On-farm Productivity Enhancement Program
Fourth Annual Report

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Winrock International Institute for Agricultural Development

in cooperation with

Center for PVO/University Collaboration in Development
Agricultural Cooperative Development International

October 30, 1996

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WINROCK INTERNATIONAL

February 3, 1997

Ms. Sallie Jones, Chief, Matching Grants
AID/FDC/PVC
1515 Wilson Boulevard, Room 725
Rosslyn, VA 22209

Dear Sallie:

On behalf of Winrock International, the Center for PVO/University Collaboration in Development, and Agricultural Cooperative Development International, I am pleased to submit ten copies of the fourth OFPEP Annual Report (six for your office, and one for the AID Mission in Senegal, Kenya, Ethiopia, and Uganda.

Given the increasing complexity and scope of the program, and the more demanding reporting requirements set up by Winrock and the PVO/University Center for the project, this year, this final draft of the report has taken a little longer to compile than initially anticipated. We hope, however, that this did not inconvenience you too much and that the preliminary draft that was sent to you in October 96 provided some useful information.

Overall, I am personally very happy with the achievements of Year IV: the number of participating institutional partners and smallholder farmers substantially increased, as compared to the previous years; the activities in Ethiopia received a positive audience and generated much interest among farmer communities; program monitoring generated more quantitative impact indicators than ever before.

Moreover, OFPEP received complementary financial support from other institutions/donors in 1996: Monsanto Corporation provided Winrock with funds to strengthen the weed control/soil management component of OFPEP in Senegal; IFAD provided a large three-year grant to WARDA/Winrock to study the impact of OFPEP's approach on the diffusion of rice technologies in Senegal, The Gambia, and Côte d'Ivoire; COOPIBO (a Belgian NGO) supported the distribution of virus-free, improved cassava varieties in eastern Uganda; FICAH continued its support of OFPEP activities and approach in western Kenya.

I will be glad to provide you with additional information, if necessary.

Sincerely,

Pierre Ph. Antoine
OFPEP Program Director

jf
c: M. L. Surgi, Center for PVO/University Collaboration in Development
J. Walton, Agricultural Cooperative Development International
M. Onim, OFPEP Coordinator, East Africa
A. Faye, OFPEP Coordinator, West Africa
Senegal/Kenya/Uganda/Ethiopia country teams

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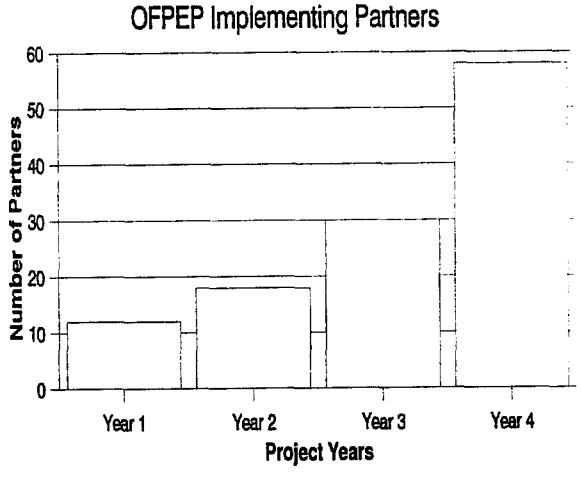
I. Executive Summary

This fourth annual report of the On-farm Productivity Enhancement Program (OFPEP) focuses on field activities that have been implemented from October 1, 1995, to September 30, 1996. In the period covered by this report, OFPEP has been operational in Senegal, Uganda, Kenya, and, for the first time, Ethiopia. As in previous reports, agricultural activities of the current season will be described, but their results will be reported in next year's report.

Based on visits to the field, talking with farmers, and reading the numerous studies and reports prepared by collaborators and lead agencies in each country--the progress made in many areas is outstanding. The number of partner organizations and community groups working with OFPEP now totals 58, and more than half of the farmers directly receiving training were women. This number is multiplied many times over when combined with villages who receive training from community trainers specifically prepared for that purpose by OFPEP and its partners. There were more than 770 such field staff and lead farmers trained in the past year.



In each country, at least two Advisory Council Meetings were held which reviewed the programs of country activities and provided technical and programmatic guidance for OFPEP teams. In Washington, DC, the OFPEP Steering Committee held three meetings to review the overall program strategy and progress and to discuss possible program expansion and to plan for the final evaluation.

In February of 1996, an OFPEP International Workshop was held in Kisumu, Kenya, to bring together OFPEP staff from four countries and the U. S. to exchange ideas and experiences from the various OFPEP sites. Also present at the meeting were representatives from the USAID-funded BRIDGE project in Malawi. This project links with extension systems for sustainable agricultural development and works with resource-poor farmers, supplementing rather than replacing normal extension channels. Thus, they were able to contribute insights from their experience that were of interest to the OFPEP program.

One of the results of this workshop was the organization and presentation of two workshops for OFPEP staff and collaborators in Kenya and Uganda by the PVO/University Center. The subjects--which were requested during the Kisumu workshop--were Monitoring and Evaluation systems, and the use of computers in those

systems. This ongoing upgrading of staff and partner's skills should result in improved gathering and presentation of data regarding the impact of OFPEP.

Another new activity introduced this year in two countries, and now being tried in the others is the use of photography as a tool for farmers to evaluate the impact of OFPEP. At newer sites, it is being used by farmers to illustrate issues in agricultural productivity that they would like to address with OFPEP. The PVO/University Center provided disposable cameras and training to the field staff who worked with farmer groups. The farmers themselves decided as a group what photographs would constitute indications of impact, and then chose photographers among themselves. The entire group then debated the merits of each photo and its effectiveness at portraying their message. A color brochure of the first results from Kenya and Uganda is now available.

OFPEP received complementary financial support from other institutions/donors in 1996: Monsanto Corporation provided Winrock with funds to strengthen the weed control/soil management component of OFPEP in Senegal; IFAD provided a large three-year grant to WARDA/Winrock to study the impact of OFPEP's approach on the diffusion of rice technologies in Senegal, The Gambia, and Côte d'Ivoire; COOPIBO (a Belgian NGO) supported the distribution of virus-free, improved cassava varieties in eastern Uganda; FICAH continued its support of OFPEP activities and approach in western Kenya

Country Highlights

Senegal

Year IV of OFPEP in Senegal continued the pattern of success from previous years:

- consolidating and spreading successful interventions
- expanding into new areas, including developing nationwide programs with additional collaborators, and solidifying existing relationships
- stepping back when linkages between collaborators proved solid and independent
- intensifying and adding technologies/techniques to further increase agricultural yields beyond those already realized
- constantly studying the OFPEP approach to better understand farmers' realities in order to make OFPEP interventions become even more effective

If adoption rates are seen as an indicator of the ability of an intervention to provide farm families with sufficient incentive to continue to use it after more than one season, then several specific interventions introduced by OFPEP and its partners can be judged overwhelmingly successful. Fully 100% of farmers trained in the OFPEP/Peace Corps Rice Program have become adopters. Sixty-one percent of farmers being trained in the use of compost continue to do so after more than one season. Adoption of improved practices has spread far beyond village limits. An impressive 284 farmers (including

those originally trained), or 1290%, have adopted the live fencing/cassava plantations introduced three years ago in Baback village. Over 700 farmers are now using the improved millet seeds introduced by OFPEP and CCF in the same area. Many of these farmers are combining techniques on their own initiatives. They are using compost on millet fields with improved varieties to increase yields from 10% to 500%. Based on data collected on a variety of introduced technologies, yield increases ranged from 10% to over 900%. Only one example of negative yields occurred and that was caused by cricket infestation.

Similar increases in income have also been shown. Farmers participating in the weed control/labor reduction program are increasing yields from 21 to 53% per hectare, bringing an increase of income from US$138 to $375. One of the reasons for the large percentage of farmers adopting the live fencing/cassava plantation system is the increase in income that the cassava can bring. Income earned from cassava ranged from $76 to $258. The most common uses of the increased income were for purchasing food for the household, buying agricultural inputs, and covering school fees and other costs related to education.

Other highlights included: the establishment of seed and cereal banks in six villages to store improved seed and enable all interested farmers to participate; an expansion in the demand for improved seed varieties; increased numbers of composting pits; increasing ability of farmers to provide leadership and training in extending agricultural interventions to other farmers; and steady growth of the involvement of women farmers in training and technical assistance support activities. Also of note, OFPEP facilitated collaboration between Peace Corps and ISR for an initiative to distribute other improved cereal seeds throughout the entire country. Requests for collaboration with new organizations are increasing. OFPEP has initiated a survey to 40 NGOs and associations where OFPEP is working to identify the potential new collaborations. Lastly. there is growing recognition of the effectiveness of the OFPEP approach as a viable model for other organizations and programs. OFPEP has been requested to take part in a collaborative process for the reorganization of the National Agricultural Extensions Program (PNVA). The IFAD-funded Research on Accelerated Diffusion of Rice Technology Program (RADORT) will facilitate the diffusion of improved varieties of rice and cropping practices in Senegal, Côte d'Ivoire, Nigeria, and The Gambia based on the OFPEP model and will study the impact of OFPEP and its predecessor project, OFSP, on the diffusion of rice technologies in Senegal and The Gambia. This is both a recognition of OFPEP's accomplishments and attests to its sustainability.

Uganda

The Uganda program continues to grow and develop in new directions. There are an additional 20 partners this year, with many more unaffiliated farmer groups in each district being added to the long list of farmers learning together with OFPEP. This increase in the number of partner associations without a concomitant increase in the

number of extension workers has meant that OFPEP staff are concentrating more on training of trainers (TOT) for the staff of collaborating organizations and lead farmers rather than working directly at the field level. These TOTs equip the trainees with the skills needed to plan and monitor demonstrations and their impact. In the past year, over 770 trainers were prepared, and over 28,000 men, women, and children received training in one or more OFPEP activities--with just over 52% being women.

Following farmer's exchange visits which were organized mid-1995, the farmers' groups have increased networking among themselves. Lead farmers in some groups are now invited by other groups to teach them some particular OFPEP-promoted technology they realize they need brushing up in. Two new OFPEP staff have been added to continue to expand the level of activities, particularly in the area of gender in agriculture, and also in the Mukono district.

The institutionalization of OFPEP interventions and the capacity building that we strive for with our partners is bearing fruit. Outside funding has been grated to four OFPEP partners by a Belgian NGO--COOPIBO Uganda. This funding is to support activities aimed at distributing improved cassava varieties to farmers to mitigate the ravages of the African Cassava Mosaic Disease now affecting East Africa. At least 60 acres of the improved cassava varieties were put under cultivation with many more being planned. Continuing technical assistance to the four partner NGOs comes from OFPEP.

Among the seed varieties introduced by OFPEP this year were the Igola groundnut and upland rice. In all, a total of 620,629 kilograms of improved maize, soybeans, beans, groundnuts, and sorghum were sowed on 54,289 acres. In addition, 324,000 cassava cuttings were planted.

Lead farmers who have been trained by OFPEP have been the source of most of this improved seed production. Each district now has several farmers--both men and women--who are producing quantities of the improved seed variety to sell in their villages, in the local markets, and, in the case of some bean seeds, in the Kampala markets. One farmer now has a contract to provide maize and soy flour to local schools, improving not only his family income but the nutritional status of the schools' children.

This period also witnessed invaluable networking between the OFPEP countries. OFPEP Kenya and Uganda had a joint workshop in Tororo, Uganda, in December, 1995. In February there was an OFPEP International Workshop in Kisumu, Kenya; and in May, there was an OFPEP Kenya-Uganda joint computer training, again in Kisumu, Kenya. More importantly, OFPEP-Uganda supplied OFPEP-Kenya with rhizobia and two varieties of groundnut seeds in exchange for TSP and DAP fertilizers.

The gender program added two assistants in the last half of September: one for field operations to be based in Mukono district and other for gender issues. The main thrust of the gender program is the promotion of a gender-balanced implementation of the OFPEP-promoted technologies. A secondary thrust has been tapping technologies that save on

women's involvement in domestic chores so that the time thereby saved is rechanneled to farm operations to maximize farm output. This is how a local NGO, the Joint Energy and Environment Projects (JEEP), came to be closely associated with OFPEP's gender program and is working with it to promote the use of fuel-efficient wood stoves.

Kenya

Completing its second year as a full partner in OFPEP, the Kenya team continues to grow and intensify its efforts. Several new staff and volunteers are enabling OFPEP Kenya to add new partners, and work more closely with their older ones. Three new Peace Corps Volunteers began working with the program this year. Over 2,700 farmers were reached through the collaboration of OFPEP and its partners with a comprehensive on-site training program on both seeds and soil fertility and conservation.

The past two rainy seasons saw up to 36 demonstration sites with over 100 different variety/fertility demonstrations. Increases in yield through the use of improved varieties coupled with one or more fertility enhancement techniques were impressive. Depending on the type of fertilizer demonstrated, yield increases over the controls ranged from 21 to 40% for maize (MDC); 73 to 91% for sorghum (Seredo); 15 to 102% for Lipala beans; and 34 to 147% for soybeans (Nam I).

The impressive results of compost in the demonstration plots were not initially duplicated on farmers' own plots. This led to an analysis of farmer's own compost which indicated the need for further training for farmers. OFPEP and its partners developed a new program and teaching materials on compost-making which were implemented at the end of the project year.

OFPEP Kenya and one of its major partners--CARE Kenya--was recognized in the local newspaper and by the Ministry of Agriculture for their efforts at increasing agricultural production in the Kisumu area at a Field Day attended by over a hundred people. OFPEP's reputation as practicing a viable, cost-effective approach to increasing agricultural productivity is also evidenced in the number of faculty from a major agricultural university in Kenya that sends its students to do internships with the OFPEP team. This not only adds some much-needed manpower to the program, but also exposes a new cohort of future agricultural specialists to the unique and effective OFPEP approach.

Responding to the needs of the farmers is one of the hallmarks of that approach. When news of the devastating Africa Cassava Mosaic Virus (ACMV) started coming from over the border in Uganda, Dr. Moses Onim and his team responded by conducting a survey to assess the damage of the virus on the cassava crop in the district bordering Uganda. Once accomplished, he mobilized the communities and agricultural authorities to quickly develop a plan for accessing and multiplying resistant strains of cassava planting

materials. The last year of OFPEP will see much activity in this area as the disease moves through the cassava-growing areas of western Kenya.

Ethiopia

Africa Village Academy (AVA) became a partner implementor for OFPEP in Ethiopia in June, 1995, beginning full operations in September, 1995. In its first year as a part of OFPEP it has implemented several important activities. After recruiting the appropriate staff, AVA immediately prepared an action plan and was able to achieve several goals by the first rainy season of 1996. Three solid NGOs were chosen out of several that would have liked to join forces with OFPEP. These are AVA itself, Christian Children's Fund, and Agri-Services Ethiopia.

The first major activity was the training on Participatory Rural Appraisal (PRA) technology for the collaborating NGO staff. The baseline reports that resulted from this extensive training became the basis of future activities of OFPEP with its partners by identifying the types of problems faced by farmer and interventions that should be addressed.

Thirty-six demonstrations at ten sites with variety, fertility, and herbicides were conducted with the three partner organizations and 284 farmers--of whom 12% were women. The results from this season will be evaluated with farmers to develop further recommendations and possibly further demonstrations.

Format

This Executive Summary is followed by detailed country reports. In the appendix can be found copies of reports, forms, students, newsletters, etc., mentioned in the larger document.

II. Overall Organization, Management, Staffing

A. Winrock International

During Year IV of OFPEP, Winrock continued to provide the overall technical, administrative and financial leadership to the program, to coordinate implementation of activities by the subcontractors and various in-country partners, and to do the liaison with USAID, the main donor agency, and other potential or actual donors.

Winrock maintained close cooperation with the PVO/University Center for daily coordination of the overall program, monitoring, planning, and reporting. In Senegal, Winrock remained the lead implementation agency. In Kenya and Ethiopia, OFPEP continued to be efficiently implemented by Winrock, Lagrotech (Kenya), and African Village Academy (Ethiopia), without the necessity of a formal subagreement. In Uganda, the subagreement with ACDI remained in effect throughout the year. Joint planning between Winrock and ACDI was strengthened during the year.

As director of OFPEP, Dr. Pierre Antoine made several visits to Senegal, and visited Ethiopia, Uganda, and Kenya at least once during the year. He initiated the international OFPEP meeting in Kisumu in February 1996, that brought together the staff from the three East African countries, plus a representative from Senegal, the project coordinator from the PVO/University Center, the Winrock program assistant, a senior advisor/facilitator, and two guests from a similar Winrock project in Malawi. The workshop contributed to the strengthening of internal project coordination in regard to approach, technical content, monitoring, and to the establishment of useful linkages with the outside development and scientific community.

The opportunity for the OFPEP director to make several visits to Senegal resulted from the simultaneous funding of several Winrock projects by different donors in West Africa, requiring regular on-site inputs. He also made a coordinator visit to the PVO/University Center (with the OFPEP East Africa coordinator), as well as three visits to Steering Committee meetings in Washington. On behalf of Beatrice Luzobe, Uganda OFPEP staff, he presented a paper on the impact of OFPEP technologies on the life of women smallholders in Uganda at the International Symposium on Farming Systems in Burkina Faso.

Dr. Moses Onim and Mr. Alphonse Faye pursued their efficient leadership of OFPEP as regional coordinators for East Africa and West Africa, respectively. Dr. Moses Onim made several technical visits to Uganda during the year, organized exchanges and meetings between the Uganda and Kenya teams, and assisted the Ethiopia partners and OFPEP staff to develop, plan, and implement activities of OFPEP in that country. He also made substantial contributions to the development of a proposal to secure future funding for OFPEP activities in Ethiopia.

Mr. Alphonse Faye's role in OFPEP was restricted to a single country, Senegal, since the program in The Gambia terminated in 1995. However, with the increasing complexity of the eight-year old program in Senegal, and the integration of other donors' funded activities in the country (IFAD grant on dissemination of rice technologies; Monsanto support for weed control/soil management), the challenges required his full attention.

In Uganda, a renewed staffing emphasis was placed on the gender specificities of the program. As a result, Winrock hired two new female extensionists (Julian Nyachwo and Adeline Rwashana) to assist Beatrice Luzobe and the ACDI team in that endeavor.

Ms. Johnnie Frueauff assumed the responsibility of administrative assistant/backstopping specialist throughout the year. Dr. Frank Byrnes provided senior technical advice on a regular basis and facilitated the Kisumu workshop. Dr. Henk Knipscheer assumed valuable program and administrative leadership during Pierre Antoine's travels or vacations.

B. PVO/University Center

As a core member of the OFPEP consortium, the Center for PVO/University Collaboration in Development (the Center) through its Program Coordinator, Ms. Mary Lou Surgi, provided overall coordination and information dissemination about project activities. Ms. Surgi provides technical assistance in program planning, training, and project monitoring. She designed and implemented training for staff and partners in Senegal and Uganda on several subjects and conducted periodic monitoring of field activities. She also coordinates the provision of technical assistance through a network of the Center members, recruits consultants, and is responsible for overseeing the OFPEP newsletter. She coordinates administrative and financial management support for the Center staff and technical consultants.

This past year has seen the Center take a more active role in field activities, providing direct training to OFPEP staff and farmers, and providing resources for additional training to be made available locally. At the urging of the Center, staff in the four OFPEP sites have redoubled their efforts to prepare appropriate teaching materials for their partners and farmers. This is in line with the emphasis of "training of trainers" approach being emphasized so that OFPEP interventions and information can reach more farmers, and the technical capacity of partner organizations increases, enhancing long-term sustainability.

Also at the Center, a part-time Information/Communication Specialist produces the OFPEP newsletter, "Of Soils and Seeds" and assists in the production of other OFPEP-related materials such as the "Through Farmer's Eyes" photo brochure and some teaching materials being prepared in the field. He also handles requests for technical information and other documents of interest to project partners and helps to identify sources of technical information on request from the field.

The Process and Linkages Specialist in Dakar, Ms. Lisa Washington-Sow, assists OFPEP partners in the areas of resource and needs assessment, data collection, monitoring and evaluation, forming linkages with government and nongovernment institutions, and the dissemination of information about project processes and results. She has also been active in several inner-agency groups n Senegal that are advising the AID mission in its reorganization efforts, and is a member of a team that assists NGOs under consideration for AID grants to undergo a self-evaluation exercise to identify their needs for institutional strengthening.

Other Personnel Support. (Match) Dr. Robert Gurevich, Executive Secretary of the Center, and Mr. Ralph Montee, Program Director for the Center, provide programmatic backup and administrative support.

C. Global Technical Information Support

Technical Resource Bank. The Center continues to update its informal technical resource bank comprised of specialists in such fields as agroforestry, tropical soils, credit analysis, agronomy, etc. At the present time, there are 20 scientists from seven universities plus NifTAL, who have shown their support of OFPEP by agreeing to provide technical information as needed without incurring costs to the program. The Center contacts them by FAX, telephone, or E-mail, whenever it receives requests from the field. The Center also has access to library and research facilities to provide backstopping for information needs.

Technical Communications to OFPEP Staff. In the past year, the Center has provided subscriptions to a variety of free and low-cost newsletters and other publications which address issues similar to OFPEP. This helps OFPEP staff to network with colleagues engaged in similar activities. The Center also provided two large collections of up-to-date technical information tailored for each OFPEP site. The Center handles technical requests for specific project information, materials, equipment, reference sources, etc., that concern project-related issues ranging from specifics on species of vetiver grass to where to buy equipment for rhizobium production.

Technical Consultants. The Center has recruited consultants, either in-country or from outside, who provided expertise in gender analysis, information systems, economic impact of selected project activities and monitoring and evaluation. In the fourth year of the project, six consultants identified and recruited by either the Center, Winrock headquarters, or the field have provided input either on a professional or volunteer basis to the project.

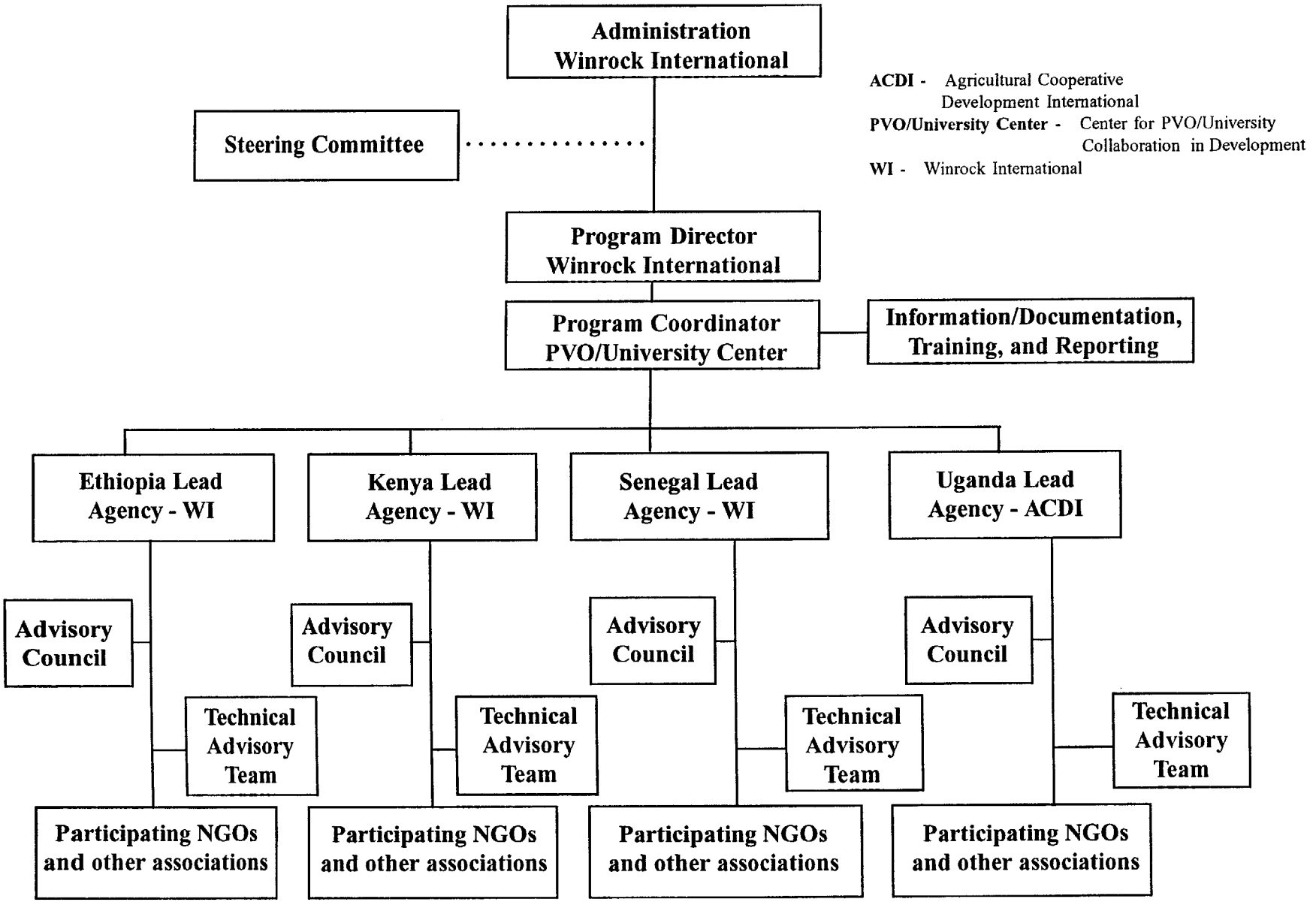
Newsletter. Two issues of the OFPEP newsletter, "Of Soils and Seeds", were published in French and English editions **(See Appendix 19)**. The newsletter has a worldwide circulation of over 1000 subscribers in English, and 250 in French. Aimed at the field

level agricultural worker, it is designed to be a forum for exchange of ideas among the various collaborators in the four countries that make up the OFPEP program, and others interested in the same issues.

D. Lead Organizations and Organization Charts

The roles and responsibilities of implementing institutions of OFPEP are presented on the following page **(Figure A)**. Details regarding in-country organization and management will be covered under each country report along with their organizational charts **(Section III).**

Figure A **OFPEP Management and Organizational Chart**



III. Country Reports

Presented in this section are the country reports, their organizational charts, and details regarding in-country organization and management.

Senegal

I. Introduction; Staffing

This fourth annual report of the On-farm Productivity Enhancement Program (OFPEP) focuses on project activities and accomplishments for the period October 1995-September 1996. Senegal, characterized by a soudano-Sahelian climate, has only one rainy season per year which begins in June and ends in September. Since the current agricultural season will conclude with the harvest in December 1996, we report results from the harvest of 1995 and the activities initiated in the 1996 season.

There were several additions to the OFPEP/Senegal team this year. Amadou Diouf assumed the post of Soil Fertility Program Manager. He coordinates and implements a program of activities to restore soils in the zones of Kolda and Nioro where rice farmers have experienced iron toxicity, water erosion, salt intrusion, and declining productivity. His agricultural experience in Senegal brings a much-needed emphasis on soil fertility issues.

Simon-Pierre Sarr has been hired as the weed control extension supervisor. Although based in Ross-Bethio in the North, he coordinates all training related to the use of Roundup Dry herbicide in both the Fleuve and Anambé regions (South) in regards to: the identification of potential clients for demonstration in this first year, monitoring of activities, and liaison with the Dakar team. He is seconded by Dian Diallo, weed control extensionist, who is based at Anambé and implements all training and monitoring of activities in the Anambé basin.

Other team members continued in their respective roles: Alphonse Faye as Country Coordinator supervises the technical execution of activities and manages the program in Senegal. Lisa Washington-Sow, as Process & Linkages Specialist whose responsibilities include coordinating collaborations, information diffusion and coordinating the monitoring of program activities. Mamadou Jalaan Faye, as Extensionist, is the liaison person between headquarters and local field agents. **Figure 1** shows the Organization Chart for OFPEP Senegal, and **Figure 2** indicates OFPEP partners and activity sites on the map of Senegal.

Support staff include: Aïssatou Keita Daffé as secretary and Baba Lô as driver.

Figure 1

Management and Organizational Chart of OFPEP in Senegal

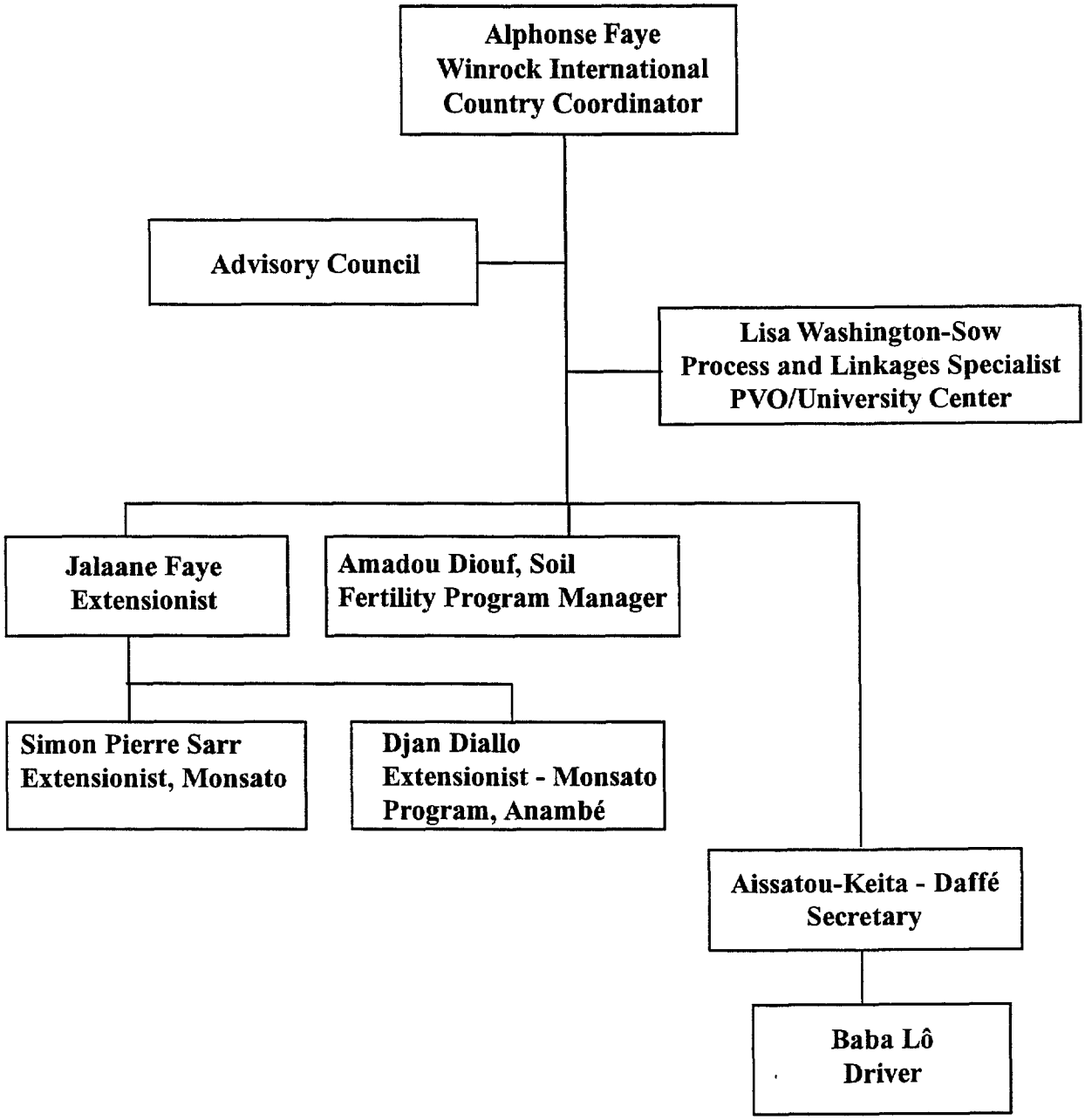


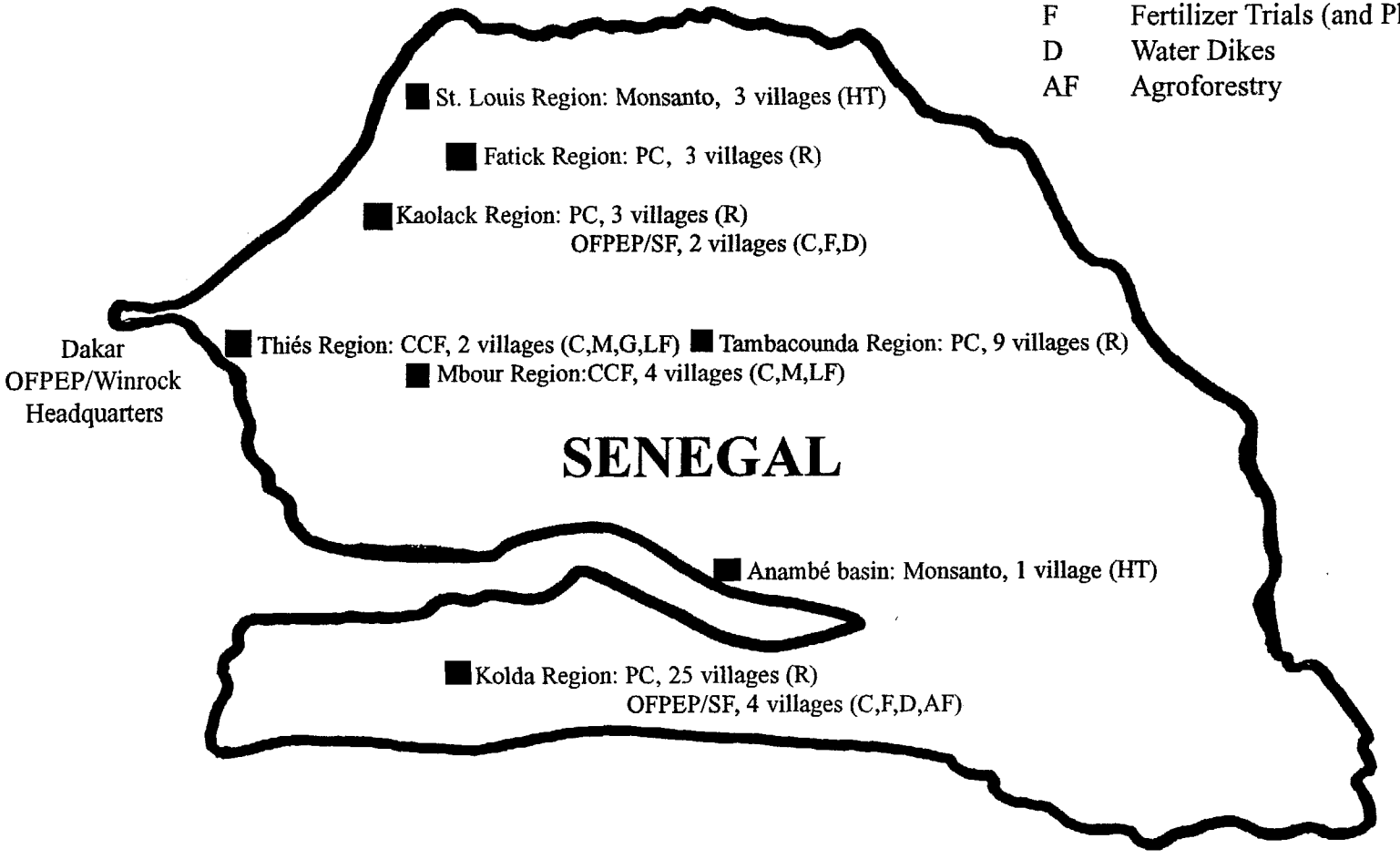
Figure 2

OFPEP Senegal

Activity Sites

LEGEND

PC	Peace Corps
CCF	Christian Children's Fund
HT	Herbicide Trials
C	Composting
M	Improved Millet
I	Improved Groundnuts
F	Fertilizer Trials (and Phosphate)
D	Water Dikes
AF	Agroforestry



II. Project Activities

A. Seeds

One of OFPEP Senegal's major activities over the years has been the introduction of improved varieties of **rice**, along with improved agronomic practices. From the 1995 growing season, the 198 women and 18 men rice farmers working with the Peace Corps/OFPEP Rice Program produced 4324 kg. of rice by planting 195 kg. of the OFPEP-promoted varieties of Rock 5 for deep water; DJ-1219 for standing water and IRAT-10 for upland cultivation.

For the 1996 growing seasons, the demand for seeds was only partially satisfied by OFPEP because of enormous difficulties in obtaining improved variety seed this year. There will be an estimated 311 (291W 19M) rice farmers for this campaign at 53 sites.

The CCF village of Baback was chosen as the pilot village for the multiplication of For the improved variety of **groundnut**, Flower 11. Ten farmers, including a women's group, received 20 kg/each of seed for multiplication and storage for next year.

Using the production of improved **millet** seed Souna 3, and IBV8004 introduced by OFPEP in 1995, the 6 CCF projects have institutionalized seed and cereals banks. Each project has established its own methodology for its cereal seeds bank. This will permit all interested farmers in each village to benefit from these seeds. A limited number of seed multipliers have been identified in each village. They will continue to apply rigid criteria when farming to maintain the purity of this seed.

An improved seed program instigated at the OFPEP organized open-house and exchange forum between Peace Corps Rice and Sustainable Agriculture Volunteers at ISRA during 1995 has resulted in a nation-wide OFPEP sponsored program. A total of 350 kg. of improved varieties of **corn, millet, cowpea and sorghum** to be planted in demoplots have been distributed to 122 farmers across 7 regions of Senegal and are being monitored by 11 PCVs and respective ISRA researchers.

B. Soil Management

The **CCF/OFPEP** composting program in the **Thies** region continues to grow. In 1995, a total of 184 farmers dug compost pits in the 6 villages. More than 120 pits were emptied for use in the last rainy season and 52 new pits have been created in 1996.

OFPEP has introduced a new soil fertility program to selected farmer groups in the **Kolda** and **Nioro** regions previously having collaborated on improved rice. First results of the program will be available at the end of 1996. The objectives of this program are to improve soil fertility through: the use of organic matter as fertilizer (compost and manure), spreading of mineral fertilizers, improved farming practices, making optimal

use of water with small means, and combating salt and iron toxicity as well as water erosion. In addition, soil samples were taken from 3 plots per village and analyzed. (Table 1). A brief diagnostic study was conducted with women rice farmers and their husbands (whose upland crops with erosion problems magnify salt intrusion into the rice fields) to assess the priorities of soil problems and solutions attempted by farmers. The aim of the study was to identify the principal constraints to soil fertility, and discuss possible solutions at the farmers level. The results of these two exercises permitted the Soil Fertility Program Manager to develop a program with the farmers. OFPEP also provided material inputs for this year's activities. (Details of this program are available in a document in French by Amadou Diouf and Lisa Washington-Sow in the Dakar office.)

Table 1. Activities and material inputs provided per village

Region/ Village	Activities	Material inputs received
Kolda: Ibrahima Nema	Composting/farming techniques, protective dikes	5 square shovels, 5 round shovels, 3 pix axes, 3 weeding hoes and 2 wheel carts.
" " Temento Samba	Nursery (Agroforestry), composting, use of mineral fertilizer NPK	50 kg NPK, urea, compost
" " Nematoba Mandingue	use of mineral fertilizers: NPK and urea, compost	50 kg urea, 50 kg NPK
" " Linguetto	use of mineral fertilizer: NPK	50 kg NPK
Nioro: Soukoto	liming, anti-salt dam	50 kg lime, 5 square shovels, 5 round shovels, 3 pix axes, 3 weeding hoes and 2 wheel carts.
" Ndiayene Post	liming, anti-salt dam	50 kg lime, 5 square shovels, 5 round shovels, 3 pix axes, 3 weeding hoes and 2 wheel carts.

All 6 villages participating in this activity received 50 kg of natural phosphate which is to be incorporated with composting. All inputs were delivered to the "soil fertility groups"

consisting of 10 farmers selected by respective village chiefs and Presidents of women's rice groups. These 10 farmers will be responsible for reimbursing the inputs at the end of the season so that they can be distributed to 10 other farmers next year. The soil fertility program is monitored by local extension volunteers who have demonstrated leadership capacity, dynamism towards agricultural development in their village and willingness to serve as liaison between the OFPEP Soil Fertility Program Manager and the farmers. In addition to completing monitoring sheets and assisting farmers with techniques introduced, these extension volunteers are in regular contact with the OFPEP office.

C. Collaborations and Linkages

1. Peace Corps and Farmers' Associations

The U.S. Peace Corps (PC) continues to be an important collaborator with OFPEP. This collaboration takes many forms, and each of these contributes to the long-term sustainability of the linkages which OFPEP has husbanded as well as the technologies and practices that are spreading. Some of the linkages that have been formed are described below:

Transfer of seed technology. The OFPEP/PC Rice Program is carried out in conjunction with the PC. This program uses a participatory approach to provide technical assistance to rice farmers. The linkage fostered by PCVs with traditional rice associations (presented in D4) enables technical knowledge to be disseminated by the program through the rice farmers themselves.

Forging linkages that result in sustainable programs. In addition to the above example of linkages between and within women's rice groups, the new Peace Corps/ ISRA Seed Initiative is a result of the 1995 In Service Training (IST) for Peace Volunteers organized by OFPEP at ISRA Bambey. As a result of this "open house," volunteers were put in touch with researchers focusing on regionally specific crops and issues. Peace Corps Volunteer Leader Chris Hartly and ISRA Breeder Farmara Massaly are to collaborate on a program to cover the entire country with improved cereal seeds. They began with extensive baseline studies and small demonstrations during the first year. During 1996, year 2 of the initiative, OFPEP has sponsored the extension of a total of 350 kgs of regionally appropriate improved variety millet, corn, cowpea and sorghum. This effort also will be monitored by the Peace Corps/ISRA linkage.

Exchange of information and training initiatives. OFPEP helps to create linkages between and among various organizations. An example was training on composting organized by a Peace Corps Volunteer with an extension agent of ENDA GRAF (NGO) and attended by 8 PCVs and 24 of their village family members and friends. The inter-organizational contacts were facilitated by OFPEP staff.

OFPEP staff also facilitated an inter-village training session at Marlothe (Fatick islands) led by Mrs. Diodio Diouf and Mr. Tidian Loum (farmers of Pethie, Foundiougne region) and attended by 20 women farmers and 25 men. Mrs. Diouf and Mr. Loum are model farmers. They have not only adopted row seeding diffused through the OFPEP/PC Rice program, but they also voluntarily trained/sensitizedother men in surrounding villages to do the same. The objective of this session was to permit the farmers of Pethie to share their problems and positive experiences with the techniques introduced by OFPEP with farmers from Marolthe who are new to the program this year.

OFPEP/Peace Corps Soil Fertility Program. This new program, which aims to work with selected farmers on soil fertility issues, stems from OFPEP's long-standing collaboration with villages from the Peace Corps Rice Program.

2. Christian Children's Fund and Community-based Organizations (CBOs)

The overall objective of the collaboration with CCF is to improve the well-being of children in the communities in which they live. A specific objective of each activity with CCF is to extend the activity so that each village family practices the OFPEP technologies introduced to the village. A village extension worker, who is a member of the local project management committee and is trained by OFPEP, serves as an intermediary between OFPEP and farmers. Modest financial support for these workers is shared by both CCF and OFPEP and this joint-support is crucial to success.

This program is partially supported by the Natural Resource Based Agriculture Research Program (NRBAR)--an AID funded initiative with the Senegalese Agriculture Research Institute (ISRA. That project assisted in the identification of technologies to be demonstrated in farmers fields and organized several training of trainers workshop.

Aïfa Fatimata Ndoye, an intern at OFPEP Dakar and student at the National Advanced Agriculture School of Thiès, is working on a detailed socio-economic study of the impact of OFPEP/CCF activities. The study, begun in July, will be completed in November, 1996.

3. Other collaboration

ISRA is always at the base of all collaborative activities carried out by OFPEP providing technical assistance, being a source of tested technologies, and providing support in monitoring and follow-up of activities in the field.

The **NRBAR-Agroforestry** program is presently under review due to a change in the ISRA researcher allocated to this program and the need identified by both ISRA and OFPEP to redefine the program goals and activities to accommodate farmer needs more directly.

OFPEP staff also work closely with the coordinator of the Research on Accelerated Diffusion of Rice Technology Program in West Africa **(RADORT)** to implement activities for this program in Senegal. Following the launching seminar held in May to inform potential participants about the program, OFPEP staff have worked on the definition of the process of identifying collaborators and coordinated an informational tour of the pilot region (Podor).

During 1996, expressions of interest for partnership with OFPEP were expressed by a number of Senegalese institutions. These institutions are listed in **Table 2**.
The OFPEP activities undertaken earlier in collaboration with COM are now being implemented by farmers in collaboration with **World Vision**--another OFPEP collaborator that has recently opened a new office in Khonghel. World Vision/ Khonghel staff are in contact with OFPEP staff in regards to supervising improved rice activities introduced by OFPEP to these farmers.

In collaboration with Monsanto, the **Weed Control Roundup Dry** program assumes a new methodology beginning with this third phase (1996) to diffuse the herbicide through local commercial distributors. Emphasis is placed this year on introducing the product to new farmers through demonstrations. Farmers associated with Diapanté and the GIEs of the Anambé Basin who had collaborated with OFPEP in 1995 will, therefore, no longer be a part of this activity. Instead, interested farmers from the Anambé basin who have experienced considerable loss in irrigated lands due to weeds will take part.

4. Development of Collaborative Networks

Expressions of interest for collaboration by users (NGOs, farmers' associations) during OFPEP Year V.

Table 2. Organizations and proposed collaboration

Organization	Theme of collaborative activity
AHDIS, Bambey	composting, nursery management, assisted natural regeneration of forest species, use of fish scales for soil fertility and development of audiovisual tools
Serigne Moustapha Bassirou Mbacké	irrigated rice and vegetable parcels
Science and Agriculture Techniques STA	anti-salt dams in Fatick region
Prix Sénégalais pour la Promotion de la Jeunesse, Kaolack	agroforestry activities in Kaolack region
GIE Fogo Jom, Thiès	community development
Carrefour Solidarité, Kolda	improve seed selection and farming, soil fertility

Additional information was solicited from a variety of organizations through the OFPEP questionnaire which will allow OFPEP Senegal to take an inventory of potential partners for the 1996-1997 period and beyond. After receiving expressions of interest, OFPEP sent a questionnaire to more than 40 NGOs and associations involved in agricultural activities in the present areas where OFPEP is working (Copies of these documents are available, in French and in English, in **Appendix 1**.). Results of this questionnaires will be used for the following:

- level of demonstrated modification and activity of the organization
- degree of correspondence in organizational objectives and activities with those of OFPEP
- demonstrated capacity to share costs of collaborative activities
- availability of human and logistical resources to share costs of the monitoring of activities

Expressions of interest by donors and international institutions. OFPEP has also been requested to take part in the development of the "Programme des Services Agricoles et Organisations Paysannes" (PSAOP), initiated by GOS and the World Bank. OFPEP staff have actively participated in the meetings to define the process of collaboration for this program.

OFPEP also has been cited as a potential partner for the **Community Biodiversity Development and Conservation Program** which aims to strengthen systems of community innovation in the area of biodiversity and is sponsored by the governments of the Netherlands, Sweden, and Canada.

ISRA and NRBAR also are seeking to expand on existing programs in Natural Resources Management. OFPEP also has been active in the **USAID** re-engineering process, having attended 3 meetings this year organized by the Senegal mission.

5. Advisory Council Meetings

An Advisory Committee meeting was held June 4, 1996. The agenda included the following points: the soil fertility program, coordinated by Amadou Diouf; the new IFAD-funded Research on Accelerated Diffusion of Rice Technology Program (RADORT) sponsored by WARDA and Winrock, coordinated by Niels Hanssens; discussion of proposed consultancy study of Women's groups working with the OFPEP/Peace Corps Rice Program. **(Appendix 2)**

D. Technical Assistance and Training

1. Training provided by OFPEP

OFPEP provides both training directly to farmers, as summarized in **Table 3** below, as well as training to organizations and Training of Trainers, as described in **Table 4**.

2. Training Materials Development

A series of "Guides Practiques" has been developed by OFPEP staff in Senegal and the PVO/University Center on OFPEP technologies. These guides, written in French, are to serve extension workers and trainers with didactic material for the field. The following guides are being developed for distribution during the first quarter 1997: Seed Selection; How to Improve Cassava Production; Composting; and Improved Rice Production. Copies of these guides may be requested from the OFPEP Dakar office.

3. Training of Staff

Mamadou Jalaan Faye and Aissatou Keita Daffé continued English lessons. Lisa Washington-Sow was trained on Access for Windows database software, and Aissatou K. Daffé completed a short course on WordPerfect 6.0 for Windows and Lotus for Windows.

Lisa Washington-Sow also was trained on the Participatory Institutional Diagnostic (Nov-Dec.) which was followed up by a meeting 4/5/96 on how the various participants have used their training (or plan to). A network of consultants will be created and the CONGAD will be petitioned on behalf of the new trainees to provide support for PIDs in Senegal to permit trainees to practice.

Lisa Washington-Sow represented the Senegal team at the OFPEP Workshop held in Kisumu, Kenya--a week of fruitful work, discussions, and exchanges with the different branches of OFPEP in other countries.

Mamadou Jalaan Faye participated in training on Gender Analysis 11/95 at Saly Portudal organized by UNIFEM (United Nations organization on women). OFPEP has become an active member of the UNIFEM network this year.

The WARDA/WI Research on Accelerated Diffusion of Rice Technology (RADORT) program--based on the OFPEP model--is to study the diffusion of improved varieties of rice and the cropping techniques in Senegal, Côte d'Ivoire, Nigeria and The Gambia. Alphonse Faye participated in the selection of the program coordinator and planning meetings for activities during 1996 in Bouaké, Cote d'Ivoire. He also participated in the workshops that launched the RADORT program held in Cote d'Ivoire, St. Louis, Senegal, and The Gambia May 15-30. The workshops gathered potential collaborators for the

program in each country from government institutions and non-governmental organizations to exchange views and experiences on development, extension and diffusion. Lisa Washington-Sow and Amadou Diouf have been actively involved in the identification of collaborators for this program.

Amadou Diouf attended a seminar on the "improved water retention dike" sponsored by the CRDI on improved dikes which included field visits, training and discussion. There is potential for the development of an activity on this subject in the Kaolack region, in conjunction with the NRBAR program.

4. Consultancy studies

Wendy Wilson Fall has completed a study on Women's Associations in the Kolda region working with Peace Corps Rice Program, and Susan Gannon has carried out a similar study for the regions of Foundiogne and Nioro. Both studies found that OFPEP's approach to this program in working through village groups is the most sustainable strategy that accommodates the organic structures of the villages themselves and because it fulfills a need (W. Wilson Fall, 1996). At the same time, the groups are constantly evolving with fluctuations in the environment and livelihood strategies of their members (S. Gannon, 1996). (The full text of these documents are available in the OFPEP Dakar office.) A summary of these is presented in **Appendix 3**. Five other previous studies done on the same area are also available. This brings together the experiences of OFPEP and the Peace Corps volunteers working with women rice farmers over a period of more than 6 years.

Study recommendations included OFPEP deepening its understanding of membership criteria and its social and historical understanding of the villages it works in. Also, in order to expand diffusion, OFPEP should continue to work with the Peace Corps to assure that appropriate communications and extension techniques are used. It would also be valuable if the placement strategy of PCVs was altered to assure a better monitoring system for the program.

Table 3. Farmer training

Themes	Number of Men & Women Farmers Trained in 1995-96	Number of Villages	Activities
Rice (with Peace Corps)	201W 15M	54	Diffusion of improved varieties: rice DJ 1219, Rock 5 and IRAT 10; improved farming practices:
compost (with CCF)	316M	23	compost making and utilization
live fencing (with CCF)	20 M	8	utilization of live fences in farming systems
improved millet (with CCF)	62 M	6	diffusion of improved varieties and associated cropping techniques
improved* groundnut	2W 8M	1	diffusion of improved varieties and associated cropping techniques
Soil management*: water dikes	3 W, 9 M	1	construction of dikes around fields to retain water
Soil* Fertility: Inorganic fertilizers	7 W, 3 M	1	application of trial doses of 100 kg/ha NPK and urea, half at tillering, and half at height growth
Soil* Fertility liming	53 W, 37M	2	trial remedy for iron toxicity
Soil* fertility: organic fertilizers and improved farming techniques	158 W, 84 M	17	farming techniques: plowing/incorporation of manure into soil
Soil* Management: Agroforestry	6M	1	Cashew-nurseries for erosion control around fields
*Weed Control, Fleuve Region	2W,14M**	11***	Application of Roundup Dry prior to planting
Weed Control: Anambe	23M, 1W-**	24***	Application of Roundup Dry prior to planting
Totals	427W, 296M	105	

* first year program in 1996
** includes 1995-96
*** demonstration plots

Table 4. Training of Trainers provided to collaborators

Organization Requesting Training	Subject of Training Session	Number of Trainees
Peace Corps	Approach to OFPEP/ Peace Corps Rice Program	18
Peace Corps	Rice Morphology-Types of rice varieties	9
Peace Corps	Monitoring and evaluation	9
Peace Corps	Rice plant diseases: toxicity and soil fertility	9
Peace Corps	Context of rice in Senegal: harvesting, yield estimation	9
Peace Corps	Collaboration with OFPEP	9
Christian Children's Fund	Extension techniques for each intervention; activity monitoring	12

III. Project Results

A. Adoption and Yields

While **Table 5** summarizes the number of adopters for this project year, it is important to understand the extent of the yield increase we are talking about to understand what adoptions can mean for a farmer. **Table 6** gives an indication of the ranges in yield increase over traditional varieties and practices that a typical farmer can be expected to experience when adopting improved seed varieties and other improved practices.

Table 5. Percentage of farmers trained during Year IV having adopted* proposed seed/soil technologies and reasons

Program	Number Trained	Number adopting technique (including those directly trained)	Percentage adopting the technique after training	Reasons
Rice	293	293	100 %	short cycle, on-line planting: easier to weed;
Compost	316	192	61 %	
Live fencing	22	284	1290 %	
Improved millet	62	761	1200 %	

* Following definition of adopters at Kisumu workshop, only these 4 programs have been implemented for more than demonstration year.

Table 6. Ranges in yields obtained for each of the technologies

1995-96 Program	Traditional varieties/ practices: yield ranges kg/HA	Improved varieties/practices yield ranges/kg/ha	Explanations for low points in yield range and comments
Rice	90-1000	907-1800	didn't plant rice in proper ecology
Improved Millet	179-511	60-1900	attacks of crickets
Composting (on millet)	179-511	200-2500	insufficient dose of compost or attacks by crickets
Anambé weed control in rice fields	1,810 - 3,130	2,390-3,500	variation could be due to many factors such as: cropping system or poor application of herbicide
Fleuve region: (weed control in rice fields)	344 -5,200	1,500-5,700	" "

Table 7 gives an example from one village with a Peace Corps extension agent of how the increased production is used. It is important to note that in general, rice farmers working in the Kolda, Nioro and Foundgioune regions produce exclusively for consumption and seed production, while those in the Anambé and Fleuve groups grow rice for the market. The farmers who grow for home consumption do not market their seeds, but exchange them through informal networks (see Jérome Guin, 1994; Agne, Ba, and Ndiaye, 1995).

Table 7. Example of how yields were used in Salemata

Farmer	Yield in kgs	#kgs stored for seed	#kgs consumed
Jean Marie	1018	500	518
Mariama Siree Diallo	100	20	80
Jarga Souare	350	100	250
Jaara Women's Group	50	to be distributed to 10 members	0
Ganjiri Women's Group	14	14	
Muntaga Bijar	175	25	150
Musi Ba	1260	100	1160
Adama Dione Soure	160	100	60
Abdoulaye Diallo	120	0	120

In the OFPEP-CCF program, the objective is to generate seed for local seed banks funded by CCF. Depending on their production, each farmer is to sell a portion of his harvest back to the bank after having taken a portion for consumption and a portion for planting next year. The 6 CCF projects have set up village seed and cereals banks with harvest from last years improved millet activity. The table below illustrates the amount of seeds for this season as an example of the amount of production being generated for seed multiplication which will ultimately translate to increased income and food for home consumption.

Table 8. Illustration of amounts of improved seeds being multiplied by CCF farmers

Village	Total yield of improved seeds harvested from '95 campaign (kgs)	Seed stored in seed bank distributed for 1996 campaign (kgs)	Stock distributed as of 7/96*	Number of farmers to receive improved variety seed '96 campaign*	Number of seed multipliers 1996 using 1 kg of seed on 1/4 ha
Baback	11220	237	237	43	4
Fandene	6923	620	456	226	5
Fissel	5000	713	502	251	2
Thiadiaye	5455	460	150	49	4
Diokhar	8680	871	406	116	15
Ndollor	14282	600	212	66	5
Total	51,560	3501	1963	751	30

*Seed continued to be distributed, total number of kg distributed will be reflected in next quarter's report

B. OFPEP's Impact on Women

As illustrated in Table 9, the OFPEP activity with the largest proportion of female beneficiaries is the OFPEP/Peace Corps Rice Program. This is because women are the traditional cultivators of rainfed rice, the target crop for this activity. It is important to note that women's rice production is destined for household consumption rather than the market. Therefore, increases in yield obtained from improved variety rice translate directly into increased consumption for farm families.

The OFPEP/Peace Corps Rice Program raises two interesting gender questions. First, men's increased participation in the program (and in rainfed rice in general) implies the use of women's labor. This is because in the 4 traditional rice growing regions women, either individually or organized into traditional work groups where the owner of the parcel will purchase a meal for all participating women, are the weeders. Therefore, where one sees a men's plot, one can assume increased work burden (weeding/ transplanting) for women without knowing where the benefits of the increased rice production will end up.

Second, in order for women to practice the technique of on-line seeding, they must have access to men's labor and equipment. The seeder and animal traction to pull it are the property of men and the time for seeding the rice fields in this manner is the same as the period in which men are seeding their peanuts with the same equipment. Therefore, the ability to plant seed on-line poses a major challenge for women. It costs approximately $10.00 per one full day's work to seed ½ HA. Assuming the labor for hire is available, the returns are thought to be worth it. Assuming a 20% increase in yield, the increase on .5 HA of rice would be 200 kilograms. With this yield, a farmer could provide her family with an additional 5 weeks worth of rice. (T. Osborn, Gatekeeper series no.SA48, 1995).

CCF: The villages with which OFPEP works with Christian Children's Fund are dominated by the Sereer ethnic group in areas where pressure on the land has been considerable and as a result, women's role as independent farmers is marginal. Though OFPEP activities indirectly benefit women as family members who share in the work (weeding, transformation) of cereals as well as consumption, OFPEP does not directly impact women's income or personal contribution to the household grain stocks. Because women do not have rights to land ownership, the live fencing program which implies a permanent right to the land in order to reap the long term effects is limited to men.

Weed control: Although there is a small presence of women commercial rice farmers in both Anambé and Fleuve, only one woman has been associated with this activity. The gains obtained from increased production and time saved with Roundup Dry applications has the effect of increasing production. Yet, locally produced rice sales have been on the decline as a result of the lower price of imported rice (due to lifting restrictions on imports). Women's involvement in this activity is on the decline as a result of the increasing difficulties with marketing channels.

Table 9a. Percentage of men and women adopting OFPEP technologies in selected villages

Collaborator/Activity	Number of Adopters	% Women Adopters	% Men Adopters
Rice	293	94%	6%
Compost	192	1%	99%
Live fencing	284	0	100%
Improved millet	761	0	100%
Improved groundnut	10	20%	80%
Soil Fertility Agroforestry	6	0	0
Weed control/Roundup Dry Fleuve	16	25%	75%
Weed control/Roundup Dry Anambé	24	0	100%

C. Technology Diffusion Beyond the OFPEP Zones

CCF Cassava/Live Fencing: One of the important collaborative activities undertaken with CCF is the **live fencing/cassava** plantation. The number of villages involved in this activity has spread through farmer exchanges from 1 village in 1993 to 11 in 1996. Four of these villages are beyond the OFPEP working area.

PC Rice: Several consultancy studies have documented the exchange of improved variety seed through informal networks to villages outside of OFPEP's zone of intervention (J. Guin, 1994, Agne et al, 1995). According to consultant Wendy Wilson Fall, who studied women's rice associations in the region of Kolda, the exchanges take place along maternal lineages as there is a tradition amongst the Fulani (dominant ethnic group in the region) to exchange favors with maternal relatives more so than with paternal relatives. As a result, non-assisted diffusion occurs more fluidly from one village to another than within villages because the woman resides with her husband's family or paternal relatives.(W. Wilson Fall, 1996).

To illustrate the complexity of the diffusion and the challenges it poses for monitoring this activity, one PC volunteer in Nioro writes:

> *Before my arrival PCV Scott Moeller distributed several kilos of both Rock 5 and DJ-1219 to the Barria women's group president and her choice of 14 women for the 1995 rice season. I have in my possession the women's names and how much each received of each variety. The good and the bad news is that these women went home and re-distributed the seed within their compound. For example, 1 kg of seed may have been split between 2 or 10 different women. This helps spread the improved variety seed but makes data collection nearly impossible (K. Miller, end of campaign report Barria, 1995).*

OFPEP Soil Fertility: The composting sessions held during this quarter were designated for the 6 villages targeted for this program in Kolda and in Nioro. But farmers found such value in composting that they called other farmers from several neighboring villages bringing the total number of farmers trained at 6 sessions to 242, many of them being women. Table 9b gives details on farmers trained in soil fertility management during Year IV.

Table 9b. Percentage of men and women trained in soil fertility management during Year IV

Collaborator/Activity	Number of Adopters	% Women Adopters	% Men Adopters
Soil fertility water dikes	22	25%	75%
Soil Fertility Urea fertilizer	126	70%	30%
Soil Fertility liming	90	59%	41%
Soil fertility composting and improved farming techniques	242	65%	35%

D. Income

1. Commercial rice production in Anambé

As a result of the use of Roundup Dry prior to planting, farmers increased their production by an average of 21.1%, which is equivalent to 552 kg/ha or 69,000 CFA ($138.00), at market price of rice paddy of 125 F/kg ($0.25) (S. Diallo and L. Sonko: Feb. 1996). Similarly, tests in the Fleuve region proved that the treatment applied at 3.4 kg/ha increased farmer production by 53% or 1500 kg/ha which is equivalent to 187,500 CFA or $375.00 at the same market value.

2. CCF

Income generated from the live fencing/cassava activity in Baback and Ndollor varies from 38,000 CFA ($76.00) to 129,380 CFA or ($258.76) according to the surface area planted with cassava. According to the study by Aifa Ndoye on the impact of supplementary revenues, the most common uses of the funds are:

- purchase of millet and rice (for households with insufficient production to cover the year)
- to cover daily household expenses (food)
- to buy agricultural inputs--seeds and insecticides
- to repair and maintain agricultural tools/equipment
- to distribute to the neediest members of the CCF community
- to purchase furniture
- to finance the construction of homes
- to cover school fees/ cost associated with housing students in town

According to A. Ndoye, inhabitants of Ndollor send their secondary level students to Thiadiaye (nearest school). As a rule, parents have established that each child sent to Thiadiaye to stay with a family for the purpose of studying must pay the host family 15,000 CFA and 1 sack of millet for the academic year. Prior to the project, several families had great difficulties in fulfilling these obligations. Some students were even forced to abandon their studies during the year. This year however, families report that thanks to the surpluses generated by the improved millet program, more students will be sent to secondary school.

Miss Ndoye's study was based on a sample of 46 household randomly selected from a total of 236 households surveyed from two village: Ndollor and Baback.

The methodology used to rank households employed: 4 socio-demo-graphic variables: (total population per household, active population per household, consumption units per household and dependency ration), and 19 socio-economic variables (variables of ownership: land availability, number of cattle, number of

goats, number of poultry and quantity of agricultural tools.) These two kinds of variables were analyzed using Principal Component Analysis (PCA), Hierarchical Descendent Classification and Factorial Discriminatory Analysis respectively to asses the significance of all analysis performed to establish the boundaries of the ranking and the most discriminatory variables.

The boundaries and characteristics of each rank are as follows:

Group	**Number of house-holds**	**Average household population**	**Average Available Surface area in HA**	**Average number in herds**			**Level of agricultural equipment**
				Cattle	Goats	Poultry	
I	14	13					
				5.6	11.2	9	high
II	9	11	5.8	4.8	4.4	19.5	moderate
III	15	11.4	5.2	13	2	3.5	poor
IV	8	10	5.9	12	0	2.5	very poor

Table 10: Income generated from cassava/live fencing in Ndollor and Baback, 1995

Household Wealth Ranking	**Cassava**	
	Average Surface Cultivated (HA)	**Profit in US$**
I. Richest households	1.13	$258.76
II.	.31	$185
III.	.31	$100
IV. Poorest households	.30	$76.00

(Source : Aïfa Ndoye, 1996)

E. Food Supply

The clearest evidence of increase in food supply as a result of OFPEP is illustrated in Aïfa Ndoye's study of impact at the household level based on in-depth study of OFPEP/CCF activities at Baback and Ndollor (see above).

Table 11. Food security:. increase in food supply with OFPEP improved millet

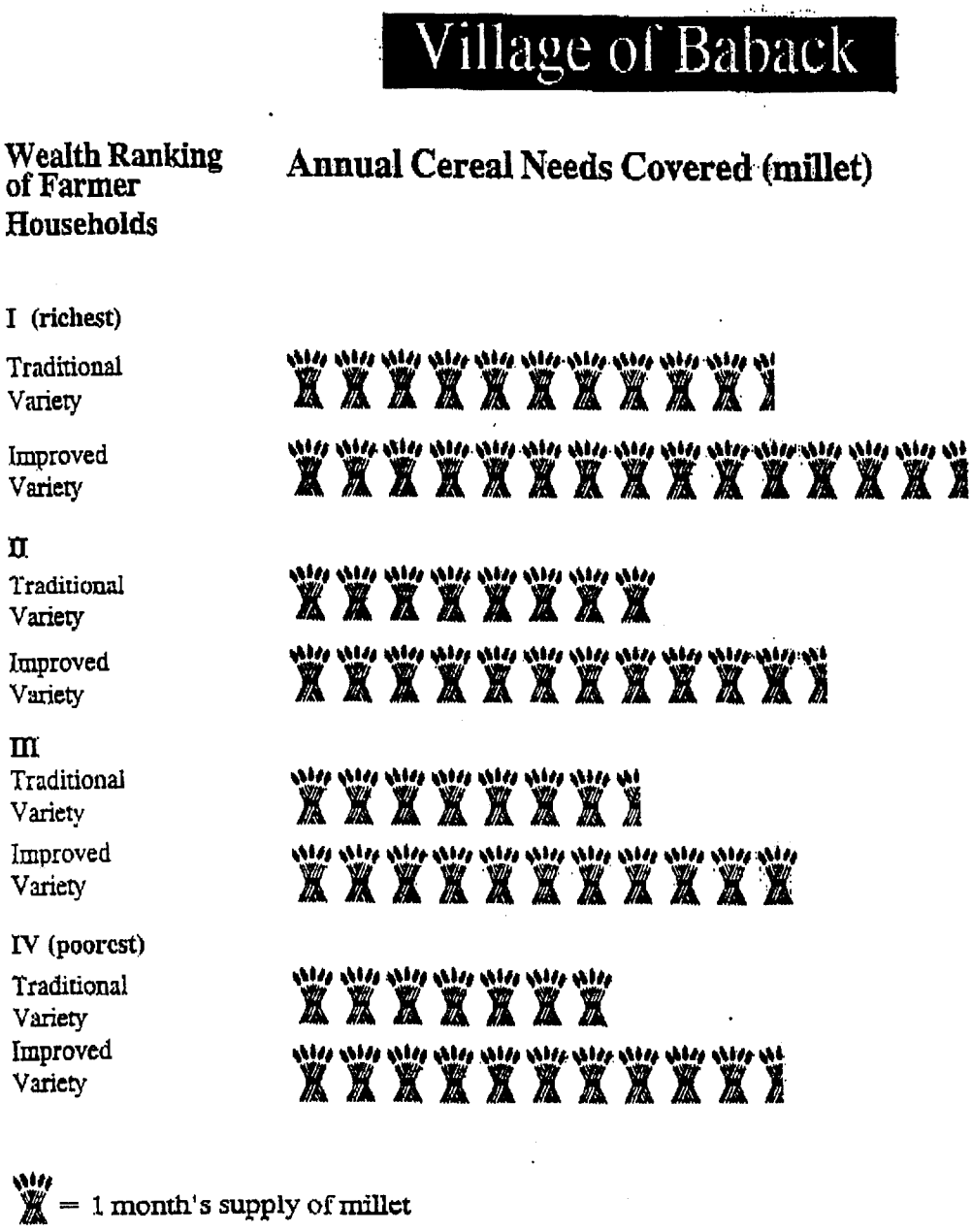
Household Wealth Ranking	Months of food supply before OFPEP interventions	Additional months of food security with OFPEP improved millet program	Total Number of Months of food security with OFPEP intervention
I. Richest households	10.5	4.0	14.5
II	8.0	3.5	11.5
III	7.5	3.5	11.0
IV. Poorest households	7.0	3.5	10.5

(Source: A. Ndoye, 1996)

OFPEP helped households at wealth ranked levels of II, III and IV to increase the amount of food supply in the family by 3.5 months. In the highest wealth-ranked households, OFPEP interventions allows them a food surplus of 2.5 months. (A. Ndoye, 1996)

Table 12. Annual cereals needs covered (millet)

The analyses were performed on data collected during the rainy season of 1995.



F. Some Program Challenges and Possible Solutions

Table 13 illustrates a number of challenges faced in program implementation and remedies used to resolve them.

Table 13. Challenges/Solutions

Problems	Solutions
Hiring local extension staff through government extension service or NGOs to monitor the new soil fertility activities in Nioro and Kolda could prove difficult to coordinate.	Identification of local resource people based in the villages where activities are carried out. They are self-motivated individuals with knowledge of local practices and problems and this promotes sustainability.
Data collection from collaborators in the field	Exchange forums were held with Peace Corps and CCF village agents with data collection as a central theme. Monitoring systems adjusted to better accommodate both collaborator and OFPEP needs. This includes the addition of bi-monthly reports for CCF.
Difficulty procuring rice seed for PC Rice program: Volunteers had requested 138 kgs DJ1219, 180 kgs IRAT and 75 kgs Rock 5 this year. However, improved rice varieties Rock 5, DJ 1219 and IRAT were nearly impossible to obtain this year in Senegal	OFPEP was able to acquire 120 kg of DJ1219 and 60 kg of Rock 5 for the PC Rice program from National Agriculture Research Institute (NARI) in Sapu, The Gambia. To partially cover the demand for IRAT, PCVs will look to farmers with larger seed supplies.
Lack of funds for soil fertility program	The ambitious training sessions have been reduced to 2 themes per village. Inputs and paid collaboration will be kept to a minimum to promote the local leaders and sustainability of activities.
Difficulty in obtaining sufficient improved ground seed for new program	Number of pilot villages to launch the program was reduced to one.
Communications problems in the office: insufficient computers for staff, frequent breakdowns of computers and rupture of email network due to mechanical problems	Negotiations are underway for renting an additional computer with sufficient memory to install needed software in addition to the latest email system
Lack of credit component in OFPEP program	Linkage established with COMACAP (a credit-based project) and some farmers' associations
Limited human resources available due to funding constraints	Interns from universities in Senegal can provide valuable inputs and studies within OFPEP

Uganda

I. Introduction

The period covered by this report is October 1, 1995 - September 30, 1996, a period of intense political activity in Uganda. This factor certainly had an effect on the OFPEP field activities both in terms of the frequency of activities and the magnitude of farmer participation. The political activity in question included the promulgation of a new constitution, presidential campaigns and elections, parliamentary campaigns and elections, and the formation of a new, democratically elected government.

The significant change in OFPEP's approach this year has been concentration on the training of trainers (TOTs) with an increasing number of collaborating partners, rather than being responsible for many demonstrations on our own. Enhancing the linkages and partnerships between and among local organizations is an important addition to our approach in achieving sustainability and the spread of technologies.

The following organizational chart depicts OFPEP-Uganda's staffing pattern, while the map shows our working area in Uganda. **(Figure 3 and Figure 4)**

II. Project Activities

A. Seeds/Vegetative Materials

In Year IV, more than 250 demonstration plots were planted out of 208 planned. Each of these demonstration sites has several 6 m x 4 m plots to demonstrate OFPEP-introduced technologies (soil mending, new seed varieties, crop spacings) and controls, the number depending on a farmer group's capacity to look after the demoplot. In addition to the varieties already introduced in previous years, upland rice and an improved groundnut variety (Igola) were demonstrated on a few plots.

The varieties being demonstrated include Longe 1 Maize, Nam 1 and 2 soybeans, seredo sorghum, millet P224 (renamed Pesse and officially released), and MCM 5001 (K131) beans. Introduced K132 beans will be harvested in November/December 1996.

Table 14 shows the amount of seeds of the introduced varieties that were planted this year, along with the amount of acreage.

Figure 3

Management and Organizational Chart of OFPEP in Uganda

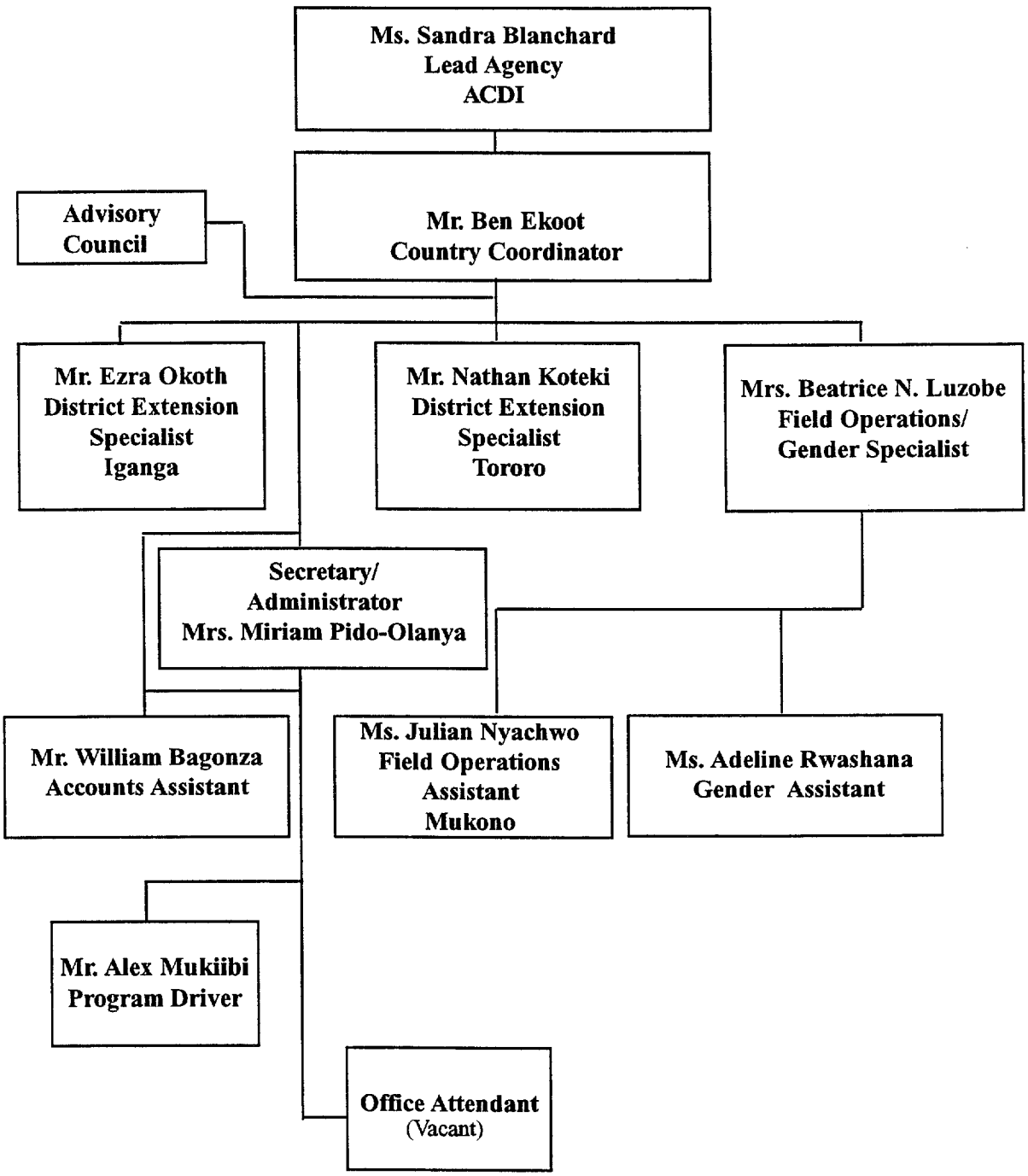


Figure 4

OFPEP/Uganda
Activity Sites

Table 14: Quantity of improved seed planted in 1995/96

Crop	Quantity Planted (kg)	Acreage
Maize-Longe 1	388,300 kg	38,830 Acres
Soybean-Nam 1	276,680 kg	13,834 Acres
Beans-K131	22,515 kg	938 Acres
Ground Nuts-Igola 1	1,330 kg	42 Acres
Sorghum-Seredo	1,804 kg	564 Acres

Source: Extension Specialists' and Collaborators' records.

It is important to note that the source of most of the improved seeds is no longer OFPEP or its partners, but the **lead farmers** who have received training through OFPEP and gone on to become net producers of the seeds for sale or exchange with other farmers. This sustainable practice meets one of the major goals of OFPEP.

There are several impressive cases where farmers working with OFPEP have gone on to become small to medium scale producers and marketers of improved seed varieties. A survey carried out in one of the OFPEP districts as an example showed that 90% of the farmers did not have or were unaware of any improved seed varieties in their localities. In 1996, there are numerous suppliers throughout the district producing and selling hundreds of kilos of improved seeds to other farmers, to schools, and to OFPEP.

Florence Apio was the first lead farmer in her village and soon adopted all OFPEP technologies. She has continued to multiply and sell Nam 1 soybeans and Lfonge 1 maize since 1994. She has bought a bicycle with some of the proceeds of her sales and continues to produce and sell to NGOs and individual farmers.

Onder W. Kabise filled his granary I the first season of planting 1 kg. of Seredo sorghum plus was able to give his brother 2 bags for food. "He has enough food in his home always despite a very large family."

Difasi Hadali is one of the lead farmers who has adopted OFPEP technologies and has specialized in multiplying improved ground nuts and upland rice. Last season he sold 17 bags (unshelled) to Buetlaja College. His seeds of upland rice have diffused to many farmers in Busaba. Last season 6 sacks of rice were sold to different farmers for seed.

The forty members of Mudodo Group are multiplying sufficient quantities of the improved varieties of soy, maize, beans, upland rice and groundnuts so that the entire village will have sufficient quantities of these crops.

The table above does not include cassava whose demand is simply beyond OFPEP's capacity to meet single-handedly. Cassava is a staple food crop which has virtually been wiped out by the African Cassava Mosaic Virus (ACMV) disease, particularly in Tororo district and some parts of Iganga district and in many other parts of Uganda. The demand for the resistant varieties developed by the Namulonge Research stations is beyond their ability to produce it. The genetic material has even entered into politics with politicians making this scarce material available to selected voters in their districts, thus compromising the research and extension community's ability to get it to farmers for further multiplication as originally planned.

OFPEP has been working on this serious problem for several years, distributing the improved genetic material and demonstrating a variety of methods for its multiplication from which the farmers can choose the methods they are best able to implement. In 1995, 13 acres in Iganga district were planted with NASE 1&2. In 1996, over 31 acres have been planted. We must pay special tribute to COOPIBO-Uganda, a Belgian NGO which agreed to fund four collaborating NGOs/CBOs to help them multiply sufficient quantities of the improved varieties. These organizations have established nearly 60 acres of the tolerant varieties as mother gardens from which planting materials for further multiplication will be harvested. We reserve special gratitude for the Namulonge Agricultural and Animal Research Institute (NAARI), Root Crops Section for both the multiplication technologies and the improved germplasm.

Just obtaining the genetic material is not enough to insure its spread. Severe problems have occurred in the multiplication of the germplasm. Seedlings are attacked by termites, as well as the multiplication chamber itself. If they survive that attack, there are still the root rats destroying the roots in the field to overcome.

When multiplying the improved planting materials, there has been a notable departure from the use of High Humidity Rooting Chamber technology and return to the old method of direct planting of 2-3 node cuttings The results are shown in **Table 15**.

While there was apparently no significant difference in germination rates between the two technologies, especially comparing the Iganga district data against the Mukono district data, it is clear that the High Humidity Chamber technology is superior in terms of disease control. Mukono recorded NIL % diseased plants because their data is from the application of the High Humidity Rooting Chamber where selection of diseased plants is possible so that diseased plants are not transplanted. Given that ACMV infection is OFPEP's main worry, the way forward is clearly indicated: to move fast with the High Humidity Chamber method of propagating ACMV-tolerant cassava planting material.

Table 15. High humidity chamber vs direct planting methods of propagation of cassava planting material

	Iganga District	Tororo District	Mukono District
1. No. of farmers' groups participating	143	45	24
2. Method of propagation	Direct Planting of 2-3 nodes	Direct Planting of 2-3 nodes	High Humidity Chamber
3. No. of ACMV-tolerant cuttings planted	177,000	158,447	10,800
4. % of cuttings germinated	95%	58%	97%
5.% surviving in field	85%	58%	72%
6. % of diseased plants in field (with ACMV)	12%	12%	NIL

Source: Collaborators' and OFPEP records

B. Soil Fertility and Management

Activities in soil fertility and management include the promotion of composting, use of animal manure, demonstrations of inorganic fertilizers, rhizobial inoculation, agroforestry and soil conservation methods. These topics are included in training of trainers sessions, which are then incorporated into the demonstrations facilitated by partner organizations and farmers. In addition, soil samples were taken in Mukono district and were analyzed by Makerere University.

OFPEP's efforts in soil fertility management are soliciting a farmer's response somewhat secondary to new seeds and cropping techniques, yet, yield data clearly show a high positive correlation between soil fertility and yield. The highest yields were obtained from fields on which animal manure (40-350% over the control) and compost manure (+22%) were applied. Admittedly, soil fertility management techniques are labor-intensive and require such farm equipment as wheelbarrows, animal-drawn carts and shovels; and where inorganic fertilizers are needed, some spare cash to purchase the fertilizers. This is an area where a small credit scheme would certainly make a lot of sense.

Another observation is that both animal and compost manure are readily applied on vegetable gardens, which are usually adjacent to the homesteads. Being high-value crops and critical to nutrition, women especially have been willing to go the extra mile to manure their vegetable gardens. Banana plants, which are both a food and a cash crop, are also being manured. The challenge is to extend manuring and composting from these

vegetable gardens to the open fields for the growing of the other food crops--legumes, cereals and root crops.

Gender analysis will help to determine household labor roles and whether there is sufficient motivation to make changes. All those involved in soil fertility management must be identified and mobilized before a crisis situation is reached. While research institutes will always come up with new, improved seeds, it will be impossible to introduce new, improved soils from the research institutes to the farmer.

C. Partners and Linkages

This year has been productive for forming new partnerships and linkages.

Nationally, the following have been added to our list of partners:

- The International Institute of Tropical Agriculture (IITA) at Namulonge Agricultural and Animal Research Institute
- Centro Internacional de Agricultura Tropical (CIAT) at Kawanda Agricultural Research Institute
- The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) in respect to the National Oil Crops Development Organization (NODO) and their Training Department in Entebbe
- Uganda Co-operative Alliance (UCA)
- The Uganda Oil Seed and Processors Association
- The Joint Energy and Environment Projects (JEEP)
- COOPIBO-Uganda

At the district level we have the following additional partners:

Mukono District

- World Vision-Uganda
- Youth and Elderly in Society (YES)
- Wekembe Community Development Program

Iganga District

- Rural Education Program for Development (REPROD)
- Musubi Development Association
- Bukooma Sub-County Agricultural Extension Service
- Kugulu Development Group (KDG)

Tororo District

- Busiime Rural Development Association (BRDA)
- Tororo Arch-Deaconary of the Church of Uganda
- Abur Foundation for the Unfortunate People (AFUP)
- Osukuru Young Farmers
- Sindwala Rural Development Association
- BUSABI Development Aassoication

In Tororo some farmers' groups strongly feel that they should be officially recognized as collaborators on the same footing as NGO/CBO collaborators, arguing that they are as solidly organized. There are presently six such farmers' groups in Tororo with a total membership of 214 farmers--42% of whom are women.

While on partnerships and linkages, it should be noted that proposals submitted by four of our partners to a local donor for funding were all successful. COOPIBO-Uganda funded the partners on the strength of their participation in OFPEP in regard to technology diffusion.

There are at least 3 occasions in each season when partners formally come together with our Extension Specialists. These are: (1) Pre-seasonal Planning Workshops, (2) Training of Trainers Workshops and, (3) Seasonal Review/Consultative Workshops.

An extensive listing of all our partners can be found in **Appendix 3.**

D. Gender Program

The new Gender/Field Operations Specialist was hired and started her work at the beginning of the project year. One of her first tasks was to identify areas needing attention in the gender program. The gender specialist did this through discussions with OFPEP staff, collaborators and farmers themselves. The areas were described as follows:

Areas	Sub-topics
Gender and Agriculture	- Definition of gender - Gender and development - Gender role and imbalances - Food security - Impact of agricultural technologies.
Optimal use of Resources	- Environment and development - Time management - Energy saving technologies

Nutrition	-	Basic Nutrition
	-	Soybean utilization at home level
Extension skills	-	Mobilization, sitting arrangement, timing, situation.
	-	Religion, language
	-	Gender balancing

To address some of the concerns above, a combination of training and new technologies will be introduced. The technologies demonstrated were:

1. UNICEF or Dembe improved stove
2. Raised mud or lorena stove
3. Hay basket cooker (or smokeless stove)
4. Different recipes for preparation of soybeans; e.g. milk, chapatis and pancakes, balls and mixing with cereals to make both thick and stiff porridge.

In doing so, additional linkages were developed for the OFPEP program. A strong linkage has been developed with Joint Energy and Environmental Projects (JEEP). Its staff have been involved in all the gender training held so far, facilitating on environment and energy conservation. A member of the Association of Uganda Professional Women in Agriculture and Environment (AUPAE), which is an affiliation of Winrock's African Women Leaders in Agriculture and Environment Program, has participated in training, and Makerere University has been involved in the analysis of soybean for the trypsin inhibitor. This was to add impetus to our efforts to increase soybean utilization in homes.

Since the gender program is part and parcel of OFPEP, its overall goal is to increase food security in homes and the general welfare of families. Therefore all its activities must relate to increased food production and incomes. Sessions were held on sensitization on Gender and Agriculture which were aimed at helping communities understand issues of gender and its relation to development, food security (including production, access to agricultural inputs and training, and nutrition security) and eventually assessing the impact of OFPEP technologies (both positive and negative) on food security. Constraints to the woman farmer were also included.

The sessions on optimal use of resources were aimed at reducing the workload of the farmers especially women and therefore creating more productive time on the farm. In the long-run the communities are expected to have a better environment after the environmental conservation lessons and continued use of improved stoves. The nutrition component of the training and practical activities completes the chain of food security by ensuring that limited resources are managed with a focus on appropriate nutritional content for families.

Quite a few lessons have been learned during this last year of intensive gender training activities that are being incorporated into the OFPEP program. Thus, participatory

learning with the farmers, and applying it to introduced technologies, is the key to OFPEP's long-term success.

Because of the enormous amount of work needed in the gender area, and the potential for its impact, an assistant to the gender specialist has been recruited and also an additional extension/gender specialist for Mukono district has been hired. The program is also collaborating with other NGOs dealing with the same issues. The participation of women in the training has been lower than that of men when the training sessions are held away from their homes. Accordingly, efforts are being made to have training closer to where the women live to ensure their full participation. The campaign to use soybeans in the home and to encourage its continued production will stimulate farmers to expand production until they are able to reach commercially viable quantities of production.

E. Technical Assistance and Training

OFPEP staff are involved both in direct farmer training, and training of trainers (TOT). The numbers below reflect the total number of farmers trained by OFPEP staff and/or by its partners or lead farmers.

Table 16. Total number of farmers trained by technology

Technology	Men	Women	Youth	Total
Seeds & cropping	4,091	5,409	32	9,532
Soil fertility management	5,830	3,653	0	9,483
Cassava multiplication	3,323	5,420	4	8,747
Gender /agriculture/energy saving stoves	197	141	3	341
TOTAL	13,441	14,623	39	28,103

Source: OFPEP Extension Specialist and partner records.

Table 16a. Training of Trainers conducted

No. of TOTs	39	Subjects at TOTs Pre-seasonal planning, soils, seeds, cropping, gender and agriculture, energy-saving, rhizobial inoculations, on-farm soybean utilization, cassava multiplication. Demoplots layout, monitoring and evaluation.
No. of Male Participants	461	
No. of Female Participants	290	
No. of Youth	19	
Total No. of Participants	770	

Source: OFPEP Extension Specialists records.

Gender training: the gender activities are expected to cover all the areas reached by OFPEP. So far three TOTs have been conducted to cover all the OFPEP areas of Tororo districts. In the Tororo training, over 30% of the trainees were women. For Iganga district, only Busiki sub-county has been covered. Thirty-seven staff and lead farmers of Busiki Multipurpose Rural Development Association (BUMURUDA) were trained, of whom 16 were women.

All the OFPEP groups have requested and have been promised gender training either at district or sub-county level. The training will be organized in three phases:

1st Phase: Major TOT. 1-3 per district depending on the number of OFPEP farmers covered so far.

2nd Phase: Follow-up on the above TOTs. Note that the two phases can be done concurrently.

3rd Phase: More of the training at lower levels of sub-county or groups. This is intended to draw in more women and also intensify assessment of the impact of OFPEP technologies on women.

More information on the gender training program can be found in **Appendix 4.**

1. Training Materials

A variety of training materials are being developed and/or distributed to farmers and trainees on a variety of subjects.

- Trainers' guides are being developed to facilitate gender training at the grassroots level on the three components being handled presently, i.e. gender and agriculture, optimal use of resources, and soybean utilization.

- Simple teaching materials on health matters have been taken from UNICEF and distributed to participants at every training and some left at district offices. This is an effort to improve the standards of living in OFPEP areas.

- Several resource reading materials were received from and through the efforts of the PVO/University Center. These included the OFPEP Newsletter, the SPORE technical bulletin, the Lost Grains of Africa, and the African Farmer, among others.

- OFPEP staff made 3 study tours to both Kawanda Agricultural Research Institute and Namulonge Agricultural and Animal Research Institute to access new developments and share field data in the crops OFPEP is promoting.

- The PVO/University Center conducted a Monitoring and Evaluation (M&E) Workshop for both Extension staff and collaborators.

- The PVO/University Center also mounted a crash program in computer skills - especially in respect of the EpiInfo program for analyzing the M&E data - for staff of both OFPEP Kenya and Uganda in Kisumu, Kenya.

2. Meetings

In addition to regular meetings with collaborating agencies, a special meeting was called with interested participants to discuss marketing issues facing farmers and how to address them. The minutes from the first meeting of this group can be found in **Appendix 5.**

The staff of the OFPEP program have been recognized for their contributions to agricultural productivity through OFPEP's innovative approach and have thus been invited to participate in a number of national and regional conferences sponsored by the government and several bi-lateral donors. Some of these included:

- The Lake Victoria Environment Management Workshop.

- A Regional Workshop on Strategies for Food Security and Agricultural Development.

- A National Agricultural Research Organization (NARO) National Workshop on Review and Planning of Maize Research. This workshop emphasized the participatory approach well-known to OFPEP.

- An International Workshop of the Cassava Biotechnology Network to review achievements and bottlenecks in cassava research with a focus on Africa's needs. This workshop was also intended to promote collaboration.

- A Ministry of Agriculture, Animal Industry and Fisheries - convened meeting to consider the formation of a National Oil Crops Development Organization (NODO).

- An East Africa Root Crops Research Network (EARRNET) workshop whose emphasis was the cassava crop.

3. Technical Assistance

OFPEP has distributed crop growers' guides produced by the Uganda Seed Project at Kawanda to trainees and collaborating organizations. Our own farmer's production guides on various crops, however, are held up by the artist who has not finalized the illustrations.

In Tororo district, our Extension Specialist provided technical assistance to the Department of Agriculture to train their staff in the use and application of rhizobial inoculants. The Extension Specialist also assisted the Tororo District Farm Institute (DFI) Training Center, in setting up demonstration plots for soybeans (Nam2) with rhizobium inoculation.

The Uganda Co-operative Alliance Ltd. also received technical assistance in obtaining soybean rhizobium for five of their districts, and their extension agents also received training in the PRA method of communicating with the farmers.

A Makerere University post-graduate student received technical assistance in his field project on soybeans and rhizobium.

OFPEP assisted the Uganda Oilseed Processors Association (UOSPA) Extension Specialist by providing accommodations in our Iganga offices thus giving him the much needed close collaboration to promote oilseeds - including soybeans - in this district.

III. Project Results

A. Impact

1. Adoption Rates

As adoption rates are considered to be an acceptable and desirable measure of project success, we can say that OFPEP Uganda is showing impressive results in the adoption of

improved seed varieties. Year IV of OFPEP has seen a dramatic increase in the number of farmers adopting OFPEP-introduced seeds and methods of on-farm selection, harvesting and storage of improved seed varieties. More than 12,000 farmers are now adopting these improved seeds, an increase of more than 350% over the past year.

Table 17. Number of farmers adopting various technologies

Technology	Men	Women	Total
Soil conservation	2,878	4,316	7,194
Soil mending	2,353	2,762	5,115
New seeds	4,884	7,325	12,209
Row cropping	2,271	2,181	4,452
Rhizobia application	256	475	731
Energy-saving stoves	0	327	327
On-farm soybean utilization	115	200	315
Calliandra	154	102	256

Sources: OFPEP Extension Specialists' records.
Note: Adopters outside of the OFPEP farmers' groups are not included in the above data.

Sample surveys carried out in each of the three districts (Mukono, Iganga and Tororo) in which OFPEP is operating show that new seed varieties are the intervention with the widest use. The adoption rates for new seed varieties lie between 36 and 40%. The second technology attracting significant adoption rates is row-cropping. Calliandra and inoculation of seeds with rhizobia are the slowest moving technologies in terms of adoption. Sample survey data on adoption may be summarized as follows:

Table 18. Ranking of adoption rates of all OFPEP-introduced technologies from a sample of male and female farmers in two OFPEP districts

Technology	Adoption ranking
New seeds	1
Row-cropping	2
Soil conservation	3
Soil mending	4
Energy-saving stoves	5
On-farm soybean utilization	6
Rhizobial inoculation	7
Calliandra	8

Source: OFPEP Extension Specialists' records.

Note: The rankings above are not entirely fair comparisons of the acceptance of the technologies by the farmers for the following reasons:

First, some technologies such as energy-saving stoves and soybean utilization are recent introductions.

Second, the calliandra seeds and rhizobial inoculants are difficult to obtain in sufficient quantities to foster increased adoption.

Third, for soil improvement to be done properly, additional farm equipment such as wheelbarrows, shovels, ox carts, and above all, some inorganic fertilizers, are needed to supplement any animal manuring and/or composting.

Closely related to adoption as a measure of impact is, what evidence does OFPEP have to show that the technologies it is introducing are diffusing through farmers themselves? Is the trend of the farmer-to-farmer diffusion upward?

In each district, we now have at least one lead farmer who has become a seed producer/distributor. These farmers are now selling improved seed to other farmers including those who are not members of their farmers' group. The next step is for these lead farmers to access the improved seed directly from the Uganda Seeds Project at Kawanda Agricultural Research Institute for their multiplication efforts. This should happen during the final year of this phase of OFPEP.

2. Increase in Income

Another measure of the impact the technologies are making on the farmers' welfare is in terms of food security and surpluses for cash to meet other domestic needs. The M&E survey forms are citing an increased number of farmers who attest that their food security has improved with the OFPEP technologies, and that they are even generating some income. The use of income has been reported as follows:

Table 19. Uses of increased income among a sample of 49 households

How used?	% of Farmers
Acquiring new farm land	4%
Farm improvement including implements	4%
Petty trade business	10%
Household needs	20%
Paying school fees	50%
Building construction	8%
Hiring extra labor	2%
Paying dowry	2%
TOTAL	100%

Source: Monitoring forms from a randomly selected sample of 49 farmers in Tororo district.

3. Gender Implications of Project Impact

The overall aim of OFPEP technologies is increased productivity and improved living standards for the rural family. It should, however, be noted that the technologies promoted may have a positive or negative effect on food production according to who is adopting the technology. Therefore, a good understanding of such impact can greatly enhance the work of OFPEP.

The family allocation of farm labor in the program area is such that men are mainly involved in activities with financial and social benefits. These include growing or rearing and sale of farm production (non-traditional cash crops inclusive). Women are involved in activities of domestic concern like food production, cooking, fetching water, collecting firewood, nursing children etc. With this in view, who adopts what technology and who is likely to be affected by each can easily be understood by analyzing the technology itself.

- **Seed Technologies**

The introduction of improved seed varieties has led to increased food production. In addition to assured food security, the families get better diets and surpluses for sale which uplift the economic status of the families. The biggest advantage of high yielding improved varieties is that the farmer, especially the woman with multiple roles, cultivates less and harvests more.

Case Studies

A farmer in Usukuru sub-county (Tororo) district planted 2 kg. of K131 bean and harvested 110 kg. Wafula in Buhwama harvested 100kg out of the same amount planted. Wafula is a lead farmer of a group with 12 women and 14 men. These yields are double what the local varieties have been yielding.

In Baitambogwe (Iganga district), one farmer planted 20kg of improved soybean (Nam1) which yielded 700kg. The family was able to buy building materials and put up a shelter during the subsequent season.

The cassava story: According to the surveys, this crop ranks as the No.1 food crop in the 3 districts. Unfortunately, in many areas cassava had been wiped out by the African Cassava Mosaic Virus (ACMV). Hence, food security is being seriously affected. Through OFPEP, ACMV tolerant varieties (NASE 1&2) have been introduced. Last year (1995) in Iganga, 11.5 acres were planted for multiplication and more than 31 acres have been planted this year. 541 women benefited from the training. Planting materials are now flowing into Tororo district where 5 women's groups. The people now have hope.

OFPEP seed demonstrations have minimized the risks of:

- **Planting seeds of low viability and poor quality**. The introduction of pure and clean germplasm at the demonstration and adoption level and emphasis of on-farm seed production activities has resulted in greatly improved seed stocks for farmers..

- **Adoption of technologies and varieties that may not be relevant or suitable to the farmers' environment.**

- **Incidence of diseases and pests related to management practices.** This has been possible through emphasis on improved agronomic practices.

All the above factors have resulted in optimal use of farm resources (land, labor, time and money) which can be reallocated to other activities like domestic work, agricultural training, and other community activities that can enhance the wellbeing of families.

A sustainable source of improved seed and viable planting materials has been created through OFPEP efforts, which have reduced problems of late planting and dependence on external sources.

Negative effects/implications of seed technologies. It is important that the negative effects/implications of OFPEP seed technologies, as well as positive ones, be identified and analyzed. Agronomic practices (like row cropping, counting of seeds [seed rate], thinning, etc.) turn out to be more labor intensive in the short run than local practices. This puts more pressure on the already busy schedules of farmers, especially women. Such useful practices end up being applied more to crops produced for cash, where men are involved, than to food crops. In the long run, food security in homes is affected. The women are also viewed as low adopters. This issue is being addressed by the Gender Program.

During a collaborator's meeting held in Iganga, marketing ranked high as a problem for all the 15 groups. This is another factor limiting continued utilization of some seed technologies. Though OFPEP has limited funds and manpower to handle marketing issues, it has made contacts for the farmers to a number of potential buyers of the crops especially soy; for example, Mukwano Industries, Investment in Develop Agriculture Reports (IDEA), Kolpings, etc. Recommendations from a paper by Ben Ekoot could also be implemented if funds were available.

- Increased production is also likely to create family tension where there is a distinct division of roles. The women may claim more control of benefits from the food surpluses they produce. On the other hand, the men might refuse them or feel their financial status is threatened.

In an interview with trainee groups in Tororo and Iganga during the cassava multiplication TOT, men, women and children were all found to be involved in production, but marketing was mainly done by men. This was because they had bicycles, "but a carefully veiled reason appeared to be that they wanted to control funds" (reported by Dr. Moses Onim).

- **Soil Technologies**

OFPEP soil technologies have helped smallholder farmers both to conserve and improve the fertility of their soils. *In Busaba and Adhola subcounties (Tororo district), the gullies are filling and farmers are very excited.*

As a prerequisite to using soil amendments, OFPEP has assisted in carrying out soil analyses to establish the soil status in some areas. The results have filled a missing link in the agricultural systems wherever the analyses have been carried out. The collaborators and farmers are very grateful. *"I tried to look for this kind of information from district*

headquarters but in vain, yet it is very important when dealing with soil fertility" one coordinator of a collaborating NGO commented.

Negative implications of soil technology. In most cases, soil conservation and fertility enhancement activities appear to farmers to be an extra load, different from their usual farming and unlike those concerning seeds. To make matters worse, benefits are generally not felt or seen in a single season. Although the small holdings average only 1-2 acres, farmers find it difficult to apply the technologies to the whole area. For example, the digging of terraces, application of manure, and making of compost are all labor intensive. In some cases, farmers have become discouraged and not adopted the practices at high rates. *In Magamaga (Iganga) farmers were requesting wheelbarrows to carry compost manure to far gardens.* In the long run, sensitization and increased incomes resulting from the improved technologies will enable farmers to overcome their doubts.

In addition, there are gender and social implications of these technologies. Most of them are viewed as better applied by the land owners who may not necessarily be the cultivators. For example, women do not want to get involved in planting trees which they will never own, or improve land which does not belong to them, but to their husbands. On the other hand, if women take up such technologies, men might feel threatened. "We cannot plant the grass bands because the land was specifically lent to us to plant soy beans" one woman's group reported. This group (Poyameri United Women's Association, PUWA) is composed of 24 women and 5 men. OFPEP intends to handle this sort of problem through creating awareness of the overall benefits of such technologies to farm families and communities.

In conclusion, the impact of a technology on food production depends on at least three factors:

- the social-cultural implications and economic benefits perceived by the adapters/adopters;
- its relationship to already existing roles;
- the existing farming systems in the area.

In most cases, a technology with negative implications achieves a low adoption level. This, in turn, affects the amount of food produced. The fact that women in Uganda, who are the major producers of food consumed in rural homes (over 75%), have other multiple off-farm duties results in limited enthusiasm to adopt labor-intensive technologies. Their restricted access to land and farm benefits affects food production even more. For further information on the impact of some on-farm technologies of food production, please see **Appendix 6.**

B. Evaluation Through Farmers' Eyes Photography Project

We highlight this technical assistance in its own section because it was new, frustrating, and yet interesting. Mary Lou Surgi of the PVO/University Center introduced the concept and donated four disposable cameras for this exercise. Each of the four farmers' groups which participated (2 in Iganga and 2 in Tororo) took photographs of OFPEP-related activities/ results and picked out 5 photos which to them portrayed OFPEP in their lives and at its best. Some of the photographers in these groups had never handled a camera before and quite literally took their time about the project. In two of the cameras, many shots did not turn out well. However, in the end the farmers said they had enjoyed the exercise very much, and the result--a graphic depiction of the impact of OFPEP through farmer's eyes--is probably the most important impact of all. The details of this exercise are to be found in **Appendix 7.**

C. Lessons Learned

As OFPEP completes its fourth year of activities, the staff, partners and farmers have faced many situations, problems and opportunities that they have used to learn from and to improve their approach and interventions. **Table 20** presents some of these problems and how OFPEP staff and farmers are addressing them.

D. Future Plans

In the fifth year we plan to do the following:

- Intensify follow-up of trainers developed through TOTs to encourage them to exemplify OFPEP technologies on their own farm lands.
- Increase contact meetings with collaborators to address the issue of monitoring of both the demonstration plots and adopters.
- Acquire more ACMV-tolerant cassava planting material for multiplication.
- Increase the number of farmers' exchange visits.
- Complete publication of OFPEP farmer's production guides.
- Intensify on-farm utilization of various crops through OFPEP gender activities.
- Increase efforts in soil conservation and fertility-mending.
- Open up the remaining sub-counties.
- Expand disaggregation of data by gender, geography and levels of income.
- Complete an overall assessment of the 5-year program: objectives met, sustainability, impact on food security, protection of the environment, and quality of life of targeted households and communities; institutionalization of OFPEP's approach and technical messages.

Table 20. Some challenges and possible solutions

	Challenges	Solutions/Recommendations
1.	Farmers have continued to press for direct seed loans to them. The revolving seed loan scheme through collaborators is not popular with the farmers.	The revolving seed loan scheme has been tried only for one year. We need to strengthen the capacity of our collaborators to run this scheme. We should give it more time.
2	Expansion of acreage is difficult to achieve with hand hoes. Animal traction or tractors are needed to open more land.	As a minimum, animal draught power should be vigorously sought wherever feasible. Assistance may be sought from NGOs to promote this technology.
3.	Farmers do not make their orders for rhizobia in time; and rhizobia producers are still rather slow in meeting orders.	Collaborators should take orders for rhizobia at least two months in advance of the date for rhizobia application.
4.	The Uganda Seeds Project sometimes does not have the seeds needed in stock.	Attempt to get multiplier seed at least for demonstrations only to fill the gap.
5.	Some collaborating NGOs (and they are the majority) lack funds for their own activities. They somehow (albeit indirectly) look to OFPEP to support them.	Inspire them to start own income-generating activities. Enhance their project proposals writing skills to apply to other donors.
6.	Lack of farm credit limits farmers' capacity to expand production.	Farmers' groups should initiate group savings.
7.	Low farm gate prices during the harvest period.	Farmers should be encouraged to improve their storage to stagger supply throughout the year so as to achieve price stability. They should also form marketing associations for collective bargaining.
8.	Collaborators need to do more training.	Together with lead farmers, the collaborators involved in training deserve a pat on the back through reimbursement of their training expense.

Kenya

I. Introduction

A. Project Structure and Management

OFPEP-Kenya continues to intensify its efforts in six districts in western Kenya. Several staff changes have taken place over the past year, including the addition of several volunteer and full-time staff to help meet the demands for increased services from OFPEP (see Organizational Chart - **Figure 5**).

Dr. J. F. Moses Onim is the OFPEP East African Coordinator. He provides direct leadership in both administrative and technical matters for OFPEP-Kenya and is in charge of overseeing activities in OFPEP-Uganda and OFPEP-Ethiopia.

Ms. Rose Sigar is the program extensionist. She is in charge of overall technical aspects of program operations activities, provides supervision of administrative assistant, and assists with field and office duties involving writing reports.

Ms. Caroline Sikuku, field extensionist, joined the program in April 1996 as an extension specialist in charge of Siaya district. Her responsibilities are overseeing all program activities in Siaya district including: recruiting collaborators and farmer groups, monitoring and evaluation of the demonstration and adoption fields; and liaising with collaborators in Siaya district to ensure smooth running of program activities in the district. Other duties include collection and analysis of data from the demonstration and adoption plots, preparation and submission of detailed monthly reports on all program activities in the district, and training of NGO staff and farmers.

Mr. Henry Ouko, accountant/assistant extensionist, joined the program in mid-March, replacing Mr. Chrispine Okoth who left in December 1995. He prepares monthly financial reports and helps with field activities whenever necessary.

Mr. Nelson Omondi, field extension agent helps to oversee and supervise program activities in the field, with special attention to Kisumu. He is also responsible for supervising and monitoring research activities done in collaboration with Lagrotech consultants, and collecting and analyzing data from these fields. Mr. Omondi also produces illustrations for various audio-visual materials for OFPEP and its partners.

Mr. Erick Omondi, formerly a volunteer student intern, is now field extensionist in charge of Homabay and Migori districts. His responsibilities include overseeing all program activities in the districts including: recruiting collaborators and farmer groups; data collection and analysis; monitoring and evaluation of the demonstration and adoption fields; liaising with collaborators in Siaya district to ensure smooth running of program activities in the district;

Figure 5

Management and Organizational Chart of OFPEP/Kenya

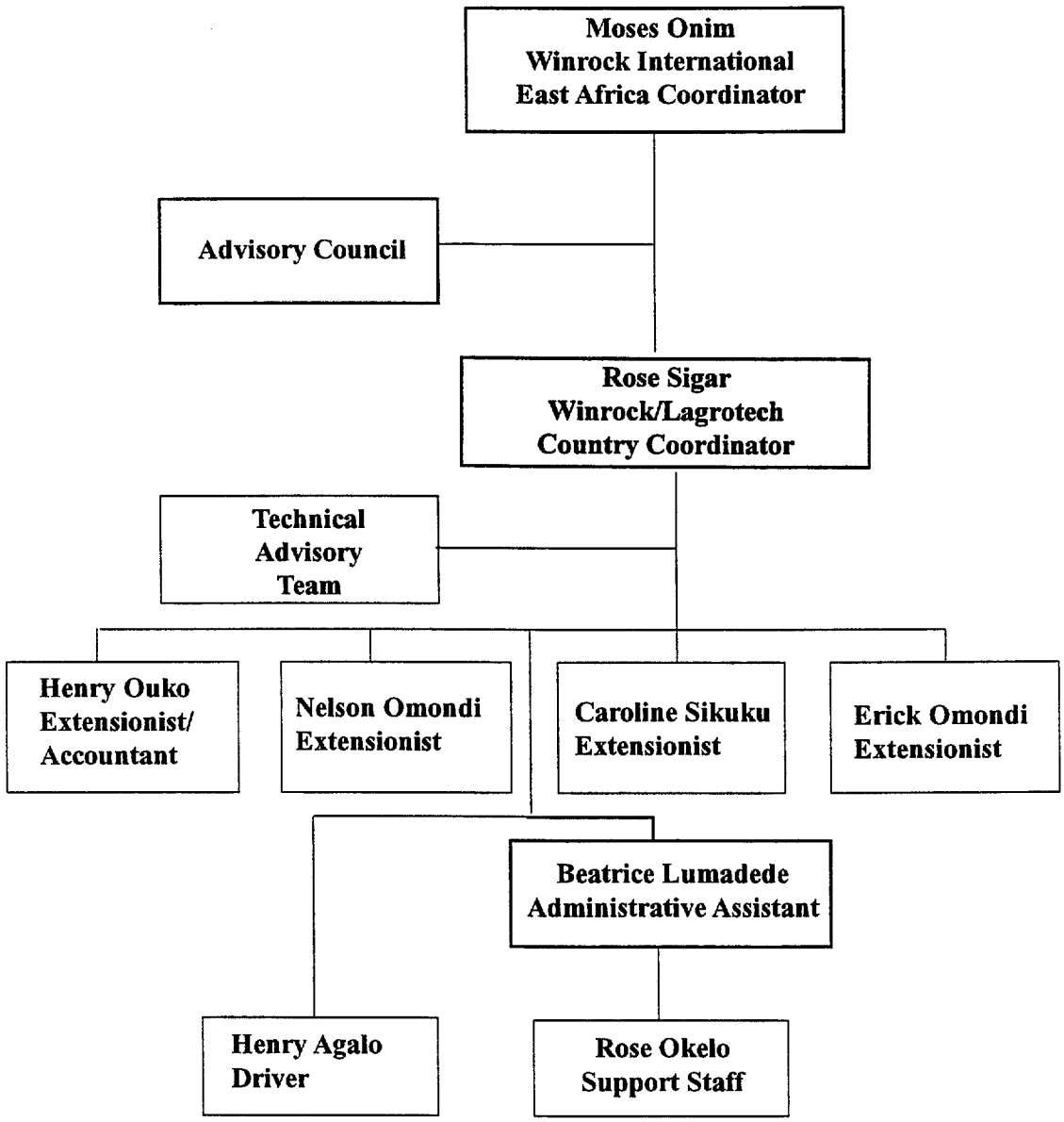
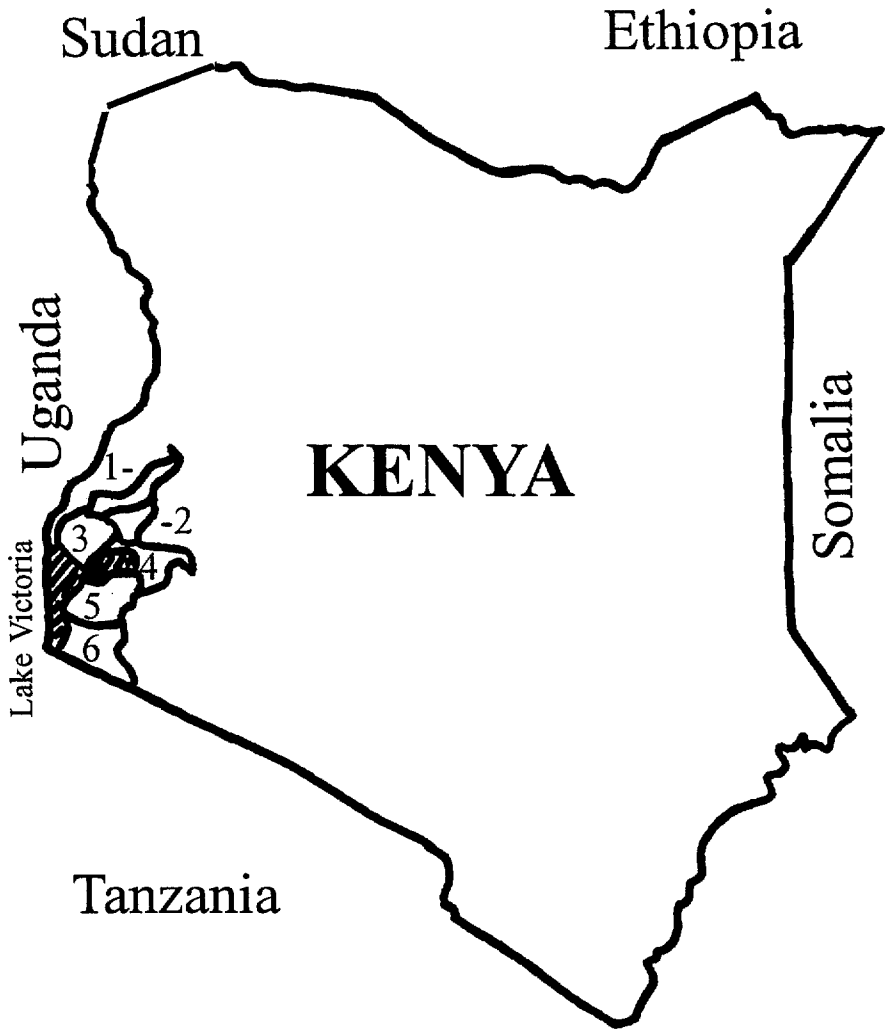


Figure 6

OFPEP/Kenya
Activity Sites



1= Kakamega
2= Vihiga
3= Siaya
4= Kisumu
5= Homa Bay
6= Migori

preparation and submission of detailed monthly reports on all program activities in the district; and training of NGO staff and farmers.

Ms. Beatrice Lumadede, administrative assistant is in charge of office administration OFPEP-Kenya financial accounting, and computer word processing and data analysis.

Mr. Henry Agalo, program driver, whose duties also include assisting program extension staff in the field.

Mr. Boaz Oloo started off as a volunteer in charge of goat activities but has now been absorbed as a full employee of the program as an assistant field extensionist (Livestock/Crops).

Mr. Robert Collins Ondigo, the country coordinator, retired from his position in early March, 1996. Timothy Ayieko left the program late last year. He was the program driver.

B. Overall Approach

To help increase the farm productivity for the small-scale resource-poor farmers, it is important that they have increased access to improved technologies. Alternatively, farmers' own indigenous technical knowledge can be improved through collegial research (i.e researchers working with farmers to improve on the technologies they already know).

To achieve this objective, OFPEP-Kenya and its collaborators establish demonstrations within the rural communities. Both local and improved soils and seed technologies are being tested. The idea is to bring to the community improved technologies and compare them against their own. In those cases where the new technologies outperform farmers' existing technologies, there is a clear demonstration that should convince farmers. Should the local technologies perform better, then OFPEP/Kenya staff together with project partners work with farmers to improve on them (e.g., seed selection). In addition, farmers are trained at the demonstration sites on proper use of the improved technologies (e.g., fertilizer application). The table below shows a summary of the number of demonstration sites established during the past 12 months and the number of sites at which training was conducted.

II. Project Activities

A. Seed and Cropping Techniques

In Western Kenya, where OFPEP operates, only about 30% of the farmers use commercial improved seeds. This is according to an informal survey conducted by the Ministry of Agriculture Livestock Development and Marketing (MALDM). The other

70% use on-farm selected seeds, seeds bought from the market, or seeds borrowed from neighbors.

OFPEP-Kenya has had an uphill task of creating awareness among the rural farming communities on the importance of using improved seeds and in training farmers on better methods of on-farm seed selection. The major method has been establishing crop variety demonstrations in the farmers field where the commercial improved crop varieties are compared to farmers' local varieties. There have been instances where farmers' varieties have out yielded improved varieties.

Table 21. A summary of the number of demonstration sites established and the number of trainings conducted in OFPEP-Kenya.

	Activity	# of Sites		Partners
		SR95	LR96	
Improved Seeds	Maize varieties	17	19	LAGROTECH, CCF, CARE, PCV, GRAIL
	Bean varieties	17	19	LAGROTECH, CARE, GRAIL, PCV
	Soya varieties	17	5	LAGROTECH, CCF, C-MAD, CARE, GRAIL, PCV
	Groundnuts varieties	0	15	LAGROTECH, CCF, C-MAD, CARE, GRAIL, PCV
	Seed storage trials	7	0	CARE, WV, LAGROTECH, CCF
	Sorghum varieties	0	14	LAGROTECH, CCF, C-MAD, CARE, GRAIL, PCV
Soil Improvement measurement	D.A.P. inorganic	17	8	LAGROTECH, CCF, CARE, PCV
	fertilizer	17	25	LAGROTECH, CCF, CARE, PCV
	Animal/farm yard	37	25	LAGROTECH, CCF, CARE, PCV
	manure	17	19	LAGROTECH, CCF, CARE, PCV
	Compost	17	30	LAGROTECH, CCF, C-MAD, CARE, GRAIL, PCV
	Rhizobial inoculants			
	TSP			
TOTAL		163	179	
Capacity Building	Training of trainers	2	1	All collaborators
	Training of farmers	17	30	All collaborators

Note: SR - short rains; LR - long rains.

In the short rainy season of 1995 and long rains of 1996, a total of 100 variety demonstrations were established in 36 sites in the areas where OFPEP-Kenya operates. The crops demonstrated were cereals (different varieties of sorghum and maize), and legume crops including food beans, soybeans, and groundnut. As stated in previous reports, the objective of the demonstrations was to bring to the attention of the farmers differences in performance of various crop varieties recommended for their regions. The farmers should then be able to choose the best yielding crop varieties to adopt.

Lagrotech Consultants, in collaboration with OFPEP, is undertaking a seed screening/ research on 14 improved maize seeds. The purpose of the trials is to gauge varietal differences in terms of grain yield and duration to maturity, and secondly, to compare the performance of the varieties in DAP fertilizer and control plots. These trials have been conducted in four sites. The results from the research will be reported in the next quarterly report.

B. Soil Fertility Management

Soil management activities of OFPEP-Kenya aim to combat problems of poor soil fertility and land degradation. The program targets rural households, who typically live on marginal lands. Poor soils prevent these farm households from accumulating enough resources to invest in improving their lands. Low investments, in turn, lead to steady deterioration in land quality.

OFPEP-Kenya assessed soil fertility by comparing crop responses to various fertility amendments in on-farm demonstrations. The results indicated that one can expect additional grain yield of between 65-100% above control by applying DAP either singly or in combination with organic manures. By applying only animal manure to improve soil fertility, increased maize grain yields were 59.3%. A best cost practice is, therefore, using combinations of organic manures with DAP at half rates.

The results also bring out clearly the fact that inputs of phosphorus is essential if inoculant is to enhance legumes yields. On its own, inoculant does not have a significant effect on field bean yields. In the short rains for 1995, yield of field beans were actually reduced by 6.3% below that of the control. However, that of soybeans increased by 11.4% for both inoculant and combination of inoculant and TSP **(Table 22).** TSP enhanced yield of soybeans by only 9.7%. TSP alone and TSP/inoculant increased yields of field beans by 28.6% and 57.5%, respectively. Moreover, yield data from long rains of 1996 indicate that inoculant enhanced the yields of field beans, groundnuts and soybeans **(Table 23).** However, the percentage of increase yields of field beans over control was only 15.9% compared to over 100% increase of inoculant plus TSP.
Still, for farmers unable to purchase inorganic fertilizer (TSP), the use of only inoculant can also give a good yield, particularly for soybeans and groundnuts while giving marginal yield increases for field beans.

Following the poor enthusiasm recorded for compost as a technique of improving soil during 1995 long rain demonstration (see OFPEP second annual report to USAID), OFPEP-Kenya embarked on a rigorous training for farmers on compost making. The rationale for this training was that:

- To increase crop production, use of inorganic or organic fertilizers is essential;

- Availability and cost of inorganic fertilizers is a major constraint to crop production;

- For resource-poor farmers, preparation and use of compost remains an interesting option as one of the few ways they can afford to improve soil fertility.

Table 22. Crop yield in relation to fertilizers from the demonstration of the short rains of 1995.

Crop	Fertilizers	Yield per Plot 24M^2 (Kilos)	Yield per Hectare (Kilos)	% Increase Over Control
Maize MDC	DAP/Animal Manure	6.14	2558.3	100.0
	DAP	5.05	2112.5	65.1
	A/Manure	5.00	2083.3	59.3
	Control	3.07	1279.2	-
Field Beans GLP92	TSP/Inoculant	2.75	1145.8	57.5
	TSP	2.25	937.5	28.6
	A/Manure	1.94	808.3	10.8
	Inoculant	1.64	683.3	-6.3
	Control	1.75	729.2	-
Soybean Nam1	TSP/Inoculant	1.75	729.2	11.4
	Inoculant	1.75	729.2	11.4
	TSP	1.70	788.2	5.7
	A/Manure	1.50	625.0	3.3
	Control	1.55	645.8	-

Table 23. Crop yield in relation to fertilizers from the demonstrations of the long rains of 1996.

Crop	Fertilizers	Yield per Plot $24M^2$ (Kilos)	Yield per Hectare (Kilos)	% Increase Over Control
Maize MDC	TSP/A. Manure	6.58	2595.8	21.9
	TSP	7.06	2941.7	38.2
	Compost	6.86	2991.7	40.5
	A/Manure	7.12	1966.7	39.3
	Control	4.85	2129.2	-
Sorghum Seredo	TSP/A. Manure	5.13	233.3	91.1
	TSP	5.10	2125.0	74.1
	Compost	4.83	2112.5	73.0
	A/Manure	5.56	2316.7	89.8
	Control	2.93	1220.8	-
Field Beans Lipala	TSP/Inoculant	4.99	2076.2	102.9
	TSP	4.79	1995.8	94.7
	Inoculant	2.85	1187.5	15.9
	A/Manure	3.44	1433.3	39.8
	Compost	3.59	1858.3	81.3
	Control	2.46	1026.0	-
Soybean Nam1	TSP/Inoculant	11.39	4745.8	147.1
	Inoculant	6.20	2583.3	34.5
	TSP	6.87	2837.5	47.7
	Compost	7.93	3304.5	72.0
	A/Manure	8.13	3387.5	76.4
	Control	4.61	1920.8	-
Groundnuts Red Beauty	TSP/Inoculant	2.26	941.67	4.63
	Inoculant	3.17	1320.83	46.76
	TSP	4.17	1737.50	93.06
	Compost	4.49	1870.83	107.87
	AM	3.21	1337.50	48.61
	Control	2.16	900.00	-

Demonstration emphasized making compost using locally available materials. Farmers were trained in various methods of making compost. One such method is shown in **Appendix 8**. The number of farmers trained in compost making technologies are shown in the table below.

Table 24. Number of farmers trained in making compost.

	# Trained	% of Total
MEN	124	33.51
WOMEN	196	52.97
YOUTH	50	13.51
TOTAL	370	

To assess the quality of manure to be used in the demonstration plots, samples and matured compost were collected and analyzed from the Kibos Sugar Research Station. The results are in **Appendix 9**. Comparisons were made of the quality of the compost before the farmers received training and after training on compost making by both the collaborators and OFPEP staff. The results indicate that there was substantial improvement in the quality of the compost after the farmers had received training. This was later reflected in yields from the demonstration plots.

Using what they learned from one compost demonstration training conducted in Luanda division of Vihiga district, several of the training participants made their own compost. We had the opportunity of visiting six of these farmers and were able to collect samples for analysis to verify the quality of the materials used. The results from the laboratory analysis are being shared with the farmers. Most of the farmers visited expressed an interest in continuing to make the compost.

C. Partners and Collaboration

In addition to the nine organizations reported on last year, several additional church and youth groups have approached OFPEP Kenya for assistance. Activities and trainings are being planned for the next rainy season (October, 1996). The addition of these grassroots groups will enable OFPEP staff to extend the technologies to an even wider audience. A map showing the districts where OFPEP and its partners are working can be found in **Figure 6.** OFPEP Kenya is also enhancing its collaboration with the Peace Corps. It began work with three new volunteers in the short rains of 95 and has also provided technical assistance in the production of a book for elementary schools on conservation of the environment.

D. Other Technical Interventions

1. Agroforestry

During one of his trips to Uganda, Dr. Moses Onim brought in a leguminous creeping plant known in the local Ugandan language as "Mukuna." "Mukuna" is known to

improve soil fertility. It has been put under trial locally by a Lagrotech consultant. Should its performance in improving soil fertility surpass or compare well with those of already known soil improving shrubs, OFPEP will include it in some demonstrations set up in the farming community. In addition, Lagrotech has been carrying out agroforestry trial/demonstrations using *Sesbania sesban*. The purpose of this trial is to verify whether using sesbania under short term improved fallow (1 to 2 yrs) does enhance soil fertility as has been well documented. If the experiment proves it works under field conditions, then OFPEP will establish multiple on-farm demonstrations.

2. Farmers Training/Field Day on Soybean Utilization

After 1995 long rain demonstrations, one of the lead farmers, Mr. Alex Mboto, decided to expand acreage under soybeans. He planted about one-half of an acre of soybean varieties, Magoye and Nam1. OFPEP, in collaboration with CARE-Kenya, used this opportunity to create further awareness in the surrounding of the benefits of soya and its high nutritive value. Mr. Mboto's farm was used as a field day site with specific emphasis on soya utilization. OFPEP used the expertise of CARE-Kenya staff in home science to train farm families in the various ways of using soybeans **(Appendix 10)**, while OFPEP staff trained the farmers on the agronomic aspects of soybean production **(Appendix 11)**. The number of farmers trained during this field day were 72, this included 37 men, 18 women and 17 youth. Also attending the field day were Ministry of Agriculture field staff and other collaborating NGO staff. A journalist from a leading local daily newspaper was invited to attend and report on activities.

3. Traditional Seed Storage Demonstration

A detailed replicated seed storage demonstration comparing the effectiveness of traditional seed storage technologies to a recommended commercial seed storage pesticide, Actellic Super (250 g primiphos methyl per liter), was set up in seven sites in three districts in western Kenya with collaborating NGOs. The seed storage technologies being tested include hanging maize cobs under the roof eaves, hanging the cobs outside under tree branches and hanging cobs over cooking places, mixing the seeds with sand at a ratio of 1 sand to 2 seed ratio, and wood ash as preservatives **(Appendix 12)**. After a period of six (6) months, observations were made on the effects of each treatment on the condition of the seeds and germination tests conducted. Their results can be found in **Appendix 13.**

4. Cassava crop

Cassava, a main crop in many parts of Nyanza and Western provinces, is threatened by incidence of the disease African Cassava Mosaic Virus (ACMV) encroaching from across the border in Uganda. To combat this disease before it reaches an alarming level, OFPEP-Kenya has initiated a Baseline Survey on the disease incidence in parts of Siaya district, Ugunja division, bordering Uganda (see **Appendix 14**). These surveys have been done in other Divisions of Siaya district. A training in collaboration with NARD and KARI is

scheduled for December 1996. The collaborators will aid in conducting the survey and then train farmers in the use of clean planting materials and on rapid methods of cassava multiplication.

E. Training and Technical Assistance

1. Farmer training

Table 25. Number of farmers trained on all OFPEP introduced technologies* from all demonstration sites

MEN	875
WOMEN	720
YOUTH	1,048
TOTAL	2,643

* Technologies include improved seed varieties, organic and inorganic fertilizers, inoculants, inoculant/fertilizer combination, compost making and agronomic practices, soybean utilization, traditional seed storage, demonstrations, and crop surveys.

The figures above include farmers trained by the collaborators after attending Training of Trainer organized by OFPEP and those trained by OFPEP staff independently and in collaboration.

2. Student Field Assignments

OFPEP being a technically oriented program has attracted a number of students from various agricultural institutions on field assignments. The program has at the moment six students attached to OFPEP, one of whom has already graduated but has joined the program as a volunteer. The students are mainly involved in field activities and assist the extension agents and staff from our collaborating organizations.

3. Training Materials and Technical Assistance

Kenya Agricultural Research Institute (KARI) has continued to provide technical support in soil sampling and chemical analysis, in addition, OFPEP has also requested KARI to analyze compost and manure samples collected from the farmers and used in the 1996 long rain demonstrations plots.

A Training of Trainers workshop on soil management was conducted between 27 - 28 November, 1995. Attending this workshop were 28 participants drawn from government ministries and collaborating NGOs. The participants were trained on various aspects of soil management **(Appendix 15)**. In addition, 10 training sessions were held for farmers

at the sites where 1995 short rain demonstrations were conducted. A total of 224 people were trained, of whom 129 (57.6%) were women, 80 (35.7%) men and 15 (6.7%) were youth.

To aid in training the farmers during the field day on soya utilization, various training materials were prepared and distributed to the farmers. These included reading materials describing appropriate agronomic practices and pictorial training aids on ways of using soybeans.

Some of the training materials developed and other examples of technical assistance provided are listed below:

Training Materials Developed and Distributed. (Examples can be seen in the appendices): OFPEP-Kenya has developed a number of training materials to aid in Training of Trainers and in training farmers. They include:

- A-FRAME;
- training guidelines that are given to farmers during the training sessions;
- training modules on seed selection, storage and soil conservation.
- Peace Corps booklet

Requests for Technical Assistance: CARE-Kenya requested that training be provided to their community extension workers in Siaya district. CARE-Kenya requested for training in the use of A-FRAME. This will be organized for at a later date.

Requests for Technical Information, Newsletters, Research Information (and how they were handled):

- Ten members of the Technical Advisory Team requested that the combined OFPEP East African articles be considered for publication in the "Of Soils and Seeds" newsletter. These were produced and distributed to them.

- One collaborator, Sustainable Community Oriented Development Program (SCODP), requested and was given training modules on seed selection and storage to help them in training farmers.

- KARI, in collaboration with the University of Nairobi, is in the process of conducting national research on the effectiveness of documented trap crops of striga weed (*Striga hermonthica*). The team requested that OFPEP-Kenya provide it with varieties of soybeans being promoted by OFPEP. Soybeans being one of the OFPEP-introduced crops, the team was provided with two of the varieties.

Advisory Council and Other Meetings Held During the Period

- One Advisory Council (AC) and three Technical Advisory Team (TAT) meetings were held during the reporting period. Attending the AC meeting were the regional coordinators and top leaders of the collaborating organizations. The TAT meetings were attended mainly by staff in charge of agricultural activities of the collaborating organizations **(Appendix 16).**

- OFPEP East Africa meeting. On 4 - 5 December 1995, Dr. Moses Onim, OFPEP East Africa coordinator, organized a bilateral meeting for OFPEP staff from both Uganda and Kenya. The objective of this meeting was to consult and adopt a common strategy of program implementation in the two countries **(Appendix 17).**

- International Workshop. From 11-16 February 1996, the OFPEP director, Dr. Pierre Antoine, in collaboration with OFPEP coordinator at the PVO/ University Center, Ms. Mary Lou Surgi, organized a workshop for OFPEP staff from all countries in which OFPEP operates. The workshop which was highly successful was used as forum for discussing activities in each country. The report on the workshop is out and can be made available on request.

- Training for staff on using computers in monitoring and evaluation was organized in May 1996 for staff from Kenya and Uganda.

F. Photography as an Evaluation Tool

1. Problems of Soils and Seeds as Seen Through the Farmers Eyes

This activity involved the use of cameras by the farmers to portray visually what they think and feel are some of the most important problems of soils and seeds that affect their communities. Being a pilot exercise only one youth group was selected to undertake the activity, the grail youth groups. These are groups affiliated to the Grail Community Development Program, a program of the Catholic mission. The objectives of the activity were:

- to expose the farmers to the technology of using cameras to describe their problems;
- to learn about the main problems concerning seeds and soil fertility as portrayed visually by the farmers;
- to learn about the process by which the farmers make decisions about prioritizing their problems.

Details of this activity can be seen on a separate report with explanations from the farmers about the photographs. Also included in the report is a description of the process involved from the beginning to the end of the exercise **(Appendix 18).**

2. Community Impressions of Impact

The purpose of this exercise was to give farmers an opportunity to use a technology that is usually only used by outsiders. It will allow them to express their perceptions of the impact that OFPEP is having on their lives, using their own words and pictures.

For this particular exercise, a group that had collaborated with OFPEP-Kenya for two seasons was selected. Through facilitation of OFPEP staff, the group discussed what the impacts of OFPEP have been, and the best way to represent them photographically. After listing all the photos to be taken, those selected to take the photographs were trained in how to operate the cameras. They were then left to go and carry out the exercise.

The exercise was completed and the results compiled in a color booklet. Included are photographs from the exercise with farmers' views on what the photographs portray.

III. Project Results

The communication approach through on-farm demonstrations, as used by OFPEP, is simple and clear. It does not depend on the farmer's educational background. Farmers do not have to leave their farms in order to get the message. 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. Follow-on trainings are conducted during which the technologies are discussed and evaluated by area farmers. The farmers see the results of their simple changes in a small area in contrast to the rest of the plot.

Farmer training at the demonstration sites is one area where OFPEP-Kenya has made great achievements. In the previous one year, October 1995 to September 1996, a total of 2,643 farmers have been trained on various technologies by OFPEP staff and collaborators. Of these 27.2% were women, 33.1% were men, and 39.7% youth of both sex.

The aim of these farmer trainings at the demonstration sites is to enhance adoption of one/more or the demonstrated technologies

A. Adoption

We are using adoption rates as a key indicator of the effectiveness of OFPEP-introduced technologies among farmers. The figures in the table and discussion below were obtained after follow-up visits were made to members of the farmer groups that participated in the previous season's demonstration activities. Ten farmer groups with a total membership of 356 out of a total of 28 groups were visited. Hence, the results described below are from these farmers. We note that women as a group were the highest percentage of adopters.

Table 26. Percentage of farmers interviewed who have adopted OFPEP-introduced technologies.

TECHNOLOGY	MEN	WOMEN	YOUTH
Improved Seed Technology	40.7	50.3	7.0
Soil Fertility Technology	14.0	21.0	0.0
Compost Making	10.5	8.0	1.1
Maize	30.0	70.0	
Sorghum	27.6	72.4	
Soybean	40.5	59.5	
Foodbean	17.1	82.9	
Groundnuts	16.7	83.3	

The adoption of soil technologies was rather low. This could imply that the most felt need of the farmers was availability of improved seeds. But there may be other reasons for the apparent lack of interest in soil fertility enhancing technologies. Once these constraints are addressed, we anticipate higher adoption rates.

Food bean has had the highest number of adoptors (81.9%) followed by soybean (61.2%). Adoption of improved maize and sorghum varieties were similar, being both cereals farmers put the same value on the two. The high adoption of legumes compared to cereals would mean that farmers valued legumes more than cereals, and this should be translated to improved nutrition and well being of the farmers.

It is from the adopted technologies that we expect the program to have the impact of improving nutrition, income, and well being of small farmers in targeted areas of program operations. This can be in form of enhanced yield earnings from the increased yield and purchase of other services from the money earned, e.g., paying school fees, buying animals, etc. Below are examples of some farmers on whose life the program has had an impact:

> *Abiud Asoya harvested 150kg from 0.5 Ac where previously he used to harvest between 15-20kg.*
>
> *Martin Awue had a similar increase in maize yield which he sold and used the proceeds to purchase a goat.*

Paul Adera adopted improved maize variety (MDC), harvested 630 kg, sold this for Ksh. 1000. The money earned was used to pay school fees for his son.

Damaseno Owere adopted and planted improved beans, sold some worth Ksh. 100 and retained 4 kg for seeds. The money earned was used to purchase other kitchen utilities like salt, sugar, etc.

Most farmers who adopted soybeans planted small quantities for their own consumption to improve nutrient quality of their meals

Some reasons put forward by farmers for adopting the technologies included:

- enhanced yields from the use of organic manures both animal manure and compost;
- enhanced yield from the use of improved seeds e.g Seredo, Maseno Double cobber and K131 beans;
- have realized the nutritional benefits of soybean after the training on utilization, hence have increased its use;
- On-farm seed selection is important as most farmers use local seeds.

A number of reasons were put forward by the farmers for not adopting some of the available technologies:

- white sorghum is heavily attacked by birds and requires extra labor input to scare away the birds;
- soybean utilization and marketing is a problem for some farmers particularly in areas where they have not been trained on utilization;
- soybean is susceptible to damage by wild rats and squirrels;
- local soybean takes long to mature;
- lack of funds to purchase commercial inorganic fertilizers;
- most commercial inputs are not available locally and sometimes are late even at the places where they can be purchased.

Evidence is available that OFPEP-introduced technologies have spread beyond the working area. An example of such spread is from the farmer Mr. Alex Mboto. He was able to sell one bag of soybeans to an organization from Kitale in Trans Nzoia district. A number of farmers have also given seeds to their relatives who may have come to visit and seen the demonstrations. They liked what they saw and asked for some seeds which they carried back with them. One such farmer is Mr. Joel Orwa from Homabay district who gave seeds to his daughter living in another district.

Table 27. Ranges in yield obtained for each of the demonstrated crop technologies

Crop	Yield Range (kg/HA)	Reasons for Variations
Sorghum Seredo	916.7 - 2595.8	Variations in time of planting.
Maize	366.7 - 3079.2	Same as above
Beans	916.7 - 2595.8	Same as above but also crops destroyed by storm and hailstone.
Groundnuts	783.3 - 2675.0	Mature crops destroyed by wild animals
Soybeans	2687.5 - 4125.0	Destruction by squirrels and hailstone

The yield ranges indicated above are from the demonstration sites. Much of the harvest was saved for seed by the adopting farmers to be used the following season. Farmers indicated giving some seeds to neighbors and group members. However the quantities were small as they were only for purposes of seed stock.

Mr. Nehemiah Osike from Homabay district noted having produced 14 bags of Homabay groundnuts that he sold in the local market.

Mr. Alex Mboto from Siaya district produced 2½ (90 kg) bags of soybeans. He sold 2½ sacks and kept 1 sack for food and seed.

Some other anecdotal evidence from the farmers themselves is presented below. This gives an indication of the diverse impact on farmers' household activities resulting from OFPEP initiatives.

> *Farmer Nehemiah Osike from Homabay district planted 2 acres of seredo sorghum, 3 acres of MDC maize variety, and 3 acres of Homabay groundnuts. All the seeds used were obtained from the demonstration plots.*
>
> *Farmer Martin Awuo of Ojunge/Nyamula multipurpose group planted ½Ac of MDC maize and ¼ acres of seredo sorghum. He had planted the MDC maize variety in the previous season and obtained 2½ bags of maize.*

Ms. Eunice Ochila planted 500 m of soya seeds obtained from the demonstration plot and harvested 3 kg from which she made soybean milk and cake. Everything was consumed and she now is looking for additional seeds.

Ms. Mary Ogilo Odongo planted soybeans in the short rains of 1995 and harvested 10 kg. She used the soybeans to make soy milk for flavoring tea, as a vegetable, and sometimes roasted them for snacks. She also planted MDC maize seeds.

Ms. Beatrice Akinyi tried soybeans, MDC maize, and seredo sorghum. She harvested 4 kg of soybeans, 30 kg of seredo sorghum, and 30 kg of MDC maize. She liked the MDC because it was sweet when roasted.

Ms. Prisila Ojuok Gembe adopted and planted 450 m^2 of soybeans, 300 m^2 of seredo sorghum, and 250 m^2 of MDC maize. She used soybean milk to make soy milk and cakes.

Ms. Catherine Ayoo adopted and planted ½ acres of seredo and K131 field beans and harvested 14 kg of beans. She has cooked them together with maize and her family truly enjoys it, finding it delicious. In general, women mostly adopted soybeans to a larger extent but also tried field beans, maize and sorghum.

Evidence from focus group discussions conducted with farmers in the months of July showed that a number of farmers who had multiplied their own seeds from the demonstration plots and replanted in the following season did get increased yield that generated additional income e.g.:

- Farmer Nehemiah Osike, having produced 14 bags of groundnuts sold this to get Ksh. 14,000.00, which he used for his children's school fees.
- Farmer Martin Awuo sold part of his maize produce and earned him Ksh. 680.00 which he used to buy a goat.
- Farmer Alex Mboto bought improved maize seeds (Hybrid) from the sale of soybeans.

B. Impacts on Women

The OFPEP strategy is to work with local collaborators who conduct agricultural programs that reach farmers with technologies and practices that enhance farmer returns to labor. One of the key elements in this approach is the focus on smallholder farmers, particularly women. From the baseline/impact assessment evaluation survey conducted in areas where OFPEP/Kenya operates or where it plans to operate, 34.3% of the women surveyed were involved in growing maize and 34.6% in beans. This is in contrast with

men, 33% of whom grew maize and only 15% grew beans. In other words, women had control over growing of beans, a major protein source for Kenyan families.

The major cash crops like coffee, tea, and trees are controlled by men. The sale of supply food crops is under the jurisdiction of women in most of these areas mainly because the sales have low cash returns. Income earned from these sales is used to provide for daily household requirements like soap, paraffin, sugar, etc. Twenty-six percent of women surveyed sold maize and 25.6% sold beans.

The production and preparation of food for family consumption is fully the responsibility of women. Fetching firewood, carrying water, and looking after the general welfare of the family are women's responsibilities with minimal help from men. This is reflected in the higher adoption of soybeans by women who are responsible for the nutrition and health of the family.

Recognizing the fact that messages and information are transferred among women through women's groups and on-farm demonstrations, OFPEP - Kenya in its initial stages used women groups as entry points into the community. Meetings were organized with group members during which focused group discussions (PRA) were held. It was during these sessions that OFPEP approaches mandates were introduced to the groups (refer to OFPEP Third Annual Report - 1995 p. 55). The table shows the number of groups met by district.

Of the farmers met during this initial contact, 85.6% were women, 13.7% were men, and 0.7% were youth. From these initial contacts, OFPEP went on to establish farmer managed demonstrations with the groups. Follow-on visits were made to discuss the monitoring and evaluation of the demonstrations with the farmers. Final training sessions to evaluate the performance of the various demonstrated technologies by the farmers were also conducted.

During training at the 1995 long rains demonstration sites, 1724 farmers were involved. Of these, 493 (28.3%) were women. In training sessions on how to make compost, 196 of 370 met were women. At the long rains 1996 demonstration sites, 720 women were trained in various technologies.

Areas in which OFPEP-Kenya has benefitted women include on-farm seed selection and storage through training and demonstration (50.3% of those who have adopted this technology are women). These women truly appreciate the efforts of OFPEP in encouraging on-farm seed selection--realizing the importance of undertaking this activity as a necessary component to improve on seed quality. Some have reported enhanced yields after proper seed selection.

Another area in which OFPEP-Kenya has benefitted women is training in soybean utilization. One such training was conducted in Siaya district with 24 women from the Ongira Women Group attending the training. Through PRA session held with women's

groups during evaluation of adoption of OFPEP introduced technologies, it was found that only women have adopted soybean utilization. This is 13.3% of the total number of people participating in this evaluation exercise. The women appreciate soybeans nutritive contribution, particularly for children.

Women have also benefitted from OFPEP-Kenya's efforts to hold trainings and demonstrations within their communities. This is important to women who, as the managers of their family affairs, barely have time to attend residential training. Women see the results of the changes they make in a small area in contrast to the rest of the plot. They see changes by the roadside, on their way to the markets, to fetch firewood, and to collect water from rivers. As they meet with other group members they discuss what they see and implemented.

C. Lessons Learned and Future Plans

As OFPEP completes its fourth year of activities, the staff, partners and farmers have faced many situations, problems and opportunities that they have used to learn from and to improve their approach and interventions. The table below presents some of these problems and how OFPEP staff and farmers are addressing them.

The following activities are proposed for OFPEP-Kenya during Year V:

- Four Advisory Council meetings will be held in the course of the year.
- Technical Advisory Team meetings.
- Information collection and dissemination.
- Baseline surveys on soil fertility, soil conservation, seed quality, and availability and nutritional status of children aged 1-5 yrs.
- Quarterly and annual reports.
- Training of trainers.
- Mobilization of demonstration materials.
- Distribution of DPGs.
- Monitoring of demo-sites.
- Harvesting of demo-plots.
- Evaluation of the technologies demonstrated by the farmers, collaborators and OFPEP-Kenya staff: adoption, impact.
- Overall assessment of the 5-year program: level of objectives met, sustainability, impact on food security, protection of the environment and quality of life of targeted households and communities; institutionalization of OFPEP's approach and technical messages.

Table 28. Challenges/Solutions

Lessons Learned/Challenges	Solutions/Remarks
1. Growing and utilizing soybeans is a new technology in most areas where it has been promoted.	OFPEP plans soybean production and utilization as a package, so that farmers do not sell all that they produce. This point will be made through training of trainers and of farmers.
2. Farmers like early maturing than late maturing varieties, e.g. NAM 1 - soybeans, Mwezi Moja - field beans	Train farmers on seed selection for the early maturing and also train
3. Proper and efficient means of transport in the field is a necessity for efficient field coordination	Means of transport should be provided for every field staff to effectively cover the area of operation and efficiently carry out program activities
4. Although demonstrations have always been established as pure standard, farmers main planting technique is inter-cropping systems	Inter-cropping of maize and beans/soybean has been introduced in the demonstrations
5. Adoption of various technologies is area specific therefore demonstrations established should be for those techniques likely to be adopted	Needs assessment should be conducted with every group recruited for the program activities
6. Demonstration should be done at least twice with the same farmer/group to give opportunities for more interaction with farmer to all for follow up on the performance of a particular variety with respect to soil fertility amendments	Farmers are targeted for both short and long rains demonstration
7. Setback or slow rate of adoption of the demonstrated technologies due to how availability at the village level	Making the technologies available through a selected stockiest within the village or nearest market centre
8. Getting reliable data (yield) from all the demonstration sites has proved difficult and slow. The data sometimes doesn't reflect the true yield from the plots due to interference by the farmers.	Select a standard farmer from whom to get reliable yield data. The rest of the farmers and the standard farmer will all be involved in assessment of adoption.
9. Some farmers apparently did not understand the role of demonstrations and have interpreted it to be a new farming system in which farmers are encouraged to plant a variety of crops on one piece of land to economize on limited land.	Continue enlightening farmers on the role of demonstrations as a training ground where they can learn and pick out the best technologies. Collaborators should also ensure they pass the right and complete information to the farmers.

10. Traditionally, seed selection has generally not been done well by farmers; most purchase seeds from the market when rains start. They have appreciated OFPEP's training on seed technology.	OFPEP to continue with training on seed technologies. Farmers who buy seeds from markets are now finding it really difficult as prices go up with onset of rains. Those with OFPEP are lucky.
11. Most farmers have not fully exploited the potential of group labor as an approach towards increased farm productivity. They only see the group as an entry level for information dissemination by various development agencies.	OFPEP plans to encourage the use of group labor through training groups on group dynamics and restoration. Successful groups may be referred to and, if possible, visited.
12. Labor constraints, especially among the sponsored farming families (CCF), limits them from using compost. They, however, know and appreciate from demonstrations the ability of compost to increase production.	Encouraging group labor could be a solution.
13. Combinations of inorganic and organic fertilizers enhance yield more than the inorganic or organic fertilizers used slightly	Farmers should be encouraged to use combinations of the fertilizers if they can afford to acquire both
14. Most farmers' perception is that DAP results to striga growth, the field may have resulted to the reduced adoption rate of DAP	Continue training farmers on the benefit of DAP fertilizer to enhance yield
15. Farmers are not aware of any other control method for striga other than using animal manure to suppress its growth and hand putting which they do	Create awareness and train other methods of control, e.g., use of trap crops
16. Farmers only think of the high cost involved in purchasing fertilizers but not the benefits accruing from the use of the fertilizer	Cost benefit analysis of the introduced technologies should be done and shared with farmers to encourage use and adoption of the technologies
17. Adoption of inorganic fertilizer is very limited because small-scale farmers cannot afford to purchase.	Encourage group purchases, however small. Seek credit options.
18. The University of Nairobi has been producing inoculant for over 10 years. However, this technology has not reached many farmers. Farmers are still apprehensive about its benefits, hence a low adoption rates.	Intensify training for farmers on the benefits of using the inoculant. Seasonal feedback on seed varietal and soil fertility performance on yields will be given to farmer groups for better understanding.

Ethiopia

I. Introduction

A. Program Launching

In June 1995, Africa Village Academy (AVA) became the lead agency for the OFPEP as it began to plan for program development in Ethiopia for the first time. On October 2, 1995, it conducted a launching seminar with 18 participants from 13 organizations in attendance. By January 1, 1996, AVA/OFPEP started operations at its new office. Staff, including a Technical Coordinator, a Secretary, and an Accountant, were in place. (The staffing and organization of AVA/OFPEP can be seen in **Figure 7.)**

Program implementation began with two meetings of the Technical Advisory Team to gather ideas and suggestions, to select intervention areas, to discuss the annual plan of action and assess seed and soil fertility problems. The existing indigenous knowledge of the farmers and the best agricultural practices so far applied were discussed. Major emphasis was given to finding volunteer collaborators who would like to participate in the demonstration activities. This early planning enabled activities to begin before the cropping season, and to ensure better understanding of the program by potential collaborators.

Three AVA/OFPEP staff attended the February, '96 Workshop conducted at Kisumu, Kenya. This workshop helped AVA/OFPEP staff to learn from their colleagues in other OFPEP countries. This orientation on the policies, approaches and implementation strategies of OFPEP program proved very useful.

An action plan for the year 1996 was prepared. Though five collaborators volunteered to work with AVA/OFPEP, it was decided to limit efforts in the first season because of timing and logistical issues. Among the potential collaborators, the three chosen to conduct demo plots were: Christian Children's Fund (CCF) in Northern Shewa, Agri-Service Ethiopia (ASE) in North Omo, and Africa Village Academy (AVA) in Western Shewa. Since the program was new to Ethiopia, much of the time was spent facilitating the commencement of the initial activities and integrating collaborators in the program. **Figure 8** shows the program sites in Ethiopia.

The first major activity was training in Participatory Rural Appraisal (PRA) methodology, organized for the collaborating NGO staff. Twelve participants from four collaborating agencies came to the 10-day training. Immediately following the training, a base line PRA survey was conducted in two sites: one at Kerabu Harbu at AVA's project site; and the other in Debre Berhan, a CCF site. The outcome of this PRA baseline survey has helped to identify the basic types of problems and interventions that should be addressed.

Figure 7

Management and Organizational Chart of OFPEP in Ethiopia

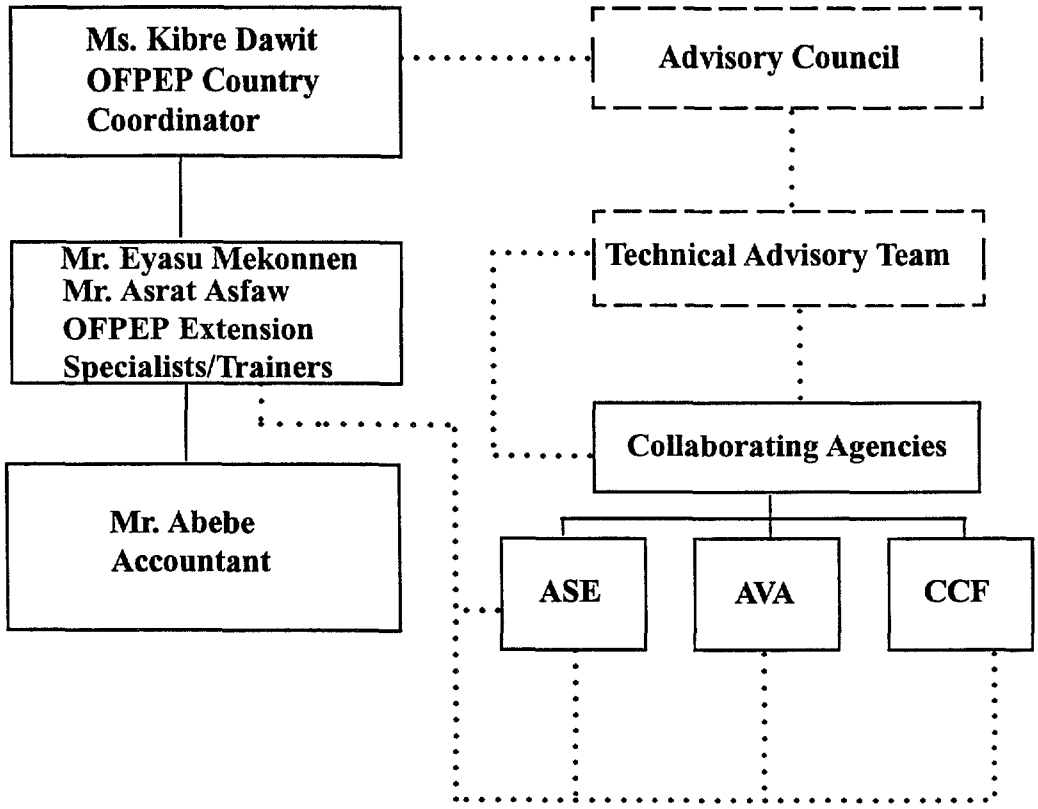


Figure 8

OFPEP/Ethiopia
Activity Sites

AVA = Africa Village Academy
ASE = Agri-Service Ethiopia
CCF = Christian Children's Fund

B. Program Approach

Current national statistics for Ethiopia clearly indicate the need for a program oriented toward increasing the productivity of agricultural activities among small-holder farmers. For instance:

- population growth may reach close to 3%;
- the nation is still in food deficit;
- inorganic fertilizer use is limited to about 7 kg/ha;
- only 2% of the farmers have access to improved seeds;
- a small fragment of the farming community receives agricultural extension services;
- the nation is the center of origin and diversity for many cereal crops; however, the full genetic potential of this germplasm is not well explored.

Thus, the OFPEP approach was adopted for Ethiopia and described as follows:

- Identification of constraints limiting agricultural productivity at the farm community level through a participatory approach with farmers. This baseline data collection is followed by best-bet assessment where alternative solutions are evaluated with farmers.

- Introduction and familiarization with the purposes of the intervention activities:
  - discuss the problems the interventions will address
  - discuss the reasonably attainable benefits to the farmers from the interventions

- Commitments involved from the partnership between OFPEP and participating farmers
  - OFPEP — inputs (seeds, fertilizer, Broad Bed Maker, herbicides) visits to discuss and monitor the progress being made
  - Farmers — inputs (land, labor)accommodate visiting farmers, interviews

- Verification of Farmers Understanding of:
  - purpose of the intervention activities
  - responsibilities of the partners (Farmer vis-a-vis OFPEP)
  - operational procedures
  - expected benefits

- Agreement and implementation of action plan
  - selection of sites
  - land preparation, planting date, etc.

- input provision and conducting demonstrations
- time for evaluation and interview of farmers and front-line extension agents

- Setup simplified monitoring systems to gather information on farmers' evaluation of the intervention activities at various stages of implementation.

II. Project Activities

A. Seeds and Soils

Activities conducted during this cropping season are listed below.

Table 29. List of demonstration sites and crops included.

Location	Crop	Demonstration	Collaborator (NGO)
North Omo	Sweet Potato	Variety	Agri-Service Ethiopia (ASE)
North Omo	Sweet Potato	Fertility	ASE
Kerabu-Harbu	Wheat	Variety	Africa Village Academy (AVA)
Kerabu-Harbu	Wheat	Fertility	AVA
Kerabu-Harbu	Teff	Variety	AVA
Kerabu-Harbu	Teff	Fertility	AVA
Kerabu-Harbu	Oxalis L. (Weed)	Herbicide	AVA
Debre Birhan	Wheat	Variety	Christian Children's Fund (CCF)
Debre Birhan	Wheat	Fertility	CCF
Debre Birhan	Barley	Variety	CCF

B. Partners and Linkages

1. Implementing Collaborators

Christian Children's Fund (CCF). Soon after launching the program, efforts were made to approach NGOs who had offered to collaborate during the seminar. One of the collaborating organizations, Christian Children's Fund (CCF), has as its main mandate to improve the nutrition of the communities where it works. To this end, they have a food security program in which agricultural activities are given emphasis in order to help the people improve food production. So OFPEP agreed to collaborate with CCF with the understanding of assisting CCF achieve its objective.

Agri-Service Ethiopia (ASE). Agri-Service Ethiopia (ASE) became the second collaborator and selected the Southern area (North Omo). Their main objective is to increase food crop production to contribute to food security of the farmers in the North Omo area.

Africa Village Academy (AVA). The third collaborator is Africa Village Academy (AVA). The objectives of AVA include the alleviation of on-farm problems faced by vegetable growers and increasing the production of the staple food crops of farmers in the Kerabu Harbu area. AVA's agricultural extension package approach fits well into OFPEP's program.

In addition to its implementing NGO partners, OFPEP-Ethiopia has added many linkages to its growing network in this first year of operation.

2. Technical Assistance

Ethiopian Seed Enterprise (ESE). The Ethiopian Seed Enterprise is the leading agency responsible for the maintenance, production, and distribution of certified seeds in the country. Currently the agency carries stocks of improved varieties of wheat, teff, barley, haricot beans, maize, sorghum, and flax. It also has improved varieties of wheat (5), teff (3), and barley (2).

OFPEP Ethiopia was able to obtain improved varieties of wheat, teff, and barley from the agency for its demonstration programs in Kerabu (AVA) and Debre Birhan (CCF). Unfortunately, the ESE has not succeeded in multiplying pulse crops. This has limited the program in the Debre Birhan area where beans are one of the major staple foods. Agronomists at the ESE were valuable sources of agronomic information in regard to the main improved crop varieties in Ethiopia. They also have given us a copy of their proceeding of a workshop on Seed Technology in Ethiopia.

Institute of Agricultural Research (IAR). The institute is a dedicated research organ of the government of Ethiopia. Its mandate includes: (1) formulating national research

Table 30. Summary of activities by collaborator.

Interventions	Collaborator NGO	# of Partner Farmers	Activities
Seeds	CCF	6	Introduce improved varieties of wheat and barley. Provide vegetable seeds.
Seeds	ASE	4	Introduce improved varieties of sweet potato and conduct demonstrations and farmers assessment of the varieties.
Seeds	AVA	6	Introduction of improved seeds of Teff and wheat, demonstration setup, and conduct farmers evaluation.
Soil Fertility	CCF	1	Setup on-farm demonstration on fertility improvement techniques. Follow-up visits and discussion with farmers.
Soil Fertility	ASE	8	Evaluate improved and local sweet potato varieties under different soil fertility management practices. Collect agronomic and farmers' reaction information.
Soil Fertility	AVA	1	Introduction of improved seeds of Teff and wheat, demonstration setup, and conduct farmers evaluation.
Herbicide	AVA	7	Use of Roundup to eradicate persistent weed. Demonstration of use of sprayers and techniques of spraying. Monitoring farmers' reaction

guidelines; (2) coordinating national agricultural research; and (3) undertaking research in its centers and sub-centers located in various agro-ecological zones of Ethiopia. The institute is the main breeding center for new and improved varieties and conducting research on new and better farming practices suitable to each agro-climatic zones. Realizing this, OFPEP has established working relationships with the various stations of the Institute. This include (1) Holetta Research Station [45 km west of Addis Ababa] dedicated to research adaptable to the central highland zone, (2) Melkassa [Nazareth] Research Station [115 km south of Addis Ababa], specializing in dry-land agriculture seeking technologies adaptable to moisture stressed areas, (3) Awassa Research Station [300 km south of Addis] which concentrates on southern Ethiopian food crops (mostly root crops).

(1) The Holetta Station was involved in OFPEP's intervention project with vegetable growers at AVA site. Weeds, pests and disease were identified as the major problems limiting productivity among the farmers. The research station was contacted and consulted about the problems. In regard to the weed problem, the station manager was able to provide a number of options including cultural and chemical control measures. Based on his information, OFPEP's project was initiated and is now in progress. The center also conducts basic research in the identification and isolation of rhizobia from root nodules of pulse crops. However, the results of this study are confined within the station and we are waiting and closely monitoring the progress to start our BNF project.

(2) Melkassa (Nazareth): This station was originally dedicated to research in root crops which are the main staples of the Southern Ethiopian people. The center sent one of its agronomists to participate in the PRA techniques training conducted by OFPEP in the early days of April. Since then we have been in close contact with the station. This station was approached to provide us with 5000 cuttings of improved sweet potato varieties (Koka 6 & 12) for OFPEP's collaborative work with Agri-Service Ethiopia in southern Ethiopia. The station personnel provided us with the materials from their own variety maintenance stock and were keenly interested in follow-up activities concerning the performance of their varieties.

National Soil Laboratory (NSL). The soils of our demonstration plots were analyzed by this laboratory. Extensive technical assistance was provided to us on the data analysis and interpretation of the final data. The NSL is also about to start limited greenhouse experiments on radio-isotope tracer studies and BNF. We are monitoring the progress of this activity and will be part of the project since we have strong interest in BNF.

Farm Africa. This is an NGO specializing in Farmer's Research Projects (FRP) which conducts basic research and publication of useful data on major crops and farming practices in southern Ethiopia. The agency was approached by phone to give us information about the North Omo area where we were about to start joint activities with Agri-Service Ethiopia. It immediately provided us with a baseline survey report on Sweet Potato Production in the area and this publication was the main source of the intervention program since Agri-Service's baseline survey work was not completed.

International Livestock Research Institute (ILRI). OFPEP extensively uses ILRI's library and has received a copy of its computer database on phosphate rocks and minerals in Africa. We are gathering the articles to help locate phosphate rocks in Ethiopia. Once the material is located we have the intention of including it into our fertility improvement program to remedy phosphorus deficiency.

C. Technical Assistance and Training

The major training activities of this first year was the PRA training mentioned above, and the training of farmers and NGO extension staff as part of the demonstration plots. The following table summarizes trainings, topics and farmers trained. Training of farmers was also conducted during the field visits.

Table 31. Demonstrations and farmers trained

Project	# of Demos	# of Farmers Trained		# of Observer Farmers		Total Training Contacts	
		Men	Women	Men	Women	Men	Women
Seed (Variety)	18	16	0	116	15	132	15
Fertility	11	10	0	44	7	54	7
Roundup	7	6	1	56	12	62	13
TOTAL	36	32	1	216	134	248	35

Notes:

1. Training of farmers on their demo plots was conducted informally during the field visits by OFPEP staff and collaborating Extension Agents. Most of the demo sites are located along roads and village trails where passers-by and villagers would gather around to discuss the technologies introduced.

2. Farmers inform us that many people look at the demo sites as they pass by. However, our report here reflects what we can substantiate with the farmers gathering during our visits and the constructive discussions held.

A document on soil analytical data, interpretation, and possible fertility management methods for the North Omo site of Agri-Service Ethiopia was prepared and shared with the collaborating NGO.

Other documents were prepared by AVA/OFPEP-Ethiopia and are available at the office in Addis Ababa.

"Report on Planning Workshop"
AVA/OFPEP - Ethiopia
January 23, 1996

"Chemical and Physical Characteristics of Soils of Chelbe and Zefano Peasant Associations of North Omo Zone in Southern Ethiopia"
Eyasu Mekonnen, OFPEP/ASE Joint Project
"Participatory Rural Appraisal on Sweet Potato Production at Chelbe Development Site"
Habtamu Bantero, Agri-Service Ethiopia
Translated by Eyasu Mekonnen
May 1996

"AVA/OFPEP Field Activity Report"
April-June 1996

"Report of Participatory Rural Appraisal, Western Shewa Administrative Region"
Alemgena Wereda
AVA/OFPEP
April 1996

"Report of Participatory Rural Appraisal, Northern Shewa Administrative Region"
Keyit-Christian Children's Fund (CCF) Center
Bassona Werana Wereda
AVA-OFPEP/CCF
June 1996

III. Project Results

With only one season of demonstrations, it is not yet possible to speak of adoptions or increases in production or income. However, we are pleased to present some results and learning from the first season of demonstration plots. Data was collected and analyzed and the results were compared with the farmers reactions in lively group discussions.

Table 32 summarizes the various crop varieties that were obtained for demonstrations.

A. Sweet Potato Demonstrations

Farmers' overall reactions to the sweet potato variety trials can be summarized as follows:

- Farmers planting 2-3 cuttings at a spot to ensure survival of at least one. Farmers use this method to justify their initial apprehension about planting only one cutting per hole. However, the demo data shows that fertility treatments could improve the survival rate of transplanted cuttings.

- Farmers found that spacing should have been narrower. They indicated that the spacing recommended by research was too wide leaving large unused spaces in

between plants and rows. They also noted that plots with fertilizer treatments can use the wide spacing since growth is vigorous.

- The failure of Koka 12 could have been due to loss of sap (moisture lost to evaporation) during transport from research station to the farmers' plots. They gave the benefit of the doubt to the introduced varieties. They remarked that Koka 6 responded well to their soil which is in agreement with the collected data (> 90% survival rate).

- Surprisingly farmers suggested that we conduct a follow-up demo in the October/ November cropping cycle by using cuttings from the demonstration plots.

- With respect to the introduced technologies:

  - Koka 6 is performing a lot better and farmers expressed they are anxious to see the yield;
  - In the fertility demos the inorganic fertilizer plot has outperformed compost and control;
  - They indicated that weed growth is dense and vigorous on the DAP-Urea plots. Since hand hoe cultivation is time consuming, it can compete for labor.

Table 32. Crop varieties included in the demonstrations

Crop	Variety	Type	Source
Sweet Potato	Koka 6	Improved	Inst. of Agri. Res. (Nazareth)
	Englizia	Local	Partner Farmers
	Koka 12	Improved	Inst. of Agri. Res. (Nazareth)
	Shurie	Local	Partner Farmers
Wheat	Shemet	Local	Partner Farmers
	HAR 710	Improved	Eth. Seed Enterprise
	Menzie	Local	Partner Farmers
	HAR 1685	Improved	Eth. Seed Enterprise
	ET-13A	Improved	Africa Village Academy
	Konteb	Local	Partner Farmers
Barley	Bulga	Local	Africa Village Academy
	ARDU-12B	Improved	Eth. Seed Enterprise
	Ferke	Local	Partner Farmers
Teff	DZ-01-196	Improved	Eth. Seed Enterprise
	Bunign	Local	Partner Farmers
	Becho	Local	Partner Farmers
	DZ-01-354	Improved	Eth. Seed Enterprise
	Enat	Local	Partner Farmers

B. Herbicide Demonstrations

Table 33. Effect of Roundup (glyphosate) on weed population density

Partner Farmer	Untreated (# of weeds/sq. m)	Treated (# of weeds/sq. m)	% Reduction
1	1260	156	88
2	1316	241	82
3	2123	453	79
4	1327	290	74

The above data shows a significant reduction in the re-growth of the weed. In terms of labor cost this technology is profitable to the farmers when compared to the amount of time they spend on weeding by hand involving all family labor.

C. Lessons Learned

- Laboratory analysis of soils have confirmed the farmers claim of declining fertility status of their soils (See OFPEP-Ethiopia PRA reports). Analysis of soils of North Omo (Agri-Service Ethiopia) shows deficiencies of nitrogen, phosphorus, low levels of organic matter, and acidic pH values that could contribute to unavailability of some nutrients.

- Farmers are open to new technology packages. However, they prefer to be thoroughly informed of various factors of the technologies. For example, we were asked questions about taste and texture as well as the yields of the improved seeds we introduced at the time of planting.
  Farmers tend to feel part of the action when the demo plots are carved out of the field where they grow the same crops. Due to our lateness in getting underway in Debre Birhan (CCF sites) most of the farmers gave us blocks of land from their fallow land. Unfortunately, farmers took care of these plots poorly when compared to the others.

- Farmers tend to take their own action unless extension agents visit them quite often (formally and informally). Extension agents of the collaborating agencies are busy with their routine assignments to the extent of not monitoring the joint demo sites. The result of this negligence has been reflected in the partner farmers taking their own action.

- Unclear policies of the government, . OFPEP had to halt its extension activities in two out of the three NGOs (CCF and AVA) temporarily because of orders from

the Bureau of Agriculture. With respect to CCF there was a delay of more than three weeks. This delayed the planting period by about one month. Thus, some of the potential farmers went ahead and planted on their own, while those who waited for us were a bit disappointed. This delay of planting time was reflected in the extremely poor performance of two demonstrations and the moderate germination and growth vigor on the rest of the plots in Debre Birhan. While AVA did not engage in its usual Training, Extension, Technology Dissemination, Demonstration and Credit (TETDC) program in field crops, it was able to do the OFPEP demos which started late.

D. Future Plans

Recommendations for the coming year:

- Plan ahead based on baseline survey data and involve farmers early in the season.
- Organize training workshops to extension agents of collaborating NGOs before the cropping season starts.
- Introduce vegetable crops and promoted their increased use to improve the nutrition of the farmers in the Debre Birhan area (CCF).
- Conduct baseline surveys concentrating on the gender and nutrition issues of the farming communities.
- Involve women farmers in the extension activities and hire female extension agents. NGOs must keep themselves up-to-date with respect to government (national and local) policies. Development (extension) agents should be briefed on a regular basis about the policies.
- Increase the number of collaborators.

Action Plan for the Coming Year

- Provide adequate planting material of the improved sweet potato varieties preferred by the farmers.
- Establish demonstration plots on soil and seed management.
- Locate rock phosphate in Ethiopia and include it in the fertility management demonstrations
- Establish on-farm soil conservation activities
- Expand collaborative activities with CCF and ASE.
- Contact previously listed collaborators.
- Develop and finalize the PRA, seed, soil fertility, and soil conservation training materials.
- Collect photo and video information from the field to develop the training material with visual aids.
- Conduct training needs assessments of the collaborating agencies.
- Conduct several trainings with collaborators and farmers on different techniques based on the results of the training need assessment.
- Establish a Visual Aids Library using the photo prints and video films which can be used as reference materials for training activities.

IV. Financial Report

Table 34 presents the recorded financial situation of the program at the end of Year IV, and the expected expenditures during Year V. As the program progresses, activities multiply, and demands on funds become heavier. Budget projections for Year V illustrate that trend. These projections also include a number of delayed billings incurred during Year IV.

There are two other main reasons for substantial increases of expenditures during Year V. First, the Uganda program that, during the first four years of OFPEP, was in large part financed by matching funds, will be exclusively financed by the OFPEP USAID budget during Year V. Second, the Ethiopia program component that was initiated at the end of Year III is expanding rapidly and will be more costly to implement during Year V.

It should be noted that, as indicated in the summary, OFPEP benefited from complementary funding during Year IV, that made it possible to expand both its technical scope and the number of target (partner) communities. For instance, Monsanto Corporation provided Winrock with funds to strengthen the weed control/soil management component of OFPEP in Senegal; IFAD provided a large three-year grant to WARDA/Winrock to study the impact of OFPEP's approach on the diffusion of rice technologies in Senegal, The Gambia, and Côte d'Ivoire; COOPIBO (a Belgian NGO) supported the distribution of virus-free, improved cassava varieties in eastern Uganda; FICAH continued its support of OFPEP activities and approach in western Kenya.

Table 34

WINROCK INTERNATIONAL INSTITUTE FOR AGRICULTURAL DEVELOPMENT
AFRICA - ON-FARM PRODUCTIVITY AND ENHANCEMENT PROJECT
October 1, 1992 through September 30, 1997 (Expressed in US$)

	EXPENSES YEAR 1 - 4			PROJECTED YEAR 5			CURRENTLY BUDGETED		
LINE ITEMS	UNITS	USAID AMOUNT	PVO MATCH	UNITS	USAID AMOUNT	PVO MATCH	UNITS	USAID AMOUNT	PVO MATCH
I. SALARIES AND WAGES		255,311			66,020			314,944	
II. FRINGE BENEFITS		99,665			24,665			107,569	
III. SHORT-TERM SPECIALISTS		73,327			31,328			93,677	
IV. TRAVEL AND PER DIEM		114,900			39,360			181,257	
V. ALLOWANCES		13,065			0			17,520	
VI. IN-COUNTRY COSTS		364,401			247,320			430,263	
VII. OTHER DIRECT COSTS		23,727			9,447			30,503	
VIII. PROCUREMENT		2,729			2,000			33,500	
IX. SUBCONTRACTS									
A. PVO/Joint Center		645,351	237,842		269,340	65,188		934,691	311,962
B. ACDI (Uganda)		193,569	132,438		153,839			281,313	241,451
C. Save the Children (The Gambia)		176,370	66,835					333,207	111,292
D. World Vision/Africare		0	0					81,245	27,082
E. PACT					20,000			0	0
TOTAL SUBCONTRACTS		1,015,290	437,114		443,179	65,188		1,630,456	691,787
X. INDIRECT COSTS		129,737	333,687		43,925	89,882		159,706	354,081
Other Donor Support			60,025			65,795			0
TOTAL ESTIMATED COSTS		2,092,152	830,826		907,244	220,865		2,999,395	1,045,868

Appendix 1

Questions and Draft Letter for Potential Collaborators (in French and English)

Contributions from each member of OFPEP partnership - Senegal

Appendix 1a

Questions for Potential Collaborators

1. Please describe your organization: exactly where you work in Senegal, your approach, your organizational structure, your different projects, donors, etc...

2. Please describe your present activities in the following areas. For each area that you have activities please describe the specific activities/techniques that you promote, the number of villages and number of male/female farmers involved with the activity, and the number and type of staff that work specifically in that activity.

Soil fertility management

Soil conservation

Use of improved seeds

Seed selection and storage

3. If you have done any baseline studies or PRA's in the area where you would like to work with OFPEP, please include a copy of their results with this questionnaire.

4. How do you determine if your projects are successful? Please describe your monitoring system.

5. What logistic support do you provide to your field staff?

6. In which of the following activities would you like to collaborate with WI/OFPEP?

____ Soil fertility management

____ Soil conservation

____ Use of improved seeds

____ Seed selection and storage

7. What are your expectations from the OFPEP collaboration?

___ Technical assistance & training

___ Linkage with research institutions

___ Assistance with monitoring & measuring impact

___ Training materials

___ Training of trainers

8. Have you had experience with previous collaborative projects? Please describe them.

Dear potential OFPEP partner:

Thank you for the interest you have shown in working in partnership with WI in the On Farm Productivity Enhancement Program (OFPEP) project. You may know that this project has been working in Africa for almost 9 years and has enjoyed developing partnerships with many groups and organizations throughout East and West Africa. In doing so, we have learned the importance of reaching a clear understanding between OFPEP and potential collaborators. Therefore, we are enclosing a short questionnaire for you to fill in and return to us so we can better understand the needs of your organization. We are also enclosing some additional information on OFPEP to further your understanding of what OFPEP is and how it works.

Contributions from each member of the OFPEP partnership

The OFPEP approach is one of participation and collaboration. It recognizes that when organizations who have common goals share resources and work together, they both will come closer to meeting their shared goals, and thus, the needs of their constituencies.

In OFPEP, each partner has responsibilities and contributions to make in order for small-holder farmers to benefit. We describe these in the table below so that they can be discussed and understood before either side commits to joining this partnership.

OFPEP	PARTNER
Provides technical assistance and training to its partners and a larger network of interested groups and individuals in the areas of soils and seeds identified by the participating farmers.	Provides its knowledge of and access to local communities and active farmers who have already had experience with problems of soils and seeds.
Provides linkages with local and international research institutions who have access to technologies appropriate to the seed and soil problems identified by participating farmers.	Provides sufficient field staff and supervisors to work with target farmers on joint baseline study/PRA, program implementation activities, and program monitoring and reporting.
OFPEP staff will work with the NGO staff and farmers to design a program to be implemented by the NGO with the guidance of technical resource staff of OFPEP.	Sufficient logistics for training, visiting demosites, and monitoring of activities.
OFPEP staff will work with partner staff and farmers to develop appropriate monitoring tools so that joint evaluation of the impact of introduced technologies can be assessed.	Work with OFPEP staff to develop and implement appropriate monitoring activities and provide bi-monthly reports.
Provides a variety of training materials appropriate to the technology and audience.	
Provides training of training sessions for NGO field staff, extension staff, lead farmers, etc...	Training of farmers by trainees who have participated in TOT's sponsored by OFPEP.
Provides inputs for initial demonstration of proposed technologies.	

Appendix 1b

ON-FARM PRODUCTIVITY ENHANCEMENT PROGRAM (OFPEP)
No. 11B Rue 3 Angle C
Tel/Fax : (221) 24-19-19
BP : 3746
DAKAR, Sénégal

OFPEP QUESTIONNAIRE DESTINE AUX POTENTIELS COLLABORATEURS

Addresse:

Tel/fax:

(Continuer sur le verso si nécessaire où fâites joindre des feuilles supplémentaires)

1. Veuillez faire une présentation de votre organisation incluant le suivant: date d'établisment, zone d'intervention au Sénégal, approche, différentes structures mises en place, vos différents projets, et vos bailleurs de fonds.

1.1 Présentez votre organigramme y compris le nombre de personnel qui sont à la disponition de votre structure.

2. Fâites une présentation de vos activités en cours dans les domaines suivants. Pour chacun de vos domaines d'intervention, veuillez présenter les différentes activités et techniques que vous préconisez, les nombre de villages et de paysans (hommes et femmes) impliqués dans l'activité en question, et le nombre et les catégories de personnes qui travaillent dans le cadre de chaque activité . Quel est la taille moyen des parcels exploités et le principal contraints exprimés par les paysans sous les thèmes listés ci-dessous?

2.1 Gestion de la fertilité des sols

2.2 Conservation des sols

2.3 Utilisation de semence améliorées

2.4 Sélection et stockage de semences

2.5 Le paysans travaillant avec vous, sont-ils organisés en associations? Si oui, quelle est la nature de leusr organisations?

3. Si vous avez réalisé des études de bases ou des évaluations participatives en milieu rural dans les domaines dans lesquels vous souhaitez collaborer avec l'OFPEP, veuillez joindre un exemplaire des résultats obtenus au présent questionnaire.

4. Comment arrivez-vous à déterminer la réussite de vos projets? Décrivez le système de suivi que vous pratiquez.

5. Quel support logistique offrez-vous à votre personnel de terrain?

6. Dans lequel des domaines suivants souhaitez-vous collaborer avec l'OFPEP? (Mettez un croix sur votre choix)

- Gestion de la fertilité des sols
- Conservation des sols
- Utilisation de semences améliorées
- Sélection et stockage de semences

7. Qu'attendez-vous d'une collaboration avec l'OFPEP ?(Mettez un croix sur votre choix)

-Assistance technique et formation
- Liaison avec des institutions de reherche
- Assistance dans le suivi et les études d'impact
- Matériel de formation
- formation de Formateurs
-autre (expliquez)

8. Avez-vous déjà une expérience dans le domaine des projets collaboratifs ? Veuillez fournir des détails.

S.V.P Rétournez cette questionnaire et documentation à l'attention de:
Lisa Washington-Sow, Résponsable de l'information et la communication
OFPEP
B.P 3746
Dakar

Contribution de chaque partenaire de l'OFPEP

L'OFPEP préconise une approche de participation et de collaboration. Il reconnaît que lorsque des organisations poursuivants les mêmes objectifs partagent leurs ressources et travaillent ensemble, elles sont mieux placées pour atteindre ces objectifs et par conséquent, de faire face aux besoins des collectivités qu'elles servent.

Au sein de l'OFPEP, chaque partenaire a des responsabilités et une contribution à apporter, au profit des petits paysans. Elles sont décrites dans le tableau ci-dessous pour pouvoir faire l'objet de discussions et être compris avant tout établissement de liens de partenariat.

OFPEP	PARTENAIRE
Fournit une assistance technique et une formation à ses partenaires, cet CS intègre dans un réseau plus vaste de groupes et personnes intéressés par les problèmes de sols et semences identifiés par les paysans impliqués.	Fournit un savoir qu'il fait bénéficier aux communautés locales et aux paysans impliqués qui ont déjà une expérience des problèmes de sols et de semences.
Permet la liaison avec des institutions locales et internationales de recherche qui maîtrisent les technologies appropriées pour faire face aux problèmes identifiés par les paysans dans le domaine des sols et des semences.	Fournit du personnel de terrain et des superviseurs en nombre suffisant qui travaillent avec les paysans ciblés sur une étude commune de référence on une évaluation participative, la mise en oeuvre, le suivi du programme, ainsi que l'établissement de rapports.
Le personnel de l'OFPEP travaillera avec celui de l'ONG et les paysans pour la conception d'un programme qui sera mis en application par l'ONG, avec un encadrement par le personnel technique de l'OFPEP.	Logistique suffisante pour la formation, la visite des sites de démonstration et les activités de supervision.
Le personnel de l'OFPEP travaillera avec celui du partenaire et les paysans pour mettre au point des outils appropriés de suivi permettre une évaluation de l'impact des technologies introduites. fournit divers matériels de formation adaptés à la technologie et à la population cible.	Travaille avec l'OFPEP pour la mise au point et la conduite d'activités appropriées de suivi, et préssente des rapports bimestriels.
Fournit des formateurs pour les sessions à l'intention du personnel de terrain des ONG le personnel de vulgarisation, les paysans chefs de file, etc..	formation des paysans pour des formateurs ayant participés aux sessions parrainnées par l'OFPEP.
Fournit les intrants pour les premiers démonstrations consernant les technologies préconisées.	

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ON-FARM PRODUCTIVITY ENHANCEMENT PROGRAM (OFPEP)

No. 11B Rue 3 Angle C
Tel/Fax : (221) 24-19-19
BP : 3746
email: winrock-senegal@cgnet.com
DAKAR, Sénégal

Cher (Chère) partenaire éventuel,

Merci de l'intérêt que vous avez manifesté en travaillant en partenariat avec Winrock International dans le cadre du projet relatif au programme d'amélioration de la productivité en milieu paysan (OFPEP). Comme vous le savez peut-être déjà, ce projet est présent en Afrique depuis presque 9 ans et a permis d'établir des liens de partenariat avec bon nombre de groupes et organisations en Afrique de l'Est et en Afrique de l'Ouest. Ce faisant, nous avons appris combien il était important de parvenir à une claire compréhension entre l'OFPEP et ses éventuels partenaires. C'est pourquoi nous joignons un questionnaire que vous remplirez et vous retournerez pour que nous faissions mieux cerner les besoins de votre organisation. Nous joignons également quelques informations supplémentaires sur l'OFPEP pour que vous puissiez mieux comprendre sa nature et son mode de fonctionnement aussi bien que un brochure sur le demarches de l'OFFEP.

-date de delais à remettre-

-processus de choix-
-selection a quel date
-reunion de lancement? contacts individuelles?
-protocole ou plan collaboratives?

En esperant vos reponse tres prochainement, veuillez recevoir des nos salutations le plus distingués.

Lisa Washington-Sow
Réspnsable de l'information et la communication

Appendix 1c

ON-FARM PRODUCTIVITY ENHANCEMENT PROGRAM (OFPEP)

No. 11B Rue 3 Angle C
Tel/Fax : (221) 24-19-19
BP : 3746
email: winrock-senegal@cgnet.com
DAKAR, Sénégal

Cher Collaborateur Potentiel,

L'ONG Winrock International, dans le cadre de son projet relatif au programme d'amélioration de la productivité en milieu paysan (OFPEP) se propose d'identifié de partenaires potentiels pour la mise en oeuvre de projet collaboratifs à partir de l'année 1997.

L'OFPEP est mis en oeuvre en Afrique depuis presque 9 ans et a permis d'établir des liens de partenariat avec bon nombre de groupes et organisations en Afrique de l'Est et en Afrique de l'Ouest. Ce faisant, nous avons appris combien il était important de parvenir à une claire compréhension entre l'OFPEP et ses éventuels partenaires.

Nous avons identifié votre structure puisque vous intervenez dans le domaine de l'agriculture. Si vous êtes interesé par cette propostion veuillez remplir et nous retourner le questionnaire ci-joint avant le 31 octobre 1996 pour que nous puissions mieux cerner les besoins de votre organisation. Nous joignons également quelques informations supplémentaires sur l'OFPEP pour que vous puissiez mieux comprendre sa nature et son mode de fonctionnement aussi bien qu' une brochure sur les démarches de l'OFFEP.

Après retour du questionnaire rempli, nous aurons à selectioner de potentiels collaborateurs en fonction du niveau:

- de dynamisme manifesté et de la cohérence institutionnelle,
- de correspondance des objectifs et activités avec les nôtres
- de la capacité démontré à partager les côuts des activités de collaboration
- de la disponibilité des resources humaines et logistiques pour le suivi des activités.

En esperant votre réponse très prochainement, veuillez recevoir, cher collaborateur mes salutations les plus distinguées.

Lisa Washington-Sow
Résponsable de l'information et la communication

Appendix 2

Minutes from Advisory Committee Meeting
June, 1996 - Senegal

Appendix 2

Minutes from Advisory Committee meeting June 6, 1996

Introduction by Dr. Frank Byrnes, Meeting Chaired by Alphonse Faye

Meeting Agenda:
1. Introduction of RADORT program
2. Presentation of OFPEP Soil Fertility Program
3. Discussion of proposed consultancy study on women's rice associations working with the PC Rice program

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1. **Introduction**: History of OFPEP from reforestation to agriculture production under OFSP later expanding into soil fertility issues under OFPEP and open to new ideas suggestions by farmers to solve problems related to agricultural production.

Issues now central to OFPEP: impact or changes occurring in farm families' lives as a result of OFPEP interventions. Impact is now captured through:
- monitoring or fine-tuning
-concrete evaluations capturing the continuity of impact on a regular basis.

We are successful if we help farm families meet their own objectives while promoting:
-sustainability of activities
-institutionalization of OFPEP concepts. Once people begin to change, they strive for more changes.

2. Mr. Niels Hannsens, of Dutch nationality recently joined the Winrock team as Principle Investigator of the Research on Accelerated Diffusion of Rice Technologies (RADORT) Program, and is based at WARDA Headquarters, Boauké Cote d'Ivoire.

RADORT workshops were held in Senegal, Cote d'Ivoire and The Gambia to launch the program aiming to inform potential collaborators about the program 5/23-31.

RADORT is a research, not development program which will do extension at the same time.

WARDA has developed many improved varieties (IVs) but has trouble diffusing them through the government extension services. It collaborates with WI for lessons learned on OFPEP. It aims to do research on methods used in OFPEP.

Workshop objectives were to explain how the program should proceed and identify regions in which the program will take off. In Senegal the Fleuve area is targeted.

OFPEP impact studies will be of use to RADORT

Steps identified:
-RADORT will select partner NGOs and government agencies
-benchmark studies are to be conducted
-Training NGO staff in areas where rice production can be improved such as; the use of IVs, inputs and post harvest techniques.

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Monitoring and Evaluation will be done to assess training and compare benchmark studies to end results.

Area selected:

Senegal: Fleuve and lowlands: Nioro and Lower Cassamance
Gambia: uplands
Cote d'Ivoire: irrigated rice

Countries selected because of WI or WARDA presence with important rice growing areas, or IFAD interventions and improved varieties (IVs) potentially available locally.

RADORT will foster links between research and farmers. All IVs must pass through national research institutions.

FB: potential development of market for small holders to become seed providers for large producers. When people can double or more their rice production they are happy to sell.

LWS: Our experience with small holders is that they produce for consumption exclusively. Question: who is involved , where and when will the program begin?

NH: WARDA in Senegal should make an inventory of NGOs in Fleuve region, collect baseline information and hold meetings with the NGOs.

Only 1 region/country will be targeted in year 1.

2. Amacodou Diouf, Soil Fertility Program Chief presents the Soil fertility program.

Introduction
Program is targeted for 6 villages chosen by Country Coordinator based on his knowledged of problems in these villages. Program involved 3 problems associated with fertility:

-climate, fertility, and man

Context/Justification
Studies conducted: 1. Seneagrosol: Prospects for program in Kolda and Nioro 2. Bibliographic review 3. Soil Analysis

Methodology
Participatory approach that relies on sensitizing, training and demonstration, revolving credit for inputs and inter-village visits.

Objectives
To improve soil fertility for rice farmers and consequently improved their revenue.
Activities: composting, water retention dikes, anti-salt dikes, training on use of mineral fertilizer

Length of program: 2 years requested as minimum time. Year 1 consists of preparation; year 2 execution of planned activities.

Location: 6 test or pilot villages. 4 in Kolda: Ibrahima Nema, Temento Samba of the Dabo

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Arondissement; and Nematoba Manding and Linguetto of Dioulacolon Arondissement. There are also 2 villages in Nioro: Soukoto and Ndiayane Post.

Planned activities:
training in composting, improved use of mineral fertilizers, anti-salt dikes, water retention dikes, improved farming practices and agro-forestry

Timing/Distribution:
Ibrahima Nema: Year 1 water retention dikes, training on composting, improved farming practices

Linguetto: NPK, composting, improved farming practices

Temento Samba: Agro-forestry

Inter-village visits: to Nematoba Manding involving 7 villages and Linguetto involving 3 villages for September-October 1996.

Institutionalization: in order to promote the transparency and sustainability of OFPEP activities.
activities: identify resource persons for permanent monitoring of activities and provide them with complementary training. This will involve:
-persons based in villages
-technical traditional government services
-Potential local NGO already carrying out activities in the zones.

Monitoring and evaluation
-monitoring indicators will be identified for each activity based on OFPEP logframe
-monthly activity monitoring to be done by resource persons, collaborating NGOs or government services

Calendar of activities: May-July- training and monitoring
Nov. Jan- program evaluation

Program costs: Materials/products 850,000 F
Site visits to be determined
Support from govt. service " "

In conclusion Mr. Diouf underlines that the development of the soil fertility program represents an OFPEP team effort based on participatory approach with the populations concerned.

Comments on presentation

A.Faye: The objectives of the program have to be linked to extension. We are not as concerned with how to resolve all soil fertility problems of the villages as how to make improved variety (rice) yield at its maximum potential.

-Revolving credit will be difficult to justify in this context as we are dealing with food crops and not cash. Quantifying the repayment will be difficult.

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-there is also no commercial potential for rice in these areas. It has an important social value and will never be sold. Furthermore, it is primarily a women's crop.

L. Niang: The interventions need to be prioritized (water management vs. soil fertility) given that we are talking about a food crop. Investments have to be justified for food crops.

-possibility for collaboration with other NGOs should be investigating as the program seems vast for WI to execute alone.

-Need to find a way to compensate for cost/benefit of men going to work on women's fields

-where will funding come from to incorporate CERP teams?

M. Preia: The aspect of revolving credit was to reconstitute inputs

-govt services needs money but we also need their support

A. Faye: We don't need very highly qualified people to follow/introduce these technologies for extension. Extension can be done by local leaders.

-For any technology requiring credit, it is necessary to define the estimated yield increase that will allow for 1. reimbursement 2. payment of inputs

-I am committed to sustainability in the long term- that is the OFPEP approach. We have never purchased inputs before so why should we start now.

Amacodou Diouf: The principal is to support grassroots structures at he village level interested in our approach.

-Compost training NRBAR program is being executed with fish scales for trials as fertilizer in the framework of research/extension.

-How can mineral fertilizers (NPK and Urea) being introduced by the OFPEP soil fertility program be sustainable? How long will they have to be applied before becoming effective?

-For AHDIS the fish scale program is favored because of its sustainability.

Amadou Diouf: It is true that Alphonse Faye may not have been informed about all aspects of the new program as I was responded to orders given by Pierre Antoine as well as Alphonse Faye. The program is a "project" still in the planning stages. the document presented today was completed yesterday with the inputs of L. Washington-Sow, J. Faye..

- It is true that we can't work alone.. We have listed all potential collaborators and discussed with NGOs, government services including the water company of Kaolack regarding the installation of dikes and agriculture bureaus of Kolda and Kaolack about their potential contributions.

-We are still considering the method and type of collaboration that would be possible with government services.

-we hope to work with only those who are willing/ready to provide service to these villages. If funds are available for this we will pay them, if not, we will find another solution.

- In response to Mr. Diouf's preoccupation with mineral fertilizers, working without mineral fertilizers has limitations. Natural regeneration is not enough given population growth, pressures on land, etc.. Optimal agricultural yields can only be achieved with mineral fertilizer.

A. Faye: The program has not been technically validated. The soil analysis which has cost us 1,500,000 CFA up until now, should be the basis of this program. Furthermore, no extra funding has been confirmed for this program. We have received 2,500,000 F and have made the following major expenditures for the program: soil analysis 1,500,000 F
material inputs 850,000 F
(for farmers)

1996 Agricultural Programs

World Vision: Training on agroforestry techniques will be conducted by village leaders. Trainers will be paid 5000 CFA per session by World Vision. WV will also be conducting seed storage activities in conjunction with WARDA. In Kaolack, WackNGouna and Khonghel, a millet seed program will be conducted with technical support from ISRA and the striga resistant sorghum program will continue this year in regions with dekk soils, the type most degraded in Senegal.

CCF: Souna 3 program will continue with OFPEP in its second year in addition to composting, live fencing and a new groundnut program introducing the Flower 11 variety to pilot farmers in Baback.

A. Faye: OFPEP will terminate in 18 months from now. If it is to continue, activities should focus on minimizing risks for farmers while increasing yields. Credit must be incorporated through well-known activities that are apt to bring revenue such as livestock breeding schemes.

-Discussions-

L. Washington-Sow: As time has not permitted us to discuss all elements of program, such as the institutionalization study of women's groups working with the PC Rice Activity, those interested can remain for informal discussions. .Otherwise we thank you for attending this meeting and hope to be in close contact with you all in the near future to discuss activities carried out during this campaign and their impact.

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Persons attending:

Name	Tittle	Organization
Amy Sullivan	Rice Volunteer	Peace Corps
Lamine Niang	Program Officer	Christian Children's Fund
Alphonse Faye	OFPEP Country Coordinator	Winrock International
Mamadou J. Faye	OFPEP Program assisant	Winrock International
Amadou Diouf	OFPEP Program Officer	Winrock International
Lisa Washington-Sow	Process and Linkages Specialist	PVO/University Center for Colaboration in Development
Ken Byrd	APCD/ Agriculture	Peace Corps
Niels Hannsens	Principal Investigator-RADORT	Winrock/WARDA
Jeff Provolny	Technical Advisor/CBNRMP	Winrock
Marcel Preira	Development Extention agent	World Vision
Amacodou Diouf	AHDIS Coordinator	AHDIS
Safietou Fall	ISRA-LERN	ISRA
Francis C. Byrnes	Senior Associate	Winrock

~~(c: admgt64)~~

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Appendix 3

Fall and Gannon Summaries - Senegal

Appendix 3

Executive Summary of: "Women's Association in the Kolda Region: A Case Study of Local Institutional Issues." Wendy Wilson (Anthropologist). June, 1996.

I. INTRODUCTION:

Women farmers in the Kolda region were interviewed to assess the role of womens' associations, analyze how the associations function in the context of their communities, and assess their potential sustainability once the OFPEP rice program is completed.[1] The villagers were asked why they participated in the OFPEP project; the benefits villagers' believed they received by participating in OFPEP; how they viewed the way individuals were selected to participate in the OFPEP program; their perceptions of factors that constrained the diffusion of improved varieties; the defining characteristics of the social aspects of women's groups; other activities carried out by women's groups; geographic constraints to participation; historical disincentives to participate; levels of commitment to improving agricultural practices; and economic opportunities and bottlenecks.

II. DESIGN OF THE STUDY:

The work called for the use of participatory methodology which included the following tasks:

- conduct group and individual interviews in addition to reference to secondary documentation;
- analyze the objectives of the womens' groups and how they complement the OFPEP's objectives;
- evaluate the impact that OFPEP has had on these groups and their capacity to maintain and diffuse the proposed techniques;
- identify the manner in which the techniques are diffused to groups and individual rice farmers;
- discuss the strengths and weaknesses of the womens' groups and of the rice program as it pertains to these groups.

Villages were selected using the following criteria:

- one control village (never participated in OFPEP)
- villages having two or more years of PCV presence
- documented group of 4 or more monitored rice farmers
- increase over time in the numbers of farmers interested in the program
- variation in the intervention periods (1991-1996)

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[1] The rice program began in 1990 in Kolda and Nioro. The objectives of the rice program are to: (1) increase rice production by introducing improved varieties specific to the ecologies in which the farmers operate (in particular short cycle varieties), and (2) introduce on-line seeding with animal traction where rice is direct seeded.

- local leader of rice program cited

The chosen villages include: **Ibrahima Faty** (Dioulacolon), **Sare Yero Diaw** (Dioulacolon), **Missira Kamara** (Dabo), **Ibrahima Nema** (Dabo), and **Sare Tamsiru** (Dioulacolon).

III. VILLAGES THAT PARTICIPATED IN THE STUDY:

1. IBRAHIMA NEMA

The farmers complained about a lack of access to improved rice varieties. Approximately half of the women farmers have access to improved rice seed while the other half would like to plant improved varieties but are unable to obtain the seed they need. For example, a variety called Fenken produced good yields. They have also tried Irat 10 and Djibilor (DJ 12 - 519). To work the rice each women has a contiguous parcel of land on a common rice terrain. The women organize by household. Each household splits the benefits in half--one for sale and the other half for personal use.

2. SARE TAMSIRU

The village had the benefit of a Peace Corps volunteer for three years, and has recently started to work with another volunteer. Thirteen women are currently involved in the Winrock program, eight of whom joined the program during the first year. In the second year five additional woman joined the program. Fourteen more woman would like to join the program, many of whom are particularly interested in short cycle rice varieties.

3. SAMBA YERO DIAW

Approximately 23 years ago the Chinese introduced new seeding techniques and new varieties. As a result of the experience the entire village adopted new ways to cultivate rice. The men plant rice with a semoir and a team of bulls, while the women work the riziere in family teams. Their relatives often visit them from other villages to learn how to plant rice and to learn about new improved varieties. The village has been participating in the Winrock program for two years. Recently, the Communaute Rurale visited them and indicated that they would help them to organize activities and groupements.

4. MISSIRA CAMARA

There is a village-wide Women's Association (a GIE) which has been operating since 1983. The association produces tomatoes, okra, and onions. The association members are organized according to their demonstrated interest in and the amount of voluntary support they contribute to the association. The women indicated that a lack of seed for new rice varieties is their biggest production constraint. They would also like to have a shorter cycle rice variety.

5. IBRAHIMA FATY

The village has been working on selected rice projects for seven years. They have been introduced to three new rice varieties: Djibilor, Sappo, and Pekin. Each of the woman farmers has her own rice plot. They would like to have a moulin since it would save them

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Appendix 4

Grassroots-based Groups with which OFPEP-Uganda is working - Uganda

Appendix 4

GRASS ROOTS- BASED GROUPS WITH WHICH THE ON-FARM PRODUCITIVITY ENHANCEMENT PROGRAM (OFPEP)- UGANDA IS WORKING AS AT 31,JULY, 1996

MUKONO DISTRICT

1. Buzaama Growers Co-operative Society Ltd, Buikwe
2. Talent Calls Club, Seeta, Goma
3. Uganda Association for Social Economic Progrss, Ngogwe
4. World Vision - Uganda.
   - B Kisimba Moslem Women's Group, Najja
   - B Bulere Women's Group, Najja
   - B Makindu Women's Group, Najja
   - B Mawoto Women's Group, Najja
   - B Tulikimu Najja Women's Group, Najja
   - B Ndabakuki Women's Group, Najja
   - B Tusitukire Waamu Women's Group, Najja
   - T Lumuli Women's Group, Misindye, Goma
   - T Mawangaala Women's Group
   - T Nyenje Farmers Group
   - B Agali-Awamu Association, Mawotto, Najja
   - B Kyosimba-Onanya, Bulere, Najja
   - T Misindye farmers' Group
   - T Kasaayi farmers' Group
   - U Namulesa Group, Ngogwe
   - U Lubongo, Ngogwe
   - U Kiringo, Ngogwe individual farmer
   - U Ddungi, Ngogwe
   - B Kiyindi, Najja
   - B Busagazi
   -T Gulama
   - U Ndolwa, Ngogwe

IGANGA DISTRICT

1. Multi-Purpose Training and Employment Association (MTEA)
2. Busabalamu Agro-Silk Development Association, Busalamu, Bukanga
3. Baitambogwe Fruit Farmers' Association, Baitambogwe, Magamaga sub-county
4. Toka Farmers, Kazigo, Nambole
5. Kamukamu Women Group, Baitambogwe
6. Tuje Tugezeku, Isikiro
7. Wairama Women Group, Wairama, Nakigo
8. Mpande Tweyambe Women Group, Kisowozi, Ivukula
9. Kalungami Health Care Project, Kalungami, Nabitende
10. Namulanda Youth Group, Namulanda, Bukoma

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11. Bunabbala Labe Women Group, Bunabbala, Bukoma
12. Bugwe Youth & Women Group, Bugwe, Ivukula
13. Yaniyamaite Women Group, Namakoko, Ivukula
14. Bugabwe Green Dramatic Group, Bugabwe, Nakigo
15. Budhwege Gospel of Peace Group, Budhwege, Bulamagi
16. Mayuge Women Group, Mayuge, Imanyiro
17. Musubi Development Association, Musubi, Kigandalo
18. P.I.E.D, Nakalama, Nakalama
19. Kitaigalwa Farmers Group, Kitaigalwa, Nakivumbi
20. Multi-Sectoral Environment Development Association (MEDA), Namiro, Kityerera
21. Namayemba Women Group, Namayemba, Kapyanga
22. Kisowogi Women's Group, Mpande
23. Kikalu/Namakoko Women Group, Namakoko
24. Lwatama Development Group, lwatama
25. Kisega Women's Group, Kisega
26. C.A.R.D. Baitambogwe, Baitambogwe
27. Namadu Group, Musubi
28. Ikumbya Farmers' Group
29. Nabyoto Farmers' Group
30. Gwembuzi Garmers' Group
31. Namakoli Farmers' group
32. Matovu Farmers' Group
33. Nawango Farmers' Group
34. Kigobero Farmers' Group
35. Namuntenga Farmers' Group
36. Isenda Farmers' Group
37. Naisamula Women Group
38. Nabitulta Women Group
39. Nakisenhe Adult Literacy Class
40. Masita Youth Group
41. Bugalama Farmers Association
42. Bubago Farmers' Group
43. Mukitono Rural Rehabilitation and Development (MURRAD) Buluza, Nakigo
44. Kigulu Development Group (KDG), Kigulu
45. Rural Education Programme for Development (REPROD)
46. Multi-sectoral Rural Development Project of Busoga Diocese (MSRDP)
47. The Corner-Stone Orphans Education Association (KSOEA)
48. Club-Zuka, Musubi-Kitembezi, Kigandalo
49. NYPEA Association, Nankoma
50. Agooma General Enterprises
51. BUMURUDA (Busiki Multi-Purpose Development Association)

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Appendix 5

OFPEP-Gender Program - Uganda

Appendix 5

OFPEP - GENDER PROGRAM

CONCEPT PAPER FOR THE TRAINING OF TRAINERS WORKSHOPS ON GENDER, FOOD PRODUCTION AND RELATED ISSUES

THEME: TOWARDS ULTIMATE FOOD SECURITY

By
Beatrice N.Luzobe
Gender/Field Operations Specialist
OFPEP-Uganda

"OFPEP with its participatory approach to transfering appropriate technologies to farmers.... is trying to look at the way in which it approaches seeds and soil fertility issues at household level" (OFPEP Newsletter, January, 1995).

OFPEP-Uganda has integrated the gender component in order to understand the impac of the technologies on the families and food production. Hence the inclusion of the gender program in its interventions.

I. THE PROGRAM'S TERMS OF REFERENCE

1. Monitor the impact of OFPEP Technologies on family food production, food security and the potential for generating income form sales of surplus

2. Develop links between women - oriented organisations and OFPEP activities to further mutual objectives.

3. Work with women groups in the OFPEP districts and encourage their active participation in the rural development and the mobilization of government and NGO resources.

4. Identify gender-sensitive issues that may impede the success of OFPEP.

II. RATIONALE FOR GENDER T.O.Ts

In November 1995, the author made a familiarization tour around the three OFPEP districts in Uganda (Iganga, Tororo & Mukono) mainly to introduce herself and discuss with the groups. She was also to assess the different issues which required special attention by the gender program and draw out a plan of action.

Some of the issues discussed were: What is gender? Why the gender bias of gender programs, the constraints to women farmers that impede food production, the gender roles and the nutrition status in the areas.
During the discussions it was identified that there was need to:-

- sensitize OFPEP communities on gender issues related to food production.
- further discuss the optimal use of farm resources, including time management & energy conservation, water harvesting among many, to optimise food production. This would also lighten the burden of women farmers enabling them to put more time into food production.
- seriously handle the issue of nutritional security with special consideration of soybean, the long standing OFPEP promoted crop.

III PURPOSE OF GENDER T.O.TS

To train the leaders of farmers' groups and CBO/NGO staff who will train the grassroots farmers in the identified areas to be addressed by the gender program.

IV OBJECTIVES/EXPECTED OUTCOMES

1. At the end of each course the trainees should:
- be sensitized and therefore be able to sensitize their communities regarding gender issues as related to food production and security.
- be able to carry out gender role analyses in their areas to facilitate their understanding the impact of the introduced technologies on families.
- be able to understand the resource/product vs use/benefit relations in their own communities and how they affect food production.
- be able to help their members come up with appropriate daily work plans which can ensure maximum farm labour allocation.
- be able to demonstrate the relevant appropriate technologies in energy saving and also appreciate the importance of environmental protection and energy saving in homes as related to food production.
- know the basic of nutrition and importance of soybean to ensure nutrition security in homes and also be able to demonstrate different methods of preparing soybean.

2. The participants will be expected to train in the acquired skills to their groups.

3. Through the T.O.Ts the program expects to cover the OFPEP areas, be able to assess the overall impact of the introduced technologies and further address the negative effects to facilitate maximum food security.

V PROPOSED TRAINING PACKAGE

1.	Gender and Agriculture	- Introducing Gender - Food security and constraints to women farmers. - The OFPEP-Gender program and impact of Agricultural technologies on food production.
2.	Optimal use of Farm Resources.	- Environmental protection - Time Management - Energy conservation.
3.	Nutrition	- Nutrition in General - Malnutrition and its indicators - Soybean utilization an answer to malnutrition in homes.

4. Any other relevant skill which can facilitate adoption of OFPEP technologies and understanding their impact. For example teaching methods, extension, PRA approach, water harvesting etc.

A maximum number of 30 participants should be targeted per training. Preferably men and women who have trained in seeds and soils and capable of training others, to create a gender balance in the discussions. These may be any of these below:-

- staff of collaborating Non-Governmental Organisations (NGOs) or Community Based organisation(CBOs).
- Lead farmers of groups under the above organisations.
- Opinion leaders in the communities where the above organisations operate.

VII FACILITATORS

In addition to the gender specialist and her assistant,

- the extension specialists are expected to include some of the topics in their extension training.
- technical personnel from collaborating NGOs and CBOs be identified to facilitate on the topics of their profession or experience.
- external facilitators from relevant government and non-governmental organisations ~~can be used.~~
- as a way of furthering capacity building among former trainees, those capable can be identified and used in the T.O.Ts.

DURATION

A minimum of 3 days can be used to cover the proposed topics. However, depending on the needs assessment work already done by collaborating group, some of the topics may be expanded or even dropped resulting in increase or decrease of the days.

The training can be conducted on consecutive days or broken into parts to be carried out at different days depending on the work schedules of the facilitators and collaborators.

VIII VENUE

The venue should be in a rural setting to facilitate demonstration but with accommodation for participants e.g a school, community centre or even homes. It should be accessible to every participants invited.

IX METHODOLOGY

The focus of the trainings should be on:

1. Knowledge -creation where lectures reading materials and audio-visual aids can be used.

Relevant facts and generalizations can be laid out by the facilitator. However, the participants should be encouraged to:

- associate or disassociate themselves and their communities from any socio-cultural-economic generalization laid out to them by the facilitator.
- to ask for clarity and challenge any scientific fact, presented to them, basing on their experiences.

2. Awareness raising using brainstorming sessions group discussions or structured experience like case study, role play and miming.

3. Skill-building involving practice and demonstrations.

All or some of the above methods can be used depending on the time available, nature of topic and situation in the community..

Note: Training manuals have been developed to facilitate training both at T.O.Ts and grassroots levels. The manuals use simple language where hard sociological and scientific terms are avoided in order to reach out to trainers of the grassroots.

X RESOURCES

Resources can be mobilized by either the program, the collaborating group or the participants themselves depending on affordability and any other prevailing situation.
Examples of possible resources are:-

- stationery e.g. flip charts, note books, markers, pens etc
- demonstration materials e.g. pictures, utensils, tools etc
- accommodation facilities
- meals
- utilities e.g. water, and lighting.

XI. EVALUATION

Note: The training can always be adjusted to accommodate any new district in Uganda or another OFPEP country.

OFPEP-GENDER PROGRAM

OFPEP TRAINING MANUAL ON GENDER AND FOOD SECURITY IN HOMES

By
Beatrice N.Luzobe
Gender/Field Operations Specialist

Reviewed by:-

1- Ezra Okoth-Extension Specialist - OFPEP.

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TITLE OF COURSE: **GENDER AND FOOD SECURITY**

OBJECTIVES:

- To sensitise the participants about gender issues as related to food security and enable them sensitize thegrassrootst farmers.
- To carry out a gender role analysis with the participants and equip them with skills of doing the same in their respective areas.
- To introduce the OFPEP Gender Program and assess the impact of OFPEP technologies on homes.

TOPICS AND SUB-TOPICS

- Introducing gender (what is gender and gender issues?, Gender and Development (GAD); Gender bias in development efforts; Gender roles; the due change.)

- Gender and Food Security (What is food security?; Women andadequatee food production; Constraints faced by women farmers; women and economic access to food; Nutritional security and recommendations for addressing the constraints).

- The OFPEP-Gender Program and the impact of OFPEP technologies on food security (The goal and interventions of OFPEP. The objectives of the gender program; and the impact of OFPEP technologies on families and food production).

Methodology

Each sub topic should begin with a brain storming session to collect the views of participants before the literature is given out by the facilitators. Some section can be presented in a form of survey using PRA approach. Role plays group discussions, and case studies can be included where applicable.

Resources

Flip charts or black board, visual aids,questionariess.

I. INTRODUCING GENDER

1. Gender and Gender Issues

Brain storming: What is gender and gender issues?

Text:

Gender is either of the two sexes (male and female). It can also be viewed as consisting of men, women, and children. Gender issues are concerned with the relationships roles and responsibilities of men, women and children in homes and communities. Gender issues are also concerned with how the above factors affect or influence development. Therefore the participation of men, women and children is called for (although the bias of gender program towards women can be justified). Gender issues are more concerned with equitability than equality. Because of the biological and moral nature of each gender is unique and superior in its own way, and therefore deserves respect recognition or reward. (Use the family sharing/rewarding anology in appendix 1 to elaborate)

2. Gender and Development

Brainstorming: How can gender issues be related to development?

Text:
Development is simply positive change in any sector of life. In order to have balanced development all the genders i.e. women, men and children have to be equitably involved. Males and females should be given equal opportunities to develop themselves and eventually their communities.

Examples of development sectors where consideration gender is important:

- Agriculture: both genders should get involved in production and have equitable share of the benefits e.g. sales of surplus.
- Education: girls and boys should always be given equal opportunities in acquiring format education. Men and women should also have equal opportunities to training.
- Law: men, women and children should be aware of their rights and laws that protect them and against domestic violence.
- Culture: Cultures which oppress deny rights of one gender and those outdated must be gradually outdated.

Brainstorming: Where do we find gender imbalances in our communities? What can be done?

3. Rationale for Gender Bias in Development Efforts.

Brain storming: Why do most gender program focus on women?

Text:
Whenever we talk about development there is a need for a balance as already indicated above. This can only be offered through offering equal opportunities to both genders (male and female).

Generally in Uganda, in all sectors of life, with an exception of very few communities, the female gender (women and girls) has not had enough opportunities to develop. For example less girls are educated than boys; more females face domestic violence; because of numerous domestic and reproductive roles, women have less time to attend training and community meetings; and so on.

Therefore, if anybody is interested in balanced development S/he has no choice but to focus on women first since they are not likely to move at the same pace with men. In other words women emancipation is very critical in development.

4. Gender Roles

Text:
Gender roles and responsibilities are those which are specific to a particular gender. There are two ways of categorising gender roles and responsibilities.

i. As biological (sex linked) or socio-economic.

- The biological roles are related to the biological nature of the gender. For example giving birth and fathering children. These cannot be changed.

- The socio-economic roles have been perceived by culture over along time to be performed by a particular gender. For example women cook and men build in many communities.

ii. The second way is categorising them as:-

a. Productive roles - roles provision of basic needs like food shelter, cash e.g. farming and hired labour and building.

b. Reproductive roles - responsible for propagation e.g. child bearing, fathering, mother care, giving a nurturing atmosphere and protection.

c. Maintenance or Domestic roles - e.g. cooking , cleaning , fetching water and firewood, and smearing houses.

d. Community roles - e.g. attending meetings and other functions like church, funerals and weddings.

Discussions: What are the gender roles for men, women, children in your community? Is there anything wrong with these roles? (Role play or mime)

Text:
All gender roles are important and there is nothing wrong with being involved in any of them. However, there are problems inherent in these roles.

- The perceived value and prestige attached to each of them which bring the biggest rift in offering opportunities among the genders. *"Women's role in economy has often been underestimated and their work in agriculture has long been invisible"* as reported in the Food Policy Report.

- Some roles are more involving that they leave no time for the concerned gender to participate in the others. For example a pregnant mother may feel too weak to farm, or attend a meeting.

5. The need for change.

Brainstorming: In light of the gender roles problems, should there be change therefore? What has been influencing change?

Text:
One important point to remember is that change is slow and painful. We talk of changing a person or a culture which has been influenced for a very long time. Therefore a gradual change should be expected through sensitization which calls for a lot of patience and understanding. The biggest hope lies in the young generation. (Challenge to child up bringing)

Nothing much may be done to the biological roles but there is a lot of room for adjustment in the socio-economic roles to facilitate balanced development.

Agents of change in gender roles.
There has been gradual change in most cultures and communities which is still continuing.

- With time the economic pressures have influenced change in many gender roles. e.g Urban migration of men in search of employment left the women at home to fend for the families in every aspect. Men also performed women's roles wherever they moved.

- Sensitization through education and training: The educated men and women behave differently from their fore parents.
- External influence: Those who have had a chance to mix with other people have changed a lot. Compare the urban areas as opposed to closed rural communities.

II GENDER AND FOOD SECURITY

1. Food Security

Brainstorming: What is food security? Is it enough to only have a lot of food produced. What other factors ensure food security.

Text:
Simply food security means when people have enough food or assured of enough food resources. There are three major pillars of food security.

- Food availability or adequate food production
- Economic access to the available food
- Nutritional security which often depend on the availability of non-food resources such as child care, health care, clean water and sanitation.

A forth one usually added is asset base. The family may not have economic access (cash) but assets like animals and equipments which can easily be turned into cash or exchanged for food.

According to the Food Policy Report, Washington DC 1995, women play significant if not dominant roles in supplying all the three pillars necessary to achieve food security. But they play these roles in face of enormous social, cultural and economic constraints.

Discussions:
Which gender(s) is responsible for the following farm activities.

Activity	Men	Women	Children
Land clearing			
Land opening			
Ploughing			
Planting			
Weeding			
harvesting			
Processing/Drying			
Storage			
marketing			

A role Play of mining can be used here

What are the implications of the above organisation?

Text:
Estimates from the Food and Agriculture Organisation (FAO) show that women accounting for more than half of the labour required to produce food consumed in the developing world and three forth in Sub Saharan Africa.

In most rural communities of Uganda all genders (men, women and children) are involved in agriculture and display a mixed pattern of responsibilities. Some share them, while others leave some activities to a particular sex e.g land opening to men and weeding to women and children.

However, Ugandan women produce over 75% of the food consumed in homes. The men get more involved in production of food for sale.

Constraints faced by Women farmers.

Discussion:
What are the constraints faced by farmers and which are specific to men, or children or women. Which gender is more constrained?

Text:
Despite the women's importance in food production, they usually have lower levels of physical and human capital than men. Hence the constraints of women farmers listed below:

1. Reproductive and maintenance roles.
Women are involved in many off-farm activities most of them on a daily basis which affect their time invested into farming. For example when pregnant, she may become too weak to dig. (Discuss other examples)

2. Limited or no access to land rights.
Although this applies to all those without land titles, it affect more the women. Major adjustments o.. land are done by or with the permission of the land owner and the long-term benefits are also to him. This affects the rate of adoption of some technologies, for example tree planning and terracing by the landless who are mostly women.

3. Limited access to common property resources.
Since natural resources belong to land owners, the women may have a limited access to them. These include forests, lakes and rivers, minerals including sand and clay deposits.

4. Lack of capital to purchase the necessary tools.
Since women are more involved in growing food for consumption in homes, they always have less cash than men, or none at all. This hinders their ability to purchase the necessary tools like ploughs to improve on their farming methods. They mostly use simple tools like hoes and pangas.

5. Limited contact with agricultural extension
Most of the agricultural extension workers at the grass roots are males yet in many communities the interaction between women and outside men is restricted or not encouraged.

Secondly, even where the mixing of men and women is allowed, the men extension workers may not fully understand the problems pertaining to women or the women may not feel free with them. Thirdly women have less time to attend agricultural extension training.

6. **Lack of access to credit**

With no tangible properties like land and buildings to secure loans in the financial institutions, women have limited access to credit facilities.

Secondly, even for credit programs with no tangible collateral it is automatically the man (who is the head of the family) to go for the loan, once it is not specifically focussed on women.

7. **Lower education levels.**

Because of lower education levels, less women are involved in the agricultural trainings. And many times when they get involved, they have a communication problme.

WOMEN AND ECONOMIC ACCESS TO FOOD

Brainstorming

How do men and women spend their money? Who gets more money?

Text:

A family's economic access to food depends heavyly on its real income. The general welfare of a family does not only depend on its income but on who earns that income. A number of studies found that women, relative to men, tend to spend their income disproportionately on food for the family. And womens incomes are more strongly associated with improvements in childrens health and nutritional status than mens income (Food Policy Report 1995)

However, it should be noted that for a woman to be involved in economic activities it involves more sacrifice on her part and the burden becomes heavier. This is because she remains with all her traditional roles to accompolish. For that reason women can only get involved in petty businesses and therefore end up to be poorer than men. The effect can be seen in female headed families.

This is unfortunate because women's incomes are more associated with improvements in childrens health and nutritional status than are men's incomes. (Food Policy Report).

NUTRITIONAL SECURITY

Brain storming:

What other factors may affect food security even when there is a lot of food produced?

Text:

Nutritional Security means adequate nutritional status in terms of protein, energy, micronutrients and minerals for all household members.

Adequate availability of food is necessary for nutritional security but not necessarily sufficient. For example:-

- the food may be plenty but of the same nutritional requirement e.g. maize or rice or matooke.

- the food may be plenty but the families ignorant about appropriate utilization.
- other non food resources such as child care, health care, clean water, and sanitation may not be available.
- food distribution within households any bias affects one gender especially female.
- distribution of other resources within households e.g. health care, education, weaning etc.

Ensuring nutritional security through a combination of food and non food reosurces is almost exclusively for women.

Time allocation:
The critical issue in the use of the above resources is time. Women are involved in agriculture, domestic production and care of household members. The time allocated to any of these is very important. For example care affects nutritional security through feeding practices e.g. breast feeding, weaning etc and through health and hygine practices e.g.bathing and washing of hands.

RECOMMENDATIONS FOR REMOVING CONSTRAINTS OF WOMEN FARMERS.

Brainstorming:
What can be done to eliminate or reduce the constraints seen above?

Text:

1. Constraints to food production

Women's ability to fulfill their roles as food producers can be enhanced by improving womens access to resources technology and information.

- lightening the women's burden by either involving the male gender in some of the reproductive domestic roles. Or introducing appropriate technologies which do so. E.g. energy conservation, water harvesting etc.
- ensuring women's rights to land through non discriminatory registration or tithing, and fair allocation within clans.
- guaranteeing a sustainable use of natural resources by women so that there is a continued use.
- introduction of innovative credit programms using non-traditional forms of collateral.
- Provision of effective agricultural extension services to women as form managers is essential to increasing the adoption of new technologies and realizing productivity gains in agriculture.
  - women extensionist should be encouraged to work at grassroots level or male ones trained to deal with women farmers.
  - the messages should be made appropriate to women farmers.
- Girls education should be increased to ensure the next generation of human capital. Boys and girls should always be given equal opportunities to education.

2. Constraints to economic access.

Women ability to generate and control income should be increased.
Strategies should be set to enable women to be involved in more renumerative employment opportunites. But this should not be at the expenses of their time, their children's welfare or their own health and nutritional status. The strategies can include:

- technologies to reduce time spent on traditional home production.

- education and training is very crucial especially to those who do not have physical assets.
- family planning programs to reduce on the family, burden.

The major strategy is to increase the women's income earning potential while reducing the energy or time intensity of their activities.

3. Constraints to Nutritional Security

Good health and adquate nutrition are important to women at all stages of their lives. Women need to protect their own health and nutritional status to be able to fulfill their productive and reproductive roles.

- Programs which ensure other none food resources need to be encouraged e.g. for safe water, good sanitation etc.
- Programs to improve and protect womens lives are important e.g. family planning.
- Sensitization about food values and utilization is a critical issue.

References

1. Women: The Key to Food Security: Food Policy Report (The International Food Policy Research Institute)

III THE OFPEP - GENDER PROGRAM AND IMPACT OF OFPEP TECHNOLOGIES ON FOOD PRODUCTION

This section is intended to review OFPEP, assess the impact of OFPEP technologies. and discuss the OFPEP gender expectations with the participants.

Note: Some of the discussion question in this section are more appropriately handled during field visits than in class.

1. REVIEW OF OFPEP

Discussion: **What is OFPEP?**

OFPEP is On-Farm Productivity Enhancement Programm. OFPEP's overall goal is to improve nutrition, income and general well-being of the small scale-farmers through increased, sustainable agricultural production.

OFPEP interventions are seed, soils and gender. The gender component draws in the people who work with seeds and soils and also benefit from increased food production. The programm uses a participatory approach and is implemented through collaboration with NGOs. CBOs, extension services and farmers groups.

OFPEP seeds and soils technologies

Discussion: **What have we done with OFPEP in our area?**

The OFPEP technologies can be summarized as follows:

- Introducing seeds of improved varieties.
- Following recommended agronomic practices like spacing, seedrate, planting time and weeding time.
- On-farm seed activities like germination tests, selection, presentation and storage.
- Soil conservation methods e.g. making of terraces, digging trenches, planting grass strips and stabilization bands.
- Soil fertility improvement methods e.g. composting, inoculation, application of manure and inorganic fertilizers and agroforestry technologies.

2. THE IMPACT OF OFPEP TECHNOLOGIES

Discussion: **What are the advantages or benefits and disadvantages or problems of OFPEP introduced technologies.**

Technology	Benefit	Problems

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What can be done by OFPEP, the collaborators and the farmers to address the problems.

Text
However good a technology is, it might have some side effects or negative feed back which can deter its adoption. Therefore it is always important to assess the negative and positive implications of a technology. Later its real impact may also be assessed and its problems addressed to facilitate its quick adoption.

3. THE OFPEP GENDER PROGRAM

Discussion: **Having reviewed OFPEP in your area, what do you expect of the OFPEP - gender program?**

TEXT
Gender expectations

If we are to address the problems of women's overload, social tensions and land disputes and other negative effects likely to arise from OFPEP technologies, a gender program is an appropriate intervention. However, it is important to note that gender deals with social issues from which a dramatic change is unexpected. It is a gradual process where many players are involved.

In view of the above the gender program is expected to be involved in:-

1. Proper gender role analyses in its districts to enable OFPEP understand the likely variations in the impact of the technologies on food production.

2. Carrying out surveys concerning adoption and effect of technologies on women, men and children.

3. Sensitizing and training OFPEP staff on gender relations in Agriculture. To this effect, collaborations with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) should be streghthened, since it is considering 'genderizing' the extension services in Uganda.

4. Sensiting the communities on gender issues.

5. Collaborations with other government departments and NGOs which handle gender issues for development. Any whose intervations aim at making the load of the already over burdened woman.

6. Working closely with women groups but not in isolation of men since they are part of the development process and control most of the resources and benefits. The gender program is already training trainers who are both men and women.

7. Ensuring complete food security by ensuring the proper utilisation of the food grown. This is a problem of nutrition. For example soybean utilization needs to be stepped up.

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Appendix 6

Impact of Some On-Farm Technologies on Food Production and Gender Expectations Uganda

Appendix 6

The Impact of Some On-farm Technologies on Food Production and Gender Expectations in Central and Eastern Uganda

A paper presented at the
Second International Symposium of the
African Association of the Farming Systems Research

by

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and Pierre Antoine, Director

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Winrock International Institute for
Agricultural Development

July 18, 1996

I. Introduction

In 1992, Winrock International, in collaboration with Agricultural Cooperative Development International (ACDI) and several NGOs, initiated the On-farm Productivity Enhancement Program (OFPEP) in Uganda. OFPEP work is located in the three districts of Mukono, Iganga, and Tororo in Central and Eastern Uganda.

The overall goal of OFPEP is to improve nutrition, income, and the general well-being of small-scale farmers through increased, sustainable, agricultural production. Technical emphasis is placed on seed multiplication, technology and use, and on soil conservation and fertility management.

The program uses a participatory, demand-driven approach and is implemented through collaboration with NGOs, extension services, and farmer groups. The strategy is to achieve sustainable results through the training of trainers and the strengthening of institutions, associations, and communities involved in agricultural production and management of soil resources. A summary of the OFPEP program is presented in **Appendix A.**

In the program area in Uganda, the family is the basic unit of agricultural production. Men and women generally have specific and distinct roles and expectations within that unit. Traditions and cultural ties are strong and prevent a quick introduction of changes in the overall gender pattern.

Improved technologies and techniques introduced by OFPEP have had a positive impact on crop yields and soil fertility levels. However, intensification of agricultural production and soil conservation work generally require additional labor and time. On the other hand, increased revenues resulting from available food surpluses may bring some distortion in the traditional man/woman roles in the management/control of funds within the household. These labor/cash considerations may interfere with a full adoption of proposed technologies and techniques.

Lessons learned from implementation of OFPEP emphasize the need for proper gender role analysis in order to better predict the potential impact of extension activities. More attention to the specific role of women is needed, but this should not be done in isolation of men.

II. Gender Relations and Roles in the Program Area

Analysis of gender roles in a particular area provides a critical background to the under-standing of the impact of any technologies being introduced.

Most of the agricultural households display mixed patterns of responsibilities. Some share responsibilities of land preparation and other field work and livestock care, while others leave processing and marketing of outputs to a particular sex. The results of a simple survey done with 6 groups from Tororo district are shown in **Appendix B.**. A total number of 68 women and 63

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These technologies are delivered to the grassroots farmers through the collaborating NGOs/groups. By the end of 1995 the estimated membership was as follows:

OFPEP Districts	No. of Institutional Collaborators	Membership		
		M	F	T
IGANGA	41	750	541	1291
TORORO*	18	-	-	2269
MUKONO	3	96	185	281
TOTALS	**62**	**-**	**-**	**3841**

*The ratio of male to female is about 50% although the exact number could not be determined.

Although the official membership was determined to be 3,841 individuals, more farmers, in fact, were trained,and new collaborators have continued to come in. There is also a definite multiplier effect from the OFPEP farmers to their neighbors.

The overall aim of OFPEP technologies is increased productivity and, therefore, improved living standards of the rural family. It should be noted, however, that the technology may either have a negative or positive effect on food production. A good understanding of possible impacts can, therefore, greatly enhance the achievement work of OFPEP objectives.

As already indicated, the family allocation of farm labor in the program area is such that men are mainly involved in activities with financial and social benefits. These include growing or rearing and sale of farm inputs (non-traditional cash crops inclusive). Women are involved in activities of domestic concern like food production, cooking, fetching water, collecting firewood, nursing children etc. With this in view, who adopts what technology and who is likely to be affected by what technology can easily be understood by analyzing the technology itself.

A. Seed Technologies

1. The introduction of improved seed varieties has led to increased food production. In addition to assured food security the families get better diets and surpluses for sale which uplift the economic status of the families. The biggest advantage of high-yielding improved varieties is that the farmer, especially the woman with multiple roles, cultivates less and harvests more.

   Case Studies

   - *A farmer in Usukuru sub-county (Tororo) district planted 2kg of K131 bean and harvested 110kg. Wafula in Buhwama harvested 100kg out of the same amount*

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men were involved. It was noted that women were overburdened because their roles involved daily activities. For men, apart from farming, the rest was occasional, though at times strenuous.

The family is the cornerstone upon which the Ugandan society is built and the basic unit of production. Therefore in analyzing the impact of any technology, it is important to note that the gender relations in families are such that:

- The man is the head and, therefore, decision-maker in the family. Most of the time he allocates duties to his wife, or wives, and children.

- The woman is the food producer while the man is the cash provider and, therefore, the financial controller.

- The man is the sole owner of all the family property, i.e., land, house, and all farm produce. In some cultures the women and children are also regarded as part of the property.

- At the community level, men seem to command power and supremacy. However, there are variations from this general picture depending on the cultural setup, level of development and the external influence of a particular community and definitely the marital status of the head of the family (whether single, widowed, etc.).

For example, some men interviewed during the above survey were already aware of women's constraints. They were very willing to help but still bound by cultural ties. "Your fellow men will regard you as a weakling or bewitched by the woman," one man commented. In other areas, the women were blamed for failing to adjust to change even when the men have done so. Very few women, if not none, can allow their husbands in the kitchen.

III. The Impact of OFPEP Technologies on Food Production

The OFPEP seed and soil technologies in Uganda can be summarized as follows:

- Introducing seeds of improved varieties, following recommended agronomic practices like spacing, seed rate, planting time and weeding time.

- On-farm seed activities like germination tests, selection, preservation and storage.

- Soil conservation methods like building terraces, digging trenches, planting grass strips, stabilization bands.

- Soil fertility improvement methods like composting, rhizobium inoculation, application of green/animal manure and inorganic fertilizers, and agroforestry technologies.

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Possible potential negative effects/implications of seed technologies

The recommended agronomic practices (like row cropping, counting of seeds (seed rate), thinning, etc.) turn out to be more labor intensive than local practices in the short run. This puts more pressure on the already busy schedules of farmers, especially women. Such useful practices end up being applied more to crops produced for cash, where men are involved, than to food crops. In the long run food security in homes is affected. The women are also viewed as none or low adaptors.

In some areas, increased production has led to serious marketing and storage problems. For example, soybean marketing is a problem because of low domestic consumption. The crop was mainly introduced in Uganda as a cash crop and therefore has not contributed so much to food security. Because of low or no domestic consumption and very limited markets, there is a reduced rate of adoption of the improved varieties of soya in such areas. *During a collaborator's meeting held in Iganga, marketing ranked high as a problem for all the 15 groups.*

Family tensions: increased production is also likely to create family tension where there is a very distinct division of roles. The women may claim more control of benefits from the food surpluses they produce. On the other hand, the men might refuse them those increased benefits, or feel their financial status is threatened.

In PRA interviews with trainee groups in Tororo and Iganga during the cassava multiplication T.O.T, men, women, and children were found to be involved in production but marketing was mainly done by men. This was because they had bicycles, "but a carefully veiled reason appeared to be that they wanted to control funds" (reported by Dr. Moses Onim).

B. Soil Technologies

OFPEP soil technologies have helped smallholder farmers both to conserve and improve the fertility of their soils. *In Busaba and Adhola subcounties (Tororo district) the gulleys are filling, and farmers are very excited.*

As a prerequisite to soil amendment, OFPEP has assisted in carrying out soil analyses to establish the soil status in some areas. The results have filled a missing link in the agricultural systems, wherever the analyses have been carried out. The collaborators and farmers are very grateful. "I tried to look for this kind of information from district headquarters but in vain, yet it is very important when dealing with soil fertility," one coordinator of a collaborating NGO commented.

Possible potential negative effects/implications on soil technologies

In most cases soil activities seem to be an extra load, different from the usual farming unlike those concerning seeds. To make matters worse their benefits may not be felt or seen in a single season. Although most of the time the small holdings are 1-2 acres, farmers find it difficult to apply the technologies in the whole area, for example digging of terraces, application of manure, and making of compost. In some cases the farmers have become discouraged and abandoned.

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planted. Wafula is a lead farmer of a group with 12 women and 14 men. These yields are double what the local varieties have been yielding.

- *In Baitambogwe (Iganga district), one farmer planted 20kg of improved soybean (Nam1) which yielded 700kg. The family was able to buy building material and put up a shelter during the subsequent season.*

- ***The cassava story*** *. The crop ranks No.1 food crop in the 3 districts according to the surveys. Unfortunately, in many areas cassava has been wiped out by the African Cassava Mosaic Virus (ACMV), hence, food security is being greatly affected. Through OFPEP, tolerant varieties (NASE 1&2) have been introduced. Last year (1995,) in Iganga 11.5 acres were planted for multiplication and more than 27.5 acres have been planted this year. 541 women benefited from the training. Planting materials are now overflowing into Tororo district where 5 women groups, with a membership of 130, have benefited. The people now have a hope.*

2. OFPEP seed technologies have minimized the risks of:

   - Planting seeds of low viability and poor quality. This is through introduction of pure and clean germplasm at the demonstration and adoption level and emphasis of on-farm seed activities.

   - Adoption of what may not be relevant or suitable in the farmers' environment. There are incidences where the local varieties of sorghum have out-yielded the so-called improved at the demonstration level. In such a case the farmer does not have to waste his resources to adopt.

   - Incidents of diseases and pests related to management. This has been possible through emphasis on the recommended agronomic practices.

   All the above factors have resulted in optimal use of farm resources (land, labor, time and money) which can be reallocated to other activities like domestic work, agricultural training, and other community responsibilities to enhance the well-being of families.

3. A sustainable source of pure seed and viable planting materials has been created through OFPEP effort. This has reduced problems of late planting and dependence on external sources.

   The cassava story is still a good case. Because of the limited availability from the research institutes, it was very difficult to obtain enough materials, but the Iganga district is becoming self-sufficient with Nase 11.

In view of the above, the OFPEP gender program is expected to primarily focus on:

1. Proper gender role analyses in its districts to enable OFPEP to understand the likely variations in the impact of the technologies on food production.

2. Carrying out surveys concerning adoption and effect of technologies on women, men and children.

3. Sensitizing and training OFPEP staff on gender relations in agriculture. *To this effect, collaborations with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) should be strengthened, since it is considering "genderizing" the extension services in Uganda.*

4. Sensitizing the communities on gender issues.

5. Collaborations with other government departments and NGOs which handle gender issues for development. Any whose innovations aim at making the load of the already overburdened woman easier.

6. Working closely with women groups but not in isolation of men, since men are part of the development process and control most of the resources and benefits. *The gender program is already training trainers who are both men and women.*

7. Ensuring complete food security by ensuring the proper utilization of the food grown. This is the problem of nutrition. For example, soybean utilization needs to be stepped up.

The Gender T.O.T concluded in March 1996 included soybean utilization in homes. The impact has been that "farmers who used to complain about the marketing of soya are happy with the alternative of eating it themselves," reports the Tororo Extension Specialist. This is going to ease the women's work of looking for vegetables especially during the dry period.

V. Acknowledgments

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In Magamaga (Iganga) farmers were requesting for wheelbarrows to carry compost manure to far gardens.

In addition there are gender and social implications of these technologies. Most of them are viewed as better applied by the landowners who may necessarily be the cultivators. For example, women do not want to get involved in planting trees which they will never own or improve land which is for the man. On the other hand, if women adopt such technologies, men might feel threatened. "We cannot plant the grass bands because the land was specifically lent to us to plant soybeans, " one women's group reported. This group (Poyameri United Women's Association, PUWA) is composed of 24 women and 5 men.

C. Conclusion

In conclusion the impact of a technology on food production and the conservation of soil resources depends on:

- The social-cultural implication and economic benefit perceived by the adaptors/adoptors.
- Its relationship to the already existing roles.
- The existing farming systems in the area.

In most cases, a technology which has shown excellent technical merits and advantages, but which carries some negative social implication (e.g., time-consuming) achieves a very low adoption level. This not only affects the amount of food produced, but may threaten the soil resource base of the communities, as physical and chemical soil degradation is an increasingly severe problem and deserves serious and immediate in several places.

The fact that women in Uganda, who are the major producers of food consumed in rural homes (over 75%), have other multiple off-farm roles, indicates their low enthusiasm to adopt labor intensive technologies. Their little access to land and farm benefits affects food production even more.

IV. GENDER EXPECTATIONS

If we are to address the problems of women's overload, social tensions, land disputes, and other negative effects likely to arise from improved technologies, including some demonstrated by the OFPEP program, a gender program is an appropriate intervention. However, it is important to note that a gender approach deals with social issues. Dramatic changes are unexpected. It is a gradual process where a diversity of players are involved.

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OFPEP

ON-FARM PRODUCTIVITY ENHANCEMENT PROGRAM

The On-Farm Productivity Enhancement Program (OFPEP) integrates efforts to improve farmers' access to good seeds with activities aimed at increasing soil fertility and management at the farm level. It currently has sites in Senegal, Uganda, Kenya and Ethiopia. Winrock International heads the USAID funded project and is supported globally by the PVO/University Center for Collaboration in Development. The Center is responsible primarily for establishing linkages, program documentation, and information gathering and dissemination.

OFPEP is concerned with integrating sound technical knowledge with the social, cultural, and educational conditions at the farm level. OFPEP uses an approach based on participatory rural appraisal (PRA) techniques to identify the problems and potential solutions related to agricultural productivity. It then serves as a liaison between community groups/NGOs/PVOs and research institutions that provide training and information about tested techniques to stem the decline of soil fertility and improve crop production through better seed varieties.

Simple techniques like applying animal manures as fertilizer, composting crop residues, planting seeds of improved varieties, or inoculating seeds with rhizobium are demonstrated on the farmers' own fields. The farmers become involved in evaluating the usefulness of the technologies for their particular situations. They make suggestions for adaptations and then try the new techniques again. News of the results of these simple innovations is spread in the country and throughout the OFPEP network by word of mouth, cross-visits, and written materials.

OFPEP's THREE PREMISES

Smallholder farmers throughout the world have more knowledge about agricultural production than they realize.

Increasing smallholders' awareness of that agricultural knowledge could lead to increased food productivity under environmentally sound conditions.

Locally available technical inputs can increase productivity

PROGRAM ACTIVITIES

Seed and soil activities

- Participatory assessment of traditional seed and soil management practices.
- On-farm demonstrations of seed selection & storage techniques, biological nitrogen-fixation, agroforestry, erosion control, appropriate use of inorganic fertilizers, and crop residue management.
- Distribution of inoculum.
- Training in seed and soil technologies.
- Facilitation of sustainable production of BNF inoculum and green fertilizers.
- Development of markets for inoculum, seeds, and other technical inputs to be supplied locally.

Networking activities

- Creation of in-country networks.
- Linkages of country networks into larger global web.
- Generation of detailed implementation plan (DIP) through participatory workshops.
- Dissemination of program news throughout the international development community via OFPEP's newsletter -- *Of Soils and Seeds/Des Sols et Des Semences* -- produced in both French and English.
- Establishment of databases on seed and soil related resources, active consultants, and other programs/projects.

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HOW OFPEP CREATES LINKAGES

OFPEP links members of the international development community into a global network concerned with seed and soil issues. It is pursuing a model that can be replicated at sites experiencing problems of agricultural production related to declining soil fertility.

SENEGAL

Lead Institution: Winrock International
Participating Organizations: US Peace Corps, Rodale International, Christian Children's Fund, World Vision, Senegal Institute for Agricultural Research (ISRA), Diapante, Anambé Farmer's Association.

Each OFPEP country site has a lead agency to coordinate project activities and serve as base for the program's in-country management. Each country has a network of development professionals and rural community members, mostly farmers, who take part in a participatory process of defining and prioritizing seed and soil problems. Technical activities within each country site are guided by Advisory Committees which are made up of representatives from participating organizations.

KENYA

Lead Institution: Winrock International
Participating Organizations: CARE, Christian Children's Fund, Mobilizing Against Desertification, ICRAF, US Peace Corps, World Vision, the Grail Community.

THE MONITORING PROCESS

OFPEP relies heavily on farmer participation to build on their indigenous knowledge concerning seeds and soil fertility management. To develop this knowledge base, Winrock International, the Center for PVO/University Collaboration in Development, and the lead agencies in target countries follow a three step process of baseline collection, periodic monitoring, and evaluation. The guiding principle of the monitoring and evaluation system that of participation. NGO staff members, Peace Corps volunteers, and extension agents as well as the participa farming communities are aided by OFPEP staff in deve ing appropriate systems to track activities. Baseline data collection precedes any technical intervention in an are Periodic monitoring is flexible enough to be adapted to variable situations in the target countries and is not so cumbersome as to overburden staff of the implementing agencies. Such a process will enable program partners t document the changes ocurring in farm practices and th impacts on farm families.

ETHIOPIA

Lead Institution: Africa Village Academy (AVA)
Potential Participating Organizations: World Vision, Catholic Relief Services, Save the Children, Sasakawa/Global 2000, VOCA, Oromya Agricultural Development Bureau, Agri-Services, Christian Children's Fund, Technical and Science Commission of the Ethiopian Government.

UGANDA

Lead Institution: Agricultural Cooperative Development International (ACDI)
Participating Organizations: Christian Children's Fund, Multipurpose Training and Employment Association, Makerere University, Buzaama Growers Coop. Society, US Peace Corps, Talent Calls Club, Uganda Association for Social and Economic Progress and several local groups.

The linkages created by OFPEP offer many OPPORTUNITIES to program participants.

OPPORTUNITIES FOR FARMERS:

To share their wealth of knowledge with others in the network.

To participate in setting the agenda for a program addressing their needs.

To improve the productivity of their farms.

To explore new sources for seed and inputs.

To improve their families' quality of life.

OPPORTUNITIES FOR RESEARCHERS:

To learn more about the reality farmers face and the constraints they cope with.

To conduct research with greater relevancy to farmers needs.

To extend their proven technologies to greater numbers of farmers.

To access other researchers around the world working of problems of mutual interest.

To use the technical assistance network offered by OFPEP.

To participate in training sessions.

OPPORTUNITIES FOR NGOs AND COMMUNITY GROUPS:

To share their knowledge and experience with researchers and other farmers.

To bring proven technologies to communities they are involved with.

To learn more about participatory research and development.

To exchange information with other organizations and agencies.

To upgrade technical skills.

To link up with other collaborators in the network to expand programs of their own.

Appendix B: Results of a Simple Gender Analysis in Tororo (n=68 women; 63 men)

	WOMEN	MEN
Common to all	1. Farming. - planting, weeding of food crops. - harvesting of food and cash crops. -grazing goats.	1. Farming -bush clearing and land preparation. -planting and weeding of cash crops. - milking and grazing cattle.
	2. Food preparation. -winnowing, grinding and cooking. - fetching water and firewood.	2. Building -main house & kitchen. - storage facilities. -pit latrine.
	3. Cleaning. -smearing and sweeping houses. -sweeping and digging compounds. -washing kitchen ware and clothes.	3. Purchase of basic needs. -house ware. -education (school fees). -land.
	4.Child birth and caring. -producing children. -providing mother care.	4. Paying taxes and involvement in community efforts.
Not common to all.	-bush clearing and land preparation. -paying school fees. -marketing food crops. -bathing husbands.	-"drinking" - maintaining the compound. - fetching water.

Appendix 7

Problems of Seeds and Soils as Seen Through Farmers' Eyes - Uganda

Appendix 7

PROBLEMS OF SEEDS AND SOILS AS SEEN THROUGH FARMER'S EYES

This activity has three objectives:

1. To expose the farmers to the technology of using cameras to describe their problems.

2. To learn about the main problems concerning seeds and soil fertility as portrayed visually by the farmers.

3. To learn about the process by which the farmers make decisions about prioritizing their problems.

PROCEDURE

1. You will have to divide the groups into males and females for this exercise. Then each group will choose a representative: one female and one male. This is important because we want to see if there are any differences in the problems identified by the women and the men, as they have different responsibilities in farming. The selection of the "official group photographer" will have to proceed in a culturally appropriate manner. But the man and woman (boy and girl if they are truly "youth"!) chosen should be respected by the community and they should be the type of person who can take the advice of others on the kinds of photos/problems they should emphasize. The person chosen should be reliable and commit themselves to begin and finish the work on schedule.

2. Facilitate a discussion with each group on what they should take photos of: major problems associated with soils and seeds only. Each group should discuss their problems and together think of the best ways they would like to show the problem, and how it affects their families and other members of the community. This should develop a list of photos they want to take.

3. Discuss and have everyone agree on types of photos or areas where photos <u>should not be taken</u> because of cultural, religious or other taboos. Be sure to obtain a consensus.

4. Be sure to develop a plan to individually train each of the photographers so that they are comfortable with the camera. Allow a certain number of photos for learning/experimenting with holding the camera steady, ideal distance from subject, using the advance wheel, etc... Maybe 3-5 photos can be allowed for this. You should also agree in advance that the photographer can use 2 or 3 photos of his or her own choice (their family, house, etc...) But no more, or there won't be any left for the problems!

5. You might suggest that when taking photos of problems they think beforehand about the best way to portray/represent the problem. If the problem affects people, then they should be shown in

the photo in a way that depicts the difficulty.

6. Begin each role of film with a picture of the photographer.

7. Develop the photos as soon as possible. Make 4 sets of photos: 1 for the photographer, one for the community group (in a book maybe), one for OFPEP/Kenya and one to send to me.

8. Now comes the important part! Facilitate a community discussion with the photos and have the group identify the problems in the photos--perhaps choosing only the best photos to show each problem. Take good notes of what the different farmers say about the relative importance of the problem. Discuss how the proposed OFPEP interventions might improve the chosen problems. Ask the farmers to think ahead and imagine what the photo would look like if the intervention is successful. This will give you and the group some indicators by which you can monitor and evaluate your success. You may decide to repeat the photography exercise at the end of the second season to have the farmers take photos of improvements/impact. This will give you two sets of photos: "before" and "after", sort of like a "baseline" and a "final" set of photos.

9. Write a report describing the entire activity from the initial meeting to discuss the idea, all the way through the final meeting when the groups identified the photos that best show their problems. Then send me the photos with the group's explanation of the photo/problem for each of the best photos. Try to capture the exact words of the group as much as possible.

Instructions for using the disposable cameras:

Gold packet: One time use Flash Camera (27 photos)

Has a focus-free lens, what you see is what you get. Return entire camera for processing your prints. Do not try to open it yourself.

Can be used indoors or outdoors. Stand at a minimum of 4 feet and a maximum of 14 feet.

Silver packet: One time use camera for outdoors only (24 photos)

Photos should be taken outdoors. If taking shots of people, they should be 1 meter away from the camera.

Both cameras have to be advanced with the wheel on the back of the camera, they are not automatic.

COMMUNITY IMPRESSIONS OF IMPACT

SUGGESTIONS FOR USE IN THE COMMUNITY:

As this is just an experiment, I would like you to discuss among yourselves the following points, then make decisions and then discuss the ideas with the farmer group for their input and agreement.

1. I suggest that one camera be given to a male farmer group and the other to a female farmer/group. This way we will see if there are any differences in their perceptions of problems.

2. Facilitate a discussion with each group on what we want photos take of: major problems associated with soils and seeds only. Each group should discuss their problems and together think of the best ways they would like to show the problem, and how it affects their family. This should give them a list of photos they want to take.

3. The selection of the "official group photographer" will have to proceed in a culturally appropriate manner as only you know. But the man and woman chosen should be respected by the community and the type of person who can take the advice of others on the kinds of photos/problems they should emphasize. The person chosen should be reliable and commit themselves to begin and finish the work on schedule.

4. Discuss and have everyone agree on types of photos or areas where photos should not be taken because of cultural, religious or other taboos. Be sure to obtain a consensus.

5. Be sure to develop a plan to individually train each of the photographers so that they are comfortable with the camera. Allot a certain number of photos for learning/experimenting with holding the camera steady, ideal distance from subject, using the advance wheel, etc... Maybe 3-5 photos can be allowed for this. You should also agree in advance that the photographer can use 2 or 3 photos of his own choice (his family, house, etc...) But no more, or there won't be any left for the problems!

6. You might suggest that when taking photos of problems they think beforehand about the best way to portray/represent the problem. If the problem affects people, then they should be shown in the photo in a way that depicts the difficulty.

7. Literacy levels are not indicators of good problem identifiers/photographers.

8. Begin each role of film with a picture of the photographer.

9. Develop the photos as soon as possible. Make 4 sets of photos: 1 for the photographer, one for the community group (in a book maybe), one for you and one to send to me.

10. Now comes the important part! Facilitate a community discussion with the photos and have the group identify the problems in the photos--perhaps choosing only the best photos to show each problem. Take good notes of what the different farmers say about the relative importance of the problem. Discuss how the proposed OFPEP interventions might improve the chosen problems. Ask the farmers to think ahead and imagine what the photo would look like if the intervention is successful. This will give you and the group some indicators by which you can monitor and evaluate your success. You may decide to repeat the photography exercise at the end of the second season to have the farmers take photos of improvements/impact. Sort of before/after set of photos.

Appendix 8

Composting Methods - Kenya

Appendix 8

1. CHOOSE A SPOT THAT IS AT LEAST PARTIALLY PROTECTED FROM RAIN AND DIRECT SUNLIGHT

   GATHER THE CROP RESIDUES, ANIMAL MANURES AND OTHER WASTES AND BRING THEM TO THE PREPARATION SITE

   MEASURE THE AREA WHERE YOU WANT TO PREPARE YOUR COMPOST AND MARK WITH POLES (OPTIONAL)

2. LOSEN THE SOIL WITHIN THAT AREA WHERE YOU WANT TO PREPARE YOUR COMPOST BY DIGGING, LIGHTLY THE EARTH SURFACE. THIS IS TO AID IN AIR CIRCULATION WITHIN THE COMPOST.

3. PILE THE CROP AND OTHER TOUGH PLANT MATERIALS FIRST (15cm). FOR THE NEXT LAYER SPREAD THE ANIMAL MANURE TO A THICKNESS OF ABOUT 5 - 8cm, FOLLOWED BY ABOUT 3cm OF GOOD TOP SOIL.

4. WATER THE PILE UNTIL IT IS SUFFICIENTLY MOIST. WATER REGULARLY.

5. PILE ANOTHER LAYER OF THE MATERIALS IN THE SAME SEQUENCE AND REPEAT UNTIL A HIEGHT OF ABOUT 1.5M OF THE COMPOST PILE IS ATTAINED.

5. TURN OVER OR MIX THE PILE WITH AVAILABLE TOOL AFTER THREE WEEKS, THEN AGAIN AFTER FIVE WEEKS.

HARVEST THE COMPOST IN THREE TO FOUR MONTHS

Appendix 9

Laboratory Analyses of Compost/Manure Samples - Kenya

Appendix 9

A). Results of laboratory analyses of compost samples collected from compost prepared by farmers before training for use in the long rains of 1995 demonstration sites.

		pH	K_2O	CaO	P_2O	O.M	N
			----m.e.----		ppm	--------%-----	
			<0.2	<0.4	<20	<4.0	0.2
SAMPLE NO							
S1		6.9	1.82	-	0.50	13.60	1.18
S2		7.9	1.66	-	0.19	17.00	0.86
S3		7.7	1.30	-	0.34	21.20	1.25
S4		7.8	0.77	-	0.20	22.50	0.47
4	Average	7.58	1.39	-	0.31	18.58	0.94

B) Results of laboratory analyses of compost samples collected from compost prepared by farmers after training, for use in the long rains of 1996 demonstration sites.

			pH	K_2O	CaO	P_2O	O.M	N	CEC
				---meq-----		ppm	-----%----		m.e.
				<0.2	<4.0	<20	<4.0	<0.2	<20
NAME OF FARMER	DISTRICT	LOCATION							
J. Ogutu	Siaya	E.Asembo	7.66	14.30	10.83	43.33	4.72	0.35	18.90
J. Tanya	Vihiga	S.W.Bunyore	8.33	10.00	16.93	63.66	4.82	0.33	24.00
C. Andiasta	Vihiga	W.Bunyore	8.33	10.86	17.60	49.33	6.11	0.55	31.38
S. Ambuka	Vihiga	S.W.Bunyore	8.13	13.26	15.83	38.50	6.07	0.42	-----
S. Ogola	Siaya	W.Uyoma	8.00	14.26	20.62	38.83	5.82	0.29	-----
K. Odhiambo	Siaya	W.Asembo	7.76	13.40	24.29	53.33	6.25	0.56	-----
A. Osiako	Vihiga	S.W.Bunyore	8.56	24.46	13.12	54.33	6.51	0.50	-----
J. Atutu	Vihiga	W.Bunyore	7.66	12.23	18.43	38.66	5.15	0.63	-----
E. Maria	Vihiga	W.Bunyore	7.75	11.20	17.03	37.50	5.64	0.65	-----
J. Owiti	Siaya	N.Sakwa	7.40	7.40	15.00	31.00	5.98	0.57	-----
F. Ondiro	Siaya	C.Alego	8.20	16.64	14.06	26.00	6.30	0.68	-----
M. Odhiambo	Siaya	E.Alego	8.20	20.88	12.03	43.00	6.08	0.66	-----
S. Owino	Siaya	S.Gem	7.90	15.36	16.56	46.50	8.34	1.42	-----
Rera CCF	Siaya	S.Gem	7.70	30.96	20.00	17.50	5.64	0.68	-----
W.W.Opiata	Vihiga	S.W.Bunyore	7.60	6.96	14.06	54.00	6.72	1.04	-----
J.O.Ooko	Migori	S.Kamagambo	7.90	6.40	12.66	46.50	2.08	0.26	-----
T. Orik		Kagan	8.10	12.96	10.63	39.00	2.80	0.30	-----
T. Ochal	H/Bay	E.Gem	8.10	9.12	11.50	41.50	2.20	0.22	-----
J. Ogwel	H/Bay	Kagan	7.20	6.40	11.50	34.00	5.46	0.34	-----
J. Opiyo	Migori	W.Kamagambo	8.10	30.96	10.63	20.00	7.52	0.74	-----
A. Osiyo			7.50	10.24	23.75	46.00	5.36	0.72	-----
R. Odera	Migori	Wan'g chieng	7.60	20.16	20.00	5.00	8.65	1.43	-----
J. Omundo	Migori	N.Kamagambo	7.80	8.00	16.56	34.00	4.59	0.37	-----
J. A.Akala	H/Bay	S.Sakwa	6.50	5.92	12.66	36.00	5.75	0.41	-----
M. Owiti	H/Bay	E.Kochia	8.20	21.60	23.75	10.00	6.10	0.61	-----
E. Owinyo	H/Bay	C.Karachuonyo	7.10	2.92	12.66	46.00	4.92	0.37	-----
E. Obondi	Migori	W.Kamagambo	8.90	19.36	10.31	38.00	4.66	0.38	-----
V. Ochuoga	Siaya	N.Ugenya	9.30	27.20	20.63	32.00	5.87	0.36	-----
S. Ondiso	Siaya	Uholo	7.80	16.64	13.44	24.00	4.61	0.68	-----
M. Ayuoyi	Siaya	E.Gem	8.40	28.00	18.44	38.00	5.21	0.41	-----
L. Odhiambo	Siaya	C.Gem	7.70	12.64	20.00	56.00	4.86	0.39	-----
O. Odundo	Siaya	N.Sakwa	7.60	11.04	20.63	45.00	4.68	0.39	-----
M. Ombalo	Siaya	S.W.Gem	7.60	10.72	22.50	46.00	5.56	0.50	-----
33	TOTAL		252.48	482.01	538.64	1310.47	185.69	18.21	74.28
	AVG.		7.65	14.61	16.32	39.71	5.63	0.55	24.76

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C) Results of laboratory analyses of animal manure samples collected from animal manure used in the long rains of 1995 demonstration sites.

Sample	pH	K_2O	CaO	P_2O	O.M	N
		---meq----		ppm	-----%-----	
		<0.2	<0.4	<20	<4.0	<0.2
1. Ani. manure	7.8	1.68	0.72	29.40	2.00	
2. Ani. manure	7.4	1.68	0.47	26.40	1.02	
3. Ani. manure	7.7	2.35	2.35	29.90	1.61	
Avg.	7.63	1.90	1.10	28.57	1.54	

D) Results of laboratory analyses of animal manure samples collected from animal used in the long rains of 1996 demonstration sites.

			pH	K_2O	CaO	P_2O	O.M	N
				---meq----		ppm	-----%-----	
				<0.2	<0.4	<20	<4.0	<0.2
NAME OF FARMER	**DISTRICT**	**LOCATION**						
M. Odhiambo	Siaya	E.Alego	8.60	13.92	14.06	24.50	4.45	1.31
Lumigo w/g	Siaya	C.Asembo	7.70	18.08	37.50	21.00	7.31	0.79
J.Agutu	Kisumu	S.W.Kisumu	8.70	30.96	16.56	20.00	6.78	0.35
F.Ondiro	Siaya	C.Alego	8.70	25.77	13.19	48.50	4.61	1.48
L.Oduogi	H/Bay	W.Kanyamwa	6.30	12.96	25.00	52.50	4.66	0.46
J.Oduwo	H/Bay	Ndhiwa	8.70	19.36	13.44	55.00	6.65	0.40
J.Tanya	Vihiga	S.W.Bunyore	8.60	30.96	15.63	39.50	6.22	0.56
P.Okello	Kisumu	S.W.Kisumu	7.70	16.64	18.75	64.50	7.56	0.68
8		TOTAL	65.00	168.65	154.13	375.00	48.24	6.30
		AVG.	8.13	21.08	19.27	46.88	6.02	0.75

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Appendix 10

"Why Soya Beans?" - Kenya

Appendix 10

OFPEP-KENYA IN COLLABORATION WITH CARE KENYA, SIAYA

WHY SOYA BEANS?

ANG'O MA OMIYO NGO'R SOYA DWARORE

Mondo dhano odong maber kendo motegno, dwarore ni mondo ocham chiemo mopogore kaka;

- Chiemo magero del(Protein)
- Chiemo makelo teko (Carbohydrate)
- Chimo mageng'o tuoche (vitamins)

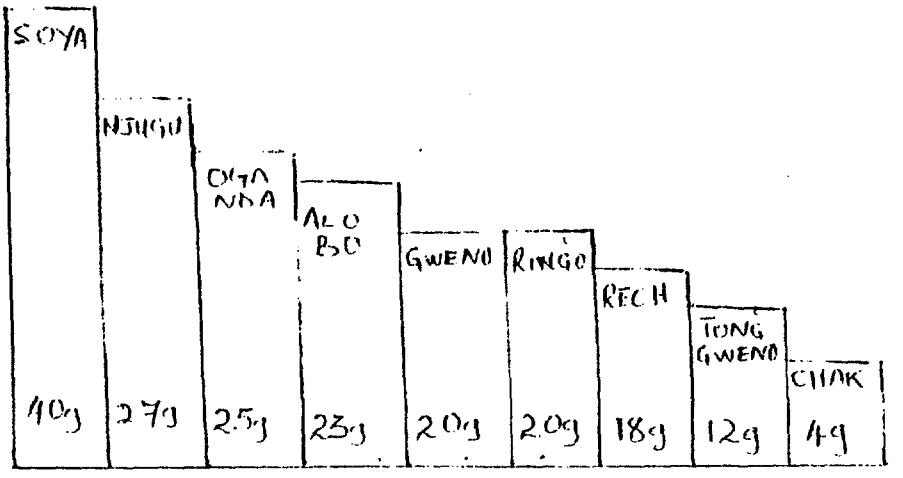
Chiemo magero del yudore e ringo, rech, tong' gwen, chak, oganda, olayo, njugu, soya to gi ng'oche mamoko.

Ji mang'eny ok nyal yudo chiemo magero del maber maa kuom ringo, rech, tong gwen koda chak nikech nengo gi mi malo. Omiyo di watim ongo? Di waling' to ji thagore? Koso warit mondo ngato oa kamoro obi okonywa? Ooyo nyaka wakonyre wawegi.

Yo achiel mawanyalo konyorego wawegi en ninyaka wati maber gi chiemo mawanyalo yudo eyo matot kendo waloso wawegi.

Ng'or mar soya emayudo yot kendo oting'o chiemo magero del togimamoko mamedo teko kendo geng'o tuoche mopogore. Kaichamo soya to idongo kendo ngimani bedo maber. Moloyo kuom nyithindo matindo kagichamo soya to dendgi bedo maber kendo tuoche mang'eny ok makgi. Omiyo chak konyori gi soya kawuono.

Ka ipimo soya kod chiemo mamoko to iyudo ni soya oting'o chiemo magero del maber moloyo gi kaka onyis kaeni.



E gram 100 mag chiemb soya nikod 40g mag chiemo magero del (protein). Omiyo soya emaoyombo duto.

MANDAZI MAR SOYA (SOYA PANCAKE)

KAKA ILOSO MANDAZI GI SOYA.

GIK MADWARORE

Kikombe achiel (1) mar mok soya

Tong gweno achiel (1)

Mok muhogo kijike adek (3) mar chiemo

Sukari Kijike ayiro (2) mar chiemo

Mo mar chiedo

Chumbi matin

1. Ket tong achiel, sukari togi chumgi e mok soya. Ruqi maber.
2. Med kijike adek (3) mar mok nuhogo. Ru gi maber mondo kik oipwore ka ichielo gi.
3. Chiel mandasi e mo mochuaki nyaka kit gi lokre marabour koni gi Lwi.
4. Ka ok ikonyri gi sukari to inyalo tiyo gi chumbi, kitungu kata pili pili manumu Mosuagi. Magi loso mandasi maber manuithindo ohero.

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OFFEP-KENYA IN COLLABORATION WITH CARE-KENYA, SIAYA

KAKA ILOSO MOGO MAR SOYA

GIMADWARORE

NG'OR SOYA

1. Gol gik mochido kod kite mondo idong' gi soya maler

2. Ool soya e pi moyienyp. Ne ni pi yienyo mak odok chiou.

3. We soya oyieny epi kuom dakika piero adek (30 minutes)

4. Bang' yienyo soya luok gi gipi maler

5. Mo soya moseyienyo e par kata gunia echieng' nyaka gitui. [illegible] kaya ndolo maromo adek (3 days)

6. Reg soya motuo epong'

7. Chung mogo moregi mondo igol yugi maricho.

8. Kan mogo moregi kamaber mamuya ok donjie. Ayo [illegible] kaka dwarore.

Ng'eni opoko mar koth soya oting'o chiemo magero del omiyo kik igol gi [illegible] lendo ng'eni mok soya inyalo loso godo chiemo mang'eny kaka nyuka, chal, [illegible] to gi mamoko.

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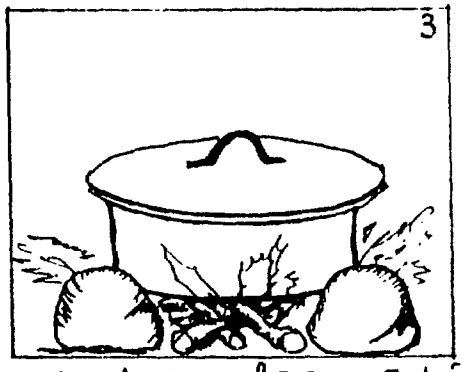
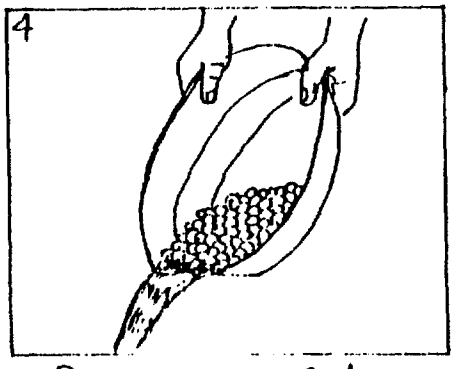
Dar yugi gi kite man e Soya Beans

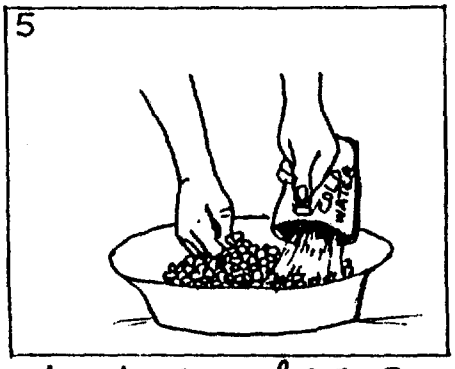
Ol Soya Beans e pi mawalo mos mos mondo kik pi Okwe



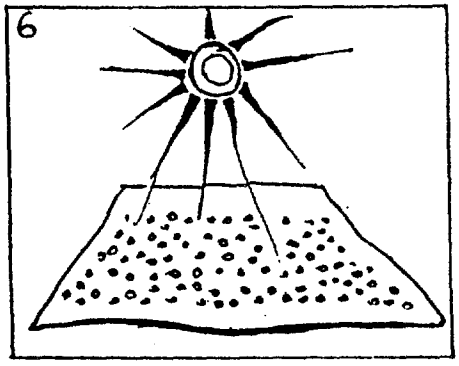
Chuak Soya Beans e pi mowalo kuom dakika 30.



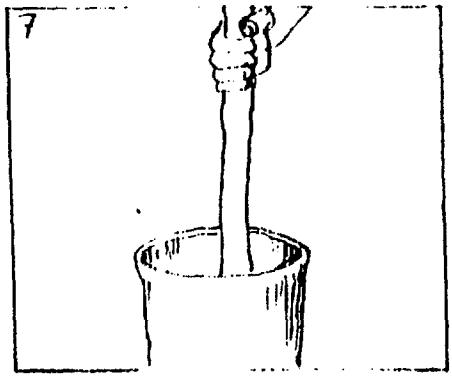
Puk pi maliet piny



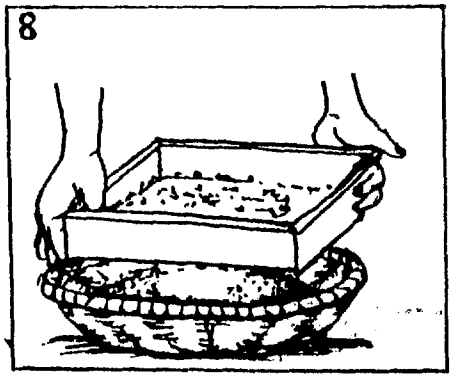
Luok soya Beans maler gi pi mangich



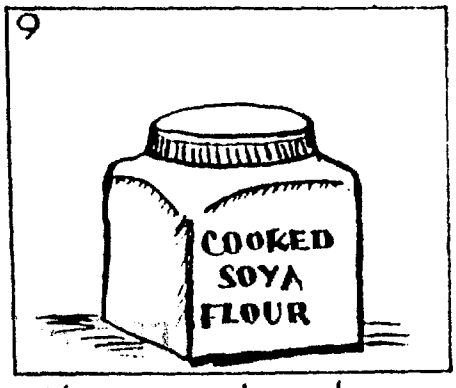
Mo soya Beans mochuaki e par kata gunia e chieng nyaka gitno.



Yok kata reg soya Beans.



Chung mok soya moregi



Ket mog kamaber mokwe, kendo ikonyri kode kaka idwaro.

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Appendix 11

Benefits of Soybeans - Kenya

Appendix 11

BENEFITS OF SOYBEANS

- SOYBEAN IS NUTRITIOUS
  - Soybean is high in protein and is used for making many tasty and wholesome foods
  - Oil form soybean can be used as a cooking oil. It also has many industrial uses.

Every 100g of soybeans contains 40g of protein, 32g carbohydrates, 20g fat, 5g minerals, 3g fibre, together with moisture and trace quantities of other nutrients.

- SOYBEAN CONTAINS HIGH PROTEIN CONTENT COMPARED WITH OTHER FOODS
- SOYBEAN CAN BE HIGH YIELDING WITH GOOD MANAGEMENT
- A CHEAP SOURCE OF PROTEIN COMPARED TO ANIMAL SOURCE
- SOYBEAN ENRICHES THE SOIL
  - Soybean roots can fix nitrogen from the air. Some of this nitrogen is left behind in the soil.
  - Crop grown after a soybean crop will need less nitrogen fertilizer than normal.
- BREAKS PEST AND DISEASE CYCLE IN ROTATION WITH CEREAL CROPS

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GROWING SOYBEANS

1. PLANNING

Start with a small area and gradually build up your skill in growing and using the crop. When you have successfully grown the crop on this small area, you may think of planting a larger area.

2. SITE SELECTION

Choose land that is flat or with just a small slope. Choose land that has deep soils and good drainage, with no problems of water logging.

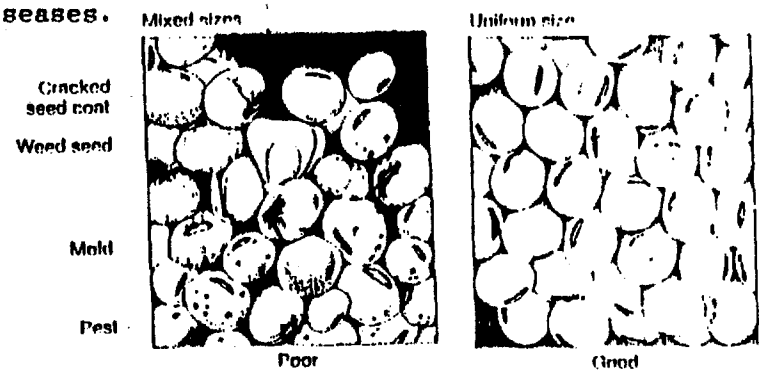
3. SITE PREPARATION

Clear the land off grasses and weeds, and prepare the same way you do for other crops. There should be no weeds growing at planting time.

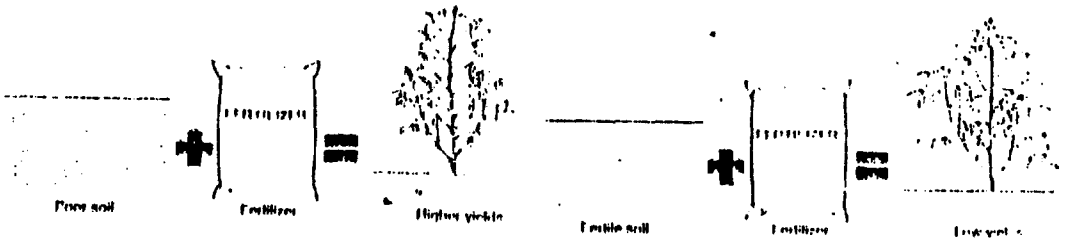
4. PLANTING

Plant in rows 60cm wide and 15cm between plants in each row, at a depth of 1 to 2 cm.

Seed quality - For good germination and plant stand, seed planted should be clean and free of pests and diseases.



Fertilizer - A soybean plant needs many nutrients for healthy growth and high yields. Yield increase from fertilizer will be highest on poor soils. Do not apply fertilizer on fertile soils. It will give too much leafy growth and reduce yields.



Add **organic fertilizer** in any amount possible. Very large amounts are needed to improve seed yields significantly. But even small amounts will improve the soil structure and plant growth.

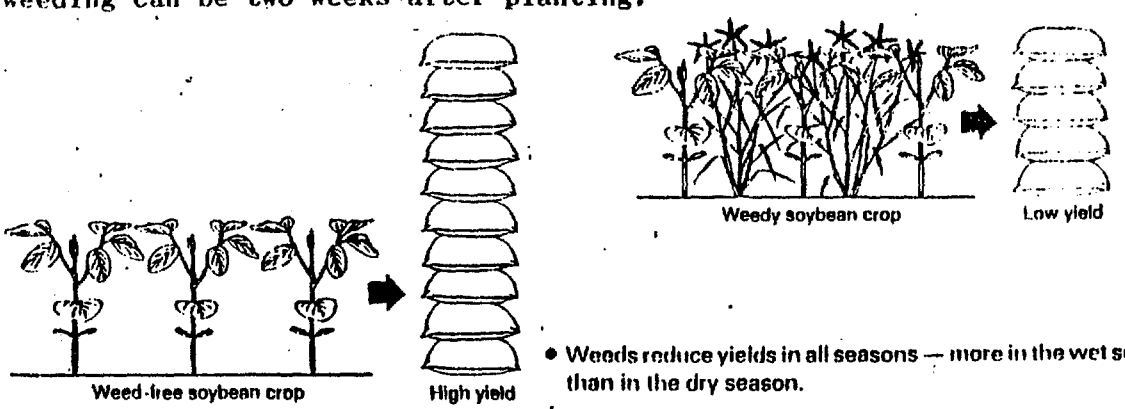
Inoculant - Soybean needs the right kind of bacteria to grow root nodules. Seeds should be treated with the right Rhizobium culture before planting every year (See separate paper for steps on how to use inoculant)

5. TIME TO PLANT

At the beginning of the Long rains, between February and March depending on the area would be an appropriate time to plant soybean

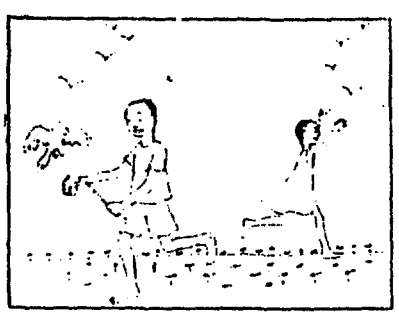
6. PLANT PROTECTION

Weeds.
Weeds rob seedling nutrients. Weeding should be done 1, 2 or 3 times, depending on how fast the weeds grow on the farm. The first weeding can be two weeks after planting.



• Weeds reduce yields in all seasons — more in the wet season than in the dry season.

Birds.
When the seedlings are emerging, it is necessary to scare birds in early hours of morning and late afternoon. Birds can damage soybean only during the first two weeks after planting

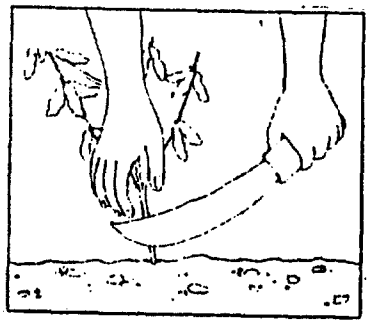


Rodents.
Rats, rabbits and squirrels will eat leaves and tops of plants as soon as the first leaves begin to appear. As a means of discouraging them, keep dense vegetation back from the growing area.

Insects.
In most areas, there is no problem. If a few pod sucking bugs appear, they will do little damage and usually you should nothing about them. They are easier to detect in the morning before it becomes very hot. If there is a large population of pod-sucking insects, you may spray with any of the following insecticides:

1. Thiodan
2. Ambush
3. Sherpa

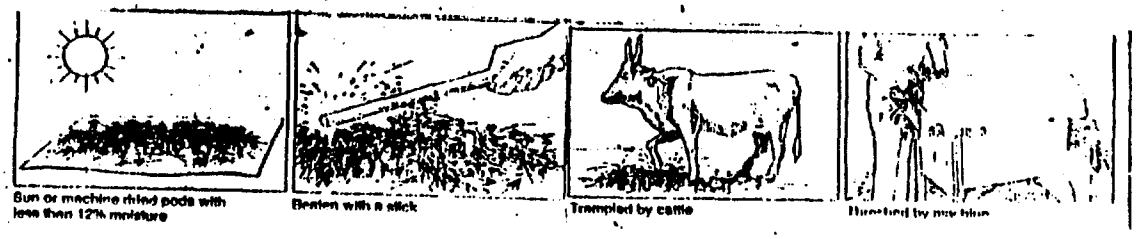
7. HARVESTING



When the pods turn brown and rattle when shaken, the whole plant should be harvested. This will normally be 4-5 months after planting. if harvesting is delayed the pods will shatter and the seeds may be scattered. The mature plants will be uprooted and loosely stacked for late threshing. They should be harvested in dry conditions.

8. THRESHING.

Plants must be kept dry. They may be spread on an open place and sun-dried. Hand threshing is suitable for small quantities. they should be threshed as soon as possible.



9. STORAGE.

Grains for eating should be stored in dry conditions, at less than 10% moisture. If it is possible to dent the bean with your teeth, the seed is to moist and should be dried further. After proper drying the grains should be stored in woven sacks, in well ventilated rooms.

Seeds for planting should be stored in a plastic bag so that the seed remains dry. Keep until planting time in a cool part of the house.

APPENDIX 5.

DAILY NATION, MONDAY, DECEMBER 25, 1995

NATIONAL NEWS

Food cost blamed for poor diets

By ZEPHANIAH MAGARA

Thirty per cent of Kenyan children are malnourished and have stunted growth because families cannot afford animal protein foods, an expert says.

Dr Moses Onim, the On Farm Production Enhancement Programme's East Africa regional director, said meat, fish, eggs and milk, had become unaffordable for many, adversely affecting children's health.

In a paper read on his behalf by the OFPEP Kenya Country coordinator, Mr Robert Ondigo, during a farmers' field day in Ukwala Division in Siaya District, Dr Onim urged proper use of available food.

The occasion was organised by OFPEP in collaboration with Care-Kenya and the Ministry of Agriculture to promote "Soya beans as the cheapest and most balanced source of vegetable protein.

"Using Soya beans in the diet daily will improve the health, growth and development of the family, especially children," said Dr Onim.

Mr Iskamdar, the Care-Kenya assistant director of programmes, promised to make arrangements to teach the women how to make *tempe*, an Indonesian Soya delicacy.

"We cannot accept disease and suffering while we wait for people to come to our aid from outside. We have to solve this problem affecting the health of out children," said Dr Onim.

Children who did not have access to balanced food could not concentrate on their studies and performed poorly in class.

Soya beans, he said, was a source of a substance called lecithin, which was important for the brain and nerve cells.

Mr Ondigo said his organisation had set aside Sh21.3 million ($38,000) for the Soya beans propagation programme in Nyanza and Western Province. He said the USaid-funded project would take Soya beans to every home in the next five years.

The Soya beans had 40 per cent proteins for every 100 grams compared to 20 per cent in meat and 25 per cent in other beans.

Soya could be stored with traditional technology for two three years and could also be used to produce high quality milk for home use.

He said a Soya variety named NAM 1 from Uganda could produce between 2000 and 4,000 kg per hectare.

BEST AVAILABLE COPY

Appendix 12

Seed Storage Procedures; People Chosen Kenya

Appendix 12

TRADITIONAL ON FARM SEED STORAGE PROCEDURE

PRESERVATIVE

1. HANGING

a). Tie 6 cobs of maize with a wire or a thin sisal string and hang on roof inside the house under fire place.

b). Tie 6 cobs of maize with a wire or a thin sisal string and hang on the roof eaves outside the house.

c). Tie 6 cobs of maize with a wire or a thin sisal string and hang on a tree branch outside.

2. SAND

a). Mix 2 kilos of shelled maize seed with 1 kg of dry sand. Mix thoroughly and put in a tin. Cover the tin and keep in house.

b). Mix 2 kg of shelled maize seed with 1 kg of dry sand put in polythene bag and then put in tin and cover the tin and keep in house.

c). Put 2 kg of shelled maize seed in tin without mixing with sand, cover the tin and keep in house.

3. WOOD ASH

a). Mix 2 kg of threshed bean seed with wood ash. Mix thoroughly so that the ash covers all the bean seeds. Put the mixture in a tin. Cover the tin and put in house.

b). Mix 2 kg of bean seeds with ash. Put the mixture in polythene bag then put in tin. Cover the tin and keep in house.

c). Put 2 kg of bean seeds in tin without mixing with ash. Cover the tin and keep in house.

4. WOOD ASH

a). Mix 2 kg of threshed sorghum seed with wood ash. Mix thoroughly so that the ash covers all the sorghum seeds. Put the mixture in a tin. Cover the tin and put in house.

b). Mix 2 kg of sorghum seeds with ash. Put the mixture in polythene bag and then put in tin. Cover the tin and keep in house.

c). Put 2 kg of sorghum seeds in tin without mixing with ash. Cover the tin and keep in house.

5. ACTELLIC SUPPER

a). Mix 2 kg of maize seed with actellic super. Put the mixture in sisal bag. Tie the bag tightly and keep in house.

b). Mix 2 kg of bean with actellic super. Put the mixture in sisal bag. Tie the bag and keep in house.

c). Mix 2 kg of sorghum seed with actellic super. Put the mixture in sisal bag. Tie bag and keep in house.

PEOPLE CHOSEN TO CARRY OUT TRADITIONAL SEED STORAGE

	TREATMENT	SEED	QUANTITY	CONTAINERS
1. SABINAH A. ONYANGO KANO CHIGA	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
2. TOBIAS OCHUKA NYAHERA	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
3. ERIC OCHIENG' RANGALA	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
4. SELLA OSITA/ EPHRAIM OYONDI MUHANDA PRI. SCH.	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
5. AUGUSTIN MUMMA NYAKACH	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
6. ALEX MBOTO Siaya Jera	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	
7. JOSEPH AGUNDA Siaya Boro	Sand	Maize	6 kgs	3 tins
	Wood ash	Sorghum	6 kgs	3 tins
	Wood ash	Beans	6 kgs	3 tins
	Hanging	Maize cobs	18 cobs	

Four litre empty paint tins	=	65 tins
shelled maize seed required	=	45 kg
Threshed sorghum seed required	=	45 kg
Threshed Bean seed required	=	45 kg
Maize cobs for Hanging	=	126 cobs
Polythene Bags	=	21
Actellic super	=	1 tube (400) gm

Appendix 13

Effects of Seed Storage Treatment - Kenya

Appendix 13

A) Visual observations on the effects of seed storage treatment on maize, sorghum and bean seeds.

TREATMENT/METHOD OF STORAGE		CROPS - SEED		
CONTAINERS	PRESERVATIVES	MAIZE	BEANS	SORGHUM
HANGING	1. Under branch tree branches outside	Attacked by ants		
	2. Under roof eave.	Attacked by rats and cob completely eaten up.		
	3. Over the fire place in the house	No damage observed, cobs covered with soot		
Thoroughly cleaned four liter tin paints	DRY SAND:			
	1. Seeds + sand in polytene bag put in tin.	- No damage		
	2. Seeds + Sand put in tin.	- No damage.		
	3. Seeds put in tin - control.	- Attacked by weevils.		
	DRY WOOD ASH:			
	1. Seeds + Ash in polytene bag put in tin.		- No damage	- No damage
	2. Seeds + Ash put in tin		- No damage	- No damage
	3. Seeds put in tin without ash (Control).		- No damage	- Attacked by weevils
GUNNY BAGS	ACTELLIC SUPER			
	1. Seeds + actellic super.	- No damage	- No damage	- No damage
	2. Seeds not treated with actellic super	- No damage	- No damage	- No damage

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b) Percent germination of maize seeds after 6 months storage under traditional and modern storage techniques.

MAIZE

# TREAT-MENTS	SITES						TREATMENTS		
	KAWUONDA	MUHANDA	ALEX MBOTO	OCHUKA	LEONIDA. ODHIAMBO	RANG'ALA	TOTALS	MEANS	RANK
1	28	96	57	74	96	46	397	66.17	5
2	92	99	18	94	92	41	436	72.67	3
3	66	56	53	87	53	86	401	66.83	4
4	91	67	82	67	80	52	439	73.17	2
5	5	40	48	43	59	62	257	42.83	6
6	4	4	40	3	44	52	147	24.50	8
7	97	94	79	95	96	48	509	84.83	1
8	97	47	0	0	0	32	158	26.33	7
TOTAL	462	503	377	463	520	419	2744		
MEANS	57.75	62.88	47.13	57.88	65.00	52.38		57.17	

Key:

1. Tin + Sand + Polythene bag
2. Hanging under a tree
3. Hanging under roof eave
4. Hanging under fire place
5. Tin + Sand
6. Tin - Control.
7. Gunny bag + Actellic
8. Gunny bag - control

ANOVA

SOURCES OF VARIATION	DF	SS	MS	F
Totals	47	45812.67	974.74	1.54ns
Locations	5	1748.67	349.73	0.55ns
Treatments	7	21956.34	3136.62	4.96*
Error	35	22107.66	631.65	-

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C) Percent germination of bean seeds after 6 months storage under both traditional and modern storage techiques.

BEAN

TREAT-MENT #	SITES						TREATMENT	
	KAWUONDA	MUHANDA	ALEX MBOTO	OCHUKA	L. ODHIAMBO	RANG'ALA	TOTALS	MEANS
9	79	76	81	70	74	53	433	72.17
10	90	96	79	50	74	94	483	80.50
11	81	77	96	70	78	100	502	83.67
12	95	96	76	47	86	92	492	82.00
TOTAL	428	427	418	323	404	366	2366	
MEANS	85.60	85.40	83.60	64.60	80.80	73.20		78.87

Key:
9. Tin + wood ash
10. Tin - control
11. Tin + polytene bag + wood ash
12. Gunny bag - control
13. Gunny bag + Actellic

ANOVA

SOURCES OF VARIATION	DF	SS	MS	F
TOTALS	29	7907.47	272.67	0.97
LOCATIONS	5	1749.07	349.81	1.24ns
TREATMENTS	4	531.80	132.95	0.47ns
ERROR	20	5626.60	281.33	

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D): Percent germination of sorghum seeds after 6 months storage under traditional and modern storage techiques.

SORGHUM

TREAT-MENT #	SITES						TREATMENTS	
	KAWUONDA	MUHANDA	ALEX MBOTO	OCHUKA	L. ODHIAMBO	RANG'ALA	TOTAL	MEANS
14	33	30	71	16	34	5	189	31.50
15	3	15	21	15	3	1	58	9.67
16	7	60	79	42	40	21	249	41.50
17	6	45	18	15	15	61	157	26.17
18	60	86	68	91	63	88	456	76.00
TOTALS	109	236	257	179	152	176	1109	
MEANS	21.80	47.20	51.40	35.80	30.40	35.20		36.97

Key:
14. Tin + Wood ash
15. Tin - Control
16. Tin + polytene bag + Wood ash
17. Gunny bag - Control
18. Gunny bag-Actellic

ANOVA

SOURCES OF VARIATION	DF	SS	MS	F
TOTALS	29	24164.97	833.27	2.53
LOCATIONS	5	2953.37	590.67	1.79ns
TREATMENTS	4	14615.80	3653.95	11.08***
ERROR	20	6595.80	329.79	-

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Appendix 14

Results from Sample Survey Conducted on Severity of ACMV - Kenya

Appendix 14

Results from a sample survey conducted on the severity of African Cassava Mosaic Virus (ACMV).

FARMERS NAME	FARM AREA(Ac)	CROPS DISEASED (%)	FARMER'S PERCEPTION OF DISEASE CAUSE.
Roselida Nyangweso	0.125	71.0	Hailstone
Josephina Hoto	0.125	100.0	No idea
Cecilia Awino	0.25	7.1	Dry/Harsh weather
Caroline Ochieng	0.50	55.0	Many weeds e.g couch grass
Atieno Musamba	0.25	100.0	Dry harsh weather, poor soil fertility
Helene Anyango	1.00	100.0	Too many weeds, dry/harsh weather
Joyce Anyango	0.25	100.0	Weeds e.g couch grass
Erenia Obat (>70yrs>	0.125	100.0	No disease, no problem
Rosemary Akinyi	1.00	100.0	Many weeds, poor soils
Magnus Opondo	1.00	61.1	Suspected disease but doesn't know which
Maria Lucas Adhuno	0.25	20.0	Hot sun
Edwina Handa	0.25	58.3	Suspected disease but doesn't know which
Leonida Adala	0.25	40.0	Poor soil fertility
Josephine Opany	0.025	50.0	No idea
Judith Okelo Mial	0.03	45.8	Hailstones, Poor soils
Sypros Anyango Juma	0.5	32.0	Suspected disease termed madness ("raneko")
Millicent Auma	0.036	100.0	No idea
Mary Ayomo	0.006	20.0	Thought normal
Dan Otieno Anyinyo	0.027	31.1	Disease
Daniel Wagoma	0.23	88.0	Hailstorms
Awour Ooko Gombe	0.25	80.0	Dry or Chilly weather
Mary Otola Ngoga	0.50	15.0	Poor soil fertility
Vitalis Odawa	0.25	35.7	Poor soil fertility
Rose Auma	0.50	60.0	No idea
Totals	**7.516**	**1470.1**	
Average	**0.313**	**61.25**	

Appendix 15

Training of Trainers Workshop on Soil Management, Nov. 1995 - Kenya

Appendix 15

ON-FARM PRODUCTIVITY ENHANCEMENT PROGRAM (OFPEP) KENYA

TRAINING OF TRAINERS WORKSHOP
ON
SOIL MANAGEMENT

HELD AT TOM MBOYA LABOUR COLLEGE,
KISUMU
NOVEMBER 27-29, 1995

PREPARED BY:

DR. J. F. MOSES ONIM,

MR. ROBERT C. ONDIGO,

MS. ROSE SIGAR,

MR. CHRISPINE OKOTH AND

MR. NELSON OMONDI.

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FIGURE 1. LOCATION OF OFPEP DISTRICTS AND OFPEP POTENTIAL AREAS OF OPERATION IN KENYA

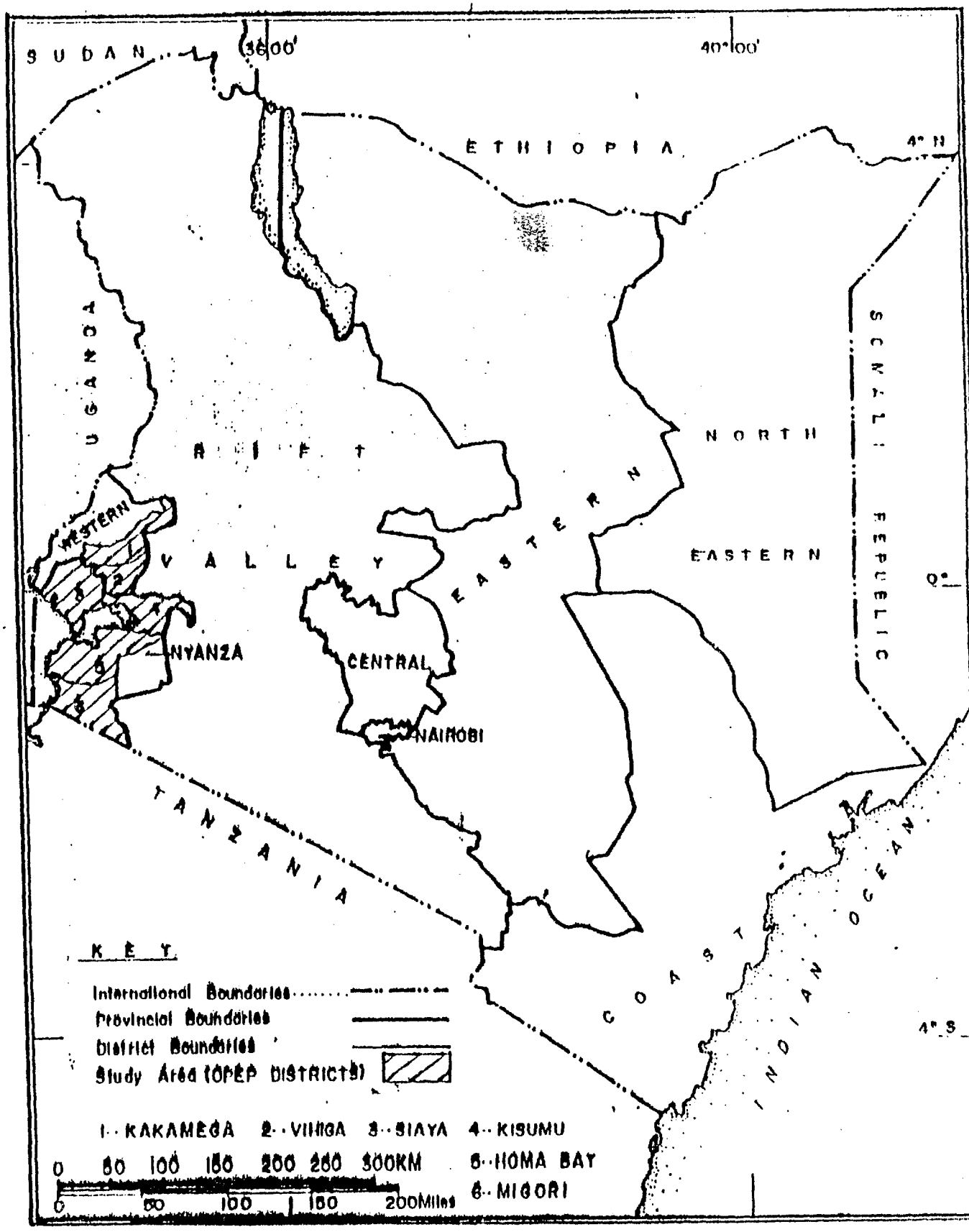

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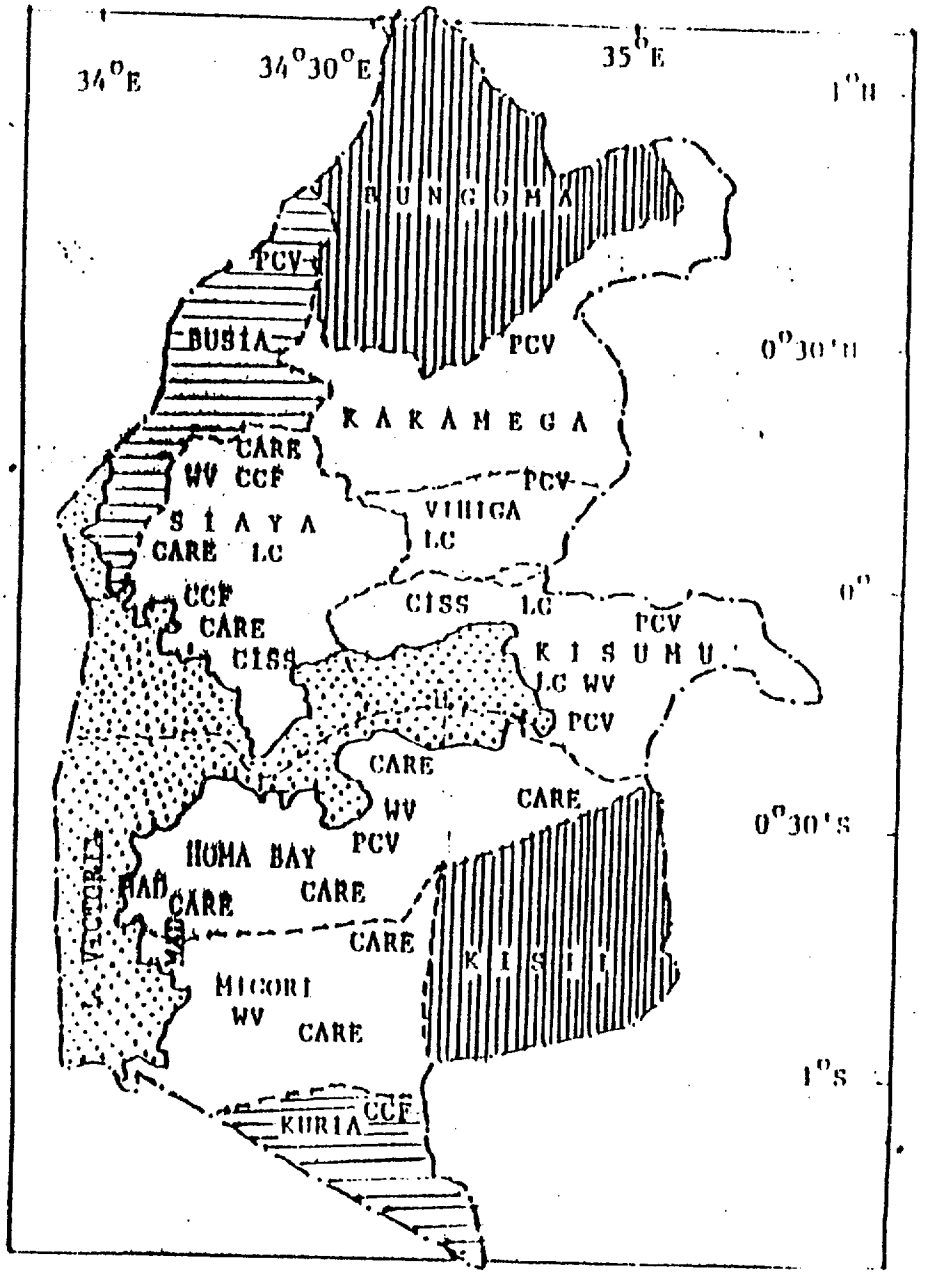
FIGURE 2. The Location of OFPEP-Kenya Collaborating NGOs



OFPEP DISTRICTS

DISTRICTS WHERE OFPEP'S COLLABORATORS ARE LIKELY TO EXTEND OFPEP TECHNOLOGIES TO

OFPEP COLLABORATORS PRESENT AND OFPEP TECHNOLOGIES ARE LIKELY TO SPREAD TO

OFPEP COLLABORATING NGOS

CARE	- Co-operative American Relief Everywhere
CCF	- Christian Children's Fund
CISS	- Community Initiative Support Services
LC	- Lagrotech Consultants
HAD	- Mobilizing Against Desertification
PCV	- Peace Corps Volunteers
WV	- World Vision International

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SOIL FERTILITY.

By

J.F. Moses Onim.

OFPEP Co-ordinator for East African.

28 November, 1995.

1. INTRODUCTION.

Drastic changes have occurred in soil fertility levels all over Africa in the last three to four decades. In the middle of this century, slash and burn and shifting cultivation were the major methods of crop production. Human population was very low and people communally owned land in most countries. So whenever a piece of land was exhausted, it was left to recover for many years, and thick vegetation cover would regrow on it. Such thick vegetation covers and light use of land for crop production and grazing maintained high levels of soil fertility and conserved the soil very well. However, in most African countries, as more people were born and child survival rates dramatically improved due to improved medical facilities soon after independence in the early sixties, pressure on land and other natural resources started to build up. Slash and burn and shifting cultivation could no longer be practiced as people settled permanently on their piece of land. They cultivated the same piece every year, generally without using any soil fertility improving techniques. Fragmentation of family land also continued as the same piece of land was sub-divided to many more family members. This led to increased intensity of land use without maintaining or improving the declining soil fertility. Therefore in the last few decades, capacity of land to produce high crop yields has been drastically reduced.

Crop yields are dropping steadily as the years go by, and in many cases, farmers shift to crops that are less sensitive to low soil fertility. This shift is for example, from maize to sorghum to cassava. As soil fertility continues to decline, crop yields also decrease and intensity of crop parasites, pests and diseases also increases. This is mainly due to growing of the same crop(s) every year, and lack of good crop rotation. Cassava is an excellent example in Uganda where its pests like green cassava mice, mealy bugs and diseases like African Cassava Mosaic Virus (ACMV) have made cassava production in many parts of Uganda impossible. In Kenya, dramatic increase of the parasitic weed of cereals and grasses -- striga-- in the Lake Victoria region in the last two decades is another good example. Due to declining soil fertility in the Lake region, there has been a dramatic increase on the incidence of striga on maize, sorghum, finger millet, rainfed rice and sugarcane.

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2. CAUSES OF LOW SOIL FERTILITY.

Cause of low soil fertility are many. The three most important ones are geological causes, chemical changes in the soil due to several environmental and climatological factors like rainfall, and activities of man and other animals.

2.1. GEOLOGICAL CAUSES OF LOW SOIL FERTILITY.

Natural or inherited soil fertility of an area very much depends on the types of underlying rocks from which the soils in the area are made. This process has taken millions of years to produce the soils that we have today. However, it will take one heavy rainfall to erode this soil that took millions of years to evolve. Sandy soils are generally derived from sandstone or granitic rocks. They are low in important plant mineral nutrients (especially bases) and have high acidity and toxic levels of minerals like aluminium and iron. These soils are of low fertility and have low water holding capacity. On the other hand, vertisols or black cotton soils are some of the riches soils in the world, although they are difficult to work when they are wet and very dry.

2.2. CHEMICAL CAUSES OF LOW SOIL FERTILITY.

Environmental and climatological factors like rainfall usually alter the chemical balance of plant nutrients in the soil. Such imbalances often result in high soil acidity or imbalances of plant soil nutrients, which may result in toxicities or severe deficiencies. An examples is salinity (high salt levels in the soil) which makes crop production of most crops impossible, unless salt tolerant varieties are developed or introduced. Salt accumulation on the land may occur through use of salty irrigation water or through salt encroachment from the sea or ocean. This is a major crop production problem in coastal areas of Kenya along Indian Ocean. When acidity of the soil becomes too high because of various reasons, like loss of humus in the soil and the use of certain acidifying fertilizers, the chemistry and the balance of plant nutrients in the soil drastically change, and many plant nutrients become deficient or toxic. An example is phosphorus which becomes unavailable in soils where soil acidity is high. In highly acidic soils, phosphorus becomes bound into complexes from which plant roots cannot absorb it.

2.3. HUMAN AND ANIMAL CAUSES OF LOW SOIL FERTILITY.

When man and other animals harvest various crops and forages from land, they remove large quantities of plant nutrients which must be replaced if the same level of soil fertility is to be maintained. Just imagine the number of tones - approximately 40 - of sugarcane that is harvested say from one acre of land. Think of 3 to 4 tones of dry maize grain per hectare that is harvested from our fields every four months, twice a year; and the 10 to 20 tones per hectare of crop residues that are grazed

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by livestock or simply burned after harvesting. The lost 13 to 24 tones per hectare of maize grain and stover that are removed every harvesting time may contain up to 10% plant nutrients, which is equivalent to approximately 1.85 tones per hectare of plant nutrients per growing season. In a few cases we may apply small quantities of organic or inorganic fertilizers, however, these will not replace all the lost plant nutrients to the soil. The process of removing plant nutrients through harvesting and not adequately replenishing them through appropriate fertilization is called "mining" of the soil. As the soil is mined over several years, soil fertility keeps declining until its productive capacity drops close to zero.

Other human activities like deforestation, poor agricultural practices, and industrial mining of valuable mineral disturb the soil physical and chemical constitutions which cause and enhance its degradation manyfold. All these decrease the level of soil fertility.

3. TYPES OF LOW SOIL FERTILITY: DEFICIENT AND TOXIC LEVELS OF PLANT NUTRIENTS.

Low soil fertility may be caused by many different things. However, low levels of plant nutrients in the soil is the most important cause in small holder farms. There are, however, also types of low soil fertility that are caused by high salinity, high soil acidity, and often toxic levels of elements like iron and aluminium. Low soil fertility may therefore be defined as individual or combined physical and chemical factors that reduce productivity of the soil.

Each deficiency or toxicity has its specific symptoms by which it is recognized. For example, when maize or sorghum leaves - or most grass species for that matter - turn purple, this indicates phosphorus deficiency. On the other hand yellowing of leaves with slow plant growth would usually indicate nitrogen deficiency.

To know the exact nature of the problem, soil analyses and/or plant tissue analyses will generally tell us which plant nutrients were deficient and which ones were at toxic levels. In general, ordinary farmers will detect low soil fertility when they notice that their crops are progressively performing poorly; but the crops will generally improve when a suitable fertilizer is applied to the soil.

4. IMPACTS OF LOW SOIL FERTILITY ON AGRICULTURAL PRODUCTION.

As has been mentioned, low soil fertility will result in reduced crop yields of grain and stover per unit area of land. This happens even when rainfall, temperatures, pests and diseases are not the causes. Through the food chain, soils that are deficient

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in a particular plant nutrient, like phosphorus, will transmit that deficiency to animals which consume forages growing on such soils. Similarly humans who may consume plant materials and animal products from such deficient environments will also be deficient in the specific nutrients, unless they supplement. It is therefore important to give livestock mineral salt licks to replenish them with deficient minerals like phosphorus and calcium. Similarly, pregnant mothers often become anaemic because of deficient supply of iron in their diets. They are usually given iron tablets to overcome this problem. If they are not provided with such iron tablets, the mothers are naturally forced to look for iron in the soft rocks that they are forced to eat. Livestock will also be seen eating the soil in search of missed minerals.

In cases where nutrients are in excess and therefore toxic, for example, in the case of fluoride, the teeth will be colored in humans.

5. METHODS OF ESTIMATING SOIL FERTILITY.

The level of soil fertility may be determined by several methods.

5.1. GENERAL POOR CROP PERFORMANCE.

This is the most common method that most people are familiar with. However, the poor crop performance should not be due to drought, pests or diseases. Plant disease symptoms, especially viruses, may resemble those of plant nutrient deficiencies or toxicities. However, most farmers seem to know the differences between the two.

5.2. CROP RESPONSES TO VARIOUS FERTILIZERS.

Such poorly performing crops as stated above, will significantly respond to the application of fertilizers that contain the deficient plant nutrients. Generally, improved yields will linearly respond to increased levels of fertilizer application, up to a maximum level. Thereafter the yield curve will not increase even though higher levels of fertilizer were still added to the soil. It is therefore important not to continue applying higher and higher levels of fertilizer after the optimal level has been reached. The highest yield response point on the yield curve is not necessarily the most optimal economic point. The highest yield where the best economical use of fertilizer is attained should be determined for each crop in each area.

The size of yield response of a crop to fertilizer application, can therefore be used as an indicator for the level of soil fertility for the specific plant nutrient(s), for example, phosphorus or nitrogen.

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5.3. CHEMICAL LABORATORY SOIL ANALYSES.

Each nutrient has its required optimal and maximum levels for good crop growth. For example 15 parts per million is the minimum level for phosphorus, while 0.2% by weight of the soil being analyzed is the minimum for nitrogen. Levels lower than these will result in plants showing deficiency symptoms for these nutrients. Soil analysis is often found to be useful for pinning down the nature and level of low soil fertility. However, not everybody should try to send their soil samples for analyses since this is a very expensive exercise. However, soil fertility maps for each area should be developed to indicate the nutrients that are likely to be deficient or toxic.

5.4. PLANT LEAF ANALYSES.

Plant leaf analysis is the most accurate method of determining whether the required levels of particular plant nutrients are actually present in the plant for its good growth and high yielding performance or not. This is not a very common method of analysis, however, it is commonly used by sugarcane and tea plantations as a basis for determining the types and levels of fertilizers to apply.

6. METHODS OF IMPROVING SOIL FERTILITY.

There are several methods of improving soil fertility. These include the following.

6.1. THE USE OF ORGANIC FERTILIZERS.

This category includes animal manures, compost and crop residues.

6.1.1. USE OF ANIMAL MANURES.

Livestock consume a wide range of plants and therefore harvest sizeable quantities of the 26 essential plant nutrients. As has been mentioned earlier, nutrients that are already deficient in the soil will not be harvested by the livestock in required quantities. Livestock are therefore viewed as nutrient harvesters from outside the farm, and concentrate them in the farm through the deposition of their manure. Approximately 60% of nitrogen excreted by livestock is in their urine. It is therefore important that urine should be retained together with dung when preparing animal manure for soil fertility uses.

Animal manure should be collected and allowed to decompose in a depression (preferably cemented) so that there is minimum loss of nutrients, especially nitrogen and potassium, through leaching out of the heap. Similarly, to minimize disappearance of nitrogen as gas (volatilization) from the decomposing manure, the

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heap should be in the shade - not in the sun. As manure decomposes, its temperature sharply rises, and when it drops and stabilizes after about six months and weeds and grass start growing on it, then it is ready for use.

a). METHODS OF APPLYING ANIMAL MANURE TO THE FARM.

The manure may be spread into the field then it is ploughed in. This requires large quantities of manure - approximately 10 to 15 tones per hectare. The second method is to apply two or single handfuls per planting hole. This reduces the amount required by half (7.5 tones per hectare) with the same yield responses.

b). HOW TO APPLY MANURE AT PLANTING TIME.

Dig planting holes according to the recommended spacing, then place one or two handfuls of manure into each planting hole. Mix manure well with soil in the hole with a stick before placing seeds. Cover the seeds well and step on the covered hole to give the seed good contact with the soil for good germination. If manure is not mixed well with the soil, the seeds placed on it will simply rot. Manure has a long beneficial effect on the soil of up to five years, when crop yields will be diminishing year by year from the time of first application, but will still be better than where no manure was applied.

6.1.2. COMPOSTING.

Composting requires gathering of plant materials like crop residues and piling them in a pit under shade to decompose. To enhance the process of decomposition in areas with low rainfall, water should be added as often as needed. Fresh vegetation should also be added to the dry crop residues to enhance their decomposition. Better still, fresh animal manures should be added to the compost heap every once in a while, not only to enhance its rate of decomposition, but also to improve its nutrient balance. Nutrient balance of compost can be further improved by adding layers of wood ash which is rich in potassium and calcium. Where possible, addition of rock phosphate will improve the phosphorus content of the compost and make it much richer for crop needs.

Compost may be handled and applied during planting in a similar manner as animal manures. Generally compost has less residual fertility effects than animal manures. It is difficult to make enough compost for planting field crops like maize, however, adequate compost for kitchen gardening for vegetable production is very beneficial.

Both animal manure and compost do not only improve soil fertility by supplying plant nutrients, they also improve soil physical structure, water holding capacity and numbers of soil microbes.

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6.1.3. USE OF CROP RESIDUES.

Crop residues are usually burned after harvesting in many communities. This may be good for control of plant pests and diseases, but it is very bad for soil fertility improvement. Crop residues should be ploughed underground soon after harvesting to decompose in the field, or they should be composted, or fed to livestock whose manure should be used to improve soil fertility.

6.2. USE OF INORGANIC FERTILIZERS.

These are fertilizers with specific quantities of particular plant nutrients to overcome known deficiencies in the soil. Because these fertilizers have high concentrations of chemical nutrients, follow instructions for use carefully, otherwise there will be very low plant germination. Mix the fertilizer into planting holes as was done for animal manure and compost, before placing seeds and covering. Never place seeds directly onto fertilizer in the planting holes. For planting fertilizers like Diammonium phosphate (DAP), Double superphosphate (DSP) or Single superphosphate (SSP), application rates would be 1 unit/hole for DAP, 2 units for DSP, and 3 units for SSP. For DAP, one teaspoonful per planting hole is recommended for maize. This will require approximately one 50 kg bag of DAP per acre.

When the maize or sorghum crop is knee high (2 ft), one should top dress it with a nitrogenous fertilizer like Calcium Ammonium Nitrate (CAN), Sulphate of Ammonia (SA) or urea. One teaspoonful of any of these fertilizers should be incorporated into the soil around each plant. These fertilizers are high in nitrogen which is easily lost to the air if the fertilizer is not covered around each plant immediately. Top dress your crops when the soils are moist, and when it is not a dry spell. Do not drop the fertilizer on plant leaves since this will cause severe burning (scorching) of leaves. One may also use foliar fertilizers or apply fertilizers through irrigation water.

6.3. USE OF AGROFORESTRY TECHNOLOGIES.

The use of agroforestry technologies include alley cropping which is also called hedgerow cropping, or use of agroforestry species to generate leaf litter which is used to improve soil fertility. The leaves may also be fed to livestock as fodder, then animal manure may be used to improve soil fertility. Most agroforestry legumes used nodulate and hence fix nitrogen which may later be recycled to benefit food crops in the same or subsequent seasons.

Because many of the introduced agroforestry plant species tested have experienced various problems, including pests and diseases and low production of leafy materials, their impacts in improving soil fertility has been questionable. However, plant species

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which are widely used in traditional agroforestry in Buganda and Busoga and western Kenya have significant soil fertility improvement capabilities. These include Ficus (Back cloth tree) and Albezia species which are widely used in banana and coffee plantations to improve soil fertility.

6.4. USE OF BIOLOGICAL NITROGEN FIXATION (BNF) THROUGH INOCULANTS.

There are specific bacteria called Rhizobia that many legume crops need to be associated with in their roots before they can nodulate (develop swellings on their roots) in which they manufacture nitrogen fertilizer from the air. For traditional crops like food beans, groundnut, cowpeas and farmers' soybean varieties, there are naturally existing Rhizobia in the soil that inoculate these crops whenever they are planted in soils where they had been grown before.

For other varieties of legumes, especially soybeans, that are introduced into new areas, like Nam 1 to many parts of Uganda and western Kenya, we need to treat their seeds with a specific inoculant carrying the right Rhizobial strain. When soybeans are inoculated with suitable strains of Rhizobia, their grain yield will increase by between 20 and 30%. However, in soils which are deficient in phosphorus, when phosphorus is also applied along with inoculation, grain yield may increase by upto 50%.

The instructions for inoculation must be carefully followed for positive results to be realized. For example inoculant packets should not be exposed to the sun.

Not all these methods of improving soil fertility will suit everybody, nor do I expect any single farmer to attempt to use all of them. The aim of OFPEP is to make available to the farmers tested technologies, with relevant information for each technology for the farmers selection of those that suit their circumstances best. The main goal is to enhance on-farm productivity by using suitable technologies which have been tested in on-farm demonstrations and performed well to the farmers' satisfaction on her/his own environment.

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OFPEP-KENYA LONG RAINS DEMONSTRATION RESULTS (1995)

Results of laboratory analyses of samples of compost and animal manure used in some demonstration sites

COMMON RANGES OF PLANT NUTRIENTS IN ANIMAL MANURE AND COMPOSTS

ORGANIC MANURE		PLANT NUTRIENTS CONTENTS						
		pH	%N	O.M.	%P2O5	%K2O	%CaO	%MgO
FARM YARD MANURE			1.0-2.1	-	0.4-1.5	1.2-8.4	0.3 2.1	0.3 1.4
COMPOST			0.5-1.6	-	0.3-0.5	0.5-7.4	4.6 5.4	
COMPOST	S1	6.9	1.18	13.60	0.50	1.82		
	S2	7.9	0.86	17.00	0.19	1.66		
	S3	7.7	1.25	21.20	0.34	1.30		
	S4	7.8	0.45	22.50	0.20	0.77		
TOTALS		30.3	3.74	74.30	1.23	5.55		
MEANS		7.58	0.94	18.58	0.31	1.39		
ANIMAL MANURE								
	S1	7.8	2.00	29.40	0.72	1.68		
	S2	7.4	1.03	26.40	0.47	1.68		
	S3	7.7	1.61	29.90	2.35	2.35		
TOTALS		22.9	4.64	85.70	3.54	5.71		
MEANS		7.63	1.10	28.57	1.18	1.90		

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Soil contents of organic matter, phosphorous, nitrogen and important plant nutrient bases in some districts in western Kenya.

DISTRICT	%			bases (me/100g)			
	O.M	N	P(ppm)	K	Na	Ca	Mg
Deficient if:	<4.0	<0.2	<20	<0.2	<0.1	<4.0	<1.0
KISUMU (n=17)							
Deficient	6	15	2	0	2	3	0
Adequate	11	2	15	17	15	14	17
% Deficient	35.3	82.4	11.8	0.0	11.8	17.6	0.0
SIAYA (n=31)							
Deficient	27	25	16	6	4	9	0
Adequate	4	6	15	25	27	22	31
% Deficient	87.1	80.6	51.6	19.4	12.9	29.0	0.0
HOMABAY (n=5)							
Deficient	2	0	0	0	0	0	0
Adequate	3	0	5	0	0	5	5
% Deficient	66.7	0	0.0	0	0.0	0.0	0.0
VIHIGA (n=2)							
Deficient	2	2	0	0	0	0	0
Adequate	0	0	2	2	2	2	2
% Deficient	100.0	100.0	0.0	0.0	0.0	0.0	0.0

O.M - Organic Matter, N - Nitrogen, P - Phosphorous, K - Potassium, Na - Sodium, Ca - Calcium, Mg - Magnesium.

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Results of laboratory analyses of soils from the soil surveys

LAB NO	DISTRICT	LOCATION	pH	Na	K	Ca	Mg	CEC	P	O.M	N
				m.e%					ppm	%	
Minimum Required				0.1	0.2	4.0	1.0	20.0	20.0	4.0	0.2
001	Kisumu	Oboch	6.4	0.27	2.30	10.8	4.9	16.17	34	4.38	0.13
002	Kisumu	Oboch	6.0	0.27	1.48	13.4	5.4	21.53	39	4.81	0.17
003	Kisumu	Oboch	6.8	0.23	2.09	10.8	6.0	12.86	39	4.33	0.19
004	Kisumu	Oboch	5.4	0.33	1.12	2.6	4.9	9.75	12	3.81	0.16
005	Siaya	S.Ugenya	5.2	0.27	0.48	4.9	6.3	9.19	11	3.56	0.41
006	Siaya	S.Ugenya	5.6	0.06	0.29	6.3	1.7	4.55	5	1.85	0.10
007	Siaya	S.Ugenya	5.6	0.01	0.14	1.8	2.4	4.95	10	1.78	0.07
008	Siaya	S.Ugenya	5.2	0.08	0.20	2.4	1.1	2.71	4	1.57	0.09
009	Kisumu	E.Kolwa	5.4	0.35	0.54	1.1	5.1	16.36	11	1.78	0.12
010	Kisumu	C.Kisumu	6.0	0.77	0.54	5.1	3.9	14.80	28	1.94	0.11
011	Kisumu	C.Kisumu	6.6	0.27	0.37	9.0	3.9	13.39	45	2.07	0.13
012	Kisumu	C.Kisumu	6.0	0.06	0.93	3.6	2.9	15.49	23	4.15	0.18
013	Kisumu	C.Kisumu	5.2	0.08	0.88	8.1	1.3	9.10	78	2.35	0.13
014	Kisumu	E.Kolwa	6.8	2.49	1.50	16.7	6.7	36.14	61	5.59	0.20
015	Kisumu	Sigoti	6.0	0.23	2.05	10.4	3.9	19.43	42	4.77	0.18
016	Kisumu	Sigoti	5.4	0.20	1.60	7.1	2.6	16.80	28	5.04	0.21
017	Kisumu	Sigoti	6.2	0.21	2.41	11.4	4.2	12.34	44	4.77	0.15
018	Kisumu	S.Nyakach	6.2	0.21	2.62	9.7	3.9	17.68	40	4.47	0.19
019	Kisumu	S.Nyakach	6.0	0.33	1.63	11.3	5.6	24.24	35	3.06	0.17
020	Kisumu	S.Nyakach	6.2	0.20	1.94	9.8	11.1	18.11	36	4.77	0.15
021	Kisumu	Oboch	6.0	1.11	0.38	11.1	1.6	25.03	29	4.29	0.14
028	Vihiga	Lugaga	5.8	0.23	0.50	5.5	1.6	10.59	21	3.12	0.14
029	Vihiga	Lugaga	5.8	0.23	0.34	7.5	1.3	12.43	29	2.51	0.17
030	Siaya	Wagai	5.8	0.23	0.27	4.9	5.4	14.26	14	1.16	0.10
031	Siaya	Ugunja	6.0	0.27	0.48	3.6	1.8	7.35	8	3.06	0.10
037	H\bay	W.Kanyada	6.0	0.30	1.05	24.0	10.1	47.08	176	4.92	1.86
038	H\bay	W.Kanyada	6.1	0.08	0.70	16.0	11.3	41.48	105	4.42	1.46
039	H\bay	E.Kanyada	6.6	0.33	0.53	11.0	9.1	25.55	76	3.42	1.78
040	H\bay	E.Kanyada	6.4	0.37	0.42	14.4	6.7	25.03	59	3.10	1.83
041	H\bay	Kanyamwa	6.6	0.72	0.77	30.2	9.8	51.80	168	7.02	2.78
042	Siaya	Nyan'goma	6.3	0.18	0.50	5.4	1.7	10.33	26	2.08	0.14
043	Siaya	Bar Agulu	5.4	0.22	0.37	3.7	2.4	12.78	15	2.78	0.12
044	Siaya	Ugunja	5.1	0.18	0.17	2.0	1.6	3.30	6	1.34	0.08
045	Siaya	Ndega	5.5	0.64	0.15	15.2	12.0	26.50	21	8.35	0.50
046	Siaya	Ndega	5.2	0.24	0.46	7.6	5.8	10.65	18	3.96	0.29
047	Siaya	Sega	5.7	0.17	0.19	3.6	2.3	5.05	10	2.08	0.08
048	Siaya	Ran'gala	5.3	0.18	0.08	1.9	1.0	1.90	6	1.05	0.04
049	Siaya	Ran'gala	5.1	0.18	0.04	2.0	1.2	2.90	6	1.18	0.05
050	Siaya	Nyawara	5.4	0.19	0.33	7.1	3.7	9.55	22	4.21	0.23
051	Siaya	Ulumbi	5.9	0.29	0.36	6.9	3.3	6.30	57	2.43	0.13

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			pH	Na	K	Ca	Mg	CEC	P	O.M	N
				m.e%					ppm	%	
Minimum Required				0.1	0.2	4.0	1.0	20.0	20.0	4.0	0.2
LAB NO	DISTRICT	LOCATION									
052	Siaya	Ludha	5.9	0.21	0.46	6.8	4.2	6.60	22	2.30	0.11
053	Siaya	Nyagoko	6.7	0.27	0.99	15.4	9.2	16.85	120	4.08	0.16
054	Siaya	Omia Mwalo	7.3	0.89	0.32	21.1	8.6	20.50	61	4.73	0.20
055	Siaya	Omia Mwalo	7.2	0.45	0.94	10.8	14.3	5.65	250	2.24	0.15
056	Siaya	Kagwa	6.9	0.39	0.90	9.1	15.8	15.05	137	2.60	0.27
057	Siaya	Kokwiri	6.0	0.49	1.44	13.4	7.1	24.85	244	1.97	0.06
058	Siaya	Ajigo	6.3	0.64	0.33	12.6	8.1	8.95	50	3.28	0.14
059	Siaya	Bar Chando	5.9	0.21	0.97	9.1	6.2	7.10	32	2.83	0.12
060	Siaya	Kaudha	5.3	0.20	0.13	6.1	4.2	7.15	14	3.22	0.10
061	Siaya	Kanyadet	6.1	0.23	0.34	7.1	3.7	9.35	25	3.02	0.11
062	Siaya	Kambare	5.7	0.12	0.32	5.3	3.3	8.85	14	2.43	0.08
063	Siaya	Gombe	5.9	0.34	0.30	7.6	3.8	14.35	8	2.56	0.09
064	Siaya	Karanda	5.8	0.08	0.57	3.1	3.7	8.85	15	1.71	0.07
065	Siaya	Got Ramogi	5.5	0.13	0.75	5.7	3.9	13.48	23	2.37	0.12
066	Siaya	Got Ramogi	6.2	0.27	0.40	8.8	7.6	17.74	33	2.67	0.15

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The soil fertility amendments used are presented below.

Soil amendment used	Quantities used	
	Field Measure/ planting hole	Estimated weight (kg)/ha
Control (Nothing applied)	0	0
Animal Manure	Two handful	5,000 - 10,000
Compost (cpt)	Two handfuls (hf)	4,000 - 8,000
Diammonium phosphate	1 teaspoonful (tsf)	60 kg of P_2O_5
Diammonium phosphate with animal manure (a.m)	1 tsf DAP + 1 hf a.m.	60 kg DAP + 7,500 a.m
Diammonium phosphate with compost	1 tsf DAP + 1 hf cpt	60 kg DAP + 6,000 cpt

The average maize grain yield (kg) in relation to fertilizers per 24 M^2 plot and per hectare.

FERTILIZERS	YIELD PER PLOT 24 M^2	YIELD PER HECTARE	% INCREASE OVER CONTROL
DAP/COMPOST	17.54	7308.3	192.3
DAP	14.00	5833.3	133.3
DAP/ANIMAL MANURE	10.50	4375.0	78.1
COMPOST	10.32	4300.0	75.0
A/MANURE	8.08	3333.3	33.3
CONTROL	6.55	2500.0	-

Effect of fertilizer application on germination percentage of some cereal and legume crops in OFPEP districts in western Kenya.

	Soil fertility improving treatments						Crop	
Crops	AM	COMP	DAP	AM/DAP	COMP/DAP	CONTROL	Totals	Means
Maize (MDC)	57	68	61	74	50	72	382	63.7
Sorghum	61	77	55	77	62	82	414	69.0
Food Beans	48	37	26	39	18	53	221	36.8
Soybeans	40	42	20	(39)	31	62	234	39.0
Groundnuts	21	24	4	3	36	39	127	21.2
Germination totals	227	248	166	232	197	308	1378	
Germination Means	45.4	49.6	33.2	46.4	39.4	61.6		15.9

Key: AM - Animal Manure, Comp - Compost Manure,
DAP - Diammonium Phosphate, MDC - Maseno Double Cobber.

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Farmers evaluation report on crop performance.

CROP	Variety	n	Mean	Rank
Maize	H625	5	2.00	1
	H512	14	2.28	2
	L\white	13	2.53	3
	L\yellow	14	2.54	4
	MDC	14	2.78	5
Sorghum	Seredo	12	1.58	1
	Andiwo red	1	2.00	2
	W\sorghum	9	2.55	3
	Nyakabala	7	2.55	3
	Goperi	1	3.00	4
	Andiwo 2	12	3.41	5
	Ochuti	2	4.00	6
Beans	Local	2	1.50	1
	MCM 5001	4	2.00	2
	GLP 92	4	2.00	2
Soya	NAM 1	6	1.16	1
	Local	7	1.50	2
G-nuts	H\bay	7	1.28	1
	Uganda	7	1.57	2

Farmers evaluation report on fertilizer performance.

Crop	Fertilizer	n	Mean	Rank
Maize	DAP\ A.manure	3	1.33	1
	DAP	15	2.06	2
	Compost	11	2.18	3
	DAP\Compost	5	2.20	4
	A. Manure	11	2.90	5
	Control	15	3.13	6
Sorghum	DAP\compost	4	1.75	1
	DAP\ A.manure	4	1.75	1
	DAP	14	1.78	2
	A.manure	10	2.00	3
	Compost	10	2.60	4
	Control	14	3.57	5
Soyabean	Compost	1	1.00	1
	Inoculant	4	1.50	2
	Control	4	2.50	3
	DAP	4	3.00	4
	A. Manure	4	3.00	5
	DAP\Compost	4	3.00	6
Groundnuts	DAP	1	2.10	1
	A\manure	1	1.80	2
	Control	1	0.80	3

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The data presented below shows the crop yield in Kg/24m^2 and Kg/Ha of the different varieties of crops planted in demonstration plots.

Crop\Variety name	Yield Kg per 24m2	Yield in Kg per hectare	Ranks
Maize			
Local white	16.06	6691.7	1
Local yellow	14.90	6208.3	2
Maseno Double Cobber	12.98	5408.3	3
Hybrid 625	12.48	5200.0	4
Hybrid 512	12.21	5087.5	5
Sorghum			
Seredo	10.62	4437.5	1
Nyakabala	7.72	3216.7	2
Andiwo 2	6.01	2504.3	3
*Mtama-1	4.44	1850.0	4
Food Beans			
MCM 5001	6.62	2758.3	1
Local	4.56	1900.0	2
GLP-92	4.28	1783.3	3
Soybean			
Local	9.89	4120.8	1
Nam 1	7.23	3012.5	2
Groundnuts			
Uganda Red	4.73	1970.8	1
Homabay	4.40	1833.3	2

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OFPEP-KENYA TRAINING OF TRAINERS ON SOIL MANAGEMENT HELD AT TOM MBOYA LABOUR COLLEGE IN KISUMU ON 28 AND 29 NOVEMBER,95.

SOIL AND WATER CONSERVATION

By

Robert Collins Ondigo

INTRODUCTION

Soil and water conservation is a farm management practice undertaken by farmers to maintain soil fertility and water for the use of crops in order to have high yields. By proper soil and water conservation practices, the rates of soil degradation and erosion are tremendously reduced.

i. Causes of soil degradation

The degradation of soil is the deterioration of the soil fertility so that its previous production capacity is reduced. These deterioration include high soil acidity which may be caused by chemical changes in the soil due to heavy leaching as a result of heavy rains, salinity due to salt encroachment from seas or oceans and salty irrigation water on agricultural land, poor farming practices e.g ploughing across the contour, same crop planted on same land year after year and not constructing terraces on slopes and various cause of soil erosion.

ii. Soil erosion

This is the removal of soil from arable land and overgrazed pastures caused by rain run off, rivers and wind.

The removal of the top soil is enhanced by unprotected surfaces caused by overgrazing, bad farming practices like ploughing downhill on slopes, deforestation, monoculture, livestock, wildlife and man making tracks in the fields. Man is the most single one cause of soil erosion and degradation through his/her activities of housing construction sites, burning charcoal, road construction, mining and poor farming practices. By the removal of soil either by water and wind, the loss of top soil is much higher than you think. It has been estimated to be much more than a big lorry load of soil from every acre every year. If this is not stopped, the top soil which contains plants nutrients will get thinner every year hence decrease in yields.

Erosion is more severe in loose loamy silty and sand soils than in clay soils. Also on long steep slopes. Naturally man cannot change the rainfall or the soil, but can change the length and steepness of a slop through terracing. Man can also improve the vegetative cover and soil structure by planting trees and practicing good farm management.

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Methods of estimating rate of soil loss.

Soil loss by erosion depends on several factors that is.

amount and energy of rainfall	+	erodibility of the soil	+	length and steepness of slope	+	crop and land management.

Many researchers have worked on the "Erosion Processes and their preventative measures" and have come up with many ways of estimating the rate of soil loss in a given area per year. Some of these methods are involving that they have a lot of calculations which are cumbersome to small scale farmer. It is, therefore, appropriate to discuss the two simplest methods which an ordinary farmer may use.

a) **The bucket method.**

In this method the amount of run-off rain water from a specific area of land is harvested into buckets and its quantity measured. The eroded soil in the run off water settles at the bottom of the buckets which is dried and weighed. The collection of run-off water is usually done in a period of one year after which the rate of soil erosion in tones per acre or hectare is calculated.

b) **The peg method.**

This is a method whereby metal pegs are driven into the ground having a portions of known heights above the ground. These pegs are left in position for a period of one year without any disturbances to the pegs. When it rains and erosion takes place, the pegs will seem to be growing tall. The increased height of the pegs can then be used to estimate the rate of soil erosion which is then converted into the amount of soil lost per acre or hectare per year.

EXAMPLE

1. **The Bucket Method**

Assume that your land is 1 acre

The run-off water is collected from 10 m^2 land per year

The eroded soil from 10m^2 land weigh 5 kg.

Calculation 1 acre = 4000 m^2

1 ton = 1000 kg

Soil loss from 1 acre in tons on this piece of land per year is:

$$\frac{4000}{10} \times \frac{5}{1000} = 2 \text{ tons}$$

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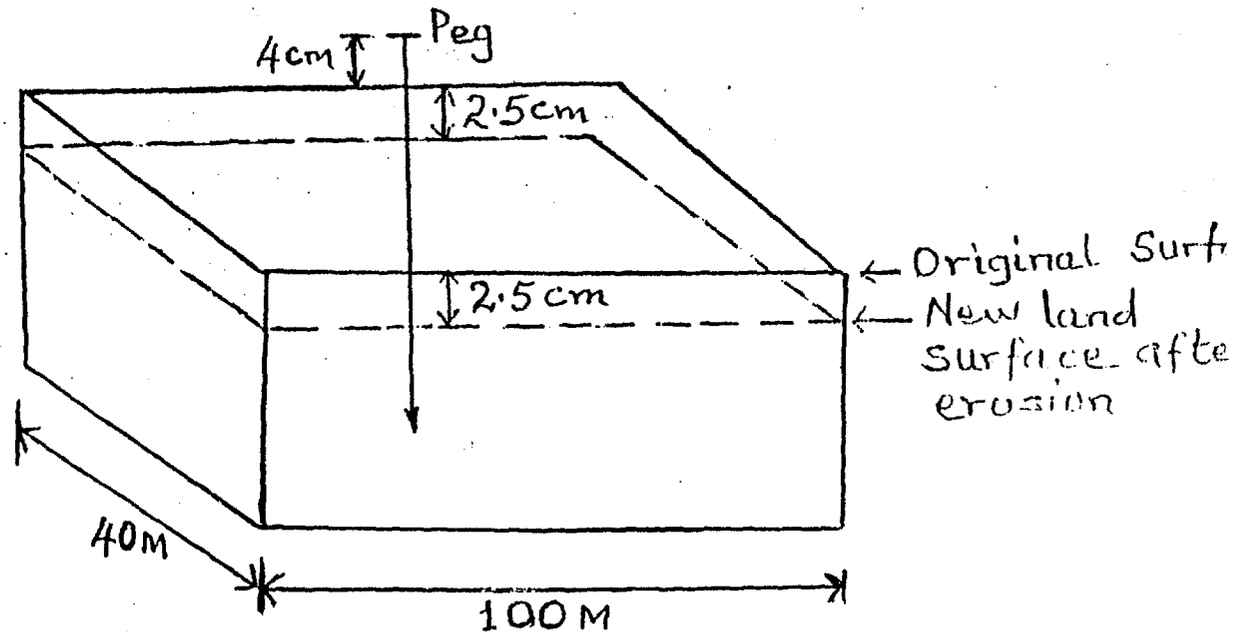
2. The Peg Method.

The land is 1 acre of 40 m x 100 m the increased height of the peg is 2.5 cm after erosion has taken place in one year



Calculation 1 acre = 4000 m^2

1 m^3 = 1 ton

2.5 cm = 0.025 m

Soil loss from 1 acre in this piece of land per year is

0.025 m x 40 m x 100m = 100m^3 = 100 tons

Assumption

1. Uniform erosion took place on the land
2. Uniform erodibility of soil
3. Uniform slope on land
4. Uniform terrain

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SUMMARY

Various causes of soil erosions

1. Removal of trees, bushes and grass prior to cultivation which is disastrous on steep slopes

2. Cultivation up-and down hill

3. Bad farm management e.g.

   a). monoculture and planting same crop without fallow for a long period.

   b). no rotation of crops

   c). poor crop stand due to lack of fertilizers or organic manure.

4. Burning of vegetation, especially on slopes.

5. Overstocking which causes.

   a). bare patches in vegetative cover on ground
   b). compaction of soil through trampling
   c). replacement of good grass species by poor annual grasses
   d). development of gullies along stock tracks down the slopes

6. Cultivation or overgrazing of river banks followed by flooding by high water flows during heavy rains.

7. Unprotected road banks.

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EXERCISE 1

Q1. A farmer in Homa Bay district has a farm measuring 80 m by 210 m. On this farm all the environmental features are uniform that is, vegetation, slope, soil, etc. The farmer used the "Peg Method" for estimating soil loss from his land. After a period of one year he finds that the increased height of the peg is ½ in. Calculate the annual soil loss from this land in tons

Q2. A land at Majengo in Vihiga district with all environmental features uniform measuring 32 m x 76 m is used for growing maize. An area on this land measuring 4 m by 5 m has been identified and "Bucket method" is used to estimate soil loss on this land. After one year the soil collected weighed 850 gm. Calculate the annual soil loss on this land in kg.

PRACTICAL USE OF A-FRAME

BY

MS. ROSE IMBUGA AND MR. ERNEST VURUNGU
(Student attached to OFPEP for six months)

FROM

SIGOTI AGRICULTURAL TRAINING CENTRE

An A-Frame.

A-Frame is made with three sticks, two of which should be 2.1m long, and the third should be 1.2m long. Figure A below shows an A Frame.

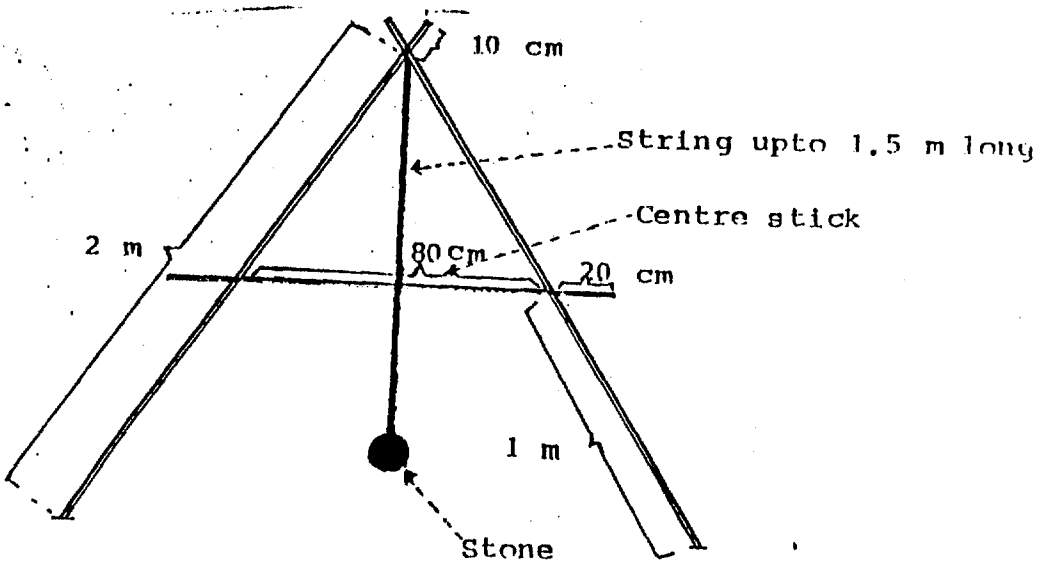

Diagram showing an A-Frame with all its essential parts.
(Diagram by Mr Nelson Omondi, OFPEP Kenya)

How to use an A-Frame

- o Go to the field whose contour you want mark.
- o Mark the position where the legs of the A-Frame are.
- o The string will swing because of the weight of the stone at its end. Allow it to come to rest on a point on the cross bar of the A-frame.
- o Mark the position of the string on the cross bar of the A frame.
- o Then change the positions of the A Frame legs by turning the frame through 180 degrees, so that the two legs stand at each others previous positions. Let the string come to rest and mark its new position on the cross bar.

- o Mark the middle position of the two strings marks. This become the position where the first peg should be planted.
- o Fix the position of the first leg and swing the second leg to a new position where the string rests at the middle point, and mark the new position of the leg.
- o Continue doing this and marking the fixed leg position with pegs.
- o The pegs will be showing the contour line in the field.

The distance between the contour lines will be determined according to the slope.

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II Construction of terraces

These are done to a slope into strips which are fairly uniform. This is done by digging trenches 30-60 cm wide and 30-60 cm deep across a slope. The soil scooped is thrown up-slope to create a bund about 15 cm away from the trench to minimize the soil falling back into the trench. A similar bund is constructed down the slope at intervals of about 21 m (70 ft). Where the slope is very steep (over 12%) the intervals between bunds can be made shorter and shorter. The bunds are stabilized by planting grass on them. The diagram below shows how a terraces are constructed. The depth of the ditch should not be more than one foot deep, to avoid getting into the subsoil. Only dig the ditch through top-soil.

The soil from the trench is thrown on the upper side of the slope to avoid soil loss which would occur if the soil was thrown on the lower side. On the upper side, any lost soil will drop back into the trench. Eroded soil from the upper side of the slope will held back as is shown in the diagram. As this process continues, the terrace becomes bench-like as it flattens. The terrace bunds should be stabilized by planting suitable plant species on them. Such species include napier grass, which is a fodder grass, vertiver grass and setaria species. Forage or fodder legumes may also be planted to stabilize the bunds. Unsuitable plant species may be too aggressive for moisture or shading to the extent that the neighboring food crop like maize and beans may be smothered.

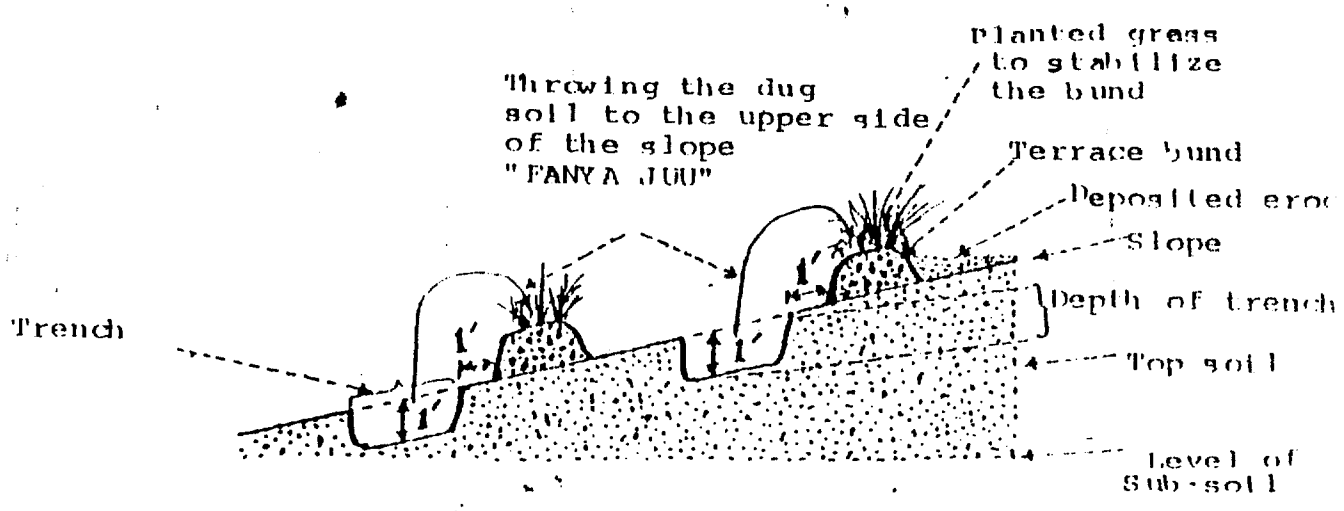

Diagram showing terraces of the type called "Fanya Juu".
(Diagram by Mr. Nelson Omondi, OFPEP Kenya)

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OFPEP-KENYA TRAINING OF TRAINERS ON SOIL MANAGEMENT HELD AT TOM MBOYA LABOUR COLLEGE IN KISUMU ON 28TH AND 29TH NOVEMBER, 1995.

TYPES OF SOIL EROSION AND ITS IMPACT TO THE ENVIRONMENT

BY

CHRISPINE OKOTH AND NELSON OMONDI

INTRODUCTION

Agriculturally good soil contains the nutrients and water that plants need for growth and serves as the medium from which they grow. The primary purpose of soil management is to provide a continuously supportive and productive soil for plant growth through adequate and proper provision of water and nutrients and soil conservation practices. When the soil is left without vegetative cover, erosion may result. Since erosion is one of the most serious environmental problem facing many farmers around the world, it is necessary to understand the process of erosion and its effects upon environment before providing background for planning agricultural activities in areas that are more or subject to erosion and need controls to reduce erosion.

Erosion is the movement of top soil by water, wind, ice or geological processes. It is a function of climate, topography (slope) soil, vegetation and human actions such as cropping methods, irrigation practice and equipment use.

1. TYPES AND CAUSES OF SOIL EROSION

The major erosion are water-caused and wind-caused.

a. Water-caused erosion

There are three stages of water caused erosion; Sheet erosion, rill erosion and gully erosion;

i. Sheet erosion

This is caused by intense rainfall or large rain drops that displaces soil particles. This is when the rate of rainfall exceeds the rate of infiltration of water. As water accumulates, it begins to remove soil more or less uniformly over a bare sloping surface. Moving down the slope, the water follows the path of least resistance, such as channels or tillage marks or depressions in the land surface. It is the first stage of erosion and hard to identify, this can only be assessed by observing what is happening during a heavy rainstorm i.e coloured run off water with accumulated soil down the slope.

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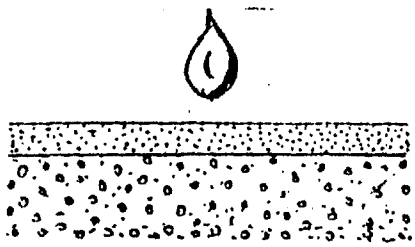
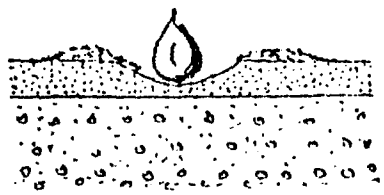
A



A rain drop falls onto the ground

B

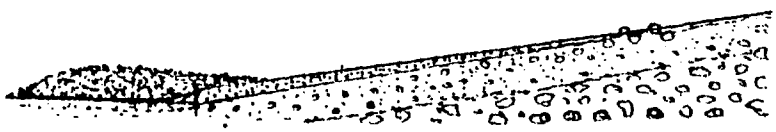


It makes a tiny crater in the soil

C

It brakes the fine soil particles outwards

D



The fine soil particles are moved down slope by run off, and erosion pavement caused.

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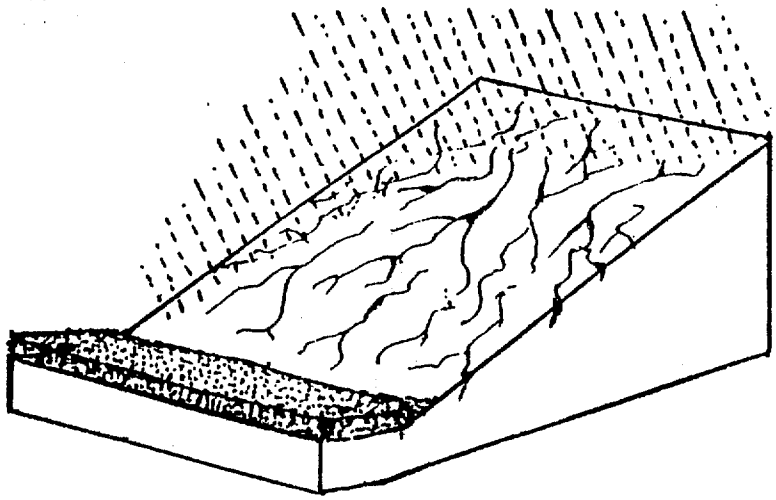
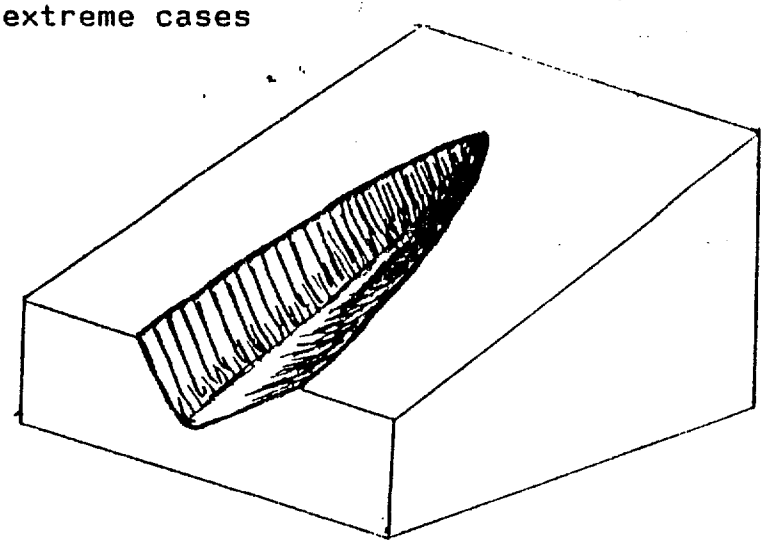
ii. **Rill erosion**

Concentrated run off may remove enough soil to form small channels, tiny gullies or rills in the field. While rills are often the first visible sign of erosion, they can be covered up by tillage practices. Under continued rainfall, rill erosion increases rapidly. Sleeper or longer slopes increases the depth of the rill as the quantity of water will be larger and high velocity. The soil loss per unit area increases with the length of the slope but not proportionally.



iii. **Gully erosion**

As water accumulates in narrow channels, it continues to erode more soil. This is the most severe case of erosion and can remove soil to depth of 1 to 2 feet or up to several hundred feet in extreme cases



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b. Erosion by wind action

In arid and sem arid regions, wind erosion can be extremely serious. Top soil blown away from the land can leave the land unproductive and increase the number of particles in the atmosphere thus effecting the climate.

Extreme wind erosion, coupled with climatic changes and human activities can contribute to the formation of deserts. People contribute to the increased wind erosion and hasten desertification by cutting woody species for fuel wood firewood and other uses, over-cultivation, and other practices such as improper cattle management that lead to overgrazing.

2. FACTORS EFFECTING ERODABILITY

The main factor that affect erodibility of soil are the physical structure and chemical composition of the soil, the slope of the land and the management of the land.

Quality of the soil and how much it is subject to erosion. Sometimes hard clods one formed in the soil which cannot or can hardly be broken up by falling rain drops. Others are held together as "loose sand" and that means that one soil type will offer much more resistance to erosion than the other. This resistance depends mainly on;

o **The Texture**

The texture (the grain composition) of the soil does not change much. The various types of soils have different degrees of erodibility, but unfortunately this can only be correlated to measurable properties to a limited degree. The following are the types of soil with the degree variations of erodability.

Sand and loamy sand - low because of high infiltration

Sand loan, silt loam and loam - high because of low infiltration and weak cohesion

Clay loam and clay - low because of strong cohesion

o **The moisture content**

The moisture content of the soil is not the same throughout the year, so at certain times the soil is much more sensitive to erosion than others. When dry, some soils are very hard and difficult to cultivate. They are then not easily broken up by rain - drops. If the moisture content is higher, these soils are more manageable and the clods sometimes break up on their own. If the soil becomes very fine through tillage operations, the danger of erosion is very great. The rain no longer has to break up the clods, the soil particles can be quickly carried away by the streaming water. If the soil

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is very wet (saturated) the resistance to erosion often disappears altogether.

- **Organic Matter**

  Organic material most important particularly in contribution to binding the soil particles. The more organic materials the less erosion.

- **Length of slope.**

  This is known as topographic factor. This is expressed as length in feet of water flow down a slope and the steepness of the slope. The longer the slope the winder the surface area and more soil will be eroded.

- **The kind of cropping system**

  This comprises monoculture or crop associations and sequences. Cropping and management factor considers the soil loss under specific cropping and management compared with the loss from a continuous fallow, as well as the influence of rainfall during the different crop stages. A good soil cover is important control of both wind and water erosion. If the soil is not well covered , the following will occur.

  - There will be nothing to interrupt the rainfall in order to slow down its velocity before it hits soil particles.

  - The run-off velocity will not be decreased by physically restraining water and soil movement.

  - There will be a decrease in the ability of the soil to store water by providing shade, humus and plant mulch. This involves crop rotation, inter-cropping and relay cropping. If this is not practiced, the soil will be left bare and erosion will occur.

- **Soil Management system**

  - This involves the system of tillage and the type of crops planted. Since erosion varies due to moisture content, the period for tillage is very important. If it is the soil that breaks when dry, then if ploughed during dry season, erosion will easily take place. Road construction will also lead to erosion.

- **Degree of gradient (steepness) of the slope.**

  - The steeper the slope the higher the velocity. This will break up the soil and erosion will take place

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3. Impact of soil erosion to the environment and farming

When soil erosion takes place, the fertile soil is washed away into river valleys and water bodies such like rivers, ponds, lakes, seas, and oceans. Due to this movement of the top soil. there are positive and negative impacts of soil erosion to the environment.

a. The positive impacts.

- Erosion increases soil fertility in the valley beds by bringing fertile soils from the higher elevation to the lower elevation.

- Due to erosion ox-bow lakes are formed at the lower parts of the rivers. This provide water for animal and breeding environment for fish.

b. The Negative Impacts

- Soil erosion has negative impacts on farming through the loss of soil fertility and damaged soil structure. This results in drastic drop in land productivity e.g crop yield, planted pastures, natural grasslands and forest resources.

- Soil erosion causes siltation of dams for domestic, irrigation and generation of hydro-electricity. This leads to a heavy expenditure in order to rectify the situation. This leads to a heavy expenditure in order to rectify the situation. This has a further effect on the economy as the hydro-electricity is the major source of industrial energy and when interfered with production will be rectified drastically.

- Due to large quantities of eroded soil, rivers are filled with debris and that causes river meanders and floods. This damages farming land and property.

- Erosion also has drastic effect to the aquatic life (plants and animal). Due to erosion, the eroded soil recedes water from its former place. This affects the aquatic life since the area covered by water is reduced. In addition the water is polluted by the eroded soil and hence not conducive to aquatic life.

- Wind erosion cause air pollution by blowing soil and dust particles in the air. This has effect on the vegetation and the solar energy.

- Erosion control takes a lot of farmers time and a lot of money is evolved.

METHODS OF CONTROLLING SOIL EROSION

BY

ROSE A. SIGAR AND NELSON OMONDI

Basically erosion is dependent on the pattern of cultivation, especially in regard to the vegetative cover and the structure of soil. Erosion is more severe in loamy-silty-sandy soils than in clay soils, and it is more severe on long and steep slopes.

Erosion (soil loss) consequently depends on several factors:

Amount and energy of rainfall	+ erodibility of the soil	+ length and steepness of slope	+ crop and land management

You cannot change the rainfall or the soil, but you can change the length and also the steepness of the slope. You can also improve the vegetative cover and soil structure. Measures taken against soil erosion are called soil conservation measures. These measures can be grouped into,

1. Cultural measures 2. Physical measures

CULTURAL MEASURES

Cultural measures include all farming practices in which vegetation helps to minimize erosion. These measures aim at good structure of the soil, including protection against erosion:

Good farm management	contour farming	Mulching
Crop rotation	Strip cropping	Mixed cropping

Farm management

Good farm management can reduce the amount of erosion much more than terraces,especially on gentle slopes. Good farm management looks after the soil as well as the crops.

Ploughing as well as digging with a fork, are in themselves conservation measures, because they produce suitable soil structure. The clods formed by the cultivation give large pore spaces, which increase the infiltration rate and retain large amounts of water, thus decreasing the runoff and the erosion. Mechanized cultivation increases erosion compared to hand hoeing, particularly discing and harrowing which destroy clods.

Fertility an/or manuring favour the growth of crops, and this results in good protection against erosion during the growing season.

Early planting is important as much of the erosive rains comes during the beginning of the rainy season. An early planting during the rainy season will develop better plant and give protection against soil erosion

On erodible soils the choice of crop for cultivation should be considered. The soil loss through erosion varies according to the type of plant, providing that it is well established: grass (least soil loss). small grain crops, maize, cotton, peanuts and cassava (most soil loss).

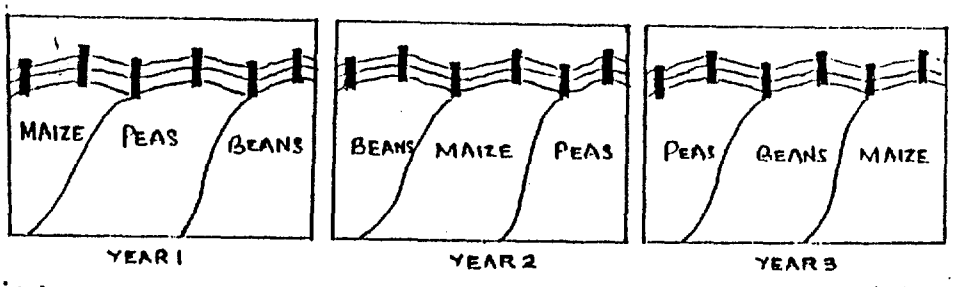
Contour farming

All cultivation, ploughing planting, weeding is done horizontally along the contour and not up and down the slope. Even on gentle slopes of 2-7%, contour farming reduces the soil loss by half. This practice has the effect of creating ridges across the land which reduce the rate of runoff. Because small barriers are provided by the rows, the water moves less quickly, erosion is reduced, and the soil is able to absorb more water.

However, contour farming needs to be planned carefully. On a very steep slope or in areas of heavy rainfall and easily eroded soils, water can build up in each contour, spill over, and break across contour lines. The volume of water can be build up broken with each broken row, and the result can be more erosion, not less

Crop rotation

Crop rotation is one way to reduce soil erosion. Maize and other crops should not, if possible, be cultivated year after year. A three year rotation of maize and grass is recommended for maintaining a soil structure which will decrease the rate of erosion.



Mulching

During the off season a continuous layer of crop residue left on the ground provides effective erosion control by reducing the rain drop impact on the soil and reducing runoff thereby, increasing the rate of infiltration in the ground. Mulch also helps in retaining soil moisture and contributing to the soil fertility as the residues decompose. By improving the soil fertility plant growth is enhanced and hence effective soil cover.

Contour strip cropping

Contour strip cropping promotes good soil structure and decreases erosion by water flows. For example, when grass and crops are planted in alternating strips, the grass strip reduces water flow and serves as a filter to catch much of the soil washed from a strip crop row. Strips structured close to land contours give good erosion control.

Strip cropping is best in permeable soils and on slopes which are not too steep, preferably not exceeding 15-20%. In Kenya the maximum width of crop strips might be:

30-20 % About 10m, or closer if experience demands it

20-12 % About 20m, according to observations made in Kenya

< 12 % The following formular can be used for calculation of the width in feet: 168 - (7 x % slope), e.g. for a 10% slop, 168 - (7 x 10) = 98ft = 30m.

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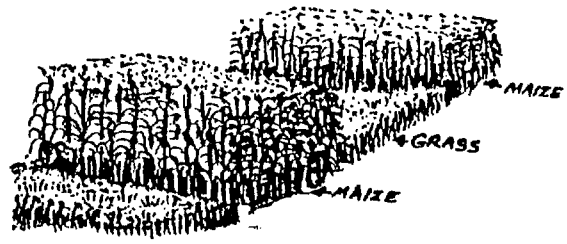

Contour strip cropping - Maize and grass

Grass Strips

Grass strips are widely used on slopes to control erosion. The simplest way to create grass strip is to leave strips of land unploughed along the contour (e.g 1m wide) to enable the local grasses to come in , and after a period of time to establish a grass cover.

PHYSICAL MEASURES

Physical measures have as their objective to drain or infiltrate the excess water during rain storms and to retain the moisture in the soil between the rainfalls. They include:

Cutoff drains, Artificial waterways, Terraces

A survey for physical soil conservation should start with an examination of the topography to find out the directions of the potential overland flow. At the same time it is necessary to locate waterways for discharging water from terraces and cutoff drains

Cutoff drains

A cutoff drain is an open trench with an embankment on the lower side. A cutoff drain protect cultivated areas from the erosion by water flows. They can also be used for gully control. Large water flows coming from outside a farm have to e diverted from the farm by a cutoff drain, e.g. collecting water from a hillside, or preventing water from a plateau from flowing down a terraced slope, or taking care of water from a road side ditch.

Cutoff drains should be dug only where there is evidence of large water flows which cannot be stopped through normal terracing. Usually only one cutoff drain is needed on a slope. only on very long slopes might an extra cutoff drain be dug in exceptional cases. Do not dig any cutoff drain if farmers do not agree to do terracing below the drain and to maintain the channel by removing the soil deposits.

It is usually wise to dig a cutoff drain (hill side ditch at least 2 feet wide and 1 foot deep) along the upper boundary of a farm. In Fanya Juu terracing the top terrace should be constructed as a cutoff drain, with the soil being thrown down the slope so that the channel can carry as much water as possible.

A cutoff drain dug by hand is often 5 feet (1.5m) wide at the top, 3 feet (0.9m) wide at the bottom and 2 feet (0.6m) deep, giving a cross section of 0.7 sq.m.

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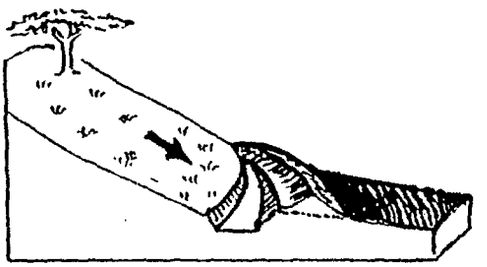


Cutoff drain discharging water from a hill slope.

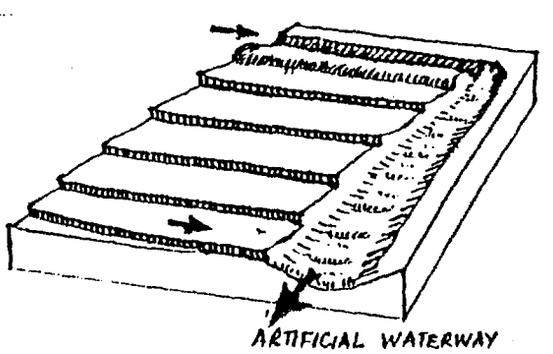
Artificial waterways

The water from cutoff drains as well as from terraces should be discharged into natural watercourses (rivers) or onto non-erodible areas such as stony ground or permanent pasture with a good grass cover. If it is not possible to find such an outlet point within a reasonable distance, the excess water has to be taken down the slope by an artificial waterway.

A waterway should be wide (5 feet at least), shallow (1 foot deep) and covered with short grass, all to minimize erosion. The width can be varied depending on the size of the catchment area and the steepness of the slope. The necessary width in feet of an artificial waterway in erodible soils can be read from the table below

Catchment area of water way in acres	The steepness of the slope less than 6 %	6-12 %	>12 %
5	5	6	8
10	6	8	10
15	7	11	17
20	8	15	23
30	9	23	31
40	12	30	41
50	16	38	56

In erosion resistant soils such as clay and clay loam, the width as shown in the table can be much less, but not less than 5 feet.



Cutoff drain and bench terraces discharging water into an ARTIFICIAL WATERWAY

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To calculate intervals between terraces.

Vertical interval between terraces (V.I)

This is the difference in height between two terraces. The V.I between two terraces depends on the slope and can be calculated in three different ways:

A. The ordinary formula - V.I (in feet) = $\frac{\text{percentage slope}}{4} + 2$

B. The bench formular - V.I (in feet) = $\frac{\text{Percentage slope}}{8} + 1$

C. a constant V.I of 5 - 6 feet or 2.5 to 3 feet (1.5 - 1.8 or 0.75 - 0.9 m)

The method selected depends on the slope:

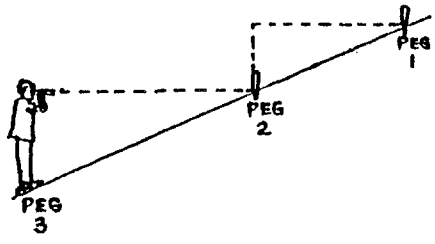
- 5 - 12 % A, B, or C, but the horizontal interval is never greater than 80 (24 m) on erodible soils.

- 12 - 35 % B, or C.

- 35 - 55 % C or modified bench terraces.

How to set out a constant V.I. (using a mans hieght, V.I. = between 5 and 6 feet)

You need some pegs and a flat straight object such as a board or a book. Hold the board as horizontally as possible at the eye level and in line with the first peg. Move yourself up and down the slope until your eye is exactly in line with the first peg. Now put a peg in where your feet are. Move down the slope and repeat the process for peg number three.



How to get out a constant Vertical Interval (using a man's height, V.I. = Between 5 and 6 feet)

Horizontal Interval (H.I) between terraces

The width of a terrace expressed as the horizontal interval between terrace edges (grass Strips). It is calculated as H.I = $\frac{\text{V.I.} \times 100}{\text{\% slope}}$

Soil erosion barriers should be constructed across the slope to reduce soil erosion by rain runoff. The barriers should be placed along the contours in the farm. There are several methods to determine where the contours run. These include sophisticated equipment like theodolite, spirit levels and sample equipment like an "A Frame". For purposes of field extension and for the benefit of the farmer we will briefly look at an A-Frame and see how it may be use to determine contours in the field.

Terraces

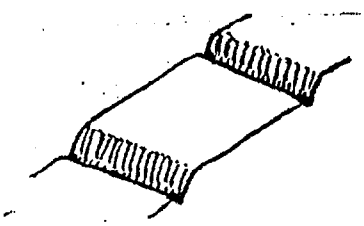
Terraces reduce effective slope length and retain much of the soil, moisture and nutrients moved between terraces. Terraces are needed on slopes with erodible soils where cultural measures by themselves are not sufficient to prevent an undesirable loss of soil.

Types of terraces (see figures below):

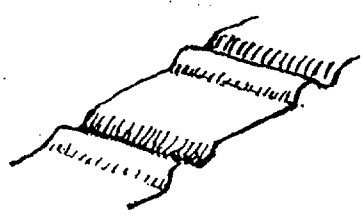
1. Bench terraces - not practicable on shallow soils (< 0.5 - 0.8m). Recommended on slopes of 2 - 55%.

2. Channel terraces - on slopes 5 - 20%

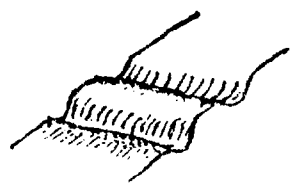
3. Ridge terraces - on slopes of 5 -8%.



Bench terrace



Channel Terrace



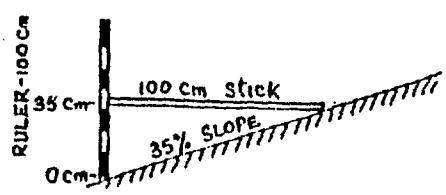
Ridge Terrace

In the construction of channel terrace the soil is moved downhill. Bench terraces can be developed from grass strips as shown below. Grass strips can start as, unploughed strips, grass planted in one or two rows or trash lines laid along the terrace lines. To hasten the formation of a bench terrace one can make a ridge by digging a channel (2 feet wide, 2-3 feet deep) and throwing the soil uphill using the so called "Fanya Juu" method.

In siting the terrace it is important to consider how to discharge the water from the terraces. Natural water courses, permanent pasture/forest and stony or rocky ground are the most suitable discharge points, however, if these possibilities do not exist, the excess water has to be drained onto grassed artificial waterways, down the slope along the common boundary between two farms. The terraces should not be crossed by roads or paths, but the drainage system should start from those points.

To measure the percentage slope

Percent slope, can be measured simply using a ruler graded in centimeters or inches, and a straight stick measuring 100m (or 100 inches) long. To get the percent slope, lay one end of the stick on the slope, and hold the stick as horizontally as possible. Use the ruler to measure how high the free end of the stick is above the ground. For example, a measurement of 35cm in 100cm = 35%.



How to measure the percentage slope

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OFPEP - KENYA TRAINING OF TRAINERS WORKSHOP ON SOIL MANAGEMENT HELD AT TOM MBOYA LABUOR COLLEGE ON 27-29 NOVEMBER, 1995.

WORKSHOP P R O G R A M

MONDAY, 27 NOVEMBER, 1995.

2.00 pm. - 6.00 pm.	-	ARRIVAL OF PARTICIPANTS AND REGISTRATION (Received by OFPEP-KENYA staff).
6.00 pm. - 6.30 pm.	-	WELCOMING REMARKS (Ms. Rose Sigar/Mr. Chrispine Okoth)
6.30 pm. - 7.30 pm.	-	S U P P E R

TUESDAY, 28 NOVEMBER, 1995.

7.00 am. - 8.00 pm.	-	B R E A K F A S T
8.00 am. - 8.10 am.	-	INTRODUCTION OF OFPEP AND EXPLANATION OF THE PURPOSE OF THE TRAINING TO THE PARTICIPANTS (Dr. J. F. Moses Onim)
8.10 am. - 9.30 am.	-	SOIL FERTILITY (Dr. J. F. M. Onim) a) Causes of low soil fertility b) Types of low soil fertility
9.30 am. - 10.00 pm.	-	Impacts of low soil fertility on agricultural production (Dr. J. F. M. Onim)
10.00 am. - 10.30 am.	-	T E A B R E A K
10.30 am. - 12.00 pm.	-	Impacts of low soil fertility on agricultural production (Dr. J. F. M. Onim)
12.00 pm. - 1.00 pm.	-	Methods of estimating and improving soil fertility (Dr. J. F. M. Onim
1.00 pm.- 2.00 pm.	-	L U N C H B R E A K

RESEARCH

2.00 pm. - 2.30 pm.	-	Methods of estimating and improving soil fertility (Dr. J. F. M. Onim
		SOIL CONSERVATION
2.30 am. - 4.00 am.	-	Causes of soil degradation and erosion (Mr. R.C. Ondigo)
4.00 pm. - 4.30 pm.	-	C O F F E E/T E A
4.30 pm. - 5.30 pm.	-	SOIL CONSERVATION PRACTICAL 1. (Ms. Rose Imbuga and Mr. Ernest Vurungau)

WEDNESDAY, 29 NOVEMBER, 1995.

7.00 am. - 8.00 am.	-	B R E A K F A S T
8.00 am. - 9.00 am.	-	Types of Erosion (Mr. C. Okoth)
9.00 am. - 9.30 am.	-	Impacts of soil erosion to the environment (Mr. C. Okoth and Mr. Nelson Omondi)
9.30 am. - 10.00 pm.	-	Methods of estimating rate of soil erosion (Mr. R.C. Ondigo)
10.00 am. - 10.30 am.	-	T E A B R E A K
10.30 am. - 11.00 pm.	-	Methods of estimating rate of soil erosion (Mr. R.C. Ondigo)
11.00 pm. - 1 pm.	-	Methods of controlling soil erosion (Ms Rose Sigar and Mr. Nelson Omondi)
1.00 pm. - 2.00 pm.	-	L U N C H B R E A K
2.00 pm. - 3.00 pm.	-	PRACTICAL 2. USE OF A FRAME AND LEVEL STAFF (ALL PARTICIPANTS)
3.00 pm. - 3.30 pm.	-	REMARKS (Participants)
3.30 pm. - 3.40 pm.	-	VOTE OF THANKS (Participant)
3.40 pm. - 4.00 pm.	-	CLOSING REMARKS (Mr. Michael Obora District Agricultural Officer Kisumu)
4.00 pm.	-	D E P A R T U R E

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Appendix 16

Minutes of Technical Advisory Team Meetings - Kenya

Appendix 16a

▸ MINUTES OF THE 3RD TECHNICAL ADVISORY MEETING HELD ON OCTOBER 11TH, 1995

PRESENT

DR. M. ONIM	- OFPEP-EAST AFRICA CO-ORDINATOR - CHAIRMAN
A. O. OMOLO	- CARE-KENYA - KISUMU
MARY LOU SURGI	- PROGRAM CO-ORDINATOR PVO/UNIVERSITY CENTER
W. OTWAL	- FOREST DEPARTMENT - KISUMU
E. VURUNGU	- STUDENT (OFPEP-KENYA) - KISUMU
ROSE IMBUGA	- STUDENT (OFPEP-KENYA) - KISUMU
CHRISPINE OKOTH	- OFPEP-KENYA - KISUMU
ERICK OCHIENG'	- CCF RANGALA - SIAYA
B. LUMADEDE	- OFPEP-KENYA - KISUMU
GEORGE AWITI OYAREH	- CCF - SIAYA
J. AGUNDA	- CARE-KENYA - SIAYA
MARK OMONDI	- KENGO AGROFORESTRY - KISUMU
OYONDI EPHRAIM	- TEACHER - MUHANDA - VIHIGA
PERIS OCHOLA	- NSRC - KIBOS - KISUMU
PETER OMONDI	- CMAD - HOMA BAY
C. NYOKORA ONYANGO	- CMAD - HOMA BAY
DAN OCHIENG	- CISS - KISUMU
FRANCIS K MUORIAH	- CARE KENYA HOMA BAY
JAPHETH OUKO	- WORLD VISION - KISUMU
ROSE SIGAR	- OFPEP - KENYA - KISUMU
R. C. ONDIGO	- OFPEP - KENYA - SECRETARY

ABSENT WITH APOLOGY

CHRIS ANDREWS - PEACE CORPS - KAKAMEGA

AGENDA

1. Introduction of Ms. Mary Lou Surgi to the members
2. Review of previous minutes
3. Report on Progress made in Program Activities for the last four months.
4. Collaboration and Linkage
5. Elaboration on the role of collaboration and Linkages in relation to OFPEP

6. A.O.B

The meeting started at 10.15 am with the chairman welcoming all the members who had turned up for the meeting. He then thanked Ms. Mary Lou for having had time to attend the meeting and introduced her to all collaborators and ofpep staff who were present.

MIN. 1/3/95 REVIEW OF PREVIOUS MINUTES

After going through and discussing the previous minutes topic after topic, some observations were made a few mistakes detected and corrected as follows:-

- On page 4 last paragraph "since all farmers" should read "since most farmers"
- On page 5 line 3 "The KNSRS" should read "The NSRC Kibos"

- On page 8 line 23 "sites to be reported" should read "sites to be repeated"

- Germination - There was brief discussions on germination as members felt that with application of fertilizers particularly DAP and even animal manure which has no decomposed well usually give low germination. It was therefore, felt that farmers should be well advised to time the rains that sowing of seeds be done when there is enough moisture in the soil. The same should apply when using inoculant also.

- Cassava Mosaic virus - It was emphasized that cassava is a major food crop in Siaya and Homa Bay districts that if attack of the cassava mosaic virus is not addressed, eventually the crop may disappear. Members remarked that the cooking type or varieties of cassava are more sensitive to the virus than the ones dried and turned into flour. However, it is adviceable to introduce clean cassava planting materials bulk them and supply to farmers. It was also noted that the international center for Insect Pest and Entomology (ICIPE) is currently working on cassava Mosaic virus, that there findings should be followed to see if it can assist the farmers.

MIN. 2/3/95 PROGRESS REPORT FOR THE LAST FOUR MONTHS

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For the last four months from June to October, 1995 OFPEP staff together with the collaborating partners carried out the following activities:

Training of Farmers

A complete list of farmers groups trained in the six OFPEP districts was presented and distributed to the members. The summary of which is given below;

COMMUNITY TRAINED		DISTRICT	MEN	WOMEN	YOUTH	TOTAL
NO.	26	6	434	493	797	1724
MEANS			16.69	18.96	30.65	66.31

The 1724 people trained during the period originated from the collaborating partners as follows;

COLLABORATING ORGANIZATIONS	NUMBER TRAINED
1. Lagrotech Consultants	310
2. Peace Corps Volunteers	368
3. CARE-Siaya	404
4. CCF	379
5. MALDM	42
6. CARE-Homa Bay/Migori	221
7. World Vision International	0
8. CMAD	0
TOTAL TRAINED	1724

Harvesting/weighing of yields and data collection

During the months of July and August, 1995 all the crops on the demonstration plots were harvested, dried, threshed and weighed. This exercise was carried out by the farmers, collaborating agents and the OFPEP staff. The data was collected calculated and analyzed as shown in the results tables below:

PRODUCTIVITY DEMONSTRATION PLOTS YIELD RESULTS

CROP	VARIETY	MEAN YIELD (KG) per plot site Plot area = 24 m2	Approximate yield/ha (kg)	Ranking
MAIZE	MDC	12.98	5408.3	3
	H 512	12.21	5087.5	5
	H 625	12.48	5200.0	4
	LOCAL YELLOW	14.90	6208.3	2
	LOCAL WHITE	16.06	6691.7	1
SORGHUM	SEREDO	10.65	4437.5	1
	NYAKABALA	7.72	3216.7	2
	WHITE SORGHUM (MTAMA I)	4.44	1850.0	4
	ANDIWO	6.01	2504.2	3
BEANS	GLP 92	4.28	1783.3	3
	CMC 5001	6.62	2758.3	1
	LIPALA	4.56	1900.0	2
SOYA BEAN				
	NAM I	7.23	3012.5	2
	LOCAL SOYA	9.89	4120.8	1
GROUND NUTS	UGANDA RED	4.73	1970.8	1
	HOMA BAY	4.40	1833.3	2

FERTILITY DEMONSTRATION PLOTS YIELD RESULTS

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FERTILITY DEMONSTRATION PLOTS YIELD RESULTS

CROP	FERTILITY TREATMENT	MEAN YIELD (KG) PER PLOT SITE PLOT AREA 24 m^2	YIELD/Ha (kg)	RANKING	INCREMENT OVER CONTROL %
	DAP	13.96	5825.0	2	113.4
MAIZE	A/MANURE	6.08	3366.7	5	23.4
	COMPOST	10.32	4300.0	4	57.6
	DAP/A.MANURE	10.50	4375.0	3	60.3
	DAP/COMPOST	17.53	7704.2	1	182.3
	CONTROL	6.55	2729.2	6	--
SORGHUM					
	DAP	10.36	4316.7	2	139.8
	A/MANURE	6.75	2812.5	5	56.3
	COMPOST	6.60	4300.0	4	52.8
	DAP/A.MANURE	8.28	4375.0	3	91.7
	DAP/COMPOST	12.85	7704.2	1	197.5
	CONTROL	4.32	2729.2	6	--
BEANS					
	DAP	3.88	1616.7	3	47.0
	COMPOST	3.95	1645.8	2	49.6
	A.MANURE	3.04	1266.7	4	15.2
	INOCULANT	4.50	1875.0	1	70.5
	CONTROL	2.64	1100.0	5	--
SOYA BEANS					
	DAP	10.52	4383.3	1	214.0
	COMPOST	8.85	2437.5	4	74.6
	A.MANURE	6.42	2675.0	3	91.6
	INOCULANT	7.23	3012.5	2	115.8
	CONTROL	3.35	1395.8	5	--

MIN 3/95 COLLABORATION AND LINKAGE

This is an area which has not been very well understood by the partners what role they should play. We, therefore, lucky to have Mary Lou who is the program Coordinator PVO/University - USA with us during the meeting who explained what is expected of OFPEP and collaborators.

Mary Lou explained that collaboration will only work smoothly when all parties have;

- A common goal - raising food production of by the farmers using different technologies, hence improve standard of living
- Have mutual benefits
- Be free and open in communication
- Have mutual trust and respect to each other
- Share resources available among each other
- And be accountable to the farmers, the partners and the Donors.

For the program to succeed she listed certain activities to be taken up by partners as shown the table below;-

CONTRIBUTIONS FOR SUCCESS

OFPEP	PARTNER (NGO)
- Provide Technical Assistance and Training	Recruit interested farmers to the program
- Link with research institutions to update the information	- Have knowledge of the farms, crops grown, the farming practices of the area and be accessible to farm communities
Assist in with monitoring and measure the impact of the program to the community	- Have active field staff and be able to supervise them

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Prepare and provide training materials	- Organize and train farmers on the program technologies
Organize and carry out training of trainers to the NGO field staff, extension staff and lead farmers	Have sufficient logistical support for training, monitoring and follow-up of the demonstration sites

The collaborating partners were then divided into three (3) groups and asked to discuss and come up with ideas how well the program should be run. The outcome from the discussions were follows;-

Group 1.

1. COLLABORATION AND PARTICIPATION

- The collaborative process as an OFPEP partner is a positive trend towards farm productivity and bringing related NGOs and Government institutions together through technical advisory team and the advisory council. By so doing, the following have been achieved;

  i) Creating environment for sharing experiences
  ii) Giving farmers wider choice among existing technologies
  iii) Improve technical capacity of the extension staff involved in the program
  iv) Sharing of human resources and other inputs as may be required by farmers for demonstration and trials.

  Constraints
  i) Inadequate staff and related resources to effectively and efficiently cover all planned activities
  ii) Partners roles and terms not clearly spelt out.

  There problems should be reviewed by both the OFPEP and Collaborators Managements.

2. SUSTAINABILITY

  i) Involving more than one organization enhances continuity should any wind up.

  ii) The OFPEP approach of developing technologies with farmers creates community interest and therefore is likely to be adopted and to continue.

  iii) Collaborators to incorporate related OFPEP activities in their routine work plan and hence budget where possible

GROUP 2.

1. BENEFIT GAINED

  - Soil fertility data compiled by the Kibos Research station
  - Demonstration Results
  - Coordination of NGO's for experience sharing
  - Training of TOTs and farmers

  CONSTRAINTS

  i) Language problem (terminologies)
  ii) Transport to reach farmers and distribute inputs

2. SUSTAINABILITY

  i). Capacity building of trainers an farmers by conducting more training programs
  ii). Clear training methodology by using hard data and visual aids

  iii). Create awareness on the need to improved soil fertility.

  iv). Work closely with the government of Kenya to be able to hand over when the project closes.

  v). OFPEP and collaborators to plan activities together to avoid misunderstanding and duplications.

  vi). Limit the number of trials in a farmers plot to enable the farmer know exactly what is being done. Too many would confuse the farmer.

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GROUP 3.

COLLABORATION AND PARTICIPATION

The relationship between OFPEP and NGOs should be formalized defining the roles to be played by each partner.

BENEFITS

i) In training there is opportunity to share ideas
ii) Share the results of activities e.g soil survey fertility trials, seed storage etc.
iii) Farmers receive seeds, fertilizers for their demonstrations.

CONSTRAINTS

i) Inadequate resources e.g transport and inputs not being available in time.

ii) Timing of field activities should be uniform in a given area.

iii) Too many trials on a farmer's plot confuse the farmer.

SUSTAINABILITY

i) Technologies are sustainable because they address felt need using locally available resources.

ii) Sharing of the information with both collaborators and farmers

iii) The farmers are involved in managing the demonstration sites hence learn and appreciate the outcome for future use.

AOB

Mr. Muoriah wanted to know how and where he can get the vanilla beans. He was told that the beans are available in uganda that Dr. Onim could make such arrangements (Action Dr. Onim).

There being no any other business the meeting ended at 4.15 pm.

Signed ..... Chairman Date .....

..... Secretary Date .....

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Appendix 16b

MINUTES OF THE TECHNICAL ADVISORY TEAM MEETING HELD ON 26/6/96 AT THE OFPEP-KENYA OFFICES - KISUMU.

Present

1.Joseph C.Odongo(WV)
2.George B. Otieno(MENR)
3.Japheth Ouko(WV)
4.Wycliff Otwal(MENR)
5.Joseph Agunda(CARE)
6.Caroline Sikuku(OFPEP)
7.Rose Sigar (OFPEP) - Chairperson
8.Erick Ochieng(CCF)
9.Seline Awuor(SCODP)
10.Henry E.Ouko(OFPEP)
11.Tobias O.Athiambo(CARE)
12.George Awiti(CCF)
13.Nelson Omondi(OFPEP) - Secretary
14.Dismas Okello(SCODP)
15.Dr. Moses Onim(OFPEP-E.A)
16.Grace A. Ongiri(C-MAD)

The agenda of the meeting

1. Introduction of new members to the TAT members.

2. Review minutes of previous meeting.

3. Report on progress made on program activities in the previous six months.
   - o Seed storage trial observations and germination results.
   - o Establishment of demonstrations in the L.rains 1996.
   - o Compost/Animal manure analysis results.
   - o Germination results from the 1996 long rains season demonstration sites.
   - o Observations and remarks from the evaluation of the demosites made by Dr.Onim in company of OFPEP-Kenya staff.(Dr.Onim).
   - o Demonstration sites selected as suitable for training farmers.

4. Collaboration and linkage.

5. Planning for program activities for the next three months.
   - o Training of farmers.
   - o Training of trainers
   - o Harvesting and weighing of yields of demonstration plots.
   - o Tentative date for the next meeting.

6. A.O.B.

The meeting commenced at about 10.00 a.m. The chairperson thanked all the participants for having had time to attend the meeting on time even though most of them travelled from far places. She then introduced the agenda of the meeting in the above sequence.

MIN/1/1/96. INTRODUCTION OF NEW MEMBERS TO THE TECHNICAL ADVISORY TEAM.

All the participants did self introduction by name and institutions they represented. Overall, seven institutions were at least represented namely; World vision (2), Ministry of environment and natural resources (2),
CARE-KENYA (2), OFPEP (5), CCF (2), SCODP (2), and C-MAD (1).

MIN 2/1/96. PREVIOUS MEETING MINUTES (REVIEW)

Matters arising-

- o Green and yellow grams which had been proposed to be included in the trials of 1996 long rains was left out later subject to shortage of seeds at the local market.
- o Andiwo 2 sorghum variety was omitted in the minutes though it was later included in the trials of long rains 1996.

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- In the minutes it was proposed that DAP was to be used as an inorganic fertilizer in the trials involving cereals, but this was later changed to TSP fertilizer due to unavailability of DAP in the market. at the time of purchase.

- Regarding fertility trials , an issue was raised to the effect that most farmers happen to avail premature animal manure which later in-turn translate into negative yield difference as compared to control plots.

  Dr. Onim, however reiterated that it is the work of the extension to relay the correct information and massages to farmers suffering from such technical problems. The problem was noted and would be addressed in future farmers training.

- Instead of using only 2 ground-nut varieties in the trials as was proposed, a third variety known as Igola 1 was later included. This was obtained from Uganda and is said to be tolerant to g\nut rosette disease, thus the reason for including it the demonstration.

- Planting spacing - even though between row spaces had been stipulated in the minutes as 1m, some sites had been planted with intra-row spacing of 0.5m. The explanation for this being that the farmers had complained that too much land was being wasted with 1m spacing between the rows. However Dr. Onim noted that between row spacing of 0.5m were much narrower than even spacing between rows of cereals (eg 0.9m x 0.3m). It was therefore, agreed at the meeting that between row spacing remain at 100 cm. (1 m.) wide and not 50 cm.(0.5 m.)

- Mr. Aguda emphasized the importance of repeated screening of crop varieties in trials since this approach helps farmers choose their best cultivars representatively from a broad menu. However, Dr. Onim clarified that OFPEP's approach is not necessarily to screen a large number of crop varieties but just a few improved cultivars to compete with farmers' best local crop strains. The reason for this being that should the best of the farmers out yield the best of the commercial varieties, then the programs would lay emphasis on training farmers on seed selection.

MIN 3\1\96. <u>PROGRAM ACTIVITIES FOR THE LAST SIX MONTHS</u>

I. SEED STORAGE TRIAL

The results were seen to be quite encouraging particularly with regard to maize storage treatments. The hanging methods of maize cobs showed fairly high germination percentages particularly hanging under tree and hanging over traditional cooking place. It was therefore agreed that the data would be used to train farmers through extension on seed management activities at local farmer level.

The trend of the germination results of sorghum and bean storage widely deviated from that expected. On further enquiry it was realized that bean seeds for the trial were purchased from the market and therefore could have been stored after treating with actellic. Similarly sorghum results were disputed and it was realized that these seeds were obtained from the farmers without enquiring about the source or for how long they had been previously stored or under what conditions the storage had been. It was therefore agreed that sorghum and bean storage trial be repeated using seeds of known source and quality. The seeds will have to be obtained from farmers immediately after harvesting so as not to get seeds already damaged by pests or treated with some form of preservatives.

II. ESTABLISHMENT OF 1996 LONG RAINS DEMONSTRATION SITES.

It was highlighted that a total of 36 demosites were established in the long rains '96. These comprised 33 fertility and 33 crop variety trials which totaled to 67 demonstration trials for both cereals and legumes.

III) COMPOST/ANIMAL MANURE ANALYSIS RESULTS.

The tables were distributed to the participants indicating laboratory analysis results of compost manure samples obtained before and after training farmers on compost making. The data showed massive improvements in nutrient levels in compost manures made after training the farmers. Major increments were realized with nutrients such as Potassium, calcium and Phosphorous. However Nitrogen fell slightly below required minimum range probably due to technical factors such as; duration of composting, materials used, bad sitting and poor storage. It was agreed that compost should last for at least 6 months to be considered fully decomposed. The need to train farmers on good storage of ready made compost manures was stressed as this would ensure less leaching of nutrients available in the manures.

IV) GERMINATION RESULTS - LONG RAINS '96

It was noted that the differences in germination between soil fertility treatment was not significant as was the case in the long rains 1995 demonstrations, suggesting a tremendous improvement in planting methodology. However, the mean germination numbers was noted to be below 50% particularly

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with legumes and this was perceived as indicating clearly, technical negligence on the part of the staff involved. This could have been as a result of; poor seeds or even wrong planting space in some sites and failure to do germination test on the seeds that had been stored for long periods. The members agreed to be more care in future planting operations

V) EVALUATION OF OFPEP/COLLABORATORS DEMONSTRATION SITES BY DR. ONIM.

Dr. Onim explained at length how he took the task to visit and evaluate each and every site where OFPEP had demonstrations with collaborating organizations. He issued the participants with copies of evaluation sheets which were used during the exercise. He commended the general performance of the demosites and thanked all those involved for their efforts.

He, however noted that, one major and most common problem observed in almost all the demosites was late planting which could lead to general poor performance of the crops and later poor yield. Other technical problems noted included; wrong fertilizer application; Wrong spacing in some few areas; shortage of soyabean seeds leading to fewer sites having soybeans; and overshooting of the set target of the number of demonstration trials as per last planning meeting.

VI) DEMOSITES SELECTED AS SUITABLE FOR TRAINING

During the above evaluation exercise (v), certain sites were disqualified as not suitable for training of farmers. This was based on the condition of the crops vis-a-vis those of the surrounding crops in other farmers field. Some demosites were severely affected by drought and others by water logging to the extent that crops could not recover even when environmental conditions improved later. Such were the demosites ruled out for purposes of training farmers. In total, 23 sites were selected as suitable for training while the rest ruled on technical grounds. The meeting proposed that farmers should be encouraged to participate more in evaluating demonstrated technologies at the demosites.

MIN 4\1\96. COLLABORATION AND LINKAGE

- Mr. Agunda of CARE-Siaya, clarified that collaboration between OFPEP-Kenya and CARE-Kenya has gone a step further with particular reference to , On-Farm seed management techniques and soyabean production. Two CARE-Kenya staff based in Siaya district (Messrs. Moses Siguda and Sylvester Kobare) are currently engaged in training farmers on On-farm seed management. All these are as a result of mutual efforts between OFPEP and CARE (i.e collaboration) with the aim of enhancing On-Farm productivity.

- World Vision noted that due to heavy commitment of their staff in-charge of agriculture, their collaboration with OFPEP-Kenya has been weak. However he was happy to report that a new staff, Mr. Joseph Odongo, has been fully employed by the organization to take full of the projects agricultural activities and, therefore will be fully available for the collaboration activities.

MIN 5\1\96. PLANNING FOR PROGRAM ACTIVITIES FOR THE NEXT THREE MONTHS

Training of farmers at the demonstration sites was the most important activity to be undertaken in the coming month. Below is a tentative schedule set for training farmers at the various demonstration with the collaborators in charge;

i) Training of farmers -

Trainers	Tentative dates
CARE-siaya	4th.,9th.,16th.,17th.
OFPEP/Lumigo	8th.
CARE-Homa-bay	17th.
CCF-Rangala/OFPEP	10th.
CCF-Rera	16th.
C-MAD-Homabay/OFPEP	15th.,16th.
WV/OFPEP	4th.
MENR-Kisumu/OFPEP	2th.,11th.

It was agreed that training materials like teaching visual aids should be reproduced and made available to the collaborators in time.

ii) Training of Trainers

Dr. Onim emphasized that the training will this time be on cassava crop particularly because this is a very important food crop in the lowland regions where soils are infertile.

- In a crop preference ranking PRA sessions held with farmers in Siaya district by OFPEP staff, Ms. Caroline Sikuku, cassava ranked second after sorghum as an important food crop in the

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region. However, it was noted during a random survey done in some farms, that an average of 50% of the cassava crops in the farms were infected by cassava mosaic virus (CMV). This showed that the varieties available were susceptible to the disease and that farmers do not select their planting materials well before use. Hence the importance of conducting this training in readiness for the short rain planting.

- The training is meant to create awareness on the importance and prevalence of the disease and to stress on the urgent need to introduce, through rapid multiplication, some resistant cassava cultivars.

- The participants were asked to propose a convenient date and place to hold the training. Siaya district was selected as the place to hold the training due to the importance of the crop in the region and also due to the disease prevalence in that area. The crop was also noted by some of the participants to be a major staple and cash crop in the area.

- Tentatively, the participants agreed that the training be held within the third week of August '96. Attendants will include : KARI(Kakamega),OFPEP-Kenya, Ministry of agriculture and livestock development extension staff, staff of collaborating organizations and lead farmers.
- Venue was suggested to be JERA-INN, situated in Ugunja division of Siaya district.

iii) Harvesting and weighing of yields from demoplots

The meeting was informed that weighing had been started with food bean crop since it matured earlier than all the crops tested in the demonstrations. Dr. Onim displayed a sample of the kind of gunny bags that OFPEP has proposed to use in
demo-harvesting. The bags would all have an OFPEP-K mark for purposes of identification and that farmers should be notified in advance that the bags will be recovered back for purposes of future harvesting.

vi). Tentative date for the next meeting

Tentative date for the next TAT meeting set for 28/8/96 and should there be no changes or alterations ,this proposal will remain in force. The members would reminded two weeks before that date.

6. AOB.

**Dr. Onim took the opportunity to distribute 5 charts having picture illustrations depicting seed related activities . The charts were to be used as teaching aids during trainings by the extension to facilitate dissemination of
on-farm seed management practices to farmers.**

The meeting ended at 4.00pm. and all the participants left for their respective destinations.

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Appendix 16c

OFPEP-KENYA TECHNICAL ADVISORY TEAM MEETING HELD AT THE KISUMU OFFICE ON 24/9/96

IN ATTENDANCE

1.	John Okelo	(CCF)
2.	Eric Ochieng	(CCF)
3.	Wycliffe Otwal	(MENR)
4.	Erick Omondi	(OFPEP)
5.	Caroline Sikuku	(OFPEP) - Taking minutes
6.	Silvester O. K'obare	(CARE)
7.	Henry E. Ouko	(OFPEP)
8.	Peris Ochola	(NSRC - KARI)
9.	Nelson Omondi	(OFPEP)
10.	Rose A. Sigar	(OFPEP) - Chairperson

Absent with apology - Grace A. Ongiri (C-MAD)

The days' Agenda of the meeting

1. Review minutes of previous meeting.

2. Report on progress made on program activities in the previous three months

   - Analysis of results of Compost/animal manure soil fertility amendments.

   - Observations and comments from LR 1996 yield results (Dr. Onim)

   - Farmers training at the demonstration sites (number of farmers trained)

   - Establishment of demonstrations in the SR 1996.

   - Training at the demo sites of short rains 1996.

3. Planning for program activities for the next three months.

   - Germination count from the 1996 short rainy season demonstration sites
   - Training of farmers
   - Training of Trainers
   - Harvesting and weighing yields from the demonstration plots
   - Seed storage trial (Beans and Sorghum)
   - Tentative e date for the next meeting (to plan for the LR 1997 activities)

The meeting started at 10.30 a.m. The Chairperson welcomed participants to the meeting and thanked them for availing themselves despite their busy schedules. She then requested participants to do a self introduction since there was a new member to the meeting - Eric Omondi (OFPEP).

She then introduced the day's meeting agenda and they were followed in that order.

1. REVIEW OF THE PREVIOUS MEETING'S MINUTES

Matters arising

Peris from KARI inquired whether the cereal crops planted with TSP during the long rains were followed up with top dressing to carter for the Missing N. In response, it was explained that no top-dressing was done. OFPEP borrowed from SCODP'S experience from which cereals performed well. The yields still improved above control and TSP is relatively cheaper than DAP and therefore could be affordable by farmers.

Participants were challenged to start thinking in terms of seed acquisition sustainability so that OFPEP does not keep buying some inputs from Uganda and other areas other than the project area. They could look into possibilities of multiplying desired seeds by the communities using local farmers.

2. REPORT ON PROGRESS MADE ON PROGRAM ACTIVITIES IN THE PREVIOUS THREE MONTHS

- Compost results improved from what it was initially reflecting positively in the yield performance in the LR 1996 demonstrations.
- Farmers should be encouraged to add more N sources to their compost material to improve further the quality of the compost
- It was observed that even though good quality compost is used, it is important to determine the target soil nutrient content and pH before application as these factors e.g. low pH could fix P while other nutrients may antagonize performance of essential nutrients in the compost. Soil analysis of every new demonstration site was thought to be necessary.

Table 1: Results of laboratory analyses of compost samples collected from compost prepared by farmers before training for use in the long rains of 1995 demonstration sites.

	pH	K_2O	CaO	P_2O	O.M	N
		----m.e.----		ppm	--------%-------	
		<0.2	<4.0	<20	<4.0	<0.2
SAMPLE NO						
S1	6.9	1.82	-	0.50	13.60	1.18
S2	7.9	1.66	-	0.19	17.00	0.86
S3	7.7	1.30	-	0.34	21.20	1.25
S4	7.8	0.77	-	0.20	22.50	0.47
4 Average	7.58	1.39	-	0.31	18.58	0.94

TABLE 2: Results of laboratory analyses of compost samples collected from compost prepared by farmers after training, for use in the long rains of 1996 demonstration sites.

TABLE 2: Results of laboratory analyses of compost samples collected from compost prepared by farmers after training, for use in the long rains of 1996 demonstration sites.

			pH	K_2O	CaO	P_2O	O.M	N	CEC	
				---meq---			ppm	-----%----		m.e.
				<0.2	<4.0		<20	<4.0	<0.2	<20
NAME OF FARMER	DISTRICT	LOCATION								
J. Ogutu	Siaya	E.Asembo	7.66	14.30	10.83		43.33	4.72	0.35	18.90
J. Tanya	Vihiga	S.W.Bunyore	8.33	10.00	16.93		63.66	4.82	0.33	24.00
C. Andiasta	Vihiga	W.Bunyore	8.33	10.86	17.60		49.33	6.11	0.55	31.38
S. Ambuka	Vihiga	S.W.Bunyore	8.13	13.26	15.83		38.50	6.07	0.42	-----
S. Ogola	Siaya	W.Uyoma	8.00	14.26	20.62		38.83	5.82	0.29	-----
K. Odhiambo	Siaya	W.Asembo	7.76	13.40	24.29		53.33	6.25	0.56	-----
A. Osiako	Vihiga	S.W.Bunyore	8.56	24.46	13.12		54.33	6.51	0.50	-----
J. Atutu	Vihiga	W.Bunyore	7.66	12.23	18.43		38.66	5.15	0.63	-----
E. Maria	Vihiga	W.Bunyore	7.75	11.20	17.03		37.50	5.64	0.65	-----
J. Owiti	Siaya	N.Sakwa	7.40	7.40	15.00		31.00	5.98	0.57	-----
F. Ondiro	Siaya	C.Alego	8.20	16.64	14.06		26.00	6.30	0.68	-----
M. Odhiambo	Siaya	E.Alego	8.20	20.88	12.03		43.00	6.08	0.66	-----
S. Owino	Siaya	S.Gem	7.90	15.36	16.56		46.50	8.34	1.42	-----
Rera CCF	Siaya	S.Gem	7.70	30.96	20.00		17.50	5.64	0.68	-----
W.W.Opiata	Vihiga	S.W.Bunyore	7.60	6.96	14.06		54.00	6.72	1.04	-----
J.O.Ooko	Migori	S.Kamagambo	7.90	6.40	12.66		46.50	2.08	0.26	-----
T. Orik		Kagan	8.10	12.96	10.63		39.00	2.80	0.30	-----
T. Ochal	H/Bay	E.Gem	8.10	9.12	11.50		41.50	2.20	0.22	-----
J. Ogwel	H/Bay	Kagan	7.20	6.40	11.50		34.00	5.46	0.34	-----
J. Opiyo	Migori	W.Kamagambo	8.10	30.96	10.63		20.00	7.52	0.74	-----
A. Osiyo			7.50	10.24	23.75		46.00	5.36	0.72	-----
R. Odera	Migori	Wan'g chieng	7.60	20.16	20.00		5.00	8.65	1.43	-----
J. Omundo	Migori	N.Kamagambo	7.80	8.00	16.56		34.00	4.59	0.37	-----
J. A.Akala	H/Bay	S.Sakwa	6.50	5.92	12.66		36.00	5.75	0.41	-----
M. Owiti	H/Bay	E.Kochia	8.20	21.60	23.75		10.00	6.10	0.61	-----
E. Owinyo	H/Bay	C.Karachuonyo	7.10	2.92	12.66		46.00	4.92	0.37	-----
E. Obondi	Migori	W.Kamagambo	8.90	19.36	10.31		38.00	4.66	0.38	-----
V. Ochuoga	Siaya	N.Ugenya	9.30	27.20	20.63		32.00	5.87	0.36	-----
S. Ondiso	Siaya	Uholo	7.80	16.64	13.44		24.00	4.61	0.68	-----
M. Ayuoyi	Siaya	E.Gem	8.40	28.00	18.44		38.00	5.21	0.41	-----
L. Odhiambo	Siaya	C.Gem	7.70	12.64	20.00		56.00	4.86	0.39	-----
O. Odundo	Siaya	N.Sakwa	7.60	11.04	20.63		45.00	4.68	0.39	-----
M. Ombalo	Siaya	S.W.Gem	7.60	10.72	22.50		46.00	5.56	0.50	-----
33	**AVG.**		**7.65**	**14.61**	**16.32**		**39.71**	**5.63**	**0.55**	**24.76**

TABLE 3: Results of laboratory analyses of samples of animal manure used in some demonstration sites in the long rains of 1995.

Sample	pH	K_2O	CaO	P_2O	O.M	
		----m.e.----		ppm	%	
		<0.2	<4.0	<20	<4.0	<0.2
1. Ani. manure	7.8	1.68	0.72	29.40	2.00	
2. Ani. manure	7.4	1.68	0.47	26.40	1.02	
3. Ani. manure	7.7	2.35	2.35	29.90	1.61	
AVG.	**7.63**	**1.90**	**1.10**	**28.57**	**1.54**	

TABLE 4: Results of laboratory analyses of animal manure samples collected from animal used in the long rains of 1996 demonstration sites.

			pH	K_2O	CaO	P_2O	O.M	N
				---meq----		ppm	-----%----	
				<0.2	<4.0	<20	<4.0	<0.2
NAME OF FARMER	**DISTRICT**	**LOCATION**						
M. Odhiambo	Siaya	E.Alego	8.60	13.92	14.06	24.50	4.45	1.31
Lumigo w/g	Siaya	C.Asembo	7.70	18.08	37.50	21.00	7.31	0.79
J.Agutu	Kisumu	S.W.Kisumu	8.70	30.96	16.56	20.00	6.78	0.35
F.Ondiro	Siaya	C.Alego	8.70	25.77	13.19	48.50	4.61	1.48
L.Oduogi	H/Bay	W.Kanyamwa	6.30	12.96	25.00	52.50	4.66	0.46
J.Oduwo	H/Bay	Ndhiwa	8.70	19.36	13.44	55.00	6.65	0.40
J.Tanya	Vihiga	S.W.Bunyore	8.60	30.96	15.63	39.50	6.22	0.56
P.Okello	Kisumu	S.W.Kisumu	7.70	16.64	18.75	64.50	7.56	0.68
8		**AVG.**	**8.13**	**21.08**	**19.27**	**46.88**	**6.02**	**0.75**

Observations and comments from LR 1996 yield results

- H625 performed worst of the Maize varieties. This could have been due to late planting and also because fewer trial averages were used for this variety.
- The same trial averages should be used for all varieties for fair comparison. Varieties with fewer trial averages should be omitted from the analysis.
- The use of TSP on cereals without follow up by top dressing may have contributed to the low performance of the hybrids, since hybrids are heavy feeders.
- Maize yields of local variety (LW) were higher from Ms. Leonida and Mr. Maxwel's farms because they used ON-farm selected maize as advocated by OFPEP. Relatively low yields from the same variety at Ms. Sophia's who never used selected seeds was noted for comparison.

CROP VARIETIES ANALYSIS

Sorghum performance

- Sorghum is generally sensitive to late planting.
- Mtama 1 was most attacked by birds lowering yields significantly.

GROUNDNUT

- Red beauty was noticed to have good yielding potential but ended up yielding poorly. Participants could see to the earthing up of the pegs to help it yield better.
- Igola and Homabay varieties have their pegs well covered in the ground and this probably explains the better yields observed.

- Igola yielded best - had best peg orientation as it spreads flat to the ground. However, it was observed that it does not taste as well as Red beauty and Homabay varieties.

FOOD BEANS

- KI3I performed best among the varieties. It is the same variety as the one previously coded as MCM 5001.

SOYA BEANS

- Most farmers do not know how to utilize soya. There is need for training on soya utilization. This is in plan.

CROP VARIETY DEMONSTRATIONS - LONG RAINS 1996

MAIZE (N = 12)

PARAMETER	MDC	H512	H625	LW	LY
WT/PLOT	7.39	5.73	0.88	6.27	5.56
WT./Ha	3079.17	2387.50	366.67	2654.17	2316.67

SORGHUM (N = 9)

PARAMETER	SEREDO	MTAMA 1	ANDIWO 2	NYAKABALA
WT/PLOT	6.23	2.13	2.20	3.66
WT./Ha	2595.83	962.50	916.67	1525.00

GROUNDNUTS (N = 8)

PARAMETER	RED BEAUTY	HOMABAY	IGOLA
WT/PLOT	1.88	5.13	6.42
WT./Ha	783.33	2137.50	2675.00

FOOD BEANS (N = 18)

PARAMETER	LIPALA	GLP-92	K131
WT/PLOT	3.63	4.00	7.77
WT./Ha	1512.50	1666.670	3237.50

SOYBEANS (N = 2)

PARAMETER	NAM 1	LOCAL
WT/PLOT	8.00	6.45
WT./Ha	3333.33	2687.50

CROP FERTILITY RESULT ANALYSIS

- Compost had good results on yields across all varieties well above control.
- Inoculant did not perform well with beans but improved yields of groundnuts and soya.
- Single use of TSP and Inoculant improved yields of the various crop varieties (except Inoculant for beans). However, when used in combination, it was observed that yields were reduced. This will be observed for repeats from the SR 1996 activities.

Matters arising

- Same farmers should be used throughout for demonstrations and training. Shifting from farmer to farmer with the same demonstrations inco-operated unnecessary errors which could be avoided.
- Standard training sites/demo data base sites should be used to get consistent data.

CROP FERTILITY DEMONSTRATION RESULTS - LONG RAINS 1996

CROP	N	PARAMETER	AM	COMP.	INO	TSP/INO	CONTROL	TSP
SOYA	4	WT/PLOT	8.13	7.93	6.20	11.39	4.61	6.81
		WT./Ha	3387.50	3304.17	2583.33	4745.83	1920.83	2837.50
		% INCREASE	**76.36**	**72.02**	**34.49**	**147.07**	___	**47.72**

CROP	N	PARAMETER	AM	COMP.	INO	TSP/INO	CONTROL	TSP
G/NUTS	9	WT/PLOT	3.21	4.49	3.17	2.26	2.16	4.17
		WT./Ha	1337.50	1870.83	1320.83	941.67	900.00	1737.50
		% INCREASE	**48.61**	**107.87**	**46.76**	**4.63**	___	**93.06**

CROP	N	PARAMETER	AM	COMP.	INO	TSP/INO	CONTROL	TSP
FOOD BEANS	15	WT/PLOT	3.44	4.46	2.85	4.99	2.46	4.79
		WT./Ha	1433.33	1858.33	1187.50	2079.17	1026.00	1995.83
		% INCREASE	**39.84**	**81.30**	**15.85**	**102.85**	___	**94.72**

CROP	N	PARAMETER	AM	COMP.	CONTROL	TSP	TSP/AM	TSP/ COMP
MAIZE	12	WT/PLOT	7.12	7.18	5.11	7.06	6.23	9.60
		WT./Ha	2966.67	2991.67	2129.17	2941.67	2595.83	4000.00
		% INCREASE	39.33	40.51	---	38.16	21.92	87.87

CROP	N	PARAMETER	AM	COMP.	CONTROL	TSP	TSP/AM	TSP/ COMP
SORGHUM	9	WT/PLOT	5.56	5.07	2.93	5.10	5.60	----
		WT./Ha	2316.67	2112.50	1220.83	2125.00	2333.33	----
		% INCREASE	89.76	73.04	---	74.06	91.13	----

Establishment of demonstrations in the SR 1996

A total of 38 sites between OFPEP and Collaborators have been planted in the short rains in 1996.

TRAINING FARMERS AT THE DEMO SITES - SR 1996

- o OFPEP and collaborators will facilitate training at their respective sites. Dates for training on legumes could be set as appropriate by the respective staff. However, dates for the cereals training will be arrived at/brought to OFPEP during the next TAT meeting.

3. PLANNING FOR PROGRAM ACTIVITIES FOR THE NEXT THREE MONTHS

Germination counting of SR 1996

OFPEP and collaborating staff should do the germination counting at their respective demo sites.

- o Training of Trainers

  There was to be a TOT on the cassava mosaic disease sometime in August. This did not take place but details will be communicated once Dr. Onim has finalized arrangements for this.

- o Harvesting and Weighing yields from demos.

  LR - completed but not all results received - efforts should be made to bring this. From SR demonstration care should be taken that farmers are given enough explanation or what should be done.

- o Seed storage trial (Beans and Sorghum)

  This trial may be repeated if enough quantities of the seeds can be found (50 kg) each from one common source. Incase enough seeds are not found, then the trials will be repeated with fresh harvest proceeds from the SR activities.

- o Tentative date for the next TAT meeting was scheduled for Wednesday November, 20th 1996.

Appendix 16d

MINUTES OF THE T.A.T PLANNING MEETING FOR LONG RAINS 1996, HELD ON 15.11.95

PRESENT:

1. Charles Nyakora Onyango - C-MAD
2. Fredrick Gweyo - CARE
3. Helidah - Grail
4. Wycliffe Otwal - MENR-Forest Department
5. Joseph Agundah - CARE-Kenya
6. George Awiti - CCF-Rera
7. Dismas Okello - SCODP
8. Ernest Vurungu - OFPEP-Kenya
9. Rose Imbuga - OFPEP-Kenya
10. Robert Ondigo - OFPEP-Kenya - Chairman
11. Nelson Omondi - OFPEP-Kenya
12. Chrispine Okoth - OFPEP-Kenya
13. Rose Sigar - OFPEP-Kenya - Secretary

Agenda:

1. Introduction
2. Seed variety
3. Soil fertility
4. Number of demonstration sites
5. Sizes of plots
6. Spacing
7. Activity Plan
8. Survey
9. A . O . B.

Min. 1/3/95: INTRODUCTION

After welcoming the members to the meeting, the chairman thanked all those present for taking time off their busy schedule to attend the meeting. There followed self introduction of those present. The Chairman then explained the presence of those who had not been in the previous meetings. He also explained the absence of Dr. Onim who was busy preparing for his trip to Ethiopia.

The Chairman stressed the importance of planning activities together noting that this leads to uniform demonstration establishment and therefore solid data for analysis. All those present supported the idea of planning together.

Min. 2/3/95: SEED VARIETIES.

Both cereal and leguminous crops would be included in the

demonstrations.
The following varieties were agreed upon to be included in the long rain demonstration of 1995.
Cereal

i. Maize - H625, H512, Maseno Double Cobber, local white, Local yellow and Pwani Hybrid.

ii. Sorghum - Seredo, Nyakabala, Mtama 1, Gopari/Hela, Ochuti, Rabuor.

Legumes. i. Beans - GLP-92, Hong Rangai, Okuodo, GLP-2 (Lipala)

ii. Soybeans - Nam 1, Local.
iii. Grams - Green & Yellow grams.

Due to the high number of local sorghum, more varieties should be included in the demonstration, however, this would lead to more number of plots per farmer adding more load to the farmers labour requirement. For this reason, it was agreed that the local sorghum used would depend on its popularity in the locality, and that only four sorghum varieties would be demonstrated per site. Half the farmers would plant Seredo, Mtama, Nyakabala and Rabuor and the other half to plant Seredo, Mtama, Ochuti and Gopari.

One participant commented that repeating varieties demonstrated in the long rains of 1995 would be illogical as farmers may not see the importance of the demonstration if the results from the demonstration had already been presented to them.

Two more local beans would be included in the demonstration in addition to the improved varieties GLP-92 and MCM 5001. These would be Hong Rangai & Okuodo. If available GLP-1004 (Mwezi moja) would also be included. Grail accepted to look for and avail Okuodo. Soya beans and groundnut varieties would remain as they were in the 1995 long rain demonstration, that is Nam 1 and local soya: Uganda red and Homabay for groundnuts. It was proposed that grams be included in the demonstrations of long rains of 1996 due to their importance not only in providing protein to the family but also a source of income, as they fetch high prices in the market.

TSP would be used in all plots of productivity trails for legumes and DAP for cereals. Cereal plots would be 5 or 6 depending on varieties available.

Min. 3/3/95: SOIL FERTILITY

For the fertility demonstration, similar treatments to those demonstrated in the 1995, long rains would be repeated for the cereals. Except for the legumes, TSP would replace DAP. Reason being, Nitrogen in the DAP suppresses the activity of the

bacteria in the nodules. The treatments would therefore be as follows,

Cereals; Maize & Sorghum - DAP, Animal manure, DAP/Animal Manure Control, Compost, DAP/Compost

Since improved hybrid maize varieties are specific to regions, Maseno Double Cobber was proposed to be used in all the fertility trial plots in all the districts. For sorghum variety seredo would be used.

Legumes - Groundnuts, Beans and Soyabeans.

Treatment - TSP, Animal Manure, Inoculant, compost; control, TSP/Inoculant.

Varieties;
- Groundnuts - Uganda red
- Beans - Lipala
- Soyabeans - Nam 1

In order not to have a bias on any treatment e.g always putting the control plot at the end, the meeting agreed that randomization would be done using ballot papers. Once done, farm layout would be drawn and submitted to the OFPEP office. It was stressed that the area chosen should be as uniform as possible to minimize effects of difference in soil fertility or topography on yield.

One participant suggested that due to the economic status of the farmers the program targets, we should not emphasize on expensive commercial fertilizers like TSP as a soil improvement techniques but instead emphasize on locally available materials like compost and animal manures. Thus, instead of having a combination of TSP with inoculant as one of the treatments, we should have TSP with Animal Manure and TSP with compost. However, this was ruled out because the high level of nitrogen in the organic fertilizer would suppress the development of nodules. Only TSP would be combined with inoculant. The Phosphorous (P) is needed to enhance activity of bacteria.

After discussing all the treatments involved and coming up with a number of plots per farmer, it was realized that a number involved would be to large for one farmer to handle. It was suggested that two neighbouring farmers would be involved in the demonstration. One to handle the legume demonstration and the other to handle the cereals. Another suggestion was that cereals be demonstrated in 1996 long rains and legumes in 1997 long rains. The first suggestion was supported by all those present. It was also realized that both groundnut varieties could be used in the fertility trials as each was popular in specific areas. In this regard, Uganda Red would be used in Kakamega, Vihiga, Siaya and Kisumu and Homabay variety in Migori, and Homabay

districts.

Min. 4/3/95: NUMBER OF DEMONSTRATION SITES

One participant suggested that, inorder for the meeting to know the number of demonstration sites to be handled by each collaborator, it was important to first know the number of plots involved in both productivity and fertility demonstration and also to know how many demonstration sites OFPEP has targeted for the long rains of 1996.

From minutes 12 and 13 discussions, the following number of plots were arrived at;

Crop	Number of plots	
	Productivity	Fertility
Maize	6	6
Sorghum	6	6
Beans	4	6
Soya beans	2	6
G.Nuts	2	6
G/Grams	2	-
	---	---
	22	30

The total number of plots would, therefore, be,

Productivity	22
Fertility	30

	52
	=====

The meeting was informed that OFPEP had targeted between 40 - 50 demonstration sites. Forty four (44)demonstration sites was supported as appropriate by all. It was also decided that since legumes and cereals would be handled by different farmers, 22 of the demonstrations would be for legumes and 22 for cereals.

The demonstration sites would be distributed evenly across the six districts OFPEP operates. The smaller district of Kakamega, vihiga and Migori would each handle 4 having a total of 12 demonstration sites and the larger districts to take a total of 34 demonstrations sites. Siaya would have 12 , Kisumu 10, Homabay 6 and Migori 6.
The distributions with respect to districts and collaborators would be as follows:

SIAYA - 12	KISUMU - 10	HOMABAY - 6
CARE - 4	Grail - 6	C-MAD - 4
SCODP - 4	MENR - 4	CARE - 2
CCF-Rera - 2		
CCF-Rang'ala- 2		

MIGORI - 6	VIHIGA - 4	KAKAMEGA - 4
Grail /OFPEP - 2	Lagrotech/OFPEP	Lagrotech
CARE Volunteers - 4	Peace corp Volunteers	Peace corp

It was agreed that OFPEP should also have its own demonstrations in each district which will be included in the total number of demonstrations sites.

Min. 5/3/95: SIZES OF PLOTS

Taking into consideration the status of the farmers OFPEP works with and their farm sizes, it was decided that the plot sizes should not be so large as to take up most of the farmers land, at same time the plots should not be so small that it would fail to create an impression on the farmers mind especially during farmer evaluation. All concurred that a plot size of 4m x 6m and a 1m path between the plots would be sufficient.

MIN. 6/3/95: SPACING

To make analysis of the plant germination and yield results easy, a uniform spacing would be adopted for cereals and legumes irrespective of the Agro Ecological zones. Thus,

Crop	Spacing (cm)	# of lines per plot	# plants per plot
Maize	90 x 30	6	102
Sorghum	60 x 45	9	108
legumes	45 x 15	12	396

Maize and legumes will be sown two plants per hole and later thinned to one plant per hole, and sorghum will be thinned to 4 plants per hole.

MIN. 7/3/95: ACTIVITY PLAN

From the discussion, the following workplan was drawn for the activities of long rains of 1996.

ACTIVITIES	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Farmer selection	X	X												
Survey		X	X	X										
Land preparation		X	X	X										
Planting			X	X	X									
First germination counting			TWO	WEEKS	AFTER	PLANTING								
weeding				X	X	X	X							
Training							X	X	X	X				
Harvesting							X	X	X	X				
Weighing of yield from demonstration plots										X	X			
Report of long rains results												X		

The criteria for selecting farmers would include, availability of land, accessibility of the farm and the farmers willingness to let others come and learn from him.

Weeding interval of the plots will depend on farm condition. Training should be organized at a time when treatment differences are quite pronounced. This is usually towards the harvesting period. The meeting should not be scheduled on a market day.

MIN. 8/3/95: SURVEY

The members were informed of OFPEP-Kenya's plan to conduct a survey with individual farmers in the areas where it has activities and in areas it intends to have activities. The objectives of the survey are:

1. To evaluate, monitor and assess the impact of OFPEP/collaborator activities with the collaborating farmers

2. To use the results as a Bench mark or a Baseline for future activities.

The distribution of the number of farmers interviewed would depend on the sizes of the respective districts as shown below:

District	Collaborator	Number of farmers	Farmer number
Kisumu	Grail	10	1 - 10
	MENR	10	11 - 20
	OFPEP	10	21 - 30
Siaya	LUMIGO	10	31 - 40
	SCODP	10	41 - 50
	CCF-Rera	20	51 - 70

	CCF-Rang'ala	20	71 - 90
Migori	Grail	10	91 - 100
	CARE	10	101 - 110
	Kengo	10	111 - 120
Homabay	CARE	10	121 - 130
	Kengo	10	131 - 140
	MENR	10	161 - 180
	C-MAD	20	181 - 200
Vihiga	OFPEP	20	201 - 220
Kakamega	OFPEP	20	221 - 240

Going through each individual question on the form, stated that they were comfortable with all the questions in the form except numbers 11 and 13. After some discussion, the meeting agreed that with PRA approach to the questions, it need not be difficult or offending to get answers to the questions. This could be done in a manner that is comfortable to both the interviewer and the farmer.

A . O . B

There being no other business, the meeting adjourned at 5 p.m, where upon members dispatched to there respective stations.

Appendix 17

Joint Kenya/Uganda Staff Meeting
Held December, 1995 - Kenya

Appendix 17

JOINT KENYA/UGANDA OFPEP STAFF MEETING HELD IN ROCK HOTEL IN TORORO DISTRICT, UGANDA (5 AND 6) DECEMBER, 1995.

PRESENT

UGANDA TEAM

MR. BEN EKOOT	- COUNTRY CO-ORDINATOR
MR. NATHAN KOTEKI	- EXTENSIONIST SPECIALIST FOR TORORO DISTRICT
MR. EZRA OKOTH	- EXTENSIONIST SPECIALIST FOR IGANGA DISTRICT
MS. BEATRICE LUZOBE	- GENDER SPECIALIST

KENYA TEAM

DR. MOSES ONIM	- EAST AFRICA CO-ORDINATOR
MR. ROBERT ONDIGO	- COUNTRY COORDINATOR
MR. NELSON OMONDI	- EXTENSIONIST
MS. ROSE SIGAR	- EXTENSIONIST SPECIALIST
MS. BEATRICE LUMADEDE	- SECRETARY

AGENDA

SESSION 1. PLANS FOR UGANDA DEMONSTRATIONS IN THE LONG RAINS OF 1996.

CHAIRMAN: MR. BEN EKOOT

1. A WORD OF WELCOME (MR. EKOOT)
2. IN-HOUSE ARRANGEMENTS FOR THE TEAM (MR. KOTEKI)
3. INTRODUCING THE PURPOSE OF THE JOINT MEETING (DR. ONIM)
4. PLANS FOR DEMONSTRATIONS IN IGANGA DISTRICT FOR THE LONG RAINS OF 1996 (MR. OKOTH)
5. PLANS FOR DEMONSTRATION IN TORORO DISTRICT FOR THE LONG RAINS OF 1996 (MR. KOTEKI)

SESSION 2. PLANS FOR KENYA DEMONSTRATIONS IN THE LONG RAINS OF 1996

CHAIRMAN: MR. ROBERT COLLINS ONDIGO.

1. INTRODUCING RESULTS OF DEMONSTRATIONS IN KENYA IN YEAR 1. (DR. ONIM)

2. PLANS FOR DEMONSTRATIONS IN KENYA FOR THE LONG RAINS OF 1996 (MS. SIGAR)

3. DEVELOPMENT OF TEACHING AIDS IN OFPEP-KENYA (MR. OMONDI)

WEDNESDAY, 6TH DECEMBER.

SESSION 3. JOINT PROGRAM ISSUES FOR BOTH COUNTRIES.

CHAIRMAN: MR. OKOTH.

1. PLANS FOR DEMONSTRATION IN MUKONO DISTRICT FOR THE LONG RAINS OF 1996 (BY MR EKOOT)

2. MARKETING STRATEGIES FOR OFPEP'S SURPLUS PRODUCTIONS OF CROPS AND SEEDS (MR EKOOT)

3. GENDER AND AGRICULTURAL DEVELOPMENT IN EAST AFRICA (MS. LUZOBE)

4. PLANS ON WHAT OFPEP-EAST AFRICA SHOULD STRIVE TO ACHIEVE (DR. ONIM)

8. DISCUSSIONS

9. WRAP UP DISCUSSIONS

The meeting started late because of delay for clearance at the boarder. The Kenya team arrived at the boarder at 8.30 am, crossed the boarder at 10.00 am, arrived in the Hotel at 11.00 am and the meeting started at 11.20 after checking in the rooms. The delay made some changes in the above agenda. Uganda team arrived in the hotel a day earlier in readiness of the meeting.

SESSION 1. PLANS FOR UGANDA DEMONSTRATIONS IN THE LONG RAINS OF 1996.

CHAIRMAN: MR. BEN EKOOT
MIN.1

A WORD OF WELCOME (MR. EKOOT)

Mr. Ben Ekoot who chaired this session welcomed the Kenya team by telling them to speak in one voice with OFPEP-Uganda, be free in talking without any tension in order to work harmoniously together as one family. He continued that the meeting would be a good ground for preparing for evaluators who may come anytime. Therefore, they should look after the farmers who are the first evaluators.

MIN.2

IN-HOUSE ARRANGEMENTS FOR THE TEAM (MR. KOTEKI)

Mr. Koteki gave a brief in-house arrangements. He informed the teams that most of the meetings would be held in the hotel apart from brief field visits around. He said that meals were available and would be served by the hotel, but incase the team wanted to go out in town, arrangements would be easily made through him and all payments would be made in Uganda currency.

MIN.3

INTRODUCING THE PURPOSE OF THE JOINT MEETING (DR. ONIM)

Dr. Onim explained the purpose of this meeting at length. He started by referring to his visits in the OFPEP Countries. He has had a chance to travel to West Africa twice in a year and once to America, the same as his colleague in West Africa. He said that Americans frequent E. Africa and so there was no reason for the East Africa team not coming together. This prompted him to request the donors who allowed the meeting to be held at a minimized charge. He listed the following as the purpose of the meeting;

- **Meeting colleagues**

- **Encouraging communication**

This will make the staff share experiences by exchanging visits and compiling publications especially the TOT's, news articles, results of the data collected and questionnaire. This can be used to show a series of events to the farmers, donors, collaborators and etc.

- **Planning the futures**

The two team can plan there future very well by reviewing where they are going to and coming from so that they can lay strategies for planning of demonstrations, preparing for final evaluation, laying strategies for extension of other phases wisely, reviewing the question of continued funding and addressing mistakes critically by ourselves

o **Prepare for all OFPEP meeting proposed to be held in Kenya early in 1996.**

He continued that Dr. Pierre Antoine and Ms. Mary Lou have a vision of potential interest in East Africa. After the Gambia OFPEP was stopped, Ethiopia OFPEP was launched in October, 1995. He briefed the team of the management structure of OFPEP-Ethiopia starting with Winrock International as a host, African Village Academy which is housing OFPEP-Ethiopia under the leadership of Kibre Dawit and the hiring of the staff.

He commented on communication between Ethiopia and other E.A OFPEP which he said was not easy because of flying as compared to Kenya/Uganda where road communication easy and cheaper.

Finally he encouraged the teams on accountability and preparing reports in good time.

Mr. Ekoot wanted to know the different modes of operation in both countries. Dr. Onim explained that the Kenya staff operate from one base because in the beginning there was only one staff working in six districts with the collaborators and the system has worked so well because the staff are at the same level and they can easily discuss and brainstorm. Initially this system was designed also for Uganda and they can go ahead and try it if need be.

MIN. 4

PLANS FOR DEMONSTRATIONS IN IGANGA DISTRICT FOR THE LONG RAINS OF 1996 (MR. OKOTH)

Mr. Okoth explained plans for Iganga district starting with the historical background, achievement by adoptions, demonstration (crops variety and fertility), post and pre harvesting techniques and strategies planned to for district.

OFPEP-U started his activities in Iganga district in 1993 with MTEA as the first NGO collaborator. In the short rains of 1993 the number of collaborators increased to 6 farmer groups, 1994 the number increased to 14 farmer groups with 375 participating farmers and in 1995 farmer groups increased to 98 with 1198 participating farmers.

Geographically he said that Iganga district has a total of 26 sub-countries with an area of approximately 100,000 km sq.

o **Achievement by adoptions**

He reported that the success indicators of OFPEP-U demonstration as been seen by the number of farmers adopting the technologies. Maize; (Longe 1) about 16108 farmers have adopted, with 9420 men and 6698 women respectively. Beans; (K131) about 5164 farmers have adopted, with 1549 men and 3615 women involved.

He also gave an update of Cassava Multiplication of Nase 1 and 2 with the collaboration of MTEA\OFPEP\COOPIBO. He said that Cassava has been distributed in Iganga district to 25 groups to plant in 0.5 acres each. This effort has been successful carried out by COOPIBO funds with other collaborators supplying technical support.

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o **Demonstrations**

He estimated 100 demonstration sites of which the following crops will be planted; Soya bean (Name 1 K131, KI32, White haricot), Maize (Longe 1), Millet (Pese P224), Cassava (Nase 1,2& 3), Rice (Upland rice), Sorghum (Seredo/Sekedo etc.) and Groundnuts (RMP12).

o **Soil Conservation and fertility demonstrations**

The construction of bunds, trashline grass strips for conservation and the use of rhizobium inoculant, compost, animal manure Am/compost and Agroforestry; nursery techniques for fertility were planned for the success of the demonstrations.

o **Post-harvesting and pre-planting techniques**

Post harvest techniques like On-farm seed technologies, in-field selection of seeds and Sound storage practices for seeds and farm produce are intended for the post harvest. Pre-planting techniques like seed sorting and germination test is planned before planting the demonstration plots.

Finally he mentioned that TOT's, provisions of demo kits and standardized methods of reporting in demos should be encouraged as a strategy for achieving good demonstrations.

MIN. 5

PLANS FOR DEMONSTRATION IN TORORO DISTRICT FOR THE LONG RAINS OF 1996 (MR. KOTEKI)

Mr. Koteki explained plans for Tororo demonstration trials starting with the historical background, achievement by adoptions, demonstrations (crops variety and fertility), post and pre harvesting techniques and strategies planned to for district.

OFPEP-U started his activities in Tororo district in 1993 with CCF and now there are 7 collaborators. He said that Tororo district has a total of 28 sub-countries with an area of approximately 55400,000 km sq.

o **Achievement by adoptions**

He reported that most farmers have adopted, while others have not liked the technologies. He estimated about 2000 farmers who have adopted Maize and the same number have adopted sorghum.

o **Demonstrations**

He estimated a total of 46 demonstration site for both crop varieties and soil fertility trials planned for the long rains of 1996. The to be planted included both the cereals and legumes respectively. Soya bean (Name 1m K131, KI32, White haricot), Maize (Longe 1), Millet (Pese (P224), Cassava (Nase 1,2& 3), Rice (Upland rice), Sorghum (Seredo/Sekedo etc) and Groundnuts (RMP12).

The plan for soil conservation and fertility demonstrations, post and pre harvesing techniques is the same as Iganga district.

Finally he mentioned that TOT's, provisions of demo kits and standardized methods of reporting in demos, farmer competitions and literatures should be encouraged as a strategy for achieving good demonstrations.

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SESSION 2. PLANS FOR KENYA DEMONSTRATIONS IN THE LONG RAINS OF 1996

CHAIRMAN: MR. ROBERT COLLINS ONDIGO.

The chairman Mr. Ondigo thanked the organizers of the meeting and OFPEP Uganda staff for providing the venue. He saidd that this was one way of sharing ideals and achieving a common goal successfuly. He urged every person to be willing to participate in the discussion.

MIN. 1

INTRODUCING RESULTS OF DEMONSTRATIONS IN KENYA IN YEAR 1. (DR. ONIM)

Dr. Onim introduced the results of the demonstrations in Kenya in year 1 starting with the soil survey, demonstrations (varieties, soil fertility and farmers' evaluation), trainings and teaching aids. All the staff present were given copies of the results with them which he used in explaining the results.

- On soil survey, he used the results of laboratory analyses of soils from the soil survey where soil was sample in different OFPEP-Kenya districts. This was followed with the summaries of soil contents of organic matter, phosphorus, nitrogen and important plant nutrient bases in some districts in western Kenya. Lastly the results of laboratory analyses of samples of compost and animal manure used in some demonstration sites.

- On demonstration he introduced varietal, soil fertility technologies and farmers evaluation of technologies results.

  In the varietal trials, the commercial improved crop varieties were compared to farmers' varieties. Yield were collected and analyzed at end of the season and the farmer' varieties out yielded the commercial improved.

  On the soil fertility technologies he said that the data indicated that one can expect additional grain yield of about 80% above control by applying DAP, 19.1% for animal manure and 48.3% for compost.

- Farmers' evaluation of technologies was very interesting and he said it need more observation. During training sessions of farmers at the demo site they were given the chance to assess the performance of varieties and fertility technologies accordingly. Later after harvesting and weighing a correlation between the farmers' ranking and the actual yield was done. The correlation showed that the farmers were poor in predicting grain yield.

  During his presentation of the trainings he introduced Training Of Trainers (TOTs), training of farmers and training aids.

- He continued that two TOTs have been conducted on seed activity and soil management. During the TOTs the participants were requested to keep records on the number of people they have also trained. In the first TOT the participants have reported to have trained a total of 1354 on seed activities. During the farmers training at the demonstration sites all over the OFPEP-Kenya districts, a total of 1724 farmers were trained. This included 434 men, 493 women and 797 youth. On the training aids he drew so many example of teaching aids prepared by Mr. Omondi. He said that OFPEP-Kenya have developed so many aids which can be shared between other OFPEPs.

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MIN. 2

PLANS FOR DEMONSTRATIONS IN KENYA FOR THE LONG RAINS OF 1996 (MS. SIGAR)

Rose gave a brief background of OFPEP-Kenya activities. OFPEP-Kenya operates in 6 districts with 8 collaborators. She had a written handout of her presentation which she distributed to the meeting and it was followed and discussed item by item.

In her presentation she started with the activities preceding long rains of 1996 which were seed storage trials, farmers training on compost making lead by CARE Kenya and Jim Rugh's questionnaire.

Plans for demonstrations in the long rains of 1996 were categorized in crop variety demonstration, soil fertility demonstrations and number of demonstration sites following the planning meeting with the collaborators. During this planning meeting the following plans for long rains were made;

- Crop variety demonstration; both the cereals and legumes were discussed and selected ready for long rains demonstration of 1996.

Cereals:	Maize -	H625, H512, Maseno Double Cobber, local white, Local yellow and Pwani Hybrid.
	Sorghum -	Seredo, Nyakabala, Mtama 1, Gopari/Hela, Ochuti, Rabuor.
Legumes:	Beans -	GLP-92, Hong Rangai, Okuodo, GLP-2 (Lipala)
	Soya -	Nam 1, Local.
	Grams -	Green & Yellow grams.

- Soil fertility demonstrations is planned that one cereals and legumes variety will be used. Each variety will receive various soil amendment treatment with the same agronomic management.

  For the Cereals, Maize (Maseno DC) and Sorghum (seredo) will receive DAP, Animal manure, DAP/Animal Manure Control, Compost and DAP/Compost treatments. The legumes, Groundnuts (Uganda red), Beans (Lipala) and Soya beans (Nam 1) will be treated by TSP, Animal Manure, Inoculant, compost; control and TSP/Inoculant.

- The target number of the demonstration is 44 with 22 for variety and 22 for fertility to be distributed to all the collaborators with respect to the district size. The plot sizes is 5m x 5m and the crop spacing (cm) is Maize 90 x 30, Sorghum 60 x 45 and legumes 45 x 15. The meeting had a question on the spacing and sizes of plot being not uniform for the both countries. Ms. Sigar promised to amend and send the copy to the collaborators.

  She continued that OFPEP-K together with the collaborator have drawn a work plan for all the activities for long rains of 1996 right from farmer selection, land preparation, planting, first germination counting (two weeks after planting), weeding, training, harvesting, weighing of yield from demonstration plots and report of long rains results.

MIN. 3

DEVELOPMENT OF TEACHING AIDS IN OFPEP-KENYA (MR. OMONDI)

Mr. Omondi explained the meaning of teaching aids as a direct means of conveying massages which is silent but effective.

He said that the developing of aids depends on composition of the people trained e.g.

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literate, illiterate, age groups and children. This category will enable you to design which type of teaching aid to use. He named some of the teaching aids as; - flip charts, drawing illustrations, photographs and objects (physical).

He showed the meeting some of the teaching aids he had developed for OFPEP-Kenya.

Session 1 and 2 of the meeting ended at 10.00 pm.

WEDNESDAY, 6TH DECEMBER.

SESSION 3. JOINT PROGRAM ISSUES FOR BOTH COUNTRIES.

CHAIRMAN: MR. OKOTH.

MIN.1

PLANS FOR DEMONSTRATIONS IN MUKONO DISTRICT FOR THE LONG RAINS OF 1996 (MR. BEN EKOOT)

- Mr Ekoot briefed the meeting of the activities in Mukono district which he said it does not have a resident field specialist. Beatrice the Gender specialist is acting as field specialist in the district since October,1995. However, this case may be reviewed sometimes in March, 1996, since the district is relatively large, it has a high potential of cassava production and is located within the banana belt.

- OFPEP is currently working with three collaborators namely; Talents Calls Club, Uganda Association for Socio Economic Program and Buzama Co-operative Society. OFPEP operates in 3 sub-countries within the district and so far only 20 demonstration plots were established in the short rains and the crops were still in the field. The crops planted included; maize, cassava, soya bean and food beans.

- He told the meeting that his major observation was that farmers are interested in marketing activities than farming and this has affected the rate of adopting of OFPEP farm innovations.

- There is a plan therefore, to involve a lot more volunteers particularly agricultural graduates from various institutes to help enhance general dissemination of OFPEP related activities in the district.

MIN. 2

MARKETING STRATEGIES FOR OFPEP'S SURPLUS PRODUCTIONS OF CROPS AND SEEDS (MR EKOOT)

- Mr. Ekoot explained at length the marketing strategies and problems associated with marketing of surplus crop produce. From his observations farmers tend to take almost all their produce to the market at the expense of household food demand. Soya bean in particular seem to be doing well and most farmers produce it as a cash crop. Since there is no ready market for the product, middlemen tend to capitalize on the excess supply of soya therefore, exploit farmers who are the producers.

- For the farmers soybeans seem to be a slow going product due to unready markets. Farmers are at a disadvantage particularly lacking the bargaining power since they are hand pressed for cash to satisfy other pressing needs. This makes farmers to be at the mercy of middlemen. There is opportunity cost involved in soya bean production and this together with other costs has the potential to reduce general profitability. Seasonal variations or changes also determine the production and marketability.

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- Farmers problems with marketing of soya beans include; need for spot cash (immediate payment), illiteracy, farmers have often means of getting income and utilization of soya beans.

- Local markets of soya includes; Food processors, oil expellers, Roasting in streets, other economic uses include; beverage, milk production (extraction) and soya cake.

Plans - Farmers should trained in future issues related to marketing strategies of surplus farm produce. They should be informed that the market as such is dynamic.

- OFPEP Uganda can be able to accumulate or store substantial amount of soya but this can actually involve a lot of money since farmer will go full blast in soya production.

- Quality of the farm products should be within acceptable standards so as to attract markets i.e grading of products.

0 A case should be made on how to solve marketing problems with regards to crop production.

MIN 3.

GENDER AND AGRICULTURAL DEVELOPMENT IN EAST AFRICA (MS. LUZOBE)

- Both men and women have equal responsibilities in development issues particularly agriculture. Most women are illiterate as opposed to men and therefore a better language of approach need to be used as to make them fit well in development issues. Gender issues involve social factors particularly with regards to introduction of technology interventions.

- She has made visits to various farmer groups working with OFPEP Uganda districts and her major observation was that the farmers have accepted new crop varieties as their best choice e.g Cassava, maize. However, there were still some problems such as soya bean marketing and water availability.

- The women activities included; planting, weeding, taking care of goats, milking, harvesting and small domestic cores while on the other hand men activities included; initial farm preparation such as bush clearance and cultivation, House construction, paying of taxes and school fees and community tasks.

- Most men tasks are in most cases not daily done, while women have everyday activities which must be done for the sustainability of households.

- Most roles therefore are shared between men and women otherwise some may be difficult to share on cultural point of view such as; land ownership, child bearing or nursing. However the role of children also need to be addressed and given fresh perspective and awareness.

- In certain cases women are overloaded with almost all the household responsibilities particularly where men are involved in a great deal in leisure like alcohol drinking.

- Since in most cases women do the cooking as a major role, soya bean which is doing well particularly in Uganda is not properly utilized. This is because most people are willing to consume it but adoption seem to be very slow. Instead they only think of selling the little they produce because they don't know how to consume it.

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- In her plan she mentioned that training of trainers workshops will be organized in an effort to sensitize both men and women on gender awareness regarding agricultural development e.g crop utility and rainwater storage.

MIN 4.

PLANS ON WHAT OFPEP-EAST AFRICA SHOULD STRIVE TO ACHIEVE (DR. ONIM)

- **Joint planning and analysis with collaborators**

Dr. Onim advised the OFPEP East Africa to deeply involve the collaborators in every activities at all stages to the extend that every information should be shared at all levels. This should include; planing meetings, training, results of the demonstration and facilitation.

- **Gender analysis of OFPEP Technologies**

On the gender, he asked the OFPEP-East Africa to carefully look into related issues particularly bearing in mind the socio factors. By this he meant that in certain cases women will not accept to take certain responsibilities due to social factors.

- **Newsletter for OFPEP East Africa**

Co-authorship should be encouraged in any publication particularly when many people are involved. This means that it is due to the team effort that the publication or article was produced successfully. Names of the people who contributed to the production of the article will therefore appear on the final publication accordingly.

- **How do we estimate impact?**

He said that the only simple way of measuring the impact is by knowing the number of people reached through training and the number of adoptions. OFPEP staff should train NGO collaborators who will later train Trainers (extensionist). Trainers train farmers who later pass on technologies to others through diffusion. In training the long-run number of trained farmers reached by way of training will be equivalent to impact.

- **Fine Tuning of OFPEP Technologies**

It is important that commercial inorganic fertilizer will be used in all fertility trials both in Kenya and Uganda as well as Ethiopia.

Agroforestry technologies should be looked at in more detail particularly from the stand point of soil conservation and fuel wood production.

Children or youths be given a good coverage in the program especially with regards to sharing of activities in family households.

More socio-economic problems or advantages associated with agricultural practices. (Social analysis)

- **All OFPEP Meeting of February, 1996**

This will involve all OFPEP delegates from almost the whole world and therefore East Africa will serve as the host of the planned meeting.

Production of printed training Aids

Production of training aids should be encouraged as a model or approach to training facilitation. Drawings and charts can be multiplied and made in a system of flip chart in the right sequence and this can help in training sessions.

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o **OFPEP welfare saving scheme**

This serves as a major saving unit for OFPEP staff and as a means of generating interest and dividends for the staff members. The accumulated savings can therefore serve as a borrowing pool for the staff members incase of problems such as death, sicknesses and may be school fees etc.

Discussions

Kenya OFPEP can assist Uganda OFPEP in terms of acquisition of Hybrid seeds.

The meeting ended at 4.00 pm.

CHAIRMEN 1. SESSION 1 _____
MR. BEN EKOOT

2. SESSION 2 _____
MR. ROBERT ONDIGO .

3. SESSION 3 _____
MR. EZRA OKOTH

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Appendix 18

Photo Project Information - Kenya

Appendix 18

PROBLEMS OF SOILS AND SEEDS AS SEEN THROUGH THE FARMERS EYES.

GRAIL YOUTH GROUPS, KISUMU DISTRICT.

The process started with a meeting with the grail youth group to organize for Ms. Mary Lou and OFPEP-Uganda teams' visit on the 4th May 1996. Ten youths attended the meeting including the coordinator of the group, Mr. Maurice Okello. Most of those attending this meeting were leaders of the 3 youth groups affiliated to the Grail community development programme, namely;

- Miendi youth group
- Sianda youth group
- Onyinjo youth group

On may 4th 1996, Ms Mary Lou Surgi met with the group members in the company of the Dr. Moses Onim, OFPEP East Africa Coordinator, OFPEP-Uganda and OFPEP-Kenya staff. The meeting which started late due to delays at the border was used as a forum to introduce to the group members the idea of using photography as baseline and impact evaluation tool.

After a formal introduction of those present, the groups coordinator gave a brief of the GRAIL centre and Community Organic Farming Development (COFDO). COFDO, he said, was involved in training farmers on preparation and utilization of organic fertilizers. After the group coordinator's speech, Ms Mary Lou took the chance to introduce and discuss with the youth the use of photography in programme activities.

After a consensus from the group that they welcomed the idea of being the first group to use photography in program activities in Kenya, Ms. Rose Sigar set a date to meet with the group later and discuss on what needs to be done and camera operation.

On 20.5.96 we met with the group leaders and made an appointment to meet with other group members on the 26.5.96 at the Grail centre. The meeting did not materialize as only 2 members of the group turned. I made another appointment with the chairman of the group, Mr Kennedy Mbaja for the 16.6.96. Thirteen members of the group turned up on this particular date and we had a lively discussion on the activities they were involved in. Later I introduce the subject of the meeting to them - Using Cameras to portray their problems on soils and seeds.

Present during the meeting were;

Kennedy Mbaja
Charles Odhiambo
Paul Wadegu
Maurice Juma
Kennedy A. Ogalo
Timothy Onguko
Julius Otieno
Bernard Otieno

- Paul Okidi
- Jeremia Olwedo
- Timothy Otieno
- Maurice Oriwa
- Fred Ochieng

To guide us in this discussion, we set out an agenda for the topic, thus:

1. Prioritize problems affecting the community in general

2. Zero-in to problems in agriculture

3. To expose the farmers to the technology of using cameras to describe their problems.

4. To take the group through a step by step process of using the camera.

1. PRIOTIZING PROBLEMS AFFECTING THE COMMUNITY IN GENERAL

Each person was then given a piece of paper in which they were asked to list down all the problems they felt affected their communities most regardless of priority. Once this had been done, the papers were passed forward and together we went through each paper at a time to get which was the most frequently listed problem. Below is a list prioritizing the problem;

1. Source of income - 7
2. Food - 6
3. Education - 6
4. communication - 3
5. Social (Unity) - 3
6. Political - 2
7. Roads - 1

The numbers indicated how many times each was listed and therefore, how important the problems were to those present. They are listed in order of importance.

2. PROBLEMS IN AGRICULTURE.

Lack of food or lack of enough food to feed the family throughout the year ranked as the second most important problem of the community. This set in motion the second agenda of the meeting, problems in agriculture that led to reduced yield hence lack of food. Again using pieces of paper, the youth were asked to all the problems they felt reduced farm productivity. Below is how the problems were listed and ranked.

1. Education/training - 10
2. Fertilizers - 10
3. soils ((poor) - 10
4. Seeds - 9
5. Farm implements - 7
6. Finance - 7
7. Pests - 4
8. Land - 2
9. Poor farming systems - 1

Training, fertilizers and poor soils were all ranked as the most important factors that reduced farm productivity. These were followed closely by seeds.

Last on the listing was poor farming systems. Further discussions with the group revealed that, money was a problem in relation to agricultural mainly because of expensive inputs as fertilizers, seeds and insecticides..Land turned out to be a problem due to the increasing population pressure that led to smaller and smaller land holdings.

Lack of training on improved agricultural technologies was also emphasized by the group as major draw back to increased farm productivity. They noted that much of the information they get on improved agricultural technologies was just that which trickled down to the community from outside most of which were distorted by the time the farmers gets them. They liked the idea of training within their own community.

3. SEEDS AND SOILS PROBLEMS THAT CAN BE PRESENTED PHOTOGRAPHICALLY

The following were discussed as some of the problems of soils and seeds that could best be portrayed photographically

Soil conservation and fertility

- Short stunted plants
- Yellow coloration on the leaves due to lack of nitrogen
- Purple coloration of the plant due too lack of phosphorous
- Striga weeds
- Eroded soils

Seeds

- Maize strip virus
- Poor germination
- Poor plant stand
- Poor looking crops
- Poor yields
- Poor nutrition, therefore malnourished family.

4. INSTRUCTIONS FOR USING THE CAMERA

Using the handout left behind by Mary Luo and the instructions on the camera packets, I took the group through a step by step process of using the cameras ensuring that each step was well understood.

After the above discussion, I left the group to organize themselves how they were going to under take the activity. They divided themselves into two groups, east and west each taking a camera. Since there were no ladies present, both the cameras were given to male members.

The meeting ended at 5 p.m. We agreed to meet after two weeks to discuss the progress and at the end of July to pick the cameras for processing.

SELECTION OF FIVE FINAL PHOTOS.

After Processing the photos, another appointment was made during which each photo would be evaluated and the five best selected for final presentation and description. On this occasion, the members were divided into groups of 3 and each group given a set of photos which they were asked to rank according to their own perception of the photo and to describe as best as they could each photograph. At the end of the exercise the sets of photos were collected and together with the group we went through each one by one starting from the best to the last. The groups narratives of each photo were also written down. The five best photos of each group were taken and compared with the rest. That which appeared in all the groups was taken as the best photo. Followed by the second most appearing and so on upto the fifth. The description given by each group for the photos was summarized with the group members for final presentation. Below is the narrative of each of the photos inorder of ranking:

SUMMARY

In summary the key persons involved in this activity were as follows;

1. Organizer of the group for the activity

   i. Mr. Maurice Okello - Grail youth group coordinator
   ii. Mr. Kennedy Mbaja - Group chairman

2. Who and how the photo evaluation idea was presented to them

   i. Ms. Mary Luo Surgi - Was the first to present the idea to the group, when she came to facilitate the computer training.

   ii. Ms. Rose sigar - Followed up on Ms. Mary Lou's visit to further clarify any issues that may not have been clear during the first meeting and to conduct focused group discussions to get the group started on the activity.

3. Which farmers took the photos.

   i. Fred Ochieng

   ii. Kennedy Ogalo

4. How the final photos were chosen - This was done as described above Selection of the final photos also depended problem priority ranking that had already been discussed, and on clarity of the picture

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IMPACT ASSESSMENT BY FARMERS USING PHOTOS
SIDINDI AND SANGO FARMERS' GROUPS
SIAYA DISTRICT - OFPEP PROJECT

PERIOD . MAY 1996 TO JULY 1996

OBJECTIVE

- To give farmers a chance to express, in pictures, their perceptions of the projects impact on them.

GROUPS SELECTED AND WHY? BY WHO?

- SIDINDI and SANGO groups are sponsored farming groups by CCF with whom OFPEP Collaborates in Siaya District. They were selected by our CCF collaborator because members made an effort to share seed variety proceeds from the respective demo plots and that they had good attendance during OFPEP/CCF training at the demos of long rains 1995 activities.

GROUP ORGANIZATION, EVALUATION INTRODUCTION, AND PROCESS.

- Appointments were made with the groups by the CCF collaborator, Eric and OFPEP staff - Caroline. An average of 15 members turned up at each meeting. This was sometime in May 1996.

- The objective of the evaluation was explained by Eric who facilitated a review of the OFPEP/CCF demonstration activity that they participated in.

- Members were challenged to come up with a list of what they thought to have benefitted as a result of the demo. and training. (only one demo had been carried out by these groups at the time of this evaluation.) Lists of perceived benefits were drawn by the group secretaries. SANGO members could vividly remember OFPEP/CCF demo and so highlighted benefits from CCF projects which indirectly brought out OFPEP/CCF activity indicators.

- By considering each perceived benefit (as listed) at a time, the members were to depict these. After some arguments and discussions, they came up with lists of descriptions on the kind of pictures that would best depict the percived benfits.

- They then selected their photographers whom they gave the picture descriptions as guidelines. The photographers were trained on the use and given the Cameras.

- By 30th July 1996, both groups had returned the Cameras. Caroline (myself) made appointments and visited both group members. They related the photos with the guideline descriptions and came up with the following results.

RESULTS Attached are the photos and narratives following from the group discussions. Yellow and white coloured stickers are used to differentiate Sidindi and Sango farmer groups respectively.

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SANGO FARMERS' GROUP - PHOTO NARRATIVES

- Photos were numbered in the order in which they were taken.
- Photos selected as best by farmers have white stickers on the top right hand side corner
- Eric (CCF) has been trained by OFPEP on seed and soil improvement technologies

PICTURE # 1

Mr. Linus Owino, the photographer on his farm. Eric took this photo while illustrating to him how to use it.

PICTURE # 2

Eric, taken by Linus the photographer. He stands on Linus' maize farm which he planted with local seeds selected from his farm the previous season and selected as taught to him by Eric.

PICTURE # 3

A group member and grandchild on their sweet potatoes demo farm - (by CCF) for food and income.

PICTURE # 5

This farmer also in # 4 planted maize using compost which Eric trained them to make. She bought her maize seed from the open market. The results are discouraging. Next time she'll select her seeds from her own farm following Eric's latest advise.

PICTURE # 6

This farmer had helplessly been watching her fertile top soil disappear down the sloppy land. The project came to her rescue when Eric mobilized group member to erect soil conservation structures. With the use of compost and On-farm selected seeds, she is able to harvest good maize crop from the reclaimed piece.

PICTURE # 7

The farmers have been able to harvest good yelds from trainings on seed selection and soil fertility management. The sizes of baskets and filling indicate this.

PICTURE # 8

Some members of the group tilling the group farm in readiness for the short rains 1996 demonstration. The children also often come around to lend a hand or ran errand for their busy mothers.

PICTURE # 9

This farmer got some improved seeds (a handful) from Eric after the last demonstration. She planted them in a row amongst her local maize bought from the market. The difference is striking. "How can I get more?"

PICTURE # 10

A member on her kitchen garden. The project encourages members to have backyard kitchen gardens.

PICTURE # 11

Mr. Lenus Owino (photographer) and son usually prevent formation of deep gully along the path leading to their home by planting sisal and fast growing local shrub (TITHONIA). It is from such gullys that waters run to their farms.

PICTURE # 12

Lenus Owino and sons weeding their maize garden planted from On-farm selected seeds. They had previously relied on buying seeds from the open market. He inter-cropped the maize with sunflower as experiment to minimize bird damage on sunflower. This did not work. Maize production was however better than previous harvests.

PICTURE # 13

Same of the Sango group members after their weekly meetings at a members' home. This is usually a forum for information dissemination.

PICTURE 14

A group member admires her sunflower and maize planted where she used to keep her livestock (GUNDA) a live demonstration on the power of Animal manure on Crops.

PICTURE # 15, 19 & 20

These are group members at their backyard sunflower gardens for income/oil and the leafy materials for manure.

PICTURE # 18

Mary Onyango has learnt to plant local sorghum in rows. She however ignored to thin her crop as advised and has realized no yields of sorghum.

PICTURE # 21

A member (Same as Picture # 3)

PICTURE # 22

Youth, help their mothers to manage farm activities. See also picture # 23 of youth at groups' tree nursery. Passion fruit trees are growing - to help alleviate diseases.

PICTURE # 25

A member weeds her kitchen garden in readiness for the short rains about to start. The period preceding the short rains is a period when vegetables are scarce due to drought. This picture was taken to show the problem of vegetables at this period which probed the project to encourage kitchen gardens.

Appendix 19

"Of Soils and Seeds" Newsletter

Of Soils and Seeds

No. 6, Summer 1996

An Expansion of Seed Sowers / Les Semeurs

OFPEP-Ethiopia Partners Trained in Participatory Rural Assessment Methodologies

Editor's Note: Information for the following article was compiled from a training manual prepared by Asrat Asfaw of Africa Village Academy (AVA), lead agency for OFPEP-Ethiopia.

In April 1996, OFPEP held a training workshop for the local partner organizations in its newest country-site, Ethiopia. This workshop on *Participatory Rural Assessment* methodologies (PRA) was the first of OFPEP's formal field activities there. OFPEP uses PRA techniques in all of its country-sites to identify problems and potential solutions related to agricultural productivity.

This workshop integrated theoretical sessions with hands-on practice activities which allowed the trainees to use the tools they learned. The training culminated in a four-day exercise conducted in each of two villages in Kerabu Harbu Kebele. OFPEP's lead partner organization in Ethiopia, AVA, has been working in these villages, and OFPEP will soon begin collaborative activities there to improve seed production and soil fertility. (Other PRA exercises are being conducted with AVA/OFPEP partners Christian Children's Fund and Agri-Services in their respective working areas.)

For this exercise the trainees were split into two teams, one to work in each village. One group worked with cereal growers and the other with vegetable growers. Collaborating with the local farmers, the teams used four PRA tools to aid the farmers in identifying specific problems related to agricultural productivity. The results will be used to develop possible OFPEP interventions.

The first of these tools, **natural resource mapping**, was employed to identify and locate the existing natural resources of the area. Using tree bark, leaves, stones and sticks to represent various geographical features, the trainees helped the local farmers construct crude maps on the ground. Eucalyptus leaves marked property boundaries, dry sticks laid end to end represented the main asphalt road, long strands of dried grass indicated feeder roads, and clumps of soil represented farm areas. Each of the two teams took approximately half a day to complete this exercise, and the results were shared with the respective villagers to confirm the accuracy of the maps. Upon completion, the maps were copied onto flip charts for further study.

Next, the teams had the farmers identify and prioritize the problems related to farm productivity. To do this the trainees adapted the Problem Priority Ranking System to include a **Farm Productivity Problem Analysis**. Farmers were given a number of small stones and asked to allot more stones to the more serious problems and fewer stones to problems of lesser importance. Each group performed the exercise three times, and the average score was recorded for each problem. Although the priorities differed between the vegetable growers and the cereal growers, the open discussions among the farmers and trainees that sur

See PRA Methodologies, pg. 3

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Get Your Goat!

The day was February 13, 1996. A crowd of local farmers and curious onlookers gathered at the Goat Multiplication Center in Holo, western Kenya, to see five of their own receive some very special goats through Lagrotech's *Dual-purpose Goat Extension Program.*

Lagrotech is the nongovernmental organization in Kenya that collaborates with Winrock International and the PVO/University Center on the OFPEP project. "Dual-purpose goats" are the result of a 12-year research program funded through the Small Ruminant Collaborative Research Support Program (SR-CRSP) of the U.S. Agency for International Development (USAID) and the Kenya Ministry of Agriculture, Livestock, Development, and Marketing.

Five Kenyan farmers received dual-purpose goats through an extension program of Lagrotech. Lagrotech is the local NGO that collaborates with Winrock International and the PVO/University Center on OFPEP activities in Kenya.

So what is so special about these goats? Small East African does are crossbred with Toggenburg bucks, and the result is a goat that produces between one and four liters of milk per day. These cross-bred kids have a better genetic background for size, and they grow much faster than those from non-crossed does. The benefits of these goats to the farmer-owners and their families are: improved nutrition (milk and meat), increased income (selling excess milk and marketing kids), and higher yields from crops fertilized with goat manure.

Of Soils and Seeds is the newsletter of the On-Farm Productivity Enhancement Program (OFPEP), primarily funded by the U.S. Agency for International Development (USAID) under agreement FAO-0158-A-00-2054-00. OFPEP focuses on farmers' access to good seeds, improved soil management practices and sustainable yield increases. The program, led by Winrock International and implemented jointly with the PVO/University Center, ACDI, the Peace Corps, and several other nongovernmental organizations (NGOs) and research/extension organizations, has sites in Senegal, Uganda, Kenya, and Ethiopia. USAID is the major donor. The Center for PVO/University Collaboration in Development publishes the newsletter and welcomes inquiries, comments, and submissions. Address correspondence for the newsletter to *Of Soils and Seeds*, Bird Building, Western Carolina University, Cullowhee, North Carolina, USA, 28723-9056; fax to 704-227-7422; or send e-mail to pvouc@wcu.edu.

The five recipients on this particular day — three women and two men — were from extremely poor families. All had children and none had a cow or goat for milk production. To be eligible to receive one of Lagrotech's dual-purpose goats, these farmers had to agree to either buy or be loaned a doe with the following stipulations: (1) agree to confine the doe under zero grazing to avoid breeding with local bucks and to minimize risk of contamination by worms; (2) improve goat-feed supply with the help of OFPEP/Lagrotech and Kenya extension workers; and (3) breed doe to purebred Toggenburg buck provided by Lagrotech. By passing on a doe offspring to another farmer, these farmers will satisfy the conditions of the purchase or loan.

The process of matching the five goats to the five eligible farmers was arduous. The goats, paraded before the crowd, varied in size and color, and one was obviously pregnant. (Whenever possible, Lagrotech will distribute pregnant does to eligible farmers.)

Each goat was assigned a number from one to five, then numbered slips of paper were put into a hat. As each farmer reached into the hat to draw a number, he or she stepped forward to take the leash of the goat bearing the corresponding number. The reactions of the farmers varied from disappointment to great satisfaction. One woman who received the doe about to deliver a kid (or possibly twins) was especially excited.

See Goats, pg. 6.

Farm Productivity Problem Analysis

Vegetable Growers

1. Irrigation water shortage
2. Draught animal shortage
3. Weeds (introduced and indigenous)
4. Cost of fertilizer
5. Land shortage
6. Marketing
7. Erosion
8. Frost
9. Pests
10. Seed shortage
11. Wild animals crop damage
12. Seed germination problems

Cereal Growers

1. Irrigation water shortage
2. Flood
3. Seed shortage
4. Farm transport accessibility
5. Land shortage
6. Water logging
7. Wild animals crop damage
8. Erosion
9. Pests
10. Fertilizer usage problems
11. Cost of fertilizer

rounded this exercise were recorded for the valuable insights they provided.

Then the trainees asked the farmers to use **seasonal analysis calendars** to identify seasonal changes in life and work in their villages. The calendars were selected based on the priority problems identified by the two groups: labor, water, cropping, pests and disease, food, and animal feed. The names of the months in the Ethiopian calendar were written on pieces of paper and laid on the ground. Again, the participating farmers were given small stones to show in which months of the year each problem is more or less significant. The information depicted on the ground, as well as the surrounding discussions were recorded and reviewed with the farmers to confirm accuracy.

Finally, **individual farm mapping** was used to verify the findings of the other tools. Individual farmers from different wealth groups within each village were selected randomly for this purpose. Again, they used sticks, leaves, and rocks to illustrate their individual farms. The farmers' problems were discussed and recorded as the maps were constructed: land holding size, type of soil, types of crops grown, family size, availability of labor, major problems with farm activities, and types of pests and weeds.

It is important to note that PRA is a set of tools and experiences that enables community members as well as outsiders/researchers to understand and analyze complex systems. It is not a panacea for all development problems, and the label can easily be misused to describe any "discussion" with the community. At the very least, PRAs should follow these guiding principles: (1) optimal ignorance — don't find out more information than is needed or can be utilized; (2) appropriate imprecision — don't measure more accurately than needed; and most importantly, (3) triangulation — use at least three methods, i.e. individuals or groups of informants, places, times, disciplines, etc., to cross-check information as it is gathered, and to constantly update knowledge and understanding as it unfolds.

One aspect of PRA that is often overlooked is the importance of accurately recording all discussions surrounding the use of the various tools. It is also necessary for the PRA team members to hold daily discussions and debriefings about their findings. This clears up any misunderstandings or misconceptions among the team members and gives new direction and focus to further exploration.

Equally important is the daily write-up and dissemination of the study's findings, with the compilation and results published as soon after the completion of the study as possible. This facilitates the sharing of information with a wide audience and further adds to the participatory nature of the entire experience.

Under the guidance of staff from OFPEP's local partner organizations, Ethiopian farmers map out their farms on the ground. Later the maps were copied onto flip charts for further study.

Modern Agro-forestry at Work

Iganga District, Uganda

Traditionally, farming practices in the East-African country of Uganda have involved the planting of woody perennial trees to provide shade to perennial crops, namely, coffee, bananas, and cocoa. The *ficus*, *albizia*, and *maesopsis* species were favored because they could be harvested for firewood and timber. Also, their leaf litter provided ground coverage that kept the soil cool and moist. As this ground cover decomposed, nutrients were recycled back into the soil.

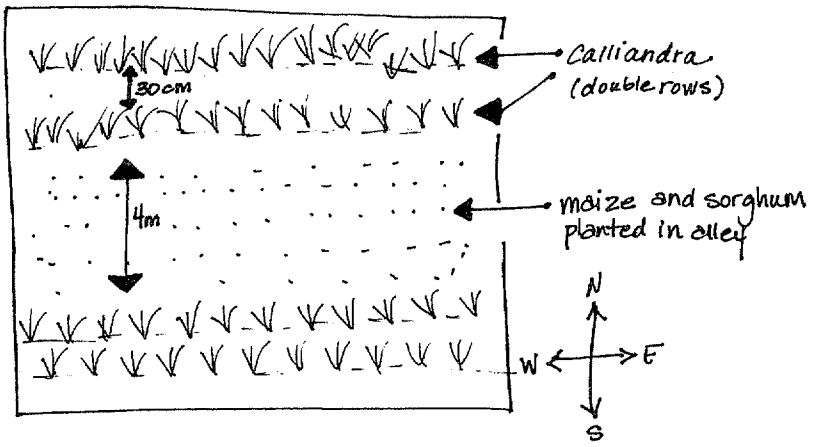
Although modern farmers in Uganda realize these advantages, most have not deliberately or systematically planted these trees with their crops, except for *maesopsis* and *ficus* with cocoa. In 1994, the OFPEP team in Uganda began training local farmers in modern agro-forestry techniques. Their goal was to get local farmers to plant trees or shrubs on a sustainable basis that would be compatible with their cash and income crops. A demonstration project was initiated to show farmers that trees can recycle nutrients back into the soil and thereby benefit cash crops.

OFPEP staff are working to increase the number of Ugandan farmers who practice alley cropping.

The first step was to raise seedlings of calliandra in two nurseries. (Calliandra, also a woody perennial, was chosen for this project because of its quick growth rate and multipurpose use.) In all, 16,000 seedlings were raised and transplanted between late March and early May 1994, and a total of 13 demo plots received calliandra seedlings that season.

The demo plots consisted of double hedgerows of calliandra spaced 30 centimeters apart and separated by a 4-meter-wide alley. In these alleys, maize (corn) and sorghum were planted. The rows of calliandra were planted in an east-west orientation in order to minimize shade of the crops growing in the alleys. (See diagram.)

By September 1994 the calliandra were ready for the first harvest of "green manure." The hedgerows were cut back and the trimmings laid in the alley. In approximately one week's time, after all the leaves had fallen off, the branches were collected for firewood. The tiny leaves were left on the ground to decompose into the soil. Three such harvests of green manure had been made by the end of July 1995.



In addition to the expected benefits of hedgerow or alley cropping, the local farmers participating in the demonstration project were pleased to notice that bees had been visiting the calliandra flowers in the demo plots. These farmers were told that if they could grow enough of this shrub, they would be able to

See Agro-forestry, next page

introduce bee-keeping on their farms for the production of honey.

In addition to using the calliandra clippings as "green manure," some of the farmers mixed them with pasture grasses and used them as forage for their livestock. The palatability of calliandra to livestock and the ease of harvesting it could significantly reduce or eliminate the need for livestock to graze. The resultant animal manure could be applied to the soil to improve fertility.

One of the problems farmers encountered was the calliandra seed pods bursting open before they could be harvested. To prevent this, the farmers were advised to harvest the pods when they are first mature (a yellowish color). Some farmers took seedlings home to raise strictly for seed production.

Another of the farmers' concerns was that since the calliandra grows so quickly it might impinge on the space for growing food crops. They were told that they could plant the calliandra on marginal land that would otherwise be poor for crop production, like steep hill slopes or rocky areas. The calliandra should be harvested often for green manure and for firewood.

By early 1996, over 1200 farmers had been trained in the use of calliandra in agro-forestry. However, only 17% of them had adopted the practice of hedgerow or alley cropping with calliandra on their farms. OFPEP staff are currently working with the farmers to understand the reasons for low adoption rates, and how they can be improved.

Increased Productivity in the OFPEP Family!

The OFPEP family got a little bigger recently, as two staff members welcomed new additions to their families! Congratulations to all!

- Beatrice Luzobe, Gender Specialist in Uganda, had a baby daughter in May.
- Lisa Washington-Sow, the PVO/University Center's Process and Linkages Specialist based in Senegal, also had a daughter, in June.

Sources of Seeds

OFPEP does not provide seeds, except in its own project areas. However, there are several sources of seeds which readers may wish to explore.

AgroForester Tropical Seeds. You can order a seed and inoculant catalogue from this company out of Hawaii (USA). They specialize in a wide variety of seeds and inoculants for agro-forestry species from *Acacia angustissima* all the way to *Tehprosia vogelii*. Contact them for a free catalogue.

AgroForester Tropical Seeds
P.O. Box 28
Holualoa, Hawaii 96725 USA
Telephone: 1-808-324-4427 Fax: 1-808-324-4129
E-mail: agroforester@igc.org

The Inland and Foreign Trading Company (FTE) LTD. This company out of Singapore has a long list of legume cover crop, pasture, shrub, and tree seeds. Contact them directly for more information on their product lines.

The Inland and Foreign Trading Co. (FTE) LTD.
Block 79A, Indus Road #04-418
SINGAPORE 169589
Telephone: 65 272 2711 Fax: 65 271 6118

Educational Concerns for Hunger Organization (ECHO). This U.S.-based organization provides small quantities of a wide variety of vegetable, fruit, and forage crops to church groups and missionaries working with farmers around the world.

ECHO
17430 Durrance Road
North Fort Myers, Florida 33917-2239 USA
Telephone: 941-543-3246 Fax: 941-543-5317
E-mail: ECHO@xc.org

Local Seed Systems News. This is a new newsletter being published in Zimbabwe to promote small-scale seed production by self-help groups. Its objectives are: (1) to support the exchange of new ideas among institutions and individuals, (2) to create awareness of the untapped resources at farmer household levels to enhance seed security, (3) to disseminate information about new developments in the local seed system (LSS) sector, and (4) to establish a seed network in the SADC region. If you would like to contribute articles, or be added to the mailing list for this newsletter, contact:

Editor
Local Seed Systems News
P.O. Box 4046
Harare, ZIMBABWE

OFPEP-Uganda Partners Strike Gold With Belgian NGO

Four of OFPEP's partners in Uganda have obtained a grant from a Belgian nongovernmental organization —COOPIBO — to extend and expand their collaborative activities begun with OFPEP. These activities relate to rapid multiplication and distribution of disease-resistant cassava varieties. Cassava is a staple food crop in Uganda which is being seriously attacked by a cassava mosaic disease.

OFPEP's four partners in Uganda are: Talent Calls Club in Mukono District; FURA Fellowship and Busaba Project both in Tororo District; and Multi-Purpose Training and Employment Association in Iganga District. While OFPEP is not a funding agency, one of its goals is to build the capacity of the institutions and organizations it works with in its host country sites. It was in this respect that OFPEP staff trained personnel of these four NGOs in proposal writing, which ultimately lead to their success in obtaining the COOPIBO grant.

Dr. Moses Onim, OFPEP East Africa Coordinator, made the initial contact with COOPIBO, and Ben Ekoot, local OFPEP Coordinator in Uganda, provided technical assistance to the four NGOs during the actual proposal-writing process. Through this type of training and technical assistance, OFPEP hopes to ensure the sustainability of its activities in each of its four country sites.

Fodder Tree Legumes Are Topic of International Course

The 4th International Course on "Fodder Tree Legumes - Multipurpose Species for Agriculture" will be held in Queensland, Australia, in November/December 1996. The course is aimed specifically at those people interested in using multi-purpose tree legumes for: (1) improving forage availability in small-holder livestock systems, (2) developing sustainable agro-forestry farming practices, and (3) rehabilitating degraded lands.

Participants should have a university degree or equivalent and should be reasonably competent in the use of English. Some familiarity with fodder tree species is desirable, but not essential.

For more information, contact:
Course Secretariat
"Fodder Tree Legumes"
Department of Agriculture
The University of Queensland
St. Lucia, Queensland 4072
Telephone: (07) 365 2062
International: 61 7 365 2062
Telex: AA 40315
Fax: (07) 365 1188
International Fax: 61 7 365 1188

Goats, cont'd.

Finasi "Mama" Ababu, a 60-year-old widow who lives on a small farm in Kenya's densely populated Vihaga District, knows such elation. In 1988 she received two pregnant does through the SR-CRSP. One delivered twins, a doe and a buck. She sold the buck to a butcher and used the money to finance the education of her three daughters.

Other benefits of Mama Ababu's goats have been: milk averaging 1.3 liters a day after nursing; manure that is collected regularly and added to the compost pile; and regular cash flow from selling surplus milk and from marketing the buck kids. Secondary dividends are the large bunches of bananas growing on Mama Ababu's well-fertilized plants, and the lush, green grass on which her goats graze.

Operations such as Mama Ababu's provide Lagrotech's Dual-purpose Goat Extension Program, principally supported by annual grants from the Food Industry Crusade Against Hunger (FICAH), with demonstration and reference sites for introducing new farmers to dual-purpose goats and related management technologies.

While an innovation in some ways, the Dual-purpose Goat Extension Program is just a special application of OFPEP activities. OFPEP concentrates on improving farmer access to seeds for food and cash crops and assists in improving and maintaining the fertility of soil.

Uganda and Kenya Workshops Update OFPEP Activities; Focus on Monitoring & Evaluation

OFPEP staff from Senegal, Uganda, Kenya, Ethiopia, and the U.S. met in Kisumu, Kenya, for a week-long workshop in February to discuss the program's activities and training needs in each of its country sites.

Two members from the BRIDGE Project also participated in the workshop. BRIDGE is implemented by Winrock International with the Christian Service Committee of Malawi. BRIDGE links with sustainable agricultural development extension programs and works with resource-poor farmers, supplementing rather than replacing normal extension channels.

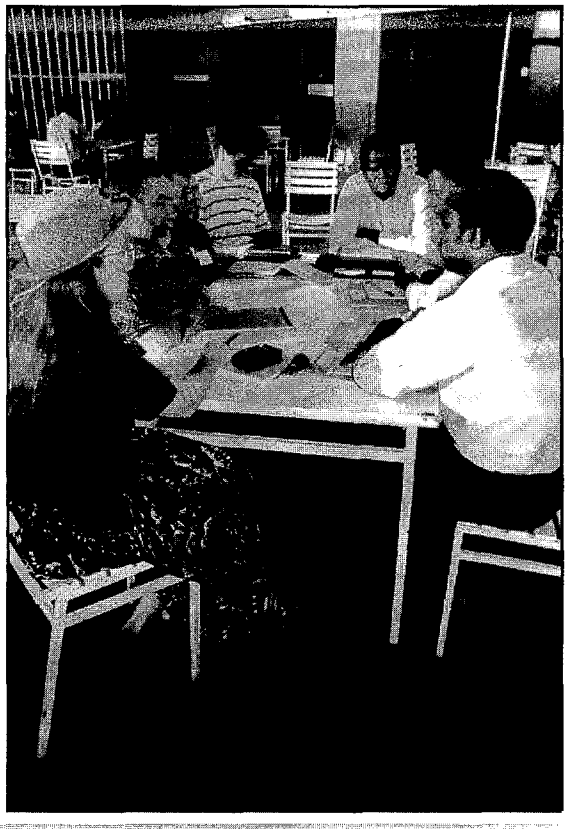
Workshop activities were planned and managed to contribute directly to achievement of the following:

- Establish systems for the exchange of ideas and experiences among OFPEP country teams.
- Facilitate development and initiation of monitoring and reporting systems to assure the collection of data for course corrections, evaluations, planning and reports.
- Design strategies to assess OFPEP's impact on its collaborative and partner institutions.
- Refine criteria for evaluating OFPEP strategies for participatory methods.
- Review in-country strategies to ensure programs address the needs of women farmers and their roles in the agricultural system and family economy.
- Identify and assess possible activities for consideration in a future phase of OFPEP.

To address the training needs identified at the Kisumu workshop, Mary Lou Surgi, program coordinator for OFPEP at the PVO/University Center, organized and presented two follow-up workshops in May for OFPEP staff and partners in Uganda and Kenya.

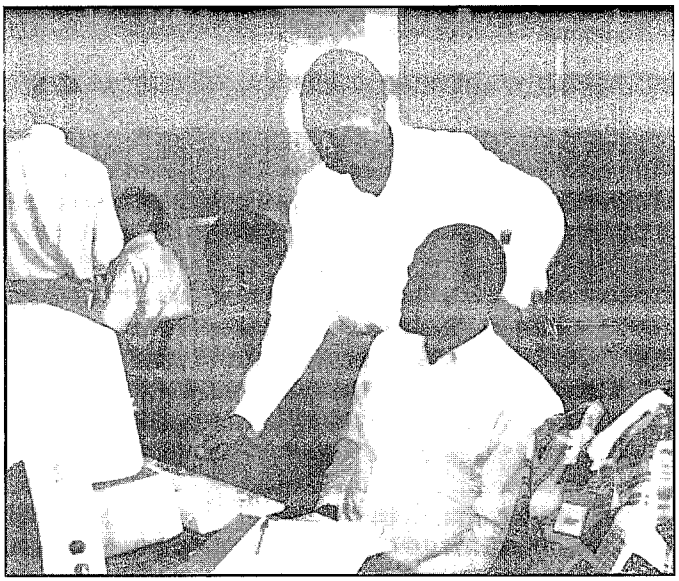
The first of these was held in Uganda's Mukono District and was attended by 11 persons, mostly from collaborating organizations in the three Ugandan districts where OFPEP is working. The workshop focused on how OFPEP's monitoring and evaluation process can complement the monitoring and evaluation activities of its partners.

Also covered was the more general topic of collaboration in OFPEP. Participants shared problems they have encountered and information about how they overcame these problems. And they discussed the benefits of a collaborative project such as OFPEP to all stakeholders, i.e. organizations, funders, and farmers.



Mukono workshop participants discuss OFPEP's monitoring and evaluation process with Mary Lou Surgi (foreground, left) of the PVO/University Center.

After the Mukono workshop, the Uganda staff traveled to Kisumu, Kenya, to continue the monitoring and evaluation training with their Kenyan counterparts. This second workshop centered on the use of *EpiInfo* software to analyze data from farmer surveys. Training was provided by Mr. Dalmas Owino, a computer trainer and experienced user of EpiInfo. Owino is continuing to work with the staff in both countries, assisting them with the input and analysis of the monitoring and evaluation data.



Dalmas Owino (standing) trains Kisumu workshop participants on how to use the computer program EpiInfo *to analyze data from farmer surveys.*

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breakthrough in striga weed control research.

Readers who have had success with eradication of these or other weeds, are encouraged to submit their experiences and suggestions to *Of Soils and Seeds* for inclusion in the next issue.

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Address Correction Requested