provided to five volunteers that will be collaborating with SCF on the North Bank Division.

3. Consultancies During the Period

During the fifth year there was a visit by MSU staff and a number of consultancies conducted to review various aspects of the OFSP. In the paragraphs that follow, a brief summary is provided on each.

"Consultancy Report," August 1991, by Deirdre Birmingham (see Appendix D)

In August of 1991, Ms. Deirdre Birmingham, Winrock International training specialist, went to Senegal and The Gambia on a consultative visit to review OFSP training component.

She saw that the OFSP strategy was "to train those who can train others", thus the approach which depends heavily on field-based agents, is to replicate the training message. OFSP staff does have a good understanding of the clients who are to be trained. These participatory research and training activities are at the heart of the project. This type of training requires the OFSP staff to "think from a farmer's perspective".

She observed that Osborn and Faye were using a training approach appropriate for many levels of education. Her main conclusion was that "attaining the project's goal is not just dependent upon the technical message, but also on the communication approach." The farmer participatory demonstrations are the key teaching/learning tools of the project. She lauded the staff's attempt to understand the roles and responsibilities of women within the project context. Finally, she recommended the OFSP staff consider developing a computerized management information system, continue its development of extension materials, and upgrade relevant staff skills.

As a follow-up to Ms. Birmingham's recommendation to develop a management information system, a concept paper was written by the OFSP staff and a consultancy was undertaken by Robert Deuson in September 1992 to assess what could be done in this area.

"Visit with On-farm Seed Production Project," September 1991, by James C. Delouche (see Appendix E)

Dr. James C. Delouche of Mississippi State University made a consultative visit to the On-farm Seed Project in September 1991 to undertake a technical review of OFSP activities.

He perceived that OFSP collaborated with PVOs/NGOs and the Peace Corps in the two countries with active field programs. Collaboration, he observed, varies substantially with the operational mode and resources of the collaborator, the goals of the collaboration, the technologies to be transferred and messages to be communicated. He studied the "process" of the collaborative program, concluding that OFSP provides primarily a service and support program. Delouche indicated that OFSP was exceptionally well-suited to its goals, clientele and resources. OFSP uses simple, viable, relevant and valid technologies to maintain a balance between the transfer process and the technology being transferred. Traditional practices, he observed, are validated. The process approach, based on identified and defined needs as opposed to assumed needs is the OFSP's strength. Those interventions that are "doable," using valid technologies and "understandable" messages make OFSP a success. He suggested that it could perhaps become an effective model for larger multilateral and bilateral aid programs.

Monitoring and evaluation is difficult in a collaborative activity. The OFSP has utilized a variety of methods and important lessons have been learned. It is clear that improvement can be made in the monitoring and the evaluation of collaborative activities. In the future, donors, implementors and collaborators need to understand what is feasible in this area in order to develop relevant indicators of progress.

"Farmer Seed Practices - Region of the Louga, An Assessment of World Vision/OFSP Activities," June 15-19, 1992, by Stephen Leisz (see Appendix F)

This document follows-up on Winrock International's On-Farm Seed Program's (OFSP) collaboration with World Vision International (WVI) over the past 3 years in the Region of Louga, Senegal. The main findings of the study are that improved seed selection techniques which have been extended to the local bush consultants have been accepted by the agents and are being used by them. Overall, though, the level of acceptance of the

techniques is low. Only in one village surveyed was the level high enough to suggest that the extended techniques might be incorporated into traditional farming practices. Among the techniques extended, two have high adoption rates: screening and storing seed separate from food stocks. The other techniques (separate seed plots, selecting plants as seed sources before harvest, rouging for disease, following the plant through its cycle to determine if it has desirable qualities at each stage of development, and harvesting the seed separate from the main harvest) have much lower levels of acceptance.

"A Review of Save The Children/USA/Gambia's Rice Extension Program and Collaboration with The On-Farm Seed Project," July 13-17, 1992, by Stephen Leisz (see Appendix G)

A study was done of Save The Children Federation/USA (SCF) rice extension program on the North Bank of the Gambia River during the week of 13-17 July 1992. The main conclusion of the study was that adoption of the new rice varieties promoted by SCF have been fairly widespread in the area where work had been carried out.

The extension of row seeding technology for direct seeded rice, the main technique extended by the project, has been fairly well adopted in the Nuimis area of the north bank, but less so in the Baddibu districts. The main difficulty faced in promoting row seeding is convincing men to loan their wives the seeding machine or to seed the rice for them. Those interviewed agreed that farmers could in many cases totally take over the production of the new varieties which have been introduced. The main limitation to this is poor rainfall in certain years which leads to poor harvests.

The study also attempted to gather information on where SCF should move with its program and what roles the On-Farm Seed Project (OFSP) could play in its future. The main suggestions were that SCF should concentrate on providing technical assistance to farmers and only provide new varieties when the village being worked with was a new one, or when a new cultivar had been identified and SCF could act as the releasing agent. It was suggested that OFSP should continue to provide training for SCF's extension agents, increase the number of their trips to SCF's rice fields, and help identify new rice cultivars for the SCF to introduce to the farmers.

"General Guidelines to Build a Data Entry and Verification System for the OFSP Project," September 3-16, 1992, by Robert Deuson (see Appendix H)

Winrock and its collaborators have already collected a critical mass of computer hardware and software and each organization has on its staff at least one person either with training, or interested in being trained, in data entry and verification. With some modest additions in hardware and software, Winrock and its partners could quickly acquire the capability of creating and maintaining a common Data Entry and Verification System.

Training, will have to be provided to individuals in each organization with an interest in becoming the key person in the OFSP/NGO network.

Recommendation: with so many collaborators, it is imperative that the OFPEP staff develop a set of standard procedures, which all agree to follow, in order to assure high quality and consistent data entry and verification. Such procedures should be consigned

to a user's booklet and used for training the users. It is also recommended that one person in each organization be made responsible for the supervision of data entry and verification.

It is further suggested that the person in charge of data entry and verification system at OFSP be a locally hired permanent employee of the project.

B. Overall Results

1. Introduction

The OFSP, working through PVO and Peace Corps programs, directly benefitted people through seed multiplication, field demonstrations, and training programs. The number of project beneficiaries has been estimated. Over 65,000 small farmers were beneficiaries of the On-Farm Seed Program through participation in training and demonstrations (Tables 2 and 3). Of these, 23,457 were men and about two-thirds of the beneficiaries or 43,690 were women. The number of those who were able to benefit indirectly through contact with participants was not quantified. However, if each farmer participant of the OFSP talked to two other farmers, those benefiting indirectly would be well over 125,000. The ability to reach female farmers shows the extent to which the PVOs and the Peace Corps along with the OFSP, are working with resource poor farmers who have the least access to advice and technology. In addition, the interventions have proven appropriate and sustainable to traditional low input farming.

For many of the farmer beneficiaries, going hungry during part of the year is a reality of life. Growing enough food to feed their family during the "hungry season" is often their number one worry and concern (Leisz, 1992). If project donors are to judge the OFSP by the criteria of benefiting the "poorest of the poor," then the project, by this standard, was a glowing success (Bragantini and Schillinger, 1992).

Table 2. Number of people trained by OFSP and farmer beneficiaries of training.

	Senegal		The Gambia	
	Men	Women	Men	Women
Peace Corps	36	43	10	17
NGO Extension Staff	200	50	137	44
Gov. Extension Staff	60	0	54	6
Farmer Beneficiaries	11340	5600	4400	15500

Table 3. Number of demonstrations completed and farmers who observed demonstrations.

Type of Demonstration	Senegal			The Gambia		
	No.	Men	Women	No.	Men	Women
Rice	371	550	9990	240	320	10360
Millet	308	3000	500	0	0	0
Cowpeas	145	3000	500	50	80	1020
Groundnuts	40	270	60	0	0	0

2. Senegal

In Senegal, the OFSP provided training and technical assistance to extension staff from governmental and non-governmental organizations during the life of the project. Most training of government extension agents has been within the context of activities of a PVO or the Peace Corps. In a few cases PVO/NGO staff were provided training but, due to various reasons, further collaboration did not develop.

With the Peace Corps Senegal, the OFSP provided formal training to over 106 Peace Corps Volunteers (PCVs) during the life of the project. However, the primary contribution of the OFSP was in the technical assistance provided to volunteers and farmers during field visits. Peace Corps/Senegal (PC/S) and the OFSP developed close collaboration starting in 1988. It began with activities in peanut seed storage, testing of millet varieties, and a pilot rice program in the Department of Bignona in the Casamance.

After 2 years, successful results were being obtained by OFSP with farmers in Bignona but, political problems forced PC/S to move to other regions. Rice activities were expanded in the departments of Kolda, Sedhiou, Nioro, and Foundiougne.

After gathering information for a year from farmers through interviews, observations, and measurements, PCVs implemented farmer participatory demonstrations to promote improved rice varieties, improved nursery management, early transplanting of seedlings, and other management practices. The new varieties and improved agronomic practices were accepted by farmers, and this technology rapidly spread to new villages.

The impact of the PC/S OFSP collaboration was significant since nearly 100 villages have been involved; hundreds of demonstrations undertaken; and thousands of female rice farmers reached with improved varieties, and sustainable, low input practices and technologies. These interventions have increased rice yields and food availability. In addition, the rice varieties and practices spread widely from farmer to farmer through traditional means.

Numerous documents have been produced by the Peace Corps volunteers and the OFSP describing the activities that have provided valuable baseline data and the results of participatory demonstrations.

World Vision International (WVI) Senegal has an integrated development program on water management, agriculture, and health in the regions of Louga and Thies in northern Senegal. The project serves over 320 villages and a population of 150,000. These northern regions of Senegal served by WVI have become increasingly marginal for agriculture because of limited rainfall (250-300 mm per year), widespread deforestation, and decline in soil fertility.

Starting in 1990, OFSP began a collaborative program with WVI to undertake a survey through WVI field staff and bush consultants to determine seed practices and problems. The information developed from this initial survey resulted in a program of demonstration and seed multiplication that involved participation of WVI and OFSP as well as the national seed program and the national agricultural research service. Two trainer workshops were conducted for 25 WVI staff, government extension staff, and bush consultants. Bush consultants are lead farmers who are responsible for demonstrations and seed multiplication activities with farmers in a five village area. These trainers then trained 70 men and 64 women to monitor activities. Each of the 70 bush consultants conducted training in a total of 250 villages. In addition, OFSP conducted training sessions and field visits on seed multiplication for farmers in selected villages. WVI conducts millet and cowpea demonstrations and seed multiplication in 70 villages. In 1990, there were 50 ha of improved millet and 30 ha of improved cowpeas. Certified seed production was carried out on 40 ha of cowpeas and 20 ha of millet. Activities in 1991 and 1992 have been presented in the previous section.

WVI has made this program a priority, and the results have been impressive in combined demonstrations and seed production efforts. Improved practices have been promoted and seed of varieties not previously available at the village level has been multiplied. This effort has involved hundreds of villages and thousands of farmers and has resulted in higher yields of millet and cowpeas and availability of seed at the village level.

The OFSP collaborates with the Christian Childrens Fund (CCF) in Senegal in field activities in five villages involving agriculture, education, health, and community development. The activities are managed by village committees. CCF staff facilitate the linkage of these committees with sources of assistance from governmental and non-governmental organizations.

The OFSP was engaged by CCF to work with the villages to increase millet yields by improving seed quality and related practices through a step by step approach. Millet is the staple of the villagers, and because of low soil fertility, drought, and high cost of fertilizers, millet yields are low. This situation contributes to a long hungry period and poor nutritional status of the children. CCF staff and village committees are convinced that the approach of the OFSP is viable for achieving the goal of higher food availability at the village level.

The primary involvement of the OFSP with Catholic Relief Service (CRS), was with their Seed/Cereal Bank Program which involved the construction of 15 metric ton capacity seed/cereal stores in 256 villages. In 1989, the OFSP assisted in the midterm evaluation of the CRS training program carried out in villages following construction of the village seed/cereal stores. As a result of the evaluation, modifications were made in the training program. In 1990, the OFSP participated in a rapid rural appraisal (RRA) in two villages

to assess the impact of the village seed stores initiative. The OFSP also participated in the final evaluation of the training program for the seed/cereal stores in 1991. CRS participated in the formation of the OFSP Advisory Council and was an active member.

3. The Gambia

In 1988, when the OFSP was initiated in The Gambia, seed activities had already been underway involving the Seed Technology Unit of the Ministry of Agriculture which produces certified seed, and NGOs that multiply the seed with contract growers at the village level. This situation provided an ideal opportunity for the OFSP to collaborate with the government and the NGOs in training activities enlisting the assistance of Mississippi State University as trainers. In 1988-89, workshops on Seed Production and a second workshop on Harvesting, Postharvest Handling, and Storage was provided to over 70 extension staff of Action Aid, Catholic Relief Services, Canadian Universities Service Overseas (CUSO), Freedom From Hunger Campaign, FAO Fertilizer Project, Save The Children (USA), and government extension staff. The training included field visits, seed lab visits, discussions, participant presentations, and numerous training materials.

Along with this training effort, the OFSP collaborated in the writing, editing, production, and distribution of the "Seed Multiplication Manual for Extension Workers in The Gambian Seed Industry". The participants in the training worked in over 500 villages that represented over 20,000 farmers. The training effort was useful to the participating organization and helpful to the OFSP in establishing its role in The Gambia.

Save The Children Federation (SCF), has a diverse program in health, food production, and education in the North Bank division of The Gambia. Approximately 30% of SCF's resources are devoted to agricultural activities, which are focused on helping 10,000 women farmers in 24 villages to increase food production through gardening, introduction of new rice varieties, animal traction, and seed multiplication. The OFSP has assisted SCF since 1988 in training field staff and farmers in seed production, post harvest handling, and rice production. The key contribution of the OFSP has been to improve the technical capacity of the field staff so that female rice farmers can be assisted more effectively in traditional rice production. This kind of technical assistance was available from no other source in The Gambia. The mission was accomplished through the initiation, in 1990, of participatory rice demonstrations that served as a training tool for the field staff and farmers. It brought attention to the agronomic practices that must go with improved varieties and row seeding in order for high yields and a lower labor demand to be achieved. The rice demonstration was a strategic change in the SCF program that brought benefit to many more female farmers than before. Additional assistance was given in demonstrating the prototype rice seeders and participation in program planning.

The Freedom From Hunger Campaign's (FFHC) focus in The Gambia is working with women rice growers in 32 villages of the lower river, north bank, and MacCarthy Island north divisions. FFHC has concentrated on rice production in swamps and tidal areas, where they are introducing new rice technologies, improving rice quality, promoting water harvesting, controlling salt water intrusion, and strengthening village institutions. The OFSP began collaborating with FFHC in 1988 by providing seed production workshops to their field staff. In 1990, the OFSP helped FFHC develop their program in animal traction by identifying a farmer from the Casamance region of Senegal who then trained

women farmers in the FFHC program on animal traction techniques. OFSP assistance to FFHC in 1991 included further rice training for field staff, field visits, and collaborative testing of a prototype rice seeder. The OFSP also helped evaluate the overall FFHC program and develop their 1992 work plan.

The OFSP provided basic seed training to 14 Catholic Relief Service (CRS) field staff in 1988-89. The CRS participated in the seed program management seminar in 1989 and in the formation of the OFSP Advisory Council. The CRS agricultural program officer served as chairman of the OFSP Advisory Program. An in-country matching grant was provided to CRS for cowpea seed production training based on field visits in conjunction with MSU.

One of the mandates of the OFSP was to provide, if possible, assistance to additional African countries. The OFSP has provided assistance and training to a number of third countries. In several cases this has generated interest for the OFSP to assist in development of seed programs in those countries. The following paragraphs describe these OFSP activities. Unfortunately with only two staff members and a priority to provide services to Senegal and The Gambia, it has not been possible to meet all the demand for services in these additional countries.

- In August 1990 a five-member team from Niger visited Senegal for assistance in determining the feasibility of a collaborative seed activity in Niger. The team included representatives from the *Cellule de Liaison Recherche-Vulgarisation* within the *Institut National de Recherche Agronomique du Niger*, the *Service Semencier National du Niger*, and country and regional staff from Care International. The visitors toured World Vision/OFSP field activities, visited the National Agricultural Research Stations and National Seed Service, and spent a day discussing what they had seen. This visit was followed by a request to come to Niger to provide training to extension agents and contact farmers.

- In September 1990 a 4-day seminar in Dakar, Senegal, on planning village-level seed activities was conducted with Peace Corps staff from Zaire, Mali, and Niger. The seminar was jointly hosted by OFSP and Peace Corps/Senegal. Lutheran World Relief/Mali and OFSP sponsored representatives from two local Malian NGOs who also attended the seminar. The seminar included technical discussions, presentations by each country, and a field trip. The evaluation and feedback indicated an interest in developing seed activities in each country. This was followed by a request from Peace Corps Mali to provide training.

- OFSP was invited to make a presentation on farmer seed production during a conference at the CIAT/SADCC Regional Bean Project based in Tanzania.

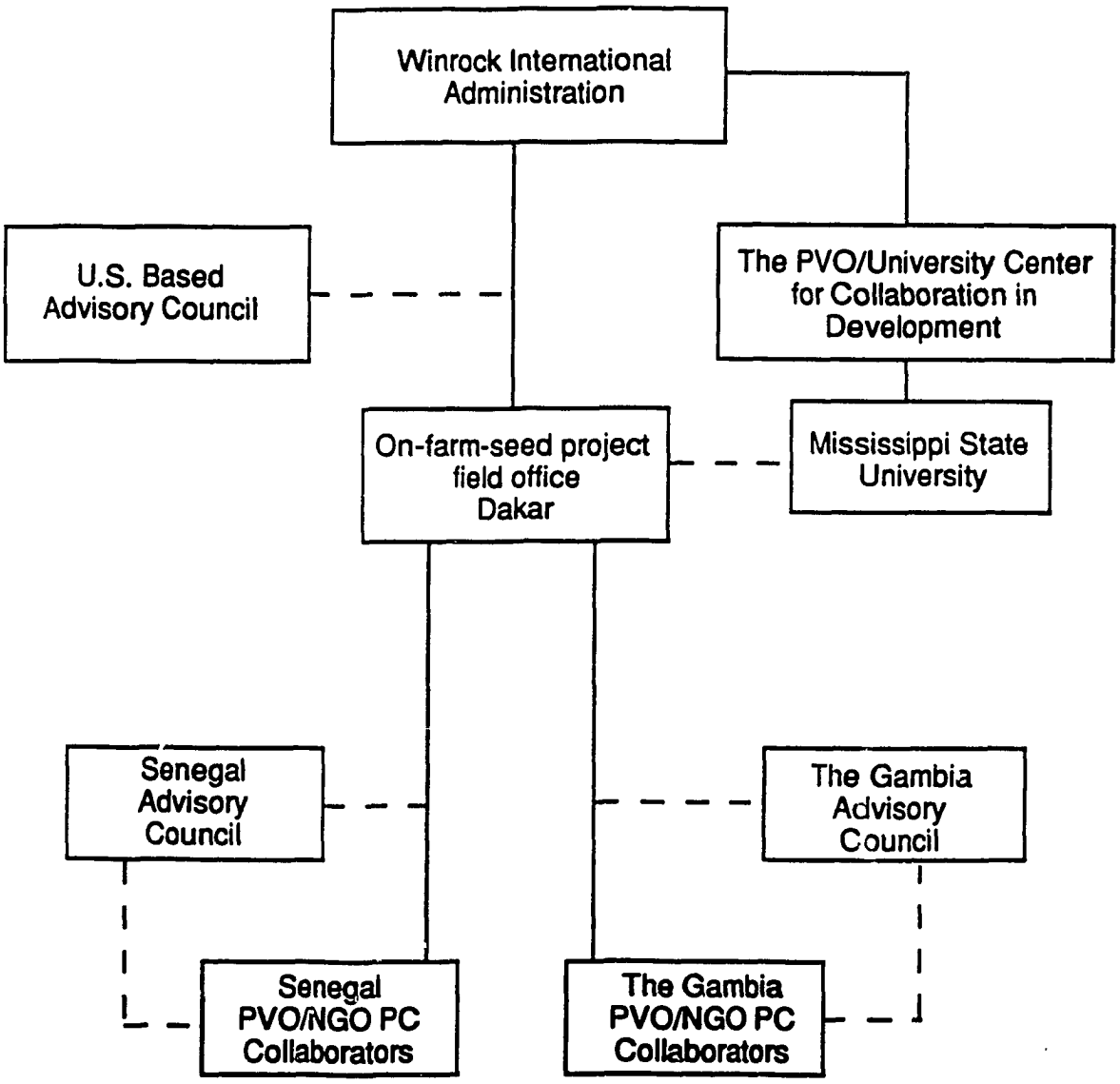
- Peace Corps Guinea Bissau participated in the rice conference in April 1992 since they were in the process of developing a rice program. The OFSP was invited by the Peace Corps to visit Guinea Bissau to assist in training and program planning and technical assistance to their rice program.

Management, Organizational, and Staffing

A. Organization

The following is an organizational chart (Figure 1) of the On-farm Seed Project. The project is featured in the center of the chart, with the two main implementors, Winrock International, and the PVO/University Center figuring above it. The in-country collaborators in Senegal and The Gambia are also connected by unbroken lines emphasizing the core players in the project. MSU is shown in a way that reveals that it is a part of the PVO/University Center, but also a unique and important organization contributing to the project. The U.S., Senegal, and The Gambia Advisory councils are linked to the relevant geographical entities by broken lines, emphasizing their advisory role.

Figure 1. Organizational chart of OFSP.



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B. Project Management and Staff Resources

During the first 2 years of the project, implementation activities were accomplished by a project leader, Mr. Tom Osborn, and a program assistant, Ms. Valerie Lamont, both based in the Winrock Washington Regional Office, with the project leader spending substantial time in Senegal and The Gambia. Since the collaborative concept of OFSP implied that field activities were to be carried out through the collaborators (the NGOs and the Peace Corps), it was felt that no permanent staff was needed in the field. Dr. Ned Raun, Winrock's regional representative in Washington, was principally responsible for the overall management and implementation of the Matching Grant Program.

The project leader was responsible for overall project management as well as for field implementation of the programs. The field activities included: host-country government relations, in-country collaboration with the Peace Corps and the PVOs, programming, training design and implementation, preparation of training materials, technical assistance, and information gathering.

The program assistant established a seed database, developed training materials, edited and published a newsletter, edited the seed extension manual, catalogued 400 publications, and assisted the project leader.

During the first year of the project, the project leader spent a substantial amount of time in the field, implementing programs although no logistical support (i.e., local staff, vehicle, and communications) was available. As the field activities expanded, greater demands were placed on the project leader for field implementation.

By the end of Year 1 of the project, it became evident that these great demands placed on the project leader far out-stripped his ability to meet them while based in Washington and without field support in Africa. For example, the project leader could not access office space nor office support belonging to collaborating PVOs because none was available.

On January 1, 1989, the project leader was transferred from Washington to Dakar. While the program assistant remained in Washington to provide home office support, she made two visits that year to Senegal to assist with field activities. With the project leader assigned to Dakar, office space was rented and a vehicle was purchased.

In October 1989, a project coordinator, Mr. Alphonse Faye, was hired to work with the project leader to: (a) establish links with training and extension resources that may benefit the PVOs, (b) represent OFSP to the *Conseil d'organisations nongouvernementales d'appui au dévelopement* (CONGAD) and the PVO community, (c) assist PVOs in developing seed-related programs, (d) provide technical assistance to the AFSI rice field trials, and (e) assist the project leader in representing OFSP and reporting to the Government of Senegal.

Home office support was transferred from Winrock's Washington, D.C. office to the Africa and Middle East Division at Winrock's headquarters in Arkansas as of January 1, 1990. The role of home office coordinator was transferred from Dr. Ned Raun to Dr. Pierre Antoine, director of the Africa and Middle East Division. Accounting responsibilities also were transferred from Washington to Arkansas.

The program assistant position was changed from full time to part time and transferred from Ms. Valerie Lamont to Mr. Steve Grant, program assistant for the Africa and Middle East Division. Some duties assigned to the program assistant were then transferred to the field. The program assistant provided home office support to the project leader, communicated with U.S.-based collaborators and technical experts, and facilitated procurement of equipment and publications for field activities. The program assistant also prepared the project newsletter, in cooperation with the PVO/University Center for Collaboration in Development, catalogued publications received, and performed special tasks such as overseeing preparation of the midterm assessment and annual reports.

This staffing arrangement allowed full scale activities in the field and was satisfactorily maintained through the end of the project. It must be noted, however, that in the fall of 1991, Ms. Sarah Luche, program associate, replaced Mr. Steve Grant.

C. Logistic Support

Thanks to the successful establishment of a field office in Dakar in 1989, Winrock's home office has not had to provide significant logistic support to OFSP. Winrock's home office staff generally assisted in providing arrangements for travel within the U.S. by OFSP staff on project business.

Materials and equipment were furnished through Winrock's procurement office. Recent acquisitions have included a laptop computer and dairy scales to weigh rice for yield estimates. Whenever the home office coordinator, program assistant or associate traveled to the field, he or she tried to bring any documents, computer diskettes, stamps, and other small pieces of equipment that could be hand-carried on an airplane.

D. Training and Technical Assistance

Through its cooperative agreement with the PVO/University Center, Winrock received technical assistance from Mississippi State University's Seed Technology Laboratory. MSU's Charles Baskin, who reviewed the seed production activities of NGOs in The Gambia in 1989, made a follow-up review of seed activities of NGOs in The Gambia and Senegal in 1990. James C. Delouche, also of MSU, made a technical review of OFSP activities in September 1991.

E. Project Fund-raising and Marketing

OFSP has been fully funded through the Food and Voluntary Assistance/Private and Voluntary Cooperation (FVA/PVC) matching grant mechanism. Winrock and its collaborators, the PVO/University Center and MSU, committed funds to the match. As OFSP entered its final year, Winrock and its collaborators explored various funding options for a second phase of the project.

F. Role of the Board of Directors

The Board of Directors gave its support to the creation of Winrock's Africa and Middle East division in 1988, and to the expansion of Winrock's development activities in Africa. OFSP, begun as a pilot activity, and partially funded with Winrock funds, is an example of Winrock's institutional commitment to program development in Africa. Board members have often acted on behalf of the institution to ensure that necessary technical, informational, and financial assistance is available for its program and project activities.

G. Development Education

Winrock International, which shares the Rockefeller legacy of charitable assistance to education, private enterprise, rural industries, and international agricultural research and development, continues to bring various groups together to discuss strategies for development in the U.S. and around the world. Groups attending leadership seminars and development workshops at Winrock include the fellows of African Women Leaders in Agriculture and the Environment, international student leaders of U.S. universities, as well as farm organization leaders and representatives from USAID and international development assistance organizations.

Winrock is also beginning farmer-to-farmer activities in West Africa (Burkina Faso, Côte d'Ivoire, The Gambia and Senegal), targeting a women-farmer clientele. This program was established by U.S. Congressional legislation and sponsored by the AID/PVC.

H. Monitoring and Evaluation

In the collaborative approach that characterizes the OFSP, the major responsibility for monitoring and evaluating project activities lies with the PVO/University Center. A variety of monitoring and evaluation tools have been utilized during the life of the project. These include the following:

Meetings and Field Visits: This is the primary form of monitoring and evaluation and it is carried out on an informal basis during meetings and field visits of project personnel with extension staff and farmers.

Case Studies: The OFSP has produced short case studies on activities with World Vision and Save The Children.

Baseline Studies: The OFSP, in collaboration with Peace Corps/Senegal and Peace Corps/The Gambia, produced several baseline studies on seed storage and rice cultivation. These include the following:

- Improving Peanut Seed Storage with Farmers in Senegal
- Pilot Rice Seed Program With Farmers in the Department of Bignona
- A Study of Rice Cultivation Practices in the Department of Kolda 1990
- Traditional/Improved Rice Practices in Department of Foundiougne 1990

- Rice Cultivation in Department of Medina Sabakh 1991
- Rice cultivation in the Department of Wakngouna 1991
- Rice Cultivation in the Department of Foundiougne 1991
- A survey with 22 female farmers in traditional rice practices in the Somita area (The Gambia).

These documents have been valuable in developing participatory demonstrations with female farmers. They have been shown to be important in training and the institutionalization of collaborative programs.

Seed Surveys: Surveys were conducted by World Vision and CCF with the assistance of the OFSP to determine the seed sources and seed practices related to millet and cowpea production, selection, and storage before interventions were undertaken.

Technical Reviews: The Mississippi State University staff conducted a technical review of the OFSP yearly. These reviews were conducted in August 1988, September 1989, September 1990, and September 1991, and lasted an average of three to four weeks.

Collaborator Questionnaire: In late 1990 and early 1991 a detailed survey was implemented with collaborators in Senegal and The Gambia to provide feedback on the usefulness of OFSP collaboration. The results of this survey were summarized in the last annual report.

Special Studies: Using a combination of participatory rural appraisal techniques and rates of adoption indicators, Stephen Leisz conducted impact surveys with WVI and SCF.

Consultant Reports: A review of training was carried out in 1991 and an assessment for the development of a management information system was undertaken in September 1992.

Reports of trials' results of demonstration plots compared to traditional plots were written, such as: "Kolda 1991 Rice Trials, Background, Organization and Results". At the conclusion of the 1992 agricultural season, four similar documents summarized the 1992 results.

A complete list of publications issued from these monitoring and evaluation exercises is found in Appendix I.

A formal final evaluation of the OFSP was completed by two evaluators in September 1992. Chosen by USAID, they spent 1 month in Senegal and The Gambia, meeting with USAID officials, PVO collaboratives, OFSP staff, and participant farmers. The full report is in Appendix J.

Executive Summary of the Evaluation Report

The On-Farm Seed Project (OFSP) was a five-year pilot project, budgeted at $1.8 million, which made technical assistance available to small farmers through institutions that work at the "grass roots" level. In essence, the OFSP was a service to PVOs and the Peace Corps. The purpose of the project was to identify and promote among small farmers improved methods of selection, production, saving, and distribution of seeds. The project worked primarily with rice, millet, cowpea and, to lesser degree, groundnuts.

Because of the diversity of interests among PVOs, the OFSP had to adapt their services to fulfill the need of each organization. This proved to be a valid means of assisting PVO field personnel in the area of seed technology. This approach should be replicable, provided that training and technical assistance has the required flexibility to tailor services to each PVO's unique needs.

The OFSP, through PVO and Peace Corps programs, directly or indirectly benefitted people through seed multiplication, field demonstrations, and training programs. The number of project beneficiaries was difficult to quantify. Conservatively, at least 65,000 small farmers were direct or indirect beneficiaries of the OFSP. Two-thirds of the beneficiaries are women. This emphasis on women was not foreseen in the Project Paper. Rather, the OFSP, Peace Corps, and collaborating PVOs recognized that rice, partially because it was a subsistence crop grown by women, had not received much attention and that the potential to increase rice yields existed.

Training in seed production and agronomic practices was provided to 560 PVO, government, and PCV extension agents via workshops, seminars, field days, and direct contact in the villages. This major component of the project was successfully accomplished.

Unlike the majority of seed production programs in developing countries, which focus on the development of national seed programs, the OFSP approach concentrated on the promotion of seed of improved varieties and on some simple seed selection and saving practices, emphasizing those with inexpensive inputs. Selection of seeds before harvest, saving seeds in the head, storing seed separate from grain, and sieving threshed seed to remove small seeds, are examples of the simple technology promoted by the project. However, since most of these practices were already part of farmers' traditional customs, the OFSP extended technical assistance to other equally important agronomic practices such as spacing, thinning, and timely transplanting.

The project proposal envisioned that "some communities would support local systems or seed production and distribution either through cooperatives or by individuals who establish private firms". This proved to be over optimistic. The OFSP worked primarily for the improvement of farmer-saved seed of subsistence crops. At this level, farmer-to-farmer seed exchange takes place almost exclusively in the form of barter, therefore, it was not realistic to expect much involvement by the private sector. However, community and individual farmer interest in local seed production systems is high. The new varieties and modified agricultural practices which were introduced with project assistance have been spread by farmers to neighboring villages in both Senegal and The Gambia.

The unquestionable success of the OFSP in bringing technology closer to small farmers through collaborating PVOs and PCVs is an approach that should continue to be explored. The lessons learned from the OFSP should be directly applicable to the Phase II OFPEP activity and, hopefully, to other technical assistance based extension projects in developing countries.

V. Financial Report

Throughout the 5 years of implementation, project expenditures have been in line with initial projections, except that in-country matching grants (ICMG) were not used to the extent anticipated in the project paper and original budget. It appears that the several NGO partners in Senegal and The Gambia were either not interested or ineligible to use the funds during project implementation. Lack of interest stemmed from the fact that the process of allocation and matching of funds was too cumbersome, complex, and time consuming for the level of financing available (about $3,000 per grant). Ineligibility to use funds was due to the fact that some collaborators (i.e., Peace Corps and Save the Children) were already using U.S. Government funds.

Winrock is confident, however, that project objectives were not hampered by the lack of use of ICMGs, since all collaborators, in fact, provided a substantial and direct contribution to OFSP. Cost sharing did indeed take place, as anticipated in the project paper, but was not specifically recorded. The final evaluation of the project supports the view that project objectives were met.

USAID funds earmarked for procurement were not used as much as initially anticipated. Most procurement expenditures were, in fact, billed to the Winrock match, rather than to USAID, simply for reasons of administrative convenience. Overall level of procurement expenditures was not lower than anticipated.

Tables 4 and 5 present a financial status report as of September 25, 1992, and the estimated cumulative expenditures incurred by September 30, 1992, respectively. The final financial report will be submitted by December 31, 1992.

Winrock introduced a request to USAID for de-obligation of all OFSP remaining funds, and their re-obligation to OFPEP.

Table 4. Financial status report as of September 25, 1992.

Category		Winrock Matching Funds		AID Matching Funds		Total	
		This Period	Cumulative	This Period	Cumulative	This Period	Cumulative
I.	Program Costs	13,887.11	443,343.00	14,453.94	724,748.66	28,341.05	1,168,088.66
II.	Indirect Costs	9,597.92	254,943.19	0.00	0.00	9,597.92	254,943.19
III.	Procurement	0.00	30,849.89	0.00	4,251.00	0.00	35,100.90
IV.	AID Evaluation	0.00	6,111.13	0.00	14,961.74	0.00	21,072.87
Total		23,485.03	735,247.21	14,453.94	743,961.40	37,938.97	1,479,205.62

Table 5. Estimated cumulative expenditures incurred by September 30, 1992.

		Winrock Matching Funds			USAID Matching Funds		
		To be processed after 9/25/92	Cumulative	Remaining	To be processed after 9/25/92	Cumulative	Remaining
I.	Program Costs	6,919	450,262	164,438	83,511	808,260	51,100
II.	Indirect Costs	16,976	271,919	(10,619)	-	-	-
III.	Procurement	47,386	78,236	(63,236)	5,140	9,391	31,249
IV.	Evaluation	14,262	20,373	(10,373)	10,038	25,000	-
Total		85,543	820,790	80,210	98,689	842,651	82,349

VI. Lessons Learned and Long-term Implications

OFSP's impact on the improvement of nutrition, income and well-being of small farm families in Senegal and The Gambia is difficult to measure directly at this point in time. However, the project has had a highly visible impact in four important areas and lessons have been learned in each of them:

- local participation and leadership development
- innovation and technology transfer
- institutionalization of the process
- the potential for replication

A. Local Participation and Leadership Development

OFSP is a unique seed project in concept. It is unique because: (1) it targeted small farmers, (2) it used a truly "grassroots" approach, making local participation a keystone of the approach, and (3) it built leadership potential, both at the farmer level and within collaborating PVOs.

Most seed programs in Africa target the larger farmers who become the main beneficiaries of the programs. OFSP targeted small, low-resource farmers. As documented in a previous section, over 65,000 farmers, two-thirds of whom are women, became the main beneficiaries of OFSP programs. OFSP staff members worked to ensure a high degree of local participation.

PVO extension staff first received instruction in training methodologies for working with farmers and technical training in seed production. Following this training Peace Corps volunteers in the AFSI program worked directly with farmers to develop their seed- and food-production capability. Collaborative activities with rice and millet seed production were conducted by farmers in their own fields.

Second, through training, OFSP developed leadership skills in PVO extension staff who worked with potential farmer leaders. The more successful farmer leaders in The Gambia were recognized in the community as sources of know-how and information. During training of extension agents by OFSP, participants visited farmers' fields to observe the actual seed production process.

Third, although farmer training was relatively new, the project was able to reach thousands of farmers through its collaborators. Already, many farmers are providing leadership and extension services to other farmers in the rice-seed activities of the AFSI program in the Casamance region of Senegal.

B. Innovation and Technology Transfer

Although OFSP's collaboration with its partners focused primarily on seed production technologies, the project staff also provided small farmers with appropriate technologies for low-input production that enabled them to increase yields.

OFSP staff provided its collaborators with three types of services: (a) identification of existing low-input, appropriate production, selection, and storage technologies available from ISRA, or from technologies thoroughly tested on the research station in farmers' fields; (b) adaptation of these technologies to the circumstances of the small farmers; and (c) training of the PVO's staff in technology transfer and demonstration methodology.

It is important to emphasize the word demonstration since the trials were not research trials nor even "on-farm trials" in the farming systems research and extension sense. These demonstration trials were indeed carried out by the PVO' staff and monitored by the OFSP staff in an adaptive fashion. The technology was proposed to the farmers, discussed with them, and eventually tailored to their individual needs and constraints. Although an effort was made to maintain homogeneity in the technology transfer process, priority was always given to diffusing the technology farmers wanted. Hence the technologies actually transferred may appear rather basic, but they are, for the most part, adopted by the small farmers and have enhanced their production and welfare. A partial list of such technologies follows:

- using improved rice varieties (e.g., short-cycle varieties) and modified practices, such as planting in rows and weeding in a timely fashion
- adding organic fertilizer to nursery beds in which improved varieties of rice are grown, and transplanting 21 day-old seedlings
- using a row marker prior to direct seeding of rice
- seeding rice in row of 20-30 cm in width, using animal drawn seeders
- improving millet production through better soil fertility management
- improving seed quality of traditional millet through selection, testing, and plant selection for seed at harvest
- improving cowpea varieties through seed testing
- storing peanuts in sand or ash as an alternative to using chemical insecticides in preventing insect attack.

Technology adoption by small farmers is a step-wise process. Farmers adopt those techniques that: (a) are closest to what they know works (risk aversion), (b) have been demonstrated to them to give higher mean yields (thereby enhancing food security) with lower variances (thus lessening production risk), (c) are applicable within the farmer's constraints (e.g., inputs requiring unusual cash flows are not adopted), and (d) are replicable by the farmers without continuing outside help (sustainability). OFSP, through

its grassroots approach has identified, adapted and transferred an array of low-input appropriate technologies that meet these criteria.

C. Institutionalization

OFSP has contributed to the institutionalization, within the Peace Corps and the PVOs, of the innovation and transfer of seed technology through local participation and leadership development. It has done so in two ways. First, OFSP has provided technical assistance to the Peace Corps and the PVOs in identifying, adapting, and transferring (through demonstration trials) innovative seed technologies. Concurrently, OFSP has built the program-planning and development skills of the managers of collaborating institutions. Field staff members of these institutions have received extensive, hands-on training in technology diffusion. By the end of the project, one can assert that the technical and managerial skills needed to extend seed technology to small farmers have been learned by the Peace Corps and PVO staff.

Second, OFSP has contributed to institution building among its collaborators in Senegal and The Gambia through the participation of PVOs and NGOs as members of the in-country advisory councils. The councils provided fora for planning program activities, discussing seed improvement technologies, and exchanging knowledge about improved seed. By the end of the project in 1992, these councils had worked with OFSP for nearly 4 years. Through these councils, the progress made under OFSP can, and will, continue beyond the end of the project.

D. Potential for Replication

One of the mandates of the OFSP is to develop a methodology that can be used by organizations in other countries. OFSP has fulfilled this mandate. A model of grassroots technology adaptation and diffusion based on local participation and leadership development has been successfully implemented through a partnership with the NGOs and the Peace Corps in both Senegal and The Gambia.

This model is fully documented in a variety of publications that explain the methodology using case studies. For example, the "Guide for Development of PVO/PC Seed Activities" will serve as a handbook to organize and to understand basic seed technology and production and provides a step-by-step guide for planning and implementing a seed program.

The model developed by OFSP and tested in Senegal and The Gambia with collaborating PVOs is replicable for other agricultural technologies and in other countries provided that the following conditions are met.

First, the technology to be diffused has to be either "on-the-shelf" (thoroughly tested) or already in use by leading farmers in the same diffusion domain. The OFSP model is not, and should not be used, as a conduit to test unproven technologies in farmers' fields.

Second, the process of identifying appropriate technologies (i.e., technologies that meet farmers' goals within their constraints), adapting them, and diffusing them, must be entirely based on local participation of target farmers.

Third, an understanding must be reached by all participating NGOs on the goals to be attained and the means to be used to attain these goals. This understanding includes: the choice of the target groups, the type of technology to be diffused, and the methods of diffusion. To reach this understanding, access to a common source of technical assistance and training is necessary. Guidance from in-country advisory councils may also be needed.

Fourth, collaborating institutions must have regular access to a reliable source of technical assistance and training. In the case of the present project, it is the staff of OFSP who provided the needed technical assistance. Other sources of technical assistance may be national and international agricultural research centers and national seed programs.

When these four conditions are met, the OFSP model may be replicated for the diffusion of various types of technologies in different countries.

VII. Recommendations for OFPEP

The On-farm Seed Project was a "low-input" project, focusing mainly on the enhancement of the local seed production potential without the purchase of expensive inputs, or of inputs of unreliable availability. Given that crop and seed production is very much a function of soil nutrients' levels and soil management practices, advisors to the project suggested around mid-1991 to incorporate a soil fertility focus into the following phase of OFSP.

A proposal was prepared in September 1991, incorporating those suggestions and integrating OFSP goals and objectives with the objectives in Africa of the Biological Nitrogen Fixation/Legume Management Project, a project funded until June 1992 by USAID/R&D, and implemented in Senegal, Uganda, Nepal, Indonesia, and Haiti.

The new proposal called "On-Farm Productivity Enhancement Program" (OFPEP) was approved for funding by USAID/PVC in September 1992. Implementation will start October 1, 1992.

The On-farm Productivity Enhancement Program (OFPEP) initially will work in three countries of Africa -- Senegal, The Gambia, and Uganda -- where Winrock, other private voluntary organizations (PVOs), and the Joint PVO-University Center for Collaboration in Development already are working in one or both of two closely related productivity enhancement projects. These address two major technology constraints at the farm level -- good seeds availability and soil fertility.

The OFPEP approach includes, but is not limited to, such activities as developing and implementing people-oriented processes for dealing with farmers and communities; developing gender sensitivities and analyses; understanding the organizational entities that can best sustain these activities on the ground; training people on an in-service basis; recruiting and managing consultants; publishing and exchanging information; monitoring and evaluating program progress, and monitoring and evaluating methods and processes. These activities will support and facilitate interaction between and blending of seeds and soil fertility activities, both of which are entering the second phase of operations and increasingly focus on the process of institutionalization.

Key elements in the approach are (a) a focus on smallholders, particularly women; (b) concern for basic food crops, nutrition levels, and the production environment; and (c) work with and through nongovernmental organizations (NGOs). To this end, Winrock will manage the program in collaboration with the PVO/University Center.

A. Difficulty in Reaching Smallholders

OFPEP recognizes the many problems involved in trying to help smallholders in the developing world improve farm productivity, manage soil and other resources on a sustainable basis, and store and market their production when yields and production increase. Most of the millions of farmers in the third world are smallholders; most live in

places not readily reached by roads, public transportation, or even mass media. They lack access to improved seeds, fertilizers, and other needed inputs, either because these inputs are unavailable or because farmers lack funds or credit to buy them.

Extension services, if they exist, rarely reach these small farmers, and, when they do, their messages and recommended varieties and cultural practices frequently are not appropriate.

The attention paid by national agricultural research systems to the problems of smallholders, particularly to the production of basic food crops, generally ranges from inadequate to nonexistent. The links between research and extension are weak, as are the links between extension and the farmers. The result is a general lack of understanding of small farmers and their circumstances throughout the public and private sectors serving agriculture. This includes lack of knowledge and understanding of smallholders' problems and potentials, as well as a failure to appreciate their indigenous knowledge and skills.

As a consequence, most programs and projects mounted to help small farmers tend to concentrate on a single problem or topic, not recognizing the interrelated set of constraints under which farmers operate. Such concentration leads to serious shortfalls in project success.

OFPEP recognizes and is sensitive to the impact of gender roles in food and cash crop production in developing countries, particularly in Africa where cash crops for export are almost entirely produced by men, while women grow food crops for domestic consumption. The specific roles of men and women for different tasks throughout the agricultural cycle, from preparing land to harvesting crops, vary across ethnic groups and among crops. Little mechanization has relieved women's burden of responsibilities; most of the activities which have been mechanized are related to men's cash crops, not women's food crops. Women have less access to credit to purchase labor-saving devices for any crop.

Approaches that fail to take into account farmers' specific conditions or reasons for their actions are likely to encounter serious resistance from the farmers. The development literature is replete with accounts of the failure of single focus projects concerned with seeds, fertilizer, irrigation, pest control, credit, land reform, cooperatives, or some other worthy topic. Other approaches, most of which also have not succeeded, have manipulated extension methods and organization without considering the relevance of the technology being extended or the competence of the extension worker.

B. Roles of Rural Women

The OFPEP strategy is to work with local collaborators who have agricultural programs that reach farmers with technologies and practices that enhance their returns to labor. These collaborators, especially village-based NGO/PVOs and Peace Corps volunteers (PCVs), work with the major producers of food crops, women, who need productivity enhancements. By training and advising NGO/PVOs and PCVs, OFPEP will indirectly reach a large percentage of this important clientele. Some organizations work exclusively with women, such as the Freedom from Hunger Campaign-Women's Rice Project in The

Gambia. Others work with men and women depending upon the crop and the gender roles affecting production.

For example, the greatest number of farmers contacted through demonstration activities in the On-Farm Seed Project (OFSP) were women. In The Gambia, rice, the major cereal crop, is a woman's crop. All of the rice efforts of OFSP were directed towards women whether through male or female agents of its collaborators. In drier areas, cowpeas and millet are the predominant food crops, and men are also involved in their production.

More of the extension agents trained by the OFSP were men, because fewer women than men receive formal education and gain access to positions as extension agents of the government or NGOs. It is imperative that both male and female agents be trained to address women's production needs. Staff of NGO/PVOs are especially concerned about reaching food producers. They cannot rely on messages transferred from men to women. However, messages do transfer among women through women's groups and on-farm demonstrations.

In the OFPEP approach, the first step is to work with the collaborators to assemble available information to gain an understanding of farmers' practices and constraints. This is accomplished by working with the collaborators to develop and conduct a survey or select a rapid rural appraisal tool. Some staff are already trained to implement the survey or appraisal. Others will be trained. The analysis of results leads to a further understanding of the roles of men and women in the farming system, the tasks in which they are involved, and the demands for labor at different times of the year. Additionally, that understanding may help strengthen local networks in the use of existing information.

Increased returns to labor and capital are sought by introducing appropriate production practices and technologies. The OFPEP training program designed with the collaborators focuses on establishing farmer-managed demonstrations. The demonstrations involve simple changes in the variety or technology used and one or two key production practices on a small portion of their plot. The technologies used must be inexpensive, locally produced, and meet farmer's criteria. Follow-on training discusses the monitoring and evaluation of these demonstrations by the women and area farmers. Women see the results of their simple changes in a small area in contrast to the rest of the plot. For example, farmer-managed rice demonstrations gave higher yields using faster maturing varieties planted in rows as compared to traditional plots of slower maturing varieties broadcast seeded. The rows allowed women to weed much earlier and faster; yields increased; labor costs reduced. The seed produced provides women with cash income. The demonstrations stimulate demand among neighbors.

The communication approach through on-farm demonstrations is simple and clear. It does not depend on the farmers' educational background. Farmers do not have to leave their farms in order to get the message. Most women are restricted from participating in residential training or traveling great distances because of their domestic responsibilities. Yet they can see a demonstration on their own or a neighbor's plot. Women hold informal discussions as they evaluate, according to their own criteria, the merits of new varieties or production and storage practices.

OFPEP recognizes that women are not a homogeneous group. Wealth, education, access to resources, food habits, cultivation practices, etc., differ among women within a region and even a community. OFPEP can assist collaborators in further defining which women need what specific kinds of help. Measuring the impact on women is another important collaborative activity. Intended impacts as well as unintended impacts can be evaluated through such tools as rapid and participatory rural appraisals.

Winrock will support OFPEP through its African Women Leadership in Agriculture and the Environment Program (AWLAE), an initiative undertaken 2 years ago and funded by several donors.

C. Basic Concepts of OFPEP

In summary, OFPEP takes into account the issues discussed above as well as the experiences of the On-farm Seed and Biological Fixation/Legume Management (BNF/LM) projects. The approaches are designed to:

- help develop private sector and marketing opportunities for seeds, inoculum, and related inputs
- address the web of constraints farmers face
- seek knowledge and understanding of farmers problems and circumstances
- strengthen local and regional networks regarding dissemination of information
- help farmers and NGO staffs identify potentials for exploiting indigenous knowledge and skills
- provide opportunities for farmers to test and adapt new technology
- arrange local training and develop training materials for use in communities by local organizations
- maximize use of local private and voluntary organizations to work with farm families
- maximize use of local and international research centers regarding knowledge and availability of existing technologies.

D. Proposed Program

This program will build upon the experiences of two innovative activities -- the On-Farm Seed Project (OFSP) and the BNF/LM project, initially managed as separate projects. This action is intended to make sure that the client-oriented approaches believed necessary to work successfully with smallholders are introduced, reinforced, monitored, and evaluated. The program provides a major role for the PVO/University Center to do what it was designed and staffed to do, namely to facilitate collaboration between universities and private voluntary organizations (PVOs) working in development.

Through this arrangement, the OFPEP consortium members will establish organizational infrastructures and administrative procedures that can be contracted or broadened, as necessary, over time to implement and manage other technology-oriented activities important to smallholders. One such addition could be smallholder approaches to irrigation systems.

E. The Issue of Seeds

This part of the program addresses one of the most pervasive problems of small farmers in developing countries -- the lack of ready, low cost, timely access to the seeds needed to grow the crops on which they depend. This effort will continue to help farmers get better seeds by working with them to improve their seed selection, production, and storage practices.

Launched in Senegal and The Gambia in 1987, the On-farm Seed Project used a process that began with discussions and surveys relating to seed. These discussions involved farmers, representatives of local NGOs, and where available, Peace Corps Volunteers. They gathered data and analyzed the strengths and weaknesses of traditional seed production and storage systems, including divisions of labor by gender. Then, they designed programs and train NGO staffs and extension agents working with local seed producers. They identified appropriate local or improved seed varieties and modified, as necessary, seed practices to local conditions. They conducted demonstrations to increase awareness among farmers and create demand for improved seeds, thus stimulating local seed production.

OFPEP will institutionalize the activities in Senegal and The Gambia, paying special attention to providing technical assistance in marketing and in developing private seed enterprises. In addition, efforts will be made to initiate on-farm seed activities in Uganda, where there already is an ongoing soil fertility project.

Winrock will provide technical assistance in seed technology in collaboration with Mississippi State University. Other PVOs, such as TechnoServe, will be called upon to provide assistance in marketing and the development of private enterprises, while a number of NGOs will assist with training and related activities in each country.

F. The Soil Fertility Issue

For 2 years, a consortium of PVOs, universities, and the Peace Corps, has explored soil improvement needs of smallholders in developing countries. The group identified unmet needs and a growing demand for technical assistance in soil fertility. It began to mobilize, coordinate, and provide technical assistance to scores of NGOs and PVOs working with smallholder families in Haiti, Nepal, Senegal, Uganda, and Indonesia.

During the pilot Biological Nitrogen Fixation/Legume Management (BNF/LM) Outreach Project, the consortium focused primarily on the use of rhizobium. Soil management innovations through use of improved germplasm in nitrogen-fixing bacteria and cover crops promise low-cost, environmentally sound, sustainable means to increase the smallholders' productivity. The pilot project combined scientific knowledge from U.S. universities with outreach experience of PVOs.

In each of the three target countries, OFPEP proposes to establish networks to assess traditional soil management practices, coordinate demonstrations, distribute inoculum and soil management services, and exchange information on soil management and fertility

enhancement techniques. In addition to BNF, alternative approaches to soil fertility management will be included. These will include fertilization, agroforestry interventions, agronomic interventions, and soil conservation. One goal of OFPEP is to foster economically sustainable enterprises to facilitate production and marketing of inoculum, fertilizers and other productivity materials.

Winrock will provide technical assistance and will work with a steering committee of U.S. PVOs, including Africare, CARE, Pan-American Development Foundation, Agricultural Cooperative Development International, Save the Children, World Vision, and the Peace Corps. In-country activities will be carried out through in-country lead agencies chosen from among the seven PVOs on the steering committee. The PVO/University Center will support in-country activities through documentation, dissemination of information, and allocation of staff resources.

G. Marketing and Distribution

OFPEP will give special attention throughout implementation to the problems associated with marketing and distribution of seeds, inoculum, and other materials produced by farmers and NGOs or acquired by them as necessary production inputs. Experiences of initial phases of the seed and soil fertility projects will be analyzed as the first step. PVOs with experience in marketing and business management will be invited to provide technical assistance.

H. Monitoring and Evaluation

The OFPEP strategy relies heavily on farmer participation. The approach is to build from the indigenous knowledge base related to seeds and soil fertility management in small and sustainable steps. This process will require a well-designed system of monitoring and evaluation to provide feedback over the course of project implementation. Winrock International, the PVO/University Center, and the lead agencies in the target countries will develop and institute a three step process of baseline data collection, periodic monitoring, and evaluation.

The guiding principle of the monitoring and evaluation system will be those of participatory rural assessment. Collaborating NGO staff members, Peace Corps volunteers, and extension agents may receive training in the techniques of participatory rural assessment (PRA). Baseline data collection will precede any technical intervention in an area. Periodic monitoring will be flexible enough to be adapted to the variable situations in the target countries and will not be so cumbersome as to overburden staff of the implementing agencies. Evaluations will be conducted in the middle and at the end of the life of the project and will use the LogFrame as the basis for evaluation. Each element will contribute to a process which is iterative and responsive to the expectations of local farmers. Such a process will guide sustainable improvements in seed production and soil fertility management.

I. Integration in Implementation

Under OFPEP, all in-country activities (seed, soil, productivity, and process) will be integrated in implementation. This will include combining existing advisory groups into a consolidated OFPEP advisory group for each country, combining technical assistance personnel and efforts so as to address seed and soil issues, and reviewing geographical work areas so as to concentrate seed and soil efforts in the same areas.

J. Management and Staffing

The start-up date for OFPEP is October 1, 1992. The overall management chart for OFPEP is presented in Figure 2.

Winrock International will administer the overall project from its headquarters in the U.S., and will appoint the OFPEP project director.

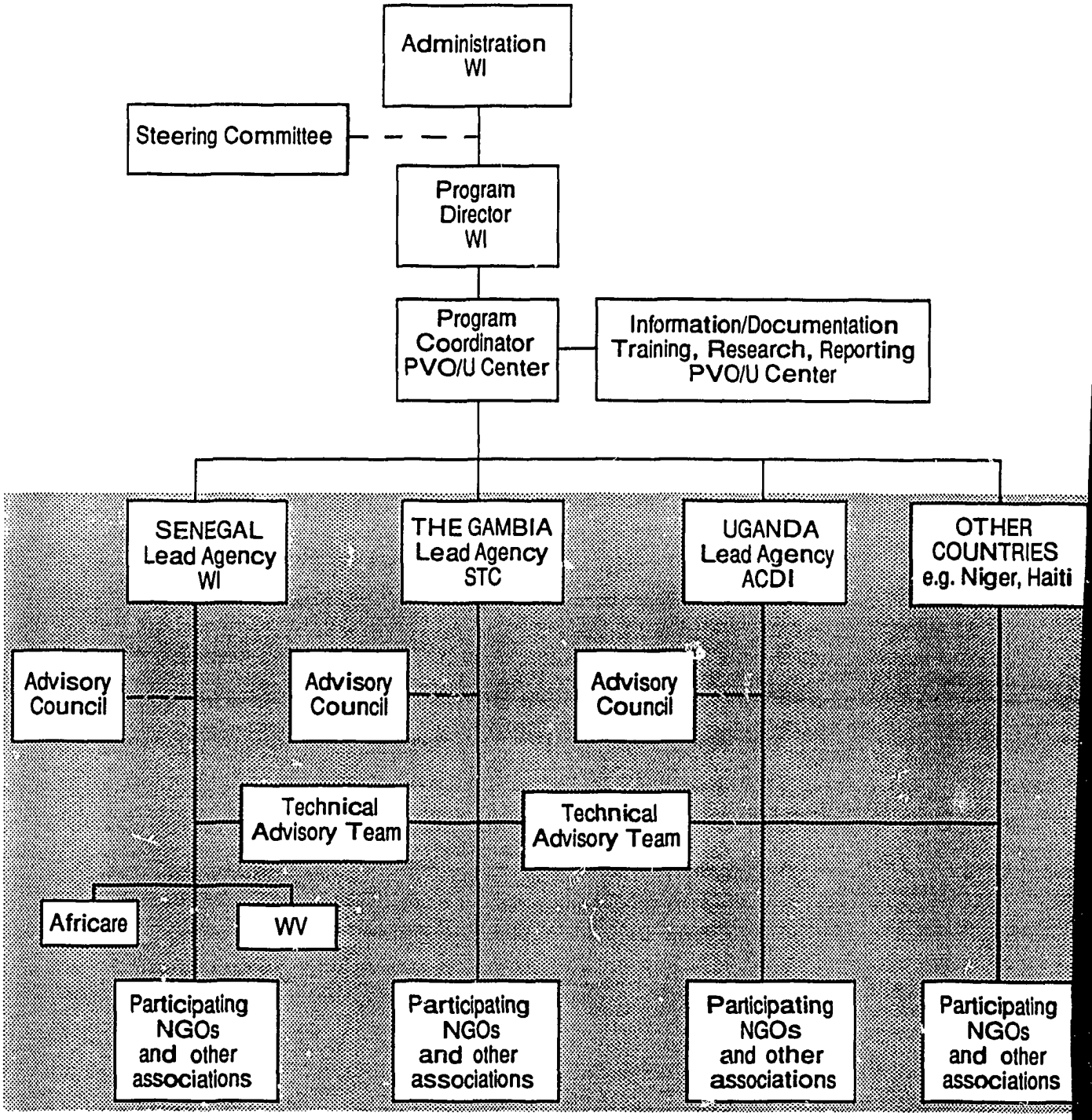
Program coordination will be the responsibility of the PVO/University Center and a full-time coordinator will be named. The PVO/University Center and its member institutions will provide information and documentation from its U.S. resource base, and will make a considerable pool of expertise available to all components of the project.

Coordination of field implementation work will be the responsibility of a specific institution nominated for each country: Winrock in Senegal, ACDI in Uganda, and Save the Children in The Gambia. Long-term staffing will be provided in all the above countries or regions by the lead institutions. In most cases, staffs now involved in OFSP or BNF/LM implementation will actively participate in OFPEP, and will be augmented by others who will address both soil and seed issues. Technical advisory services will be provided to the three countries by a Technical Advisory Team comprised of long-term and short-term expatriate and local specialists assembled by Winrock and the PVO/University Center.

Active participation (human resources or material support) will also be obtained from a variety of institutions or organizations in each participating country, including the U.S. Peace Corps, NifTAL, TROPSOILS, Rodale international or national NGOs, universities, and research centers.

Steering Committees or Advisory Councils will be set up in the U.S. and in each participating country (see Final Advisory Council Meeting Minutes in Appendix J). They will meet at least once a year and ensure coordination among program activities in each country.

Figure 2. Organizational chart of OFPEP.



WI: Winrock International
ADCI : Agricultural Cooperative Development International
STC: Save The Children
WV: World Vision
Africare: Africare
PVO/U Center: Center for PVO/University Collaboration in Development

* Note: indicated in-country lead agencies or participating NGOs are illustrative, as of the date of this proposal.

Appendix A

"Seed Sowers"
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Volume 5
Number 1, 1992

SEED SOWERS

Newsletter of the On-Farm Seed Project

Tome 5
Numéro 1, 1992

LES SEMEURS

Bulletin du Projet Semencier

WOMEN, SEED, TECHNOLOGY, AND CHANGE

The last issue of Seed Sowers described the collaboration with Save The Children USA/The Gambia (SCF) in participatory rice demonstrations, focusing on the technical aspects. Feedback from our readers suggested that an article detailing the rationale and process used in such activities would be useful. We are happy to respond to this request by describing our work with women farmers in Senegal and The Gambia. It is not only the technical content of activities but the participatory process for the development and implementation of activities that determines their sustainability and long term impact. The following article is based on lessons learned in collaborative activities with SCF, Peace Corps in both Senegal and The Gambia, and the Freedom From Hunger Campaign of The Gambia Women's Rice Project (FFHC/WRP).

REACHING WOMEN FARMERS

PVOs, NGOs and the Peace Corps are increasingly concerned with how to reach women farmers who have a primary role in African agriculture, food production, and food security for the family. Historically, national agricultural policy and agricultural extension has been oriented to male farmers and cash crops, largely ignoring women farmers. Furthermore, agricultural technologies have not been designed to meet women's needs.

Establishing viable agricultural extension activities with women farmers involves the consideration of numerous, diverse factors. In many areas women have low levels of literacy, which means that extension must be largely based on demonstrations rather than written communication strategies. Traditionally, women have limited contact with agricultural extension agents and outsiders so that extension agents, especially when they do interact with women farmers, must be culturally sensitive communicators. Women are often the decision makers regarding the production, processing, storage,

Women farmers try out a row marker as SCF field staff observe.
Agricultrices essaint un marqueur sous le regard d'un agent du SCF.

LES FEMMES, LES SEMENCES, LES TECHNOLOGIES, ET LES CHANGEMENTS

Le dernier bulletin des Semeurs décrit comment Save The Children USA/Gambie (SCF) a collaboré à l'exécution de démonstrations participatives sur le riz en mettant l'accent sur les aspects techniques. Les réponses de nos lecteurs ont suggéré qu'un article détaillant la justification et le processus utilisés dans de telles activités leur serait de grande utilité. C'est avec plaisir que nous répondons à cette demande et décrivons notre travail avec les agricultrices du Sénégal et de la Gambie. La durabilité et l'impact à long terme des activités sont déterminés non seulement par leur contenu technique mais également par le processus participatif utilisé lors de leur développement et mise en oeuvre. L'article ci-après se base sur des leçons tirées des activités exécutées en collaboration avec le SCF, le Corps de la paix au Sénégal et en Gambie et le Projet rizicole des femmes du Freedom From Hunger Campaign de la Gambie (FFHC/WRP).

COMMENT ETABLIR LE CONTACT ET FAIRE APPEL A LA PARTICIPATION DES AGRICULTRICES

Les organisations volontaires privées (PVO), les ONG et le Corps de la paix se penchent avec une assiduité et intérêt croissants sur la question liée à la participation des femmes africaines qui jouent un rôle primordial dans l'agriculture, la production et la sécurité alimentaires des familles. Historiquement, ce sont les agriculteurs et les cultures d'apport

and marketing of many crops. Developers must understand this role of decision maker as well as build upon farmers' extensive indigenous agricultural knowledge. Lastly, agricultural changes for women are being introduced into a complex web of demanding activities in agriculture, child care, domestic tasks and cultural obligations. Agriculture is often a lower priority compared to other obligations. The proposed agricultural changes must fit into an array of priorities and, as much as possible, not conflict with the other demands. Clearly, achieving viable changes that benefit women agriculturists challenges extension programs.

Because of the important role of women farmers in rice production in some areas of Senegal and The Gambia, the OFSP collaborative activities have focused on working with women farmers. Activities have taken place in over eighty villages with several hundred participatory demonstrations viewed by thousands of women and men. The project aims to identify technically sound changes that fit both socio-cultural values and on-farm resources. While the OFSP primarily focuses on seed, a systems approach has been taken that considers the other factors related to how the seed and food grain are produced, the division of labor along gender lines, labor constraints, and cultural factors.

The OFSP considers combining a process that includes participation by women farmers with a variety of technically appropriate interventions to be critical elements in collaborative field activities.

PARTICIPATION INTEGRATED WITH APPROPRIATE TECHNICAL INTERVENTIONS

Historically, the role of agriculture extension has been to diffuse/transfer practices and technologies, developed by agricultural researchers, to farmers in a rather top down and one way fashion. Extension agents became technicians presenting technologies to the farmers. By contrast, the participatory approach of the OFSP, with its PVOs/NGOs, Peace Corps, and other collaborators, has been to first understand the traditional production system and only then suggest compatible modifications. The extension agent acts, not only as a technician, but also a facilitator of a two way flow of information between researchers/developers and women farmers. Another aspect of this approach is that it involves a step-by-step, long-term approach to working with the farmer. As each change is understood and practiced, new changes are recommended for production practices; changes are based on feedback from the farmers. We encourage the farmers to adopt practices that they understand and see the benefits from using. When the farmers share in the process, they determine the direction and pace of change. For example, initial attention is often focused on an improved variety and a few modified practices that will help the improved variety produce more than the traditional variety. Though the improved varieties are used, the modified practices may not be fully adopted until the benefits of the variety and practices are effectively demonstrated.

PARTICIPATORY APPROACH

This approach depends on the flow of information from the farmers through the extension worker to the program managers. Thus, program decisions are based on the information and feedback from the farmer and extension worker . The role of the

qui ont été le point de mire des politiques agricoles nationales et des activités de vulgarisation ignorant grandement le rôle joué par les agricultrices. De même, les technologies agricoles ne sont guère élaborées de manière à répondre aux besoins et aux contraintes que confrontent les femmes.

L'établissement d'activités de vulgarisation viables, destinées aux agricultrices, demande à ce que l'on analyse et tienne compte de toute une gamme de divers facteurs. Dans de nombreuses régions, le niveau d'alphabétisation des femmes est bas. Ceci signifie que les activités de vulgarisation doivent être exécutées principalement par le biais de démonstrations plutôt que par des communications écrites. Traditionnellement, les femmes ont un contact limité avec les agents de vulgarisation et les étrangers. Il est capital que les agents de vulgarisation, en particulier lorsqu'ils travaillent avec les agricultrices, fassent preuve de tact et de sensibilité envers les besoins et les facteurs culturaux. Ce sont fréquemment les femmes qui prennent les décisions relatives à la production, au traitement, au stockage et à la commercialisation de nombreuses cultures. Ce rôle de "décideur" doit être compris par les experts du développement. De même, il est important que ces experts tirent plein profit de la masse de connaissances agricoles indigènes offerte par les agriculteurs. En dernier lieu, notons que les changements en agriculture destinés aux femmes sont introduits et s'ajoutent fréquemment à une kyrielle d'activités qui font déjà pression sur leur temps, tels les travaux culturaux, le soin des enfants, les taches ménagères et les obligations culturelles. Face à tous ces impératifs, l'agriculture n'a souvent qu'une basse priorité. Par conséquent, les changements agricoles proposés doivent tenir compte des diverses priorités et doivent, autant que possible, éviter d'entrer en conflit avec les autres demandes. Clairement, le défi à relever et le but à atteindre des programmes de vulgarisation est d'introduire des changements viables et profitables pour les agricultrices.

Dans certaines régions du Sénégal et de la Gambie les agricultrices jouent un rôle important dans la production rizicole. Les activités coopératives de l'OFSP ont par conséquent mis l'accent sur le travail exécuté avec les femmes. Les activités ont été réalisées dans plus de huit villages par le biais de plusieurs centaines de démonstrations participatives auxquelles assistèrent des milliers d'hommes et de femmes. Le projet vise à identifier des changements bien-fondés au niveau technique et qui répondent à la fois aux valeurs socio-culturelles et aux ressources en milieu paysan. Bien que l'OFSP mette principalement l'accent sur les semences, une approche de système a été établie pour tenir compte des autres facteurs liés à la production des semences et des céréales, à la division des taches par genre, aux contraintes en main-d'oeuvre et à d'autres facteurs culturaux.

Il est le sentiment de l'OFSP que pour exécuter avec efficacité les activités de terrain avec la participation des agriculteurs, une clé essentielle tient à l'établissement d'un processus qui intègre et combine la participation des agricultrices avec une variété d'interventions appropriées au niveau technique.

INTEGRATION DE LA PARTICIPATION ET DES INTERVENTIONS TECHNIQUES APPROPRIEES

Historiquement, le rôle de la vulgarisation agricole a été de diffuser/transférer les pratiques et les technologies développées par les chercheurs aux agriculteurs de manière verticale, du chercheur à l'agriculteur. Dans ce cas, les agents de vulgarisation assurent le rôle de techniciens et sont chargés d'introduire les technologies aux agriculteurs. Par contraste, l'approche participative de l'OFSP, des PVO/ONG, du Corps de la paix et de ses autres collaborateurs encourage dans un premier temps l'étude et la compréhension du système de production

Gambian women plowing a rice field by hand with a traditional hoe.
Gambiennes labourant une rizière avec la houe traditionelle.

extension agent is not only to transfer technology but more importantly to facilitate communication with the farmers. This article will explore the process used by the OFSP collaborative activities to:

- determine farmer problems and needs,
- develop farmer participatory demonstrations, and
- solicit reactions of the farmers.

DETERMINING FARMERS' PROBLEMS AND NEEDS

The OFSP provided training in rice agronomy and data collection to the extension agents of our collaborators. Field visits to extension agents were also undertaken with regular meetings. The OFSP also assisted in the interpretation of data. It is necessary to develop an understanding of the production practices and the seed-related problems of the farmers. The kinds of information gathered included: varieties used, seed sources, timing of field operations, tools used, gender roles, labor constraints, ecology/water regime, and factors such as pests, drought etc. Information was gathered through discussion with the women, field observation by the extension agent and the OFSP agronomist, and discussion with field staff of our collaborating organizations. Applying principles of RRA (Rapid Rural Appraisal) the OFSP used triangulation to verify information in three ways and placed a great value on indigenous knowledge. Informal follow up interviewing and observation in the field verified the information gathered in initial interviews. In order to successfully gather data from female farmers, staff had to establish a rapport with them. Moreover, the OFSP agronomist discussed the information with the collaborators' extension agents, verifying the technical aspects of the gathered information.

traditionnel et ce n'est que par la suite que les modifications appropriées sont suggérées. L'agent de vulgarisation est non seulement un technicien mais il facilite l'échange des communications entre les chercheurs/experts en développement et les agriculteurs. A la base du travail avec l'agriculteur est une approche à long terme, étape par étape. Au fur et à mesure que les agriculteurs comprennent et mettent en oeuvre les pratiques de production modifiées, d'autres changements ou modifications sont recommandés en se basant sur la réponse et les retro-informations des agriculteurs. L'OFSP encourage les agriculteurs à adopter les pratiques qu'ils comprennent et de voir d'eux-mêmes les bénéfices qui en découlent. En étant partie intégrale de ce processus, ce sont les agriculteurs qui déterminent la direction et le train du changement. Par exemple, l'accent initial est fréquemment placé sur une variété améliorée et sur un petit nombre de pratiques modifiées pour que le rendement de la variété améliorée soit supérieur à celui de la variété traditionnelle. Aussi, bien que de nouvelles variétés soient utilisées, il est fort possible que les pratiques modifiées ne soient pas entièrement adoptées et qu'il faille attendre que les bénéfices de la variété et de la pratique aient été pleinement démontrés.

APPROCHE PARTICIPATIVE

Cette approche repose sur le flux d'informations des agriculteurs transmis aux gestionnaires de programme par le biais de l'agent de vulgarisation. Ce sont ces réponses et informations qui sont à la base des décisions de programme. Le rôle des agents de vulgarisation est non seulement de vulgariser les technologies mais, plus important encore, de faciliter les communications entre les agriculteurs et les chercheurs. Cet article explore le processus utilisé lors de l'exécution des activités collaboratives de l'OFSP pour:

- déterminer les besoins et contraintes des agriculteurs
- développer des démonstrations avec la participation des agriculteurs, et
- solliciter les réactions et réponses des agriculteurs.

COMMENT DETERMINER LES CONTRAINTES ET LES BESOINS DES AGRICULTEURS

L'OFSP a dispensé de la formation en agronomie rizicole et en collecte des données aux agents de vulgarisation de ses collaborateurs. En sus des réunions régulières, les agents de vulgarisation furent visités sur le terrain et l'OFSP porta également son concours pour interpréter les données. Les informations collectées ont inclu: les variétés utilisées, la source des semences, le calendrier des opérations de terrain, les outils utilisés, les rôles/genre, les contraintes en main-d'oeuvre, le régime écologique/eaux et des facteurs tels les ravageurs, la sécheresse etc. Les informations furent collectées par le biais des discussions avec les femmes, des observations sur le terrain exécutées par l'agent de vulgarisation et l'agronome de l'OFSP et des discussions avec le personnel de terrain des organisations collaboratrices. En appliquant des principes RRA (techniques d'estimation rapide), l'OFSP a utilisé la triangulation pour vérifier les informations et a placé une grande valeur sur les connaissances indigènes. Des entretiens de suivi informels et des observations sur le terrain ont vérifié les informations provenant des premiers entretiens. Pour collecter les données de manière efficace, il fallut dès le départ établir un rapport avec les agricultrices. L'agronome de l'OFSP présenta et discuta des informations avec les agents de vulgarisation des collaborateurs et il vérifia tous les aspects techniques des informations collectées.

Information gathering is often best done with the women in their own fields. Information can be shared concerning what is happening in the field during critical times such as seeding, weeding, tillering, panicle formation, and harvesting. If possible it best to gather field information over the course of a year before undertaking the next step. This enables data to be collected on ecology, rainfall, traditional practices and varieties (i.e. planting date and planting method, weeding dates, tiller and panicle counting per M^2 and yield).

TYPES OF INFORMATION GATHERED

The following is a brief overview of the information gathered from women rice farmers and how that information influenced the recommendation of interventions.

In Senegal and the Gambia, rice is exclusively cultivated by women and produced primarily for home consumption. Extremely labor intensive, rice production involves land preparation, seeding, weeding, and harvesting in this case with simple hand tools on small plots of $100m^2$-$500m^2$ yielding a meager 300-1000 kg per hectare with each woman cultivating .5-1.0 HA. Women grow numerous varieties of rice in ecologies that range from upland to phreatic (sometimes submerged) to paddy (always submerged during the growing season). There is a concern about how to increase yields and at the same time to reduce the labor burden for women rice farmers thus increasing their productivity.

Field observations, discussions with women, and information from collaborating field staff indicate traditional varieties reject the shorter rainy season. Consequently, earlier maturing varieties could play a potential role in that season. Secondly, rice is traditionally broadcast seeded. While this is a rapid seeding technique, it delays weeding a month or so after planting when the rice can be distinguished from the weeds. This leads to aggressive weeds robbing the rice of light, water, and nutrients, which causes a reduced yield.

Using earlier maturing varieties and changing from broadcast seeding to row seeding present technical solutions to decreased yields caused by weeds and reduced rainfall. Row seeding allows the rice to be weeded between the rows soon after it emerges. Also, a hoe can be used rather than pulling weed by hand. Weeding can be done quicker and easier several times during the season rather than the traditional daily weeding, a time-consuming and backbreaking activity women endure for weeks.

Another way to reduce women's labor input for rice production, animal traction may offer a more effective way to row seed rice. Animal traction is widely used in Senegal and The Gambia for planting peanuts, millet, and maize. The primary problem in using animal traction for rice production is a cultural one: normally, only men use animal traction. Moreover, the period during which the women need help with planting rice is the same period when men are planting the upland crops. Fortunately, since the rice plants are small, they can be seeded in a few hours

En général, les visites sur le champ des agricultrices offrent le meilleur véhicule pour la collecte des données. Ces visites permettent de parler des activités culturales des périodes importantes telles le semis, le désherbage, le tallage, la formation des panicules et la récolte. Le plus utile est de rassembler les données de terrain sur une période d'une année avant d'entreprendre l'étape suivante. Ceci permet d'obtenir des données sur l'écologie, la pluviosité, les pratiques traditionnelles et les variétés (la date et méthode de plantation, les dates de désherbage, le compte de panicules et de talles par m^2 et le rendement).

TYPES D'INFORMATIONS RECUEILLIES

La présentation suivante offre un bref aperáu des informations collectées avec l'aide des productrices de riz et décrit comment ces informations ont influencé la recommandation des interventions.

Au Sénégal et en Gambie, ce sont exclusivement les femmes qui cultivent le riz, utilisé pour la consommation ménagère principalement. Extrêmement laborieuse, la production du riz fait appel à l'exécution d'activités telles la préparation appropriée du sol, la plantation, le désherbage et la récolte (avec dans de nombreux cas des outils élémentaires) sur des parcelles de petite taille allant de 100 m^2 à 500 m^2 pour obtenir une production de 300 à 1000 kg par hectare, chaque femme cultivant de 0,5 à 1 hectare. Les agricultrices plantent de nombreuses variétés dans diverses écologies, du riz pluvial et phréatique (parfois submergé) au riz paddy (toujours submergé durant la saison culturale). La question actuelle repose sur comment augmenter la productivité des productrices de riz en accroissant les rendements tout en facilitant et réduisant leurs heures de travail.

Les observations de terrain, les discussions avec les femmes et les informations provenant du personnel de terrain indiquent que la petite saison sèche est contraire aux variétés traditionnelles. Des variétés à maturité précoce peuvent par conséquent jouer un rôle potentiel au cours de cette saison. Traditionnellement, le riz est semé à la volée. Alors que cette technique de plantation offre l'avantage d'àtre rapide, les activités de désherbage sont retardées jusqu'au moment où est possible de distinguer le riz des mauvaises herbes, soit un mois environ après la plantation. Le riz est en compétition avec les mauvaises herbes les plus agressives pour la lumière, l'eau et les nutriments et ceci résulte dans la diminution des rendements.

L'utilisation de variétés de riz à maturité précoce et le semis en ligne au lieu du semis à la volée peuvent offrir des solutions techniques capables de redresser la diminution des rendements causée par les mauvaises herbes et une plus basse pluviosité. Lorsque le riz est semé en ligne, il est possible de désherber entre les lignes peu après son apparition. De même, le désherbage peut être effectué à l'aide d'une binette et non manuellement. Cette méthode est plus rapide et aisée, les travaux de désherbage ne sont effectués que plusieurs fois au cours de la saison et non journellement comme le dicte la méthode traditionnelle. Les travaux de désherbage sont astreignants et laborieux et font une grande pression sur le temps des femmes qui doivent s'y plier pendant de nombreuses semaines.

L'utilisation de la traction animale pour semer en ligne est un autre moyen permettant de réduire les heures de travail requises par la production rizicole. Au Sénégal et en Gambie, la traction animale est fort répandue et est utilisée pour planter les arachides, le mil et le maãs. La contrainte principale à son utilisation est culturelle car en général, seuls les hommes y ont

with animal traction. There is an economic incentive for the men to help the women since after the rice grown by the women is exhausted it is the responsibility of the men to buy rice.

II. ON-FARM DEMONSTRATIONS AS A TEACHING METHOD

Since demonstrations are still the best strategy for farmers to understand change, participatory demonstrations are developed and actually carried out so that farmers can understand the innovations in their own fields. Additional benefits of farmer participation include seeing: how farmers adopt or adapt the changes, differences in adoption/adaptation between farmers and farmer innovations. In addition, farmers themselves are able to do extension if the demonstrations are a success. Experience suggests that for the demonstration to be acceptable it must be based on what the farmers already do, be compatible in terms of labor requirement and provide a noticeable (20%) yield increase or other benefit such as reduced labor. Unless substantial benefits are demonstrated the farmers will return to traditional practices.

In the demonstrations, the extension agent facilitates the selection of the farmer and the plot, works with the farmer to implement the demonstration, and explains and assists with changes in

Gambian farmers weeding by hand in a row planted rice field.
Agricultrices gambiennes désherbent une rizère semée en ligne.

practices. Monitoring and data collection are also carried out by the extension agent on the demonstration plot and a traditional plot of the same farmer for comparison. The woman farmer carries out the demonstration on a small area to reduce risk and provides feedback on her perception of the changes.

The OFSP assisted its collaborators in the design and implementation of the demonstrations. Workshops coupled with field visits were conducted with the extension agents and program managers before and during the implementation of the demon-

accès. La période où les femmes ont besoin d'aide pour planter le riz coïncide avec la plantation des cultures pluviales et est une autre contrainte. Néanmoins, en utilisant la traction animale et grâce à la petite taille des plantes de riz, il est possible de planter en quelques heures seulement. Des raisons économiques encouragent également les hommes à porter concours aux femmes, en effet, dès que le riz cultivé par la femme est consommé, c'est à l'homme qu'échoit la responsabilité d'acheter le riz nécessaire au ménage.

II. FORMATION PAR LE BIAIS DES DEMONSTRATIONS EN MILIEU PAYSAN

Les démonstrations sont toujours la meilleure stratégie pour expliquer les changements et les innovations aux agriculteurs, par conséquent des démonstrations participatives ont été développés et exécutées dans les champs des agriculteurs. La participation des agriculteurs offre d'autres bénéfices. Il est en effet possible d'observer directement comment les agriculteurs adoptent ou adaptent les changements, les différences d'adoption/adaptation entre les agriculteurs et les innovations propres aux agriculteurs. Lorsque les démonstrations sont réussies, les agriculteurs eux-mêmes peuvent faire de la vulgarisation. L'expérience suggère que pour que la démonstration soit acceptable, elle doit être fondée sur ce que l'agriculteur fait déjà, elle doit être compatible en terme d'heures de travail et de main-d'oeuvre et elle doit offrir une augmentation visible en rendement (20%) ou d'autres bénéfices, une réduction dans les heures de travail, par exemple. A moins que d'importants bénéfices n'aient été clairement démontrés, les agriculteurs retourneront aux pratiques traditionnelles.

Le rôle de l'agent de vulgarisation est de faciliter la sélection des agriculteurs et des parcelles de démonstration. Il travaille avec l'agriculteur pour établir la démonstration, il l'aide et lui explique les changements ou modifications portés aux pratiques culturales. L'agent de vulgarisation est également chargé du suivi et de la collecte des données provenant de la parcelle de démonstration et d'une parcelle traditionnelle du même agriculteur pour les comparaisons. Dans le cadre des agricultrices, la démonstration est réalisée sur une petite parcelle de terrain pour limiter les risques et rassembler toutes les informations sur leurs opinions et réactions envers les changements.

L'OFSP aida ses collaborateurs à élaborer et à mettre en oeuvre les démonstrations. Des visites de site et des ateliers furent exécutés pour les agents de vulgarisation et les gestionnaires de programme avant et pendant les démonstrations. Le suivi des démonstrations, les discussions avec les agricultrices et l'amélioration de l'expertise technique du personnel de terrain ont éte assurés par le biais des ateliers.

III. REACTIONS DES AGRICULTRICES ENVERS LES DEMONSTRATIONS

La réaction des agricultrices envers les démonstrations est le test le plus important de la pertinence des changements introduits. Qu'ont-elles aimé? Où ont-elles éprouvé des difficultés? Accepteront-elles de participer à une autre démonstration? Les démonstrations ont-elles éveillé un intérêt chez les amies et les voisines? Les réponses à ce type de questions permettent de déterminer la réussite des activités et/ou d'établir les modifications pour la saison suivante. Les femmes furent consultées par l'agent de vulgarisation tout au cours de la saison culturale. Il leur rendit visite dans leurs champs pendant qu'elles travaillaient pour établir les observations de terrain, prendre note des problèmes et y apporter une solution, lorsque possible. Les

strations. The workshops were a way to monitor the demonstrations, to conduct discussions directly with the women farmers, and to improve the technical skills of the field staff.

III. FARMERS' REACTIONS TO DEMONSTRATIONS

The reaction of the women farmers to the demonstrations are the most important test of the appropriateness of the introduced changes. What did they like about it? What was difficult? Are they willing to try a demonstration again? Did the demonstrations generate interest among friends and neighbors? Through this direct feedback the success of the activity could be determined and/or modifications could be made for the next season. The women were consulted by the extension agent throughout the season as they were working in the field so that observations could be made and problems recorded and corrected if possible. Field days were held for the demonstration farmer to explain to the other women what she had done. The extension agent was present to facilitate and record reactions. After the harvest, meetings were conducted in the villages to discuss the different results in the various demonstration plots. (This feedback will be utilized when the PVO/NGO/PC meet with the OFSP to make decisions about the next year.) The specific demonstrations and the farmer's reactions to the technologies are summarized as follows:

Earlier Maturing Varieties

Earlier maturing rice varieties, produced by the national seed programs, can perform well under local conditions but are not available at the village level. Many of these varieties have been tested under farmer conditions and found to produce better than traditional varieties even under low input conditions. Also milling and culinary characteristics are acceptable. Rice has the additional benefit of being self pollinated so that rice can be saved from the demonstrations for seed.

The women appreciate the vigorous growth, high tillering capacity, lodging resistance, good yield, and palatability of the improved varieties. With SCF, improved varieties have been very appreciated by the women and are now grown in 70% of the rice swamp in the villages of Bakindik and Numi Lamin. In these two communities all women plant at least part of their fields with improved varieties. Drought conditions, water availability, various, changing ecologies where rice is grown, and numerous varieties result in a problem of matching the appropriate variety with the field conditions.

Row Seeding with a Row Marker

Farmer participatory demonstration (50-100 M²) plots of row seeding have been done with individual women. A row marker, like a large rake with spikes spaces 20 cm apart, can mark the row and make a furrow (see previous Seed Sowers article on SCF). The seed is then sprinkled in the rows and covered up by hand. Though broadcast seeding is quicker than planting with the row marker, the row seeded rice is much easier to weed.

agricultrices qui participaient aux démonstrations assistèrent à des journées champêtres pour expliquer et partager leurs expériences avec les autres femmes. L'agent de vulgarisation était présent pour faciliter les échanges et prendre note des réactions et commentaires. Après la récolte, il y eut des réunions dans les villages pour parler des résultats obtenus sur les diverses parcelles de démonstration. (Ces informations seront utilisées lors de la réunion des PVO/ONG/Corps de la paix avec l'OFSP pour décider des activités de l'année suivante.) Les démonstrations spécifiques et les réactions des agriculteurs en matière des technologies présentées sont résumées ci-après.

Variétés à maturité précoce

La performance des variétés de riz à maturité précoce développées par les programmes semenciers nationaux peut être bonne dans les conditions locales, cependant, ces variétés ne sont pas disponibles au niveau du village. Un grand nombre de ces variétés furent testées dans les conditions des agriculteurs. Leur production s'est avérée supérieure à celle des variétés traditionnelles même dans des conditions de bas intrants. Les caractéristiques culinaires et de mouture sont acceptables. Le riz offre l'attrait supplémentaire d'auto-pollinisation et peut être gardé des démonstrations de production de semences.

Les femmes apprécient la croissance vigoureuse, la capacité de tallage élevée, la résistance à la verse, le bon rendement et le goût des variétés améliorées. Dans la région du SCF, les variétés améliorées ont été très appréciées par les femmes et à l'heure actuelle elles sont utilisées dans 70% des rizières des villages de Bakindik et de Numi Lamin. A cause de la sécheresse, des contraintes en eau, des écologies changeantes et du nombre élevé de variétés, il est quelque peu difficile d'identifier la variété appropriée aux conditions de chaque champ.

Le semis en ligne à l'aide d'un marqueur

Des parcelles de démonstration participative (50-100m²) ont été semées en ligne avec la collaboration des agricultrices. Les lignes et petits sillons peuvent être tracés à l'aide d'un marqueur, un râteau muni de dents à 20 cm d'écart par exemple, (voir l'article dans le dernier Semeurs sur le SCF). Les lignes sont alors ensemencées et recouvertes manuellement. Bien que la

Piles of weeds in the background illustrate the hours of weeding women farmers endure.
Les tas d'herbes à l'arrière plan illustrent l'énorme effort des agricultrices.

This technique has proven effective as the first step in demonstrating to women row seeding and the ease of weeding when the rice is in rows.

The women complained that the row marker was too time consuming and difficult compared to broadcast planting in dry soil. However, once the fields were planted, the weeding was much easier and less time consuming. Adoption depends on availability of and previous work with animal traction for seeding rice. SCF has helped introduce it in 20 villages. The technique is adapted to heavy or wet soils by using a hand hoe to make the rows.

Animal Traction for Row Seeding

The labor burden on women for land preparation is considerable. Daily hoeing of the soil for weeks is necessary to prepare the land for planting after the rains have softened the soil. The lengthy time required for land preparation results in delaying the planting by several weeks when the rice could be growing. The superficial plowing that the soil received when prepared with a hoe often does not control or eliminate the weeds that start to grow once the rains start. Animal traction for land preparation can reduce women's labor burden. Unfortunately, the local plows are not well adapted for the heavy clay rice soils.

Seeding of rice by men using the super-eco seeder normally used for upland crops has gained widespread use in several areas. This practice has been going on for several years and it continues to gain momentum. In 10 SCF villages that have been using animal traction for several years there are over 30 women/men per village involved in animal traction for seeding. Fifty-70% of the rice area is row seeded with improved varieties using animal traction. In ten newer villages there are ten women/men using animal traction on seed multiplication plots and demonstrations. A female Peace Corps volunteer, working in collaboration with SCF, was involved in demonstrating the technique to the women work group in her village of Media Sedia. All the women in the group convinced the men to do the seeding with animal traction.

The FFHC Women's Rice Project in The Gambia has recently developed a program in animal traction. The OFSP introduced FFHC to an innovative farmer in the Casamance region of Senegal that uses animal traction in rice production. FFHC held a training workshop with a farmer as an instructor in animal traction for their extension agents, who were mostly women. In another very innovative approach, a farmer was brought to two pilot villages of Jiffrong and Kandor Kunda in The Gambia. Nearly 20 women were trained directly in care and handling of oxen, animal traction for pulling ox carts, plowing, and planting rice. Six pairs of oxen were purchased just for use by the women. These women then used the animal traction for transportation, plowing, and row seeding on group and individual fields.

Initial indications are that the women remain interested in this approach and in being independent from the men. It is difficult to quickly learn the care, handling, and utilization of oxen, but

méthode du semis à la volée offre l'avantage d'être plus rapide que le semis en ligne (avec le marqueur), le désherbage du riz semé en ligne est beaucoup plus facile. Cette approche a été efficace en tant que première étape pour démontrer la technique du semis en ligne et la facilité du désherbage qui l'accompagne. Les femmes se sont plaintes de ce que le marqueur prenait trop de temps et qu'il était difficile à utiliser comparé au semis à la volée dans un sol sec. Cependant, une fois les champs semés, elles apprécièrent la facilité et la rapidité du désherbage. L'adoption de cette technique pour le riz sera déterminée par la disponibilité et l'expérience avec la traction animale. Le SFC a aidé à introduire la traction animale dans 20 villages. En utilisant une houe manuelle pour tracer les lignes, la technique a été adaptée aux sols lourds ou humides.

Le semis en ligne à l'aide de la traction animale

La préparation du sol requiert énormément de temps et d'efforts de la part des agricultrices. Un sarclage journalier sur plusieurs semaines est nécessaire avant de pouvoir semer dans le sol ameubli par les pluies. A cause de ce travail intensif en préparation des champs, la plantation du riz est retardée de plusieurs semaines. Fréquemment, ce labour superficiel à la houe ne contrôle ni élimine les mauvaises herbes qui poussent agressivement dès les premières pluies. Ce travail de préparation peut être grandement allégé par l'utilisation de la traction animale. Malheureusement, les charrues locales sont mal adaptées aux sols très argileux requis par la culture du riz.

Depuis quelques années les hommes plantent le riz à l'aide du même semoir que celui utilisé pour les cultures pluviales et cette pratique se répand de plus en plus. Dans la région du SCF, 10 villages utilisent la traction animale depuis plusieurs années et plus de 30 femmes/hommes par village l'utilisent pour semer. Le riz semé en ligne avec des variétés améliorées en utilisant la traction animale est pratiqué dans 50 à 70% des rizières. Dix hommes/femmes de dix autres villages utilisent la traction animale pour cultiver les parcelles de multiplication et de démonstration. Une volontaire du Corps de la paix qui collabore avec le SCF a participé à la démonstration de la technique pour un groupe de travail de femmes du village de Media Sedia. Toutes les femmes de ce groupe ont pu convaincre les hommes à semer le riz à l'aide de la traction animale.

Le Projet rizicole des femmes du FFHC en Gambie vient de développer un programme axé sur la traction animale. L'OFSP a mis en contact le FFHC avec un agriculteur innovatif de la région de la Casamance, Sénégal, qui cultive le riz à l'aide de la traction animale. Le FFHC a exécuté un atelier de formation en traction animale destiné à ses agents de vulgarisation, des femmes dans leur majorité, dispensé par un agriculteur. En Gambie, une autre approche très innovative a été d'amener un agriculteur/instructeur dans deux villages pilotes, à Jiffrong et Kandor Kunda. Quelque 20 femmes reaurent une formation directe axée sur le soin, l'utilisation des boeufs et sur la traction animale pour tirer les charrettes bovines, labourer et semer le riz. Six paires de boeufs furent achetés pour la seule utilisation des femmes. Ces femmes utilisèrent les animaux comme moyen de transport, pour labourer et semer en ligne les champs collectifs ou individuels.

Les réactions initiales indiquent que cette approche et le fait qu'elle offre une certaine indépendance des hommes intéresse les femmes. De même, bien que le soin, le contrôle et l'utilisation des boeufs soient difficiles à maîtriser, les femmes ont déjà fait d'énormes progrès. Dépasser la peur des animaux et apprendre à labourer en ligne droite prend du temps. Lorsque l'animal appartient à un groupe, il y a la question liée à la priorité de son utilisation. Il a été démontré que les animaux sont plus utilisés comme moyen de transport que pour les

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the women have made considerable progress. Overcoming fear of the animals and plowing in a straight line all take time to master. When the animal belongs to a group there is a question of who has priority on using the animal. The animals proved to be used more for transportation and plowing, with seeding only done on a demonstration basis. Additional training has been requested by the women after their experience last year. Seeding rates and seeding plate selection, depth of seeding, timing of seeding, and row spacing are all issues that need further attention.

With five years of experience in animal traction efforts, SCF has made considerable progress in ameliorating the problems associated with animal traction seeding. SCF has required that communal and individual rice seed multiplication plots be row seeded with animal traction since 1988. Women often still prepare the fields by hand with a hoe. The men then bring the oxen and planter used for upland crops to use for planting rice. In 1991 village farmer training in plowing and row seeding of rice were initiated for women and men in five villages, with farmers attending from an additional 15 villages.

It is a big transition from planting upland crops to planting rice with the same seeder. With animal traction there has been a problem of getting the row spacing down to 20 cm.s from the usual 50 cm or more for the uplands crops. This narrow row spacing is necessary for the proper plant populations for good yields and to shade out the weeds.

Prototype Rice Seeders

In order to explore other technologies for women and rice production, the OFSP has linked collaborators with additional sources of technical assistance. The OFSP arranged for staff from FFHC and SCF to visit the ISRA research station in Ziginchor, Casamance to discuss their activities with agricultural engineer Mr. Alioune Fall, who specialized in this area. A follow up visit was made by Mr. Fall to the rice fields of the two organizations in The Gambia. The result was that two different prototype seeders were purchased by the OFSP and loaned to FFHC and SCF for testing with farmers. One seeder is a hand-pulled, single row seeder for small fields, so the women don't have to be dependent on animal traction. The second seeder was a four row seeder, capable of seeding large areas relatively quickly.

Both the prototype seeders arrived late in the field. Conse
The four row seeder was best suited to larger fields. The women deemed the seeder too heavy for use by them directly. Where used by the men, it generated considerable interest. With its high seeding speed in seeding 4 rows rather than 1, the men could assist the women and quickly return to their upland crops. There needs to be structural modification of the seeder with a wider front wheel for weight distribution and bracing on the handles for better structural stability.

travaux de labour ou de semis, activités qui semblent être exécutés pour les démonstrations exclusivement. Après leur expérience de l'an dernier, les femmes ont fait part de leur désir de participer à une formation supplémentaire. La densité de semis et la sélection des seeding plate, la profondeur, le calendrier et l'intervalle entre les lignes sont toutes des questions qui méritent une plus ample attention.

Après 5 années d'expérience, le SFC a fait de gros progrès pour améliorer les problèmes associés à la plantation à l'aide de la traction animale. Depuis 1988, le SCF requiert que la traction animale soit utilisée pour semer les parcelles de multiplication de semences de riz, communales ou individuelles. Il est toujours fréquent que les femmes préparent les champs à la main avec une houe. Les hommes viennent ensuite semer le riz avec les boeufs en utilisant le même semoir que celui pour les cultures pluviales. En 1991, la formation des agriculteurs et agricultrices en labour et semis en ligne pour le riz a démarré dans cinq villages avec la participation d'agriculteurs de 15 autres villages.

Il y a une grande transition entre la plantation des cultures pluviales et la plantation du riz avec un même semoir. Lorsque le riz est semé à l'aide de la traction animale, la distance entre les lignes, 20cm comparé aux 50cm ou plus requis pour les cultures pluviales, peut poser des problèmes. Cette distance entre les lignes doit être respectée pour obtenir des populations végétales adéquates à même d'offrir de bons rendements et L'OFSP a pris les dispositions nécessaires pour que le personnel du FFHC et du SFC visitent la station de recherche de l'ISRA à Ziginchor, Casamance, pour s'entretenir de leurs activités avec l'ingénieur rural, M. Alioune Fall, expert dans ce domaine. M. Fall réalisa une visite de suivi dans les rizières de deux organisations en Gambie. Cette visite résulta dans l'achat de deux semeurs prototypes différents par l'OFSP qui les prêta au FFHC et au SCF pour le tester avec les agriculteurs. Un des semoirs qui avait la capacité d'ensemencer une seule ligne et était tiré à la main s'avéra utile sur les champs de petite taille et réduisit la dépendance des femmes sur la traction animale. Le deuxième semoir avait la capacité d'ensemencer quatre lignes de manière relativement rapide et était davantage approprié aux champs de plus grande taille.

Les deux semoirs prototypes sont arrivés sur le terrain tard dans la saison et par conséquent n'ont pas été testés de manière exhaustive. Lorsque comparé aux semoirs tirés par les animaux, le semoir manuel à une seule ligne était efficace et facile à opérer sur les petites parcelles. Les femmes ont indiqué que son opération était aisée et que sa performance était bonne lorsque le lit de semences était bien préparé. Dans les sols humides, il y eut des problèmes d'obstruction du distributeur de semences. En utilisant ce semoir, les femmes ne doivent pas compter sur les hommes ou les animaux. Ce semoir est prometteur et doit être davantage testé.

Le semoir à quatre lignes est davantage approprié aux champs de plus grande taille. La réaction des femmes était qu'il était trop lourd pour leur seule utilisation. Lorsque c'étaient les hommes qui l'utilisaient, il suscita un intérêt élevé. Ce semoir qui a la capacité d'ensemencer rapidement quatre lignes plutôt qu'une seule, permit aux hommes d'aider les femmes et de retourner s'occuper de leurs propres cultures pluviales. La structure du

LESSONS LEARNED

These collaborative activities have confirmed the importance of the participatory process in working with women farmers. From the beginning, the participatory process establishes two way communications which leads to an understanding of gender role and constraints, and provides essential feedback for future activities.

Women farmers are receptive to innovations if the innovations are appropriate to their conditions. The process of change takes time. The adoption of improved varieties and use of animal traction that SCF has achieved has taken place over five years. Women have been able to persuade the men to help them by seeding rice in rows with animal traction. This is a dramatic change from traditional roles in rice production. Now that the men are getting more involved in rice production, animal traction for land preparation is the next step along with the development and testing of a plow better adapted for the heavy clay soils of the rice fields.

Different approaches and a range of technologies were used by collaborating organizations in agricultural extension with women rice farmers. There is a need to be innovative in extension approaches. The training of women farmers in animal traction will require several years before the effectiveness of this approach can be evaluated. The range of technologies offers a choice to the farmers to adopt or adapt changes based on their personal needs rice ecology in which they work.

The demonstrations had many benefit for the women participants. They were able to try new varieties, alternative seeding methods, and the modified production practices. They retained the seed from the demonstration plots to plant next year for themselves and to share with others. In addition, other women were able to observe the demonstration which is necessary for the diffusion of the changes.

The OFSP has helped the collaborators improve their capacity to carry out participatory process and to strengthen their technical skills. In addition, the OFSP has helped link the collaborators to new rice seeding technologies for testing in the field. While there still remains much to be done to ease the labor burden of women in rice production and increase the productivity of their labor, a participatory process has been initiated with women farmers that will continue.

semoir devra être modifiée: la roue avant devra être élargie pour que le poids soit mieux distribué et il faudra renforcer les bras pour en améliorer la stabilité.

LECONS APPRISES

Les activités coopératives ont confirmé l'importance du processus participatif lors du travail avec les agricultrices. Ce processus établit dès le départ des communications à deux sens, il mène à une compréhension du rôle et des contraintes de genre et il pourvoit les retro-informations tant essentielles à l'identification des activités futures.

Les agricultrices sont ouvertes aux innovations à condition qu'elles soient appropriées à leurs situations. Il faut du temps pour que les changements soient acceptés. Les réussites du SCF liées à l'utilisation de la traction animale et à l'adoption des variétés améliorées ont été achevées sur une période de cinq ans. Les femmes ont pu persuader les hommes de les aider à semer le riz en ligne avec la traction animale. Il s'agit certes d'un changement important dans les rôles traditionnels. Maintenant que les hommes participent davantage à la production rizicole, la prochaine étape devra mettre l'accent sur l'utilisation de la traction animale pour la préparation des terres et sur le développement et la mise à l'essai d'une charrue mieux adaptée aux sols argileux et lourds des rizières.

Les organisations qui collaborent à la vulgarisation agricole destinée aux productrices du riz ont appliqué des approches différentes et toute une gamme de technologies. Des approches de vulgarisation innovatives sont nécessaires. La formation des agricultrices en traction animale requiert plusieurs années avant que l'efficacité de cette approche ne puisse être évaluée. La gamme de technologies offre un choix aux agriculteurs et leur permet d'adopter ou d'adapter les changements en se basant sur les besoins de l'écologie dans laquelle ils travaillent.

Les démonstrations ont offert de nombreux bénéfices aux agricultrices participantes. Elles furent en mesure d'essayer de nouvelles variétés, des méthodes alternatives de semis/plantation et des pratiques de production modifiées. Elles gardèrent les semences des parcelles de démonstration pour les utiliser l'année suivante et pour en donner à d'autres agricultrices. D'autres femmes purent également observer les démonstrations, étape essentielle à la diffusion des innovations.

L'OFSP a aidé ses collaborateurs à améliorer leur capacité de mise en oeuvre du processus participatif et à renforcer leur expertise technique. L'OFSP les a également aidé à établir des liens de manière à avoir accès aux nouvelles technologies de plantation rizicole pour la mise à l'essai sur le terrain. Alors qu'il y a encore beaucoup de travail à accomplir pour alléger le fardeau des femmes et augmenter leur productivité, le processus participatif a été initié et continuera à se développer.

Gambian women rice farmers harvest rice, cutting panicles with a small knife.
En Gambie, les agricultrices récoltent les épis de riz avec un couteau.

VISITS TO OFSP

Ms. Deirdre Birmingham, Winrock training and extension associate, visited the On-Farm Seed Project in Senegal and the Gambia from August 6-17, 1991. The purpose of her in-house consultation was to analyze and provide feedback on the training she observed to project staff.

Ms. Birmingham evaluated all aspects of the training conducted by project-site staff that NGO collaborators participated in and recorded her observations finally in a "Consultancy Report". She reviewed the training approach, design, methods, materials, evaluations, and communications which she presented in the first part of her report while the second part was devoted to farmer participatory demonstrations, the third on impact assessment, the fourth on extension materials, closing with observations regarding the staff skills as training resources.

Ms. Birmingham was insightful to the project strategy throughout her report, where she claimed that it was "to train those who can train others". She realized that the challenge was for the trainers to "think from the farmer's perspective". She emphasized that the project's goal is not just dependent on the technical message, but rather the "communication approach." During her entire report, Ms. Birmingham observed the training challenges, strengths and weaknesses, recommending explicit and attainable objectives. The project welcomed her valuable input.

Dr. Pierre Ph. Antoine, director of the Africa and Middle East Division, and Ms. Sarah H. Luche, program associate, both employed at Winrock International's Petit Jean Mountain, Arkansas headquarters visited the On-Farm Seed Project in November of last year. Dr. Antoine attended two days of meetings with staff, collaborators, and USAID/Senegal officials, while Ms. Luche stayed on in Senegal and the Gambia for two weeks in order to become acquainted with project staff; Project Leader, Tom Osborn; and Project Coordinator, Alphonse Faye; and all project aspects that she has the responsibility of back-stopping.

Ms. Luche participated in two days of project briefing, and one day of research at the Dakar office with Mr. Osborn and Mr. Faye, before welcoming Dr. Antoine to West Africa. The project team met within separate meetings with World Vision's Mr. Al Johnson and Mr. Mansour Fall, Mr. Reed Hertford of SECID, Dr. Faulkner, formerly of Louisiana State University, Mr. David Delgado of USAID/Senegal, Ms. Jeanine Scott of Africare, and Ms. Mary Ann Zimmerman of Transcentury's NGO/PVO Support Project. The meetings brought about positive results with action to be taken agreed upon, resolutions by all parties to continue to keep the channels of communication

VISITES A L'OFSP

Mlle Deidre Birmingham, chargée de formation et vulgarisation de Winrock, se rendit au Sénégal et en Gambie du 6 au 17 août 1991 pour visiter le Projet semencier en milieu paysan. Le but de sa mission de consultation interne était d'analyser les activités de formation et d'offrir des retro-informations au personnel de projet.

Mlle Birmingham évalua toutes les activités de formation dispensées au site du projet destinées aux ONG collaboratrices. Ses observations sont rédigées dans un "rapport de consultation" organisé autour de quatre sections centrales et d'une conclusion. La première section du rapport traite de l'approche, de l'élaboration et des méthodes de formation, des matériaux didactiques et des communications; la deuxième des démonstrations exécutées avec la participation des agriculteurs; la troisième de l'estimation de l'impact; la quatrième des matériaux de vulgarisation et finalement; une conclusion présentant ses observations et réflexions sur l'expertise et les ressources en formation offertes par le personnel.

Le rapport de Mlle Birmingham pourvoit des aperáus profonds sur la stratégie du projet. Prenant conscience que le défi que doivent relever les formateurs tient à "penser en tenant compte des perspectives et points de vue des agriculteurs", elle souligne que le but de la formation est "de former des individus qui à leur tour pourront former d'autres individus". De même, elle met l'accent sur le fait que la réalisation du but du projet est liée non seulement au message technique mais à une "approche basée sur l'échange et les communications" également. Le rapport souligne les défis que confronte la formation, les atouts et les faiblesses et recommande des objectifs clairs et réalistes. Le projet acceuille avec grand plaisir les utiles informations et recommandations de Mlle Birmingham.

Deux autres membres de Winrock International ont également visité l'OFSP en novembre 1991. Il s'agit du docteur Pierre Antoine, directeur de la Division Afrique et Moyen Orient, et de Mlle Sarah H. Luche, associée de programme, tous deux membres du personnel du siège à Petit Jean Mountain. Pendant deux journées, M. Antoine participa à des réunions avec le personnel, les collaborateurs et les responsables de l'USAID/Sénégal. Mlle Luche séjourna deux semaines au Sénégal et en Gambie pour rencontrer le personnel du projet, M. Tom Osborne, chef de projet et M. Alphonse Faye, coordinateur de projet, et pour se familiariser avec toutes les composantes du projet qu'elle devait soutenir au siège.

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open and to increase collaboration.

Dr. Antoine made special efforts to inform the collaborators and other members of the NGO and USAID community involved in OFSP of the steps being made toward the initiation of Phase II. Dr. Antoine credited Mr. Tom Osborn and Mr. Alphonse Faye with having successfully administered a program with not altogether foreseen far-reaching agricultural development impact.

Ms. Luche traveled to the Gambia with Mr. Osborn in order to participate in additional meetings with collaborators and other international development agencies. The most important of these meetings, the Advisory Council meeting, occurred on Friday, December 6. Ms. Luche was impressed by the knowledge of the particular developmental context as well as the degree of cooperation displayed by participants in the meeting and astonished by the challenge the project poses to both international and national NGOs. The issues surrounding the introduction of foreign albeit appropriate technologies to small farmers will continue to be much debated. Dr. Antoine and Ms. Luche returned to headquarters convinced of the need to provide close and careful support to this innovative project. Among the tasks headquarters have pursued as a result of discussions with project-site staff is a feasibility study of developing an extended computerized management information system and identifying ways in which additional NGOs and collaborating NGOs can benefit from the project's grant-matching component. Ms. Luche is also seeking qualitative inputs, such as a seed technology enterprise development study, from consultants and interns to complement the project's mandate in its final stages.

Pendant deux jours, Mlle Luche prit part à des réunions durant lesquelles elle fut introduite aux activités de projet et elle passa une journée au bureau à Dakar avec MM. Osborn et Faye avant d'acceuillir M. Antoine en Afrique de l'Ouest. L'équipe du projet assista à plusieurs réunions auxquelles participèrent MM. Al Johnson et Mansour Fall de la Vision Mondiale, M. Reed Hertford du SECID, le Dr. Faulkner, au préalable avec l'Université d'Etat de la Louisiane, M. David Delgado de l'USAID/Sénégal, Mlle Jeanine Scott d'Africaire et Mlle Mary Ann Zimmerman du Projet de soutien aux ONG/PVO (organisations volontaires privées) de Transcentury. Des résultats positifs découlèrent de ces réunions. Les activités à exécuter furent définies et tous les collaborateurs décidèrent de continuer à maintenir de solides voies de communication et d'accroître les efforts collaboratifs.

M. Antoine prit soin d'informer les collaborateurs et les autres membres des ONG et de l'USAID qui collaboraient au projet des efforts en cours visant le démarrage de la Phase II.

M. Antoine félicita M. Tom Osborn de l'excellente administration d'un programme dont l'impact sur le développement agricole dépasse grandement la portée anticipée.

Mlle Luche voyagea en Gambie en compagnie de M. Osborn où elle participa à des réunions avec les collaborateurs et d'autres agences de développement international. La réunion la plus importante, celle du conseil consultatif, eut lieu vendredi 6 décembre. Mlle Luche fut fort impressionnée par la quantité de connaissances accumulées et du degré de coopération entre les participants et fut frappée du défi que le projet posait aux ONG nationales et internationales. Il ne fait aucun doute que le débat sur les questions liées à l'introduction de technologies étrangères, appropriées aux réalités des petits agriculteurs, est loin d'être éclairci et que les discussions continueront. M. Antoine et Mlle Luche retournèrent au siège convaincus de la nécessité de pourvoir un soutien solide et efficace à ce projet innovateur. Une des taches du personnel au siège, résultant des discussions avec le personnel de terrain, tient à la réalisation d'une étude de faisabilité axée sur le développement d'un système d'informations sur ordinateur de plus grande envergure et sur l'identification de moyens pour aider d'autres ONG et les ONG collaboratrices à tirer profit du programme Small Grant (petites subventions) du projet. Mlle Luche conduira également des recherches visant l'identification d'intrants de qualité, telle une étude sur le développement des entreprises de technologies semencières, de consultants et de stagiaires pour collaborer à l'exécution du mandat du projet dans ses étapes finales.

On-Farm Productivity Enhancement Program

The On-Farm Seed Project (OFSP) plans to combine efforts with the Living Soils Consortium to form an integrated On-Farm Productivity Enhancement Program (OFPEP), which would begin October 1992. The OFPEP would not only continue the seed technology and assistance efforts of the OFSP, but add components to improve soil fertility, and soil management with a special emphasis on biological nitrogen fixation/legume management techniques. The program, to be led by Winrock International in collaboration with the PVO/University Center, would initially focus on three countries: Senegal, The Gambia, and Uganda. Winrock, Save the Children, and Agricultural Cooperative Development International would be the lead agency in these three countries, respectively. The program would also include the participation of Africare, CARE, Catholic Relief Services, Christian Children's Fund, CODEL, Mississippi State University, Pan American Development Foundation, TechnoServe, and World Vision International. This is a follow-on phase for both projects and has been submitted for funding to USAID/PVC's matching grant program.

Le Programme intégré d'Amélioration de la Productivité en Milieu Paysan

Le Projet Semencier en Milieu Paysan a l'intention de combiner ses efforts avec le consortium "Sols vivant", pour former le programme intégré d'Amélioration de la Productivitié en Milieu Paysan, qui pourrait commencer en octobre 1992. Ce programme continuera non seulement à pourvoir de l'assistance en matière de technologie semencihre mais ajoutera également des composantes techniques pour améliorer la fertilité et la gestion des sols, avec un accent particulier place sur la fixation biologique de l'azote et l'utilization des légumineuses. Le programme, sous la direction de Winrock International avec la collaboration du Centre OPV/Universités, sera initialement exécuté dans trois pays: le Sénégal, la Gambie et l'Ouganda. Winrock, Save the Children et Agricultural Cooperative Develoment International seront les agences responsables dans ces trois pays, respectivement. Africare, CARE, Catholic Relief Services, Christian Children's Fund, CODEL, l'université d'état du Mississippi, Pan American Development Foundation, TechnoServe et World Vision International participeront également au programme. Le projet constitue une deuxiéme phase du projet semecier et "Sols vivants" et a été proposé pour le financement à l'USAID/PVC (programme OPV à fincancement partagé).

SEED SOWERS is the newsletter of the On-Farm Seed Project (OFSP). OFSP is designed to assist farmers at the local level in Senegal and The Gambia in adapting and using improved methods of seed production, harvesting, processing, and storage. The newsletter is issued by the Center for PVO/University Collaboration in Development, Bird Building, Western Carolina University, Cullowhee, NC 28723-9056, USA. Telephone (704) 227-7492, Telex 493-2268, FAX (704) 227-7422. Inquiries, comments, suggestions, and submissions are encouraged and welcome

LES SEMEURS est le bulletin du Projet semencier (l'OFSP) au niveau de l'exploitation. Ce Projet a pour objectif d'aider les agriculteurs sénégalais et gambiens à adapter et à utiliser des méthodes améliorées de production, de récolte, de traitement et de stockage des semences. Ce bulletin est publié par le Center for PVO/University Collaboration in Development, Bird Building, Western Carolina University, Cullowhee, NC 28723-9056, USA. Téléphone (704) 227-7492, Telex 493-2268, FAX (704) 227-7422. Les questions, commentaires, suggestions et articles sont les bien venus.

SEED SOWERS/LES SEMEURS

Center for PVO/University Collaboration in Development
Bird Building
Western Carolina University
Cullowhee, NC 28723-9056
USA

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Appendix B

"Using Farmer Participatory Research to Improve Seed and Food Grain Production in Senegal"
by Tom Osborn and Alphonse Faye

Development Studies
Paper Series

Using Farmer Participatory Research to Improve Seed and Food Grain Production in Senegal

Tom Osborn and Alphonse Faye

Winrock International
Institute for Agricultural Development

July 1991

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Using Farmer Participatory Research to Improve Seed and Food Grain Production in Senegal

by
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and
Alphonse Faye

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Tom Osborn is project leader and Alphonse Faye is project coordinator/agronomist of the On-farm Seed Production for Sub-Saharan Africa project, in which Winrock International is a collaborator. Please see page 7 for more information about the project's organization and sponsorship.

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The rice-seed case study was made possible by the leadership of Alan Johnston, associate Peace Corps director in Senegal, and the field work of the Peace Corps volunteers in the department of Bignona: Marlyn Hines, Mary Mackey, Robert Peplin, Mark Chenault, Donna Johnson, and Scott Thompson.

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Using Farmer Participatory Research to Improve Seed and Food Grain Production in Senegal

When resource-poor farmers participate in developing agricultural technologies, those technologies are more likely to meet their needs. Thus, greater involvement of farmers has been a primary factor in *farming systems research* conducted by national agricultural research systems and international agricultural research centers over the past two decades. The farming systems approach has had some implementation problems; but it has been an important first step toward engaging farmers as partners in research.

In farming systems research, control of the project -- choosing the focus of a study, setting priorities, and so forth -- lies with the researcher. *Farmer participatory research,* an alternative approach for reaching resource-poor farmers, depends more heavily on the farmers' initiative and involvement and the use of indigenous technical knowledge. Nongovernmental organizations such as World Neighbors are increasingly interested in it as a way of enhancing the effectiveness of their field activities.

Researchers have suggested that agricultural innovation comes from many sources, including the national and international research agencies, nongovernmental organizations, and farmers. Under the traditional central-source model of technology innovation, information about new farming methods moves from the researcher down to the farmer. The more recently developed multiple-source model recognizes the diversity of sources and the multitude of factors that affect the complex process of technology innovation. It includes farmer participatory research.

This paper describes, through a case study, how the On-Farm Seed Project (OFSP) in Senegal has used farmer participatory research to improve resource-poor farmers' production of rice seed and food grain. Though the example is specific, the principles it illustrates -- for conducting research and for applying that research to improve seed systems -- may be useful to other types of projects and other areas of the world.

OFSP Uses an Innovative Approach to Developing Seed Technology

Seed is the key input in agricultural development. Unlike other inputs, such as chemical fertilizers and pesticides, seed can be produced by the farmer. Traditionally, farmers produce, select, and save seed from this year's crop to produce next year's crop.

The national and international agricultural research agencies develop and test improved varieties of crops and their seed. Often, this research does not consider the needs or preferences of resource-poor farmers.

National seed systems are responsible for multiplying and distributing that improved seed. But in Africa, the government agencies that are part of the national seed systems often lack the means to multiply the seed and deliver it to the farmers.

Consequently, more than 80% of the seed planted in Africa is produced and saved by farmers. So the most direct and effective way to improve crop production in the area is to work with the traditional seed systems through which farmers can produce traditional and improved varieties.

This approach to developing technology combines disciplines, research and extension techniques, and cultural values that are not usually considered together. It involves

- **Understanding the traditional seed system.** What system do farmers use to produce and save their own seed? What characteristics do farmers want in the crops they grow? Where do farmers get seed of the varieties they need?

- **Applying seed technology to produce high-quality seed.** What seed-technology practices are used by farmers and by the national seed system? What are the strengths and weaknesses of farmers and the national seed system in producing high-quality seed? If appropriate improved varieties are available, how do they get to the farmer?

- **Conducting research into varietal development and agronomy.** Have the national and international agricultural research agencies already developed suitable improved varieties? What agronomic innovations are available and appropriate for improving seed production and yield in this region?

OFSP's approach to developing seed technology integrates such diverse but interrelated factors, with the goal of improving the quality and increasing the quantity of seed available to small farmers.

In Senegal, Institutional Support for Agriculture Needs Improvement

As mentioned earlier, a variety of institutions are involved in national seed systems. National and international agencies conduct research; national agencies provide extension services and multiply and distribute the seed. In Senegal, nongovernmental organizations also are involved in the system.

Research institutions are making progress

Agricultural research has a long history in Senegal, which was the research headquarters of French West Africa for almost 50 years, starting in 1921. Today, Senegal, with seven agronomic research stations, has one of the most extensive agricultural research systems of any French-speaking Sahelian country.

Until 1974, research was in the hands of specialized French institutions. A tradition developed in which researchers were accountable primarily to disciplinary scientific groups within bureaucratically organized research institutes. In 1974, the Institut Sénégalais de Recherches Agricoles (Senegalese Institute of Agricultural Research, ISRA) was created to bring those institutions together under one organizational structure that was responsible for all agricultural research in the country.

The system of *Unités Expérimentales* (experimental units), which existed between 1968 and 1980, offered one of the first examples of farming systems research in West Africa. The system had problems because of its top-down approach, and it ended with little progress being made toward a relationship between research and extension.

In 1982, ISRA established a Production Systems Research Department with assistance from the World Bank and financing from the U.S. Agency for International Development. Michigan State University, on contract, worked with the department's interdisciplinary teams at three sites: Djibelor, Kaolack, and St. Louis. From that work came a better understanding of Senegal's traditional farming systems and of the farmers' potential for and constraints to adopting technologies that ISRA developed. It also strengthened the ties between research and extension.

However, ISRA's effectiveness has been limited by its size and administrative structure, the effects of the structural adjustment programs, and difficult economic times. As donors' financial support has shifted, research programs have been adjusted; researchers often have not been able to pursue the work that they considered most valuable. And while ISRA's researchers, who are well trained and scientifically motivated, are interested in seeing the technologies they develop reach the farmers who need them, they must rely on the extension service to work directly with the farmers.

Overall, Senegal's agricultural research system is highly developed compared to those of most African countries; but its top-down orientation and structure fit the central-source model. However, creating the Production Systems Research Department has been a positive step toward improving the system; and ISRA researchers are a potential source of technical innovations.

Extension efforts are uncoordinated

The traditional approach of agricultural extension includes identifying farmers' problems, researching those problems, testing potential solutions, and extending the tested technology to the farmers.

In Senegal, agricultural extension is the responsibility of the Société Regionale de Développement Rural (Regional Society for Rural Development) and its regional agencies. The organization is supported by the government and donors; so staff numbers and activities vary according to the funding available. The regional agencies are not oriented toward working with resource-poor farmers; instead, they promote high-input agriculture that depends on credit.

To facilitate transferring technology to the farmers, ISRA's Production Systems Research Department established relationships with some of the regional extension agencies, including one in the Senegal River basin, one in the peanut basin, and two in the Casamance region of southern Senegal. This effort was ineffective because of the institutional and funding constraints to collaboration among Senegalese government agencies.

The regional extension agencies set up their own research. For example, the agency in the peanut basin conducted trials on some varieties and on fertilizer application, with progressive farmers and on station, that duplicated ISRA's work. It then extended the results to farmers as packages of inputs that included new varieties, fertilizer, herbicides, and insecticides, with credit usually provided by the regional extension agency. One of the agencies in the Casamance conducted rice trials with herbicides, fungicides, insecticides, and varieties from the West African Rice Development Association, rather than the varieties tested and developed by ISRA. In both instances, the agencies used a top-down approach to extend high-input agriculture that had little relevance to resource-poor farmers.

The regional extension agencies are being affected by the recent structural adjustment programs and a change in government policy to promote privatization by ending the government's role in supplying and distributing agricultural inputs. These changes in programs and policies have substantially reduced funding, staff, and support for the agencies, demoralizing them and widening the gap in extension services to rural areas.

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Institutions that multiply and distribute seed are fragmented

Senegal's national seed system comprises four related components:

- A system for acquiring new varieties from national and international institutions, which ISRA tests and selects.

- A system for multiplying seed to provide sufficient quantities for farmers. Early steps in the multiplication process are carried out by ISRA and the Direction de la Production et du Contrôle des Semences (Department of Seed Production and Control); later steps are carried out by contract growers.

- A system for quality control of seed, which is another responsibility of the seed production and control agency.

- A system for distributing seed to farmers through the regional extension agencies, the Société Nationale de Commercialisation des Oléagineux du Sénégal (National Society of Senegal for Oilseed Trade), and private dealers.

This system is changing because of the structural adjustment programs and the resulting agricultural policies. The government's role in the seed system is diminishing; the seed production and control agency is restricting its activities to quality control. Privatizing the seed industry has major implications for the seed system.

Seed production in Senegal has focused on the main cash crop, peanuts. Formerly, farmers could purchase peanut seed on credit; now they must pay for the seed at planting time or use their food supply of peanuts as seed. Work on other crops has received limited attention and funding. More than 80% of the seed used in Senegal is produced and saved by the farmers.

The greatest weakness in Senegal's seed system for food crops is in distributing seed to the farmers, an expensive task but a critical one. Peanut seed is distributed effectively, probably because of peanuts' importance as an export crop. (Historically in most African countries, export crops have been promoted since they bring in foreign exchange, which is necessary for purchasing goods from developed countries.) Seed for other crops appears not to have been tested under farm conditions to ensure that they are appropriate to the farmers' production systems. And there are no extension programs to educate the farmers about the practices that the new varieties require.

If a national seed system is to be effective, research and extension must be linked. If importing seed is a weakness in the system, seed can be multiplied locally -- farmers can multiply many varieties themselves if they are provided with initial stocks. In fact, seed production can become a small-scale rural enterprise.

Nongovernmental organizations can help fill the gap

International and indigenous nongovernmental organizations (NGOs) are emerging as an increasingly important force in the development of Africa. Several factors have contributed to this emergence:

- The drought of the 1970s and the accompanying international attention brought funding for relief activities through NGOs.
- The economic crises of African countries and the resulting structural adjustment programs have reduced all public services, including government programs for national development.
- The donor community views NGOs, both international and indigenous, as alternative vehicles for implementing rural development activities.

NGOs are working in literacy, health care, water quality and supply, natural-resource management, and agriculture. They tend to use a grassroots style of organization to respond to the needs of rural communities.

Senegal's gap in agricultural extension is being filled by NGOs. These groups have the financial support and staffs necessary to serve rural communities, but their work often is limited to small geographic areas. More than 100 international and indigenous NGOs are registered in Senegal: 64 are members of the Conseil des Organisations Non-Gouvernmentales D'Appui au Développement (Consortium of Nongovernmental Organizations for Assistance in Development); 20 are international, 39 indigenous or African; at least 54 are working in agriculture.

So far, the agricultural work of NGOs has emphasized developing water supplies for gardening during the dry season; however, interest is growing in the traditional rainy-season crops. The NGOs are increasingly concerned with activities that are technically sound and sustainable. Farmer participatory research is compatible with -- in fact, is an extension of -- the philosophy of the NGOs and can help relieve the seed-related problems of resource-poor farmers.

The On-Farm Seed Project: Collaboration is the Solution

The On-Farm Seed Project was conceived in 1986 during a meeting between U.S. private voluntary organizations (PVOs) and universities, all of which were members of the Center for PVO/University Collaboration in Development. This organization recognizes the strength of PVOs in grassroots activities but also their need for access to sources of appropriate technology, technical assistance, and training. The PVOs included CARE, Catholic Relief Services, Lutheran World Relief, Save the Children, and Winrock International Institute for Agricultural Development. The universities included Mississippi State University, which is world-renowned for its expertise and experience in developing seed programs in third world countries.

Those attending the meeting acknowledged that, as mentioned earlier, more than 80% of the crops in developing countries are sown from seed stocks selected and saved by farmers, despite more than 30 years of emphasis on and investment in seed-production and -supply programs. Seed-industry development has been important, and the assistance rendered was not wasted. However, it is clear that the national seed systems must work with the traditional seed system to develop improved varieties and be sure that these varieties reach small farmers. If the traditional seed systems were better understood, improved, and linked to the national seed systems, small-scale seed enterprises could develop.

The participants in the meeting agreed to develop a project that would assist PVOs with seed-related activities. OFSP was initiated in 1987 through the collaboration of the PVO/University Center, Winrock International, Mississippi State University, several PVOs, and the U.S. Peace Corps, with partial funding by the U.S. Agency for International Development. Its mission is to develop and implement innovative ways of improving the seed technology of rural farm families in Senegal and The Gambia.

OFSP's approach is unusual in two ways:

- Its interventions in the local seed systems are based on information gathered in the field.

- It is truly collaborative -- all its activities are carried out through field organizations: the PVOs and the Peace Corps.

OFSP is designed to enhance the seed programs of field organizations, not duplicate or compete with them. It provides a service to the PVOs and the Peace Corps: Its success depends on linking its interventions to the activities of the collaborators.

The project focuses on meeting farmers' demand for better seed by improving their systems of selecting, producing, storing, and distributing seed. Through training and demonstrations, OFSP helps farmers learn how to do better what they have been

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doing for themselves for centuries. In the process, they learn about new varieties and technologies, share indigenous knowledge and skills, and are challenged and encouraged to review and revise, if necessary, their assumptions about and criteria for selecting, producing, and storing seed.

A Case Study:
Producing Rice in the Casamance

One of the organizations that expressed an interest in collaborating with OFSP was Peace Corps Senegal, which wanted to develop a seed component for its African Food Systems Initiative. OFSP provided training to incoming Peace Corps volunteers; then, placed in villages, the volunteers worked with farmers to become familiar with their farming systems, giving particular attention to seed practices.

At the same time, OFSP contacted ISRA researchers working with major crops for information about technologies that would be relevant at the village level. The ISRA researchers were interested in finding alternative methods for interacting with farmers, particularly those planting millet, rice, and cowpeas.

Thus, a multi-institutional approach to program development took shape. The following case study examines one of the collaborative activities in which OFSP assisted.

Rice yields needed to be improved

Agricultural development activities have had little success in achieving sustained rice-yield increases in West Africa. The hindrances have included lack of appropriate rice varieties, poor water control, shortages of fertilizer and other inputs, poor weed control, shortages of labor, inadequate rainfall, and failure to consider traditional production practices and ethnic factors.

Senegal's extension process has not taken into account that the rice-farming systems differ greatly between geographical areas and even within some small areas. Further, there has been too little understanding and appreciation of indigenous technical knowledge; farmers' beliefs and expertise must be considered if the interventions are to be compatible with local production practices. The approach of delivering a package of an improved variety, fertilizer, and fixed production practices has not benefited West African rice farmers for the long term.

Therefore, to attempt to improve rice yields, OFSP and the Peace Corps collaborated with Alphonse Faye, a Senegalese rice agronomist and plant breeder, to develop a small-scale pilot program for extending rice-seed technology in the Casamance. The goal was to achieve sustained increases in yields by using a process approach to gaining knowledge and understanding of the seed-related problems of the farmers. The project combined the technical expertise of ISRA with on-site monitoring by Peace Corps volunteers in the villages, coordinated by OFSP and Peace Corps staff – a multi-institutional, comprehensive, technically sound team.

The study focused on

- the variety of ecologies in which rice is grown -- upland, phreatic (sometimes submerged), paddy (always submerged), mangrove, and riverain (deep flooded)
- the variety of planting methods -- broadcasting, planting in rows, and transplanting
- the number of rice varieties planted -- more than 200 varieties have been identified in the Casamance region alone
- the influence of labor constraints, rainfall, ecology, and cultural factors on the timing of production practices

The basic steps included

- gathering information -- developing knowledge and understanding of the production practices and seed-related problems of the farmers
- designing and implementing -- conducting trials to demonstrate how changes in the rice-production system could relieve the seed-related problems that were identified
- discussing the results of the trials with the farmers
- following up -- conducting further trials and extension activities with the farmers in the pilot group
- disseminating the results -- extending the activity to more farmers and organizations

The pilot project was meant to test the methodology of the multi-institutional approach for developing and testing technologies for improving the production of rice seed and food grain and extending those technologies to the farmers.

Farmers were using two types of rice-production systems

Farmers began producing rice in the Casamance over 10 centuries ago. The region is the center of origin of *Oryza glaberrima*, a lesser-known species of rice. In the fifteenth and sixteenth centuries, *Oryza sativa*, the species grown in Asia, was introduced to the Casamance by the Portuguese. Rice is the staple food of the area; it is grown mainly for home consumption, not for sale.

Rainfall levels in some areas of the Casamance have declined 27% in the past 20 years. This has had several effects:

- The flow of the Casamance River has been reduced, so saltwater has intruded into the mangrove and paddy rice ecologies near the river, threatening the rice plants, which cannot tolerate salt.

- Insufficient moisture has been available during the grain-fill stage of growth, so traditional varieties of rice have not been able to mature, which has reduced yields.

- Some of the traditional varieties bloom in October, when moisture is limited. Although they are adapted to predrought conditions, moisture is now so scarce in October that their yields have declined.

To determine how yields might be increased to previous levels or beyond, information was gathered from farmers and from secondary sources. The Peace Corps volunteers identified small groups of farmers, mostly women, in five villages who were willing to discuss their rice-production practices. Group interviews, conducted in January 1989, concerned the production practices used, timing of field operations, varieties used, and problems encountered. These early meetings were formal because they included village leaders.

A month later, the rice fields were visited to gather more information about soil types and salinity and water levels. Peace Corps volunteers and OFSP staff interviewed the farmers individually during and after the growing season. Discussion and feedback, primarily from the women, was an essential ongoing information-gathering component of the study.

Secondary information about rice production in the Casamance also was reviewed. A wealth of such information is available as a result of surveys conducted earlier by ISRA's rice team and Production Systems Research Department.

The research revealed that two basic systems of rice production were being used in the Casamance: the *Diola* and the *Mandink*. These are the names of the two dominant ethnic groups in the area; however, both systems are used by members of each group, with some variation in practices between groups and individuals.

The following summaries of the characteristics of the two systems are based on information gathered from more than 60 farmers from January 1989 to April 1990 in the villages of Dioloulou, Karong, Mangoulene, Tendouk, and Tiobon in the Casamance region of Senegal.

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The Diola system

The Diola system is found in 45% of the total rice-production area in the Casamance. It characteristics are

Labor. Both men and women participate in rice production. Men plow; women prepare nursery beds, plant, weed, and harvest. During the interviews, women provided information about transplanting and harvesting dates and brought seed samples to be examined and identified, while men were more knowledgeable about the timing of field preparation.

Ecology. The plots are in either phreatic or paddy ecologies near the river's mangrove area. Because salinity, iron toxicity, and acidity are problems, farmers depend on rains to flush the soil before planting. They determine whether the salinity has been reduced to acceptable levels by tasting the water.

Land preparation. Although several farmers use animal traction for plowing, most use the traditional long-handled shovel, the *kajango*, to make ridges in the soil. In areas where salinity is high, initial ridging is done in February and March to inhibit the capillary action that brings salt to the surface. Plots also are plowed after the initial rains, when the weeds have emerged. This plowing system buries weeds and manure, composts them, creates furrows that retain more water in the plots, and keeps salt away from the plants.

Plot size. Plots are small, 200 sq m or less, because landholdings are fragmented. Traditionally, family plots are scattered randomly among the large rice fields of the village.

Water control. Water comes from rainfall and is seldom drained from the plots. However, when the water is deep enough to inhibit seedling growth, it is drained during transplanting.

Seeding. The nursery beds are in upland areas and are prepared at the beginning of the rainy season. Seedlings are transplanted after the plots contain sufficient water and the salt content has been reduced, usually in mid-August. Spacing after transplanting is dense: about 10 cm x 10 cm. No particular attention is given to the age of seedlings when they are transplanted; that is, the age varies from 30 days to 60 days.

Fertility management. Cattle graze the rice stubble during the dry season. Ash, leaves, household waste, and manure are added to the plots before plowing. Because the plots are plowed after the first weeds emerge, these weeds also are composted. Chemical fertilizer is seldom used; no fertilizer was used in 69% of the Diola plots and seed beds included in the study. Almost all of the farmers interviewed used manure as fertilizer; 22% used ash; 3% used household waste; and 4% used chemical fertilizer.

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Weeding. Minimal weeding is needed. Because of the plowing method, weed infestation is low, and transplanting after the plots contain water inhibits weed growth. Plots are not weeded after transplanting.

Varieties. Farmers use two to five varieties of rice, according to the water conditions. Traditional varieties that flower in October were used by 91% of the farmers interviewed. Yield from these varieties is reduced because water is limited when the plants are in the grain-fill stage. Varieties can be identified only by examination because the names used for them are local, based on where they came from or who brought them to the village. All of the farmers surveyed saved their own seed. Field observations showed that the varietal purity of the seed was high, which illustrates the care that farmers take with their seed.

Harvesting and drying. Rice is well dried before harvest. Groups of women harvest the crop, picking only the panicles and tying them into bundles, which are stacked together for storage. Average rice yields range from 800 kg/ha to 1,000 kg/ha.

Storage. Rice seed is kept in a storage room or the attic in the family compound, separate from the store of rice that is kept for the family's food. This system's advantage is that it lets the rice dry properly; its disadvantage is that it leaves the seed vulnerable to attack from insects and rodents.

The Mandink system

The Mandink system was used in 42% of the rice-production area of the Casamance. Of the villages included in the study, one used the Mandink system and one used a modified Mandink system. The system's characteristics are

Labor. Only women work with rice; men work with the upland crops of peanuts, corn, and millet. Even though women do most of the work in producing rice, in initial interviews the men insisted on answering most of the questions.

Ecology. Rice is planted in inland valley swamps, where salinity is not a problem.

Land preparation. Women work the soil surface with small hoes, after the first rains and just before planting, to loosen the soil and remove weeds.

Plot size. Plots are larger than those of the Diola system; the average plot is 2,000 sq m.

Water control. Water control is minimal.

Seeding. In 83% of the plots, seed is broadcast when moisture in the plots is sufficient. (Plots can be seeded as soon as 100 mm of rain has fallen, but they usually are seeded later.) In the remainder, rice is planted in rows or transplanted.

Fertility management. Women work manure, the main source of fertilizer, into the soil while plowing.

Weeding. Plots are weeded from 30 to 60 days after planting. Earlier weeding is not possible because, when seed is broadcast, young weeds cannot be distinguished from rice seedlings.

Varieties. Rice seed used in the Mandink system comprises 90% traditional varieties.

Harvesting and drying. The Mandink system uses the same practices as the Diola system for harvesting and drying rice. Yields average from 800 kg/ha to 1,000 kg/ha.

Similarities and differences in the two systems

The Diola rice-production system uses more labor than the Mandink system. Labor is a major constraint in the Mandink system because only women farm rice.
The inland valley swamps cultivated under the Mandink system do not have the salinity problems of the lands where the Diola system is used. Projects to develop rice production have favored the Mandink areas because the plots are larger and, thus, tractors can be used to plow the land before the rice is planted.

The traditional method of hand plowing, using the *kajango* in the Diola system, makes it possible for rice to be produced in areas where the soil has salinity, iron toxicity, or acidity problems. The *kajango* is also used to maintain soil fertility, control weeds, and manage water; therefore, it is an essential, appropriate indigenous tool. Projects to develop rice production have bypassed farmers who use the *kajango* because modern agricultural methods have not yielded better results than traditional methods that use this tool.

Because of the differences between the Diola and Mandink systems, different strategies are needed for dealing with the seed-related and production problems of each group. The traditional approach to seed production of both systems is basically sound. As rice is highly self-pollinated, maintaining varietal purity is not a problem. Field observations during the growing season did not reveal rice plants of different heights within the same plot; thus it did not appear that varieties had been mixed. The farmers are knowledgeable about the characteristics of the varieties of rice they grow.

Rice seed is not mixed with food rice; they are store separately. Harvesting and storing rice seed in bundles of panicles results in some mold on the stems in the center of the bundles; but, otherwise, the quality of the seed is acceptable. Rice seed stores well, especially in the low-humidity conditions of Senegal during the storage season.

Losses of seed quality or quantity (to insects and rodents) during storage are minor. Simple tests of seed before planting indicate that the germination rate is 80% to 95%.

All farmers mentioned salinity in the Diola area and reduced rainfall in both areas as causes of production problems. Addressing these problems was within OFSP's mission and capabilities.

Trials were developed and implemented

Many projects have tried to increase rice production in the Casamance by promoting the use of new varieties, fertilizer, herbicides, insecticides, credit, and tractors. When these projects ended, the farmers returned to their old varieties and production practices; thus, the lasting effects of these projects on increasing rice yields have been negligible. Furthermore, as a result of these activities, farmers now believe that rice production cannot be increased without the inputs the projects supplied.

In contrast to the approach of previous projects, OFSP's strategy is to understand the traditional production system and suggest changes that are compatible with it. This is a step-by-step, long-term approach in which the project works with farmers to seek sustainable improvements that can increase yields dramatically and immediately. Initially, the changes focus on using an improved variety and modifying a few practices to help that variety produce more than the traditional variety. As farmers implement a change, they provide feedback to the project, which then initiates further changes based on that information. Farmers apply only the changes they understand and see as beneficial; as partners in the change process, they determine its direction and pace.

A plan of action was developed

The farmers who participated in the survey were asked to plant demonstration plots on their land. Because all of a village's rice plots are in the same area, using the farmers' plots for the demonstrations would make the work highly visible.

The project provided up to 2 kg of seed but gave no credit or free inputs. Farmers paid the equivalent of US 50¢ for the seed. Work started with two improved, adapted varieties that could perform better than the traditional variety under low-input conditions, provided the farmers modified a few production practices.

Four women's groups and 15 families each grew plots of approximately 200 sq m of the new variety; Peace Corps volunteers monitored the activity. The farmers were to use the rice produced from these plots as seed the following year; and, after the trials, the seed was to be introduced into the traditional system.

Improved varieties were selected

ISRA developed several improved varieties of rice that were well adapted to the area, tested them under farm conditions, and released them to farmers. These varieties produced more rice than the traditional varieties and had several characteristics that were important to the farmers:

- They did not require a certain day length for flowering and they matured earlier than the traditional varieties: in 105 to 120 days compared to 150 days. This growing period lets the rice mature with sufficient moisture during the grain-fill stage of growth, which is essential for high yield.

- They used the available level of fertility more efficiently to produce grain rather than using it to produce taller or larger plants, as do the traditional varieties. If moisture levels are high enough to promote rapid growth, plants produced from traditional varieties of seed tend to fall over, making harvesting difficult and lowering yield.

- Their tillering capacity was higher than that of traditional varieties: 5 to 25 tillers per plant, depending on fertility and spacing, compared to 2 to 5 tillers per plant. Since each tiller produces a panicle of grain, this translates into higher yields for improved varieties.

- Their grain size, milling characteristics, and taste were compatible with local preferences. These factors strongly influence farmers' decisions about adopting a new variety, particularly when the rice is for family consumption.

- They were resistant to rice blast, a major rice disease in West Africa.

Modified production practices were introduced

The improved varieties could produce more than the traditional varieties only if several production practices were modified. In both the Diola and the Mandink rice-production systems, changes were needed in planting practices.

In the Diola system, those changes involved

- **Nursery practices.** During nursery-bed preparation, sufficient manure was incorporated into the soil (15 kg for 10 sq m) to improve consistency and fertility, thus ensuring the production of healthy, vigorous seedlings. The seed was treated with an insecticide and fungicide to improve emergence and deter bird

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and insect attack. Nursery beds were planted later than normal so the seedlings would be younger at the traditional planting time.

- **Transplanting.** Seedlings were transplanted younger, at 20 days instead of the traditional 30 to 60 days. When seedlings are transplanted at more than 35 days old, the plant has no time in the vegetative stage to produce tillers before it goes into the reproductive stage that produces the grain. Thus, this early transplanting was essential for the improved varieties to produce more tillers and, therefore, greater yield. This modification represented a dramatic change from tradition, but it was a change only in timing; it required no more labor.

In the Mandink system, the changes involved

- **Row planting.** Rice was planted in rows so the plants could be weeded early, a critical factor in increasing yields. Rice plants cannot be distinguished from weeds in the early growth stages. With traditional broadcast planting, rice plants and weeds are mixed together, so early weeding is impossible. When rice is planted in rows, all plants between the rows can be removed.

  Optimum row spacing of 20 cm was achieved easily with the use of a locally constructed rake. Planting rows by hand required more labor than the broadcast method, which may have inhibited adoption of this practice, even though the increase in yield could compensate for the increase in labor required.

- **Weeding.** Row-planted plots were weeded at 20 and 40 days. Small weeds were removed early with a small hoe, rather than by hand. Two weedings of a row-planted plot required less time than one weeding of a broadcast-planted plot. Nevertheless, this change to traditional practices was difficult for farmers to accept.

The farmers' activities were monitored

In February, project workers and farmers examined the sites of the trials together to determine which varieties to use. The project team visited the sites monthly, and the Peace Corps volunteers in the villages provided on-site monitoring. The volunteers encouraged farmers to carry out the practices on time and record their activities. The volunteers also measured field size, plant height and density, tillers per plant, and yield.

The timing of traditional practices and the resulting yields were observed. It was not expected that all farmers would apply the modified practices as advised; but because the information was recorded, the effects of the recommended practices could be compared to those of the traditional practices. The information collected provided sufficient basis for concluding that the modifications to the traditional system improved yields.

As expected, the results varied greatly because of individual differences in farming practices such as water control, fertility management, and degree of adoption of the modified practices. Any analysis of the results must consider

- This was the first year of an activity in which methods and technology were being tested.
- Farmers could not see the variety and modified practices demonstrated before using them.
- Change to traditional practices is a slow process; farmers must see and understand the benefits.
- The trials were conducted under low-input conditions -- except for the seed treatment at planting -- to emphasize, initially, the improved rice varieties and modified practices.
- Results were not equally successful in both systems. Several factors contributed to this inequality, but farmers' attitudes were the greatest influence.

Despite the variations, the results were encouraging. As mentioned earlier, rice yields average 800 kg/ha to 1,000 kg/ha in both Diola and Mandink systems. ISRA data showed that, for years with rainfall amounts comparable to that of the study year, average yields were 1,040 kg/ha. But in the trials, the average yield for the rice variety DJ684D was 1,960 kg/ha (88% higher than the expected average yield for traditional varieties), and the average yield for the rice variety DJ12-519 was 1,491 kg/ha (43% higher). Two farmers included in the study had yields of about 3,400 kg/ha.

These results delighted the farmers and were sufficient to confirm that achieving incremental, sustainable increases in rice yield requires a step-by-step approach to change.

The project directly involved 80 women and 20 men. The small size of the trial plots and their concentration in small areas made them highly visible. The Peace Corps volunteers estimated that the demonstrations were observed by most of the women who grew rice in each village.

No formal field days were held at harvest time. Instead, groups of women harvesting the crops were able, informally, to observe the yields of the demonstration plots and compare them with the yields from their own plots. This approach generated considerable interest and was more appropriate to the culture than a formal field day.

Word of the demonstrations is spreading by itself, indicating that farmers are understanding and accepting the innovations. The farmers involved in the

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demonstration, in particular, expressed acceptance and appreciation of the technology and interest in participating in future activities.

Follow-up work continues

The program will continue to work with the farmers and villages that participated in the first season's trials; now that the farmers have seen some results, they are eager to continue with the demonstrations. In the next series of trials, the farmer in each village who had the highest yield, following the recommended practices, will be chosen for the demonstration, and the participants will be brought together before each field activity for instruction and discussion.

In the Diola system, the demonstration will focus on the following critical production practices:

- Preparing the nursery bed, including applying fertilizer, at the optimum time.
- Reducing the seeding density from that used in traditional practices.
- Treating the seed with insecticide and fungicide.
- Planting the nursery bed in stages so seedlings are about 21 days old at transplanting.
- Reducing the transplanting density from that used in traditional practices to allow more space for tillering; this will also reduce the number of seedlings and amount of planting time needed for the plot.
- Counting the tillers with the farmers so the farmers can observe that tiller numbers are higher.
- Recording water availability and date of harvest and comparing this data to the data for nondemonstration plots.

In the Mandink system, the demonstration will focus on

- Recruiting individuals, rather than groups, to participate so the incentive for higher yields is greater.
- Applying manure.
- Plowing at the optimum time.
- Planting in rows after 100 mm of rain has fallen.

- Using the locally constructed rake to mark rows.

- Encouraging weeding with a hoe at 20 and 40 days after planting.

The results will be disseminated

To increase the number of farmers participating in project activities in the coming years, efforts will be made to include

- Farmers in the initial villages who have received seed from those who participated previously.

- Farmers in six neighboring villages. In most cases, a participating farmer from the previous year will help Peace Corps volunteers initiate the program in new villages.

Essential data will be gathered on factors such as timing of production practices, yields of the demonstration plots, and yields of the traditional plots of participating farmers. Data also will be gathered on the spread of the improved rice varieties: number of farmers growing them, timing of those farmers' production practices, area under cultivation, and farmers' levels of satisfaction.

The results will be shared with other organizations involved in extension in the area. Through training activities, the approach and technology will be introduced to

- the government extension service
- NGOs with extension activities in the area
- farmer groups involved in producing rice
- other interested groups

Key to the project has been the process approach to identifying problems with the farmers, which allows feedback and information sharing. Farmers are now communicating with the project about problems they have identified, and the project has worked with them to solve these problems. It is hoped that the trust and confidence established between the project's staff and the farmers will result in continued feedback, which is important in selecting further activities that can alleviate the farmers' seed problems.

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Conclusions:
Benefits, Opportunities, and Lessons

The benefits of the collaborative project described in this paper have been shared by all the participants.

- The farmers have benefited by increasing their rice production, as evidenced by their willingness to participate in the next season's program.

- The Peace Corps has benefited by having a program that provides a useful service to farmers and viable and satisfying roles for the volunteers.

- ISRA has benefited by having its technology extended to farmers and by obtaining feedback from the farmers that can be used to develop future technologies.

OFSP has facilitated the development of this beneficial program. Particularly important has been the support OFSP has provided to NGOs. The managers of NGOs have a variety of responsibilities, including personnel, budget, planning, logistical support, and communication with their headquarters. Thus, it is often difficult for them to find the time and encompass all the fields of expertise needed to handle all the technical aspects, liaison, and training necessary for their programs. OFSP can provide these services in the field of seed technology, enhancing NGO agricultural programs and, in turn, benefiting the farmers.

Links must be developed carefully

Before direct links can be established between a national agricultural research system and NGOs, the following questions must be answered.

- Do the researchers and the NGO staff members speak the same technical language?

- Do the researchers and the NGO staff members have the same view of farmers, their indigenous technical knowledge, and their problems?

- Are the researchers oriented to high-input agriculture and research or to viable modifications to traditional agriculture and extension?

- Does each party have the time to establish and support links?

- Although the potential benefits for the NGO are clear, what benefits accrue to the researcher, who already may have a full work load?

- Does the national agricultural research system view the interaction between researchers and NGO personnel as a positive influence on the researcher's job performance and ability to publish research?

- If the national system lacks a mandate for or direct link to extension activities, can it work directly with NGOs?

The answers will vary in each situation, but NGOs must be aware that these issues exist. The multiple-source model of agricultural innovation involves many institutional issues that affect technology development because the objectives of the organizations involved often differ.

OFSP (and projects like it) can be the link between the national systems and NGOs because it speaks the technical language of the researchers, uses the researchers' time judiciously, and is able to communicate the NGOs' interests to the researchers. OFSP has expertise in seed issues among its full-time staff and its supporting organizations, the Mississippi State University Seed Technology Laboratory and Winrock International. It also can call on other sources of expertise -- such as staff members of international agricultural research centers, university researchers, and consultants -- for technical assistance as needed.

The lessons learned must be heeded

Farmer participatory research means entering the world of farmers and accepting them as partners. This approach can frustrate researchers and extension workers because the farmer determines the pace and scope of the activities. Nevertheless, for the approach to be successful, the following conditions must apply:

- The researchers must develop personal relationships with the farmers. In Africa, each party must be known and respected personally before technical subjects can be discussed.

- Communication must conform to the cultural norms of the area. Researchers must listen to farmers -- on the farmers' terms in their villages, fields, and homes -- because important information and feedback often come in subtle ways. Researchers must be willing to participate in many meetings that have little technical merit but great cultural meaning. Detailed knowledge of the local language is essential.

- Researchers must be clear and consistent in communicating what the activity requires. Even with clear explanations, misunderstandings will arise that must be worked out over time. Researchers must be patient: After many broken promises from projects, extension workers, and the government, farmers are wary of outsiders and skeptical of their proposals.

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- Researchers must build credibility with the farmers by using solid technical knowledge and experience and by appreciating the farmers' indigenous technical knowledge.

- Researchers must be willing to work step by step toward a long-term goal.

- Researchers must involve the farmers in extension work as soon as possible.

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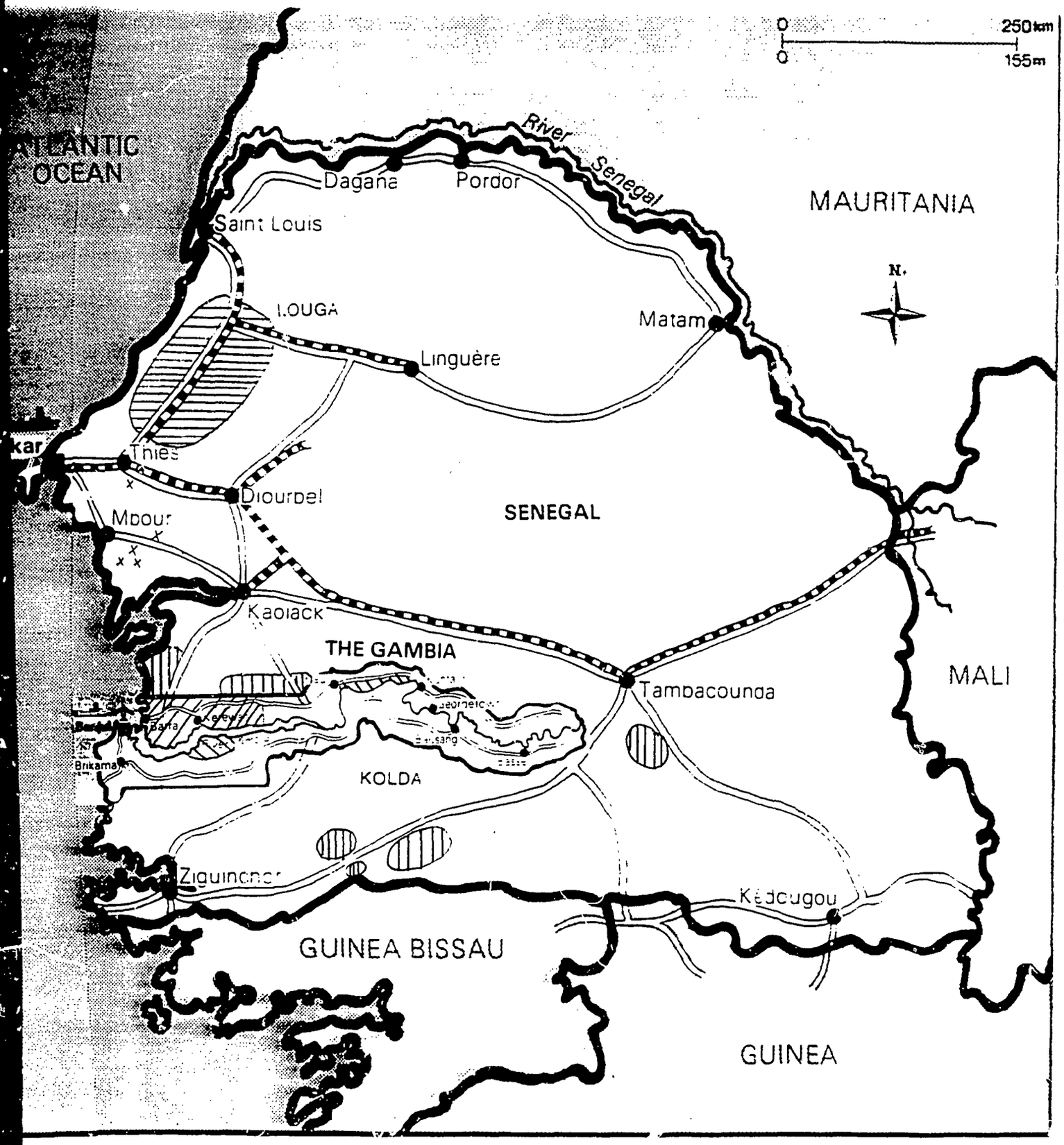
Appendix C

Map, "On-farm Seed Project Activities in Senegal and The Gambia, 1988-1992"



On-farm Seed Project Activities in Senegal and The Gambia, 1988-1992
Source: Maps on File, 1981

Legend

- Christian Children's Fund village
- Save the Children Federation
- Freedom from Hunger Campaign
- World Vision
- Peace Corps Senegal

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Appendix D

Summary of
"Consultancy Report - On-farm Seed Project - August 1991"
by Deirdre Birmingham

Summary of "Consultancy Report -- On-farm Seed Project"

August 1991
Dierdre Birmingham

In August of 1991, Ms. Dierdre Birmingham, Winrock International Training Specialist, went to Senegal and The Gambia on a consultative visit in the area of training. She produced a report for the staff that dealt with the project's training approach, design, methods, and materials, as well as addressed the training aspects of farmer participatory demonstrations, including the role of women, finishing with comments on impact assessment and the importance of extension materials.

In her introduction, Ms. Birmingham discussed the levels of training provided by the OFSP. She indicated that OFSP had operated as trainers of trainers (TOT) and had engaged in on-farm training, also. The first way that a training approach is developed is by fully developing a project strategy. The OFSP strategy is "to train those who can train others", thus the approach is to replicate the training message and largely depends on field-based agents.

Birmingham appreciated the training implication of the OFSP needs assessment. It was carried out by PVO, Peace Corps, and other collaborators through the use of a survey of farmers current seed practices. It underscored the importance of understanding the clientele who are to be trained. Birmingham advised that the questionnaire developed by OFSP continue to be regarded as an important training item, due to its use and possible refinement by collaborators. Peace Corps staff, for example, contacted OFSP on how too implement the survey whereas World Vision staff felt confident enough to train it own staff in its application. Birmingham emphasized the notion that participatory research and training were already essential to the project and recommended that rapid rural appraisal and participatory rural appraisal (RRA/PRA) be more obviously incorporated into the project. She made a recommendation that Dakar-based RRA/PRA specialist, Ms. Karen Schoonmaker-Freudenberger become involved in the project to process approaches being taken and to develop additional relevant materials. Later, OFSP Project Leader Tom Osborn did invite Schoonmaker-Freudenberger to write a discussion paper for project participants.

Birmingham discussed the training design in terms of the programming process. Here, she noted that covering all the institutional and organizational bases is the beginning to a well-found design. Then participation is the element to include, with particular attention to where and when participation should occur in the design. Trainee background information is something OFSP has demonstrated excellence,at the TOT level and the On-farm level. OFSP reviews the pretraining questionnaire completed on each volunteer and other review agents backgrounds, too.

Birmingham noted that both Osborn and Faye developed effective lesson plans. She reminded OFSP of their critical input in training delivery, since they aid in organizing and delineating objectives, topics, schedule, methods and materials. "Planning

workshops" for on-farm training with collaborator agents can be one form of a training activity

On training methods, Birmingham underscored that the trainer is "required to think from a farmer perspective". He/she should encourage the farmer to develop problem-solving skills and to learn better to assess appropriate solutions. OFSP, Birmingham commented, has achieved that perspective, based on observations of different training sessions of various NGOs. In one example demonstrated the need to use a training approach that is appropriate for many levels of education. Faye did this by use of flipcharts to explain calculations, of non-verbal communication, and of a "problematic" approach by getting the issues from the farmers which then became the training agenda. Birmingham commended OFSP's use of experiential learning, such as the on-farm trials

She observed OFSP trainee agents facilitating discussion, allowing farmers to do most of the talking, and giving the questions back to the framers to discuss. She advised that the participant trainees break into smaller groups to test their new skills, and be given sufficient time to implement skills. She reminded OFSP staff of the need of using such techniques an technologies as repetition, visual aids, field demonstrations and practicals, written materials, verbal questioning, problem-solving, case studies for the application of new knowledge of skills, and role playing.

The training materials developed by Osborn in 1988 were appropriate and were characteristic of good tools since they were made available to and were requested by the Peace Corps and the PVOs. Another sample of information in demand was OFSP's photocopies of the IRRI farmer rice primer. Birmingham's recommendation was that the materials be indexed and standardized. There appeared to ample opportunity to develop case studies, and to use videos in TOT activities.

Training evaluations were among the most difficult aspects of training to develop in a culturally acceptable context. The instructor had to convey the use and importance of the the evaluation. Once this was achieved collating the responses and making training modifications was relatively simple. OFSP continues to receive significant feedback from the Advisory Councils, for example.

"Attaining the project's goal is not just dependent upon the technical message, but the communication approach", Birmingham insists. Communication, dialogue, two-way flows of information should be emphasized versus disseminating, transferring technology, and diffusing information. These are basic approaches applicable to illiterate yet experienced adult learners that would benefit every agent. Agents should communicate a desire to learn together, not to impose change, by selecting culturally acceptable and effective modes of behavior. Birmingham observed that farmer participatory demonstration are the key teaching-learning tool of the project.

Understanding the roles and responsibilities of women is instrumental to the implementation of the OFSP. These are some of the characteristics and constraints that Birmingham asked the OFSP to consider:

- wealth, access to resources and inputs
- status in the village

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- other efforts to reach certain women
- women's roles in each ethnic group's food production systems
- women's roles in generating income through crops and vegetables

In the OFSP impact assessment, Birmingham and OFSP staff agreed on various indicators as measures of project success, both qualitative and quantitative. Birmingham made the suggestion of that the management information system (MIS) would require further development and application of new technologies. Her suggestion was considered and the OFSP has studied MIS feasibility and needs and has decided to incorporate new directions in MIS into Phase II, or the On-farm Productivity Enhancement Project.

Finally, Birmingham discussed the development of extension materials. She noted that course evaluations indicated an appreciation for the OFSP reference materials. She applauded OFSP efforts to produce, through The Gambia Agriculture Communications Unit, the following materials:

- Improving Seed Quality of Millet at Harvest
- Improving Seed Quality of Cowpeas at Harvest
- Production of Quality Rice Seed
- Germination Testing of Farmers and Extension Workers

Her concluding statements consisted of recommendations for the OFSP staff itself to pursue training and skill upgrading as the projects grows in complexity and outreach. Birmingham's visit and report contributed to the OFSP's ability to critically examine its training issues and to take action in a thoughtful and constructive way.

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Appendix E

Summary of
"Visit with the On-farm Seed Production Project"
September-October 1991
by James C. Delouche

Summary of
"Visit with On-farm Seed Production Project"

September-October 1991
James C. Delouche

Dr. James Curt Delouche of Mississippi State University, a member of the Center for PVO/University Collaboration in Development, made a consultative visit to the On-farm Seed Project (OFSP) from September 27 - October 12, 1991. In the consultant report he wrote upon his return from West Africa, he examines OFSP in terms of the nature, type and degrees of collaboration, the technologies and messages transferred, the assessment of impact and benefits, and lessons learned. He acknowledged the hospitality and helpfulness of Tom Osborn, Project Leader and Alphonse Faye, Project Coordinator, while expressing his pleasure in returning to OFSP in this his second visit. He found that his two week scheduled filled , but he was glad that it enabled him to observe field activities

The purposes of his visit were three-fold:

1. to review and assess the technical aspects and dimensions of the project in terms of the areas/crops/practices targeted for intervention, the appropriateness and soundness of the technologies and methodologies applied, the processes of technology transfer and reinforcement used, and the legacy of the project in terms of documentation, references, and technical informational materials.

2. to review and assess the types and circumstances of the collaborative seed and related activities and the factors that contribute to productive and long lasting relationships.

3. to review and assess the lessons leaned to date in the project works that should be taken into account in any Phase II of the project, and/or which can be applied in other technical assistance interventions including those of a more formal and structured nature.

His schedule of discussions and visits included discussion with Osborn and Faye, visits with collaborators in both The Gambia and Senegal, field visits with the Christian Children's Fund (CCF) in Senegal and Save the Children Federation (SCF) in The Gambia, and a refreshing roundtable discussion in Dakar with 5 Peace Corps Volunteers (PCVs) on collaborative work in Senegal.

To Delouche, the nature, types and degree of collaboration indicated a total reliance on collaboration with well entrenched PVOs/NGOs to transfer it messages and technologies and to accomplish its goals. The nature of collaboration varies substantially with the operational mode and resources of the collaborator, the goals of the collaboration, the technologies to be transferred and messages to be communicated. This ranges from a very limited specific training, as for agents of a World Bank Funded project, to considerable assistance in program planning and design, training and even field implementation and evaluation as in the case with CCF. He acknowledged that OFSP had fully recognized

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that each NGO has its own agenda. He said that OFSP is collaborating with PVO/NGOs in the specific area of seed improvement, but with attention to the "process" of the collaborative program as well as its technical dimensions and messages. It is a service and support program above all, he concluded, however with Peace Corps it verges on a partnership.

The process and organization of collaboration begins with the identification of NGO with agriculture programs. Delouche noted that Osborn's move to Dakar was crucial in this step. Collaboration differ by country also: in The Gambia it is undergone with PVOs, FAO, GOTG, while NGO sector comprised of CCF, the Freedom from Hunger Campaign, Catholic Relief Services, Action Aid and is rather ill-defined. In Senegal, collaboration with World Vision and the Peace Corps is vital, he observed. In Senegal OFSP worked with PC in invaluable way aiding in the African Food Systems initiative (AFSI) design. With World Vision, OFSP identified programs in agriculture in Louga and Thies serving over 320 villages with 150,000 population. In this program, Delouche found that millet and cowpeas seeds issues were issues that farmers brought up. The project followed the process approach gathering information from the farmer as to sources of seeds, crop production, storage practices and perceived problems.

Delouche's outlined the commentaries from PCVs on their work in progress. He quotes from PCV Mark Chenault's observations on cultural issues in farming in which men pursue cash crops cultivation, such as peanut, and women, subsistence cultivation, such as rice. Delouche found Chenault's perception of the women who are poorly equipped to irrigate and reclaim and to practice water management, suffer from lack of training and technology, particularly salient. From Julia Gamble and John McPeak he learned of the low yields on direct seeded rice, that the transplant date should be as close to 21 days as possible frequently delayed, only 40% of farmers use improved varieties, and that seeding in rows is difficult without animal traction.

As a result of these discussions, he remarked that OFSP evolved a technology transfer program that is exceptionally well-suited to its goals, clientele and resources. It has been fine-tuned, he added, and the emphasis in the process approach has been on the technology and not on the transfer itself. "It has not tried to do and to be everything". The program/project process, he observed goes from collaborators, at one end, to trainers, then to farmers at the other end. Simple viable, relevant and valid technologies maintain a balance between the transfer process and the technology transferred. He underscored that each message must be of vital interest. OFSP project approach's emphasis is on improved seeds new practices and /or varieties are not promoted without thorough on-farm testing. He made the case for OFSP exemplifying low input agriculture.

He suggested that some ancillary results of interventions exist especially when traditional practices are validated, varieties adapted to local ecosystems, ash and sand gave protection against bruchid as well as actellic, an insecticide. He pointed out that there are some illustrative technologies/messages from OFSP. He went on to describe the CCF millet intervention in Senegal, which emphasized seed selection by number of fertile tillers and inculcation of a seed production area. Also, rice intervention in The Gambia with SCF, OFSP is involved as a planner, trainer and technical resource.

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Delouche insisted on making OFSP staff aware of its impact and benefit. The desirable situation is usually an increase in cropping intensity and total production per year. Farm women, especially, have benefited because the interventions have dealt mainly with subsistence crops and subsistence agriculture is mainly the responsibility of women in Africa. It is, he stated, no coincidence that PVOs with a children focus are involved the food produced by mothers (women) and on income that can be derived from any disposition of any surplus.

He agreed with the project staff on several general assessment factors. He reminded them that benefits analysis needs also to take into account such factors as:

- increase in farmer demand for and receptivity to training
- increase in farmer attendance at field days and demonstrations
- increase in farmer demand for inputs such as fertilizer
- informal institutionalization of practices.

Some indicators of progress could include: adoption, participation, feedback, interdisciplinary, training, institutionalization. As for monitoring and evaluation, regardless of the criteria, there is a need for collaborator documentation.

He advised OFSP staff to review its "lessons learned". He suggested that lesson #1 could be that "carefully selected and appropriate technologies can be successfully transferred into the farm site with close and careful attention to the process of transfer, a limited amount of timely technical assistance and a lot of participation on the part of the recipients". Furthermore, PVOs and NGOs must be active in rural development without any substantial restrictions. Linkages and delivery systems must be developed where the extensions service does not exist or is ineffective. Timely technical assistance was the only effective kind. He agreed that low profile and cost and participatory planning are essential. Taking the process approach, based on identified and defined needs as opposed to assumed needs, interventions that are "doable", valid technologies and "understandable" message. Staff must always maintain a sharp focus, he reminded OFSP staff. He advised them to pay attention to synergies with groups who are rich in commitment and presence. He determined that OFSP plays the role as support and service rather than stand alone program has been made possible by lean staffing.

Delouche suggested that OFSP could be an effective model for larger multilateral and bilateral aid programs. It should maintain in-house expertise and technical resources, thoughtful choice of technologies and messages. At last, Delouche reminded the staff and participants that its premier activity is training, which has a multiplier effect, thus creating, in part, the necessary OFSP legacy.

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Appendix F

"Farmer Seed Practices - The Region of Louga, an Assessment of World Vision/OFSP Activities"
by Stephen Leisz

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FARMER SEED PRACTICES - THE REGION OF LOUGA
AN ASSESSMENT OF WORLD VISION / OFSP ACTIVITIES

June 15 - 19, 1992

Stephen J. Leisz
The On-Farm Seed Project

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I would like to thank Marcel Preira who facilitated the carrying out of the survey and helped me clarify my thoughts on the information which was gathered. It was through discussions with him that a methodology for gathering the information was decided upon. It was also through discussions with him that conclusions were arrived at. However, he bears no responsibility for the recommendations which are made as these are solely the authors thoughts and any weaknesses found in them should be attributed to the author. I would also like to thank Alphonse Faye and Tom Osborn for their helpful comments regarding the development of this document and for their support during the carrying out of the study.

ABSTRACT

This document follows-up on Winrock International's On-Farm Seed Program's (OFSP) collaboration with World Vision International (WVI) over the past three years in the Region of Louga, Senegal. The main findings of the study are that improved seed selection techniques which have been extended to the local bush consultants[1] have been accepted by the agents and are being used by them. In the case of all farmers, though, the level of acceptance of the techniques is low. Only in one village surveyed was the level high enough to suggest that the extended techniques might be incorporated into traditional farming practices. Of all of the techniques extended, two have high adoption rates: screening and storing seed separate from food stocks. The other techniques (separate seed plots; selecting plants as seed sources before harvest, roguing for disease, following the plant through its cycle to determine if it has desirable qualities at each stage of development; and harvesting the seed separate from the main harvest) have much lower levels of acceptance.

[1]Bush consultants are local farmers who are working with WVI as village level agents.

INTRODUCTION:

World Vision has an integrated development program of water, agriculture, and health in the Regions of Louga and Thies. Since 1990 the On-Farm Seed Program (OFSP) has collaborated with World Vision in the Louga Region to ameliorate agricultural constraints due to poor seed supply. This program has two aspects to it. The first has been the on-farm multiplication of millet and cowpea seed. This aspect has met with much success as large amounts of certified seed have been produced by the contract farmers World Vision has hired. In the 1991 growing season 13610 kilograms of certified IBV 8004 millet seed was produced on 58 hectares, 9186 kilograms of certified Bambey 21 cowpea seed was produced on 20 hectares, and 1388 kilograms of certified forage cowpea seed was produced on 9 hectares.

The second aspect of the program has been the extension of improved seed selection techniques to local farmers. To accomplish this end OFSP has trained World Vision staff and bush consultants (local village farmers) in these techniques. This paper follows up on the seed selection trainings and attempts to find how successful the extension of the techniques to farmers has been after 2 full years of the program and where difficulties in the extension process exist.

I. Background information

DATA COLLECTION[2]

Starting in 1990 World Vision, with the assistance of OFSP, started collecting data regarding the cultivation practices for millet and cowpeas in the Louga Region. The results from these surveys were the following:

59 farmers were surveyed regarding millet. It was determined that:

1. Area planted: 1-3 HA 21%
   4-8 HA 67%
   9-16 HA 10%

2. Source of Seed: Saved by farmer 44%
   Purchased at market 39%
   Certified seed from SODEVA 17%

3. Seed practices: 50% of the farmers interviewed mentioned that they screened seed to remove immature seed.

62 farmers were interviewed regarding cowpeas. It was determined that:

1. Area planted: 1-3 HA 65%
   4-8 HA 35%

[2]This information is taken from the document: "WORLD VISION/OFSP SEED ACTIVITY 1990," p. 1 and 2.

2. Source of seed: Farmer saved seed 55%
Purchased seed 45% (of which 82% came from the market)

3. Seed practices: Various selection practices were used.

TRAINING

Training was provided by OFSP in 1990 and 1991. This training was directed each year at World Vision field staff and their bush consultants[3]. The overall aim of the training was to create an awareness amongst the farmers of the need to carefully control their seed source. Through the training it was recommended that the farmers follow certain steps to maintain and improve their seed quality. These steps, if followed, would provide the farmer with seed of a higher quality than he presently used, yet allow him to gather this seed from his field and not turn to outside sources for the seed.

Farmers were told that it was necessary to follow their crop from germination to harvest. The practices recommended for farmers to follow were the following:

1. Seed should be screened to remove small, immature, grains.

2. Germination tests should be practiced on the seed.

3. Seed stock should be separately selected from food stock. This means that either a separate seed field should be grown <u>or</u> the plants to be harvested for seed should be separately selected prior to harvest.

4. The plant should be followed from germination to harvest. It should be noted which plant had desirable characteristics at each stage of development. (i.e. which sprouted first, grew fastest, stayed healthy, had desirable vegetative growth, tillered adequately, had little insect attack, matured fastest, had adequate head length, its head was uniformly filled with grain, and the grain was of a uniform, large, size.)

3. The farmer should rogue for diseases.

4. The farmer should harvest his seed stock separately from his food stock.

5. The farmer should store his seed stock separately from his food stock.

After receiving this training the bush consultants were to return to their villages and disseminate this information to other farmers. Each bush consultant was to have a demonstration field which would be used in training the other farmers. Ideally, field

[3]World Vision Bush Consultants are farmers from the villages which World Vision is working in. These consultants are picked by the villagers to attend training in seed selection techniques provided by World Vision.

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days would be held periodically through the year to facilitate this training. The bush consultants were also to multiply seed in these fields. At the end of each year this seed was certified by DPCS as to its purity.

II. Goals of this report

The goals of this report are:

1. To gauge the extent to which the bush consultants which were trained in the above techniques followed the recommended practices last year and plan on following them next year.

2. The extent to which the techniques have been passed from the bush consultant to other village farmers.

3. Make recommendations regarding how the extension system involving bush consultants can be improved.

III. Methodology used to gather information for this report

This study was undertaken during the week of June 14 - 19, 1992.

A. Village selection

It was decided that two villages in each of World Vision's four work zones in the Kebemer area should be visited. The World Vision Extensionist, Marcel Preira, chose these villages using the following criteria:

1. Each village had a bush consultant who was trained by OFSP in the above techniques during the past three years.
2. Each bush consultant multiplied seed for World Vision last year.
3. The villages chosen should be a cross-section of those which World Vision works with. (i.e. some were considered especially good, some mediocre, and some poor as to their performance. The Winrock representative was not informed as to the status of each village.)

The villages chosen were:

Palene Dep
Merina Soump*
Kaip Dia
Par Cisse
Darou Ngaraf
Ngaraf*
Kandale Mbengue
Ndiekhoumfeu

*These two were not visited due to scheduling problems with the vehicle which was at our disposal.

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B. Farmer selection

Once in the village farmers needed to be chosen for the interviews. It was decided that the most effective way to carry out these interviews was in a group setting[4]. The question was raised as to how the groups should be chosen. Marcel suggested that it would probably be best to inform the bush consultant on the day of arrival and let him gather the farmers. He suggested that, as we only required a cross-section of the farmers in the village, he could explain to the bush consultant to gather between 7 and 20 farmers for the interview process. It was believed that the bush consultant would gather a better representative sample than we could given the time and transportation constraints we were working under. It was also believed that the bush consultant would not try to skew the sample because of the relationship which World Vision has built up with each of the consultants.

In the final analysis it is difficult to give the criteria which each bush consultant used to gather the group in his/her village. However, the groups can be broken down into three distinct categories:

1. Groups made up of heads of households. (Palene Dep, Kaip Dia, and Darou Ngaraf)

2. Groups made up of all available farmers. (Par Cisse and Kandale Mbengue)

3. Groups made up of all available farmers, but limited in size due to a competing event (in this case a local market). (Ndiekhoumfeu)

In all 86 people were interviewed. 41 women regarding cowpea seed[5] selection and storage and 45 men regarding millet seed selection and storage. A final word should be said here regarding villages which were interviewed for each. Four villages were interviewed regarding millet, they were Palane Dep, Kaip Dia, Par Cisse, and Darou Ngaraf. These four were spread in three of the four zones. The two remaining villages were interviewed regarding cowpeas and were located in the same zone. They were chosen because both of the women's groups had been formed in seed selection and storage techniques.

As can be seen from the above, the selection process for both villages and farmers was not randomly done. Villages were not randomly selected due to transportation[6] and time constraints. Farmers were not randomly selected for the reasons already noted.

In addition to the interviews outlined above, a large meeting

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[4]This was the case in all of the villages except for one. In Kaip Dia two individual interviews were held before the group interview.

[5]In the Louga Region cowpeas are traditionally a woman's crop.

[6]While a vehicle was provided, we did not have total control over it, i.e. we had to share it with other competing interests. We did, however, overcome the paved road bias which Robert Chambers talks about and went many kilometers from any road in conducting the interviews.

of all the bush consultants was held in Kebemer on Thursday, June 18, and general impressions regarding the selection techniques of those who participated in the meeting were gathered. These impressions are included in the Appendix.

C. Interview

The interviews were conducted in an informally structured question and answer session. While a questionnaire was prepared prior to the interviews (see Appendix), this questionnaire was not visible during the interview (it was felt that if it was obvious that a questionnaire was being used, the participants might be distracted). Instead a number of open ended questions were asked and conversation was encouraged between the interviewers and interviewees and amongst the interviewees. Notes were taken as to the responses. At the end of each day the two interviewers (Marcel Preira and Stephen Leisz) compared their notes from the interviews. This was done as a cross-check.

Each interview was started by inquiring as to the farmers seed source. Two techniques were used to elicit answers from the farmers. One technique tried was simply having the farmers raise their hand or in some other way directly respond to the question.

The second technique tried was a modified "matrix"[7]. This was done by drawing four circles on the ground (one for the market, one for World Vision, one for the farmers own field, and one for "other") and passing out a cowpea seed to each farmer present. All the farmers were then told to put (or throw) their cowpea into the circle which represented where they got their seed from. This technique seemed to work especially well. The farmers became very active in the interview and discussion seemed to flow with the throwing of the cowpeas. Also, because all farmers threw their cowpea concurrently, no one could follow another's lead.

IV. Results of the interviews by village

A. Millet Seed

PALENE DEB

Palene Deb was the site of the first OFSP training of bush consultants in the World Vision/Kebemer area three years ago. At that time all the bush consultants who were to work for World Vision attended the meeting and so did a number of farmers who lived in Palene Deb.

11 farmers were present at the meeting held on June 15. Of these 8 had been present at the OFSP training 3 years earlier. 1 of the 11 (Ablaye Gueye) currently grows millet as a contract farmer for World Vision.

The results of the meeting are as follows:

[7]This was not a ranking device, but rather an attempt to find a way so that all participants could simultaneously "say" where their seed came from.

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TABLE I - IMPROVED MILLET SEED SELECTION TECHNIQUES
Acceptance in Palene Deb

Number of farmers who store seed: 6
Number of farmers who attended OFSP training: 8

Technique		# of those who store seed who use technique	Index of Accept-ability (Ia)[8]
Screening		6	75
Germination testing		3	38
Seed Selection			
	Separate seed plots	1	12.5
	Select before harvest from main millet plots	2	25
	The plant was followed from germination to harvest.[9]	3	38
	Rogues for disease	3	38
	Harvests separately from main harvest	3	38
Storage	Separate from food stock	6	75
	On head	2	25

Seed Source: 6 save seed from their fields for planting the next year. (All 6 were present at the OFSP training 3 years earlier)

5 buy seed from SODEVA or the market. Last year SODEVA did not have any seed so all 5 bought it in the market. They believe it was Souna III.

Screening: All 6 who save seed screen it using a "tami". 3 of 5 who buy seed screen it with a "tami".

[8]Hildebrand, Peter E. and Federico Poey. On-Farm Agronomic Trials In Farming Systems Research and Extension. Lynne Rienner Publishers, Inc. Boulder, CO. USA. 1985. p. 122.
In calculating these Indexes of Acceptability (Ia) the equation used was Ia = (C x A)/100. In this equation C = The percentage of the farmers interviewed who used the practice on at least part of the crop the year following the training in which they participated. In this case the follow-up was done 3 years later. In order to find C the number in the third column was divided by the number of farmers in the meeting who had attended the training. A = from among those farmers who used the practice, the percentage of the area they have planted to that crop on which they are using the practice. In this case the percentage of land they seeded in millet using seed which they practiced the technique in question on. In these interviews every farmer said they planted the millet seed in 100% of their millet fields.

[9]When following the plant it should be noted which plant has desirable characteristics at each stage of development (i.e. which sprouted first, grew fastest, stayed healthy, had desirable vegetative growth, tillered adequately, had little insect attack, matured fastest, had good head length, had a head uniformly filled with grain, and had grain of a uniform, large, size.)

Germination tests: 3 of 11 use a germination test.[10]
The 3 use the following techniques:

1 farmer tests 7 seeds. He checks after 3 days if 6 sprout then the seed is good, if only 4 sprout then it is poor seed.

1 farmer plants 7 seeds and checks after 3 days. If 5 sprout the seed is good if less than 5 sprout then it is poor seed.

1 farmer makes 10 holes and puts 3 seeds in each. Three days after seeding he checks them. If 8 holes have germinated then the seed is good. If more than 2 are not germinated than he has no confidence in the seed.

Seed Selection: 3 of 6 who save seed harvest all of their millet at the same time. They select the best looking head after harvest.

1 farmer has a separate seed plot. He harvests the seed plot after the main harvest. Follows all OFSP techniques. [Hectares planted from seed selected via this technique: 10 kilos planted (2.5 ha)]

2 farmers follow millet through cycle and selects in their field (they select according to OFSP criteria). They harvest before they harvest their fields for food. [Hectares planted using this technique: 1 farmer = 4 kilos (1 ha); 1 farmer = 13 kilos (3.25 ha)]

Storage: All 6 farmers store seed differently than food.

3 store seed in a granary for @5 months. Then they thresh, mix with insecticide used to store groundnuts (K-Orthine, Fenitrothion or Actelic), and store in a sack.

2 store seed on head, in a sack, in a tree.

1 threshes on the same day he harvests it, puts the seed in a sack, and puts the sack in a barrel in his hut.

KAIP DIA

Marcel gave a training on how to screen seed and do germination tests 2 years ago in this village. 6 farmers were present at the meeting in Kaip Dia. Two had been trained in the proper technique for selecting millet seed (one (Modou Ndong) attended the training in Palene Deb and one (Ibra Dia) was trained by Marcel 2 years ago). These two were interviewed privately before the main meeting. The others had been informed by the local bush consultant as to the OFSP promoted millet seed selection techniques. The bush consultant, who lives ir the village, is a contract grower, multiplying millet seed, for World Vision.

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[10]The contract grower does not use a germination test. He claims to have confidence in the seed he contract grows for World Vision.

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Table II. Improved Millet Seed Techniques Acceptance in Kaip Dia

Number of farmers who store seed: 6
Number of farmers present who participated in the training given by the bush consultant: 6

Technique		# of those who store seed who use technique	Ia[11]
Screening		5	83
Germination testing		3	50
Seed Selection			
	Separate seed plots	1	16.6
	Select before harvest from main millet plots	1	16.6
	The plant was followed from germination to harvest.[12]	1	16.6
	Rogues for disease	1	16.6
	Harvests separately from main harvest	2	33
Storage	Separate from food stock	6	100
	On head	0	0

Seed Source: All 6 of those interviewed said that they use seed from their previous years' harvest for planting the following year.[13]

Screening: 5 of those interviewed said that they use a "tami" to screen their seed before planting. They believe that if you do not do this you will not get a good harvest.

Germination tests: 3 farmers said they did germination tests. (Note that neither Modou Ndong nor Ibra Dia do germination tests. They say they have faith that their seed is good because of the selection techniques which they follow)

1 farmer makes two holes and plants an unspecified number of seeds. After 3 days he looks at the two holes. If the germination looks good, then he considers his seed good.

2 farmers make 3 or 4 holes. They also are not sure as to how

[11]see note 4.

[12]see note 5.

[13]Hands were raised to indicate who participated which technique. From observing the group dynamics neither Marcel nor I have full confidence in this result.

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many seeds they put in the holes, but after 3 days if the germination looks good they consider their seed good.

Seed Selection: Only two of the farmers use any type of improved seed selection. As noted, both of these have been trained either in a training or by the World Vision extensionist.

1 (Modou Ndong) keeps a separate field for his seed stock. He follows this field through its cycle, rogues for disease, and only chooses seed from those plants which conform to the desired criteria at every stage of growth. He harvests his seed plot after his harvest for his food stock is complete. (He plants 6 kilos of millet, but claims this covers 2 ha due to his having to use less millet per hole due to better confidence in germination)

1 (Ibra Dia) chooses seed from his main millet field as he harvests. He looks at the plant and head and only chooses those heads which are disease and insect free, have long, completely filled heads, and grain which looks good.

Storage: All of the farmers store their millet by threshing at harvest, mixing with powder (again it appears to be either K-Orthine, Fenitrothion, or Actelic), putting in a barrel and storing in their hut. All of the millet seed is stored separate from the food stock.

PAR CISSE

25 farmers were present at this meeting. Of these only World Vision's bush consultant had ever attended a formal training in seed selection (he attended this last year). He was supposed to extend this information to other farmers in his village, but it is uncertain what form this passing on of the information took. A training in seed selection is supposed to be given this year.

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TABLE III: Improved Millet Seed Selection Techniques
Table of Acceptance Par Cisse

Number of farmers who store seed: 11
Number of farmers who attended a seed selection training: 11

Technique		# of those who store seed who use technique	Ia[14]
Screening		0	0
Germination testing		2	18
Seed Selection			
	Separate seed plots	1	9
	Select before harvest from main millet plots	1	9
	The plant was followed from germination to harvest.[15]	0	0
	Rogues for disease	0	0
	Harvests separately from main harvest	2	18
Storage	Separate from food stock	1	9
	On head	1	9

Seed Source: 11 of the farmers interviewed saved seed from their millet fields.

11 farmers interviewed bought their millet seed from World Vision (including the bush consultant).

2 farmers interviewed received millet seed from other family members.

1 farmer bought millet seed from the local market. He believed the millet he bought was the local "souna" variety.

Screening: None of the farmers interviewed practices any type of screening of their seed. A variety of reasons was given for this. The farmers who bought their seed from World Vision

[14]The numbers given in this column for the Index of Acceptability may not be totally accurate. These numbers assume that the bush consultant has given a training. The Ia is calculated as a percentage of farmers out of 11 (the number who store seed) who carry out the recommended technique. Again, each farmer said they used seed they had stored in the manner mentioned on 100% of their millet field. If the bush consultant has not carried out the training then, in reality, there is no Ia number.

[15]see note 5.

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believed it wasn't necessary to screen because they bought certified seed. Others thought their seed looked good, so they did not screen.

Germination tests: 2 farmers did germination tests and used 2 different techniques. 1 made 4 small holes and put a small amount of seed in each hole (he does not count it). 3 days later he looks to see if it looks like a good amount has germinated. The other puts sand in a canary and puts some millet seed in it (again, he doesn't count it). He waters it and after 3 days checks to see if the germination looks good.

Seed Selection: 1 farmer practices a type of selection. He goes through and chooses the heads which look the best while he is harvesting.

10 practice no selection what-so-ever. They harvest all of their millet together.

Storage: 1 farmer (the one who selects) stores his millet seed separate from his food stock. At harvest he keeps the millet which he will use for seed separate and stores in, on the head in a sack. This he puts in his hut. He stores it this way for 7 or 8 months, then he threshes and mixes with powder (a fungicide) before seeding it.

10 farmers thresh all of their millet at time of harvest. They store all of it in barrels and eat it till they get to the last 10 (or so) kilos. They set this last millet aside for seed. 4 of these farmers treat the last of their millet with a fungicide before planting. 6 use no treatment.

Miscellaneous comments: In this village it was repeatedly stated that the groundnut is more important than millet and that is why few people take time to select for millet seed.

2 farmers disagreed with the above comment and said that millet was important to them because if they had a good supply their was "peace" in their household.

The farmers also generally agreed that striga is a major problem with millet.

Finally it should be noted that in Par Cisse there is a high level of dependence on World Vision for seed. Even the bush consultant did not select his own millet seed, he depends on World Vision to supply him with millet seed each year.

DAROU NGARAF

8 farmers attended this meeting. The bush consultant was trained last year in OFSP techniques and currently is a seed multiplier for World Vision. He was supposed to extend the techniques he learned to other farmers in his village. It is not known whether this was done as nobody except for the bush consultant was able to harvest millet last year. This was due to a poor rainy season. The bush consultant used IBV 8004 which

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matured. The other farmers used their local variety and the rains ended before it could mature.

TABLE IV: Improved Millet Seed Selection Techniques
Darou Ngaraf

Number of farmers who store seed: 1
Number of farmers who attended a seed selection training: 8
(It is uncertain as to whether the other farmers were trained by the bush consultant or not)

Technique		# of those who store seed who use technique	Ia[16]
Screening		8	100
Germination testing		0	0
Seed Selection			
	Separate seed plots	1	12.5
	Select before harvest from main millet plots	0	0
	The plant was followed from germination to harvest.[17]	1	12.5
	Rogues for disease	1	12.5
	Harvests separately from main harvest	1	12.5
Storage	Separate from food stock	8	100
	On head	0	0

Seed Source: 1 (the bush consultant) stored his millet seed from last year's crop. He plants 6 kilos of millet seed (1.5 ha).

6 farmers received millet seed for this year from the bush consultant.

1 received millet seed from the bush consultant for this year and from another village.

Screening: Though only one farmer stores his seed, all the farmers use "tamis" to screen their seed, even if they buy it. This is a technique which they traditionally followed.

[16]This number is derived at by assuming that all 8 farmers have been taught the techniques by the bush consultant. If this is not the case then this number is not accurate.

[17]see note 5.

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Germination tests: None of the farmers do germination tests. They claim to have faith in World Vision's seeds. They say they used to do the tests.

Seed Selection: 1 (the bush consultant) selects his seed as he was taught at the training he went to last year.

The other 7 farmers would traditionally choose the best looking millet heads after harvest and save these separately for seed.

Storage: All of the farmers said they would traditionally store their millet seed separate from food stock. They thresh the millet seed at harvest, put it in a sack and mix it with a powder (actelic). If they have no "powder" they mix the seeds with dry, pounded, neem leaves.

Miscellaneous comments: Groundnuts are more important to this village because they can be turned into oil and money, and the hay can be used for animal feed.

Last year there was an insect problem in this village. Caterpillars (worms) attacked the millet cutting the stem and attacking the grain on the head.

B. Cowpea Seed

KANDALE MBENGUE

A seed selection training was held in this village in 1991. It was open to men and women, but the emphasis was on bush consultants.

26 farmers[18] attended this meeting. 11 were from Kandale Mbengue and had been taught the seed selection techniques. The other 15 farmers were from neighboring villages and it is not known whether or not they had been taught the seed selection techniques.

[18]When working with cowpeas one works with women as women traditionally raise cowpeas. Thus, when the term farmers is used in this section it refers to women.

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TABLE V: Improved Cowpea Seed Selection
Kandale Mbengue

Number of farmers who store seed: 11
Number of farmers who attended a seed selection training: 11

Technique		# of those who store seed who use technique	Ia[19]
Screening		8	73
Germination testing		2	18
Seed Selection			
	Separate seed plots	0	0
	Select before harvest from main cowpea plots	8	73
	Follow cowpea through cycle selecting for desirable traits.	7	63
	Rogues for disease	0	0
	Harvests separately from main harvest	8	73
Storage	Separate from food stock	11	100

Seed Source: 11 farmers saved their cowpea seed from their field.

10 farmers bought their seed in the local market.

4 bought their seed from World Vision.

1 received seed from another family member.

Screening: 8 farmers screen or in some other way select their cowpea seed for size and quality.

Germination tests: 1 farmer plants 50 seeds as a germination test. If 45 germinate after 4 days then the seed stock is good. If less than 40 germinate, the stock is not considered good.

1 farmer plants 9 seeds in a canary. After 3 days if 5 germinate she considers her stock good, if 4 or less germinate, then the stock is poor.

[19] 11 was used as the number of farmers who had been trained in these techniques. The A factor is 100 because the fields planted in cowpeas are all planted using seed stored using these techniques.

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Seed Selection: 3 farmers harvest and thresh all of their cowpeas then they separate out those which they will store as seed.

7 farmers choose their seed from the area of the field which looks best (disease free, good number of pods, etc.) These are harvested before the main harvest.

1 chooses cowpeas which dry (mature) first and separates them as seed stock.

Storage: 3 store seed stock in a barrel or canary and fill over with sand and/or ash.

2 store in a barrel with neem seed oil mixed in.

5 store in a barrel with "gas".

1 stores in a plastic bottle with no treatment after cleaning the seed.

NDIEKHOUMFEU

The bush consultant for cowpeas (president of the women's group) had attended the training which was given in Kandale Mbengue in 1991. That also was the first year that the farmers had planted cowpeas in the village.

15 farmers were present at this meeting. The bush consultant was not present and many farmers were missing as this was the weekly market day in the local market in Sagata.

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TABLE VI: Improved Cowpea Selection Techniques
Table of Acceptance Ndiekhoumfeu

Number of farmers who store seed: 0
Number of farmers who attended a seed selection training: 1[20]

Technique		# of those who store seed who use technique	Ia
Screening		11*	73
Germination testing		0	
Seed Selection			
	Separate seed plots	0	
	Select before harvest from main cowpea plots	0	
	Follow cowpeas through cycle selecting for most tillers, disease free, etc.	0	
	Rogues for disease	0	
	Harvests separately from main harvest	0	
Storage	Separate from food stock	0	

Seed Source: 12 farmers buy their seed from World Vision each year.

3 farmers buy their seed in the market.

*Screening: 11 farmers in some way screen the seed which they buy and sort out those seed which appear small or damaged.

Germination tests: None of the farmers do germination testing.

Seed Selection: None of the farmers practice seed selection.

Storage: While they do not store cowpeas for seed, they do store them as a food stock. Three techniques are used.

10 farmers put cowpeas in a barrel with no treatment and put the barrel in the sun.

1 farmer adds a "gas" tablet to the barrel after the cowpeas are in it.

[20] It is only known that 1 farmer attended the OFSP training. It is not known if she extended these techniques to other farmers in the village. It is known that none of the farmers interviewed store their cowpea seed. They all depend on World Vision for cowpea seed.

1 farmer puts cowpeas in a colander over a boiling kettle and steams. Then she stores them in a sack.

CONCLUSIONS

The first conclusion which can be reached is that the program has been successful in transferring the desired skills to the bush consultant.

Table C - 1 Level of acceptance of practices by bush consultants

Village/Bush Consultant	Uses tech.	Doesn't use	Not interviewed
Millet			
Palene Deb	X		
Kaip Dia	X		
Par Cisse		X	
Darou Ngaraf	X		
Cowpeas			
Kandala Mbengue	X		
Ndiakhoumfeu			X

The majority of those bush consultants interviewed used the improved seed practices which had been extended to them. However, it is questionable as to whether the bush consultants are passing these practices along to other farmers. Each bush consultant interviewed said that he had informed his/her fellow farmers as to the seed selection techniques which s/he had been taught, but the data (interviews) suggests that improved seed practices are being adapted on a partial or selective basis by the farmers who have received training from the bush consultants. The index of acceptability for the various seed practices is provided in the following table by village.

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TABLE C-2 Acceptance of Practices by all farmers
(Index of Acceptability values for each practice by village are given. The number in parentheses is the number of farmers who practice the technique over the number of those who were trained in the practice.)

Practice	VILLAGE					
	P.D.	K.D.	P.C.	D.N.	K.M.	N.
Screening	75 (6/8)	83 (5/6)	0 (0/11)	100 (8/8)	73 (8/11)	73*
Germination test	38 (3/8)	50 (3/6)	18 (2/11)	0 (0/8)	18 (2/11)	
Seed Selection Separate seed plot	12.5 (1/8)	16.6 (1/6)	9 (1/11)	12.5 (1/8)	0 (0/11)	
Select in field before harvest	25 (2/8)	16.6 (1/6)	9 (1/11)	0 (0/8)	73 (8/11)	
Follow the plant through its cycle	38 (3/8)	16.6 (1/6)	0 (0/11)	12.5 (1/8)	63 (7/11)	
Rogue diseased plants	38 (3/8)	16.6 (1/6)	0 (0/11)	12.5 (1/8)	0 (0/11)	
Harvest seed separately from main harvest	38 (3/8)	33 (2/6)	18 (2/11)	12.5 (1/8)	73 (8/11)	
Storage - Separate from food	75 (6/8)	100 (6/6)	9 (1/11)	100 (8/8)	100 (11/11)	
Store on head, in sack, in tree	25 (2/8)	0 (0/6)	9 (1/11)	0 (0/8)	Not because	apply cowpeas

According to Hildebrand and Poey in On-Farm Agronomic Trials in Farming Systems Research and Extension, only Index of Acceptability results of at least 25, which include a C factor of at least 50, are indicative of a good possibility for the adoption of the technique which has been extended.[21] Taking this into account it appears that the practices which are most readily accepted by the farmers, and which will probably be added to their traditional practices, are screening seed and storing seed separately from food stocks.[22] A form of both of these practices seems to have been fairly common before the extension started. In the case of screening this is evidenced in the original, pre-extension, survey which showed that around 50% of all farmers screen their seed. As for storing seed separate from food, the interviewees suggested that, in many cases, they had always done

[21]Ibid., p. 122-123.

[22]In the case of Kadalane Mbengue other practices have also been adapted at a rate which suggests they will be included into traditional agricultural practices.

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One interpretation of these results is that these two techniques have been comparatively readily adopted because they reinforce traditional seed practices. Even when taking this into account, though, the adoption rate is still encouraging. In the case of screening, at least, around a 25% increase in the use of this practice is recorded over the original baseline survey for those who have undergone training. The fact that these two techniques have a strong index of acceptance amongst those farmers who have undergone training indicates that at the very least the training has started farmers down the path of viewing seed stock as separate from food stock and concurrently, that seed needs to be treated differently than food. Also, over the long run screening seed will provide some favorable selection for millet.

Germination testing seems to be another matter. While the knowledge of how one performs a germination test seems to be widespread, the actual practicing of this technique is not. In fact, some of the respondents commented that they used to practice this, but had discontinued because they now had more "faith" in their seed. It appears that germination testing is perceived as a technique that one only has to use when one doubts one's seed source.

This said, it should be noted that the failure to do germination testing on millet is not a terrible occurrence. From a technical point of view millet normally doesn't have the germination problems which peanuts or cowpeas have and farmers normally plant much more millet seed than is necessary. Because of this the advantages which are gained via germination testing may not be as evident with millet and it may be difficult to convince farmers that they should test their millet seed before planting.

From the data collected it appears that the hardest practices to pass along are also those techniques which are most directly tied to improving seed through plant selection prior to harvest for seed at harvest. Those farmers who had direct training by OFSP (i.e. the bush consultants and those farmers who live in the two villages where OFSP held trainings) also have the highest acceptance of the techniques. There are a number of possible reasons why this is the case.

First, the techniques used to select seed are highly abstract. By this it is meant that there is no immediate visible result from the action performed. The farmer must perform the same selection over a number of seasons before s/he sees a visible result. Even then, the result may be gradual, growing slowly over the years so that a single large increase is not observable. This type of concept is the hardest to transmit. The bush consultants may be having difficulty transmitting the concepts due to inadequate training or due to a difficulty on their part of adequately grasping the concepts involved. Either of these possibilities explains why OFSP seems to have gained better results in transmitting the knowledge from their trainings (as evidenced by the index of acceptance ratings).

The bush consultant could also be faced with cultural barriers when attempting to transmit the new technique. If the bush consultants are not respected enough in their village for others to accept their advice, the techniques will not be accepted. A bush consultant, while being a good farmer, could come from a low social position and, thus, not be respected, or the consultant could be involved in intra-village politics, or he could be to young to be

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accorded respect by the older farmers. Whatever the case, bush consultants, as evidenced by the data, are having trouble spreading an important part of the seed selection technique.

The above assumes that the bush consultants have been given some training as to how to disseminate the training they have received and that they want to disseminate the techniques they have been taught. If they haven't received any training this could be the reason why the skills are not being transferred to the farmers. If they have received some training, it is hoped that they are trying to transfer the improved seed selection techniques to farmers. However, there is the alternative possibility that the bush consultants actually have no incentive to teach other farmers the seed selection techniques. Currently the bush consultants are also World Vision's seed multipliers and at the end of each season World Vision buys a certain amount of the seed multipliers' harvest, but he is also left with some to sell to other farmers in the area. If the bush consultant/seed multiplier trains others how to select their own seed, he loses potential customers. Thus a potential conflict of interest for the bush consultant is present.

Finally, a word should be said about the significant portion of the farmers interviewed who depend upon World Vision as their seed source. 11 millet farmers (24% of those interviewed) and 16 cowpea farmers (39% of those interviewed) buy their seed from World Vision. While this in itself is not bad, the farmer is acquiring and planting good quality seed, there are potentially dangerous repercussions to this situation. As evidenced by the recent history of the groundnut in the area, if the seed source should be cut off, these farmers could be in trouble.

RECOMMENDATIONS

A. Seed Selection

1. A way should be found to help the bush consultant with the transmittance of the seed selection techniques.

As the data shows, the places where these techniques have been best accepted by the farmers are in Palene Deb and Kandala Mbengue, the two villages where OFSP led the trainings in seed selection. One way to help the bush consultant with teaching and transferring the techniques, and also raise the status given to the seed selection message, is to have World Vision's Agricultural extensionists present at each initial training the bush consultant gives. This would legitimize the message in the eyes of other farmers. The extensionist could also backstop the bush consultant and answer any questions relating to the technical aspect of the techniques.

2. Field trials should be done with more than one farmer in each village and the World Vision extensionist should actively follow these up.

This should be an on-going yearly process. If it is carried on year after year, it will become in-grained in the eyes of the farmers.

3. Follow-up should be done in each field on a weekly basis.

The extensionist should visit weekly all of the fields where the

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seed selection techniques are being used. On these visits he should work with the farmer marking the plants that exhibit the desired characteristics at each stage of development, roguing diseased plants, etc. (This may be to time consuming for the extensionist to carry out. Perhaps if Peace Corps Volunteers are working in the area they could be encouraged to carry out this aspect of the process.)[23]

4. In the training the techniques used to select seeds should be related to other selection techniques which farmers use in their everyday life.

Some of these are: when a farmer buys a ram for Tabaski he searches for one from a good bloodline; when a farmer buys a colt, he looks to the parents to make sure that they are strong, healthy animals; etc. Farmers selecting seed from plants with desirable qualities is not a new idea, it has been going on for thousands of years - it is why there are domesticated crops now. The process advanced by OFSP is merely trying to modify and, in some cases, reintroduce a process that has gone on for thousands of years.

5. It should be determined if there is a conflict of interest between a bush consultant's duties and a seed multiplier's. If there is, the one farmer should not be responsible for both multiplying seed for World Vision and acting as a bush consultant.

B. Germination Testing

It is encouraging that most of the farmers interviewed expressed an understanding of how to carry out a germination test, however, World Vision extensionists should look closely at the germination testing recommendations they are making. Are they in some way suggesting that germination testing is something which (only) needs to be done when one doubts the quality of their seed? It appears that a number of farmers view germination testing as something to be done when one is not sure of one's seed source. Farmers should be told that germination testing should always be done. Seed may be beautiful, but it may not sprout. A farmer can never <u>know</u> how good his or her seed is unless he has seen it sprout. While it may be cheap to replace millet seed, cowpea seed may not be as readily available and the effects of a bad germination rate on a cowpea field could seriously impact on the harvest.

C. Seed Screening and Storage

Techniques related to screening and storing seed should continue to be taught in the trainings. Even though these techniques are the ones which have the highest acceptance ratings (high enough to suggest they may be adapted permanently by the farmer), they should still be emphasized as integral parts of seed selection process.

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[23]Bal and Douglas support these two points (2 and 3) in their paper "Designing Successful Farmer-Managed Seed Systems" <u>Development Studies Paper Series</u>, January 1992, p. 5. They state: "Extension systems need the capacity to conduct many on-farm demonstrations of improved varieties. They also require a few seed extension specialists to help farmers locate seed supplies and <u>use appropriate technology to maintain their own future seed supplies</u>." (emphasis added)

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D. A hands-on component should be added to each step of the training.

Training in germination testing, screening of seed, and storage techniques could be strengthened if a hands-on component were added. By this it is meant that a germination plot should be laid out during the session, farmers should be given tamis and seed so they can screen it, and millet on heads should be available so that it can actually be "stored" during training. Hands-on experience tends to strengthen the message transmitted in any training.

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Appendix: Questionnaire used in the collection of the data.

A. How many used the techniques, which they learned, last year?

How many are planning to use these techniques this year?

How big any area are they cultivating in millet (niebes)?

How much of this will they use the techniques on?

If they don't use all of the techniques, which will they use?

B. QUESTIONARE SUR LE SEMENCES DE MIL (ET NIEBE)

Preparation:

1. Seed source

   Imported to farm (bought, traded for, etc.)
   (if yes, from where and name of seed)

   Local (name of seed)

2. Seed treatment used?

   What is it? fungicide, insecticide, etc.

3. Screening of seed used? (tri)

4. Germination tests used?

Planting/Growing season

1. Is the farmer producing seed?

   a. Does he have a seperate seed plot?

      How big is it?

   b. Does he select individual plants in the field for seed? In the plot?

2. Criteria for selecting seed for next year:

   1. Plant appearance (height, vegetative growth (alot, little, etc), tillering, homogenous maturity)

   2. Does he rogue for disease (i.e. pull out diseased plants)

   3. Length of head (size of seed packet in case of niebe)

   4. Grain size on head

5. No selection is used, he just takes millet from his food stock.

3. Harvest:

1. Are individual plants harvested specifically for seed?

Before the main harvest?

2. Is a "seed plot" harvested seperate from the main harvest?

3. Is all the millet harvested together?

4. What is the length of time between harvest and storing?

4. Storage:

1. Is seed stored seperate from food?

2. If so how is seed stored?

3. How is food stored?

4. Is seed stock treated?

How? Chemical, sand, ash, smoke, other

5. Are there pest problems in storage of seed stock?

Appendix: Comments on the general bush consultant meeting on Thursday, June 18 1992, at Kebemer.

The meeting lasted all day and it was outlined as an attempt to briefly overview all of the things which World Vision's bush consultants work in. The section devoted seed selection was abbreviated, but discussion was generated. The main theme expressed in the discussion was that all of the bush consultants felt they knew how to and were selecting for seed correctly. This belief corresponds to the information collected in the above survey.

Appendix G

"A Review of Save the Children/USA/Gambia's Rice Extension Program and Collaboration with the On-farm Seed Project"
by Stephen Leisz

A Review of Save The Children/USA/GAMBIA's Rice Extension Program and Collaboration with The On-Farm Seed Project

By: Stephen Leisz, Intern
On-Farm Seed Project

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ABSTRACT

A study was done of Save The Children Federation/USA (SCF) rice extension program on the North Bank of the Gambia River the week of 13-17 July 1992. The main conclusions of the study were that adoption of the new rice varieties promoted by SCF have been fairly widespread in the area where work has been carried out. The extension of row seeding technology for direct seeded rice, the main technique extended by the project, has been fairly well adopted in the Nuimis area of the north bank, but lags in the Baddibu districts. The main difficulty faced in promoting row seeding is convincing men to loan their wives the seeding machine or seed the rice for them. Those interviewed agreed that farmers could in many cases totally take over the production of the new varieties which have been introduced. The main limitation to this is poor rainfall in certain years which leads to poor harvests.

The study also attempted to gather information on where SCF should move with its program and what roles the On-Farm Seed Project (OFSP) could play in its future. The main suggestions were that SCF should concentrate on providing technical assistance to farmers and only provide new varieties when the village being worked with was a new one, or when a new cultivar had been identified and SCF could act as the releasing agent. It was suggested that OFSP should continue to provide training for SCF's extension agents, increase the number of their trips to SCF's rice fields, and help identify new rice cultivars for the SCF to introduce to the farmers.

I. Current work in the Gambia in Rice cultivation[1]

Save the Children Federation's (SCF) work in rice production started in 1988 on the north bank of the Gambia river in the Nuimi and Baddibu districts. The project covers a range of activities including seed multiplication, demonstration activities of improved varieties, production practices and technical equipment, seed storage construction and staff and village training.

To date improved rice varieties such as DJ12-519, BG90-2, BR92, and ROK-5 have been introduced. Each of these varieties have been introduced as part of the multiplication program and varying amounts of each has been produced as registered seed. In conjunction with the multiplication program they have also been introduced in demonstration plots so that farmers can compare them to their local varieties. The main improved technique which has been extended is that of seeding on line instead of broadcasting direct seeded rice. This technique has been extended to encourage early weeding, as on line rice is easy to weed when it is young than broadcast rice. Finally, SCF has also introduced the construction of community seed stores in the area. To date four such stores have been constructed and two government seed stores rehabilitated.

II. List of people contacted:

7/14/92 Abou Tall, Director SCF-USA/Gambia
Burang Danfo - Acting Food Program Specialist
Dembo Kinteh - CDA Bakendik
9 Farmers Bakendik
1 Farmer Buniadu
4 Farmers Berending

7/15/92 Masambah Juuf - CDA Lameng
Women's group Lameng
4 Farmers Albreda
6 Farmers Sika

7/16/92 Masaneh Ceesay - CDA Ndungu Kebbe
Keba Ceesay - CDA Kerewan
3 Farmers Kerewan
Falou N'Jaye - Program Manager/Kerewan

7/17/92 Lamin Ceesay - CDA Illiasa

Objective of study:

The objective of this report was to explore the current situation of Save the Children Federation's (SCF) rice multiplication program in The Gambia. It was hoped that through a series of interviews with the Community Development Agents (CDA), rice farmers, and visits to farmers' fields information could be gathered which could be used to help determine further collaboration between the On-Farm Seed Project and SCF-USA/Gambia.

Realizing that a thorough study could not be carried out in the time allotted, the goals of this report were the following:

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[1]The information in this section is taken from the Rice and Millet Production Project (RAMP) 1991 Annual Report, written by Save the Children Federation, The Gambia Field Office.

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1. Through interviews with CDAs and some farmers gain a rough understanding of the status of the adoption of the rice varieties promoted by SCF.

2. Through interviews with the CDAs and some farmers determine the status of the adoption of new cultural practices promoted by SCF (namely, on line planting of upland rice). Make recommendations as to how this information could be more thoroughly gathered by SCF.

3. Determine what the CDAs view as needed future collaboration between SCF and OFSP.

4. Where possible determine if seed promoted by SCF is being passed through local, informal, seed trading routes.

III. Interviews:

Methodology: Because of the limited time, data gathering was limited to interviews with CDAs and villagers. Each CDA was interviewed privately and a questionnaire was followed (see Appendix 1.a.). These interviews were carried out to gather the CDAs impressions of the current role played by SCF, the future role it could play, the impact which SCF has had, the present collaboration which SCF has with OFSP and possible future collaboration.

Village farmers were interviewed in two settings: (1) group interviews, and (2) individual interviews. In two cases, group interviews were carried out. In these cases farmers who SCF has worked with were interviewed as a group with the CDA acting as translator. The questions asked them are included in Appendix 1.b. In the other instances farmers were interviewed while field visits were being made. Similar questions were asked these farmers, but not all of the farmers had collaborated with SCF. Also, farmers were asked specific questions regarding the rice fields. Again the CDAs were used as translators.

Limitations: (1) Using the CDAs as translators could have affected the views expressed by the farmers. It is my belief that this did not take place, because in many of the interviews farmers expressed opinions which were different from some of those expressed by CDAs[2]. (2) Random sampling of farmers and fields did not take place. This was due to the time limitations placed on the visits. Because of this a representative sampling can not be claimed to have been made.

Questionnaire results:
The CDA questionnaire was divided into two parts. The first part was aimed at gathering general background on SCF's program and to elicit ideas as to the future role of SCF in the area of food production. The second part was aimed at assessing the perceived impact of the program to date.

[2]In my opinion this is a positive indication of the openness of communication between SCF's CDAs and the farmers.

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The following were general responses provided by CDAs to the following questions:

- What is the current role of SCF re: seed availability?

According to the CDAs, the current role is one of providing new seed varieties to seed multipliers and demonstration farmers. The farmers return the same amount of seed to SCF at the end of the season and the rest they save. They are encouraged to distribute this seed to other farmers who are interested. Last year (1991) SCF made extra seed available to the villages it works with due to general crop failures which were experienced the year before and attributed to a poor rainy season.

- Does SCF: (a) provide seed/market seed?

Yes it provides seed (see above). It markets seed to the extent that it buys seed back from farmers at the end of the season. This seed is then used the following year as demonstration seed and provided to new demonstration farmers by SCF. It also will sell seed to farmers who search out a CDA if the CDA has extra seed.

(b) provide credit? Yes, in the form of seed (see above).

(c) provide quality control on seed production?

Yes, CDAs visit the fields and try to encourage roguing of off types, proper weeding, spacing, etc. This is mostly done for seed multipliers and demonstration plots. The roguing is not always successful as farmers do not want to pull out potential food. Instead they claim they will separate it at harvest.

(d) purchase seed produced by farmers?

Yes, when other sources fall short of supplying SCF's needs. An example is the village of Ker Waly. In this village rice is produced only for sale. Last year SCF bought a lot of the crop. Otherwise SCF gets back seed as payment for seed and fertilizer loaned at the beginning of the season.

(e) has work been done primarily with group or individual seed production? Why?

At first SCF worked heavily with groups. They found this did not work because group work was put off in favor of individual work. Today SCF concentrates on individual contract farmers. Only one village, Ker Waly, was directly mentioned as a village where a group is being worked with as a seed producing unit, although the RAMP report for 1991 says there are three villages where communal seed production is being practiced. Ker Waly was said to be a special circumstance, as the village is not traditionally a rice producing village (it is Serer) and a group was formed with SCF specifically to grow rice for seed production.

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What could be future roles for SCF? (Where should SCF concentrate its efforts in rice/ag. production in the future?)

Table I: CDA Responses
SCF should:

Response:	# CDAs concurring
Concentrate on the transfer of new cultivation techniques and move away from acting solely as a seed supplier. (i.e. role would change to one of technical extensionist)	5 of 6
Search for new varieties and act as a facilitating agent who aids with the introduction of these into the communities. (earlier maturing, etc.)	4 of 6
Provide more help with improving and dispersing new technologies/implements (such as the single mold board plow).	3 of 6
Continue credit operation.	2 of 6
Help with the marketing of the new rice varieties by contract growers.	2 of 6
Start working with fertility issues. (i.e. fertilizer loans, other fertility issues)	2 of 6
Increase emphasis on involving men in the training and transferring of new techniques.	1 of 6
Expand its area of operation. (i.e. move into new villages as extension agents)	1 of 6

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- What future collaboration would you like to see between SCF and OFSP?

Table II: Future Collaboration (CDA Responses)

Responses	# of CDAs concurring
Utilize OFSP to continue training CDAs in rice cultivation techniques.	6 of 6
Collaborate with OFSP to find new varieties of seed.	3 of 6
Have OFSP increase its field visits to contractors fields.	3 of 6
Work with OFSP to facilitate trips for contract farmers to meet other contract farmers from other areas of Gambia and Senegal.	1 of 6
Use OFSP to help in finding appropriate technological solutions to the row seeding problem.	1 of 6
Elicit OFSP's help in providing training in pest control issues.	1 of 6
Ask OFSP to help with identifying solutions to soil fertility problems.	1 of 6

IMPACT ASSESSMENT BY CDAs:

- Is it possible for farmers to gradually take over seed production? i.e. become village level seed producers and sellers?

  5 of the CDAs believe that there is enough seed already distributed and being produced in the villages that farmers can take over the production of seed which has been released.

- Do women buy seed? If yes, why do they do so when they produce seed themselves?

  All the CDAs said that in some cases women will buy seed. These cases were unusual ones where the woman had a bad harvest the previous year and could not either save her seed or trade her seed for other seed. Only in these cases, they emphasized, would women buy seed.

- If they buy seed, do they buy all of what they plant? Yes, but only as outlined in the previous response.

- What is the price of this seed compared to the price of food grain? Seed is approximately 1 and 2/3 times the price of food rice.

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- Do women trade seed among themselves?

All the CDAs said that women trade rice among themselves. Examples were given of women who had traded rice with contract farmers. In these cases the CDAs believed that the farmer had seen the rice, asked the farmer about it and requested a trade. Sometimes seed is traded for seed, sometimes it is traded for food rice, and sometimes labor is traded for seed (the woman helps with the harvest and seed given in exchange for the work). In cases where women have traded for the varieties distributed by SCF it is not known by the CDAs whether the technique of row seeding was also passed on to the farmer. It was generally believed that the contract farmer told the farmer requesting the seed about row seeding, but this could not be verified.

All of the CDAs expressed the opinion that they felt that more seed was distributed via these informal channels than via SCF's official seed dispersal program.

- Have you noticed a change in rice practices since SCF started working in this area? How?

All the CDAs said that they have noticed a change in rice cultivation practices since they started working in the area.[3] To varying degrees they said that the new varieties and row seeding for upland rice had been adopted. The highest adoption rates were estimated for the Nuimis area (Lameng and Bakindik) and lower adoption rates were estimated for the Kerewan and Illiasa areas.

INTERVIEWS WITH FARMERS:

A total of 39 farmers were interviewed. 31 have worked with SCF, 8 have not worked with SCF. 31 were interviewed in groups, 8 were interviewed individually.

Farmer profile:

Bakindik - 9 farmers; 4 have worked with SCF, 5 are not associated with SCF. 8 were interviewed in a group, 1 was individually interviewed.

Buniadu - 1 farmer who works with SCF was interviewed.

Berending - 3 farmers were interviewed. 1 works with SCF, 2 do not. All were interviewed individually.

Lameng - 13 women were interviewed in a group. All work with SCF.

Albreda - 4 women were interviewed in a group. All work with SCF.

[3]This excludes one CDA, Lamine Ceesay, who has only been at his site for only 10 months.

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Sikka - 6 women were interviewed in a group. All work with SCF.

Kerewan - 3 women were interviewed individually. 2 work with SCF, 1 does not.

Seed Source:

- Do you save rice seed? Why, why not? What is the rice variety(ies) you use and/or save?

  All of the farmers save their rice seed when their harvest is good enough to warrant saving it. The varieties used in the areas were the following: At various places the varieties promoted by SCF and, Bendung Khoyo, Buiba, Bendung Wolengo, Cow-cow, Weomano, Casamance, Barre Fita, Ba Ceedy, Suntu Kum Musoor. Also, some improved varieties had been introduced by other sources, such as the agriculture agent and other NGOs, prior to their introduction by SCF.

- Do you buy rice seed? Why, why not? What is the variety(ies) of the seed?

  As noted by the CDAs, the farmers mentioned that they only buy seed if they have a bad harvest and cannot trade for rice seed. Also, they said they will buy seed if they observe a new variety and the owner will not trade for it.

- Where do you buy it from, SCF, market, etc.?

  Now the majority of farmers buy seed from SCF. Before SCF worked in the area they would buy seed from the market and other farmers. Sometimes farmers still buy from these other sources, but the number one answer by farmers was that if they buy seed, they do so from SCF.

- Do you get seed from another source? variety?

  As noted above, they trade for seed from other farmers or receive seed in trade, on loan, or as grants from family members.

- How do you like the seed?

  In each case the farmer only searched out the seed if they had already seen it in the field and liked it. Thus, satisfaction with the seed was high.

Farming Practices:

- Do you transplant rice? How much? Only in Kerewan and Illiasa[4] was rice transplanted. It was not possible to determine how much area was transplanted.

[4]Farmers were not interviewed in Illiasa.

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- Direct seed? How much? All the farmers direct seeded at least some of their rice. In all villages except for Kerewan and Illiasa direct seeding made up 100% of the rice fields.

- Techniques used? Do you use SCF promoted techniques? Why, why not?

  The main technique promoted by SCF has been row seeding. All the women interviewed expressed knowledge of row seeding. However, not all of them row seeded. Even those who did row seed, did not row seed all of their fields. They all expressed a desire to row seed because they said that they thought it made weeding easier and a number of women commented that row seeding gave a better harvest. The main limitation to row seeding was their ability to convince their husband to either seed their field using his animal traction seeder or loan his seeder to them. All the women were also familiar with the row marker which has been developed, but none liked to use it because it was to heavy, took two people to use, and/or took to long to use.

- Do you store seed? As previously noted, all of the farmers interviewed stored their seed when their harvest was good.

INDIVIDUAL FARMER COMMENTS:

"I'm broadcasting Bendung Khoyo (a local upland rice) because I can't wait for my husband to come and row seed it."
(Farmer in Buniadu)

"A problem associated with row seeding is that birds follow the seeder and pick out the rice seed when it is planted on line. Also grasshoppers attack the young rice plants. There are also birds that shred the young plant."
(Farmer in Buniadu)

"I saw last year that I got a better yield by planting my rice on line."
(Berending Farmer)

"We don't buy seed, but others come to buy or trade for our seed."
"If SCF can not provide seed, we will use what we have saved."
"Those who broadcast do so because their husband will not help them plant on line using the animal traction seeder."
"We know about the row marker (rake), but we don't use it because it doesn't cover the seed as well as the seeder. Birds can get to the rice easier."
(The rice growers in Lameng who have worked with SCF)

"We used to broadcast our own fields and row seed those for SCF. We found that SCF fields yielded better, now we try to plant all of our fields on line."
"Even if SCF doesn't contract for seed anymore, we will still plant on line."

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"We have been paying a farmer to seed our rice fields on line, now he is fishing and I may have to broadcast seed my fields."
"If SCF can not provide seed and we have adequate rains, we can provide our own seeds."
(Comments from the village of Albreda, all the commentators work with SCF)

"I don't own a seeder, I have to borrow my husbands. It is sometimes hard to get his seeder."
"Row seeded rice is easier to take care of and yields better than broadcast rice."
"We would like to row seed all of our rice, but we give priority to rice being produced for SCF."
"The row marker is laborious and sometimes you need two people to use it. It can't be used after the rain has started in muddy places."
"Others (farmers other than those which SCF has worked with) have started to row seed, but still no one row seeds all of their rice fields, only some."
(Comments from farmers in Sikka. The comments were from farmers who had not worked with SCF and also from some who had.)

"I used to row seed my rice, now I have to broadcast because I can't get the seeder from my husband."
"If I have seed provided by SCF, I row seed, if it is my own seed, I broadcast. The row seeder uses more seed than broadcasting."
(Farmers in Kerewan who have worked with SCF)

IV. CONCLUSIONS:

According to the information gathered from the CDAs and the farmers interviewed, the following conclusions can be reached:

1. The varieties which have been introduced have been fairly well adopted. CDAs and farmers concurred on this point. Also the fields which were visited had been planted with introduced varieties in many cases.

2. Row seeding has been fairly well established in some places (mainly in the Nuimis) and has the potential to be established in other places. The knowledge of the benefits from row seeding is wide spread and most women interviewed felt that they would like to row seed. However there is a limitation to the adoption of row seeding which was cited by CDAs and farmers. This is the difficulty of getting equipment for the farmer to use when row seeding. Not all husbands will seed for their wives, or loan their equipment to their wives, and the farmers do not like using the row marker.

3. Both CDAs and farmers agreed that farmers could take over production of the improved varieties in villages where the improved varieties have been established for a number of years. On this issue the CDAs were more cautious than the farmers. The farmers believed that in every case if SCF left after this year they would continue to produce their own "improved" varieties as long as the rains were good. CDAs felt that only villages which had been producers for a number of years could be responsible for their own seed production.

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This being said, it appears that seed demand has been high the last few years due to poor rains which have caused poor harvests. This is the one scenario which the farmers felt might limit their ability to produce seed. Still, even with the poor harvests and poor rains, it appears that farmers are continuing to save their seed as much as possible and trying not to depend on SCF seed. SCF's seed store program has the potential to aid farmers as they try to save quantities of seed and take over production of the improved seed varieties. However, the program appears to be to new to tell if it will have the hoped for impact.

As for distributing the improved seed, CDAs and farmers concurred that traditional methods of distribution could disseminate the improved varieties to those who want them. Some of the CDAs even felt that the improved varieties have been more widely distributed through traditional channels than through SCF's official distribution system.

4. According to the CDAs SCF should in the future concentrate on:

   a. providing technical assistance to farmers instead of seed. This includes providing improved farming techniques and follow-up, extending information re: the proper weeding time, proper fertilizer application, etc.

   b. facilitating the identification and introduction of new, shorter cycle, varieties of all crops concerned.

   c. facilitating the introduction and adoption of new farming implements which would lower the dependence on the men's equipment.

   d. helping with the marketing of rice seed produced by the individual growers.

   e. working with the problem of poor soil fertility.

5. According to the CDAs The On-Farm Seed Project should:

   a. continue to provide training re: rice and millet production.

   b. expand the numbers and times of their visits and include visits to fields where rice cultivation is actually taking place.

   c. help identify new, shorter cycle, rice varieties and farming implements which can be extended to farmers by the CDAs.

V. Recommendations:

1. In order to better understand the adoption rate by farmers of the new varieties and of the row seeding CDAs should randomly follow the plots of several farmers (equal parts those who

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have worked with SCF and those who have not) to determine over one year the percentage of those farmers who row seed and plant improved rice varieties.

2. If it appears that new varieties are being adopted at a good rate, CDAs' roles should change from being seed suppliers to being agents who extend improved techniques for the cultivation of rice. Periodically CDAs should carry out some sort of follow-up to determine if it is time to introduce a new technique. This should be dependent on the adoption rate of the last technique introduced.

3. CDAs should try to work with men so that the men are supportive of the introduction of new techniques for rice cultivation.

4. OFSP should modify its training as the needs of the CDAs change. (i.e. as techniques are adopted by farmers, OFSP should respond by offering training in other techniques so the CDAs can pass these on to farmers.)

5. OFSP should increase its field visits to CDAs' farmers fields. These visits should be used to provide hands-on (in the field) training to CDAs and to help trouble shoot technical problems encountered by the CDAs.

6. SCF and OFSP should work to facilitate the identification and extension of new rice seed varieties (shorter cycle, etc.) and also identify and facilitate the extension of new farm implements that may help farmers carry out desirable technical aspects of rice cultivation.

7. The introduction of new techniques should continue to be done by the demonstration method. This method of using farmers to demonstrate the new seed variety, new technique, etc. seems to work very well. All the farmers who adopted the new variety and/or new technique did so because they had seen the variety/ technique in a demonstration plot and were impressed by it. Also, the area where row seeding is most widely practiced, The Nuimis, has experienced almost 10 years of row seeding demonstrations. In the Nuimis area GARD was actively promoting row seeding of upland rice before SCF started work there. This experience lends credence to the belief that demonstrations over time will lead to adoption by those seeing the method, if the method is truly better.

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Notes from SCF:

Falou N'Jaye:

Adoption rate of practices is higher than think. SCF only concentrating on multipliers and demo plots. Others who have not worked with SCF are also using the techniques and seeds.

This year will start to shift focus from demos and multiplication to extension of new techniques.

People do store seed def. from food.

People do select seed to some extent. Multipliers and demo farmers do from center of field, etc. (millet)

Other farmers do by head length.

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Appendix H

"General Guidelines to Build a Data Entry and Verification System for the OFPEP Project" by Robert Deuson, September 1992

General Guidelines to Build a Data Entry and Verification System for the OFPEP Project

Robert Deuson
September 1992

Introduction

These guidelines are adapted in part from Tatian,[1] with specific examples drawn from the consultant's field observations in Senegal in September 1992. They are meant only as suggestions. The proposed data entry and verification system represents the outer shell of the new Management Information System (MIS) that Winrock and its partners propose to build as a means of monitoring, evaluating and documenting the OFPEP Project (see diagram).

The data entry and verification system will be designed to record three types of data: (1) baseline data; (2) end-of-Project (EOP) data; and (3) extension-research data. All three types of data will concern the On-Farm Seed (OFS) activity as well as the Living Soils Outreach (LiSo) activity.

In the first section, I discuss the different types of data to be collected, entered and verified for both activities (OFS and LiSo). In the second section, I discuss typical procedures for organizing, entering and verifying data from questionnaires and secondary sources. In the third section, I discuss data file management and exchange among the OFPEP participants. In the fourth section, I compare several types of data base management systems (i.e., software) and attempt to assess their appropriateness to the tasks and for the collaborators. I conclude with some recommendations, especially with respect to hardware and software procurement and management and with respect to training.

Hoping to enhance readability, I used the first person throughout this report. I do not mean to imply that I did all the work by myself. It is obvious that without the support of the OFSP staff (Tom Osborn and Alphonse Faye) and that of the Winrock collaborators, this report would not exist. All omissions, errors, and opinions found herein remain, however, mine.

Special thanks are due to David Keley, Associate Director for Country Program, Peace Corps, and Peace Corps Volunteers Christopher Bopp, John Vrey, Huges Hogan, and Larry Phipps, stationed in Passy, for inviting me to their rice fields to witness first hand their collaborative work with Winrock. Their kindness and generous hospitality was very much appreciated.

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1 "Designing a data entry and verification system." Peter A. Tatian, Microcomputers in Policy Research 1. International Food Policy Research Institute, 1992, 65 pp.

Section One: Types of Data

Three types of data need to be collected during the next five years: baseline data, extension-research data and end-of-project data. These data need to be collected for several purposes. Baseline data permit extensionists to establish a benchmark against which they will measure progress attributable to their actions. Baseline and end-of-project data will permit project evaluation and monitoring. By extension-research data, I mean information that permits the extensionists (i.e., Winrock staff and their collaborators) to "research", i.e., assess rigorously, the impact of extension on yields, incomes, and overall welfare of the target populations as well as measure the "spread effect" of their activities. Of course, extension-research information may also be used in monitoring the project.

These three types of data should be collected with various frequencies. Table 1 contains an array of suggested data collection patterns.

These data collection patterns and frequencies are of course examples of what could be done. The final type, amount and frequency of data to be collected needs to be determined ultimately by the technical staff.

For example, "demonstration domains" (i.e. target areas) need to be delineated carefully through a zoning exercise prior to install demonstration trials. The information for the OFS activity is probably already available. For the LiSo activity, baseline zoning is essential. Without it, the final impact of that activity on the demonstration domains may not be assessed. For one proposed technology, "deep phosphating", soil improvement in the 4th year needs to be assessed.

I suggest that a socioeconomic profile of the target farmers be established in the first year through a one-time "light and quick" survey, reassessed at project mid-term (30 months), and updated in the fifth year. The objective here would be to help us understand the levels of income and access to resources (land, labor, inputs, credit). This profile would be done on a sex-disaggregated basis.

Demonstration trials of the type implemented in the OFSP have been successful and will likely be continued in the second phase and initiated for the LiSo activity. It is essential that we know well the plots and soils on which these trials are conducted. In addition to the agro-climatic data already collected in this type of trials, I suggest that we collect a modicum of socioeconomic data such as mean labor time (on a small sub-sample) by major cultural practice being implemented, input and output prices, potential opportunity cost of labor (all of this on a sex-disaggregated basis). Even if the project is essentially targeting low-input subsistence farmers, this information will be useful in assessing the sustainability of the technologies being demonstrated and their potential income generation should these technologies yield a marketable surplus. The data may also be used to perform risk analysis and some simple farm-based policy analysis.

Table 1. Data collection by type and by activity: suggested patterns and frequencies.

ACTIVITY	TYPE OF DATA		
	BASELINE	EXTENSION & RESEARCH	END OF PROJECT
ON-FARM SEED:			
- demonstration domains (DD)	zoning (1)	none	impact on DD:1
- socio-econ profile	once	mid-term (1)	final (1)
- demonstration trials	plot survey	E&M[1] @ year	4+1 year aggregate
- spread effect	none	@ year	final (1)
- sustainability	none	mid-term (1)	5th year w/o intervention
LISO:			
- demonstration domains	zoning (1)	4th year P_2O_5	impact on DD (1)
- socio-econ profile	once	mid-term (1)	final (1)
- demonstration trials	soil survey	E&M @ year	soil fertility enhanc.
- spread effect	none	@ year	final (1)
- sustainability	none	mid-term (1)	5th year w/o intervention

[1]Evaluation and Monitoring

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The "spread effect" should be measured each year and at the end of the project. Number of farmers by sex and age adopting the proposed technologies and the surface areas planted with that technology should be recorded. One interesting study is being conducted in the Passy area by a Peace Corps Volunteer: farmers are stratified according to the degree of technology adoption and parameters enhancing or retarding adoptions are identified in each group. I am not suggesting this kind of study be done everywhere but if a collaborator is interested in doing one, the project should support him/her.

Sustainability monitoring is imperative now with USAID. Indicators of sustainability need to be developed with the collaborators and with USAID. See the concept paper by Rod Kite. I suggest that for some technologies (e.g., composting, manuring, row seeding), the fifth year be used as a test of sustainability: OFPEP and its collaborators leave it up to the participating farmers to implement or not the technology demonstrated in previous years while monitoring and evaluation continues on all plots. If the technology is abandoned, a rapid appraisal survey may be used to determine the causes of abandon.

Summary. In this section, I suggested that a modest amount of data be collected during the five-year OFPEP project. "Extension-research" data need to be collected to allow us to monitor demonstration trials. Baseline surveys are necessary to establish a bench mark which will be compared with end-of-project impact assessment. For both activities (OFS and LiSo), I propose to collect data in five categories: (1) the demonstration domains (where are the fields and are they representative of the target area?); (2) the socioeconomic profiles (who are the people who cultivate those fields and what is their level of access to productive resources?); (3) the demonstration trials (how well do the technologies fare in the hands of our farmer-collaborators?); (4) the spread effect (which farmers adopt the technologies? How many of them? Why or why not?); and (5) the sustainability (what happens when we leave? Can this project be replicated elsewhere?)

Section Two: Procedures

This section is divided into four parts: (1) questionnaire design; (2) data files; (3) data entry and verification; and (4) use of secondary data. The discussion follows Titian with some notable adaptation to the OFPEP case.

Questionnaire Design

Questionnaire design must be preceded by careful survey planning. Survey planning includes: model specification, pretesting, and estimating data entry requirements.

To specify an analytical model, the questions to be answered by the research must be clearly articulated. Summary tables that will contain the descriptive statistics calculated from the collected data must be laid out. When more sophisticated analytical models are to be used (e.g. stability analysis in seed trials) they should be completely specified to make sure that the data to be collected are adequate to carry out the necessary computations.

All questionnaires should be pretested to insure the suitability of the questions and to develop lists of coded response (see below).

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The time needed to process data needs to be estimated carefully. Formulas to do so are offered in Titian (p. 4). In addition, I recommend that statistics be kept on the actual time needed to process the data in order to improve the estimates.

Most questionnaires are made up of two parts: the header and the body. the header appears at the top of each page of the questionnaire and contains information that applies to the entire questionnaire such as: name of farmer-collaborator, type of demonstration trial, field and plot numbers, date, etc. the body of the questionnaire contains the descriptive data itself, i.e., the information collected on the parameters of interest.

Where qualitative values are used (e.g. crop harvested, type of in-kind payment, sex of labor used), numeric values must be used to represent qualitative responses to the questions. These values are called codes. They serve two purposes: they standardize responses to questions and they simplify the analysis of data. Certain rules apply in developing codes. First, always find out if similar codes have not yet been developed and if so, evaluate whether they can be adapted to your study. This may save you a lot of time and aggravation. Second never let enumerators create new codes in the field as the need arises: these codes would not be standardized across the survey. Third, never give a new meaning to an existing code, but rather assign a new code number to each new response. Fourth, develop and continuously update and disseminate a common code book to be used by all enumerators and analysts.

Recommendation. I strongly recommend that the OFPEP staff examine a copy of ICRISAT (for dryland crops), WARDA (for rice) and TROPSOILS (for LiSo) code books and assess whether elements of each could not be concatenated into a comprehensive OFPEP code book.

An important issue in designing code books involves distinguishing between missing interviews, responses, or data items and zero interview, responses, or data items. In a missing interview, there is no way of telling whether the activity under scrutiny (e.g., seed usage) has taken place. Likewise, a missing response is a nonresponse and a missing data item is a case where a specific data item for a particular transaction is missing. A missing value code is then entered in both the questionnaire and the data file. For example in SPSS PC+ a system missing value, indicated by a period (.) allows SPSS to automatically exclude missing values from statistical computations.

A zero interview, on the other hand, means, for example, that a particular household did not use a given seed variety. A zero response means that it is known that a particular activity did not take place. A zero data item means that its value is actually equal to zero. Thus it is generally a bad practice to use zero as a missing value.

Summary. All questionnaires must be developed following a careful plan. The end use of the data must be kept in mind: a model must be specified and the data to support it carefully built up into the questionnaire. The questionnaire must be pretested. An estimate of the time necessary to process questionnaire should be made. Each page of the questionnaire should start by a header. The body of the questionnaire should contain alphanumeric, descriptive answers (string variables) as well as precoded numeric answers. Care should be taken in distinguishing between missing responses and zero responses. A code book, based on existing code books and adapted to the present situation, should be

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developed, pretested, and scrupulously maintained and disseminated on a continuous basis to the users.

Data Files

In this section, a case is made for: (1) setting up data files before collecting data, and (2) for adopting a relational data base model.

A data file is a set of related information stored together and accessible through the use of database management software. Data files receive a unique file name which identifies each one of them. The most usual way of organizing the data in a file for analysis is in a rectangular file (or flat file) in which columns represent variables (the basic types of information, e.g., name, age, sex, etc.) and rows represent particular sets of values for each variable. A row is called a record.

A data file must be organized before collecting data. This tactic has at least two advantages: (1) it allows the analyst to use space very efficiently, i.e. without having to repeat redundant information; and (2) it allows the analyst to determine the levels of data and key variables and thus create a relational data base model (see below).

The level of a data file is the way in which file records are classified in that file. To define the level of the data in a file, the file must include key variables which identify uniquely each data record among all other records. Key variables must be unique so that no two records should have the same combination of values for the key variables. Variables that are not key variables are called attribute variables.

For example, in the OFS demonstration trials, data are collected at the village, household and person level. Hence there is a single record in the data file for each household member in each village. Key variables may be: the village, the household, and the person. Attribute variables may be: the seeding date, the seeding density, and the yield.

Once the data has been organized in rectangular (flat) data files based on levels, these flat data files may be related to each other through the use of key variables. The result of such an operation is known as a relational database model. For example, assume we have two rectangular data files: one on households participating in the seed trials and another on collaborators (person) participating in those same trials. We may want to add the average age of the household to the household-level data. First, the person-level file must be aggregated by village and by household, taking the mean of AGE to create a new variable, AVG_AGE. The aggregated file can then be merged with the household data file. The resulting file is a relational data file. Aggregation is thus the process of combining into a single record all the records in a file with the same values for a subset of key variables.

Summary. The final form of the data should be considered when the questionnaires are being designed. The structure of all data files must be set before the data collection begins. First, a set of rectangular files must be developed. Questionnaire data should be separated by levels which may mean separating the data from a single questionnaire into several files. The level of the file is defined by key variables that uniquely identify each

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file record. Second, rectangular data files should then be combined as needed by the analysis into a relational database model.

Recommendation. It is highly recommended that an MIS consultant be brought in at the onset of the project to develop a relational database model in collaboration with project staff and collaborating NGOs. This is especially important if baseline and ECP surveys are to be undertaken.

Data Entry and Verification

Following Titian, the process of data entry and verification involves seven steps which are briefly described below. These steps are:

1. Reception of questionnaires
2. Questionnaire preparation
3. Data entry
4. Range and rule checks
5. Interrecord checks
6. Interfile checks
7. Visual inspection

The procedures described below should be consigned to a loose-leaf notebook procedures manual to serve as a reference to all staff.

Step 1: Reception of Questionnaires. The questionnaires should be collected periodically from the enumerators and separated into batches by type. For example, all soil fertility questionnaire should be put in one batch, all seed variety inventory questionnaires in another batch, etc. Once separated into batches, questionnaires are sorted by their key variables and numbered sequentially. This numbering should continue from one batch to another for the same type of questionnaire. No two questionnaires of a given type should have the same number.

Once the questionnaires have been sorted by batch and numbered, a data entry and verification form is attached to each batch. The form is used to record the completion of the different steps in the data entry and verification process. In addition, the receipt of the questionnaires is recorded in a logbook (see Titian, figs. 14 & 15 for examples).

Step 2: Questionnaire Preparation. Questionnaire preparation consists in the following actions. First, each questionnaire is visually inspected for missing or inconsistent information or entries that simply "don't look right". This must be done by the field enumerator, the field supervisor, and the data analyst. The motto here is "the sooner, the better", i.e. a problem caught at that point will save much time and energy later on.

Second, the preparer either writes in all codes if the enumerator has not been asked to do so or writes in missing codes and verifies the exactness of codes already written in, in the case the enumerator is asked to write in the codes.

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Third, the preparer uses the Questionnaire Preparation Form to record any problems that requires further explanation from the field enumerator. This form carries in its header: the name of the preparer, the questionnaire ID number and the batch number. In its body, we find: the questionnaire number, the village code, the household code, the date, and the requested clarification. The preparer then sends the form with copies of the contested questionnaires to the field enumerators.

Note that the data entry should proceed once the preparations have been completed. The corrections to the contested questionnaires can be made when field enumerators have had a chance to answer the preparer's questions.

Step 3: Data Entry. The following simple rules apply: (1) each batch should be entered into a separate set of data files; (2) the data file name should include both the name of the questionnaire and the batch number, e.g. SEED01.DBF; (3) the data entry operator should enter all the data for one level before proceeding to the next level.

Step 4: Range Checks and Rule Checks. There are two different types of data errors: (1) data entry errors and (2) inconsistent and missing data. Data entry errors are mistakes made while entering data from the questionnaire into the computer. When information was entered correctly from the questionnaire but some of the data are missing or "do not make sense" when compared with other information, we have the second type of errors. Data entry errors can be fixed by changing the data file so that it agrees with the questionnaire. Inconsistent and missing data problems can be fixed by consulting other sources, e.g. the enumerator or the respondent. When correcting missing data, both the data file and the questionnaire should be corrected.

Range checks verify the value of individual variables. For example, if they are only 2 varieties of rice seed available (the traditional one and the DJ12-519 variety), the range for the variable SEED will be 1,2. That is a code of 3 for seed will be detected and flagged by the program. This will be the case for discrete (coded) variables. A range should also be defined for all continuous variables (numeric variables). For example, if it is known that the price of rice never falls below 70 FCFA/kg and never rises above 130 FCFA/kg, the range for the variable PRICERIC will be defined as: 70 THRU 130. Any Price below 70 or above 130 will be detected and flagged.

Rules specify relationships between different variables within the same data record. They are used to identify three types of problems: missing data, mathematical relationships, and conditional relationships. Rules are written in the language used in the software utilized, e.g. dBase programming. Examples are given in Titian (p.38), using SPSS. A log should be kept to record an outstanding problem detected by these range and rule checks.

Step 5: Interrecord Checks. These involve comparisons between values from different records but within the same data file. Among other errors, interrecord checks permit the detection of out-of-sequence records or double records. Out-of-sequence records could indicate that an observation is missing or that a value for a key variable was entered incorrectly. Double records occur when the same record on a questionnaire is entered twice. Depending on the software used, a report writer could generate a list of all out-of-records or double records detected in a data file.

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Step 6: Interfile Checks. This check permits comparison of different data files. For example, a program can be written to make sure that information on key variables (e.g. household) is exactly replicated in two different data files.

Step 7: Visual Inspection. There are some data errors a computer cannot detect. For example, the computer cannot detect if an entire record of data is missing nor can it detect if the exact value was entered correctly. Therefore, it is necessary to either perform a record-by-record visual inspection of each file or alternatively enter all data files twice and compare both files. This latter process is called double entry.

Summary. Seven steps are necessary to enter the data and verify the accuracy of this process. Step 1 involves organizing questionnaires in batches, numbering them and recording their receipt. Step 2 is questionnaire preparation: each questionnaire is checked for missing and inconsistent information and any anomaly is recorded and sent to the field for resolution. In step 3, each batch of questionnaire is entered into a separate set of data files. In step 4, range and rule checks are performed to detect data entry errors and inconsistent and missing data. Interrecord checks and interfiles checks are performed in steps 5 and 6, respectively. In the final step, a visual inspection of the data is performed. Alternatively, a double entry process could be used.

Recommendation. With so many collaborators, it is imperative that the OFPEP staff develop a set of standard procedures, which all agree to follow, in order to assure high quality and consistent data entry and verification. Such procedures should be consigned to a user's booklet and used for training the users. It is also recommended that one person in each organization be made responsible for the supervision of data entry and verification. It is further suggested that the person in charge of the data entry and verification system at OFPEP be a local hire permanent employee of the project.

Section Three: Data File Management and Exchange

Data file management and exchange consists of four tasks: (1) organizing data file on the hard disk; (2) documenting data files; (3) backing up data files; and (4) exchanging data files between collaborators.

Organization of Data Files. Organization of data files will be, to some extend, hardware-dependent. For example, the Peace Corps uses Macintosh products and therefore will have to name and organize files according to the icon structure of the Mac. All other collaborators may use DOS-based machines or Windows-driven screens. But whatever the system used, files should be named in a mnemonic manner. Suppose we have stored information on a baseline survey of soils in collaborating farmers' fields. We may then want to name such files with an abbreviation of the questionnaire name and its ID number, e.g. SOILSURV.Q01, for the first questionnaire on soil surveys (in MS-DOS). We can then sort the questionnaires by type (soil survey, household survey, etc.) and by ID number (Q01, Q02, ..., Q0N).

Files must then be grouped into directories and subdirectories. Again in DOS machines, main directories may represent major surveys, e.g. C:\SOILS.01; C:\SEEDS.02:

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C:\SOCIOECO.03, etc. It is a good idea not to mix data files and program files (that is programs written in dBase or SPSS to manipulate the data). This can be done by creating subdirectories such as: C:\SOILS\DATA and C:\SOILS\PROG. Likewise the C:\SEEDS\DATA and C:\SEEDS\PROG would be created, and so on. This parallel structure should be respected in the entire directory scheme. As a rule of thumb, do not keep more than 100 files in a directory.

Documenting Data Files. In a project such as OFPEP with so many collaborators, it is paramount to fully document all data and program files. Whether files contain directly entered data or have been created by manipulating and combining other data files (i.e. relational files). Data file documentation should contain the following information. In its header: file name, description, file format (e.g. Paradox), location on disk, eventually program that created the file, and number of variables. In its body: variable label (e.g. VIL), variable width (e.g. 3), type (e.g. numeric), and description (e.g. Village). A one-page data file documentation should be printed for each data file and filed in a loose-leaf binder.

Backing Up Data Files. Two rules apply: (1) every two weeks, a full scale backup of all data and program files should be performed, and (2) between the biweekly backups, a daily backup should be carried out using a set of rotating diskettes. Special software, such as FASTBACK, make such operations relatively painless.

Exchanging Data Files. Because Senegal has relatively good telephone lines and has access to an exchanger (SYNPAC), it is possible to plan for rapid data file exchange among the partners, provided they have the necessary modem and communication software. The alternative is of course the exchange of diskettes. Electronic mail presents the additional advantage of permitting data exchange with the collaborators' headquarters.

Summary. All files must be named in a mnemonic way and organized in parallel directories and subdirectories. Separate subdirectories should be created to contain data and program files. All data files must be documented using a data file documentation sheet, a copy of which should be filed in a loose-leaf binder. All files should be backed up biweekly and daily. Data file exchange is possible either through exchange of diskettes of through the use of electronic mail.

Recommendation. Data file management and exchange should be monitored by the MIS-designated person in each organization. The MIS-designated person in OFPEP should also take responsibility for developing, maintaining and disseminating among the collaborators a complete documentation of the data base.

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Section Four: Hardware, Software, and People Choices

In this section, I reviewed succinctly the hardware and software presently available to Winrock personnel and their collaborators and I make recommendations with regard to both. I also tried to assess who, in each organization, may have an interest in maintaining and servicing the data entry and verification system.

Winrock. Presently, the OFPEP has the following equipment: two 286 Zenith portables, one with a hard disk, and two 386 portables (a Zeos and a Digital DECpc 320P). While these machines are still serviceable, the Zenith without the hard disk should probably be replaced while the one with the hard disk suffers from screen fading. The DEC machine is the most advanced and most recently acquired one. However, unless one has fighter-pilot quality vision, the screen fonts are simply too small and working long hours on it can be tiring for the eyes. The Zeos is by far the best all around machine available at present to the project. In addition, the project owns an aging but serviceable Epson dot matrix printer (short carriage).

Software available includes: WordPerfect 5.1., DOS 5.0, Windows 3.1, MSTATC, Lotus 123, PROCOMM. Tom Osborn uses WordPerfect and PROCOMM and Alphonse Faye uses WordPerfect and MSTATC. At present no DBMS software is available to either of them.

Recommendations:

1. The available machines should be made more usable through the addition of inexpensive black and white station monitors.
2. Any new machine purchased should be equipped with readable screens and with an incorporated modem.
3. An additional Epson large carriage printer should be purchased to facilitate visual inspection of the data.
4. If funds permit, it would be advisable to acquire an MS-DOS work station equipped with a large disk (200 Mbytes). This will become necessary if the project hires a data entry and analyst person.
5. All computers should have at least 4 Mbytes of memory to operate Windows-based software efficiently.
6. If funds permit, a data entry/analyst familiar with (or willing to be trained in the use of) DBMS software and/or a statistical package should be hired. Eventually, if such person can be found, the analyst may also be the administrative assistant to the project.
7. The project should purchase both a DBMS software and a statistical package (more on choices below).

World Vision International. WVI has a few MS-DOS based machines and uses WordPerfect 5.1, Lotus 123 and Paradox. To manage its data base of sponsors and donors, WVI has developed a set of proprietory Paradox-based programs. Mr. Al Johnson is himself very computer-literate and uses PROCOMM and electronic mail software on a regular basis. Starting October 1, 1992, WVI will add Ms. Anna Frank to its staff in Senegal for a period of one year. Ms. Frank is a Paradox expert user. When asked if it might be conceivable to eventually use her talents to design an MIS in collaboration with OFPEP and to train its users, Mr. Johnson responded favorably.

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At present, Mr. Mansour Fall is the person most skilled at WVI in computer usage. He works closely with Dr. Ndiange Ndiange, the agro-climatologist of ISRA. WVI has already a tradition of data collection and compilation in collaboration with ISRA and AGRYMET.

Save the Children Federation, The Gambia (SCF/Gambia). SCF has six IBM-clone computers: one is used by the Director, one by the secretary (word processing), a third one to maintain a sponsorship data base and communication network, a fourth is used by Ms. Rose Naruru, Program Officer, in her research, the fifth is used for accounting and finance, and the last one is used to enter research information (such as 1000 questionnaires on AIDS currently being imputed). It appears that SCF has ample hardware to accommodate eventual data entry related to their collaborative work with Winrock.

Software owned by the SCF includes: dBase III, Lotus 123, WordPerfect 5.1, and Windows.

Two people are knowledgeable about computers: the Director himself, Mr. Abou Tall, and a trained statistician, Mr. Falu Djie. Ms. Naruru feels that both of them may be interested in collaborating with OFPEP in developing an MIS and receive training in its use. She agreed to discuss the matter with them in a preliminary fashion.

Christian Children Fund (CCF). IBM equipment is being used by CCF administration. The major use of this equipment is for the sponsor program and administration.

The equipment is also used to produce periodic reports to the *"Ministère de tutelle des ONGs"*. The person responsible for maintaining the data base on sponsors and on administrative and financial management of CCF is based in Togo.

In Senegal, there are four cadres. Two are interested in computer usage, including Mr. Niang, and would like to receive further training.

The Peace Corps. Their pool is comprised of: 15 Macintosh (Apple SE, Mac 2Fi, Mac LC), 2 laser printers, and 5 dot matrix printers. Peace Corps volunteers have access to 3 computers linked in a network via TOPS (a communication software). The other computers are used by administration and are linked together, and with the US-based headquarters, via modems (using MICROCOM and QUICKMAIL communication software.)

The Peace Corps has licenses for the following software: Microsoft Word 5.0, Microsoft Works 2.0, Excell 4.0, STATVIEW (used to compile the data collected on the rice demonstration trials conducted with Winrock), TOPS and QUICKMAIL, and FoxPro, a data base management system used by the administrator.

Recently, the Peace Corps has also ordered SOFTWARE BRIDGE 2.0.1, a file transfer program that allows file exchange between Mac and IBM machines.

Mr. Keley has expressed interest in being associated with the development of an MIS with Winrock.

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The Choice of Software

To implement a data entry system, three types of programs may be used: spreadsheets, data analysis packages, and database programs. the advantages and disadvantages of each type of program are reviewed briefly.

Spreadsheets. Spreadsheet programs may be used to enter data in a rectangular data file (i.e. rows and columns). Such programs, when used as data base management systems (DBMS), are relatively easy to use and to teach.

However, they suffer two major limitations. First, there is no provision for designing custom data entry screens. If unexperienced personnel is to be used to enter data, it would be best to use screens that mimic the actual questionnaire to facilitate data entry. Second, there is no automatic verification of data ranges at the time of data entry. The absence of this feature could render verification more laborious.

Spreadsheets are a good buy if used only for small data entry needs. Popular packages include: Lotus 123 (the industry benchmark), Excell (fast on Windows and well adapted to the Mac), and Quatro Pro (good graphics and incorporated printing features).

Data analysis packages. Popular packages such as SPSS/PC+ and SAS PC offer a wide variety of data manipulation and statistical procedures capabilities. However, they suffer from two drawbacks: (1) insertion of a new record in the middle of a file is impossible without adding it at the end of the file and resorting it; and (2) interrecord and interfile checks cannot be carried out using the data entry programs of these statistical packages.

Although SAS PC is definitely a formidable program, I do not recommend it for OFPEP and NGOs because the annual cost of the license is high and therefore may defeat our sustainability objective. If the license is not renewed, SAS is no longer usable. SPSS PC+ is also available in Windows version and offers good graphics.

Database programs. These programs offer many advantages: (1) they can create a wide variety of custom reports such as those showing different types of errors; (2) one can work with several data files simultaneously; (3) interfile checks (called table-lookup) can be carried out during the data entry process; and (4) they come with full programming languages, allowing the user to create "custom applications".

Their main disadvantage is that the use of their full features requires programming skills that are lengthy to learn. However, some packages, such as Paradox, are more user-friendly. dBase is the industry standard but harder to program. FoxPro is probably the fastest DBMS existing at present.

A table of features for these diverse spreadsheet, statistical, and DBMS packages is provided in Titian (p. 58). It should be noted that the collaborating NGOs do not necessarily need to adopt a common software. All of the above-cited software are capable of reading and writing a dBase file or and ASCII file format. Thus files could migrate from one program to another without loss of data.

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Recommendations

1. In choosing software, the power of the software should be balanced with its ease of use.
2. For the purpose of entering, verifying, and analyzing data of the type described in the first section, it is advisable that both a statistical package and a DBMS package be acquired by the OFPEP project and its partners.
3. Possibly the best statistical package for use in Senegal on DOS-based machines is SPSS PC+ for Windows: it is relatively easy to use (with Windows), powerful, widely used in West Africa, and carries only a one-time licensing fee. Mac users should probably stay with STATVIEW.
4. A good DBMS package for DOS machines is Paradox. World Vision uses it and has expertise in program development with it. Conceivably, World Vision may allow Ms. Anna Frank to train other users. Mac users may stay with FoxPro, also a good program.
5. A person with training in computers or with an interest in being trained, should be made responsible within each organization for the maintenance and the documentation of the data entry and verification system, this person will become the de facto "resource person" or resource person of the OFPEP/NGO network.
6. Training should be provided to the node persons in Paradox and SPPS PC+.
7. As an alternative to data transfer from the Mac to the DOS machines, OFPEP may provide at least one MS-DOS laptop to the Peace Corps for data entry in the field.

Summary. Winrock and its collaborators have already collected a critical mass of computer hardware and software and each organization has on its staff at least one person either with training, or interested in being trained, in data entry and verification. With some modest additions in hardware and software, Winrock and its partners could quickly acquire the capability of creating and maintaining a common data entry and verification system. Training, will have to be provided to individuals in each organization with an interest in becoming the "resource person" in the OFPEP/NGO network.

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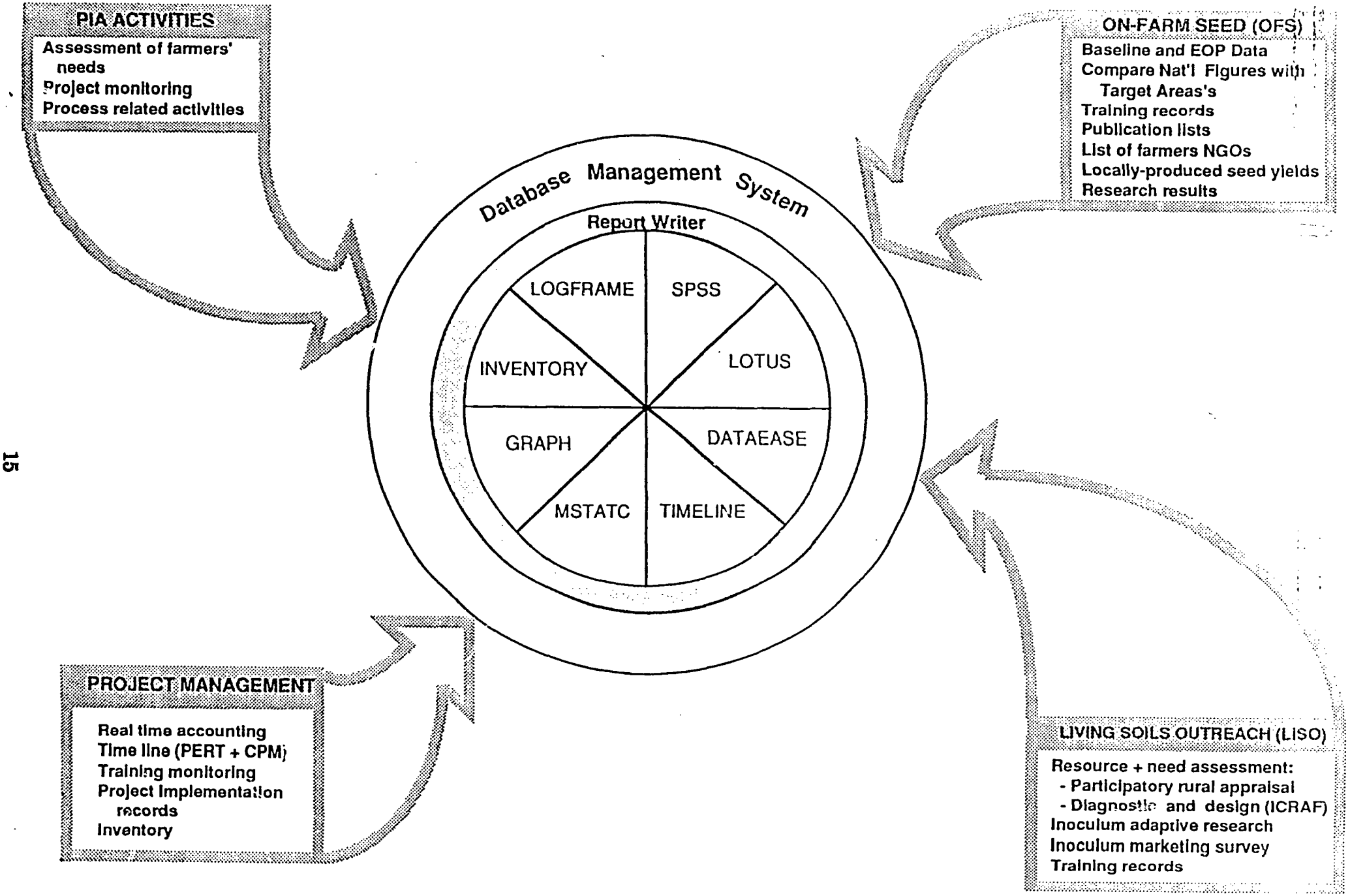
PIA ACTIVITIES
Assessment of farmers' needs
Project monitoring
Process related activities
ON-FARM SEED (OFS)
Baseline and EOP Data
Compare Nat'l Figures with Target Areas's
Training records
Publication lists
List of farmers NGOs
Locally-produced seed yields
Research results
Database Management System
Report Writer
LOGFRAME
SPSS
INVENTORY
LOTUS
GRAPH
DATAEASE
MSTATC
TIMELINE
PROJECT MANAGEMENT
Real time accounting
Time line (PERT + CPM)
Training monitoring
Project implementation records
Inventory
LIVING SOILS OUTREACH (LISO)
Resource + need assessment:
- Participatory rural appraisal
- Diagnostic and design (ICRAF)
Inoculum adaptive research
Inoculum marketing survey
Training records

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Appendix I

Publications List

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Publications List

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Faye, A., and Osborn, T., 1991, Using Farmer Participatory Research to Improve Seed and Food Grain Production in Senegal. Development Studies Paper Series, Winrock International, Morrilton, Arkansas.

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*Osborn, T., A. Faye and A. Johnston, 1990, Rice Seed Program With Farmers in the Dept of Bignona, Senegal. Winrock International and Peace Corps Senegal. Dakar, Senegal.

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Velysis, Krisitn, Murphy, Ken and Donaghue, Dean, 1991, The 1991 Wack-n-gouna Rice Report, Peace Corps, Dakar, Senegal.

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Training Materials

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Faye, A. and Osborn, T., 1991, Information Collection with Rice: Why, What, How, On-farm Seed Project, Winrock International, Dakar, Senegal.

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Appendix J

On-farm Seed Project in Senegal and The Gambia
Final Evaluation

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On-farm Seed Project in Senegal and The Gambia

Final Evaluation

AID/PVC Matching Grant
OTR-0290-A-00-7203-00

September 1992

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FINAL EVALUATION
of the On-Farm Seed Project
Senegal and the Gambia

Winrock International Institute for Agricultural Development
Joint PVO/University Center for Rural Development

Matching Grant OTR-0290-A-007203-00
Office of Private and Voluntary Cooperation
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Prepared by

Claudio Bragantini, Ph.D., Seed Specialist
William F. Schillinger, Ph.D., Agronomist

September 1992

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I. Executive Summary

The On-Farm Seed Project (OFSP) was a five-year pilot project, budgeted at $1.8 million, which made technical assistance available to small farmers through institutions that work at the "grass roots" level. In essence, the OFSP was a service to PVOs and the Peace Corps. The purpose of the project was to identify and promote among small farmers improved methods of selection, production, saving, and distribution of seeds. The project worked primarily with rice, millet, cowpea and, to lesser degree, groundnuts.

Because of the diversity of interests among PVOs, the OFSP had to adapt their services to fulfill the need of each organization. This proved to be a valid means of assisting PVO field personnel in the area of seed technology. This approach should be replicable, provided that training and technical assistance has the required flexibility to tailor services to each PVO's unique needs.

The OFSP, through PVO and Peace Corps programs, directly or indirectly benefitted people through seed multiplication, field demonstrations, and training programs. The number of project beneficiaries was not well documented and, therefore, was difficult to quantify. Conservatively, at least 65,000 small farmers were direct or indirect beneficiaries of the OFSP. Two-thirds of the beneficiaries were women. This emphasis on women was not foreseen in the Project Paper. Rather, the OFSP, Peace Corps, and collaborating PVOs recognized that rice, partially because it was a subsistence crop grown by women, had not received much attention and that the potential to increase rice yields existed.

Training in seed production and agronomic practices was provided to 560 PVO, government, and PCV extension agents via workshops, seminars, field days, and direct contact in the villages. This major component of the project was successfully accomplished.

Unlike the majority of seed production programs in developing countries, which focus on the development of national seed programs, the OFSP approach concentrated on the promotion of seed of improved varieties and on some simple seed selection and saving practices, emphasizing those with inexpensive inputs. Selection of seeds before harvest, saving seeds in the head, storing seed separate from grain, and sieving threshed seed to remove small seeds, are examples of the simple technology promoted by the project. However, since most of these practices were already part of farmers' traditional customs, the OFSP extended technical assistance to other equally important agronomic practices such as spacing, thinning, and timely transplanting.

The project proposal envisioned that "some communities would support local systems or seed production and distribution either through cooperatives or by individuals who establish private firms". This proved to be over optimistic. The OFSP worked primarily for the improvement of farmer-saved seed of subsistence crops. At this level, farmer-to-farmer seed exchange takes place almost exclusively in the form of barter, therefore, it was not realistic to expect much involvement by the private sector. However, community and individual farmer interest in local seed production systems is high. The new varieties

and modified agricultural practices which were introduced with project assistance have been spread by farmers to neighboring villages in both Senegal and The Gambia.

The unquestionable success of the OFSP in bringing technology closer to small farmers through collaborating PVOs and PCVs is an approach that should continue to be explored. The lessons learned from the OFSP should be directly applicable to the Phase II OFPEP activity and, hopefully, to other technical assistance based extension projects in developing countries.

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II. Introduction

The On-Farm Seed Project (OFSP) was a joint effort by Winrock International Institute for Agricultural Development (Winrock), the Center for PVO/University Collaboration in Development (the Center), various private voluntary organizations (PVOs), the American Peace Corps, and Mississippi State University (MSU). USAID supported OFSP through a matching grant that included contributions from Winrock and the Center. The OFSP was a five-year pilot project, budgeted at $1.8 million, which made technical assistance available to small farmers through institutions that work at the "grass roots" level. In essence, the OFSP was a service to PVOs and the Peace Corps.

The overall goal of the OFSP was to improve the nutrition, income, and well being of small farmers. The purpose of the project was to identify and promote among small farmers improved methods of selection, production, saving, and distribution of seeds and vegetative planting materials. The project sought to develop a cadre of persons from nongovernmental organizations (NGOs) and farmer groups who could be trained in seed production and who could manage the technical and training aspects of local seed enterprise development. The need for the project was justified by estimates that more than 90% of the crops in developing countries are sown from seed stocks selected and saved by farmers.

The OFSP was originally conceived as a U.S.-based technology transfer project which would work through field-based U.S. PVOs and PC convened by the Center. Senegal and The Gambia were identified as the countries of operation following AID approval of the project. The assumption that the field offices of PVOs would share the enthusiasm of their U.S. headquarters offices and the U.S. OFSP Advisory Committee proved to be over optimistic. Instead of finding in-country PVOs awaiting him as collaborators, the Project Leader, Tom Osborn, was met with lack of interest in, and awareness about, the project during his initial visits in Africa. As a result, the U.S. Advisory Council determined in 1988 that successful implementation of the project required an in-country presence. The Project Leader, who had previously been based in Washington, then moved to Senegal on a full-time basis. A second full-time in-country staff member, Alphonse Faye, was hired as Project Coordinator in 1989.

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III. Objectives of the Final Evaluation

The objectives of the final evaluation were to assess the following:

A. The "process" approach of the OFSP as a valid means of implementation and basis for an on-farm seed production model or methodology.

B. The degree and kind of participation in the field of project collaborators and the development of seed production networks.

C. The training and technical assistance activities of the project.

D. The technical component of the project.

E. Project administration and logistics.

F. To make recommendations for monitoring, implementation, and evaluation of the On-Farm Productivity Enhancement Project (OFPEP) based on lessons learned during the OFSP.

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IV. Observations and Findings

A. The OFSP Approach

The approach of the OFSP was two fold: (1) it was a collaborative project in which all activities were implemented through PVOs and PC, and; (2) it was participatory in that the traditional seed production techniques and problems were examined with the farmers before activities were undertaken. The long-term goal of the OFSP included the development of "a model or models of on-farm seed production systems which can be replicated or adapted for use in other areas". The OFSP provided services to PVO/PC field personnel, established models of collaboration, and explored new organizational arrangements. This approach was examined from several viewpoints:

1. Replicability

Because of the diversity of interests among PVOs, the OFSP had to adapt their services to fulfill the need of each organization. This proved to be a valid means of assisting PVO field personnel in the area of seed technology. This approach should be replicable, provided that training and technical assistance has the required flexibility to tailor services to each PVO's unique needs. The OFSP developed basic training packages in seed production and in rice agronomy which they then modified to fit the needs of their particular audience. In some cases, the OFSP provided technical assistance in crop production and extension rather than in seed production at the request of the PVO. This was the case with the Peace Corps program in southern Senegal, where volunteers concentrated their efforts in testing new rice cultivars and promoting improved agronomic practices, giving seed production a lower priority.

2. Innovativeness

Most seed programs in developing countries target the larger farmer as potential recipient of their technology and, as a consequence, they are the main beneficiaries. The approach of the OFSP was to make small farmers the priority target of the project. Instead of presenting to farmers an entirely new "agricultural package", the OFSP provided training, helped conduct demonstrations in farmers' fields, and tried to teach them "how to do better what they have been doing for centuries". The project worked at the "grass-roots" level, where PVO field staff and PCVs living in villages provided the linkage between the OFSP and the target farmers.

3. Sustainability

The sustainability of the OFSP approach was appraised from several viewpoints:

- The Farmer. New cultivars that were introduced through the project are spreading to neighboring villages via traditional farmer-to-farmer seed exchange.

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- The PVOs. PVOs are generally committed to long-term development activities. Most of their staff are permanent employees of national origin. Thus, training PVO personnel has good potential for long-term payoffs.

- Crops. There are genetic and physiological differences among the crops promoted by the OFSP which are a major concern for determining how often seed stock needs renewal with good quality source seed. Rice, being self-pollinated, less subject to damage, and fairly easy to store, can be handled by farmers for a longer period before requiring a replacement with source seed. Millet, being a cross-pollinated crop, and cowpea, being more susceptible to insect damage, will require new source seed more frequently.

4. Farmers Involvement

The OFSP and PVOs used a participatory approach which involved farmers in the identification of seed related problems. It also encouraged the establishment of lead farmers in each village. Lead farmers received training in seed production practices and were encouraged to diffuse improved practices and new crop cultivars to their neighbors. Lead farmers played a central role when groups assembled to discuss seed production. Farmers' willingness to work together, however, appears to be limited to organizational matters, because communally managed seed plots were not nearly as well maintained as seed plots managed by individual farmers.

5. Personnel and Logistics

The Project Paper envisioned that training and technical assistance for the OFSP could be effectively provided on an "as needed" basis from the United States. This proved to be unrealistic. The U.S. Advisory Council made a wise decision to move the Project Leader and the project office from the Winrock Washington Regional Office to Dakar. The project would have no doubt experienced less delay in start-up activities if the Project Leader had been located in-country from the beginning. The Project Leader demonstrated admirable determination and perseverance in getting the OFSP off the ground and running. Alphonse Faye joined the OFSP in 1989, bringing to the project a wealth of experience in rice production and training and a valuable connection with ISRA, his former employer.

Travel to field sites was restricted when Mr. Faye joined the project because the project had but one vehicle, a two-wheel drive car. An additional (four-wheel drive) vehicle would have greatly facilitated field travel of the OFSP staff.

The assumption made in the Project Paper that the Project Leader would establish systems of liaison with International Agricultural Research Centers (IARCs) for sources of new varieties was not realistic because IARCs test and diffuse new seed varieties through the National Agricultural Research Systems (NARS). More appropriately, the OFSP worked with varieties already released by the NARS. Technical assistance was drawn from national sources and from the AID centrally funded Millet and Cowpea Collaborative Research Support Projects (CRSP).

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B. Project Beneficiaries

The OFSP provided training, technical assistance, and other services to PVOs and the Peace Corps which enabled their personnel to more effectively implement their respective agricultural development programs in Senegal and the Gambia. Project beneficiaries, therefore, included both PVOs, Peace Corps, and small farmers.

1. PVOs and the Peace Corps

Safe the Children Federation (SCF), The Gambia. SCF has a diverse program in health, food production, and education in the North Bank division of The Gambia. Approximately 30% of SCF's resources are devoted to agricultural activities, which are focused on helping 10,000 women farmers in 24 villages to increase food production through gardening, introduction of new rice varieties, animal traction, and seed multiplication. The OFSP assisted SCF since 1988 by: (1) training field staff and farmers in seed production, post harvest handling, and rice production; (2) providing technical assistance in rice agronomy; (3) participating in annual food production workshops and; (4) assisting in the planning of seed multiplication and demonstration activities. In recent years the OFSP reduced its training activities and concentrated more on technical assistance in rice agronomy and introduction of short-cycle rice varieties. SCF rice activities have involved 11 villages with 2900 women. In 1990, there were 25 contract growers producing rice seed in 10 villages. In 1991, there were 117 contract growers in 20 villages producing seed on 21 hectares. SCF plans to expand the rice program to new villages.

The SCF Director, Mr. Abu Tall, reported that they always had an excellent working relationship with the OFSP and that SCF is looking forward to playing a lead role in The Gambia in Phase II. Mr. Tall feels that iron toxicity and salt water intrusion in rice fields should receive priority attention in The Gambia under the On-Farm Productivity Enhancement Project (OFPEP).

Freedom From Hunger Campaign (FFHC), The Gambia. FFHC is working with women rice growers in 32 villages of the Lower River, North Bank, and MacCarthy Island North Divisions in the Gambia. FFHC has concentrated on rice production in swamps and tidal areas, where their focus is on introducing new rice technologies, improving rice quality, promoting water harvesting, controlling salt water intrusion, and strengthening village institutions. The OFSP began collaborating with FFHC in 1988 by providing seed production workshops to their field staff. In 1990 the OFSP helped FFHC develop their program in animal traction by identifying a farmer from the Casamance of Senegal who then trained women farmers in the FFHC program on animal traction techniques. OFSP assistance to FFHC in 1991 included further rice training for field staff, field visits, and collaborative testing of a prototype rice seeder. The OFSP also helped evaluate the overall FFHC program and design the 1992 work plan.

The FFHC Project Leader reported that he was extremely pleased with assistance received from the OFSP. He further reported that FFHC is looking forward to continued collaboration during Phase II, particularly in the areas of: (1) technical assistance in rice agronomy; (2) program planning and evaluation, and; (3) demonstration of new technologies in farmers' fields.

Catholic Relief Service (CRS), The Gambia. The OFSP provided basic seed training to 14 CRS field staff in 1988-89. CRS participated in the seed program management seminar in 1989 and the formation of the OFSP Advisory Council. The CRS Agricultural Program Officer served as chairman of the OFSP Advisory Program. An in-country matching grant was provided to CRS for a cowpea seed production training based on field visits in conjunction with MSU.

Catholic Relief Service, Senegal. The primary involvement of the OFSP with CRS in Senegal was with their Seed/Cereal Bank Program which involved the construction of 15 metric ton capacity seed/cereal stores in 256 villages. The OFSP assisted in the mid-term evaluation of the CRS training program that was carried out in villages following construction of the village seed/cereal stores. As a result of the evaluation, modifications were made in the training program. In addition the OFSP participated in a Rapid Rural Appraisal (RRA) in 2 villages to assess the impact of the village seed stores in 1990. The OFSP also participated in the final evaluation of the training program for the seed/cereal stores in 1991. CRS participated in the formation of the OFSP Advisory Council.

World Vision (WV), Senegal. WV has an integrated development program of water, agriculture, and health in the regions of Louga and Thies in northern Senegal serving over 320 villages with a population of 150,000. These northern regions of Senegal served by WV have become increasingly marginal for agriculture because of limited rainfall (250-300 mm per year), widespread deforestation, and decline in soil fertility. The OFSP conducted several training sessions for WV staff and farmers. Twenty five WV staff initially received training by OFSP. Forty "Bush Consultants" (lead farmers who are responsible for demonstrations and seed multiplication with farmers in five villages) also received training. In addition, OFSP conducted training sessions on seed multiplication for farmers in 5 villages. WV conducts millet and cowpea demonstrations and seed multiplication in 35 villages. About 25 metric tons of improved varieties of millet and cowpea were stored by farmers in 1991. In addition, WV purchased 2 metric tons of millet and cowpea seed from contract growers in 1991, which was then conditioned in Bambay and resold to farmers in 1992.

Christian Childrens Fund (CCF), Senegal. The OFSP worked with the CCF agricultural program in 5 villages in the Thies and Mbour regions. In collaboration with CCF staff, a farmer survey was carried out in 1991 to identify seed related practices and problems in millet. As a result of the findings, farmer training and field visits were carried out with CCF staff and 10 contract farmers in each of the 5 villages focusing on improved methods of farmer seed production and selection. As a result of the training and field visits, CCF village staff are monitoring the production of millet seed in farmers' fields.

Peace Corps. The OFSP has provided formal training for 106 PCVs in Senegal and the Gambia. Peace Corps/Senegal (PC/S) and the OFSP had very close ties since the beginning of the project. PC/S assigned dozens of PCVs to work with womens' rice production in southern Senegal in the departments of Kolda, Sedhiou, Nioro, and Foundiougne. After gathering information from farmers, PCVs promoted improved rice varieties, improved nursery management, early transplanting of seedlings, and other management practices. The new varieties and improved agronomic practices are being accepted by farmers and this technology is rapidly spreading to new villages.

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The technical capability of PCVs in the Casamance region of southern Senegal was surprisingly good, considering that most were generalists with little or no previous experience or training in agriculture. Their technical skills were, without question, increased several fold by the frequent presence of Alphonse Faye, OFSP coordinator and rice agronomist, by their side in the field. Mr. Faye and Associate Peace Corps Director (APCD) David Kelley frequently traveled together to visit PCVs in southern Senegal. Third year PCVs appeared to be especially competent, not only in rice agronomy, but in cultural and language understanding as well.

In contrast to the strong collaboration between OFSP and PC/S, close ties did not initially develop with Peace Corps in The Gambia. Although the OFSP provided formal seed production training for new PCVs who would work with rice as a secondary activity, OFSP's support was not requested for Peace Corps/The Gambia field activities. This further reinforces the point that, despite agreements and assurances issued from headquarter offices in the U.S., the type and degree of collaboration with PVO/PCs is decided at the local level.

2. Small Farmers

The OFSP, through PVO and Peace Corps programs, directly or indirectly benefitted people through seed multiplication, field demonstrations, and training programs. The number of project beneficiaries was not well documented and, therefore, was difficult to quantify. Conservatively, at least 65,000 small farmers were direct or indirect beneficiaries of the OFSP (Tables 1 and 2). Two-thirds of the beneficiaries were women. This emphasis on women was not foreseen in the Project Paper. Rather, OFSP and collaborating PVOs/PCVs recognized that rice, partially because it was a subsistence crop grown by women, had not received much attention and that the potential to increase rice yields existed.

For many of the farmer beneficiaries, going hungry during part of the year is a reality of life. Growing enough food to feed their family during the "hungry season" is often their number one worry and concern (Leisz, 1992). If project donors wish to judge the OFSP by the criteria of benefiting the "poorest of the poor", then the project, by this standard, was a glowing success.

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Table 1. Number of People Trained by OFSP and Farmer Beneficiaries of Training.

	Senegal		The Gambia	
	Men	Women	Men	Women
Peace Corps	36	43	10	17
NGO Extension Staff	200	50	137	44
Gov. Extension Staff	60	0	54	6
Farmer Beneficiaries	11340	5600	4400	15500

Table 2. Number of Demonstrations Completed and Farmers Who Observed Demonstrations.

Type of	Senegal			The Gambia		
Demonstration	No.	Men	Women	No.	Men	Women
Rice	371	550	9990	240	320	10360
Millet	308	3000	500	0	0	0
Cowpeas	145	3000	500	50	80	1020
Groundnuts	40	270	60	0	0	0

C. The Technical Component

1. Data Gathering and Baseline Survey

The project proposal anticipated that information should be gathered to "establish benchmarks as a basis for later evaluation and to identify geographic areas and seed problems in which project interventions were likely to make a significant difference". As observed during the mid-term evaluation, baseline data collection did not take place as proposed. As PVOs are often more interested in "doing something" than they are in collecting data, perhaps it was over-optimistic to expect PVOs to carry out activities that were not a high priority on their agenda. On the other hand, it does not appear that the OFSP really emphasized baseline surveys with the PVOs. This is not to say that baseline data were not collected at all. Detailed information about rice varieties, yields, local seed practices, etc., were collected by PCVs in southern Senegal, but as this was geared towards defining ecologies for rice production, it was not directly applicable to the measurement of project achievements.

Project impact assessment is becoming so important that the classic process of measuring inputs and counting outputs is no longer considered adequate. USAID seems to be especially interested in knowing who exactly is benefiting from their projects. Thus, the monitoring process has to be fundamental component of the project and not just activated when project evaluations are conducted.

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2. Training

It was written in the Project Paper that "the major products of project activity will be individuals trained in the fundamentals of seed selection, production, storage, and distribution. These individuals will be farmers, local seed specialists, staffs of participating PVOs, and Peace Corps volunteers". Training was indeed the main service that the OFSP provided to PVOs and PCVs. It was accomplished through workshops, seminars, field days, and direct contact in the villages.

The methodology to access the effectiveness of this important project component was through interviews with PVO field personnel and farmers, respectively the primary and the ultimate recipients of this program. Considering the fact that most PCVs have little or no background in agriculture before joining the Peace Corps, their overall knowledge concerning the basics of seed technology and rice agronomy was very good. This can be explained by the high quality training which the PCVs received from Peace Corps and from the OFSP and, perhaps most importantly, by their obvious desire to do meaningful work in their villages. Other field people (NGO extension agents, bush consultants, etc.) which were interviewed also demonstrated competence for the level of village needs. However, since most of them had an agricultural background, the assessment on the effectiveness of the OFSP training program was more difficult.

It can be concluded that the major component of the OFSP, training of PVO staff and PCVs, was successfully accomplished.

3. Quality of Technical Assistance

Since training of PVO staff and PCVs was the OFSP's "raison d'etre", technical expertise was extremely important to the success of the project. This technical expertise was provided by: (a) the competence of both the project leader and the project coordinator who, by having different backgrounds, complemented one to each other; (b) Winrock's institutional capability to administer agricultural projects, and; (c) the association with Mississippi State University.

The quality of OFSP technical assistance was assessed through interviews with PVO/PC administrative and technical staff and through review of training materials and training evaluations. All those interviewed expressed a high degree of satisfaction with both the appropriateness of the technical message and the teaching method. Evaluations by training recipients were also, for the most part, very favorable. Technical assistance quality was also evidenced by; (a) the FFHC and CRS requesting the project leader's assistance to evaluate their programs, and; (b) the project coordinator's widespread respect as a rice agronomist. Many PVOs have expressed their interest in continued technical assistance during Phase II.

4. Seed Production

Unlike the majority of seed production programs in developing countries, which focus on the development of national seed programs, the OFSP took a thoughtful and conservative approach concentrating primarily on the promotion of seed of improved varieties and on some simple seed selection and saving practices. Introduction of new varieties was carried

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out through demonstration plots and field days, where farmers could see and judge with their own wisdom whether the improved varieties and/or practices were worthwhile.

Seed related agricultural practices were sapiently kept at low levels, concentrating on those with inexpensive inputs, such as: selection of seeds before harvest; saving seeds in the head; keeping seed separate from grain; and sieving threshed seed to remove small seeds. However, since most of these practices are already part of farmers' traditional customs, the OFSP extended its demonstrations to other equally important agronomic practices such as spacing, thinning, and timely transplanting.

The OFSP worked primarily with rice, millet, cowpea and, to lesser degree, groundnuts. The project did not promote vegetable cuttings (cassava, yams, and potatoes) nor vegetable seeds as was originally envisioned in the Project Paper. Rice, cowpea, and groundnuts are self-pollinated, which makes it inherently easier for small farmers to produce genetically pure seed. Millet, however, is a cross-pollinated crop which requires special precautions for plot isolation and plant selection to maintain genetic purity.

It appears that farmers in the SCF impact area in the North Bank Division of The Gambia as well as in the Casamance region of Senegal are skilled in maintaining varietal purity in rice. The was evidenced in the Casamance by some Chinese varieties, introduced in the early 1970's, which are still in use and seem to be well maintained. When asked about off-types present in their fields, farmers expressed reluctance to rogue them and reported that it was easy to remove off-types at time of harvest because each panicle is harvested separately by hand.

In the Project Paper it is written that "the longer term goals of the project include development of a seed production network in each country" and that one of the project's outputs would be that "some communities will support local systems or seed production and distribution either through cooperatives or by individuals who establish private firms". These goals proved to be over optimistic. It would have been very difficult for the project to develop a seed production network because it worked with individual PVOs and PCVs in location-specific impact areas. Instead, individualized seed production support activities were established with each PVO. In addition, it must be remembered that the OFSP focused on improving farmer-saved seed of subsistence crops. At this level, farmer-to-farmer seed exchange takes place almost exclusively in the form of barter and does not involve cash. Community and individual farmer interest in seed production systems is high, but as money is not involved, it is hard to imagine a role for private firms.

The collaborative approach the OFSP used can go even further than the relationship with PVOs and take advantage of other organizations. An example is the Programme Autonome Semenciere (PAS) which is constructing small seed warehouses in the WV impact area in northern Senegal. These community seed warehouses will certainly increase farmers' capability to store their own seeds.

5. Demonstrations Versus Trials

The OFSP assisted PVOs and PCVs to conduct 1050 demonstrations in farmers' fields during the LOP. The OFSP was wise to promote simple demonstrations rather than "scientific trials" because: (1) the level of technical expertise among PVO/PC collaborators

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was limited; (2) many demonstrations can be conducted for the same level of effort required to conduct just a few trials; (3) technology introduced into villages by the project was, in general, already well tested, and; (4) demonstrations are simple to conduct and provide farmers the opportunity to make a side-by-side comparison between improved and local technology.

The project on one occasion conducted a replicated trial. In 1989, six different peanut storage treatments were tested under farmers' conditions at eleven sites (i.e. PCV villages). The trial was relevant to the needs of farmers and was well thought out. The directions provided to PCVs for carrying out the experiment were clear and concise. Following completion of the trial the OFSP tabulated mean values from the data and published the results. In this instance, where the study was clearly an experiment rather than a demonstration, the results would have had much more meaning if the data had been treated to simple statistical analysis to determine if differences between treatment means were indeed significant.

6. Varietal Introduction

It was envisioned in the project proposal that one of the OFSP purposes was the "introduction of new crops, as well as improved varieties of traditional crops". Many projects in the past have tried to increase crop production by promoting new cultivars together with other inputs. When these projects ended, the farmers frequently returned to their traditional varieties and agricultural practices. In contrast, the OFSP strategy was first to understand the traditional production system and then suggest changes that were compatible with it.

In areas where traditional varieties of millet were best for local conditions, techniques for improvement of the traditional varieties was promoted (i.e. seed screening, plant selection for seed, thinning, etc.). In northern Senegal, where traditional varieties were no longer adapted because of reduce rainfall, earlier maturing improved varieties were introduced. Farmers near Louga reported that the early maturing millet varieties not only improved their yields compared to their later maturing local varieties, but also reduced the number of weeding operations required from three to two. These new millet varieties were appreciated by farmers in northern Senegal.

Improved cowpea varieties for both grain and forage use were introduced in northern Senegal by WV and are being being well accepted by farmers.

For the OFSP, rice was a challenging crop because of the diversity of ecologies, varieties, and cultural practices under which it is grown. When the project started, collaborators were already involved with this crop in both Senegal (PC) and The Gambia (SCF). When Alphonse Faye joined the project this crop received further emphasis because, while an ISRA breeder, he helped develop several improved rice varieties that were well adapted to the target area. The main characteristics of the introduced rice varieties were: (a) photoperiod insensitivity; (b) early maturity, i.e. more adapted to the present rainfall regime; (c) shorter stature, and; (d) resistance to rice blast.

7. Agronomic Practices

The OFSP helped promote direct seeding of rice in rows using animal traction and a simple seed drill manufactured in Senegal. Row seeding allows women to weed their rice fields early, whereas with broadcast seeded rice early weeding is hard to accomplish because rice is difficult to distinguish from grassy weeds during the juvenile stage. The project also promoted the use of hand-pulled row markers for line sowing when a seed drill was not available. A further recommendation was that row spacing be reduced to 20 cm to optimize plant population. This technology appears quite valid and is being adopted by farmers. The only drawback to these new methods seen in the field was that the seed drill planted rice at too high a rate and tended to clump seed. This is because the seed drill was designed for crops with large seeds such as peanuts and maize.

An interesting sociological change is taking place in the SCF geographic area of The Gambia where animal traction and seeders are used. Rice production has always been viewed as strictly womens' work. Animal traction has always been mens' work. Now that line sowing rice with an animal-drawn seeder is becoming popular, men are starting to plant rice for the women, an activity in which they had previously never been involved.

The major OFSP recommendations for transplanted rice were to: (1) use a variety suited for the particular ecology; (2) apply cattle manure to the rice seed bed for supply of plant nutrients as well as to facilitate uprooting of seedlings, and; (3) transplant seedlings after 21 days to promote the production of panicle bearing tillers. These technically sound and practical recommendations are the backbone of the Peace Corps rice program in southern Senegal. The rapid expansion of rice varieties and agronomic practices introduced by Peace Corps/OFSP in southern Senegal provides ample evidence of the appropriateness of these technologies.

Farmers producing millet seed for WV in northern Senegal may not getting optimum benefit from their use of fertilizers. Seed growers are applying all their fertilizer (14-7-7 NPK and urea) on the soil surface after crop emergence. They do this because there is no land preparation prior to planting millet. Farmers generally seed millet into dry soil before the onset of the rainy season (this frees time after the rains begin to plant other crops) and therefore can not incorporate fertilizer below the soil surface. Also, because sowing millet into a dry seed bed often results in spotty and generally inadequate stand establishment, farmers may be reluctant to "waste" fertilizer before plant emergence. The issue here is that phosphorous and potassium are not being incorporated beneath the soil surface where they would be available to plant roots.

D. U.S. Based Collaborative Organizations

1. Winrock International

Winrock, with overall management responsibility, provided technical assistance, allocated project funds, and provided general project back stopping. The home office coordinator devoted between 10-12% of his total time to OFSP activities, which included: submission of the annual report; visiting project staff in Africa an average of two times each year;

general project coordination; and, networking with universities and organizations concerned with the OFSP.

The project funded a full-time U.S. based program assistant during the first half of the project. This position was reduced to .50 FTE when the project coordinator, Alphonse Faye, joined the project in 1989. The Project Leader, Tom Osborn, who has been with OFSP since the beginning, was initially based in the U.S. but moved to Dakar, Senegal during the second year.

OFSP staff reported that, in addition to excellent field support provided by the home office coordinator and program assistant, they also received strong support from the commodity procurement and personnel sections of Winrock.

2. Mississippi State University

The MSU Seed Laboratory faculty supported the project through annual visits to the project sites. These faculty (James C. Delouche, Joseph Cortez, Charles Baskin, and Charles Vaughan) provided a wide range of services, including: preparation of training materials; conceptualization of the advisory councils; technical assistance; and general technical support to the project. In addition, the Project Leader travelled to MSU on four occasions for assistance in writing technical documents.

It was stated in the Project Paper that the " project will evaluate seed multiplication and saving practices by on-site observations as well as tests under simulated conditions in the Seed Laboratory at Mississippi State". No tests involving simulated conditions at the Seed Lab at MSU were conducted as U.S plant quarantine laws did not permit informal importation of plant material. However, previous peanut seed research and current millet seed research conducted at MSU was useful to the project.

OFSP staff gave MSU very high marks for the support provided to the project, and felt that MSU's close involvement helped provide the necessary credibility to the project.

3. The PVO/University Center

The PVO/University Center played a major role in developing the initial concept for the OFSP. It was envisioned that the Center, as the umbrella organization of the U.S. PVO network, would serve as an effective link with PVOs in Senegal and in The Gambia. This linkage did not develop as expected because in-country PVOs, in general, develop their programs locally. It became apparent during the first year that the OFSP needed to negotiate separate working relationships in-country with each interested PVO. Therefore, the PVO/University Center activities in the OFSP focused mainly on the publication of the quarterly project newsletter "Seed Sowers". The Center's responsibilities will be greatly expanded during Phase II of the project. These responsibilities include: a .75 FTE U.S. based Project Coordinator; a .25 FTE U.S. based Information Specialist, and a full-time Process & Linkage Specialist based in Senegal. It is expected that, with this substantial increase in staff and funds over Phase I levels, the Center will play a much more important role in Phase II.

V. Lessons Learned and Recommendations

The unquestionable success of OFSP in bringing technology closer to small farmers through collaborating PVOs and PC is an approach that should continue to be explored. The lessons learned from the OFSP should be directly applicable to the Phase II OFPEP activity and, hopefully, to other technical assistance based extension projects in developing countries. With this in mind, the following lessons learned and recommendations are discussed:

A. Policy and Methodology

1. The Project Paper was over ambitious in envisioning that small farmers would be "producing a surplus of quality seed for resale" and that "private firms" would be involved. Farmer-to-farmer seed exchange takes place almost exclusively by barter. As money is not involved, it is hard to imagine a role for private firms. Similarly, expectations for private sector involvement in the soil fertility related activities in Phase II should be realistically appraised. For example, although prospects for private sector production of rhizobium bacteria may exist, research must first be conducted to generate strains and the development of a market for it may take many years. Of course, any opportunity that may appear for private sector involvement should be readily explored.

2. The OFSP made a wise decision promoting simple demonstrations of proven technology in farmers' fields rather than attempting to coordinate a "scientific" field trials. This lesson should be equally applicable in the OFPEP. PVOs need simple "farmer ready" technology. OFPEP's role is to help PVOs and PCVs extend these simple technologies to farmers.

3. Experience gained during OFSP clearly demonstrates that: (a) project administration and technical assistance must be located in-country to be effective, and; (b) working agreements with PVOs are made at the local level on an individual basis.

4. Before beginning activities under Phase II, the OFPEP should establish formal protocols with each collaborating local PVO. These agreements should outline a common goal and, to the extent possible, specify the perceived duties and commitments of OFPEP and the PVO throughout the life of project.

5. As the PVO/University Center will play a crucial role in the OFPEP, it is recommended:
   a. that the U.S. Advisory Council revise the scope of work for the .75 FTE Project Coordinator to more clearly define the duties and responsibilities for this position.
   b. that the full-time Process and Linkage Specialist based in Senegal have a graduate degree in soil fertility or closely related discipline. A person possessing both excellent technical <u>and</u> communication skills would be a valuable project asset.

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6. As was the case with the OFSP, the OFPEP will focus on training PVO staff and PCVs. OFPEP staff will need to prepare an entirely new basic "can do" training program and strategy in soil fertility management. The development of this new training program(s) will require considerable effort and should receive a high priority.

7. It appears that as the larger PVOs increase their level of sophistication and "savoir-faire", they are better realizing the importance of measuring project impact. It should, therefore, be feasible for PVOs to conduct structured baseline data collection (to be used as a benchmark) during the first year of collaboration with the OFPEP. Recommendations for conducting OFPEP-PVO baseline surveys are:
   a. Negotiate the commitment of each PVO to collect baseline data and include, if possible, in the formal OFPEP-PVO protocol.
   b. Concentrate efforts in villages that are representative of the PVOs geographic area and in which the PVO plans to implement OFPEP project activities throughout the LOP.
   c. Focus information collection in domains that can be quantified and in which OFPEP hopes to make significant contributions.
   d. Include soil analysis to determine micronutrient and organic carbon status from selected plots in the baseline survey (see technical recommendation no. 4).

8. Donor agencies need to exercise restraint when supporting PVO development activities. In addition to the OFPEP, USAID/Senegal has two large natural resource related projects coming on line which will be implemented by Africare and Oregon State University. All three projects plan active collaboration with in-country PVOs. There is a danger that these projects will collectively overwhelm local PVOs with training, technical assistance, and monetary support beyond their capability or capacity to absorb.

9. The OFSP, unlike many centrally funded AID projects in Africa, was not a management burden to USAID in either Senegal or The Gambia.

B. Technical

1. Farmers in the Casamance region of Senegal are having some difficulty in naming the introduced cultivars DJ 12-519 and DJ 684D, which are their breeding line numbers. Since numbers are hard to memorize, farmers are calling them both "djibellor", which is the name of the research station where they were developed. Although farmers are able to differentiate these cultivars by hull color, it is recommended that not only these two varieties, but each new cultivar introduced, receive a meaningful name which will allow farmers to easily distinguish it from other varieties.

2. WV is presently purchasing improved seed from the Programme Autonome Semenciere (PAS) and then selling this seed at a subsidized rate to farmers. WV is also transporting seed purchased from contract growers to Diourbel for conditioning, and then selling the seed back to farmers at a subsidized price. WV's involvement has made quality seed of improved varieties available to small farmers, but farmers

are now dependent of WV to supply their improved seed. For the sake of sustainability, WV should explore opportunities for promoting seed conditioning, storage, and marketing activities within farmer groups.

3. For planting rice with the animal powered seed drill, the diameter of the holes in the seed feeder plate (which controls seed flow in the drill) needs to be reduced and the number of holes in the plate increased. These modifications should reduce the seed rate as well as provide for more uniform distribution between rice seeds in the row. These modifications would, of course, need to be tested before they were recommended to farmers.

4. Because of widespread soil micronutrient deficiencies, the OFPEP should, as part of the baseline survey, measure surface soil micronutrient and organic carbon status from selected participant farmers' plots. These data, in addition to identifying fertility related problems which the project will need to address, would also provide excellent benchmarks to measure the project's ultimate achievements.

Appendix A
Acronyms Used

AID	Agency for International Development
APCD	Associate Peace Corps Director
CCF	Christian Childrens Fund
CRS	Catholic Relief Services
CRSP	Collaborative Research Support Project
DAR	Department of Agricultural Research, The Gambia
FAO	Food and Agriculture Organization
FFHC	Freedom From Hunger Campaign
FTE	Full Time Equivalent
IARC	International Agricultural Research Center
ISRA	Institut Seneglais de Reserches Agricoles
LOP	Life of Project
MSU	Mississippi State University
NARS	National Agricultural Research System
NGO	Non-Governmental Organization
OFPEP	On-Farm Productivity Enhancement Project
OFSP	On-Farm Seed Project
PAS	Programme Autonome Semencier
PC	Peace Corps
PC/S	Peace Corps/Senegal
PCV	Peace Corps Volunteer
PVO	Private Voluntary Organization
PVO/PC	Private Voluntary Organization/Peace Corps
RRA	Rapid Rural Appraisal
SCF	Save the Children Fund, USA
USAID	United States Agency for International Development
Winrock	Winrock International Institute for Agricultural Development
WV	World Vision

Appendix B
Persons Contacted

Name	Title	Organization
Dr. Pierre Antoine	Director, Africa Div.	WI, Morrilton, Arkansas
Ms. Aminata Badian	Soil Scientist	ISRA/Bombay, Senegal
Ms. Ansata Balde	Farmer	Diali Kounda, Senegal
Mr. Lamin Ceesay	Community Dev. Agent	SCF/The Gambia
Mr. Kebba Ceesay	Community Dev. Agent	SCF/The Gambia
Mr. Swen Christensen	Technical Advisor	FAO/The Gambia
Mr. Tom Cosier	Good Seed Mission	The Gambia
Mr. Burang Dango	Ass. Food Prod. Officer	SCF/The Gambia
Mr. David Delgado	Deputy Ag. Dev. Officer	USAID/Senegal
Mr. Amador Dia	Agric. Prog. Coordinator	WV/Louga, Senegal
Ms. Bakhya Dia	President, Farmers Club	Ndieye Ndiaye, Senegal
Mr. Assane Diagne	Director	CCF/Senegal
Mr. Abacar Diouf	Regional Controller	DPCS/Louga, Senegal
Mr. Saliou Diot	Regional Coordinator	PAS/Louga, Senegal
Ms. Binta Djamadjo	Farmer	Boudjemar, Senegal
Mr. Donald Drga	Chief, Agric. Division	USAID/The Gambia
Ms. Carfo Dumfa	Farmer	Boudjemar, Senegal
Mr. Ameth Fall	Extension Specialist	WV/Louga, Senegal
Mr. Samba Fall	Project Manager	CRS/Senegal
Mr. Lamin Fatty	Community Dev. Agent	SCF/The Gambia
Mr. Alphonse Faye	Project Coordinator	OFSP/Senegal
Ms. Julia Gamble	Peace Corps Volunteer	Sedhiou, Senegal
Dr. Elon Gilbert	Agric. Economist	Banjul, The Gambia
Mr. Ablaye Gueye	Bush Consultant	Pallene Ded, Senegal
Mr. Momodou Jammeh	Project Director	FFHC/The Gambia
Mr. Lance Jepson	Chief, Agric. Division	USAID/Senegal
Mr. David Kelley	Assoc. Director, Agriculture	Peace Corps/Senegal
Dr. Rod Kite	Agricultural Economist	USAID/Senegal
Mr. Steve Leisz	Intern	OFSP/Senegal
Ms. Khady Leye	Bush Consultant	Kaudala, Senegal
Ms. Rose Maruru	Program Officer	SCF/The Gambia
Mr. John McPeak	Peace Corps Volunteer	Kolda, Senegal
Mr. Louis Mendy	Ass. Extension Officer	FFHC/The Gambia
Mr. Ousmane Ndiaye	Bush Consultant	Ndieye Ndiaye, Senegal
Mr. Lamin Niang	Ag. Program Coordinator	CCF/Senegal
Mr. Falu Njie	Program Manager	SCF/The Gambia
Mr. Tom Osborn	Project Leader	OFSP//Senegal
Mr. Solomon Owens	Program Officer	CRS/The Gambia
Mr. Marcel Pieira	Seed Specialist	WV/Louga, Senegal
Ms. Fatu Sakho	Farmer	Dar Salem, Senegal
Mr. Pape Sall	Bush Consultant	Maka Ndiaye, Senegal
Mr. Abu Tall	Director	SCF/The Gambia
Mr. Victor Usin	Peace Corps Volunteer	Tankanto Mawnde, Senegal

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Appendix K

Final Advisory Council Meeting Minutes

Final Meeting of the Advisory Council
On-farm Seed Project

Monday, September 21, 1992, 10:30 a.m. to 1:00 p.m.
Winrock International, Rosslyn, VA

Present: Pierre Antoine (Winrock International), Frank C. Byrnes (Winrock International), James C. Delouche (Mississippi State University), Ellen Fennell (Winrock International), Robert Gurevich (PVO/University Center), Sallie Jones (USAID/FHA/PVC), Earl D. Kellogg (Winrock International), Sarah H. Luche (Winrock International), Raymond Meyer (USAID/R&D/AGR), Suzanne Rucker (ACDI), Mark Smith (Africare), Mark Ufkes (Winrock International), Ben Way (Peace Corps).

On the agenda was:

I. Introduction

II. OFSP goals, objectives, purpose, approach, management/organization, staff, partners funding, achievements, beneficiaries, outputs, final evaluation, recommendations/conclusions

III. OFPEP nature of project: OFSP and BNF and more, themes, focus, regions, organization/partners, funding

I. Introduction

Pierre Antoine chaired the meeting. He asked all the participants to introduce themselves by name and professional affiliation. Antoine welcomed the participants. He reminded us that the project comes to an end in 10 days. Earl Kellogg, Winrock International Senior Vice President, then shared with the participants his vision for programs like the On-farm Seed Project (OFSP) in Africa. He stated that organizations and institutions like ours are dedicated to alleviating poverty and hunger in the world. They operate in similar fashion by responding to Requests for Proposals. Meeting participants represent institutions that have to find resources and work with the resources we have. We are partners with the Agency for International Development and other donor institutions. Looking down the road, he said, cooperation and collaboration will be essential. The challenges Africa faces will require major efforts in important programs.

II. OFSP

The participants reviewed the historical perspectives of OFSP development. Winrock had discussed with staff of the PVO/University Center important agriculture needs being met by a low input approach. Together these two organizations came up with the goals, purposes and objectives that revolved around identifying and promoting improved methods of selecting, producing, storing and distributing seeds and vegetative planting materials to small farmers. Working with PVOs, NGOs, and Peace Corps was the best approach to benefit farmers since it involved training which has a "snow ball" effect.

There was a wish to involve private sector seed production. Frank Byrnes, Winrock Senior Associate, reminded the group of the long courtship of Winrock with the PVO/University Center and candidate countries. It meant a lot of patience and tolerance on the the part of program planners in order to bring the project about.

Eventually, the Project Leader, Thomas Osborn, became responsible for OFSP. He stayed in Washington, DC for 2 years and was one-half time in Senegal and The Gambia and one-half time in the United States. Osborn moved to Senegal in 1989 and shortly thereafter hired a lead researcher from ISRA, Alphonse Faye, to the project as Project Coordinator. Seed technology activities were backed up by MSU. Project backstopping was transferred to the Winrock headquarters in January 1990. Antoine then discussed project funding, stating that USAID/PVC is the sole source of external funding. Winrock, the PVO/University Center, and MSU are providing a 50% match.

Copies of the final evaluation report were distributed. According to the report, the project beneficiaries were the PVOs,and Peace Corps directly; such as, Save the Children Federation (SCF) in The Gambia, Freedom from Hunger Campaign (FFHC), Catholic Relief Services (CRS) in The Gambia and Senegal as well as local partners Caritas, Lutheran Relief Services, and Rodale. Peace Corps provided an important vehicle for the project, also becoming a major beneficiary.

There were some surprises concerning indirect participants, the farmers: female farmer participation was well above expectations. Antoine insisted the Advisory Council should anticipate a Phase II emphasis on WID. Sallie Jones of USAID/FHA/PVC mentioned that the project would benefit from hiring a female staff person in planning and implementation.

The roles of the collaborators were discussed. Robert Gurevich, of the PVO/University Center mentioned that the project had depended on the different strengths of collaborators. The discussion shifted to the various in-country activities, and their technical support needs. When baseline surveys were mentioned, Kellogg emphasized the need for collaborators to stay focused on the project objectives. Because the collaborators have been involved in in-country activities together there has been a high degree of satisfaction and a wish to continue the partnership. Because of its excellent resources and support the project has developed credibility, and has been recognized for quality technical assistance.

There were several technical questions posed by the evaluators concerning methods of stock rejuvenation, and the utilizations of local mechanisms. James Curt Delouche of Mississippi State University, interpreted this to mean that OFSP had understood that some indigenous farming practices are good and promote sustainability. The OFSP private sector development objectives was considered over ambitious by all. The evaluators suggested that OFSP explore promoting seed production networks and development through cooperatives and private firms. Antoine mentioned that an obstacle to private sector development is that there is little agricultural credit available to small farmers, although some have produced surpluses. Seed plots of propagated materials for the community could be set up, particularly for cross-pollinating crops advised Delouche.

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Then, the participants discussed the theme of research which was to recur throughout the meeting. The underlying issue was the focus on demonstrations rather than trials. The group acknowledged that research means successes and failures, and that demonstrations have proven successful in the ecozones where the project has been working. The project would also have to study the consequences of introducing new technologies into the social system; for example, through the use of animal traction men now have a role in rice culture in some regions.

The OFSP "Lessons Learned" were also discussed. Antoine summarized them as follows:

1. private sector involvement; OFSP participants have not reached a stage of producing seed for resale
2. separate trials and demonstrations will be implemented rather than coordination of scientific field demonstration
3. formal agreements that specify roles and duties and responsibilities, will be made among collaborators and implementors
4. one of the roles of the PVO/University Center is in extension methodologies, but it is felt that staff working on the methodologies should also possess a very strong technical background (e.g., agroforestry or soil management).

The Gambia program will again differ from the Senegal program as the Peace Corps, on whom the project depends, is not allocating agricultural volunteers in 1993. The Peace Corps will allocate agriculture volunteers in 1994. It was stated in the evaluation report that there exists a limit to Senegal's ability to absorb additional USAID-funded PVO activity, and that there are already numerous PVOs operating in-country. Another issue was OFSP's relationship to USAID/Senegal and The Gambia. Participants concurred that OFSP was not a management burden to USAID.

The group discussed the results of PVO and NGO involvement with OFSP. Winrock, as lead agency, would be interested in doing additional studies on this subject. Whether direct beneficiaries truly gained and the nature of their benefits remained an important question throughout the meeting.

III. OFPEP

Antoine handed out the map, "On-farm Seed Project Activities in Senegal and The Gambia, 1988-92", a figure depicting the roles and responsibilities of implementing institutions of the On-farm Productivity Enhancement Program (OFPEP), and figure depicting a database management system.

OFPEP can be considered Phase II of OFSP, and of the Biological Nitrogen Fixation (BNF) project, a project implemented by the Living Soils Consortium comprised of Africare, ACDI, CARE, Pan American Foundation, SCF and Winrock, and initially funded by USAID/R&D. Three of consortium members will implement OFPEP as in-country lead agencies. They include ACDI in Uganda, SCF in The Gambia, and Winrock in Senegal.

OFPEP, in addition to having a new program focus, needs a new elaborate information documentation system, marketing studies, and standardized M&E. These will be the Center's responsibilities. Winrock will provide a technical assistance pool from Senegal.

Winrock will establish a Memorandum of Understanding (MOU) with Africare/Senegal, who will undertake the BNF, as well as with World Vision/Senegal. The PVO/University Center has activities in Burkina Faso and will attempt to bring in OFPEP activities in that country. Gurevich stated that one of the Center's role is in information dissemination so that all can participate more effectively. The Center may utilize the SANREM-CRSP database. Gurevich mentioned that the implementors have a variety of African research sites. The Center will remain a proactive partner, becoming very involved in the decentralized decision-making process. Collaboration, he urged, has to be effective.

Again the group discussed the theme of trials versus demonstrations. For food crops, the locally produced rhyzobium inoculum outperforms the imported kind. The project should persuade local research institutes or other entities to isolate and multiply the local strains. As of now, research institutes do not have inoculum production activities. In this area, it would be useful to conduct both demonstrations and trials. Delouche informed the participants that the project would have to cultivate the beneficiaries (farmers) in these trials and demonstrations since they have multi-use criteria. The project must keep these trials and demonstrations and the data they generate separate. OFSP, the group agreed, must openly support research in the new phase.

Raymond Meyer of USAID/R&D/AGR said that the project requires beneficiary information which it could gain from the SANREM-CRSP, the peanut CRSP of the University of Georgia and ACDI's NifTAL in Uganda. The OFPEP could study the results of the FAO chemical fertilizer project in The Gambia in terms of the credit systems that focus on sustainability and the management practices used. Meyer gave many suggestions for additional linkages. Among these, OFPEP should access information from INTSORMIL and Tropsoils. In the future, it would be very important for the project to look at private sector and gender linkages.

The participants returned to the subject of OFPEP funding. USAID/PVC has only a limited amount of funding and therefore the project will be looking for additional donor support. From USAID/PVC the project had $800,000 including the match. Antoine anticipated that implementors, including Winrock, will submit a minimum of two proposals this year to other funding entities. Ellen Fennell is in touch with philanthropic organizations to sound out new financing opportunities and Winrock staff have met with private sector firms, such as Kellogg, Pioneer, and Monsanto. Antoine raised the issue of reconciling the project goals with those of these companies. Global 2000 staff have demonstrated interest for cooperation with OFPEP, however their methodologies are somewhat antithetical to the low-input focus of OFPEP.

Byrnes suggested that the project could look like a funnel, where we bring many resources to bear in target activities. We need to provide research facilities, ask the right questions and provide possible answers. Jones responded saying that all resources and initiatives must respond to the grassroots needs. Farmers need direct access to good information. The project must define its working modus operandi of getting information to the farmers. Antoine agreed stating that Winrock in its projects with several collaborators had served as the linkage between research and farmer. This is a catalytic role that has become a part of Winrock's identity as a PVO.

The meeting participants discussed resources that the project could call upon. OFSP evaluator, Claudio Bragantini, a Brazilian, has connections to ENBRAPA. Winrock has had seed activities in Indonesia and Nepal that would serve the Uganda project site well. Byrnes summarized that OFPEP addressed farmer productivity by recognizing that he/she needs good seeds, and soil fertility. Water management, the group agreed, is the next logical addition to the project.

Mark Smith stated that OFPEP/Africare expects to work in the communities where Africare has ongoing activities. Ben Way expressed his wish that OFPEP collaborate with the Peace Corps/The Gambia in its privatization activities, small-scale enterprise and input supply activities. The meeting ended in participants expressing their wishes and the ways for closer collaboration.

The first meeting of the OFPEP Advisory Council will likely be called during the first part of December.

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