

PD-AAN-327

WV = 31859

669-0135/15

CLASSIFICATION PROJECT EVALUATION SUMMARY (PES) - PART I

Report S U-447

1. PROJECT TITLE Agricultural Research and Extension			2. PROJECT NUMBER 669-0135	3. MISSION/AID/W OFFICE USAID/Liberia
5. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>669-83-3</u>	
A. First PRO-AG or Equivalent FY <u>80</u>	B. Final Obligation Expected FY <u>82</u>	C. Final Input Delivery FY <u>84</u>	6. ESTIMATED PROJECT FUNDING A. Total \$ _____ B. U.S. \$ <u>4,997</u>	
			7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>8/81</u> arrival of LSU Team To (month/yr.) <u>9/82</u> Date of Evaluation Review <u>12/8/82</u>	

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
<u>Administrative Structure for Research</u> Recommendation: 1. That the possible degree of autonomy for CARI be assured. 2. That the Director of CARI be accountable directly to the Minister of Agriculture as Chairman of the Research Council. 3. That the LSU technical team function in an advisory capacity while their Liberian counterparts assume line responsibilities. 4. The MOA technical committee should meet regularly	Minister of Agr.	9-30-83
<u>Staff Development</u> CARI labor force should be reorganized to ensure the timely availability of unskilled labor for research operations. GOL policy makers made aware that adequate staff & funding for research activities is essential if the country hopes to increase agriculture production over time.	Minister of Agr.	9-30-83
<u>Economic and Social Analysis Office</u> That one or more Liberians be seconded to this office	MOA - USAID Direct MOA	Immediately Continuous
<u>Appropriate Technology Department</u> That LSU and GOL give priority to filling vacant positions	CARI Director	Continuous
<u>Research Library</u> 1. That a properly trained librarian be employed as a short-term consultant to train and supervise the existing library staff, organize the library and compile/place orders for books & periodicals	CARI/USAID CARI Director	9-1-83 8-1-83
	CARI/LSU	LSU by 5-1-83 GOL by 8-1-83
	LSU	6-1-83

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. Continue Project Without Change

B. Change Project Design and/or
 Change Implementation Plan

C. Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

J.M. Cornelius, USAID/Liberia
B.J. Jadwin, USAID/Liberia
Francis Dunbar, MPEA
Greene Ekaci, MOA

12. Mission/AID/W Office Director Approves:

Signature: *Lois Richards*
Typed Name: Lois Richards
Date: August 8, 1983

PROJECT EVALUATION SUMMARY (PES) - PART I

Research Library cont'd

2. That a well qualified person with a B.S. degree be employed as a librarian and be scheduled for the M.S. degree scholarship; CARI 10-31-83

3. That better lighting, office equipment, more shelving, photocopier, air conditioning, be installed and that insects and other pests be controlled in the library; CARI/USAID 9-30-83

Physical Facilities

A complete study of the need for improved physical facilities at CARI should be conducted prior to finalizing the Phase II PP. USAID/CARI -84

Part II

Project Evaluation Summary - Agriculture Extension and Research (669-0135)

13. Summary:

The project was authorized for \$4,209,000 January 3, 1980 and the project agreement was signed March 10, 1980 with a PACD of September 30, 1983. A coup-d'etat April 12, 1980 followed by unsettled conditions in the country and delays in AID/W resulted in the contract with Louisiana State University not being signed until June 3, 1981. The delay in signing the contract automatically caused the implementation schedule to slip more than a year. Thus in March 1981 the PACD was extended one year until September 30, 1984. Because of higher than anticipated contract costs the AID funding was increased by \$788,000 in September 1982 to a LOP total of \$4,997,000.

The first two team members arrived in August 1981, three arrived in September and the sixth and final person arrived in December. The six houses that had been contracted to be built at the Central Agriculture Research Institute (CARI) by their arrival dates were not yet completed therefore alternate housing arrangements had to be made. The first few months thus were spent by the team in securing housing, providing proper utilities and logistical support in addition to trying to get organized in their respective work assignments. They did not move into permanent housing until May 1982. The Appropriate Technology Advisor was medically evacuated in April 1982 and at the time of this evaluation had not been replaced.

Although the above delays, delays in commodity procurement and the availability of sufficient numbers of trained Liberian scientists have contributed to a slow pace, it is expected however that the purpose and goals of the extended project will be met in most instances.

14. Evaluation Methodology:

Annex I of the Project Agreement states; "Two project evaluations are planned with the design of Phase II functioning as a third review of the project." This evaluation, done one year after the arrival of the LSU Team, was an in-house evaluation carried out by USAID, Ministry of Agriculture (MOA), Ministry of Planning and Economic Affairs (MPEA), CARI and LSU personnel. The Scope of Work was drafted and approved by CARI, MOA, MPEA and the Mission from Annex I of the Project Agreement and followed explicitly. This evaluation was primarily to determine progress to date and if any changes were necessary. A second "outside" evaluation will take place in September 1983. From the scope of work, a list of questions was drawn up by the USAID and sent to the

ministries involved for their review and comments. The ministries accepted the list as the basis for the evaluation exercise with the provision that the evaluators could add to the list as they saw fit in the course of the evaluation. Members of the evaluation team spent four days at CARI, interviewing LSU and Liberian staff and visiting project facilities and research sites. The evaluation was written after the team returned to Monrovia.

15. External Factors:

At the time the project was designed (1979) the GOL had a better capability, both financial and personnel-wise, to support the project. After the Coup when the financial situation became acute and many trained Liberians left the country the GOL was no longer able to support the project as assumed. There has been a large turnover in personnel and with departures of CARI staff under the project participant training program the Liberian professional staff at CARI is now bare-bones. In addition, due to GOL budgetary problems related to periodically meeting IMF standby agreement targets, the GOL quarterly financial allocations to CARI have often been late.

16. Inputs:

- 1) The PP states that AID will provide 228 person months of long and short-term assistance (including 3 p/m for evaluation) to advise and help the Central Agricultural Research Institute (CARI) build its capacity to conduct adaptive research and allocate its scarce resources to identified priority areas. Agricultural training will total 457 person months and be in a broad range of disciplines so as to strengthen the entire research institution. The commodities and other costs will include vehicles, equipment, furniture, library materials, travel supplies and vehicle operation and maintenance. Total estimated contribution will be \$4,997,000.
- 2) The PP indicates that the Government of Liberia will provide personnel, office space, supplies and equipment, and international travel for participants. Total estimated contribution will be \$5,168,000.
- 3) As the project was designed the contractor was to do all the procurement except for houses, furnishings and vehicles for the contract team. Louisiana State University was awarded the contract, however when the time came for the contract to be signed it was found that LSU was not approved for USG procurement. Rather than delay the contract another 4-6 months USAID agreed to do all the project procurement if LSU would develop the commodities lists and specifications. This has been a slow process. It was finally agreed to utilize host government procurement with SECID as the purchasing agent. This action has been a great success and commodities are arriving in due course and on a regular basis. About

half of the commodities planned for LOP have been purchased. The balance should be purchased in the 1983 calendar year. (Certainly for the second phase of the project it will be absolutely necessary that the Contractor be responsible for all procurement.)

4) All technical assistance personnel were provided by LSU as planned. The Agricultural Engineer was medically evacuated in April 1983 and was only recently replaced - a one year gap when no one was available to work on appropriate technology.

5) Long-term and short-term participants have departed for training. The PP indicated long-term and short-term participants would be sent during the first two years of the project.

6) All six staff houses and a propagation shed have been built. A seed storage building is yet to be built.

17. Outputs:

1) In relation to the development of the Research Institute, two primary outputs are seen emanating from this project. One is the development of CARI as an institution with an organization, management, function and capability adequate to perform its assigned mission. Essentially, this involves providing the proper environment and support at CARI which makes it conducive to do applied, adaptive research. The other output involves the development of the capability of the technical departments to perform their assigned missions. Their function is to design and carryout applied, adaptive research which is necessary to meet the objectives of the GOL. They must have a staff which is technically competent to perform their assigned jobs and they must have at their disposal the necessary land, facilities, equipment and support to do their jobs.

2) Actual progress has been slow due to several reasons. CARI has its third Director within the last year. The Acting Director went to the U.S. for his Ph.D. The LSU Research Coordinator was appointed Acting Director according to the Project Agreement. This did not work out - he asked to be relieved and a Liberian was appointed as Acting Director. Improved progress has been made under the present Acting Director.

3) The first annual report of research activities has been completed. In 1982 an International Root and Tuber Symposium was held in Liberia including a field day at CARI to observe research being done on cassava. It was reported that the visitors were impressed with CARI's cassava research program. Field Trials are being conducted on farms in Grand Cape Mount, Grand Bassa, Bong, Nimba and Montserrado Counties for rice and cassava. Upon satisfactory completion of farmer trials new varieties will be released. Propagation of cassava and sweet potatoes is being done by the tissue culture method which greatly increases propagation capacity.

4) Five new vegetable varieties were released in 1982.

18. Purpose:

The basic purpose of this project is to foster the development of an effectively structured and functioning agricultural research system in Liberia which will do the following:

- Interface effectively with regional and international agricultural research institutions.
- Conduct applied and adaptive research on appropriate food and cash crops.
- Cooperate effectively with extension and other development program efforts in developing viable production technology packages for improving food and cash crop production in Liberia.

It is readily apparent from these purposes that the ultimate objective of this project is institution-building. The project is viewed as a long-term, continuing effort which will likely require 12-15 years and the following end-of-project status would indicate that the basic purposes have been achieved:

1. A fully qualified and functioning staff are on-board, capable of administering the agricultural research system and producing valid, reliable research results.
2. Sound and appropriate food and cash crop and livestock production technology packages are applied through extension and other development programs.
3. Appropriate research results from regional and international agricultural research centers are utilized in the Liberian applied research program.
4. The facilities and equipment at Suakoko are sufficient to run a high quality adaptive research program.

Regarding the four items above:

1) A skeleton Liberian staff is on board however other staff are in the U.S. for further training. The six participants now in the U.S. are expected to return by the PACD. These are two Ph.D's, three for MSc's and one for a BSc. Six more participants will depart this fall, two for Ph.D's and four for MSc's.

2) Livestock technology is probably more advanced than food and cash crop technology at this time. The GOL has hired an Indian Veterinarian for the last four years to head up the livestock section. That section has done significant research in disease and pest control in livestock and is now doing nutritional and pasture management research.

3) Food and cash crops research has been underway for some time and results are being shown. Five new vegetable varieties (mentioned elsewhere in this report) have been released which should contribute to better family nutrition and cash crop production. New cassava varieties from IITA are in farmer field trials in three counties now and probably will be released in 1984. These varieties produce 3-4 times more than current varieties. Currently LAC-23 (upland) and Suakoko 8 (swamp) are the best rice varieties grown in Liberia. Research has been underway several years to find better varieties of rice. New improved varieties are also in farmer field trials and are expected to be released soon. These are expected to increase yields by 15-20%. Improved citrus and mango root stock have been imported and will be tested under Liberian conditions.

The publishing of the first annual report from CARI will give the extension officers, particularly those working for the Lofa, Bong and Nimba County Agricultural Development Projects, more information on appropriate technology packages for farmers.

4) Appropriate research results particularly from the International Institute for Tropical Agriculture (IITA), the International Center for Tropical Agriculture (CIAT) and the West African Rice Development Association (WARDA) have been and are being used at CARI. In fact practically all of the research being done at CARI on food crops is applied research. Scientists from CARI have made several visits to these institutions to exchange information and to learn. The new cassava varieties being field tested now are from IITA and preliminary results show that yields under farmer conditions, without fertilizer, are three to four times greater than local varieties. WARDA also carries out some research at CARI and the CARI staff closely collaborates with WARDA on other research CARI is doing.

5) A large order of commodities consisting mainly of laboratory equipment, shop equipment and crops research supplies has arrived since the evaluation team visited CARI. It is expected that by the next evaluation most of the equipment and supplies will be in place.

The project agreement called for five new laboratories to be built from GOL funds. These laboratories have not been built and it is doubtful if all of them can be built because of GOL budget constraints. It may be necessary to scale back some of the plans. Certainly Phase II design must look at facilities and equipment more carefully than was done for the current project. Other facilities, mainly housing, are currently being renovated with GOL funds but a study reviewing facility requirements for a complete research institute should be carried out prior to finalizing the Phase II project paper.

19. Goals/Sub-Goals:

The sector goal for this project is to increase rural income through greater Agricultural Production. This calls for increases in cash crop production and efforts toward self-sufficiency in foodstuffs. Training in agriculture is an essential element in these efforts, and strengthening administrative machinery and institutional capability, especially middle management must also be accorded high priority.

Since roughly 70 percent of Liberia's population is classified as rural poor, this project will affect positively the majority of Liberia's people. It is also consistent with objectives of the Ministry of Agriculture which call for diversifying Liberia's agricultural economy, increasing participation in modern agricultural production, increasing farmers income; and creating purchasing power, maximizing the national income of Liberia through agricultural and forestry pursuits, and providing rural and urban consumers with more nutritious diets at lower costs. Inherent in these statements is a conscious desire to reach the traditional sector of the economy (again largely the rural poor) which according to the World Bank, has a per capital GNP of \$120.00 compared with the monetized sector of the economy which has a per capital GNP of \$870.00.

20. Beneficiaries:

The expected beneficiaries of the research emanating from CARI will be the 150,000 subsistence farm families in Liberia. To date not many have benefited from the current project. There are many instances of farmers coming to the station and requesting information, better seeds or root-stocks for their own use. There have been farmer field days and other events which have been of interest. The release of five new vegetable varieties (okra, bitterball, hot pepper, sweet pepper and eggplant) is a modest beginning. The expected release of new rice and cassava varieties will have a major impact on these subsistence farmers as rice and cassava are the two main food crops.

There are also instances of larger more commercial type farmers requesting assistance in soil testing and fertilizer recommendations, farm planning, post harvest storage etc.

The lack of an effective functioning agricultural extension system is a constraint to the dissemination of information. Up to now CARI has not had much research data to distribute. Some off-station trials are being carried out on farms close to CARI and these are beginning to attract interest. The Bong County Agricultural Development Project is cooperating with CARI and with its own Extension Service is assisting with extension to Bong County farmers.

21. Unplanned Effects:

An unplanned effect was the sending of the Acting Director of CARI to the U.S. for his Ph.D and the placing of the U.S. Research Coordinator as Acting Director during his absence. Although the project agreement plainly stated this, it was not accepted by the CARI Liberian personnel. In this case it was not socially acceptable for professional Liberians to work under expatriates. The situation deteriorated to the point that the Ministry of Agriculture requested that the Research Coordinator/Acting Director be sent back to the U.S. At this point USAID/Liberia prevailed upon the Minister to place a Liberian as Acting Director and return the American to his contract job of Research Coordinator. The Minister agreed to do this although relationships between American and Liberian staff at CARI had deteriorated in the interim.

22. Lessons Learned:

(A) In this project not enough attention was given to CARI infrastructure such as water and electric supply, staff housing and basic buildings. There is nothing in the USAID funding to cover such items and the GOL budget allocations to CARI have been minimal due to overall budget ceilings imposed by the IMF. This makes for poor working conditions and poor morale among staff.

(B) Scientists no matter how experienced in the U.S. must have had previous successful overseas experience.

23. Special Comments or Remarks:

None

Evaluation of Project 669-0135

Agriculture Research and Extension

Grant to the Government of Liberia

Contractor: Louisiana State University

USAID to Liberia

MONROVIA, LIBERIA
December 8, 1982

4

INDEX For The Agriculture Research Project Evaluation

Executive Summary

- I BACKGROUND AND OBJECTIVES
- II METHODOLOGY
- III ADMINISTRATIVE STRUCTURE FOR RESEARCH
- IV FACILITIES AND EQUIPMENT
- V LOUISIANA STATE UNIVERSITY TEAM
- VI STAFF DEVELOPMENT
- VII FIELD CROP PRODUCTION RESEARCH
- VIII THE ECONOMIC & SOCIAL ANALYSIS OFFICE RESPONSIBILITIES
- IX APPROPRIATE TECHNOLOGY DEVELOPMENT
- X RESEARCH LIBRARY

Acronyms

- CARI - Central Agricultural Research Institute
- GOL - Government of Liberia
- LSU - Louisiana State University
- MOA - Minister of Agriculture
- UNDP/FAO - United Nations Development Program/Food and Agriculture Organization
- USAID - United States Agency for International Development

Executive Summary

It should be explained that the Executive Summary as required on all evaluations and which deals mainly with constraints to implementation of projects is intended to be used primarily for completed projects or those nearing completion. This evaluation is an in-house evaluation that was done one year after the arrival of the Louisiana State University Team. All items required are not necessarily applicable to this project at this time.

1. What Constraints did this Project Attempt to Overcome and does it Constrain?

This project brought about a change declared by PRC Decree 722 to change the Central Agriculture Experiment Station (CAES) to the semi-autonomous Central Agricultural Research Institute (CARI). Therefore, the main thrust is toward institution building with a second objective of applied research. There are three facets of institution building, (1) the development of the major technical components of the Agricultural Research Institute, (2) the strengthening of the management and administration of the Institute, and (3) improvement of the research-extension linkages. Applied research is the application of basic research done at the International Research Centers to Liberian conditions and putting acceptable practices and technology into technical packages that can and will be accepted by Liberian farmers to increase production and profitability.

2. What Technology does the Project Promote to Relieve these Constraints?

The project does not promote technology to relieve these constraints per se. What has been done is to bring in a team of expert expatriates to serve as staff of the institution until such time as a trained Liberian Staff is in place and to help in the institution building process and applied research.

3. What Technology does the Project Attempt to Replace?

The beneficiaries of the project are primarily the small farmers although larger farmers of a more commercial nature will also benefit. The improved technology should replace antiquated production and management practices such as the slash and burn system with its attendant severe erosion, should increase yields at less cost per unit through reduced labor and more efficient use of other inputs and should eventually help Liberia become more self-sufficient in food.

4. Why did Project Planners Believe that Intended Beneficiaries would Adopt the Proposed Technology?

The Liberian farmer is much the same as farmers all over the world. He will adopt new technology if it means increased yields and better quality crops with less labor from him and if it shows a profitability. Far too often in developing

countries new technology is introduced without the accompanying price structure to support it, i.e., usually a controlled low ceiling structure so food is cheap for civil servants, military and urban dwellers. Such is not the case in Liberia with its free-enterprise system and lack of controls on foodstuffs except for rice.

5. What Characteristic did the Intended Beneficiaries Exhibit that had Relevance to their Adopting the Proposed Technology?

As stated earlier the project has actually been underway one year and thus very few new research results are available for dissemination. There is a demand for technology, however, that is exhibited almost every day by walk-on farmers and individuals seeking advice and information as to insect and bird control, better varieties, prevention of post-harvest storage losses etc.

6. What Adoption Rate has This Project Achieved in Transferring the Proposed Technology?

There is no data available as yet on the adoption rate for the five new vegetable varieties released in 1983 by CARI. No other varieties or technical package have been released.

7. Has the Project Set Forces in Motion that Will Induce Further Exploration of the Constraint and Improvement to the Technical Package to Overcome it?

Institution building and research are continuing activities. Work has just begun in both categories. There are several Liberians now in the U.S. for training to take over important positions at CARI upon their return. As they gain experience and grow in their professions they will improve and add to the Institute's capacity.

The slash and burn or brushing system, as it is sometimes called, is very inefficient and destructive. Work has just begun on continuous cropping systems research which will create a more productive - less destructive system. It is anticipated this will develop into one of the most important research activities at CARI. It is a relatively new field and one which is receiving much attention world-wide.

8. Do Private Input Suppliers have an Incentive to Examine the Constraint Addressed by the Project and Come Up with Solutions?

No private sector organizations are presently involved in agriculture research in Liberia.

9. What Delivery System did the Project Employ to Transfer Technology to Intended Beneficiaries?

Some off-station farmer trials and extension work is being done on a very limited basis by CARI personnel. There is a Liberian extension specialist at CARI who is working with his American

Counterpart on assembling data and developing extension packages. Initially these packages will be utilized by extension officers working in the Lofa, Bong and Nimba Agriculture Development Project areas. The regular GOL extensions service presently has little capacity to carry out effective extension programs.

10. What Training Techniques did the Project use to Develop the Delivery System?

N/A

11. What Effect did the Transferred Technology have Upon Those Impacted by it?

See #6 above.

I. BACKGROUND AND OBJECTIVES
Project Purpose

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It is readily apparent from these purposes that the ultimate objective of this project is institution-building. The project is viewed as a long-term, continuing effort which will likely require 12-15 years and the following end-of-project status would indicate that the basic purposes have been achieved.

- 1) A fully qualified and functioning staff are on-board, capable of administering the agricultural research system and producing valid, reliable research results.
- 2) Sound and appropriate food and cash crop and livestock production technology packages are applied through extension and other development programs.
- 3) Appropriate research results from regional and international agricultural research centers are utilized in the Liberian applied research program.
- 4) The facilities and equipment at Suakoko are sufficient to run a high quality adaptive research program.

The Agricultural Research and Extension Project (669-0135) grant agreement was signed March 10, 1980. A cost reimbursable contract was signed with Louisiana State University on May 27, 1981. The L.S.U. team member arrived in Liberia, August, 1981. The arrival of the team had been anticipated, consequently a contract had been executed with the St. Pe Construction Company of Monrovia, to construct the six staff houses stipulated in the project paper and grant agreement. Considerable delay was encountered in the completion of these houses due to the unavoidable lack of building materials and mismanagement by the construction contractor. This dictated that the contract team find alternative housing in the general area wherever it was available. The houses were only completed in May of 1982.

In January, 1983, the first three participants left for the U.S. for advanced degree training. The Acting Director of the station was among this group, thus leaving the Director position vacant. The Research Coordinator assumed this acting position as called for in the project paper. During the first quarter of the project, the work plans for the different divisions were submitted and approved.

The first year has proven to be difficult budget-wise. A substantial increase for 1982-83 was approved by the Ministry of Planning at a level of \$2.50m which should allow for major improvements in station infrastructure and development, including a new laboratory, water system and staff housing renovation. A new standby generator was purchased during this period using AID funds to guarantee a more dependable power source.

The CARI has been in a transition period, moving from a branch of the MOA to a status of semi-autonomy as proclaimed in PRC decree number 13. There have been a number of discussions between the MOA, CARI and USAID on this topic and at the present time there are several interpretations of what semi-autonomy of an agency means. One important element seems to have emerged as a consensus of MOA and the Ministry of Planning which allows for budget allocation directly to the Institute rather than through the Ministry of Agriculture.

The project purpose as stated is to foster the development of an effectively structured and functioning agricultural research system in Liberia. This purpose remains valid.

II. METHODOLOGY

The Project Document of the Agricultural Research and Extension Project provides for two evaluations during this Phase I Project. This is the first evaluation. A second outside evaluation will be conducted in September, 1983. This evaluation team included representatives from the Ministry of Planning and Economic Affairs, the Ministry of Agriculture, USAID/Liberia and two members of the

LSU contract team - the Team Leader and the Socio-Economic Analysis Officer. The scope of work for the evaluation consisted of reviewing the following:

- a) the administrative structure for research
- b) the facilities and equipment available for research
- c) staff development
- d) socio-economic research
- e) appropriate technology development
- f) research library
- g) LSU team
- h) field crop production research

From the scope of work, a list of questions was drawn up by the USAID and sent to the Ministries of Planning and Agriculture for their review and comments. Both Ministries accepted the list as the basis for the evaluation exercise with the provision that the evaluators could add to the list as they saw fit in the course of the evaluation, provided the additions were within the scope of work outlined in the Project Document.

Two sub-groups were formed from the evaluation team to ensure the maximum use of the time available to the team and the CARI Staff/Advisers. Then, a general group session was held to merge the notes taken by the two sub-groups and synthesize them into a consensus. Since the Ministry of Planning was the coordinating agency, their two representatives chaired each sub-group. Representation on each sub-group was ensured for each member-agency of the evaluation team to allow them to cover the entire scope of the evaluation work. The CARI Staff and the LSU Advisers were the resource people, providing answers to the questions. Questions concerning each office in CARI were answered both by the LSU Adviser and his Liberian counterpart.

III. ADMINISTRATIVE STRUCTURE FOR RESEARCH

The administrative structure of the Central Agricultural Research Institute (CARI) is comprised of seven departments which in turn are each comprised of a number of sections. Each of these departments report to the Director of the Institute.

According to information received from group discussions, the present structure for the administration of CARI is adequate. However, because of the lack of trained personnel and support facilities, a number of sections are inoperative. Two cases in point are the Agro-Engineering and the Food Technology Sections. At the moment, a Liberian is undergoing training for the Agro-

Engineering Section. No expatriate counterpart is currently at post since the LSU engineer was medically evacuated in and has not yet been replaced.

In broad terms, lines of authority are delineated in the PP. A proposal regarding specifics has been submitted to the Technical Committee for review and approval. To date, no response has come from the committee. This raises the question as to whether the Technical Committee is, in fact, functioning as it should. The Evaluation Committee does not believe it is. This Committee is required to meet quarterly to review the operations of CARI and address problems that confront the Institute. To date, it has met only twice. This has resulted in counter-productive delays that hamper research efforts.

The question of CARI's status as a semi-autonomous agency was discussed at length, and because of the importance the evaluation team placed on this, sufficient time for a thorough review of the issue was allotted during the evaluation. The intent of granting such a status to the Institute is to ensure that the Director has the necessary administrative and budgetary authority to effectively conduct the kind of research program the Institute was mandated to carry out. From what the evaluation team has been able to determine, the Director does not exercise this level of administrative and budgetary authority. Most of the undertakings at CARI have to be sanctioned by the Technical Committee and Research Council before they can be carried out. Budgetary allotments submitted to the Ministry of Planning have to go through a process that is time-consuming, thereby denying CARI the financial flexibility it needs to handle emergencies as the research program proceeds. So, while the Institute is semi-autonomous on paper and we do see symptoms of such, the phrase "necessary administrative and budgetary authority", needs further clarification.

Finally, the concept of the two-way flow of information between research and extension was examined. It was determined that the mechanism to facilitate this kind of movement exists. However, the extension system of the Ministry of Agriculture is ineffective due to the lack of adequate logistics, trained personnel and effective organization.

RECOMMENDATIONS:

- 1) that the possibility of full autonomy of CPRI be clarified and implemented
- 2) that the Director of CARI be accountable directly to the Minister of Agriculture as Chairman of the Research Council
- 3) That the LSU technical team function in an advisory capacity while their Liberian counterparts assume line responsibilities

4) that the MOA technical committee should meet regularly

IV. FACILITIES AND EQUIPMENT

The evaluation team discussed the issues of facilities, equipment and maintenance with each person interviewed in the context of their sector. It is the consensus of the group that the facilities at the present time are sub-standard and adequate equipment does not exist. The evaluation team is critical of the slow pace of procurement under the project, although it was explained equipment could not be ordered until an assessment of needs was made. Some laboratory equipment cannot be ordered until a work order is issued for a new laboratory. This will be a minimum requirement.

Six houses and project vehicles to support the expatriate technicians have been provided, also a PIO/C for \$90,000 for misc. equipment has been issued. Also a large generator to provide electricity for the station was purchased from project funds.

During this phase of the evaluation, it was brought out that the Liberian budget for FY 82/83 had been increased to \$2,250,000 with the assistance of USAID and that these funds were for station development with the exception of \$1,200,000 that is allocated for salaries. Funds are budgeted for a new laboratory, improvement of the water system, renovation of Liberian staff houses, POL and research commodities.

The evaluation team suggested to the CARI Director his request for funds to renovate the water system be submitted as soon as possible.

V. LOUISIANA STATE UNIVERSITY TEAM

This part of the evaluation generated a considerable amount of interest among the team. In an attempt to determine the level of performance of the LSU team, each member was interviewed separately and asked to give a summation of his work plan and generally how it was being adhered to. The discussions were long and in-depth.

It is consensus of the evaluation committee that the performance of the LSU team the first year of operation must be viewed against a background of constraints and startup problems, but that their performance is acceptable with two departments being singled out as commendable, e.g. Analytical Laboratory and Field Crop Products Research.

The evaluation team specifically expressed the opinion there should be a more harmonious relationship among the CARI staff as a whole and that USAID can assist in this regard by making available information to the Liberian members of the station as well as the LSU team members on such matters as arrival times for commodities, etc.

VI. STAFF DEVELOPMENT

The present CARI technical staff is neither adequate in numbers, nor, with certain exceptions, in technical attainment. CARI's heavy dependency on contracted expatriates and UNDP/FAO, exemplifies the need for additional Liberian staff. At least 29 more Liberian staff members are required to fill all the presently planned institute positions. This figure implies an eventual replacement of all expatriate staff by Liberian professionals.

Since, with exceptions, most of the Liberian staff is not sufficiently trained to assume individual research responsibilities, a training program has been developed, based on USAID and other donor assistance, which will raise the overall professional training to at least the M.S. level. Several staff members have already entered training in the U.S.

Generally, the Liberian staff assignments have been commensurate with their level of training. However, the Project Paper stipulates the six senior positions (3 senior advisors to the Director and 3 senior research officers) would be staffed by highly qualified expatriate team members. They, assuming the responsibilities of that position, would be assigned Liberian staff members to serve as their deputies. It was intended that these deputies would assume the senior position as they developed the required capability.

Of the 3 deputies presently filling such positions, all are experienced, capable persons (2 hold Ph.D. degrees). It is therefore recommended that Liberian staff assume all senior positions with the expatriates serving as advisors.

Agricultural research frequently makes unique demands on scientists which often requires overtime work and other personal sacrifices. Fulfilling these extra work requirements is one of many criteria which measure a staff member's dedication. The team's consensus is that the Liberian staff is dedicated, meets the extra demands of their position, including overtime work when required. It was noted, however, that the station faces some labor constraints regarding overtime work. Budget limitations preclude payment for overtime work. Thus, if payment is not presently possible it is recommended that compensatory time-off be given in lieu of payment.

CARI has formulated staff development plans. These plans primarily focus on training and recruitment. The training plans, which are mostly AID funded, are adequate for the present and near future needs of the project. There are no major constraints to their implementation except the availability of qualified personnel.

To facilitate the hiring of qualified personnel, CARI developed a recruitment procedure. An Institute Employment Board, chaired by the Research Coordinator, interviews all applicants, reviews their credentials and makes employment recommendations based on a consensus opinion, to the Director. In reality, the procedure has not yet been tested, since GOL restrictions have prevented the hiring of new CARI staff.

To upgrade the technical staff, a participant training plan has been developed. AID-funded training will be primarily in the United States, although third-country training is possible.

The plan objective is to raise the professional staff's overall training to at least the M.S. level, although some Ph.D. training is anticipated. Accordingly, the Project Paper specifies a total of 420 man-months long-term training distributed among appropriate technical disciplines. While the plan assigns a specific number of training months to each designated discipline, in reality, the plan is flexible and allows changes according to CARI's needs. Additionally, 57 man-months of short-term training are specified in such areas as library science, research administration, soil survey techniques, etc. Alternative sources for professional training do exist and are being utilized. A limited number of fellowships have been offered by UNDP/FAO. Additionally, fellowships are frequently offered to the Ministry of Agriculture from sources not directly associated with CARI. Unfortunately, notification is usually forwarded to CARI too late to be utilized. CARI personnel must meet with the MOA to improve their communication regarding the availability of fellowships. Some in-house training is available to the staff through short-term consultancies.

While the training plan itself is adequate the constraint is the unavailability of qualified personnel. This primarily results in recruitment restrictions. CARI must meet with MOA and GOL policy-making agencies to seek relaxation of the recruitment restrictions. A capable staff is not possible if persons qualified for long-term training cannot be recruited. If, after consultation with the GOL, recruitment restrictions cannot be relaxed, then the training plan should be reviewed with USAID, as a fall-back position, to determine if capable non-technical staff could be trained at the B.S. level.

A concern of all participant training plans is whether or not the participant will return to his country and particularly his parent organization. CARI is attempting to alleviate this concern through a careful screening of candidates, a requirement of one year prior employment, and a signed "bonding" agreement requiring two years service at CARI for each year of training.

Most organizations, to promote continued staff dedication and motivation, have a mechanism for recognizing and rewarding superior performance. Such a mechanism does not exist at CARI except for possible minor adjustments in salary. Nevertheless, there is within the project an unofficial mechanism which could be utilized to reward superior achievement. Recognition should be given through awarding of fellowships, other long-term training, attendance at international seminars, etc.

To develop a highly skilled staff, a mechanism is required for removal of unsatisfactory personnel. Such mechanism does not presently exist. Civil service procedures are apparently far too complicated and drawn out to be effective. Rigorous selection of new employees will help, but this may not prove sufficient. Employees once hired cannot be removed for unsatisfactory performance except during the first three months. In research, three months is far too short to assess a scientist's capability. For the future, the GOL should be requested to extend this probationary period or alternatively to permit initial recruitment via a limited duration personal contract.

Membership in professional societies is one way scientists remain current with the progress in their disciplines. Generally, membership provides subscriptions to professional journals, publication rights, participation in seminars, etc. While a few members of the staff maintain membership in such organizations, the benefits are limited because of remoteness from the organization and delays or non-delivery of their journals. However, most of the CARI staff are not associated with any professional society. There are perhaps two avenues by which staff professionals can overcome this constraint: (1) the organization of a Liberian scientific society, or (2) the organization of a local chapter of an international professional society. Staff members should be encouraged to develop at least one of these alternatives. The primary constraint to staff development is recruitment restrictions and inadequate personnel budget. Again, meetings must be held with MOA officials and GOL policy makers to request relaxation of recruitment restrictions and simultaneously request additional personnel support funds. These officials must be made aware that increased agricultural production must be based on research and, by implication, adequate research programs and professional staff. CARI cannot achieve this status without new personnel and increased support budgets.

VII. FIELD CROP PRODUCTION RESEARCH

The evaluation team assessment is that this division is functioning properly and smoothly despite demands on staff time in developing organizational plans and procedures,

research plans, ordering equipment and commodities, etc. A viable functioning research program is in place. To a large degree, this present research program is based on research initiated prior to the arrival of the LSU team.

The field crop research program places priority on rice and cassava, the primary Liberian food crops, and to a lesser degree on yams, legumes, vegetables and tree crops. The program's continuing experiments include rice breeding and various varietal evaluations of the above mentioned crops. Recently added experiments include: two field trials on the upland rice yield response to nitrogen levels and phosphorous levels; plot trials on the yield response of upland rice to potassium and magnesium applications; plot experiments on the response of swamp rice to the time of nitrogen applications. Newly initiated cassava experiments include the effect of planting rate/hill on yield and the effect of leaf cutting on yield.

Progress in the Field Crops Research Program is Significant

Important achievements during the year include: the release of five vegetable varieties (okra, bitter ball, hot pepper, sweet pepper and eggplant); three high yielding cassava varieties are in advance stages of testing and should be released shortly; and several promising upland rice varieties, reportedly superior to LAC-23, will soon be placed in on-farm trials. This latter accomplishment is especially significant since it could reduce the present risks in basing a national rice production program on a single variety LAC-23.

An additional accomplishment and continuing service by CARI is the production of breeder's seed. All future programs promoting increased rice production must utilize high quality improved seed. In Liberia, only CARI has the capability of producing sufficient amounts to assure a continuing high genetic purity in recommended varieties.

The research program has had set-backs. A recently planned trial evaluating varietal resistance to iron toxicity was dropped due to inadequate labor assistance. Iron toxicity is one of the severe production constraints in Liberia; the loss of this trial delays the search for resistant varieties by one year. As suggested in "Staff Development" above, a reorganization of labor resources and utilization is recommended to assure that the labor needs of priority research are met.

The extension by CARI of research results and developed technical production packages is constrained by two factors:

- 1) The extension mechanism is not complete. Because of their inadequate logistical support, the national extension service has been unable to serve as the link between the CARI extension unit and the farmer.
- 2) Insufficient time - the development of technical production packages and the release of new recommended varieties requires many years of development. Adequate time has not yet been allotted this project.

Despite the above constraints, some modest extension to farmers is possible due to the recent release of five high yielding vegetable varieties and the anticipated release of high yielding cassava varieties. In fact some extension is in process through the staging of field days at CARI and through contact with a few individual national extension personnel.

It is, however, not possible to give meaning to research if the means are not available to extend the results. At present research results can be extended to farmers in the Lofa, Bong & Nimba Agricultural Development Project areas, but the regular MOA extension program will need strengthening and reorganization to make its operations more cost-effective.

Budgetary and personnel constraints require that priorities be established in crops research. Presently, the primary emphasis is on the two main food crops, rice and cassava. Such emphasis serves the primary concern of feeding people and is also supportive of present government policy and direction.

If, however, these two constraints were relaxed, stronger emphasis should be placed on legume crops. The future potential of certain legumes as industrial crops needs evaluating. Additionally, the multipurpose role of legumes in farming systems (both as rotational and intercropped) to serve as sources of fertilizer, cover crops, food crops, etc. warrants evaluation. Legumes could well prove a key factor in extending the cultivation period of upland sites. In order to facilitate the free exchange of mutually beneficial research information between CARI and other regional and international research centers, strong linkages must be developed. Some progress has already been made. CARI now receives the annual reports and major publications from most international centers including IIRI, IITA, CYMMT, CIAT and many others. This linkage could be further strengthened if CARI would publish its own annual report to exchange with these centers. It is recommended that CARI prepare and publish an annual report for each year starting with 1982.

Other methods employed by CARI to strengthen linkages with other organizations include visits by staff members to other

research centers, participating in international seminars, and sponsoring international meetings such as the recent International Tuber Symposium in Monrovia. All such activities should be continued and intensified through donor contributions and with available GOL assistance. Since Liberia is a country of several different ecological zones, promising varieties require evaluation under these varying conditions. Unfortunately, CARI has not developed a series of substations to facilitate off-station testing. Budget and personnel constraints have prevented CARI from utilizing private farms in these other areas. CARI does not have the necessary personnel to monitor such trials nor can they afford the required per-diem payments. As a compromise, the project is cooperating with the Agricultural Development Projects, particularly Lofa County, in conducting these trials. CARI provides the planting materials and technical instructions while the project agronomists plant, monitor, and harvest the trials and submit gathered information to CARI for analysis. At best, this procedure is only a partially acceptable alternative. Experience has shown the difficulty of controlling experiments when you must rely on personnel not under your direct control.

A requirement for every research institute is a competency in statistical analysis. Most scientists have some training in statistics and can design and analyze simple experiments. Presently CARI has adequate statistical expertise for its present needs. However, as personnel increase and the research program expands and increases in sophistication, a trained statistician will be required for the design of more efficient experiments and a more detailed and rapid analysis of experimental data. The project should initiate now a research for suitable applicants, or failing to gain recruitment permission, send a CARI staff member to the United States for statistical training.

The crops production section is faced with two critical present needs. Presently, the maintenance of required varietal lines for breeding purposes and for production of breeders seed requires annual replanting of these parental lines. The work and expense of annual reproduction becomes excessive. Therefore, the construction of cold storage facilities to extend seed viability over several years should be initiated as soon as budgets permit.

An additional need concerns the developing of tissue culture facilities for both breeding and research purposes and for rapid propagation of varietal materials for distribution. Distribution of high yielding cassava varieties could be greatly accelerated if such facilities existed. Certainly for both needs, the priority procurement and development of the necessary facilities warrants consideration.

The major constraints in the crops research production program are limited budgets and restricted recruitment. Since increased production depends directly on appropriate research, one might conclude that inadequate budgets result from a lack of knowledge on the part of GOL policy makers as to the role of research and extension in stimulating crop production. It thus is necessary for CARI to publicize their role and potential for increasing the nation's food production. Certainly, it is essential for CARI to arrange meetings with the Minister of Agriculture and other policy makers to explain its needs and how increased budget support for CARI is also supportive of GOL policies for increasing food production.

VIII. THE ECONOMIC & SOCIAL ANALYSIS OFFICE RESPONSIBILITIES

The Social and Economic Analysis Office has as its broad objective the conducting of socio-economic research that will impact on the national agricultural development objective. Specifically, it has the responsibility to

- i) identify problems affecting agricultural development in Liberia;
- ii) identify and establish costs associated with the production of the various crops produced in Liberia and;
- iii) translate results of agricultural research into usable form within the limits of technical and economic feasibility.

Staffing

The Grant Agreement talks only of an advisor and a Liberian counterpart but otherwise does not suggest an appropriate level of professional staffing at the initial stage of the project. However, the LSU Advisor has suggested either the combination of one agricultural economist and one sociologist or two agricultural economists with a minor in Sociology plus a Statistician, for an initial staff. The office currently comprises only one person - the advisor. No counterpart has been employed.

The Evaluation

The evaluation focused on progress made so far in identifying problems affecting crops and livestock production in Liberia, preparing various crop budgets, defining the role of women and assessing their effect on farm labor costs and finally, looking at the level of staffing.

In presenting the achievements in the above areas, the advisor stated that his first year has been devoted mainly to assisting and advising the Administrative Officer in adhering to the provisions of the Grant Agreement. He said that after spending

the first six months in this function to no avail except for the fact that the first budget was prepared, he concluded his involvement in the area and shifted his efforts to socio-economic analysis. Here, most of his efforts are now being devoted to identifying social and economic problems affecting agricultural development and to developing an appropriate research program. His paper "Some Observations on Agricultural Research in Liberia" resulted from these efforts.

It is the advisor's opinion that at this stage of the project he does not consider determining the cost and returns of various agricultural crops and defining the role of women and its effect on the agricultural labor cost as immediate priorities. Priority should be placed on planning the kind of research that could provide new technology that could be applied to Liberian conditions. The officer said that he has an obligation to guide the Director and the other officers in the direction of research and the paper he produced was intended to bring out the variables that affect agricultural development in Liberia.

Finally, he stated that the level of staffing in his office could not permit him to spread out too much. He suggested that at least two Liberians be seconded to him within the next few months to improve his professional staff.

Observations of the Evaluation Team

The Evaluation Team noted the following:

1. That the continued lack of at least one Liberian counterpart was a constraint on the work of the office;
2. That there was need to begin to pay attention now to determining the costs and returns associated with producing various crops in Liberia since there are enough farmers who would benefit from such information;
3. That it would be appropriate for the office of Social and Economic Research Analysis to begin to collect data that has already been done in social and economic research in Liberia as a prelude to evolving a new direction for social and economic research in Liberia.

Recommendation

The Evaluation team recommended that one or more Liberians should be seconded to the professional staff of the Social and Economic Research and Analysis as a matter of urgency.

IX. APPROPRIATE TECHNOLOGY DEVELOPMENT

- A. The appropriate technology department is not operational at this time. The project appropriate technology coordinator

was medically evacuated in April, and there has not been an advisor present since that time. There also is not a Liberian counterpart currently assigned and there does not appear to be a well qualified candidate available on the CARI staff. Although a Liberian who may ultimately fill the position of department head is now in graduate training, there is an urgent need to have a Liberian engineer on the staff at this time. It is recommended that LSU and the GOL give high priority to filling these positions at the earliest possible date.

X. RESEARCH LIBRARY

The library at CARI is one (1) room approximately 32 X 16 feet. The room has two large book shelves and a number of small shelves and cabinets. Although the lighting has been improved with the addition of flourescent lights, there is a need for more direct and indirect light. Various insects and small animals are hazardous to the library materials.

A library committee has been functional in reviewing the contents of the library and deciding which materials were needed and which could be thrown away. A very high percentage, probably 90%, was declared useless. No money had been spent for library materials for about 10 years.

The project has funds earmarked for the development of the library. Ten thousand (\$10,000) dollars is budgeted for the first year with five thousand (\$5,000) dollars set aside during each of the two remaining years.

An order of \$700 for basic library materials has been placed but not yet received. This included such things as card catalog, paper supplies, pamphlet boxes, rubber stamps and other needed office supplies.

A list of books and other publications have been developed by the library committee. These are on order. Publications have been received from such places as IRRI, CIAT, IITA and CIMMYT. Most of these are free publications. LSU and other expatriates as well as the Liberian staff have been generous in ordering books (free and at their own expense) and donating them to CARI library. Well over 1,000 publications have been received this year. USAID, USDA and other sources have been enlisted to supply bibliographic searches and photocopies of journal articles requested by individual research offices. Most of these books are catalogued and are shelf ready.

A list of periodicals will be compiled by the library committee. When they are ordered, effort will be made to secure back copies.

25

The assistant librarian has a sixth grade education and will be going back to school in January. There is definite need for a person with a degree to be employed by CARI and sent to receive a masters degree in library science.

A short-term consultant should be employed during the interim to properly supervise and set up the library in an acceptable fashion. Other needs for the library include a typewriter, adding machine, small desk calculator, a photocopier, filing cabinets, desks, air conditioner and several other large and small items.

Recommendations

1. that a properly trained librarian be employed as a short-term consultant to train and supervise the existing library staff;
2. that this consultant properly organize the library and compile and place orders for books and periodicals;
3. that the physical arrangement of the library be rearranged, enlarged and improved;
4. that a well qualified person with a B.S. degree be employed as a librarian and be scheduled for the M.S. degree scholarship;
5. that all departments and contracts, (expatriates and others) be encouraged to buy, if possible, books and periodicals and have them placed in the library;
6. that better lighting, office equipment, more shelving, photocopier, air conditioning, be installed and that insects and other pests be controlled in the library;
7. recognizing that \$20,000 is not enough to build a good library; that all possible efforts be made to secure more funds for improvement.