Report #10

Report of GARD Consultancy

Accomplishments, Follow-up, and Needs for Farming Systems Research/Extension with a Focus on Horticulture Crops: Training Advisor in Horticulture Consultancy

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January 3-February, 1986

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Government of The Gambia

Ministry of Agriculture

Accomplishments, Follow-Up, and Needs for Farming Systems Research/Extension with a Focus on Horticulture Crops: Training Advisor in Horticulture Consultancy,

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Introduction and Objectives

The Ministry of Agriculture (MOA) is making long-range plans to revitalize the agricultural research and extension system of The Gambia. A major part of this plan is called The Gambia Agricultural Research and Diversification Project (GARD). The GARD project paper places a strong emphasis on using farming systems research/extension (FSR/E) methodology for identification of research priorities and generation of technology acceptable to farm household members. The GARD plan also recognizes that there is considerable scope for improvement of the productivity of horticultural crops. This improvement could have substantial impact upon the nutrition and income of producers who are primarily rural women. It also has potential to aid in improving the national balance of payments, both by reducing horticultural imports, and by expanding exports.

Accordingly, the GARD plan included as one of the first consultancies a training advisor in horticulture. This consultancy took place January 3 - February 16, 1986. The consultancy is to be the first of an on-going series of consultancies. These in turn will lead to a long-term technical assistance consultancy while the senior researcher of the horticulture unit leaves for advanced degree training.

In preparation for this first consultancy, MOA prepared a terms of reference (attachment A). This report is organized according to the 6 specific activities of the terms of reference. The report outlines the accomplishments, follow-up plans, and needs for each of the 6 activities. Table 1 presents the highlights in schematic form. Attachment B provides the day-by-day schedule of work which led to this report.

Activity 1:

Review and update of training, research support, and advisory assistance to horticulture described in Project Paper (original terms of reference no. 1).

A. Training

The horticulture unit is responsible for vegetables, tree fruits, and root and tuber crops. Current staff and level of training are:

1. Vegetables
   * Sonny George (agricultural superintendent: on educational leave to obtain B.S. at the University of the Philippines at Los Banos.
   * Isatou Jack (production and post-harvest specialist), B.S., University of Florida
   * Momar Sey (assistant superintendent), diploma, Nigeria.
2. Fruits and Ornamentals
   * G. O. Gaye (scientific officer), B.S., University of Science and Technology, Kumani, Ghana
   * Ousman Jarju (agricultural assistant), diploma, Nigeria.
   * Mbemba Bojang (assistant superintendent), primary school and short-term training in Israel and Holland.

3. Roots and Tubers

   * Ernest Aubee (trainee) B.S., Sierra Leone, now teaching at The Gambia High School

   * Abdou Colley (agricultural assistant), certificate in agriculture, Gambia College, and short-term ICTA training. Penda Camara (assistant superintendent: nutrition), diploma, Nigeria; now has been rearranged to new DOA nutrition unit.

4. Extension

   * Sana Ceesay (agricultural superintendent), diploma (?)

   * Demba Jallow (agricultural assistant), certificate of agriculture, Gambia College

Short-term training needs include the following:

1. Wet season vegetable production, perhaps at the Asian Vegetable Research and Development Center.
2. Post-harvest and storage technology, especially for onion and tomato.
3. Tree fruit production, perhaps at Homestead, Florida, experiment station
4. Applied biometrics with the TI-59 and or SAS on the IBM-PC. These needs should be addressed in 1986-1987. Medium term training needs are two:

   1. M.S. degree training for the senior scientific officer.
   2. B.S. degree training for Colley. These needs should be addressed in 1988-1989.

Long-term training needs are three:

1. B.S. degree training for Jarju and Sey
2. M.S. degree training in post-harvest and storage technology for Jack.

These needs should be addressed by the end of the GARD project's initial 7-year lifetime.

B. Research Support

A reconnaissance survey, described under activity 4, was carried out by a multi-disciplinary team of 12 persons in 13 villages in Western, Lower River, and North Bank Divisions. As a result of the reconnaissance, the team identified marketing as the priority given in the largest numbers of villages. It proposed the following preliminary research agenda to address this priority:

1. Planting date and staggered planting trials, to reduce concentrated production leading to gluts.
2. Cultivar trials, to identify better storing cultivars or cultivars with differing times of maturity, so as to spread production and utilization over a longer period of time.
3. Trials with new crops, to reduce farm household risk associated with a glut of one or two existing crops.
4. Testing different storage techniques.
5. Identification of consumption patterns and quantification of consumption and production over the year, to identify potential "windows" to develop production technology to take advantage of.

This preliminary agenda will be verified and the specific crops and trial types for the 1986 wet and dry seasons proposed following the focused survey of stage II, described below under activity 4.

C. Advisory Assistance

The horticulture unit has established several objectives for vegetable and fruit research. The training advisor obtained copies of experimental designs and results of trials conducted over the past 10 years. The advisor reviewed these both for technical content and in relation to the unit's previous objective's.

Major conclusions are:

1. The experiments actually carried out have not addressed stated priorities for most crops. There has been an over-emphasis on cultivar trials, but with little useful results.
2. Fertilization experiments have not used regression analysis. Experiments with qualitative factors have used only LSD for means of separation. Training is needed in biometrics and use of programmable calculators or mini-computers. The down-loading of the Statistical Analysis System (SAS) on to IBM-PC equipment would give the unit powerful analytic capability. SAS includes the GLM procedure, which can accommodate missing data cells. GLM can do analysis of coraviance, which can be useful when stands are uneven or plots damaged due to non-treatment-related problems. GLM allows for single-degree-of-freedom contrasts, a technique useful for better planning and testing of experimental hypotheses. GLM can also do regression with even or uneven treatment increments. IBM-PC capability will become available through GARD, so training

would be needed. In the interim, the FAO-supported fertilizer program has several TI-59 programmable calculators. Training should be given in 1986 or early 1987, so data from the 1986 season can be analyzed on the TI-59.

3. Future experiments (station and on-farm) shall be based on the final 1986 research agenda established after stage II, described in activity 4 below.

Activity 2:

Formation of a group representing biological and social sciences to coordinate on-farm and on-station trials in horticultural crops.

Selection of Team Members

In selecting disciplines and organizations to be represented on the multi-disciplinary team of biological and social scientists, the horticulture unit took into account the following considerations:

1. Horticulture is a part of a larger farming system in each village.
2. Reconnaissance and description of farming systems to the Western half of The Gambia is a new activity for the horticulture unit and the Department of Agriculture. Assessment of the linkages of horticulture with other parts of the farming system is therefore necessary.
3. Involvement of representatives of non-governmental organizations (NGO's) is essential in light of their key role in support and dissemination of technology for horticultural (especially vegetable) production.

Prior to selection of disciplines and organizations to be represented, the unit reviewed materials from the 1984 Gambia Farming Systems Support Project (FSSP) sponsored workshop on the process model of FSR/E developed by CIMMYT and a modified structural model for descriptive analysis of farming systems adapted from McDowell and Hildebrand. These models helped the unit to see how horticulture might fit into the larger farming system.

Based on the above considerations and models, the unit identified the following disciplines and organizations from which it felt representation was necessary for assessment of priorities for horticulture within the farming system:

Horticulture, including both fruits and vegetables

Plant pathology

Entomology

Soil and water management

Extension, including crop agronomy and livestock

Home economics and nutrition

Rural sociology

Non-governmental organizations

Marketing

Individuals were then identified and their participation in the reconnaissance team sought. Attachment C gives a list of the individuals who participated in the team. The list also includes several individuals, marked with asterisks, who attended one or more planning or appraisal meetings of the team, but who did not participate in the reconnaissance.

Nature of the Team: A Result of the Approach of the Consultancy

The reconnaissance team that resulted, consisting of 11 individuals aside from the training advisor, was larger than the core group for horticulture envisioned at the start of the consultancy. The process envisioned at the start of the consultancy was to put together a smaller core group (for example, perhaps individual from horticulture, extension, and sociology or nutrition), conduct an initial reconnaissance to identify horticultural problems, and then bring in other specialists (such as plant pathology or soil and water management) only as needed.

The approach which the training advisor took throughout this consultancy was to present the unit (and later, the entire team) with alternative methodologies to choose from, elicit advantages and disadvantages of each alternative given the task and conditions that the unit or the team faced, encourage the unit or team to weigh the advantages and disadvantages of the different alternatives, and then make its own decision. This approach thus includes the possibility that the unit or team may reach a different conclusion from that which the advisor may anticipate, or even think is preferable. The objective of this approach is, however, less to reach a predetermined outcome, and more to internalize methodologies by adapting them to one's own situation. This internalization is most effective if people are able to make real choices and test alternative methodologies based on their own decision. Not to respect that decision when it goes in a different direction thus would be counter to one of the basic objectives of this approach.

A different decision may also reflect conditions that the trainer does not understand as well as the people who will use a methodology. A different decision thus represents an opportunity for a trainer to learn, and thereby improve the training plan. This, in fact, closely parallels the farming systems approach. The farming systems approach also takes the position that research and extension personnel are collaborators with the farm households, and that learning is two-way. Research and extension personnel respect the decisions of farm household members, and see unexpected decisions as opportunities for learning more about farm household conditions and the farming systems.

The training advisor thus discussed with the unit the alternative of a smaller group. The decision of the unit was in favor of larger, more comprehensive team. This reflects the importance placed by the unit on assessing horticulture in the context of the entire farming system.

This decision resulted in a team for which the ICTA sondeo team model is appropriate. The decision of the unit in fact was based of the philosophy as that of the sondeo team: "The more disciplines, the better." CIMMYT and ICTA team models were presented in the planning workshop, and the team, recognizing that its composition and approach to the reconnaissance was more similar to the ICTA sondeo team model, chose to use the interview pair method of the sondeo model in its work.

Future role of Team: Coordination of Trials and Relationship to Larger Yundum-based FSR/E Team

The GARD plan envisions 2 FSR/E teams to coordinate on-farm trials. One team will be based at Sapu, and the other at Yundum. Some work has begun at

Sapu, but at the start of this consultancy, the Yundum-based team had not yet been organized.

The team which resulted from this consultancy could serve as the Yundum-based team with the addition of a crop agronomist. On the other hand, this team is clearly larger than necessary for design and implementation of trials for specific priorities, either for horticultural crops, or for other components of the farming systems such as agronomic crops, livestock, or household activities. Also, the reconnaissance which this team carried out focused on linkages with horticultural crops. In the process of carrying out the reconnaissance, the team also identified non-horticultural priorities (in fact, some of these were cited more frequently than horticultural priorities). The team did not however, have a mandate to do any follow-up survey work or design trials for non-horticultural priorities. Team members did, however, express a willingness to serve as or on the larger Yundum-based team, if so requested by the Department.

The training advisor was impressed by the initiative and dedication shown by this team. The training advisor therefore recommends to the Agricultural Research Management System (ARMS) that the Department take advantage of the initiative of this team and recognize it as the overall FSR/E team for Yundum, with addition of a crop agronomist.

The team could further be broken down into 4 core groups for design and implementation of on-farm and on-station trials. The 4 core groups would be for horticulture, agronomy, livestock, and home economics. In addition to representatives from the disciplines of the core group, each core group would

also contain one person from one of the support disciplines of soil and water management, crop protection, or home economics. Which support discipline was involve could change from person to person depending on the priorities identified by team reconnaissance for each core group. For home economics, the production disciplines would become support disciplines and the choice of representative in the home economics in a given season.

Each core group would also contain a representative from extension or an NGO. Which was involved in a given season would depend on the location of that season's on-farm trials of the core group: whether the trials would be in areas where extension would be more active in trial implementation, or in areas where an NGO would be more active.

Finally, each core group would contain a social scientist, either a rural sociologist or an economist, also depending on the nature of the core group's priority each season.

Each representative on the whole team of discipline or organization would thus also serve in one or more core groups, depending on the priorities established each season. Table 2 shows the proposed organizational relationship of the whole team and the core groups, in the form of a structural chart. Table 3 shows the proposed functional relationship between the whole team and the core groups, in the form of a calendar of yearly activities

The training advisor also recommends to ARMS that the Department issue formal invitations to team members to participate in the larger team and appropriate core groups, approve necessary reallocation of Department team

members' time for these activities, and provide needed budget support. In particular, specific requests will be made for reallocation of time and budget for trials for the horticulture core group based on the stage II verification survey in March and design of trials in April and May.

Activity 3:

Review of Private Voluntary Organization (PVO) activities in horticultural extension and determination of research support needs and collaboration between these activities and GARD-support activities.

The horticulture unit identified Action Aid and Methodist mission as the 2 NGO's most active in horticultural extension work in the Western half of the country. A representative from each of these organizations participated in the reconnaissance team (see attachment C).

On January 9, unit officers G. O. Gaye and Isatou Jack, together with the training advisor and the GARD chief of party, visited a garden assisted by the Catholic Relief Service (CRS) at Kasa Kunda (near Brikama) and a garden assisted by Caritas at Kandongko (near Somita). A visit was also made to the Freedom from Hunger Campaign (FFHC) office in Banjul. Additional information on NGO activities was obtained from the Program Planning and Monitoring Unit (PPMU). Gardens assisted by Action Aid (Burong) and Caritas (Sirangor Jiramba) were also visited during the reconnaissance survey.

The following information resulted from the above visits:

1. Action Aid, CRS, Caritas, and FFHC, as well as FAO, are all involved in providing inputs to horticultural producers. However, there are differences in how the inputs are provided. CRS provides seed on a loan basis, with repayment after the

season. FAO provides credit to women's groups for fertilizer, seed, insecticide, and small implements. Action Aid gives yearly loans for inputs, but free seed at one location at least. Caritas also provides free seed. FFHC provides seed, other materials, fencing, transport, and concrete-lined wells free.

2. PPMU is working on a project proposal for a revolving loan fund for agricultural credit to female producers.
3. FFHC is active only in Upper River and MacCarthy Island Divisions, in order to avoid duplication with other NGO's. They have 10 sites in those 2 Divisions. Marketing is the main constraint of the communities. They cooperate with extension whenever it is active in one of their areas.
4. FFHC built a cold storage for the horticulture unit, but would require a proposal, to be sent back to the donors, to consider funding for refurbishment of the facility.

There was not time to visit the offices of Caritas, CRS, or Save the Children during the consultancy. Unit officer Isatou Jack will obtain information from these 3 NGO's during March. Save the Children, in particular, is active in North Bank Division, and may hire a horticulturalist for their program.

Assessment of NGO needs for horticultural research and NGO collaboration in on-farm trials with horticultural crops will be made based on the results of the stage II verification survey and the design consultancy proposed to follow in April and May. The training advisor recommends that the Ministry of Agriculture (MOA) formally invite the 2 NGO representatives in the

reconnaissance team to continue as members of the Yundum-based FSR/E team and participate as needed in the horticulture core group.

A briefing by MOA personnel (including a GARD representative) on the MOA's plans for 1986 and beyond, particularly for GARD-supported activities, would help the NGO's plan for more effective collaboration with the MOA. This briefing might be made to a group of NGO representatives, such as TANGO (the Association for Non-governmental Organizations).

Activity 4. Development and administration on a trial basis of a questionnaire on cropping patterns in western' Lower River, North Bank Division with a specific focus on identification of possible on-farm trials in horticultural crops.

Formal and Informal Survey Methods

Farming Systems Research/Extension makes extensive use of informal survey methods in diagnosis. Informal survey methods are especially useful at the beginning of diagnosis, the first step of FSR/E.

One major advantage of informal methods is in their greater ability to elicit the real perspectives and priorities of farm household members. Informal survey methods place respondents more at ease then beginning with a formal, impersonal questionnaire. This increases the likelihood of getting at farm household members, real issues, obtaining more in-depth responses, and having greater interaction between interviewer and respondents.

Another important advantage of informal methods for FSH/E is fast turnaround. The objective of initial diagnosis in FSH/E is to establish priorities for rapid action by the FSH/E team. The objective is not to obtain

quantitative data on the functioning of the entire farming system, or create a mathematical model of the system. Gathering quantitative data by means of a formal questionnaire may sometimes be faster than gathering qualitative data through informal methods, but the coding, entering into a computer, analysis. and interpretation of quantitative data is much more time consuming than the group process of analysis and interpretation of qualitative data.

Informal methods can also help to make a later formal survey more useful. The qualitative data can help the FSR/E team target the scope of a formal survey to those aspects where quantitative data would improve or complement the action program of applied research, extension, or policy recommendations. This reduces both respondent burden and the volume of data to be analyzed. It also gives a better context for interpretation of the quantitative data. The informal survey can also help build rapport between the team and respondents, and thereby improve the quality of the quantitative data.

The original terms of references for this activity used the word "questionnaire". The training advisor thus began by asking unit officers to describe their previous survey experiences. These included experiences with two formal surveys, one a large socioeconomic survey under the Agricultural Development Project (ADP), and the other an evaluation survey under one of the NGO's. One officer also had had experience in an informal survey, although this did not use a structured team process for analysis of the data. Advantages and disadvantages of formal and informal methods were elicited and compared from these experiences. At that point, the training advisor then introduced some of the literature and concepts of FSH/E informal survey methods.

Within the FSH/E literature, there are differences of opinion on how to conduct an informal survey. The two major variations are the "blank mind" approach and the topic guidelines approach. The ICTA sondeo method, developed by Hildebrand and others in Guatemala, uses the "blank mind" approach. In this approach, the FSH/E team considers itself to be looking for an "unknown set of elements." No hypotheses or predetermined topics are developed prior to the survey. Prior hypotheses, it is argued, simply result in biasing interviewers towards obtaining information on their own preconceived priorities, which may not reflect farm household members' real perspectives and priorities. Team members are thus encouraged to begin with a "blank mind". Questions are allowed to emerge from spontaneous conversation with farm household members' and hypotheses are developed only during the course of the survey.

The topic guidelines approach, on the other hand, argues for a degree of preplanning of the interview. A list of topic areas is developed beforehand. The list of topic areas is designed to insure that in each interview information is obtained on all the important components and interactions of the system. The topic areas often reflect prior hypotheses about the farming system and farm household members, priorities. The CIMMYT informal survey approach, in particular, makes use of elaborate topic area lists which may not all be covered in one interview, but rather covered by assembling information on various sections of the topic area list, from interviews at different although similar farms, like assembling pieces of a mosaic.

The topic guidelines approach remains an informal method, however, because both the exact wording and the sequence of questions is determined by the flow of conversation in each interview. The topic guidelines serve as a "mental checklist" against which interviewers check the completeness of the information that unfolds in each interview. Interviewers also use this "checklist" to guide the flow of conversation to assure completeness and increase the comparability of information from one interview to the next.

Development of Team Consensus on Survey Approach

After the members of the reconnaissance team were identified as described under Activity 2, the whole team spent three days in a planning workshop (see attachment B also). In this workshop, on day 1, the two horticulture unit officers led a discussion on survey methods. They first asked team members to describe previous survey experiences. A discussion centered around a formal survey associated with the Jahali Patcharr rice project followed. From this discussion, the team developed lists of characteristics, advantages, and disadvantages of formal and informal survey methods. This led to introduction of FSH/E survey methods, and contrasts between the "blank mind" approach and the topic guidelines approach.

At this point, the team was asked to weigh the advantages and disadvantages of the two informal survey approaches in light of the objectives of this reconnaissance and their knowledge of the farming systems of the Western half of The Gambia. This question first led the team to clarify on its own terms the scope of the reconnaissance: description and identification of farm household priorities for horticulture, taking into account the linkages of horticulture with the entire farming system. The team then weighed 2 risks that it saw as likely to occur in the interview process:

1. The risk of forgetfulness: That the flow of spontaneous conversation might result in farm household members forgetting to discuss a part of the farming system that information is needed on, because of interrelatedness of components (for example, soil pest relationships).
2. The risk of imposing problems: That asking a question about a part of the farming system which farm household members do not mention may cause them to think that they should come up with a problem related to that question (for example, because they may think that a question implies that interviewers may be interested in offering assistance in the area focussed on by the question).

The team, on balance, judged that the risk of imposing problems was the greater of the 2 risks. Thus, while the team recognized that a "mental checklist" would be one way to reduce the risk of forgetfulness and loss of completeness, it saw a checklist as increasing the risk of imposition too much. An alternative way to reduce the risk of forgetfulness would be to increase the number of farm household interviewed, so that overall a complete picture of the farming systems of the different villages and districts would result, even if some individual interviews were incomplete. However, time available for the reconnaissance (1 week) placed a limit on numbers.

The team consensus was, therefore, to conduct an "open" approach with probing in an initial reconnaissance survey. The word "open" reflected the fact that none of the team members would really go in with a "blank mind", because all had some prior knowledge (and hence some preconceptions) about horticulture and the farming systems of the western half of the country.

"Open" thus meant a "pretend blank mind'" that is, not reinforcing prior knowledge and preconceptions by developing topic areas checklist beforehand.

The team decided, however, to try to reduce the risk of forgetfulness through judicious use of probing. This meant picking up on points mentioned by respondents and probing for linkages to other parts of the farming system. The team recognized that the difference between probing a respondent's response and imposing a new problem would be a fine line, and not one that could be specified in advance. Rather, the team recognized that each team member would have to judge where that line was in the context of conversation in each interview.

The team saw the "open" approach, with Probing, as part of a two-step process. In order to develop hypotheses for a guided informal survey leading to a research, extension, and policy agenda, the team first needed a better understanding of the farming systems in the Western half of the country. The output of the "open" reconnaissance would, therefore, be a description of those farming systems. This would complete stage I. The team then, on its own, proposed a second step, stage II. Stage II would use a more guided approach. Its output would be the research, extension, and policy agenda for the horticulture unit for the 1986-87 season. This agenda would then guide research to produce and return to the people results useful in terms of the people's own priorities.

A draft report on the methodology developed by the team has been prepared by the 2 unit officers G.O. Gaye and Isatou Jack. The training advisor will assist the unit officers in refining the paper and seeking funds for Ms. Jack to present the paper to the annual Kansas State University farming systems

symposium in October 1988 (Attachment E). The training advisor recommends that the Department of Agriculture approve the travel of Ms. Jack to the symposium and provide necessary typing and xerox support.

Administration of the Reconnaissance

The team carried out the stage I "open" reconnaissance from January 27 to February 1, 1988. Attachment D shows the 13 villages covered in the reconnaissance. The attachment indicated when each village was visited, which district it belonged to, and where the team discussed the information obtained and spent the night at the end of each day.

In the course of the reconnaissance, the team found that more time was needed than anticipated. As a result, the Toniataba village interview was moved from January 31 to February 1. This extended the reconnaissance by a half-day.

The villages were selected to cover all the districts of the Western half of the country. More details on the process of selection of villages is provided under activity 5, in the discussion of identification of domains (farm households with common production problems). As that discussion explains, another output of the reconnaissance was the identification of domains for horticultural production.

The team conducted the interviews in interview pairs. This technique is part of the sondeo method developed at ICTA in Guatemala. Each interview pair consist of a biological and social scientist. In this reconnaissance, there was only 1 person formally trained as a social scientist (a rural sociologist from the Program Planning and Monitoring Unit). Team members from extension and the NGO's were considered, however, to have more social science

perspective because of their greater experience at the village level. The nutritionist was also considered to have greater social science perspective because home economics works with the whole farm household, rather than with a specific production enterprise (such as vegetable production). Thus, extension, NGO, and nutrition team members were placed in social science positions in the interview pairs, matched with biological science researchers.

The sondeo technique also changes the members of each pair from day to day. This rotation at the same time maintains the matching of biological and social science pairs. Table 4 shows as an example how this rotation was done on days 1 and 2 of the reconnaissance.

In each village, the whole team first met with a group of villagers for formalities and explanation of the purpose of the visit. The visit was presented as a katchang (conversation) about farming. Each interview Pair then went with a group of men and women for their interview. In some cases, a group would go directly to the garden. In most cases, the interview would begin in the village and then move mid-way to the garden, sometimes when the interview pair picked up on a response which they would then ask to see.

Processing of Information

A key element of the sondeo method is the pooling of information at the end of each day. Each pair describes its observations and tentative hypotheses that emerged from their interviews. The observations and hypotheses from each interview pair may still reflect a degree of disciplinary bias, even with a "blank mind" approach. For example, the pathologist in each pair is likely to see more disease problems and probe them in greater depth than the soil and water management specialist.

In one respect, this is good because it enables the team as a whole to take advantage of the expertise of different disciplines. At the same time, each interview pair must present its hypotheses to the whole team, and the team as a whole will reach a consensus on the rankage of priorities (for example, a disease problem versus a water management problem, or a fruit production Problem versus a vegetable production problem). The theory of the sondeo is that through group discussion the team as a whole will balance the perspectives of the different disciplines, and that its final consensus will reflect the ranking of priorities of the farm households themselves.

This can also be compared to a formal baseline survey. In a formal baseline survey, completeness is built into the questionnaire, before each interview, in so far as the survey designers can anticipate what the questionnaire should ask in order to be complete. In the sondeo, completeness is built into the team, through the breadth of disciplines, and achieved by the pooling of information. The theory of the sondeo is, furthermore, that the resulting pooled information is likely to be more complete than that obtained with a formal questionnaire, because the scope of information gathered is not limited to what is contained in the questions in the questionnaire. Unanticipated information is also added because the interview is informational and open to unknown elements.

In the pooling of information from this reconnaissance, one interview pair took the lead in describing what it learned from a given village. Each of the other pairs then added new information and indicated information, observations, or hypotheses that were different from the first pair or other pairs. One person (usually from the lead pair) also took notes on the

additions, differences, and group consensus. A different pair would then lead for the next village. The discussion for each village took approximately 1 hour.

On February 5, after the reconnaissance survey week, the team met for an overall appraisal session. The team pooled the information from all the villages according to a list of characteristics (table 5). The team began by filling in the characteristics in eight columns: female producers, male producers, or joint male and female producers. This involved indicating with code letters such things as local vs. concrete wells for women; types of fruit crops grown by men, women, or jointly; presence or absence of fertilizer use on womens' vegetables; and so forth. For succeeding villages, in the interest of time, only constraints were entered, and priorities starred. The number of times an item was given as a priority was then counted up across all the villages. Overall, wells and implements were ranked highest, with both having counts of 11. Within fruits and vegetables, vegetable marketing was ranked highest, with a count of 4.

Based on this result, the team looked more closely at the information obtained from the villages on the vegetable marketing problem. This information included both specific problems (such as transport difficulties and gluts for onions and tomatoes) and concrete suggestions (such as organizing a transport company, assigning different days to different villages at local markets, or import controls during the local production season). The information was discussed with the manager of Citroproducts, Ltd., a government-sponsored private company with major responsibility for marketing and processing of horticultural commodities, present in the session.

The conclusion of this discussion was a tentative agenda placing emphasis on testing technical solutions to the marketing problem. This reflected the fact that, as a commercial enterprise, Citroproducts must be guided by profitability. It will enter into marketing and/or processing only of horticultural products of market quality from organized producers. Its role is not that of a development agency, to provide assistance to improve quality or organize Producers better. Given that, and the severe budget constraints of government, the team hypothesized that reducing gluts through research would be more feasible. Tentative areas for applied research were identified as:

1. Cultivars with differing maturities.
2. Planting dates.
3. Staggering.
4. Diversification through introduction of new vegetable crops.
5. Storage techniques.
6. Consumption study, to quantify levels of local demand.

The team considered this agenda to be a working hypothesis that must be tested in stage II of the survey. In essence, the team proposed that stage II be a verification survey. This parallels the methodology of CIMMYT: following an informal survey with a more formal verification survey. However the team used the "blank mind" approach in stage I, rather than topic guidelines as in a CIMMYT informational survey, and will use topic guidelines in the verification survey of stage II, rather than a formal questionnaire as in a CIMMYT verification survey. Hence, the team's approach contains elements of both the IITA and CIMMYT approaches chosen to meet the team's needs.

Plans for Stage II

The team met again on February 11 to plan for stage II. The team first evaluated the survey methodology used in stage I. The team recognized that after the first interview, there was a tendency towards using a topic guidelist based on the first day's interview. The team also recognized that there was sometimes a tendency to cross over the "line" between probing and imposing a problem. On the other hand, the team recognized that spontaneity was greatly improved when the interview moved from the village to the garden.

Next, the team identified 5 characteristics for grouping villages for horticultural production (table 6) and identified 4 domains (table 7; see activity 5a for more detailed discussion).

Based on the identification of domains, the team then weighed the advantages and disadvantages of doing the verification survey of stage II in the same villages versus in new villages with the same characteristics. The main advantage of going back to the same villages is that the team already has an understanding of the overall farming system and can start from that to enter directly into the focus of the verification survey. In new villages, the team would tend to repeat a lot of the discussion of the "open" reconnaissance before entering into the verification part of the interview. For example, farm household members might want first to bring up implement problems for cereals. On the other hand, if new villages were chosen based on the characteristics of the domains identified from the reconnaissance, then the verification survey would provide a test of the validity of the domain characteristics as indicators of common priorities.

The team recognized there were 2 different verification objectives:

1. Verification of fidelity.

   This means verification that the team did, in fact, identify the priorities of the original villages and propose the right research agenda for horticulture.

2. Verification of transferability.

   This means verification of domain characteristics as indicators of the same priorities. This in turn first presumes fidelity of identification of priorities for the village on whose characteristics the domain is based.

The team's consensus was that this year's objectives should be limited to verification of fidelity, and that next year, both stage I and stage II should be repeated in new villages to provide a test of domain characteristics and transferability.

In the stage II interviewing, the team also decided to involve local extension personnel more. Each local extension person would be asked to select the 2 best plots and the 2 worst plots in the village's garden. The extension person would then give those names, together with the name of the president of the garden producers' group. Each pair would interview 1 of these individuals (who would not be told on what basis they were chosen).

The result of stage II would be final identification of priorities for on-farm trials with horticultural crops, together with recommendations for extension and policy support. This in turn would form the basis for a second consultancy in April and May, discussed under activity 5a.

Plans were also made to complete the summary of information from the reconnaissance and to combine this with the results of stage II. Ms. Jack will gather the notebooks of all team members and complete the filling out of the characteristics in the 3 columns of producer types for the remaining 12 villages for which only constraints and priorities were entered at the appraisal session. This summary will form the basis for a paper by Ms. Jack and Mr. Gaye to be presented at the August 1986 annual meetings of the American Society for Horticultural Science (ASHS) (Attachment E). The training advisor has confirmed this with the head of the ASHS farming systems working group, Bruno Quebedeaux. The training advisor recommends that funds be made available for Mr. Gaye to travel to Davis, California, to present the paper and interact with other horticulturalists involved in FSR/E.

Support for Stage II

The team demonstrated an extraordinary level of initiative and commitment in carrying out its mandate. The prime example of this initiative was the team's proposing on its own accord to carry out stage II, as a logical conclusion to its consideration of the best approach to reconnaissance for its mandate. This is in spite of the fact that adding stage II means increased burden on already over-committed individuals. Evidence of this was apparent in the stage II planning session, as some people were doing calculations of data right up to the start of the session, in preparation for a report on another project.

The entire FSR/E survey process also represents a new type of work that requires greater time commitments than traditional formal survey work.

Instead of hiring enumerators to gather data, the researchers themselves are the data-gatherers. Instead of analyzing the data in the office while enumerators are in the field, the researchers process the information in the evenings, after a full day of interviewing. This means longer working hours: at times, discussion extended up to 11:00 p.m. Moreover, the reconnaissance is an intensive immersion that requires a continuous period of at least a week.

The Ministry of Agriculture has established a night allowance rate of 10 dalasis (U.S. $2.00) for travel away from the home base of Ministry personnel. This rate is currently applied equally for all types of work away from home base. However, a trip to Sapu with a stay in the guest house followed by a meeting and tour of experimental plots the next day and then return to Banjul is a very different type of activity from FSR/E reconnaissance work. The team, therefore, requested that the Ministry consider establishment of a higher night rate for FSR/E reconnaissance activities, reflecting the longer working hours and greater number of continuous days away from home of such work. The training advisor supports this recommendation and considers it to be in accordance with the philosophy of GARD to support new Ministry activities in FSR/E.

The training advisor has also recommended that ARMS approve formal reallocation of time to the team members for stage II, inform them officially of the dates of stage II activities, and provide needed supplies, typing, and xerox support (see p. 5 of table 1 for details of needed supplies).

Activity 5a. Selection of the most appropriate trial type, treatment array, and experimental design for on-farm trials in different groups of farm households with common production systems.

Preliminary Identification of Domains

Identification of domains for horticultural interventions was done in several steps. First, the 2 unit specialists identified 8 domains based on their previous experience. These domains were based on 3 characteristics:

1. Predominant vegetable crops:
   a. "exotics" (especially cabbage, lettuce, carrot, and introduced tomato cultivars)
   b. Indigenous (sorrel, bitter tomato, local tomato cultivars, eggplant, hot pepper, etc.)
   c. onion
2. Presence or absence of citrus orchards
3. Ethnicity
   a. Mandinka (predominant ethnic group)
   b. Wollof (often have more access to new technology and inputs from relatives in Senegal)
   c. Jolla (smaller ethnic group)
   d. Sere (smaller ethnic group)
   e. Fulla (traditional less involved in vegetable production)

Combining these resulted in the following 8 domains:

Domain area	Predominant vegetable crop	Citrus orchards	Ethnicity (predominant/secondary)
Banjul - Pirang, (north of Gunjar)	Exotics (Banjul-Bakau area market)	Yes	Mandinka

Domain area	Predominant vegetable crop	Citrus orchards	Ethnicity (predominant/secondary)
Southwest corner (Gunjar area)	Indigenous	Yes	Mandinka/Jolla
Pirang-Kalagi	Indigenous	No	Jolla
Kiang West	Onion	No	Mandinka
Kiang Central-Jarra West	Exotics (Jenoi Soma-Farafenni area market)	No	Mandinka
Jarra West	Indigenous	No	Mandinka/Fulla
North Bank West of N'Dungu Kebbe	Exotic (export to Kaolack)	Yes	Wollof/Sere
Kerewan-N'Dungu Kebbe	Indigenous	No	Mandinka

The approach taken by the unit was to consider this as a hypothesis, to be compared against the assessment of others. First, the assessment of Jan Christiansen, FAO fertilizer program advisor, was sought. Tne FAO fertilize program has the only large-scale experience in working with trials on farmers, fields. Christiansen proposed only 3 domains:

1. Bakau area commercial producers growing for urbanized population and hotels
2. Other commercial-scale producers who can afford transport to markets (especially in the Yundum area but also possible anywhere in country)
3. "Nutritional" producers not growing for a market: cosmetic quality less important than quantity and nutritional quality.

Next, the two unit specialists presented the concept of recommendation domains to the team on day 2 of the workshop and asked them to identify characteristics for grouping farm households into domains for the western half of the country. The team came up with 16 characteristics (table 8). The team then began to rank these characteristics on the basis of importance for horticultural production. However, midway through this process, (after going through the characteristics on the left-hand side of table 8), the team decided that it did not know enough about the villages to classify them, and that the ranking was likely to bias team members, questioning, contrary to the team's decision on day 1 to use an "open" approach (as discussed in activity 4 above). The team thus abandoned the initial domain exercise.

The team instead decided to do a broad reconnaissance of all the districts in Western, North Bank, and Lower River Divisions, in order to determine characteristics for identifying domains. There still remained the practical problem of choosing which villages to go to. The team first redured the number of districts from 23 to 11, by grouping adjacent districts thought to be similar. One or 2 villages were then chosen from each district, based primarily on the extension team member's judgement of representativeness.

Domains Identified by the Reconnaissance

In the planning session for stage II on February 11, the team first identified 5 characteristics based on the reconnaissance for distinguishing domains for horticultural production (table 8). Each characteristic was scored as either more or less favorable for horticultural production:

Characteristic	More Favorable	Less Favorable
1. Water availability	L: low-lying land (high water table)	H: high-lying land (low water table)
2. Access to market	N: near	F: far
3. Climate	H: humid	D: dry
4. Level of management	H: high (food crop appearance; special practices such as manure, chemical fertilizer, trellising, or mulching; more diversity of crops)	L: low (poor crop appearance; no special practices; less diversity of crops)
5. Rice	NR: no rice (thus, vegetable production not delayed in food rice years)	YR: yes rice (thus, vegetable production delayed in food rice years)

Next, the 13 villages were listed and scored for each characteristic. Table 9 shows the result with only the favorable scores entered and unfavorable scores left blank. As the table shows, there was no clear pattern of association among the characteristics. The team therefore added up the number of favorable scores and first grouped villages into those with a higher average number of favorable scores (count = 3-4) versus those with a lower overall number of favorable scores (count = 0-2).

The team also looked at the count of favorable scores for the first 3 characteristics as representing higher potential for horticultural production. On this basis, all the villages with higher overall favorable scores also had higher potential scores (count = 2-3). Those in this group with a high level of management were termed domain A-1 (high potential, high achievement), and the 1 village with a low level of management was termed domain A-2 (high potential, low achievement). Among the villages with lower

overall favorable scores, 2 had higher potential scores (count = 2) and were termed domain B-1 (intermediate potential, low achievement). The remaining villages were termed domain B-2 (low potential, low achievement) (table 7).

Domain Refinement in Stage II

The team recognized that these domains were based on villages as a whole. Generally, horticultural production outside the Bakau area is done in group gardens. While plots are managed individually within the gardens, there are probably larger differences across gardens (villages) than within them. In stage II, the team will began to look more closely at intra-village (intra-garden) differences, through the selection of respondents based on management level within each village (high vs. low), as also discussed under activity 4. This may result in some refinement of the domains.

In table 7, villages in each domain for the stage II survey are marked with asterisks. As this table shows, 4 of the B stage II villages come from the A-1 domain. The objective here is to focus on these villages with the most active horticultural production. This will also allow more comparison of inter- vs. intra-village variation for this domain. Domains B-1 and B-2, on the other hand, each have only 1 village for stage II. The main objective here is to compare a higher and a lower-potential village across the low achievement B domains.

Identification of Trial Types and Development of Treatment Arrays and Experimental Designs for Each Trial Type

As discussed under activities 1 and 4, several trial types were proposed as a result of the initial stage I reconnaissance. These trial types are

hypotheses to be verified, modified, changed, and/or augmented during stage II. Final identification of trial types will be made based on the results of stage II.

Development of treatment arrays and experimental designs obviously is also dependent on the identification of trial types following stage II. Hence, it was not possible to carry out this part of the terms of reference within the time frame of this first consultancy. However, the unit did discuss several preliminary ideas for on-farm trials based on the reconnaissance survey. One idea would be to use producers from high management level villages as counterpart leaders of on-farm trials in low management level villages. For example, in Suarra Kunda, in domain A-1, producers were using groundnut hay mulch on tomato and intercropping cabbage and pepper with onion. The mulch could help reduce fruit rot, and the intercropping increases diversification. These techniques could be introduced in B domain villages such as Sukuta (Jarra), Burong, or Toniataba).

Another idea would be to include intercropping of vegetables of greater nutritional value in market vegetable trials. Such a trial would have dual objectives: simultaneous improvement of market vegetable production and diversification of the diet. The market vegetable trial might, for example, involve planting dates and cultivars for onion, to spread out production. Introduction of new recipes could be included for the vegetables intercropped for nutritional value.

Obtaining Information from Senegal for Use in Trial Design

At the end of the consultancy, a trip was made to Dakar, Senegal, to obtain information from several organizations there on their research results and experiences in on-farm trials which might be relevant in designing trials after stage II. Four organizations were visited:

1. CDH (Center for Horticultural Development)
2. ENDA (a Senegalese non-governmental organization)
3. ITA (Institute for Food Technology)
4. ISRA (Senegal Institute for Agricultural Research).

As a larger country with a more developed agriculture in general and horticultural industry in particular, CDH, ITA, and ISRA are able to carry out more basic research than The Gambia is capable of. Since both countries have many similarities in ecological conditions and farming systems, and share common ethnic groups, it is only logical for The Gambia to take advantage of applicable results of basic research done in Senegal. This is especially appropriate under the umbrella of Senegambia economic cooperation.

At CDH, the unit obtained seed from breeder Van de Plas of a new tomato cultivar. This nematode-resistant, heat-tolerant cultivar was bred at CDH using crosses of new material from the Asian Vegetable Research and Development Center in Taiwan and locally adapted material. It has produced over 20 mt/ha on 4-ha Production fields in the wet season, and 40-70 mt/ha in the dry season. The outstanding wet season yields offer a possible avenue for diversification and staggering of planting of tomato, which could alleviate part of the tomato glut problem.

Another new CDH tomato cultivar has resistance to Fusarium wilt races 1 and 2 and larger fruit than 'Roma', the standard dry season commercial cultivar.

Research on bitter tomato has resulted in a new high-yielding, mite-resistant jakatu (bitter tomato) line. This has now progressed to the F4 generation.

Considerable research is being done at CDH to extend the white potato growing season through identification of cultivars adapted to Senegal with differing maturities, maximum uniformity, and good storageability. Another part of the white potato program involves research on production from true seed. This program is being done in cooperation with CIP, the International Potato Center in Peru. The unit requested the farming systems economist P. A. Seck to send a list of white potato cultivars, indicating for each the following: maturity, skin color, size, cooking quality, storageability, and ecological (climatic) requirements.

The unit obtained several publications from Mr. Seck on CDH recommendations for cultivars and production practices of several other vegetables. The unit also learned that CDH is screening cassava, okra, and sweet potato to identify shorter-duration cultivars. These cultivars again may have potential for spreading production in The Gambia more evenly over the year, and thereby aid diversification and reduce market gluts. Other breeding and screening research includes IITA cassava with mealybug resistance, hot pepper using material from Taiwan, onion, and radish.

The plant pathology section of CDH is doing research on Stemphyllium resistance in jakatu (bitter tomato), pink root in onions, several pepper

viruses (including veinal mottle), and tomato leaf curl virus. They also screen new pesticides and miticides that are being introduced into the Senegalese market.

The CDH extension liaison unit has training programs on seed production and white potato production (the latter in collaboration with CIP). The training programs are given on demand by their staff of 3 persons. In the past, they have, for example, done a training program for Caritas (an NGO also active in The Gambia).

The extension liaison unit has also done some on-farm testing of improved tomato cultivars, early production of onion from sets, and introduction of 'Small Fry' cherry tomato. The early onion production from sets was found acceptable by cooperators, but cherry tomato production was not economic.

ITA is doing research on storage and fruit processing, as well as characterization of nutrient composition of local foods. Unfortunately, the visit to ITA came at an inconvenient time for ITA staff.

At ENDA, the unit met with Jacques Bugnicourt. Mr. Bugnicourt first explained the ENDA approach to nutrition education. This is based on teaching by analogy to crop production (for example, nutrition of children being analogous to fertilization of young seedlings). In an ENDA garden program, an attempt was made to introduce local watering can manufacture, but these were not fully accepted. Another ENDA project is using local herbs for tomato preservation, but the technique is still too sophisticated. Mr. Bugnicourt agreed to contact an ENDA project in Mali for more information on indigenous onion preservation techniques identified there, which might be useful in The Gambia. Mr. Bugnicourt also agreed to send a copy of a publication now in press on nutrient content and recipes of selected local foods. The unit obtained copies of several other ENDA publications already in print.

At ISRA, the unit met with Josh Posner, farming systems agronomist associated with the Casamance project. Posner agreed to facilitate participation from the project in a farming systems workshop to be held in The Gambia in April (described in greater detail later).

Follow-up Plans for On-Farm Trial Design and Analysis

In order to apply information from previous research in The Gambia, information obtained from Senegal, and other relevant research results to the design of on-farm trials based on stage II, the scientific officers of the unit first need an introduction to principles and techniques of treatment selection and experimental design and analysis for on-farm trials. On-farm trials differ from station trials in several ways. In station research, treatments are often selected in order to elucidate scientific principles (such as the inclusion of zero rate treatments, unweeded plots, artificially high rate treatments for response curves, etc.). On-farm research may sometimes include such treatments as researcher controls, but most experimental treatments are chosen on the basis of potential acceptability by farm households. Spacing treatments, for example, may not he in even increments, but rather reflect widths of different implements. Control treatment usually include both an average farmer control, reflecting the domain as a whole, and individual farmer controls at each farm. These controls are necessary for valid comparisons of economic benefit and household acceptability of new practices. Thus, selection of treatments requires dialog with farm household members.

The level of non-treatment (non-experimental) variables also differs. In station research, non-treatment variables are usually placed at non-limiting levels and controlled equally from replication to replication. This allows researchers to identify the biological potential of new treatment practices under conditions of low variability. In on-farm research, however, since the objective is to test farm household management of new treatment practices under real farm conditions, non-experimental variables remain at farmer level. This allows researchers to identify which new practices will still stand out as superior biologically, economically, and in acceptability even when measured against conditions where other factors may be both limiting, and variable from farm to farm. Extension personnel can then have greater confidence that other farm households in the domain can achieve the same results as the trial farm households when they, the extension personnel, make recommendations based on those results.

Experimental designs can also differ. Station research is almost always site-specific, with replications usually contiguous and in one location. Most on-farm research involves regional trials with replication across sites. Replications are obviously not continuous across sites, and may not necessarily be continuous within sites.

Designs for on-farm trials change as trials progress towards identification of acceptable recommendations. Earlier in the on-farm trial process, replication within sites is important to identify treatment-by-site interactions. In such trials, the objective is to test several alternatives in order to identify the best choice for a recommendation. Later in the on-farm trial process, when the objective is to verify whether a particular

alternative is in fact acceptable to farm households and now ready to be disseminated more widely in a domain, replication is done across sites only. In such trials, regression on an environmental index can be used to identify treatment-by-environment interaction for partitioning the domain and identifying more than one recommendation.

Intermediate in the on-farm trial process, the team may find it desirable to test a treatment array larger than can be accommodated on each of the cooperating farms. New techniques in incomplete block designs for on-farm trials can provide ways for teams to test more treatments across all farms without sacrificing replication within farms, or exceeding the limits of trial area of each farm. These designs can also accommodate differing block sizes among farms.

Analysis procedures for on-farm trials likewise differ. Analysis of variance often includes terms for sites, blocks within sites, and site-by-treatment interaction. A new algorithm for analysis of incomplete block designs allows this type of data to be analyzed by hand calculators, whereas traditional analysis of variance is dependent on access to a computer. Modified stability analysis, using regression on an environmental index, as mentioned earlier, can be especially useful. In addition, economic analysis and analysis of acceptability are also an essential part of analysis of on-farm trials.

During the period April 7-25, the Farming Systems Support project will sponsor a three-week workshop in The Gambia on FSH/E methods. Approximately half of the workshop participants will come from MOA, with GARD support. The training advisor recommends that the 2 scientific officers of the unit,

G.O. Gaye and Isatou Jack, be given approval to participate in this workshop (Attachment F). During the first week, focusing on diagnosis, they would serve as resource persons, applying their experience in leading the planning, conduct, and appraisal work of the reconnaissance survey discussed under activity 4 above. During weeks 2 and 3, which cover design and analysis of on-farm experimentation, they would have the opportunity to become familiar with the principles and techniques of on-farm trial design and analysis described above.

Finally, the training advisor proposes that a 3-week design consultants follow the workshop, from April 26 to May 18. This will enable the training advisor to work With the unit to apply appropriate techniques presented in the workshop to the trial needs identified from the stage II survey in March. The training advisor will be a coordinator for the FSSP workshop and would be able to extend his time in The Gambia for the proposed design consultancy.

Activity 5b. Exploration of the feasibility of the nutritional dimension in FSR/E activities.

Horticulture in The Gambia is linked closely with consumption and nutrition in two ways; production objectives include both sale and consumption, and the producers divide their time between production and preparation of food for consumption. This is because in The Gambia as in many other West African countries, women are the main producers of horticultural crops. Some of that production is market-oriented, but other production is for home use. At the same time, women have an important role in the preservation and preparation of food for themselves, children, and other adult females and males in farm households.

The GARD project paper recognized the importance of this linkage by establishing dual objectives for horticulture: to improve both the income and nutrition of rural households through the strengthening of horticultural research. This activity in the terms of reference thus reflected these objectives of the GARD plan of the Ministry.

The inclusion of this activity also recognized the potential for linking horticulture and nutrition research and extension. Female nutrition extension personnel can take advantage of gender affinity and greater cultural accessibility to women producers to provide an additional channel for on-farm trial cooperation and flow of information. On the other hand, female extension personnel are limited in number. Combining nutrition and production information in integrated extension programs for male agricultural technicians can increase their effectiveness in reaching women producers. The ENDA program in nutrition education also suggests that production and nutrition extension can be combined to achieve a synergism of mutual reinforcement.

During this consultancy, the leader of the new nutrition unit of MOA, Kuje Manneh, participated as a member of the reconnaissance team discussed under activity 4 above. Currently, the nutrition unit is carrying out a two-year foods and nutrition project in 16 villages in the Western Division. The focus of the unit is on solving nutrition problems through food service. In the first year, the project is promoting production of vegetables, legumes, and poultry for home use, together with food preservation techniques and nutrition education. The objective of the production work is to diversify the existing specialized market gardens. The project works both with women's and 8-14 year-old youth groups. The project provides information directly to both the

women's and youth groups, and through the youth group also monitors the effect of information given to women on their children's eating habits. In year 2, the project will also introduce income-generating activities.

Through the nutritionist, the unit also had an opportunity to meet with Paul Schinnock of the Medical Research Center (MRC), together with a World Bank consultant. That discussion revealed that the MRC/World Bank work was focused on identifying nutritional deficiencies. Most work to date in The Gambia has focused on macronutrients (carbohydrates, protein, and fat). Although little has been done to identify micronutrient deficiencies, folate (iron) deficiencies are widespread, and iodine deficiencies appear in the eastern part of the country. There are also riboflavin and vitamin A deficiencies.

The MRC/World Bank work is thus not focused at all on applied research and extension linking production and consumption of horticultural products. The nutrition unit's pilot project, on the other hand, does link production and consumption, but it is limited in scope. In other words, efforts through GARD to link horticultural production and consumption in FSR/E activities would support and expand ongoing MOA efforts.

Among the FSR/E community, there is increasing recognition of the importance of the linkage between production and consumption, and the need to improve FSR/E methodology to include this linkage throughout all the stages of FSR/E work. This is particularly important because FSR/E aims at the generation of technology that is acceptable to farm households and improves the welfare of all farm household members. In other words, the measure of success of FSR/E, as defined by FSR/E proponents themselves, involves more

than just increases in biological yield per plot or farm, and more than just increases in gross national food production. It also involves more than just increases in overall farm household income. The measure of success of FSR/E fundamentally requires an intra-household analysis of costs and benefits to all household members, and one key element in assessing those costs and benefits is changes in nutritional status of different household members as a result of FSR/E production interventions.

As a result of the increasing recognition in the FSR/E community of the need to include consumption and nutrition in FSR/E methodology, AID commissioned a study under the direction of Timothy Frankenberger. Sections from the report of that study were distributed to the members of the reconnaissance team, and discussed in greater detail with the unit.

The nutritionist also accompanied the unit officers and the training advisor on the visit to Senegal discussed under activi 5a above. As mentioned in that section, the nutritionist requested a copy of a publication from ENDA on nutrient content of local foods. The group also discussed ways in which nutrition and consumption problems might be addressed through on-farm trials, as also described in section 5a above.

The training advisor recommends that this collaboration between the 2 units be continued and formalized. Specifically, the training advisor recommends that the nutritionist continue to participate in both the proposed overall Yundum-based FSR/E team, and in the proposed horticulture core group, through a formal invitation and appropriate reallocation of her time.

The nutritionist and the horticulture unit also made several concrete plans for continued collaboration. The nutritionist will prepare a case study

based on the reconnaissance survey that highlights consumption issues for use in the April FSSP/MOA-GARD workshop. The nutritionist will also work closely with Ms. Jack of the horticulture unit on planning post-harvest and preservation research identified in stage II of the survey. If the survey results indicate a high priority for research in these areas, a proposal may be justified for laboratory facilities with drying ovens, refrigerator, and cold storage, for nutritional analysis and post-harvest and preservation research.

The nutritionist and the unit could also benefit from a return visit to Dakar, now that initial contacts have been made. With adequate lead time, this visit could combine several objectives:

1. Obtaining information and interaction with researchers at ITA on their work in nutritional analysis, storage, and processing.
2. Visit to commercial plants in Dakar involved in tomato and fruit processing.
3. Visit to CDH on-farm trials.
4. Interaction with the ENDA project personnel working on onion preservation in Mali.

The last objective in turn could lead to a follow-up visit to Mali, if the interaction in Dakar suggested that would be useful. Through the new project in Mali that the training advisor's home institution, Virginia Tech, is participating in, the training advisor would also be able to facilitate visits with Malian horticultural research and extension personnel on the same trip.

To support this collaboration, the training advisor recommends approval and transport, fuel, and per diem support for the follow-up visit to Dakar, as well as consideration of the possible follow-up visit to Mali.

Finally, the training advisor suggested to the nutritionist to consider needs for technical assistance in consumption-FSR/E linkages. The nutritionist identified several areas:

1. A focused survey of existing preservation techniques, such as smoke and fire drying, to determine how to improve on indigenous techniques.
2. Sensory and shelf life tests of introduced new preservation technologies, such as solar drying of okra, jam-making, pickling, chutney, bottling, and canning, to determine potential acceptability.
3. Production guides for horticultural crops currently grown for consumption use, or introduced in trials for nutritional value.
4. Training agricultural assistants (AA's) in processing, preservation, and recipes for horticultural crops grown for consumption use or introduced for nutritional value. This could include development of a working kit that would be given to the AA,s together with production guides. This would enable the nutrition unit to reach beyond the 16 villages where it has the pilot project, and integrate its work better into the MOA as a whole.

The training advisor recommends support for these proposals. Furthermore, if requested by MOA through GARD, the training advisor and Marilyn Prehm, a nutritionist faculty member at Virginia Tech, would be willing to collaborate with the horticulture and nutrition units in providing technical assistance in the above areas. The nutritionist has experience in women in development, nutrition, and home economics work in several developing countries in Asia and Latin America, and has a strong interest in working in The Gambia through GARD. The nutritionist and the training advisor are also involved in a

proposal to AID for case studies in nutrition-FSR/E linkages. With the collaboration of the horticulture and nutrition units, this proposal might ultimately lead to additional outside support for technical assistance in this area.

Table 1. Summary of Accomplishments, Follow-Up Plans, and Needs

Activity	Accomplishments	Follow-up Plans	Needs
1. Review and Update of:			
a. Training	Needs reviewed and training plan prepared based on project paper.	Await ARMS decision.	Funds as requested in training plan.
b. Research support	Preliminary assessment made based on reconnaissance survey stage I and preliminary budget prepared.	Final 1986 research/ extension/policy agenda to be submitted in April after reconnaissance survey stage II. Await ARMS decision.	Funds as requested in preliminary budget.
c. Advisory assistance	Previous research reviewed for technical content and relation to previously-established unit objectives.	Previous research to be reviewed in relation to final 1986 research/ extension/policy agenda after survey stage II.	
2. Group of biological and social scientists			
a. Formation	Larger FSR/E team at Yundum formed and operating.	Await ARMS decisions.	Formal invitations to team members from ARMS. Approval for reallocation of time for team members. Budget for future team activities.
b. Coordination of on-farm and on-station horticultural trials.	Core group for horticulture identified. Plan for operation of core group within larger FSR/E team at Yundum proposed.	Await ARMS decisions. Design trials following survey stage II.	Approval of core group operation plan. Formal invitation to core group members. Budget for future activities.

Activity	Accomplishments	Follow-up Plans	Needs
3. PVO activities			
a. Review PVO horticultural extension.	Action Aid and Methodist Mission personnel involved in FSR/ E teams. PVO gardens visited. Obtained briefing on FFHC activities	Isatou Jack to obtain briefings on CRS, Save the Children, and Caritas activities.	
b. Determine NGO needs for horticultural research support.		To be determined based on survey stage II.	
c. Determine collaboration between PVO activities and GARD-supported activities.	Participation of Action Aid and Methodist mission personnel in reconnaissance survey obtained. Continued participation of above PVO personnel in FSR/E team and horticulture core group proposed.	Collaboration in trials to be determined after survey stage II.	Formal requests for participation of these personnel from MOA. Briefing by MOA and GARD personnel on plans in MOA and how those plans could help PVO activities.
4. Questionnaire on cropping patterns in Western, Lower River, and North Bank Divisions.			
a. Development	Larger FSR/E team determined that focused questionnaire not possible prior to "open" reconnaissance. "Open reconnaissance plan developed in preparation for more focused stage II survey.	Report on methodology developed by team being prepared by G.O. Gaye and Isatou Jack. Funds for Isatou Jack to present paper to be sought by John Caldwell.	Approval for Isatou Jack to present paper on methodology and obtain evaluation by FSR/E community at KSU symposium, October 1986. Typing and xerox support.

Activity	Accomplishments	Follow-up Plans	Needs
b. Administration	"Open" reconnaissance of 13 villages carried out by FSR/E team. Domains identified based on "open" reconnaissance. Plans made for survey stage II.	Report on results of reconnaissance being prepared by Isatou Jack and G.O. Gaye. Stage II to be carried out by team in March - April 1986.	Approval and funds for G.O. Gaye to present paper on reconnaissance results and obtain evaluation by horticultural research/ extension community at ASHS meeting at Davis, California, August 1986. Support for stage II: Letters informing team of dates of stage II activities and approving their allocation of time to those activities. Vehicles and fuel to carry out stage II survey. Establishment of new MOA night allowance rate for reconnaissance survey activities reflecting longer working hours and greater number of continuous days away from home for FSR/E survey work. Night allowances at new MOA rate provided. Notebooks and pencils for recording information in field. Large sheets of paper, magic markers, cellophane tape, and chalk for assembling and making decisions on information. Typing and xerox support.

Activity	Accomplishments	Follow-up Plans	Needs
c. Identification of possible on-farm trials in horticultural crops.	Preliminary hypotheses for trial types proposed.	Hypotheses to be verified, modified, changed, and/or augmented during stage II. Final identification of trials to be based on stage II.	Above letter to team members. Above supplies, typing, and xerox support.
5a. On-farm trial design			
a. Identification of farm households with common production systems (domains).	Preliminary identification of domains for horticultural interventions done within unit. Opinions on domains for horticultural interventions obtained from Jan Christiansen. Domains based on total farming systems and sub-domains for horticultural interventions identified based on reconnaissance survey.	Greater information on characteristics, constraints, and farm household member goals and needs of selected sub-domains to be obtained in stage II.	Letters, supplies, typing, and xerox support for stage II.
b. Identification of trial types.	Preliminary hypotheses for trial types proposed.	Hypotheses to be verified, modified, changed, and/or augmented during stage II. Final identification of trials to be based on stage II.	Letters, supplies, typing, and xerox support for stage II.
c. Treatment array and experimental design for each trial type.	Visits made to CDH, ENDA, and ITA in Dakar, Senegal, to obtain information on research results which may be relevant in treatment arrays and on their experiences in on-farm trials.	Participation of G.O. Gaye and Isatou Jack proposed in FSSP/MOA-GARD workshop in April, 1986. Design consultancy proposed to follow workshop.	Approval for participation in FSS workshop. Approval and funding for design consultancy.
5b. Feasibility of nutritional dimension in FSR/E activities.	Participation of nutritionist in FSR/E team reconnaissance survey obtained. Discussion held with World Bank nutrition consultants.	Nutritionist to prepare case study based on reconnaissance survey, highlighting consumption issues identified, for	Formal invitation and approval for reallocation of time for nutritionist. Transport, fuel, and travel

Activity	Accomplishments	Follow-up Plans	Needs
	Frankenberger papers on role of consumption in FSR/E shared with unit and FSR/E team. Continued participation of nutritionist in FSR/E team and horticultural core group proposed. Visits made to ITA, CDH, and ENDA in Dakar, Senegal, to obtain baseline data on nutrient contents of horticultural products and information which may be relevant to on-farm trial design.	use in April FSSP/MOA-GARD workshop. Isatou Jack to collaborate with nutritionist on post-harvest and preservation problems in horticultural crops during and following stage II. Follow-up trip to ITA proposed. Suggestion made for nutritionist to consider needs for technical assistance in consumption FSR/E linkage.	per diems for follow-up trip to ITA. Laboratory with drying ovens, refrigerator, and cold storage for nutritional analysis and/or station research on preservation and post-harvest problems if identified as high priority in stage II.

Table 2. Proposed Composition of Steering Committee, Overall Team, and Focus Area Core Groups of Yundum FSR/E Team

Discipline/ Organization	Steering Committee*	Overall Team Reconnaissance and Visits to Trials	Focus Area Core Groups for Design and Implementation of Trials and Research			
			Horticulture	Agronomy	Livestock	Nutrition
Horticulture		1	1-2	-	-	
Agronomy	1	1	-	1-2	-	1**
Livestock		1	-		1-2	
Nutrition		1	-			1-2
Soil & Water	1	1	1**	1**	1**	-
Crop Protection		2			-	-
NGOs	1	2	1+	1+	1+	1+
Extension		1				
PPMU	1	1	1	1	1	1
Total Members	4	11	4-5	4-5	4-5	4-5

*Steering committee composition to rotate yearly among production focus and support disciplines/organizations.

**Person chosen will depend on the nature of the trial or research priority.

+Person chosen will depend on the location of the trial, and whether NGO or extension field personnel input more appropriate in design and implementation.

Table 3. Proposed Schedule of Activities of Yundum FSR/E Team

Time	Activity	Members	Output
November	Yearly reconnaissance.	Entire team.	Multi-disciplinary assessment of farm household priorities and establishment of research/extension/ policy agenda balanced across 4 focus areas.
December	Design and implementation of dry season trials	By core groups.	Trials with farm household input.
January	Mid-season visit to dry season trials.	Entire team.	Multi-disciplinary assessment of farm household evaluation of trials.
February	Reports on results of dry season trials.	By core groups to rest of entire team.	Multi-disciplinary assessment of trial results.
April/May	Design and implementation of wet season trials.	By core groups.	Trials with farm household input.
July	Mid-season visit to wet season trials.	Entire team.	Multi-disciplinary assessment of farm household evaluation of trials.
August	Reports on results of dry season trials.	By core groups to rest of entire team.	Multi-disciplinary assessment of trial results.

Table 4. Examples of Interview Pair Rotation

Day	Pair				
	A	B	C	D	E
1	Entm. Meth. M. Live.	Path. Action Aid (Advisor)	Soil & H_2O Nutri.	Hort. Soc.	Hort. Extn.
2	Entm. Action Aid	Path. Nutr. Live.	Soil & H_2O Soc.	Hort. Extn.	Hort. Meth. M. (Advisor)

Table 5. Characteristics of Villages

Resources	Crops	Livestock
Land	Upland	Non-farm
Labor	Rice	Home
Capital	Fruits	Products
Wells	Vegetables	Other
Implements	Wet	
Other	Dry	
	Cultural	
	Crop protection	
	Fertilization	
	Use	
	Storage	

Table 6. Identification of Domains: Characteristics

Potential for horticultural production	Actual horticultural production	Linkages
Water availability Access to markets Climate	Level of management • crop appearance • special practices • diversity	Rice

Table 7. Identification of Domains: Mapping

Domain	Division	Village	H_2O	Market	Climate	Management	Rice	Potential	Overall
A-1	*WD	S(K)		N	H	H	NR	2	4
	*WD	K	L	N	H	H		3	4
	*WD	SJ	L	N		H		2	3
	*NB	SK	L	N		H		2	3
A-2	WD	S	L	N	H			3	3
B-1	*LRD	N	L	N				2	2
	LRD	T	L	N				2	2
B-2	*LRD	B	L			H		1	2
	LRD	S(J)	L					1	1
	NB	J	L					1	1
	NB	NK		N			NR	1	2
	NB	KJ		N			NR	1	2
	NB	K						0	0

Table 8. Characteristics for Grouping Farm Households

Ethnicity	Soil type
Level of technology	Income level
Access to markets	Distance from river
Preferred foods	Livestock
Topography	Social communication
Land tenure	Development programs
Sex role	Type of farming
Climate	Customs, traditions, and beliefs
Predominant crops	

Table 9. Identification of Domains: Mapping

Division	Village	H_2O	Market	Climate	Management	Rice
NB	J	L				
NB	NK		N			NR
NB	KJ		N			NR
WD	S(K)		N	H	H	NR
WD	S	L	N	H		
WD	K	L	N	H	H	
WD	SJ	L	N		H	
LRD	B	L			H	
LRD	N	L	N			
LRD	T	L	N			
LRD	S(J)	L				
NB	SK	L	N		H	
NB	K					

Attachment A

Terms of Reference: Dr. John Caldwell, Training Advisor in Horticulture, Jan. 3 - Feb. 16

Background: As detailed in the Project Paper (Annex A, pp. A32-A40) GARD support for horticultural research in The Gambia will involve training, research support, and long- and short-term technical assistance during the initial five years of the project. During the initial period efforts will focus upon a few activities with high potential for success. The initial visit by the training advisor will be the first of several such visits during the first two to three years of the project. Horticulture remains a high priority of the Ministry of Agriculture and an area in which there are good prospects for significant progress in the short- and medium-term.

Specific Activities:

The training advisor in horticulture will work closely with the head of the horticultural unit, Department of Agriculture and will report to the Chief of Party and the Assistant Director, Department of Agriculture. Specific tasks will include:

1. Review and update of training, research support and advisory assistance to horticulture described in PP.
2. Review PVO activities in horticultural extension and determine research support needs and collaboration between these activities and GARD supported activities.
3. Help select the most appropriate trial type, treatment array and experimental design for on-farm trials in different groups of farm households with common production systems.
4. Assist in formation of a group representing biological and social sciences to coordinate on farm and on station trials in horticultural crops.
5. Help develop and administer on a trial basis a questionnaire on cropping patterns in Western, Lower River, and North Bank divisions with a specific focus on identification of possible on farm trials in horticultural crops.
6. Explore feasibility of nutritional dimension in FSR/E activities.

Qualifications required:

The candidate should have advanced degree training and experience in horticultural research and extension. He/she should also have knowledge of farming systems research, experience/familiarity with The Gambia in particular and W. Africa in general. Finally, the candidate should be a potential candidate for a long-term position with the project at a later date.

Dr. Caldwell is an Assistant Professor of Agronomy at Virginia Polytechnic Institute with a speciality in horticulture. He has been active in horticultural research and extension in Virginia and has been a trainer/consultant for the Farming Systems Support Project. In this later capacity Dr. Caldwell has organized two seminars in The Gambia on farming systems research and on farm trials respectively. He is interested in a continuing association with the GARD project and The Gambia including a series of short term visits and a possible long term TA position beginning in year 3.

ATTACHMENT B
Schedule of Activities
January 5 - February 16, 1986

Week	Date	Activity
0	3/1 (F)	Departure from Blacksburg, Virginia, via Paris.
	4/1 (Sa)	Overnight in Dakar, Senegal.
	5/1 (Su)	Arrived Banjul.
1	6/1 (M)	Briefing by Horticulture Unit officers G.O. Gaye and Isatou Jack on unit objectives, training, and research program.
	7/1 (Th)	Briefing by G.O. Gaye on horticultural extension. Tour of nethouse, orchards, and Citroproducts plant. Visits with Matarr Ceesay and M.S. Kah, extension. Visit with Department of Agriculture Assistant Director of Research M.S. Sompo-Ceesay; tour of Cape gardens.
	8/1 (W)	Discussions with G.O. Gaye and I. Jack on their previous survey experiences and formal vs. informal survey methods. Preliminary zoning of Western, Lower River, and North Bank Divisions into 8 domains. Discussion with GARD design team member Chris Elias on nutrition in FSR/E and Yundum team.
	9/1 (Th)	Windshield tour of Gunjar market, 3 Gunjar gardens, Kasa Kunda garden, Somita extension Mixed Farming Center, Kandongko garden, and Kolora garden.
	10/1 (F)	Discussions with G.O. Gaye and I. Jack on: (1) composition of Yundum FSR/E team and horticulture sub-team; (2) role of commodity research with an FSR/E perspective and relationship of diagnosis, on-farm research, and station research; (3) process and structural models of farming systems; (4) ICTA sondeo team process; (5) "open" vs. "closed" interview techniques.
2	13/1 (M)	Review experimental designs and results of past research. Preliminary selection of domains and preparation schedule. Meet with Bob Mann, Methodist Mission, Brikama
	14/1(Tu)	Meet with M.O.S. Jammeh, Clyde Eastman, Baboucar Komma, and Sambou Kinteh, Program Planning and Monitoring Unit (PPMU). Meet with A.O. Taal, Permanent Secretary, Ministry of Agriculture (MOA). Meet with Mbye Tourey, Community Development. Stop at Catholic Relief Services and Citroproducts. Meet with Kuje Manneh and other members of MOA nutrition unit. Meet with D.C.A. Jagne and Sankung Saigne, Crop Production Service (CPS) Meet with Jan Christiansen, FAO fertilizer program advisor.

15/1 (W) Meet with Sammy Davis, Methodist Mission; MOA nutrition unit; Harvey Metz and Sissawo Gassama, Soil and Water Management; Keeba Samateh, Freedom from Hunger Campaign; and Baboucar Manneh, Extension Aids Unit.

16/1(Th) Plan Workshop with G.O. Gaye and I. Jack. Meet with J. Christiansen, FAO program, on criteria for identifying domains for horticultural interventions.

17/1 (F) Plan workshop days 1 and 2 with G.O. Gaye and I. Jack.

3

20/ 1(M) Workshop day 1:
(1) MOA needs, GARD plan, role of FSR/E, and mandate for horticulture unit.
(2) Formal vs. Informal survey methods.
(3) "Open" vs. topic guideline approaches.
(4) Group consensus on survey approach.

21/1 (Tu) Workshop day 2:
(1) Discussion on characteristics of FSR/E and research-extension linkage.
(2) Definition of recommendation domain.
(3) Characteristics for grouping farm households in Western half of country.
(4) Discussion ranking of characteristics, leading to group decision to use survey to identify domains.
(5) Grouping of districts and selection of 13 villages across all districts.

22/1 (W) Review workshop days 1 and 2 with G.O. Gaye and I. Jack. Meet with Sompo-Ceesay and Elon Gilbert.

23/1(Th) Plan workshop day 3 with G.O. Gaye and I. Jack. Obtain supplies from AID office for reconnaissance. Meet with Michael Turner, seed production consultant, on possibilities for local vegetable seed production in The Gambia.

24/1 (F) Workshop day 3:
(1) CIMMYT vs ICTA sondeo team composition and functioning.
(2) Interview pair rotation plan.
(3) Decisions on order of villages and logistics.
(4) Discussion on interview format.

4

27/1 (M) Reconnaissance of 3 villages in North Bank Division Niumi and Jokadu districts: - Jurunku, Ndungu Kebbe, and Ker Jarga.
Discussion at Barra.
Return to Bakau.

28/1(Tu) Reconnaissance of 2 villages in Western Division Kombo districts: Sohm and Sukuta.
Discussion at Sukuta.
Return to Bakau.

29/1 (W) Reconnaissance of 2 villages in Western Division Foni districts: Kassagne and Sangajor Jiramba.
Discussion and overnight at Jenoi training center.

30/1 (F) Reconnaissance of 3 villages in Lower River Division Jarra East and Kiang districts: Sukuta (Jarra), Burong, and Nema.
Discussion and overnight at Jenoi.

31/1 (F) Reconnaissance of 2 villages in North Bank Division Baddibu districts: Suarra Kunda and Katchang.
Discussion and overnight at Jenoi.

1/2(Sa) Reconnaissance of 1 village in Lower River Division Jarra West district: Toniataba.
Discussion at Tendaba.
Return to Bakau.

2/2(Su) Meet arriving flight of Dan Taylor, planning coordinator for Farming Systems Support Project (FSSP) - sponsored April workshop.

5 3/2 (M) Accompany D. Taylor and introduce him to E. Gilbert, M.S. Sompo-Ceesay, and Department of Agriculture Assistant Director for Extension Banja and Director Janneh.
Accompany D. Taylor to AID and meet with Tom Hobgood. Visits to PPMU, Water Resources, Forestry, CPS, and Animal Health to explain FSSP workshop and seek nominations of candidates to participate in workshop.
Review and plan workshop with D. Taylor.

4/2 (Tu) Return visit with D. Taylor to CPS.
Plan workshop appraisal session with G.O. Gaye and I. Jack.
Review and plan FSSP workshop with D. Taylor.

5/2 (W) Workshop appraisal session:
(1) Pooling of information on characteristics, constraints, and priorities across the 13 villages.
(2) Identification of most frequently-cited priorities for all activities for fruits and vegetables.
(3) Discussion with Citroproducts director M.A. Ceesay on marketing problems identified in reconnaissance and activities and plans of Citroproducts.
(4) Development of tentative research/extension/policy agenda.
(5) Explanation of FSSP workshop plans and solicitation of volunteers to prepare case studies based on reconnaissance villages.
(6) Discussion of relationship of reconnaissance team and overall Yundum FSR/E team.
Meet with Chris Elias and discuss team and its possible relationship to work focusing on water management problems.

6/2 (Th) Review consultancy and prepare outline for report. Review workshop appraisal session and plan workshop stage II planning session with G.O. Gaye and I. Jack.
Obtain evaluation of consultancy by G.O. Gaye and I. Jack.

7/2 (F) Write report on summary of accomplishments, follow-up plans, and needs of consultancy.

6 10/2 (M) Write report on consultancy.
Prepare long-term training plan for unit with G.O. Gaye and I. Jack.

11/2(Tu) Workshop stage II planning session:
(1) Evaluation of survey methods used in stage I reconnaissance.
(2) Identification of characteristics for grouping villages for horticultural agenda.
(3) Identification and mapping of domains.
(4) Development of villages for stage II survey.
(5) Interviewer and interviewee selection, interviewing and reporting format, and logistics for stage II survey.
(6) Recommendations on villages for FSSP workshop reconnaissance exercise.

Introduction to FSR/E and GARD for 3 new Peace Corps volunteers who will be involved in GARD-supported activities.

12/2 (W) Present report on consultancy accomplishments, follow-up plans, and needs to Elon Gilbert and M.S. Sompo-Ceesay.
Present report to Director Janneh.
Prepare for Dakar trip.

13/2(Th) Travel overland to Dakar.
Visit AID Dakar and ITA (Institute for Food Technology).

14/2 (F) Visit CDH (Center for Horticultural Development)
(1) Discussion with P.A. Seck, farming systems economist, on ISRA farming systems work and CDH programs with white potato, onion, and other vegetables.
(2) Tour of plant pathology laboratory.
(3) Briefing by Jan Beniest on work of CDH extension liaison office.
(4) Tour of seed production unit and experimental plots and discussion with Van de Plas on CDH breeding, propagation, and extension programs.

Discussion with Kuje Manneh, G.O. Gaye, and I. Jack on linkages between horticulture and nutrition units. Visit to ENDA (Senegalese non-governmental organization) and discussion with Jacques Bugnicourt on ENDA programs in nutrition education, vegetable gardening, and traditional vegetable preservation techniques.

15/2(Sa) Visit with Josh Posner, ISRA farming systems agronomist, and discussion of ISRA structure, Djibelor project, and GARD farming systems plans.
Final review with G.O. Gaye and I. Jack of plans for March-May.

16/2(Su) Departure from Dakar and return to Blacksburg, Virginia.

ATTACHMENT C

Participants in FSR/E Horticulture Team

	NAME	ORGANIZATION & ADDRESS
1.	G.O. Gaye (team leader)	Horticulture Unit Yundum
2.	Isatou Jack	Horticulture Unit Yundum
3.	Sissawo Gassama	Soil and Water Management Unit Yundum
4.	Sankung B. Sagnia	Crop Protection Service Yundum
5.	Bakary B. Trawally	Crop Protection Service Yundum
6.	Sol Owens*	Agriculture (Agronomy) Yundum
7.	Fatou Gaye	Animal Health Yundum
8.	Patricia D. Andrews*	Animal Health Yundum
9.	Kuje Manneh	Agriculture (Nutrition Section) Abuko
10.	Baboucar Manneh	Extension Aids Unit Yundum
11.	Hassan Sallah*	Extension Aids Unit Yundum
12.	Ramesh K. Singh	Action Aid-The Gambia 32 Leman St., Banjul
13.	Sammy Davis	Methodist Mission, Brikama

Participants List (cont.)

14. M.O.S. Jammeh	Program Planning and Monitoring Unit (PPMU) 10B Cameron St., Banjul
15. M. A. Ceesay*	Citroproducts, Ltd.
16. Elon Gilbert*	GARD
17. John S. Caldwell	Horticulture Unit/GARD Yundum

*Attended some workshop sessions only but did not participate in reconnaissance work.

ATTACHMENT D

Reconnaissance Survey Schedule
January 27 - February 1, 1986

Day	District	Village	Discussion	Rest Sta.
Mon. 27/1	Niumi Lower & Upper Jokadu	1. Jurunku 2. Ndungu Kebbe 3. Ker Jarga	Barra	Home
Tues. 28/1	Kombo E & W Kombo N & S, KUDC	4. Sohm 5. Sukuta	Yundum (EAU)	Home
Wed. 29/1	Foni Bintang Karenai, Brefai	6. Kassagne	Jenoi	Jenoi
	Foni Kansala Bondali, Jarrol	7. Sangajor Jiramba	Jenoi	Jenoi
Thurs. 30/1	Jarra East Kiang West Kiang Central, East	8. Sukuta 9. Burong 10. Nema	Jenoi	Jenoi
Fri. 31/1	Baddibu	11. Suarra Kunda 12. Katchang	Jenoi	Jenoi
Sat. 1/2	Jarra West	13. Toniataba	Tendaba	Home

ATTACHMENT E

Ministry of Agriculture
Horticulture Unit

Memorandum

TO: Mr. M.S. Sompo-Ceesay,
Assistant Director,
Dept. of Agriculture.

FROM: J.S. Caldwell,
Training Advisor in Horticulture

RE: Request for approval for travel by:
Mr. G.O. Gaye and Ms. Isatou Jack to
present papers.

DATE: February 10, 1986

During the past 5 weeks, Mr. G.O. Gaye and Ms. Isatou Jack have led the formation of a multi-disciplinary team and the carrying out by this team of a 6-day farming systems research/extension (FSR/E) reconnaissance with a focus on linkages of horticultural crops with the overall farming system. This reconnaissance will be followed by a focused survey in selected villages to verify tentative priorities for the 1986 horticulture unit's research/extension/policy agenda.

In the work that Mr. Gaye and Ms. Jack has led, we have given the multi-disciplinary team methodological options to choose from in accordance with their judgment of Gambian conditions and needs. We have also developed some new techniques for processing the information from a reconnaissance designed to identify domains.

This work contains information which I believe would be valuable for other farming systems practitioners and for other horticulturalists. Presentation of papers on this work would give recognition to Mr. Gaye and Ms. Jack, the team they led, and the department. It would also enable them to discuss their work with other researchers, obtain feedback, and thereby broaden their knowledge further. Accordingly, I would like to request your approval for them to present the following papers:

1. Mr. G.O. Gaye:

   Paper on the results of the use of farming systems methodology to identify priorities for a horticultural research/extension/policy agenda, to be presented at the 1986 annual meeting of the American Society for Horticultural Science, Davis, California, August 1986.

rp

2. Ms. Isatou Jack:

Paper on issues and techniques in the application of farming systems methodology with a horticultural focus, to be presented at the 1986 annual farming systems research/extension symposium, Manhattan, Kansas, October 1986.

I will be attending both meetings, and will assist Mr. Gaye and Ms. Jack in the preparation of the papers and slides to illustrate them. With your approval, I will seek a scholarship from the Kansas symposium to support Ms. Jack's travel expenses. We would request that the GARD IPC approve funding for the travel of Mr. Gaye.

I will appreciate your consideration of these requests. Please let me know if you have any questions.

c.c.

Elon Gilbert, Chief of Party, GARD
G.O. Gaye, Scientific Officer, Horticulture Unit
Isatou Jack, Vegetable Crops Specialist, Horticulture Unit

ATTACHMENT F

Ministry of Agriculture
Horticulture Unit

February 10, 1986

Mr. M.S. Sompo-Ceesay
Assistant Director, Department of Agriculture
Cape St. Mary

Dear Mr. Sompo-Ceesay:

During the period April 7-25, 1986, the Farming Systems Support Project (FSSP) will conduct a farming systems workshop for approximately 10-15 participants from The Gambia and 15-20 participants from other West African countries. During the past 5 weeks, through the consultancy in horticulture, Mr. G.O. Gaye and Ms. Isatou Jack of the horticulture unit have acquired knowledge and experience in farming systems diagnostic techniques. They have served as facilitators during 4 days of training for nine other research and extension staff, and participated in a 6-day reconnaissance.

The FSSP has placed high priority on creating farming systems training skills among research and extension personnel in the West African region. In light of the skills already acquired by Mr. Gaye and Ms. Jack, I would like to request that you approve their participation in the FSSP workshop in the following capacities:

1. <u>April 7-12 (diagnosis)</u>:

   Serve as facilitator for sessions on survey methods on April 8, using procedures developed in the 4 days of workshops last month, and participate in the other sessions as resource persons.

2. <u>April 14-19 (on-farm trial design) and April 21-25 (on-farm trial analysis)</u>:

   Participate in sessions to acquire knowledge and skills in preparation for second consultancy in May. The second consultancy will focus on horticulture trial design and analysis.

-IV

In addition to the above activities, the FSSP might wish to request the assistance of Mr. Gaye or Ms. Jack as a trainer in other workshops in West Africa. ,One is proposed for Cameroon in fall 1986. If Mr. Gaye or Ms. Jack served as a trainer such a trip could be combined with a visit to horticultural research centers in the country of the workshop.

The FSSP will appreciate your consideration of these requests. Please let me know if you have any questions.

Sincerely yours,

John S. Caldwell
Training Advisor in Horticulture
and Coordinator, 1986
FSSP West Africa/Gambia
Farming Systems Workshop

c.c.

Elon Gilbert, Chief of Party, GARD
Susan Poats, FSSP Associate Director
G.O. Gaye, Scientific Officer, Horticulture Unit
Isatou Jack, Vegetable Crops Specialist, Horticulture Unit