669-0135
PD-AAG-810-B1
(2)

UNITED STATES

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON, D. C. 20523

LIBERIA AGRICULTURAL RESEARCH AND EXTENSION PROJECT

PROJECT NO. 669-0135

Project Paper and Authorization Package

Authorized by: USAID/Liberia

Authorization Date:
January 3, 1980

UNCLASSIFIED

1/3/80

ACTION MEMORANDUM FOR THE DIRECTOR

FROM : Jim Dempsey, DR JD

SUBJECT : Agricultural Research and Extension Project (669-0135) Authorization

I. Action Requested

Your approval is required to authorize a grant for the subject project of $4,209,000 to the Government of Liberia, Ministry of Agriculture, and to obligate $520,000 of that total for FY 1980.

II. Discussion

A. Project Activity

This project develops the capacity within the Ministry of Agriculture to conduct adaptive crop, soil and livestock research and to disseminate research results and other information to the extension service. The development of this institutional capability is seen as a long-term effort, taking perhaps 12-15 years to accomplish. Three phases are envisioned over the life of the program, the first being this project activity which addresses the constraints on research institutional management and organization. In the second phase the emphasis will shift to extension system development with some assistance provided to individual research departments. The third and final phase will feature consolidation, refinement and institutionalization of the research capability and the research-extension-development linkage. At the same time, the phasing out of the U.S. involvement will take place.

For the first phase there are three principal components or sub-tasks which will form the focal points of the project. The first will be the development of an effective interface with regional and international

research centers, utilizing basic and applied research discovered by these centers as a starting point for adaptive research activity in Liberia. The further development of the capacity to conduct applied research within the Ministry of Agriculture on crops and livestock will encompass the second major component of the project. The emphasis will be on the capability to utilize applicable basic and applied research results developed elsewhere and to apply them to Liberian conditions. The third component will be focused on forming effective linkages among research, extension and development programs. These linkages will promote a two way flow of communications, such that research results are disseminated to farmers and farmers' problems are channelled to the research institute for solution.

AID funds in Phase I will make 228 person months of long- and short-term assistance available to advise and help the Agricultural Research Institute (ARI) 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.

B. Financial Summary

AID funding for this project will be drawn from the Agriculture, Rural Development and Nutrition Appropriation as detailed in the chart that follows. The Government of Liberia's contribution to the project is estimated at $5,168,000 which accounts for 55.1% of total project costs.

	FY'80 (000)			FY'80 - 83
	First Tranche	Second Tranche	Total	LOP (000)
Technical assistance	0	237	237	1746
Commodities	129	0	129	565
Participants	0	64	64	794
Other	391	41	432	1104
Total AID	520	342	862	4209
Local Cost Financing by AID (non-add)	395	0	395	503
Host Country Contribution	-	-	1292	5168
GRAND TOTAL			2154	9377

C. Socio-Economic, Technical and Environmental Analyses

This project has been reviewed and has been found to be sound from social, economic, technical and environmental points of view. The social situation in Liberia does not contain serious obstacles to the utilization of the proposed production technology packages from ARI. Available evidence indicates that the peasant farmers of Liberia do respond to innovations, provided that the perceived benefits are demonstrable and understandable and that risk is minimized. From technical and economic analyses, it was concluded that benefits to the small farmer will be substantial and easily demonstrable and understandable. Careful attention will be paid to developing strong channels for small farmer outreach. The Initial Environmental Examination concluded that a negative determination was appropriate and that has been endorsed by the Project Committee.

D. Legal Conditions

The project meets all applicable statutory criteria and the planning and costing requirements of Section 611(a). The official government request for this project appears in Annex B of the Project Paper. The Project Paper proposes that prior to the disbursement of funds under the project grant, the Ministry of Agriculture will be required to:

1. Place all program budgets and personnel at ARI under the Research Council and Director.

2. Give the Director of ARI the budgetary authority to expend funds for the research program in a timely and propitious manner.

Annex H provides justification for the waiver of U.S. advertising of technician housing construction bids.

E. Committee Action

A Project Review Committee, comprised of USAID/Liberia personnel, recommended authorization of the project. The Congress was notified of AID's intent to authorize and obligate $520,000 for this project in the FY'80 CP. Once an FY'80 appropriations Bill has been approved by Congress, AID will notify Congress of its intent to obligate an additional $342,000 for FY'80.

F. Project Management

The Mission Officer responsible for project implementation is Jack M. Cornelius, Division Chief, Rural Development.

III. Recommendation

That you sign the attached PAF II and thereby authorize the proposed project and the waiver of U.S. advertising of technician housing construction bids.

Attachment: a/s

CLEARANCES: RD:JMCornelius (Draft)
DP:NMarsh (Draft)
DP:EMcLeod (Draft)
DR:CHusick (Draft)
CON:DD'Antonio

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS - PART II

COUNTRY : LIBERIA

PROJECT : AGRICULTURAL RESEARCH AND EXTENSION

PROJECT NO. : 669-0135

Pursuant to Part I, Chapter 1, Section 103, of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Liberian Agricultural Research and Extension Project ("The Project") for the Government of Liberia ("The Cooperating Country") invloving planned obligations not to exceed four million and two hundred and nine thousand U.S. dollars ($4,209,000) over a four-year period from date of authorization, subject to the availability of funds in accordance with the operating year budget and allotment process, to help in financing the foreign exchange and local currency costs of the goods and services required for the project.

The project will develop the capacity within the Ministry of Agriculture to conduct adaptive crop, soils and livestock research, and strengthen the extension system so that it is more responsive to the needs of subsistence farmers. This institution building activity involves three facets: (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 system linkages. AID funds will make 228 person months of long- and short-term assistance available to advise and help build research capacity and coordinate it with the extension service. Agricultural training will total 457 months and be in a broad range of disciplines so as to strengthen the entire research system. Field research and laboratory equipment will be procured for the Institute.

The Project Agreement, which may be negotiated and executed by the officers to whom such authority is delegated in accordance with AID regulations and delegations of authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and covenants and major conditions, as AID may deem appropriate.

A. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by AID under the project, shall have their source and origin in the cooperating country or the United States of America except as AID may otherwise agree in writing. Ocean shipping, financed by AID under the project, shall, except as AID may otherwise agree in writing, be financed only in flag vessels of the United States of America.

B. Conditions Precedent

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, the cooperating country shall furnish, in form and substance, satisfactory to AID: (1) evidence that the Ministry of Agriculture has placed all program budgets and personnel at the Institute under the research committee and the director, and (2) evidence that the Ministry of Agriculture has given the Director of the Institute the budgetary authority to expend funds for the research programs in a timely and propitious manner.

C. Issues

Based on the justification provided in Annex H to the project paper, I hereby approve the recommendation that advertisement in the United States of the invitation for bids on six technician houses to be constructed at Suakoko not be required, finding that the planned advertisement will be sufficiently wide to insure competitive procurement.

1/3/80
Date

Director, USAID Mission to Liberia

Clearances:

REDSO/GC (Abidjan 11516)
RD:JCornelius (draft)
DP:NMarsh (draft)
DR:CHusick (draft)

BEST AVAILABLE DOCUMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: LIBERIA

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 669-0135

6. BUREAU/OFFICE: A. SYMBOL: AFR; B. CODE: 066

7. PROJECT TITLE (Maximum 40 characters): Agricultural Research & Extension

8. ESTIMATED FY OF PROJECT COMPLETION: FY 83

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 80; B. QUARTER 1 (Enter 1, 2, 3 or 4); C. FINAL FY 83

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	(125)	(395)	(520*)	(3706)	(503)	(4209)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY	0	1292	1292	0	5168	5168
OTHER DONOR(S)						
TOTALS	125	1687	1812	3706	5671	9377

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 80 F. GRANT	E. 1ST FY 80 G. LOAN	H. 2ND FY 81 I. GRANT	H. 2ND FY 81 J. LOAN	K. 3RD FY 82 L. GRANT	K. 3RD FY 82 M. LOAN
(1) FN	B 121	080		520		1615		1400	
(2)									
(3)									
(4)									
TOTALS				520		1615		1400	

A. APPROPRIATION	N. 4TH FY 83 O. GRANT	N. 4TH FY 83 P. LOAN	Q. 5TH FY ___ R. GRANT	Q. 5TH FY ___ S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) FN	674				4209	
(2)						
(3)						
(4)						
TOTALS	674				4209	

12. IN-DEPTH EVALUATION SCHEDULE: MM 06 YY 82

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE:

TITLE: Director, USAID Liberia

DATE SIGNED: MM 01 DD 03 YY 80

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-78)

* It is expected that a second tranche of $342,000 will be provided in FY'80.

LIBERIAN AGRICULTURAL RESEARCH AND EXTENSION PROJECT PAPER

Table of Contents

A N N E X E S

I. SUMMARY AND RECOMMENDATIONS

A. Grantee and Executing Agencies:

The grantee will be the Government of Liberia (GOL) represented by the Ministry of Agriculture (MOA). The primary executing agency will be the Central Agricultural Research Institute at Suakoko (ARI) under the guidance of the Agricultural Research Council and its Technical Committee. The council will coordinate AID and other donor assistance with the ongoing GOL programs, review research direction, and monitor ARI expenditures.

B. Recommendations:

1. A grant in the amount of $4,209,000 for the four-year period FY 80 - FY 83 be authorized to the Government of Liberia for the purpose of strengthening the research and extension capabilities of the MOA and expecially ARI. The GOL contribution to the project will total $5,168,000, representing 55.1 percent of the project costs. FY 80 obligation is to be $862,000. (Detailed budgets appear on pages

2. LSU provide technical assistance for the project under a Title XII Collaborative Assistance Contract. This mode implies a long term commitment on the part of LSU and AID, subject to availability of funds and satisfactory execution of the proposed four-year first phase of the project.

3. The Mission Director/Liberia be requested to waive the requirement for U.S. advertisement of the Invitation for Bids for the construction of technician housing at Suakoko. Local Liberia competitive procedures for contract award will be followed. Waiver justification appears in Annex H.

C. The Project:

The central task which this project will address is the further development of agricultural research capability in the Ministry of Agriculture. The basic objective will be to foster development of an effectively structured

and functioning agricultural research system in Liberia. There are three principal components or sub-tasks which will form the focal points of the project. The first will be the development of an effective interface with regional and international research centers, utilizing basic and applied research results produced by these centers as a starting point for adaptive research activity in Liberia. The further development of the capacity to conduct applied research within the Ministry of Agriculture on crops and livestock will encompass the second major component of the project. The emphasis will be on the capability to utilize applicable basic and applied research results developed elsewhere and to apply them to Liberian conditions testing applicability to Liberia and developing appropriate production technology packages for dissemination to farmers. The third component will be focused on forming effective linkages between research, extension and development programs. These linkages will promote a two way flow of communications, such that ARI research results are disseminated to farmers and farmers' problems are channelled to the research institute for solution.

The development of this institutional capability is seen as a long-term effort, taking perhaps 12-15 years to accomplish. Three phases are envisioned, the first being the initiation or start-up operation in which the constraints on research institutional development are the principal problems addressed. Additionally AID will provide some assistance to operational research which emphasizes (1) the food crops of rice, cassava, and other field crops and (2) the development of appropriate technologies for farming in Liberia. Agricultural training will total 457 person/months and be in a broad range of disciplines so as to strengthen the entire research institution. AID funds in Phase I will make 228 person/ months of long and short term assistance available to advise and help ARI build its capacity to conduct adaptive research and allocate its scarce resources to identified priority areas.

Complementory assistance to the Institute will be provided by UNDP/FAO in the areas of tree crop and animal health, and by the West Africa Rice Development Association (WARDA) in rice breeding. It is expected that EEC will provide training assistance and that FAO/IFAD will assist in the development of the agro-technical aspects needed

to provide the farmers with technical packages (seed multiplication primarily). Although AID is not participating in a joint project with these other donors, all inputs will be coordinated by the Ministry of Agriculture through its Agricultural Research Council.

In the second phase the scope of the program will broaden significantly by supporting several additional research areas and the acclerated development of a research/ extension/production system. The third and final phase will feature consolidation, refinement and institutionalization of the research capability and the research-extension-development linkage. At the same time, the phasing-out of the U.S. involvement will take place.

In total, the project effort is directed toward the agricultural sector, with the ultimate audience/ beneficiaries being the peasant farmer. Phase I proposes to develop the institutional capability of the Ministry of Agriculture to produce research results or technology packages which will enable the Liberian farmer to increase yields and earn more income.

E. Legal Criteria:

The project meets all applicable statutory criteria (see Annex C). Planning and costing requirements of Section 611(a) (see Annex G) and the Mission Director's evaluation of the GOL capability to maintain and utilize the project in an effective manner (see Annex D) have been completed. The official government request for this project appears in Annex B. With respect to the Host Country contribution requirement, GOL contributions are estimated at 55.1 percent of the project total. The official request for GOL assistance for this project appears in Annex

F. Conditions and Covenants:

Prior to disbursement of funds under the project grant, the MOA will be required to:

(1) place all program budgets and personnel at ARI under the Director and Research Council.

(2) give the Director of ARI the budgetary authority to expend funds for the research program in a timely and propitious manner.

II. PROJECT BACKGROUND

A. The Setting:

Liberia, about four-fifths the size of Louisiana, has a total land area of 37,743 square miles, or about 24.2 million acres. It is located on the west coast of Africa, at a latitude of 5 to 8 degrees north of the equator. At the south-western edge of the middle African bulge, it is bordered on the south by the Atlantic Ocean, on the west by Sierra Leone, with Guinea on the north and the Ivory Coast to the east. The country stretches about 320 miles in length along the Atlantic coast and extends inland from 100 to 160 miles in width to a very irregular northern boundary. Because of its latitude and prevailing winds from the Atlantic, the climate is tropical, that is typically hot and humid. The months from June through November are those of the rainy season when food crop growth takes place.

The countryside is generally charaterized by rolling hills covered with tropical vegetation and traversed by a very limited network of all weather roads. In fact, most of the country's development is concentrated along the coastal area, particularly around Montserrado County in which the capital city of Monrovia is located. A good paved road extends from Monrovia northeastward to Suakoko and marks the division of the country into Eastern and Western Counties served by a limited number of feeder dirt roads which provide access to some of the rural areas and serve as farm-to-market roads. As the roads are extended into the rural areas, settlement and increased economic activity follow rather quickly. About 10 percent of the roads are hard surfaced.

The rural landscape may be described as consisting predominantly of thick tropical vegetation, with patches partially cleared for shifting agriculture. Tree cultures such as rubber, oil palm, coffee, cocoa, citrus and mangoes provide the commercial backbone for agriculture in Liberia.

The production of upland rice on farms is the most important food crop. Root crops such as cassava, sweet potatoes and eddoes are also important domestic crops for most small farms. The slash and burn method is used to prepare cropland and there is also a growing effort at developing irrigated rice paddies in the low, relatively narrow valleys of the northern tier of counties.

Population censuses conducted in 1962 and 1974 reveal that Liberia had an annual growth rate 3.3 percent, with the 1974 population estimated at 1.5 million. Population density averaged about 40 people per square mile, with the most densely populated county being Montserrado, 137 people per square mile, and the least densely populated being Grand Gedeh, averaging 11 people per square mile. Nearly three-fourths of the population is rural with the average size of household being 4.8 people compared to 4.1 in the urban areas. As of 1979 the average life expectancy was reported as 48 years.

B. An Overview of Liberian Agriculture

Much has been written about Liberian agriculture. In essence it is predominantly a tree culture. By virture of its tropical climate and rolling topography it has proven to be ideal for the commercial production of rubber, oil palm, coffee, cocoa, and forest products. Bananas, citrus, plantains, and mangoes are additional tree crops.

Domestic food crops consist, first of all, of rice, the country's staple food, and a mixture of root crops and vegetables. The most important root crops are cassava, sweet potatoes, and eddoes. Peanuts are also being produced to a limited extent. Vegetables are cultivated as a "backyard crop", some of which are sold in the town markets, particularly peppers, okra, four varieties of greens (leafy vegetables), bitter balls, eggplants and cabbage. Sugar cane and pineapples are of increasing importance expecially sugar cane in Eastern Liberia where there is a sugar processing plant.

In relation to agricultural imports the magnitude of rice imports is of considerable concern. In the 1960's rice imports reached 30 to 40 thousand metric tons, and peaked at 53,000 tons in 1971. In 1977 rice imports were reported at 54,000 metric tons, roughly estimated at 31

percent of total rice consumption. Average per capita consumption of rice is reported at 227 pounds, or the equivalent of 375 pounds of paddy.

In 1977, agricultural households numbered 150,579. Of this number 139,700 were producing rice on approximately a 1/2 million acres. The rice parcels average 3.6 acres per household, with an average yield of 1100 pounds per acre. About 35 percent of the rice growers produce enough rice to last until next harvest, and only 24 percent sell some rice in the market.

The commercial export promotion activities include programs in oil palm, rubber, cocoa, coffee, and coconut. Generally the sources of commercial crop export are as follows:

1. The concession sector: this group includes 7 rubber concessionaires (working almost 150,000 acres), of which 6 are both producting and processing. There are also 7 oil palm concessionaires involving 12,000 cultivated acres,

2. Commercial Liberian farmers,

3. Small and medium sized farms.

There are serious problems in the quality of the export product produced by these latter two groups. Among both groups, though especially for small farmers, the yields are quite low. To improve yield and quality the government has undertaken a special rubber rehabilitation scheme and the Liberian Produce Marketing Corporation (LPMC) is promoting improved varieties and methods for tree crop cultivation.

The LPMC is a government owned marketing board which handles the main export commodities, except rubber and also buys, mills, and sells locally produced rice. In 1977 it milled 5,000 tons of rice. LPMC supplies nearly all rice to the local commercial market. At the beginning of each season, LPMC, in collaboration with the MOA, fixes

prices for the purchase of export crops and the buying and selling of rice.

For collection of produce, LPMC uses licensed buying agents, some of which are cooperative societies and others are private merchants. To further facilitate the collection and assembly of farm produce, village traders and sub-agents buy from farmers, even making credit available to them, and then sell to the LPMC buying agents. The most visible participants in the marketing system are the market women who sell occasional farm surpluses or buy from farms and sell at retail in the local market or along the roadside. In the larger towns the markets operate daily while in the small villages markets are held only once a week.

The prices farmers receive for export crops are fixed by LPMC. These are based upon prices received by LPMC for products sold on the world market, after the following deductions are made:

- LPMC's cost of operation
- Transfer to the Reserve for Price Stabilization (to provide occasional subsidies)
- LPMC's profit.

The LPMC policy with regard to rice is tied closely to the government policy of having a fixed price at which LPMC and other importers sell imported milled rice; thus LPMC offers a price for locally produced paddy which aims to bring the farmgate price into line with import prices. In keeping with this policy, prices for paddy were raised from 5¢ per lb., in 1972 to 10¢ per lb. in 1974 and, although prices for import rice fell from 1975 onward, local producer prices were maintained and even increased to 12¢ in 1976.

In order to sustain this higher domestic price level, all importers are charged an import tax which is estimated at 50¢ per hundredweight. The relatively high domestic price is intended as an incentive for farmers to produce more rice. Up to this time, however, the response has been limited, mainly because returns per man-day of work in rice production are lower than that from other products. Accordingly, after satisfying subsistence needs

for rice, farmers have a tendency to shift to crops with a higher income return.

Liberia is heavily dependent on imports for its supply of meat and animal products. Since serious animal health problems exist throughout the country, domestic production is very limited and it is not expected that any but marginal improvements will occur in the near future. Currently, there is a dearth of information on the economics and techniques of livestock production in Liberia; hence it is impossible to make an evaluation of livestock enterprises at this time.

C. Agricultural Production Problems:

On a per capita basis, agricultural production in Liberia during 1973-77 increased at 1.9 percent per year, compared with a population growth of 3.3 percent. Obviously, food production is not keeping pace with population growth. Increasing imports of food, particularly rice, substantiate this declining trend in per capita food production. Imports of rice increased from an annual average of 38,000 metric tons in the period 1965-1969, to an average of 45,000 in 1970-1974. This latter volume of imprts represented about 25 percent of annual rice consumption at an estimated value of some 15 million dollars in 1974. Accordingly, the Ministry of Agriculture in its recently declared policy objectives calls for intensified research and extension activity aimed at increasing the production of food crops, particularly rice, cassava and livestock.

As in most tropical countries, the natural vegetation looks lush and luxuriant. The soil appears deceptively fertile and productive. Problems arise, however, as soon as the vegetative cover is removed. The soils are thin and low in nutrients necessary for plant growth and thus can provide only a season or two of field crop production.

Rainfall in Liberia varies by season and by region of the country, with an annual average of 100 to 180 inches along the 50 mile wide coastal belt, and 80 to 120 inches in the rest of the country, with the exception of a limited area in central Liberia that receives less than 80 inches per year. This combination of heat and

moisture adds to the problems of agriculture, not only in terms of insects and diseases, but also in land preparation cropping patterns, tillage practices, harvesting techniques, crop storage, and transportation to market. Basically, the indigenous crops, farming methods, and social cultures in the tropics are so different from those prevailing in the temperate zone that it is virtually impossible to transfer the advanced agricultural technology of the western world to the tropics. It is for this reason that adaptive research is critically needed in Liberia.

The constraints are numerous and any recommended technologies must be appropriate to the natural environment and available resources. Research can provide the appropriate technology but it takes scientific skills, time, money, and dedication. Experimental trials, dissemination of results, and farmer acceptance of new techniques describe the concept for long range improvement of agriculture in Liberia.

What are some of the specific obstacles which have hampered agricultural development in Liberia?

First, as mentioned earlier, the heat and humidity of the tropics encourage the growth and spead of pests and diseases.

Second, the topography of the land may be described as predominantly hilly, with very limited areas of flatlands or fertile valleys; thus limiting the cultures to hillside farming and the problems that this entails, namely soil erosion, extremely low fertility and low yields.

Third, the tropical soils, although variable, are usually thin, fragile, highly acidic, easily erodible, and iron toxic.

Fourth, the land tenure system, insofar as it encourages slash and burn operations, leads to an attitude of exploitation, rather than conservation and good husbandry. Small holders become transient farmers, sometimes commuting long distances to farm several scattered small parcels.

Fifth, the farmer is usually above middle age, representing a family of 4 to 5 persons, all of whom help with farming chores. Unfortunately, many of the most able workers, the young men of late teens and early twenties have already migrated to urban areas where the rewards to labor are usually more generous though urban unemployment rates are high.

Finally, skills of the traditional small holders are limited to those of a slash and burn culture, and even the available and proven technologies are relatively unknown. It is in this context that extension training and demonstration farming become an essential part of the agricultural development process. Higher yielding varieties, rotations, seeding rates, fertilizer recommendations, crop protection techniques and comparative economic analyses can be researched to provide appropriate technologies for small holders.

D. The Role of Adaptive Agricultural Research:

One of the key solutions, to the problems in the agricultural sector is then, obviously, a viable, productive adaptive agricultural research institution which over time can generate technologies which are relevant to the Liberian peasant farmer. Being a relatively small country, Liberia has neither the resources to mount a full-scale basic research effort in agriculture nor is it sufficiently different from other tropical areas in West Africa or elsewhere to necessitate such an effort. From a practical standpoint, therefore, agricultural research in Liberia must focus on applied and adaptive research, utilizing generally what has been developed elsewhere and then applying it to Liberian conditions and problems.

The conceptual design of the system proposed for Liberia is depicted in Chart I. There are five components in this design, each playing an integral role, and all of which are absolutely essentials in a viable program. It envisions that basic and applied research on agricultural problems being done at regional and international centers, particularly IITA in Nigeria, IRRI in the Phillipines, ILRAD in Kenya, and the WARDA effort in West Africa. Included in this first component, for example, would be major breeding programs, pioneering work on varietal selection, cultural practices and pest and disease control,

CHART I

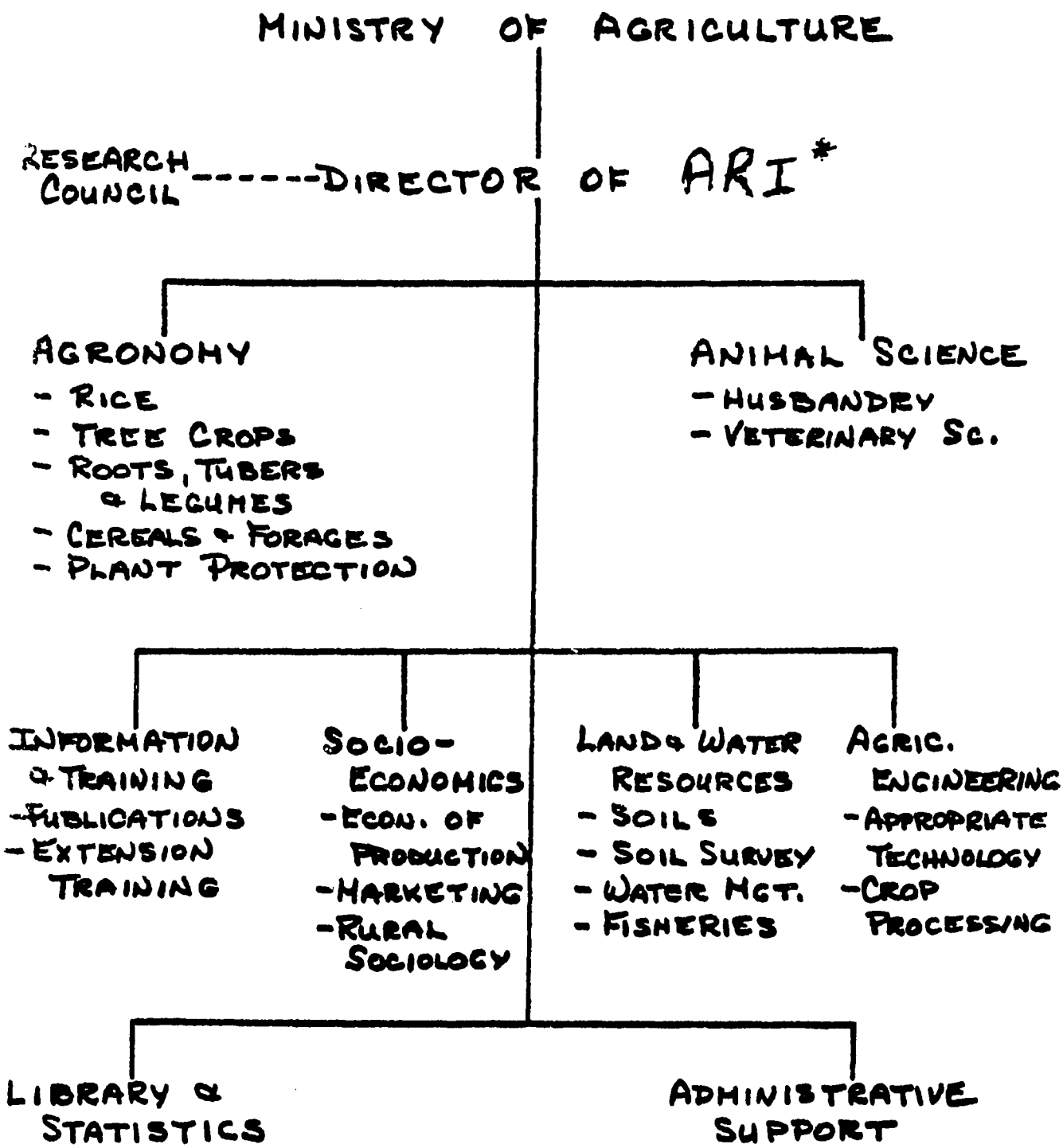


FIGURE 2. PROPOSED ORGANIZATION OF THE CENTRAL AGRICULTURAL EXPERIMENT STATION

* Agricultural Research Institute

basic work on farming systems, such as minimum tillage, and fundamentals in engineering technology adaptation. At the national level in Liberia, the central Agricultural Research Institute at Suakoko, forming the second component, would place its emphasis on applied and adaptive research, i.e. taking research results generated elsewhere and testing their applicability under Liberian conditions. Phase I of the proposed project will focus on building this capacity in the MOA.

WARDA, UNDP/FAO and a portion of AID's proposed Phase I activities will build the operational research capability of individual departments at Suakoko. Examples of such work would be varietal selection efforts using crop varieties developed at the regional and international centers, the testing of varied cultural practices to develop optimum yields and establishing the economics of production packages. Additionally ARI will coordinate its effort with appropriate Liberian institutions such as the Extension Service, the Faculty of Agriculture at the University of Liberia, the concessions, the agricultural parastatals, and the array of training institutions for agriculture.

An essential ingredient in this conceptual structure, which represents the third component, is local verification trials. This involves outfield tests of crop production practices under local conditions at regional sub-stations or on farms to determine their adaptability under a variety of local conditions. ARI would be responsible for all sub station and outfield research work in Liberia. Included in these activities will be the field trials being conducted in conjunction with the Lofa and Bong Integrated Rural Development Programs. Assuming that such trials are successful, a fourth component comes into play, the development of technology packages which can be demonstrated and disseminated by the extension and development agencies. Again ARI would take the leadership in developing these packages and the transmission of them to the extension forces. These technology packages would constitute, therefore, the core of the extension program which leads into the fifth component, i.e. incorporation by the farmer of this technology into his farming operation. Once integrated into the farming system,

technology packages should yield results, i.e. higher yields, greater economic returns, reduce labor intensiveness, the trials effectiveness must, therefore be demonstrated to the farmers and they must achieve results under local conditions.

Examining the proposed conceptualization, there is one overriding concern. Information must flow both upward and downward in the structure. This is an extremely crucial point. Researchers on the one hand, must be aware of the realities of assistance at the village farmer level in order to design relevant research programs, and on the other hand, they must seek feedback to appraise the effectiveness and efficiency of the proposed production technology packages.

In essence, a viable agricultural research system must be able to take ideas and materials developed elsewhere through basic research, test out their application, verify their local adaptability, translate them into viable production packages and transmit them successfully to the extension agencies, who, in turn, must get the farmer to adopt them. A breakdown at any point seriously damages the effectiveness of the system and this involves both upward and downward communication.

The key component in this conceptualization, and the principal focus of this project, is the development of the applied and adaptive research capability at the Central Agricultural Research Institute at Suakoko. That center is visualized as the agricultural research institution in Liberia. It would have the responsibility for interfacing with the regional and international research centers and other Liberian institutions on the one hand, and on the other hand it would supervise the process of local verification, translation into technology packages, and transmission to the extension agencies. Thus, its linkages in both directions will be extremely important, in fact vital to the achievement of sector goals.

III. Goal Structure of Project

A. Sector Goal

The agricultural sector goal as set out in the CDSS is to increase rural income through greater agricultural production. This calls for increases in cash crop production and strives for self-sufficiency in foodstuffs. Additionally the CDSS points out that the lack of trained manpower is one of the greatest constraints to Liberian development. Training in agriculture is identified as one of the prime areas for assistance. Finally, strengthening administrative machinery and institutional capability, especially middle management are rated as high priority activities in the AID strategy.

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 has a per capita GNP of $120.00, according to the World Bank, compared with the monetized sector of the economy which has a per capita GNP of $870.00.

B. Project 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 adapative research program.

The achievement of these end-of-project is most unlikely within Phase One which is planned as a four-year effort in this project paper. On the basis of time alone, it could not succeed even if the most favorable conditions prevailed. It would be impossible, for example, to select, train and put together, as an effectively functioning entity, the large cadre of scientists that will be necessary in order to make the Central Agricultural Research Institute at Suakoko the kind of institution the project envisions. Rather, a more modest level of progress is expected at the end of Phase One toward each of the above four conditions. Some stall will be trained and in-place, some research results will have been translated into production packages, some research from international and regional centers will be utilized, and most facilities and equipment will be in place.

C. Project Design Framework

In relation to the development of the research Institute, two primary outputs are seen emanating from this project. One is the development of ARI as an institution, its organization and management, its function as an institution and its capability for performing its assigned mission. Essentially, this involves providing the proper environment and support at ARI 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 fuction is to do the 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.

In more detail, the following outputs are seen as the products of this project which will indicate that the job has been done properly:

1. An effective administrative structure for research - An operational administration will be in place and in charge of the research program.

2. Scientific and field equipment for research on site - Additional or expanded facilities are planned for each research department, the library and a central agro-chemical laboratory. AID will provide equipment for the central laboratory and appropriate technology shop, library materials, and funds for miscellaneous equipment.

3. Staff development - A comprehensive staff development program is planned involving post-graduate training for twenty persons in twelve disciplines and short-term training involving four areas of work.

4. Standard procedure for getting research results to the field.

5. Research results in the following areas: (AID supported only).

   a. Rice production - varieties and cultural practices.

   b. Root and tuber crops - varieties and cultural practices.

   c. Other crops - Varieties and cultural practices.

   d. Socio-economic - social and economic problems affecting food and cash crops and livestock production.

   e. Engineering research - appropriate technology and minimum tillage for rice, roots and tubers and other crops.

6. Expanded Library - A collection of appropriate journals, periodical and research reports will be on hand to support the scientific work of CAES.

7. Extension information and training - Training courses and publications are to be developed for extension workers, based on the production technology packages produced by research at ARI.

Although this PP speaks to the objectives which will undoubtedly take 12-15 years to attain, the planned inputs are addressed basically to phase one (FY 80 - FY 83), with reference also to the linkage with phase two.

Three of the six technicians provided through the project will work at the administrative/research coordination level. They are: (1) an agricultural research coordinator who will oversee research in each of the seven departments, (2) a research/extension officer who will be charged with strengthening the extension/outreach for the Research Institute, and (3) an economic and social analysis officer who will assist with station administrative and budget matters and be responsible for social and economic analyses of proposed packages. Three additional technicians will be

assigned in Phase I as follows: (1) Departmental Coordinator for Crop Science and Propagation, (2) Coordinator for Agricultural Engineering and Appropriate Technology Department and (3) Head of the Agro-Chemical Laboratory. Although each of these technicians will be building capacity within his respective department, they will be working much more on an operational research level than the other three. The technical assistance will total 232 person/months. The work of the technicians will be supported through the provisions of vehicles, scientific and field equipment, supplies and travel. Six houses will be built in the initial phase of the project.

The participant training input will be 477 person/months of which 420 will be for postgraduate training and the remainder going to short-term training.

Four hundred thousand dollars of field and laboratory equipment will be provided for the central chemistry laboratory, the Engineering workshop and miscellaneous other equipment.

The GOL inputs will come in the form of continuation of its support of ARI., with funding for the time being maintained at 79 levels. These inputs will be in the form of personnel, equipment, supplies and maintenance and housing for their personnel. Other donors will contribute some support also. WARDA will supply a rice agronomist and a rice breeder to work in the agronomy program, supported by short-term assistance as needed on plant protection problems in rice. An IBRD loan will be used to make some improvements in facilities and the purchase of scientific and field equipment and UNDP/FAO will provide technical assistance in tree crops, horticulture and livestock production.

IV. DETAILED PROJECT DESCRIPTION

A. The Development of ARI as a Research Institution

The key element in this project design is the development of ARI as an on-going, viable research institution. It is essentially an institution-building project which will involve two major facets. One involves the development of the major technical components of the institution such as the Agronomy Department, building the capacity to perform the basic mission of the institution, applied and/or adaptive

research. The other entails the development of the inner workings of the institution and the facility so that it becomes an efficient operating entity. As supporting evidence for the analysis and recommendations, see Annex I, which contains proposals for developing individual departments and the Ministry plan for restructuring research.

The project design team reviewed extensively the Central Agricultural Experiment Station (CAES) which was the name of the facilities at Suakoko before the recent reorganization as a preliminary to the design of the project. The following points summarize the team's analysis of CAES: (now ART)

a. The research program at the present time is at best very limited. The one area where a research contribution is being made to any significant degree at the present time is in swamp rice. Yet swamp rice currently accounts roughly for ten percent only of the total rice production in the country. In upland rice and roots and tubers, two other basic food areas, very few substantive results have been produced; thus little impact has been made upon production of these crops. Several important areas basic to the food crops work such as plant protection, adaptive technology and production economics are almost totally lacking in the program at CAES. Liberia has critical needs in the food production area and the program must be strengthened in order to meet the applied adaptive research needs in this area. There is also the need for work in livestock production since protein is badly deficient in the diets of Liberian people.

b. There is evidence of linkage into regional and international research centers, but this relationship needs to be nurtured, expanded and strengthened. In several areas of work, varieties from IITA, WARDA and other locations are being tested. As an examp
tion of germ plasm in the cassava area. The surface has just been scratched, nevertheless, and a greatly expanded effort is needed.

c. Linkage with the extension and development efforts in the country is weak. CAES has had little to extend and extension has had little substantive technology to deliver to the farmer as a consequence. As one official in one of

the rural integrated development projects commented, the only technology he has been able to get from CAES thus far has been in the area of swamp rice. There is an urgent need for production technology packages aimed at farmers' problems to serve as a basis for extension programs.

d. Facilities at Suakoko are basically inadequate. Sufficient land is available (1800 acres), but aside from that there are insufficient facilities. Office space is woefully short, laboratories are too few and badly overcrowded, seed storage is a severe problem and work areas to handle harvests, thrashing, etc. are almost non-existent. For a substantive research program, additional facilities are an absolute necessity.

e. Research equipment is woefully lacking. All areas are deficient. The agro-chemical laboratory lacks many basic and essential items, for soil and plant analysis and the agricultural engineer workshop is barely operational, to name a few of the more serious problems. In order to mount a reasonable research effort, scientific equipment must be on hand, at least to the extent of certain basic items. A substantial increase in scientific equipment is crucial to the development of research capability.

f. The Library is at best little more than a random collection of a very limited number of titles. Some journals are entirely lacking, while only assorted copies of others are available. Research publications of regional and international centers may or may not be present. In short, many important scientific titles critical to research are lacking. A concerted effort must be put forth to assemble, catalogue and store properly basic research publications and journals in each of the major technical areas at CAES.

g. The professional staff at CAES is both short in numbers and lacking in training. As an illustration of the extent of the problem, currently seven of the nine section heads are expatriates, serving either on a contract to MOA or being

supported by a grant from a donor agency. The Liberian staff tend to be old-timers who lack training or a few young ones, fortunately with Master's degrees but others with only baccalaureate degree, mostly from the University of Liberia. There is a strong need for both an increase in the size of the local staff and the level of training.

h. There are severe problems in the organization and administration of CAES. At the present time, lines of operation and responsibility are blurred and confused. The Director of the facility does not have complete operational control of the program and the facility. The soils, livestock and fisheries programs ostensibly report through the Director to their respective section leaders in the Ministry. In reality, the connection seems more direct to the Ministry. Hiring of staff and setting of salaries are done at the Ministry. It is questionable whether the Director has any input into such decisions. The rank structure is also unclear, and the requirements for promotion are generally not understood. It is apparent that much needs to be done to improve the organization and administration of CAES.

i. Logistics are a most critical operating problem. Not only are budgetary levels inadequate, but there is great difficulty getting approval to expend the funds which are budgeted. Approvals for expenditures must go to Monrovia to the MOA and then to the Ministry of Finance. It is virtually impossible to run a research institution under those conditions because of the time lag between need and approval. If electrical supply fails because of a lack of diesel fuel, cold storage rooms go dead, and germ plasm and seed materials are weakened or destroyed. If water is not available because the pump does not run, laboratories cannot be operated and critical tests are not carried out. It gets down even to a lack of fuel to run vehicles and farm equipment on occasion. It is absolutely essential that operational budgetary authority rest with the Director of CAES so that integrity of the research program can be maintained.

B. Reorganization of Liberian Agricultural Research:

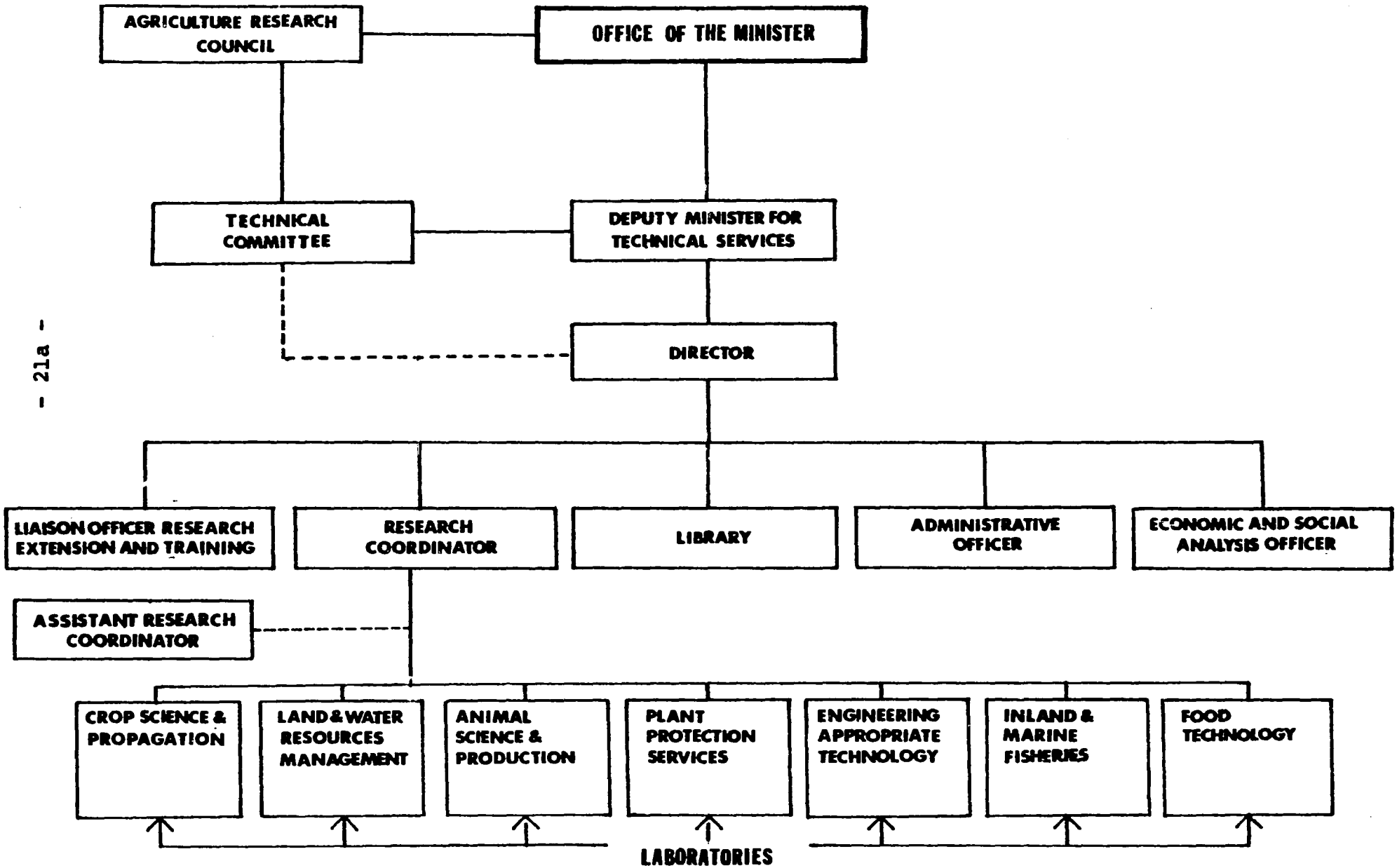
As mentioned previously, the Ministry of Agriculture has reorganized its research structure by the transformation of its main research operation, the Central Agricultural Experiment Station (CAES) into a new organization, called the Agricultural Research Institute (ARI). This new structure provides the Institute with the capability of being responsive to the needs of the farmer target groups. Additionally, to meet the objectives of coordination and integration, a special structure has been established within the Ministry to ensure clear lines of authority and accessible channels of communication. Chart II presents the structure for the new Ministry of Agriculture Research Organization. The Minister of Agriculture will be responsible for agricultural research policy but will depend on an Agricultural Research Council to recommend actions. The Minister or his Deputy will chair the council whose members include high ranking government and private individuals. Working under the Council and with the Deputy Minister for Technical Services will be the Technical Committee. This Committee shall examine the various proposals for research in agriculture. It shall suggest (when necessary) new topics or lines of research and continuously review all research work in progress and give directions for further investigations. It will seek to establish working relationships with other agricultural research institutions and organizations throughout the world and particularly with those in the neighbouring countries.

The Technical Committee will meet at least four times in a year - once every quarter. Additional meetings may be called by the Chairman when necessary. The Chairman may invite persons who are not members of this committee to attend its meetings as observers or advisors. The members of the Technical Committee will be:

1. Deputy Minister of Agriculture for Technical Affairs - Chairman
2. Director of the Institute - Secretary
3. Research Coordinator - Member

CHART II

MINISTRY OF AGRICULTURE RESEARCH ORGANIZATION CHART



4. One representative of each of the members of the Agricultural Research Committee at the Technical level - Members

5. (Ex-officio members) al Senior Research officers of the Institute - Members

These two bodies will act as a board of directors to the Institute with the Institute Director responsible for the day to day operations, employment and promotion at the Center. The Ministry will provide line item budget support to the Institute with the Council deciding general areas of funding, the Committee responsible for technical analysis and direction, and the Director responsible for the actual research expenditures of the Departments. (On the organizational chart, the Departments appear as boxes at the bottom.) In summary the Agricultural Research Institute will be a semi-autonomous organization within the Ministry of Agriculture, designed to address the agricultural constraints that limit farm production.

C. Technical Assistance to the Institute:

The project will provide three senior advisors to the Director, three research officers to coordinate ARI departments and 18 person/months of short term assistance to be used as consultants in problem or special interest areas.

1. Senior Advisors to the Director

Organizationally, underneath the Director are a number of key senior positions which are crucial to the institutional development of the Institute. The Ministry of Agriculture has requested AID assistance in filling three of these slots. First and most importantly is the Research Coordinator position. This person will assume the duties of the Director during his absence and be responsible for the coordination of all research programs including field trials. The individual Department Coordinators will report through him to the Director and he will be responsible for advising the Director and the Technical Committee on the status of research and suggest priorities and modifications. This person will have a Ph.D. and 8-10 years of experience in research management and administration.

The second position requested is that of Liaison Officer for Research, Extension and Training. The Liaison

officer must be basically an extension or production specialist, competent in economics, farming practices and extension work. He will have a basic understanding of agricultural science and be able to interpret field experiments to determine whether innovations would be feasible and profitable for farmers. He will have an understanding of socio-economic costs and benefits, appropriate input packages, cropping systems and marketing alternatives. Because he will serve as the principle link between research and extension, he must be able to understand new ideas and communicate them effectively to the rural people through the extension channel. He will plan, prepare and present appropriate information for the target audiences and obtain feedback from them. This officer will have a Ph.D. and at least 6 years of experience in research and extension.

The third position requested is that of the Economic and Social Analysis Officer who will engage himself, under the supervision of the Director, in the translation of agricultural research into data useable by other sectors of the economy and assess the socio-economic impact or potential impact of research activities at the Institute. This person will be called upon to assist and advise the Institute's Administrative Officer in the first year of operation. The candidate for the position will have a Ph.D. in agricultural economics and five years of experience.

The Ministry of Agriculture has asked for AID assistance both to fill these three senior staff positions and to train Liberians to replace the U.S. technicians. Initially each of the position will have a Liberian Deputy who will work with the American technicians and receive educational training as required. It is planned that by the end of Phase I or early Phase II the U.S. technicians will become advisors. The Deputy to each of the Americans will be promoted to the top position. American senior technicians will continue in a counterpart relationship, but with the goal of phasing themselves out as Liberian capacity develops.

It is extremely important that the American contractor understandsthat, although this is a long term relationship which is being established, a technician is not expected to be needed in the same position for the entire program duration. In the past American technicians have been used to replace Liberians in operations, rather than to advise and assist them to build their own capacity. Layered constraints to the development of a Liberian research and extension system will be addressed by the contractor. The long term relationship is needed to address all of the layers of constraints. Thus in the dozen or so years of planned assistance, the contractor's employees and mix of technicians will change according to development (or lack of development) in one area or another.

2. Senior Research Officers (Departmental Coordinators)

At present, research work at the ARI is limited to investigation in soils, livestock, agronomy (rice, root and tubers) and basic chemistry. Research in land and water, appropriate technology, and rubber, is vitually non-existent. Thus the Ministry has proposed that research efforts in all of the major agricultural sub-sectors relevant to Liberia be developed. These will include Crop-Science and Propagation, Land and Water Resources Management, Animal Science and Production, Plant Protection and Services, Agricultural Engineering and Appropriate Technology, Inland and Marine Fisheries and Food Technology. As and when funding and possible donor assistance are identified, specific projects in these areas will be initiated and incorporated into the Institute. Supporting these departments, each of which shall have its own laboratory, will be a central analytical laboratory which shall service all of the departments in chemical and physical analysis.

AID proposes to assist the Ministry by providing senior research officers as Departmental Coordinators for Crop Science and Propagation, the largest and most important department at the Institute, Agricultural Engineering, and the Analytical Laboratory. The Departmental Coordinators will be the key "hands-on" researchers in each of the research areas. Although a coordinator will be working on the particular problems and constraints within his own discipline, the responsibilities of each will be functionally quite similar. The responsibilities are as follows:

a. Supervise and manage technicians and support staff.

b. Lend technical assistance in all phases of research in his department to ensure the proper functioning of the research unit.

c. Report to the Research Coordinator and Director departmental research results and status of operations. Success, problems, and constraints should be clearly identified.

d. Suggest priorities and modifications in research and research methods to the Research Coordinator, Director and Technical Committee.

e. Coordinate and control logistic support to the Department.

f. Coordinate all aspects of his department with other technical departments and keep all other Departmental Coordinators advised of his Departments' activities.

The Ministry has requested a level of education and experience for the individual Departmental Coordinators as follows:

a. The Departmental Coordinator for Crop Sciences and Propagation should hold a Ph.D. in Agronomy with at least 6 years of research experience in a tropical country. The position will be filled by an expatriate with a tenure of service of three years with a Liberian counterpart to be trained to fill the position thereafter.

b. Departmental Coordinator for Engineering and Appropriate Technology should hold a MS Degree in Agricultural Engineering and Appropriate Technology. He should have at least 5 years general experience and some work experience in appropriate technology. It is expected that this position will be filled by an expatriate with a Liberian counterpart who will be promoted to the Coordinator position when properly trained.

c. Head Chemist, Analytical Laboratory will hold a Ph.D. and have 5 years experience in chemical and physical analysis and some experience working at an agricultural research station. It is expected that this position will be filled by an expatriate while a Liberian counterpart is trained to replace this technician at the end of Phase I.

Each of the six long term U.S. technicians will be provided with housing at Suakoko. This project will fund construction of the houses at an estimated cost of $375,000.

3. Short Term Assistance

Eighteen person months of short term assistance in disciplines to be determined by the implementing team will be provided over the course of the project. Approximately 2 person months of the total will be used for project evaluations. Assistance may be provided in any of the following: library science, animal sciences, entomology, plant pathology, storage technology, marketing, vegetable production, seed multiplication as others. The purpose of the consultant fund is to allow the research coordinator or other team members flexibility to bring in need expertise in needed areas.

D. Staff Development:

The professional and technical staff at the Institute is both undermanned and undertrained for the mission of the station. As pointed out earlier, there is already a heavy reliance on expatriate personnel either on personal services contracts or through donor agencies. At present there are 10 foreign nationals, representing nearly one-third of the professional staff. The breakdown of professional staff at ARI is as follows:

Area of Work	Liberia	Expatriate	Total
Director	1		1
Administrative Officer	1		1
Agronomy	8	5	13
Livestock	3	4	7
Entomology	1		1
Soils	7		7
Engineering	1		1
Fisheries	1	1	2
TOTAL	23	10	33

The expatriate staff is concentrated mainly in the two production areas, agronomy and livestock. The soils area, on the other hand, is entirely staffed with Liberians, trained under an earlier U.S. effort.

In evaluating the level of formal training, the data present a similar picture of heavy reliance on expatriate staff to fill positions requiring highly trained personnel. A breakdown by training level and nationality status follows:

	NATIONALITY		
Highest Degree Level	Liberian	Expatriate	Total
Doctoral	1	7	8
Master's with Diploma 1/		1	1
Master's	7		7
Bachelor's with Diploma 1/	2	1	3
Bachelor's	8	1	9
Diploma 2/	1		1
No information	3		2
Total	23	10	33

Since the anticipated output is both to upgrade present staff capability and expand the staff with additional qualified people, training will be provided at the Master's and Ph.D. and post-graduate levels. The mix of

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1/ These diplomas are courses designed for persons who hold the baccalaureate degree.

2/ This diploma is a below baccalaureate degree level certificate. It is beyond high school somewhat but not altogether like a junior college level experience.

training, as to level of training and type of candidate, will be based on the need to balance the requirements for on-going research and long term staff development. It is expected that 5 Liberians per year will be selected from the present staff or from promising young recent graduates to train in the U.S., at third country African universities, or at specialized universities in other third world countries. Decisions will be made individually on the level of education required and the institutions to attend. As an example, assuming that a person is otherwise qualified, the four institutions where a rice agronomist could best be trained would be at the University of Ibadan in Nigeria, the University of the Phillipines at Los Banos, Louisiana State University and Texas A&M University in the U.S. Each of these institutions has an outstanding rice research facility nearby where a student could do field research. The final decision will rest with student desires, student acceptability to specific institutions, cost factors, and agreement between the ART and the contractor institution. As a matter of priciple, institutions with the best applied research-oriented graduate programs would be selected, and degrees from varied institutions would be best for persons within any specific discipline to avoid in-breeding.

In terms of doctoral level training, those who do well on a Master's degree will be considered for doctoral training. The more immediate objective would be to get the professional staff basically trained at the Master's level, with the departmental coordinators trained to the doctorate degree. In the later phases, doctoral level training could be provided to some of the senior operational research scientists.

In order to support the main project purpose of institution building, training will be provided in a wide range of disciplines. Table 1 lists the disciplines, planned level and timing of the education. This list is only suggestive and it is expected that the Director, the Research Council and the Technical Committee will modify this schedule as a better understanding of training needs and constraints unfolds. The training is not limited to those areas supported with US technicians, but there is an emphasis on food crop production.

Table 1. Participant Training

Discipline	Person/Months FY80	FY81	FY82	FY83	Total
Long-term training					
Agricultural engineering-machinery	12	12	12		36
Agronomy-Rice Production	12	12			24
Horticulture-roots & tubers	12	12			24
Biochemistry	12	12			24
Agricultural Economics/ Administration & Management	12	12	12	12	48
Rural Sociology		12	12		24
Agronomy-Rice Breeding		12	12		24
Animal Nutrition		12	12		24
Extension		12	12		24
Soil fertility		12	12		24
Library science		12	12		24
Rural Sociology			12	12	24
Agronomy-cereals			12	12	24
Agronomy-forage crops			12	12	24
Fishery production			12	12	24
Agricultural economics			12	12	24
Sub-total	60	132	156	72	420
Short-Term Training					
Agricultural research administration	3				3
Library science		3			3
Soil Survey Techniques		6	6	6	18
Agronomy		9	12	12	33
Sub-total	3	18	18	18	57
GRAND TOTAL	63	150	174	90	477

Also attached, to indicate a complimentary effort, is a list of trainees to be supported by the UNDP/FAO project (see Table 2). This effort will emphasize primarily tree crops researchers and livestock extensionists, involving some 33 trainees. The EEC has agreed to make approximately $300,000 available for livestock training. This assistance is designed to complement another UNDP/FAO project, Livestock Nutrition. Also EEC fellowships will be used for unexpected or special training needs that may arise in the course of station development.

Since the project is expected to move into a second and third phase as part of the long-range institution-building program, the numbers of trainees represent a modest beginning. There is a limited number of Liberians available who meet post-graduate school requirements and many of those that do are ARI staff members. For this reason, the projected training level is only five trainees per year. During the second phase the numbers would increase significantly.

In the short-term category of training, a three month study tour of agricultural research institutions is planned for the Director of ARI. Since the project is institution-building and since the job at ARI will require the initiation of many changes, it was thought wise to have the Director visit several selected institutions for an intensive study of administrative and management practices. Also planned are some short study programs for technician level personnel in soil survey, veterinary research and library science.

E. Library:

The present library at Suakoko is woefully unadequate. Currently, it is a storage room for old books, copies of journals donated by researchers, and a collection of out-of-date research reports received from international agencies such as FAO. It does not function in support of agricultural research at the station. The facility is a single room that will be adequate as the collection is building but is too small for the envisioned research library. The librarian is a high school graduate without any library training; library furniture and equipment are minimal. All of these problems reflect the low priority given in the past to the Library at Suakoko by the Ministry.

TABLE 2.

GOL/UNDP/FAO: Support to the Ministry of Agriculture Training Program

Activities for Irrigation Engineering Training

	Duration	Location	Year
B.Sc. Irrigation Eng.	4 yrs.	Dev. Country	1980-1983
M.Sc. Irrigation Eng.	2 yrs.	Dev. Country	1980-1983

Fellowships - Vegetables:

Field of Study	Duration	Location	Year
M.Sc. (Marketing)	24 m/m	U.S.A.	1979-81
M.Sc. (Marketing)	24 m/m	U.S.A.	1979-81
M.Sc. (Veg. Prod.)	24 m/m	Dev. Coun.	1980-81
M.Sc. (Veg. Prod.)	24 m/m	Dev. Coun.	1980-81
6 Veg. Production & Price Analysis, Storage, Processing	3 m/m ea.	Neighbouring countries	1980-81

Fellowships - Livestock

Field of Study	Duration	Location	Year
DVM	72 m/m	Dev. country	1979-85
DVM	72 m/m	" "	1979-85
DVM	72 m/m	" "	1980-86
DVM	72 m/m	" "	1980-86
1 Lab. Specialist	72 m/m	" "	1981-87
B.Sc. (Animal Husbandry)	48 m/m	" "	1979-83
B.Sc. (Pasture Ag.)	48 m/m	" "	1979-83
B.Sc. (Pasture Ag.)	48 m/m	" "	1981-85
M.Sc. (Animal Nutrition)	24 m/m	U.S.A.	1979-81
M.Sc. (Genetics)	24 m/m	Dev. Country	1980-82
M.Sc. (Animal Breeding)	24 m/m	" "	1980-82
M.Sc. (Animal Husbandry)	24 m/m	" "	1980-82
M.Sc. (Poultry Produc.)	24 m/m	" "	1980-82

Fellowships - Tree Crops

Field of Study	Duration	Location	Year
M.Sc. (Cocoa Agronomy)	24	West Indies	1980-81
M.Sc. (Coffee ")	24	Ivory Coast/ India	1981-82
M.Sc. (Oil Palm and Coconut Agronomy)	24	Malaysia/ Phillipines	1981-82
Cocoa and Coffee (Seed Gardens)		Ivory Coast/ Ghana/Nigeria	1980
Oil Palm, Coconut and Cashew processing	2 x 4	Malaysia	1980-81
		Phillipines India Sri Lanka	
Fruits	1 x 2	West Indies	1979-80
Group Training (Counterpart)	1 x 2 -	Florida To be decided	
M.Sc. Coconut Agronomy (Fruit)	24	Florida/Israel	1980-81

The library should be a collection of current scientific journals, especially those dealing with tropical crops and tropical farm enterprises, also scientific books of interest to specialists and some for generalists. A documents section should be established to maintain copies of all research reports developed at the station. This could be expanded to include research reports from other institutions as well. A data bank and statistical section would maintain files of pertinent statistics and references on statistical methods. A card catalog filing system based on the decimal system, is recommended.

The library should be a pleasant place to visit and browse, as well as a place for serious study. It is not intended to be an archive of ancient materials.

Under the new organization the Director will have more say in the allocation of funds and he plans to give higher priority and budget support to the Library. In conjunction with this commitment, the following assistance will be provided by USAID for the development of the Library:

- $20,000 to build the collection of scientific journals and publications in disciplines appropriate to the work at ARI,

- Short-term technical assistance in the development of a classification system to properly catalogue and store materials and to set up a procurement system for journals and research publications,

- Short and long-term training for Liberians.

The MOA will hire a professionally trained librarian or college graduate capable of receiving training in library science. AID has programmed funds for library training at the University of Liberia.

F. Laboratory and Field Equipment:

The Ministry of Agriculture in its new plan for agricultural research has identified expanded facilities and additional equipment as a high priority for successful adaptive research. Ministry plans call for the creation or expansion of the following laboratories at Suakoko:

a. General Chemistry
b. Entomology and plant pathology
c. Land and water resources
d. Veterinary science and microbiology
e. General agronomy
f. Appropriate technology workshop

The Ministry has money available from a World Bank loan and its own development budget to expand facilities. However, funds immediately available are not sufficient to upgrade all facilities. Thus there will be a phasing of facility development over the next 4 - 5 years. USAID will contribute some of the cost of purchasing equipment for the laboratories and field research. AID will not fund any laboratory construction. The planned level of specific laboratory support is as follows:

- Agro-chemical laboratory equipment	$150,000
- Engineering (appropriate technology) workshop equipment	48,000
- Farm equipment	75,000
- Other laboratory equipment	125,000

Detailed equipment lists for the chemistry laboratory and the engineering workshop and for farm equipment to do field work appears in Annex F . The budget levels quoted above are not sufficient to purchase all that is listed.

Thus, there is a need to determine equipment purchase priorities. An initial purchase of priority items for the two labs and field operations will be delayed until the summer of 1980 in order to benefit from consultation with the American technicians and to give the Director time to find additional funds and set out a phased laboratory building program. One hundred twenty five thousand dollars in non ear-marked funds will be used to purchase equipment at the discretion of the Research Council and Director.

V. IMPLEMENTATION ARRANGEMENTS

A. Administrative Arrangements

1. GOL

The purpose of this project, as has been noted several times, is to build an institution which will provide applied, adaptive agricultural research capability to support government programs in food and cash crop and livestock production.

In part, as a result of the LSU design team's suggestions, the Ministry of Agriculture's structure for research has been reorganized. Originally it was recommended that the Central Agricultural Experiment Station at Suakoko be strengthened, and that it become a distinct, integrated, semi-autonomous administrative unit responsible to the Minister. The reorganization (described in Section IV, B) has established the type of structure and administrative control necessary to conduct applied agricultural research effectively.

2. Contract Team

The contract technicians will function as staff in the Institute. A deputy will be appointed to work with the American technicians, and depending on the deputy's training and capability, will be expected to take the technician's place on the staff. However, some of the technical assistance positions are expected to continue into Phase II. (Research Coordinator and Research Extension Liaison Officer are likely to be expatriates in Phase II).

3. AID

This project will be monitored and supervised by the Rural Development Office of USAID/Liberia. A collaborative assistance institutional contract will be entered into with Louisiana State University, the institution which drafted this project paper.

The research coordinator, extension liaison officer and socio-economic officer should be senior people, highly experienced in agricultural research administration and management. All members of the team should have substantial capability and experience in applied, adaptive research under tropical and semi-tropical conditions, particularly in the area of rice and root and tuber crops.

This project anticipates a long-range association of ARI and the selected contractor for 12-15 years.

The job description for the TA staff are provided in the technical assistance sections of the detailed description of the project. It is anticipated that the Chief of Party and most of the technical assistance staff will be active members of the contracting university faculty. Language will not be a problem since the language of government in Liberia is English. The technical assistance staff will be required to live at ARI, Suakoko.

B. Procurement Plan

1. Technical Assistance

Because of the special long-term nature of the project and the desire to foster an institutional linkage between an American agricultural research institution and ARI, the collaborative assistance contracting mode was selected. Louisiana State University was chosen to design and implement the project subject to availability of funds and the applicable AID regulations. This contracting mode provides flexibility to LSU to adjust its technical assistance to the changing needs of ARI and the MOA.

Included within the collaborative assistance contract will be those purchases which are made day to day in the provision of technical assistance (vehicle maintenance, supplies, travel, library materials and miscellaneous other costs including a short wave radio).

2. Vehicles

Because of Mission experience and expertise in vehicle procurement and shipping control, six four-wheel drive vehicles will be purchased directly by USAID. Once cleared through customs and prepared for operation, the vehicles will be turned over to LSU which will be responsible for operation and maintenance.

3. Laboratory Equipment

Detailed specifications and ordering of laboratory equipment, as identified in Annex F, will be the responsibility of LSU. ARI and LSU have worked together in identifying appropriate equipment. Although LSU

will be responsible for detailed specifications and equipment procurement, USAID will assist in expediting and clearing the goods.

4. Construction of Technician Housing

A direct AID contract will be let to a Liberian or U.S. contractor following the normal Liberian procedures for competitive bidding. Justification to waive the U.S. advertising requirement for the six houses being financed under this grant appears in Annex H. Because of the importance of having the houses ready for the technicians when they arrive at the up-country site, an AID direct contract is necessary to provide control over the tight construction schedule. A Host Country contract would take longer and would be more difficult for the AID engineers to monitor.

5. Waivers

No other waivers besides the advertisement of the construction will be sought. All purchases will be from U.S. source and origin with the exception of some shelf items purchased by LSU. The shelf item limitations of $2,500 per item, $10,000 total, will not be exceeded.

C. Implementation Plan

There are several key requirements which must be met before this project can get underway. Housing and vehicles must be available for the technical assistance personnel when they arrive. The Research Council and Technical Committee should be established and begin operation as soon as possible. An outline of key monthly events is as follows:

Month/Year	Event
November 1979	PP Review, Revision, and Approval.
December 1979	Project Agreement signed; PIO/T issued, construction planning begins.
December 1979	Temporary housing for technical assistance personnel arranged.

Month/Year	Event
January 1980	Contract for Technical Assistance signed; vehicles procured; furniture ordered.
February 1980	Construction contracts on houses and facilities at Suakoko signed.
March 1980	Construction begins.
May 1980	First three technical assistance personnel arrive (Agricultural Economist, Research Coordinator and Departmental Coordinator for Crops). Vehicles arrive.
June 1980	Research and field equipment procurement begins. Rice and root crop experiments begin.
August/September 1980	First group of participants sent for training. (general schedule appears in Table 1, Section 4D) Rice harvest begins; houses completed; furniture arrives.
January 1981	Remaining technicians arrive; establish dry season swamp rice trials.
February 1981	Order additional supplies and equipment.
March 1981	First Evaluation completed.
May/June 1981	Establish variety trials for all crops; establish first outfield plots; establish trials on production techniques for major crops in cooperation with agricultural engineering specialist.
August/September 1981	Harvest and evaluate all experimental trials, including first cassava crop; establish dry season sweet potato and cassava trials.
December 1981/ January 1982	Establish dry season swamp rice trials, including outfield plots.

Month/Year	Event
April/May 1982	Harvest and evaluate dry season swamp rice trials; construction planning for second group of technicians, begin.
May/June 1982	Second Evaluation Completed.
May/June 1982	Repeat and expand research tests on production practices for all major crops, involving agronomists and plant protection and agricultural engineering specialists.
August/September 1982	Harvest and evaluate all experimental trials, establish dry season sweet potato and cassava trials.
December 1982/ January 1983	Repeat dry season trials, including outfield testing; contract for second phase of project signed.
February/March 1983	First production technology packages developed for utilization by extension and development agencies.
March/April 1983	Project Paper for second phase prepared and reviewed.
May 1983	Third year of rice and root crop trials begin.
September 1983	First phase of project ends.

D. Evaluation

Two project evaluations are planned with the design of phase II functioning as a third review of the project. The first would occur early 1981. It would be an administrative type of evaluation in which representatives from the GOL, USAID/Monrovia and the contractor would collaborate. The following outputs would be reviewed at that time to measure progress:

- administrative structure for research
- facilities and equipment for research
- staff development
- field crop production research
- socio-economic research
- appropriate technology development
- research library

The evaluation would focus on reviewing the results achieved to that point and the utilization of the planned inputs in achieving outputs in the opening months of the project.

The second evaluation would occur in May/June 1982 at the end of the second year of project implementation and would be more exhaustive than the first evaluation. The evaluation would be conducted by a joint GOL/AID team including two outside consultants, a research administrator with extensive experience at a major institution and an agronomist with tropical experience.

The following outputs would be reviewed to measure progress:

- administrative structure for research
- coordination of research efforts
- facilities and equipment for research
- research/extension linkages

- staff development
- field crop production research
- socio-economic research
- engineering-appropriate technology research
- research library development

The evaluation would include inspection of the work going on at the Institute, discussion with the ARI contractor staff, review of reports, observations of outfield plots, and visits with the extension and development program officers. The visit with the latter would be for the purpose of reviewing the research-extension linkage to determine if research results were beginning to get to the field. Visits would also be made to some village farms to review problems and to determine the relevancy of work going on at ARI. A formal report would be submitted to the MOA, USAID and the contractor.

The design of phase II will occur in early 1983 and review the accomplishments and progress of phase I. The review will determine the extent to which the end-of-project status conditions have been met. These conditions are presented in the logframe.

Because of the nature of this project, building an applied, adaptive research institution, it is reasonable to expect that the end-of-project conditions will not have been achieved within the time frame of phase I, as has been mentioned previously. It is important, nevertheless, to measure progress and to re-assess the projected end-of-project status.

VI. PROJECT ANALYSES

A. Financial Analysis and Plan

Since this project is non-revenue producing in nature the financial analysis will concentrate on the adequacy of the non-revenue producing components.

Summary Cost Estimate and Financial Plan

The summary cost estimate and financial plan is presented in Table 3 A total project cost of $9,377,000 is envisioned, with the GOL putting up $5,168,000 and AID contributing $4,209,000. Of the total cost, GOL is contributing 55.1 percent and AID 44.9 percent. Technical assistance and personnel cost constitute the largest single expenditure. with $3,352,000 to be spent on Liberian personnel and $1,746,000 on technical assistance for a total of $5,048,000. This amounts to 57.7 percent of the directly budgeted items other than contingency and inflation. The cost of training GOL personnel, $794,000, raises the percentage figure to 66.5 percent. Since the basic constituent of an institution is its people, it is very obvious that a majority of the funds of the project are directed toward personnel services and training.

A second large category of expenditures is "other costs" where a total of $1,826,000 is budgeted. Within the category, the largest single item, "supplies", is projected at a cost of $1,230,000. This is a substantial but crucial expenditure. Services represent another major expenditure in the "other costs" category, with $456,000 being budgeted to this item. The bulk of these items are not specified, they include the normal operating expenses for an experiment station. Included in these two categories would be maintenance and repair of facilities, janitorial service, day labor, office supplies, GOL vehicle and equipment operation. (The vehicle and operation line item under "other costs" is only for the 6 US technicians' vehicles and expendable research supplies.)

Commodities are a third major source of expenditure. ARI lacks many essentials for development as an agricultural research center, and the $785,000 budgeted to that category will go a long way toward overcoming some of these defficiencies. Research and farm equipment is the biggest need and $618,000 is budgeted for that purpose.

TABLE 3

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US$ 000)

ITEM	AID FX	AID LC	GOL LC	TOTAL
Technical Assistance				
Long-term	1,632			1,632
Short-term	114			139
Sub-total	1,746			1,771
Personnel			3,352	3,352
On-Campus Assistance				
Administrative	56			56
Clerical	32			32
Sub-total	88			88
Participant Training				
Long-term	638			638
Short-term	156			156
Sub-total	794			794
Commodities				
Vehicles	97			97
Equipment	390	8	220	618
Furniture	50			50
Library materials	20			20
Sub-total	557	8	220	785
Other Costs				
Vehicle Operation & Maintenance	20	50		70
			456	456
Travel	20	50		70
Supplies & Services	75	15	1,140	1,230
Sub-total	115	115	1,596	1,826
Construction		375		270
Contingency	291			371
Inflation	115	5		120
GRAND TOTAL	3,706	503	5,168	9,377

At ARI at the present time, there are 29 houses in which the senior administrative and technical staff live. The six new houses, which will be built under this project for technical assistance personnel, will place them on a comparative basis with their counterparts. This is considered a very crucial element in the project.

Schedule of Annual Expenditures

The schedule of annual expenditures (see Table 4) depicts budgeted items across the anticipated four year time span of the project, FY 1980-FY 1983. The actual length of the project itself will be four years, with technical assistance activity actually scheduled to begin in mid-FY 1980 and extending through FY 1983.

Expenditures for phase one of the project will run at a fairly stable level for the four full years of activity from FY 1980 to FY 1983. The costs projected for FY 1980 funds include start-up costs such as construction of houses at ARI and the purchase of vehicles for the technical assistance personnel.

The expenditures of the GOL are shown at a relatively constant level in the four years of the project. GOL has financial constraints which are causing it to hold budgets at current levels. The projected GOL expenditure are held constant at the present low levels. This is the most conservative estimate of its contribution. Hopefully a modest increase in personnel and in support moneys from the GOL will be forthcoming later, and with AID's projected assistance, the Institute should be able to plan and implement the improved foods crop production program in phase one, expanding to cash crops and livestock production in phase two.

Project Outputs/Inputs Costs

An analysis of the budget by project output/project inputs costs is presented in Table 7. There are seven principal outputs projected in this budget as follows:

- Agricultural research administration and management (Output A)
- Crop production research activity (Output B)
- Other research activity (Output C)
- Analytical Laboratory Development, including purchase chemistry lab equipment and field equipment (Output D)

TABLE 4

SCHEDULE OF ANNUAL EXPENDITURES
(US$ 000)

	FY80	FY81	FY82	FY83	TOTAL
AID Totals	862	1,273	1,120	954	4,209
Technical Assistance					
Long-term - 210 PM	237	465	465	465	1,632
Short-term - 18 PM (including 3 PM for eval.)	-	38	38	38	114
Sub-total	237	503	503	503	1,746
On-Campus Assistance					
Administrative - 24 PM	14	14	14	14	56
Clerical - 24 PM	8	8	8	8	32
Sub-total	22	22	22	22	88
Participant Training					
Long-term - 420 PM	52	194	277	115	638
Short-term - 57 PM	12	48	48	48	156
Sub-total	64	242	325	163	794
Commodities					
Vehicles	64	-	-	33	97
Equipment	15	337	46	-	398
Furniture	50	-	-	-	50
Library materials	-	10	5	5	20
Sub-total	129	347	51	38	565
Other Costs					
Vehicle Operation & Maintenance	10	20	20	20	70
Travel	10	20	20	20	70
Supplies	15	25	25	25	90
Sub-total	35	65	65	65	230
Construction	375	-	-	-	375
Contingency (10%)	-	89	102	90	291
Inflation	-	-	47	73	120

	FY80	FY81	FY82	FY83	Total
GOL Totals					
Personnel	1,292	1,292	1,292	1,292	5,168
Commodities					
Equipment	55	55	55	55	220
Other Costs					
Services	114	114	114	114	456
Supplies	285	285	285	285	1,140
Sub-total	399	399	399	399	1,596
GRAND TOTALS	2,154	2,565	2,412	2,246	9,377

Percent of Contribution:

AID - 44.9

GOL - 55.1

- Agricultural engineering and appropriate technology research (Output E)

- Extension publications and training (Output F)

- Socio-economic research (Output G)

Table 5 provides an analysis of the cost of inputs for each output area. This type of internal cost effectiveness evaluation is helpful in determining if the allocation of resources among different project outputs is in line with the project purpose and goal. In this case project output A, agricultural research administration and management, receives the most funding, $1.197 million or 28.4% of the project costs. This output contributes directly to the institution-building purpose of the project. The other aspect of institution building is improved applied research. Outputs B, C, D,E and G contribute directly to this purpose at total of $2.591 million or 61.5% of project costs. Of these operation research components, the largest allocation is to crop production research. This is in line with the purpose of increased food crop production.

Turning now to the inputs, the largest single cost is technical assistance followed by training. Twice as much money is allocated to T.A. than to training and likewise twice as much money is allocated to training than to equipment purchase. Again the relative allocation seems in line with the U.S. comparative advantage in agricultural research know-how and training.

Analysis

The key analytical feature of the financial plan is that the projected recurrent costs of operating and maintaining an agricultural research center will be adequately met during the course of the project. The financial plan is deemed sound and reasonable in this regard. There is the question, however, of the capability of the GOL to maintain the recurrent costs once the project has been completed. This is a crucial question since the success of an institution building project is dependent upon the capability of the institution to survive as an efficient and effective entity once the assistance is terminated. The success of this project will put the GOL in an improved position to maintain such an institution. Since this project is projected to continue for twelve years or so, there should be ample opportunity for the results of research to reach the farmer and have impact on his operation. Improved farm production will help the economy, and with an improved economy the GOL should be able to maintain the institution.

TABLE 5

PROJECT OUTPUTS/INPUTS COSTS
(US$ 000)

INPUTS	OUTPUTS 1/ A	B	C	D	E	F	G	TOTAL	% OF TOTAL
AID									
Technical Assistance									
Long-Term - 210 PM	818	148		259	259		148	1,632	38.8
Short-Term - 22 PM	18	79	20		12	5	5	139	3.3
Sub-total	836	227	20	259	271	5	153	1,771	42.1
On-Campus Assistance									
Administrative-24 PM	56							56	1.3
Clerical- 24 PM	32							32	.1
Sub-total	88							88	2.1
Participant Training									
Long-Term - 420 PM	36	155	193		58	38	158	638	15.2
Short-Term - 57 PM	24	36	96					156	3.7
Sub-total	60	191	289		58	38	158	794	18.9
Commodities									
Vehicles	10	55	11		11		10	97	2.3
Equipment		60	60	225	48		5	398	9.5
Furniture	4	25	9		8		4	50	1.2
Library materials	1	5	3	3	3	2	3	20	.1
Sub-total	15	145	83	228	70	2	22	565	13.4
Other Costs									
Vehicle maint.&operation	5	34	12		10		9	70	1.6
Travel	6	34	12		8		10	70	1.6
Supplies	2	55	15		15		3	90	2.1
Sub-total	13	123	39		33		22	230	5.5

TABLE 5 (Cont.)

INPUTS	OUTPUTS 1/ A	B	C	D	E	F	G	TOTAL	% OF TOTAL
Construction	135	22		45	45		23	270	6.4
Inflation	50	20	15	5	15	5	10	120	2.9
AID Sub-total	1,197	728	446	537	492	50	388	3,838	91.2
% of Project Costs	28.4	17.3	10.6	12.8	11.7	1.2	9.2		
Contingency								371	8.8
AID TOTAL								4,209	L100

1/ Legend for Outputs

A - Agricultural Research Administration and Management

B - Crop Production Research,

C - Other Applied Research

D - Analytical Laboratory Development, including purchase of chemistry lab equipment and field equipment

E - Agricultural Engineering and Appropriate Technology Research

F - Extension Publications and Training

G - Socio-Economic Research

B. Social Analysis

The sector goal under which this project is based outlines two major considerations, self-sufficiency in food production and increases in crop and livestock production for cash. This specific project, which focuses on the development of an effective, efficient applied agricultural research institutional capability, pre-supposes that the principal ultimate beneficiary is the traditional peasant farmer family. Most often in Liberia the man and woman of the family are illiterate, poor and operate in a subsistence mode, farming much as their ancestors have done before them. There is increasing evidence, however, that they can be changed, particularly if risk is minimized and benefits can be demonstrated. The husband and wife farming unit is the prime target for adaptive research since they are the ones who must ultimately put into practice successfully the new technology which presumably will emanate from the research institution. Of special significance is the fact that this is a countrywide effort, and consideration must be given to the differences as well as the similarities among peasant farmers in the various regions of the country.

Socio-Cultural Feasibility

Liberia is a country of diverse people. As with other areas of West Africa, the rural folk are traditional and tribal in nature. At least 16 major tribal groups, representing three major language classifications live in the rural areas. Each of the major language groups are sub-divided into specific languages, numbering more than 20 local languages and dialects. The official language of the country is English and an increasingly larger proportion of the population speaks some English, even if it is of a pidgin variety.

The tribal groupings tend to be localized to a specific geographic area, although this is not altogether true. With increasing educational levels and with the developing infrastructure (roads and the concommitant developments such as commercialized farms and agricultural processing and marketing facilities), migration is taking place, causing a blurring of tribal lines to some extent. There tends to be specialization among the tribes. The Loma and the Kisi, for example, who are located in the North, tend to be agriculturally-oriented. The Kru, on the other hand, who are located primarily in the coastal areas are generally fishermen. The Mandingos are generally traders. Other tribal groups are somewhat less specialized but nevertheless agricultural, with the men being hunters, roaming the forest for food and doing some agricultural work while the women perform more of the usual agricultural functions. Roles between the sexes tend to be

stereotyped also. Men normally perform the heavier tasks such as tree-felling and brush-clearing and generally help with the harvest. Women do such agricultural jobs as seeding and weeding in addition to managing the home and rearing the children. The children also participate, serving to chase birds from the fields at critical times.

The tribes tend to be divided into autonomous chiefdoms, although the increasing appearance of formal government structures in the rural areas is causing this phenomenon to be less prevalent in the large communities. Most often, the chiefdom is centered in a larger village, with a series of satellite communities surrounding the area. Some of the smaller chiefdoms, however, may be confined to one village, and, in some instances, may consist exclusively of one kinship group. Larger rural communities, on the other hand, may be divided into several chiefdoms, each occupying a section of the community.

The family units are almost always patrilineal in nature. It consists of the father, his wives, his sons and their wives and all of their dependents. Most often, when the father dies, the sons then split-off into their own nuclear families and the process is repeated. Polygamy is widespread. In fact, a chief measure of wealth is the number of wives because of their usefulness as agricultural labor and for their capacity to produce offspring. Among the Kpelle, who predominate in Northern Bong County, a rich man called a "to nuu" is determined by the number of wives he possesses, the number of cattle he owns, and the number of dependents he has. He must be publicly generous, feeding people when necessary, his home and garments must be a cut above that of ordinary men, and he must lend his wives on occasion to perform agricultural work. Upon marriage, women normally go to live in the surroundings of the husband. Not to do so is considered a sign of weakness or poorness on the part of the man.

Formally organized traditional societies are a characteristic of many areas of Africa. Among males in Liberia, there is the "Poro", and the existence of this secret organization crosses tribal boundaries. There is a similar one among women, called the "Sande". They serve as political, religious, juridical and educational organizations. At or around puberty, young people are taken out of the village, the boys by the "Poro" and the girls by the "Sande", initiated into adulthood through a ritualistic, educational process, learning tribal history and lore, appropriate roles for their sex, respect for authority, etc. They enter as children and come out as adults.

Each tribe has its own status - prestige system, generally being accorded by the tribal value system. Generally, the more prominent factors that determine status-prestige are lineage, age,

competence and wealth. The emphasis will vary among tribes and even within tribes, depending on the nature of the status-prestige role. A chief is not necessarily the head of the "Poro" in the village, for example. A person who is more competent in the lore of the tribe may be accorded headship status, while the chief would be a member.

Land generally goes with lineages. Within a chiefdom, the chief assigns land among family units. The family, in turn, assigns land among the family members, usually from father to sons. The shifting cultivation patterns normally take place within this framework, and it is upon this pattern that the traditional farming system operates (for a more detailed technical discussion see the section on Crop Production Research).

Life in the traditional agricultural environment is rhythmic, and this rhythm is attuned to the crop cycle, and most important is the rice crop. Peak labor periods, such as clearing and burning, preparing rice paddies and harvesting the crop, require full attention. Slack periods - after weeding and the post-harvest months - are the times for social, political and religious activity.

Although, this is a rather brief, capsulized description of the socio-cultural context in which this project will operate, it does set forth the environment in which the fruits of this project - technology packages and improved production practices - must be introduced, accepted and effectively utilized in order for the sector goals to be achieved. At this point, the question must be raised, are there factors in this particular environment which will impinge upon the success of this project? In order to answer this question, six specific points will be addressed as follows:

Social Disruption - The crops and cultural practices which this project will encompass could conceivably be somewhat disruptive. The increasing emphasis on swamp rice in areas where it is not already grown will cause adjustments, not only in the rhythm of life in some areas, but it will also introduce a vastly different cropping system, compared with upland rice cultivation. This change, however, is not considered impossible. Some areas are already changing, particularly among the Kisi in Lofa County, where success has been achieved. Minimum tillage also represents quite a different approach and will affect the traditional cultural practices. At this point in time, its acceptability is unknown, particularly since it will require extensive purchase and use of herbicides. Yet, in other circumstances, it has been demonstrated that the traditional peasant farmer will accept change if it can be effectively demonstrated in his circumstances that a new system or method will pay off and that risk is minimal.

Use of Existing Social Structure - The presence of a relatively well-organized socio-cultural environment, especially the presence of the chiefdom, is a definite asset. Also, the patrilineal character of the family, and the strong authority of the head of the family, provide another entry point for new innovations. The problem will lie primarily in convincing key persons such as the chief and/or the village elders and heads of extended family units, about the efficiency of the change. Once they accept and use the idea or practice successfully, change will be less difficult. On the other hand, if they do resist, then change will be difficult.

Perceptions of Benefit - An important consideration in change is the perception of benefit by the targets of change promoting activity. A person's beliefs and attitudes are shaped by the environment in which he grows and matures and by his exposure to education. The more traditional his experience the more traditional his beliefs and values. The resulting conceptual and attitudinal structure forms the basis by which he perceives and reacts to change. The better the extension worker understands the mentality of his audience, the better he can help them perceive the benefits of change. He is thus able to relate to the audiences by using proper methods and techniques to assist them in perceiving benefits properly. The establishment of the Extension Information and Training component at CAES was developed with this problem in mind among others. Also, the use of the result demonstration technique hopefully, will be of great value in assisting farmers to perceive benefits.

Motivation - A primary motivational tool in promoting the new technology will be increased production which hopefully will yield increased food supplies available for the family and provide surplus which can be sold on the local market. At the same time, risk must be minimized. Hopefully, demonstrations of success by key persons in the community will serve as motivational elements.

Obstacles - It is anticipated that all possible obstacles will be removed through careful research procedure. Local verfication trials are planned to ascertain whether the technology works in different locations. Such trials will include checking the acceptability of practices under local conditions, and will also determine if the crops produced will be palatable to the local populace. If a high-yielding variety is not palatable, then advocating it may be futile. Such potential obstacles will be checked out carefully.

Communication Strategies - The research effort in the earlier stages will focus on the selection of higher yielding varieties under current cultural practices as much as possible. Earlier communication efforts will be aimed at the change of variety.

At the second stage, cultural practices of benefit will be introduced, and even later in a third stage the use of fertilizer, insecticides, etc., may come into play. The more complex the change, the more complicated is the communication process. It is also anticipated that the extension information and training unit at ARI will be helpful in training extension agents to use good communications procedures.

Role of Women

The traditional role of women in developing societies centers around care of the home and for the well-being of the family, and are generally expanded to areas of food production and processing. This holds true also in Liberia. Women are seen regularly doing many of the less strenuous agricultural production activities such as seeding and weeding and some of the processing and marketing activities such as pounding the grain and carrying products to market. Polygamy is common among rural people. In fact, a chief measure of wealth is number of wives and one of the principal reasons is their value as laborers in the fields.

There is evidence, however, that change is occurring. The previous Minister of Agriculture was a woman and so are several of the key people in the Ministry. In the first class of the Rural Development Institute at Cuttington College, there are three women in training as extension aides. Since women do perform many of the roles in agriculture, it does make sense to train women as extension workers and in fact the number trained could well be increased.

In the staffing pattern for the project, normal EEO practices will be followed; positions will be advertised and selection will be based on stipulated criteria in the anticipation that women will apply and be considered. From the standpoint of counterpart and trainee selection by the MOA, the utilization of women will also be advocated. No problems in this regard are anticipated since women already have prominent roles in the MOA and throughout the Government.

As to the conduct of the project itself at ARI at least two issues are important:

1. In the experimentation and design of production technology packages, the fact that women traditionally perform certain agricultural functions must be considered. As an example, in developing appropriate technology if a simple, push-type seeder is developed, what are the ramifications since seeding is normally a woman's job? Can the tiresome nature of this work be alleviated in some manner? Does the normal woman have the strength to push such a device or should the plan be to have the man instead take over the seeding function?

2. The chief wife particularly has an important role in family affairs. She counsels with her husband and also controls much of the activity of the lesser wives. Although tribal life in Liberia is patrilineal in nature, it is obvious that the chief wife (headwife) occupies a strategic role. On the planning of extension publication and training programs, this phenomenon must be considered. Women play a part in the decision-making progress, and their perceptions of benefit and risks are important.

Swamp Rice Feasibility

About 10 percent of the rice produced in Liberia comes from a swamp rice, while the remaining 90 percent is upland rice. The current state of technology indicates that yields can be increased significantly by going into swamp rice, but there are two significant problems. First, swamp rice work is dirty, hard and more time-consuming, compared with upland rice cultivation. Second, there is the problem of schistosomiasis, an extremely serious problem caused by snail-borne flukes which live in water. Swamp rice work carries with it increased exposure to this rather serious disease. The specific issue, consequently, which faces this project in planning the emphasis and the priority of research effort is this, should swamp rice be a major research component?

In spite of the attendant consequences, the answer is positive. Evidence is already available that Liberians are prepared to do swamp rice work if the outcome proves worthy. Yields are significantly greater, and the economic benefits to be derived are worth the effort. On the health side, progress is being made with an action-oriented program for schistosomiasis control. Extension work on swamp rice production will, therefore, require a concommitant effort on schistosomiasis control.

Summary

The social situation in Liberia does not seem to provide insurmountable obstacles to the utilization of the proposed production technology packages from ARI. Available evidence indicates that the peasant farmers of Liberia do respond to innovations, provided that the perceived benefits are demonstrable and understandable, and that risk is minimized. The leadership structure seems conducive to the spread of ideas within chiefdoms, the major social unit among rural people.

C. Technical Analysis

1. Rational for Agricultural Research Assistance

The primary objectives of agricultural research are to develop and disseminate a package of improved technology, especially

adapted to the needs of Liberia, and to develop an institutional base for the continued development of advanced agricultural technology.

It may be well to remember that important constraints on the transfer of advanced agricultural technology from one part of the world to another are imposed by major differences in climate, soils, social and economic factors. Although the basic principles of pure and applied research may be universally valid, their application varies with specific environmental conditions. This complicates the role of research, because preconceptions and assumptions are frequently invalid. Adaptive research has to be geared to local conditions and technology developed for specific locales. Research programs designed to cope with the broad spectrum of plant breeding, soil management, and plant protection are massive undertakings that must be well supported by financial and personnel resources. This USAID supported program was specifically designed to provide the outside inputs of resources, expertise and leadership required to meet the stated objectives.

From a technical viewpoint, the project is basically sound since most of the research, adaptive to the specific needs of Liberia, shall be conducted within the limits of its ecological zones. The introduction of genetic materials for rice, root and tuber crops, grain legumes, and vegetables from IITA, IRRI, WARDA and possibly other institutions from neighboring countries, is scientifically valid since these sources originate at similar latitudes with comparable environmental conditions.

Major emphasis will be directed to the institutional development component and improvement of existing crops and practices since it is recognized that the introduction of new or improved crops or cropping practices must be acceptable to the farmer before they can be integrated within existing farming patterns or be substituted for traditional systems. Yields of all leading food crops are low and have the potential for significant production increases through improved varieties and production techniques. For instance, it was demonstrated that LAC 23, an improved upland variety, showed yield increases of 35 percent over conventional varieties. When fertilizer and weed control components were included in comparative trials, yields increased 80-85 percent over the unimproved varieties. Consequently, this single practice of introducing and developing locally adapted varieties is capable of generating appreciable yield increases. When improved varieties are complemented with other supportive technical innovations, total production output can become highly significant.

The inclusion of the root and tuber crops, primarily cassava, in the program can be justified because of its major contribution as an energy source in the diets of the population. Most

cassava presently grown is produced from unimproved low yielding varieties. The crop is well adapted to most soils and climatic conditions of Liberia and possesses the capacity for producing large amounts of food calories in the form of carbohydrates per land unit.

2. Rationale for Agricultural Institution Building

The general argument for assistance in food crops research is based on the lack of suitable technological information and varieties resulting from a historical pattern of low investments in institutional building and crop research in Liberia. The limitation of staff and facilities, the lack of an adequate training and Liberian financial difficulties coupled with the need to pay greater attention to the requirements of small holders has meant that the food crop research has been spotty and erratic and the commitment to institutionalize the research system non existent. While it is true that not all the research results have been successfully transmitted to the farmers, it is even more true that the available pool of technological knowledge for transmission is small and probably not precisely relevant to the situation facing many of the small farmers. In view of the huge payoffs which have resulted from crop research in other areas and countries, investment in creating a strong and viable research institution appears justified.

The first priority of institutional building is obvious. Because of the lack of senior manpower specifically trained for the designated "institutional building" positions, U.S. personnel will be assigned with Liberia deputies. These Liberian deputies will gradually be designated as counterparts and finally into the principal position as they gain experience. The U.S. positions are designated as: (1) Research Coordinator, (a) Economic Social Analysis Officer who will also be Chief of Party, (3) Liaison Officer, Research Extension and Training, (4) Crop Science Department Coordinator, (5) Agricultural Engineer/Appropriate Technology Department Coordinator, and (6) Analytical Laboratory Supervisor.

One key question in any agricultural research project is to what extent are the results of the research being used by the target farm group. Often in a developing agricultural system, there are layered constraints which make advancement in any one endeavor futile unless development takes place in complementary areas. Effective agricultural extension is a requisite for the application of successful agricultural research. Thus, it is important to look at the agricultural extension system within Liberia to see to what extent it does constrain or will contrain farmer use of research results.

There are 12 Regional Coordinators that have had, in principle, control over the various extension workers within the Regions. However, the individual advisors are attached and often report directly to various divisions and bureau heads within the MOA or Directors of special programs. The extent to which the Regional Coordinator can effectively use extension agents assigned to his region has been limited by the fragmentation of extension assignments. The recent MOA reorganization will rationalize the MOA extension system and cut down duplication of activity and confusion over job responsibilities. A new assistant minister level position has been created to coordinate extension work. He will sit in the Research Council and work closely with the AID funded Research/Extension Liason Officer at Suakoko, Additionally the number of trained extension personnel will increase sharply as the Cuttington College Rural Development Institute graduates students.

An additional channel for dissemination of research results (production packages and improved farming techniques) are the integrated agricultural projects for Upper Bong, Upper Lofa, Central Nimba and Upper Nimba. Each of the projects is designed not to be competitive or duplicative of the MOA and other agricultural agents activity in the region. The on-going projects, Bong and Lofa, have close coordination with ARI. The Bong Project headquarters is adjacent to ARI and the Lofa/Bong Project Training Center for outreach programs is drawing on ARI research results and personnel for assistance. (The center is located on the Bong County Project headquarters site.)

These projects approach the farm production problems in a comphensive manner. They attempt to address the multiple layer constraints at the same time. Thus the projects are offering the GOL alternative organization structure for agricultural development, including a more comprehensive system for farmer outreach and feedback.

Finally, it should be pointed out that the long-term AID collaborative assistance project will shift more inputs into extension development as the project progresses. It is necessary to have the research results, input packages, and new techniques before the extension system can even be tested. Extension development activities are planned to "phase in" as the research results become available. Expanded assistance to the extension system may lag two or three years behind research development activity.

3. Rationale for Selection of Technical Assistance Staff

Two major criteria were employed in determining staff requirements. First, the input should be of sufficient size and importance to affect the identified constraints and problems within

a reasonable length of time. Second, it should not be so large that the Liberian Government will not be able to assume responsibility for the inputs and costs once the assistance is ended. These positions were jointly selected by the USAID staff and the Minister of Agriculture after exhaustive discussions, and considerations. It is envisioned the U.S. staff will encumber these slots during the first phase of the project and will then possibly be assigned to more technical and supportive jobs in the second phase.

4. Rationale for Support to the Crop Science and Propagation Department

Rice, cassava, maize, tree crops, sweet potatoes, vegetable and legumes have been selected as the initial crops in which to lend AID assistance. The reasons for these selections are obvious. Rice is the major food crop occupying roughly 70% of the total area in food crops and providing about 95% of the total cereal grain production.

Cassava and sweet potatoes are particularly important in the drier areas where rice is less reliable. In terms of importance they rank behind only rice. Average yields of all these crops are very low although limited research indicates that substantional improvements should be possible. For rice, most work has been done on the needs of upland varieties with swamp, paddy and small scale irrigated varieties receiving little attention. For cassava some well adapted varieties have been developed or introduced, however, disease and pest problems remain and there is a need for field testing. Also, although some improved agronomic practices have been identified for rice they have been inadequately tested on the farm and at the village level. For example, it has been reported that although the individual farmers may recognize the advantages of fertilizer for swamp rice production (as the research indicates) these supposed advantages disappear once cost, labor and pest damage are considered. Weeding pays off in higher yields but the necessary labor may not be available. The responses to fertilizer may vary a great deal between areas.

Tree crops and vegetable research will be components of the crop department, however, will be the responsibility of UNDP and FAO as will Animal Production and Entomology.

5. Rationale for Support Agricultural Engineering and Appropriate Technology Department

Labor constitutes the major input in traditional farming, accounting for well over 80% of the total cost of production. Tools in common use are the simple hoe, axe, cutlass and knife. Pronounced features of traditional farming are low capital investment and little or no capital accumulation except in the case of cash

crop farming. Therefore, labor productivity can be easily improved by the use of simple and efficient tools and equipment.

The country depends exclusively on imported machinery that are invariably unsuitable for use in tropical Africa. As a result there is urgent need for machinery that is designed for local use, and designs which meet the managerial and financial capabilities of the small farmer. Appropriate technology is the term used to describe those designs and means of agricultural engineering relevant to the needs of the subsistence farmer.

This department has two objectives. (1) To develop techniques in small scale irrigation and land development transferable and usable by farmers in Liberia. (2) To develop and disseminate technology appropriate to Liberian agriculture, rural development and energy. This department will develop and test simple prototypes of devices that can be adapted to Liberian sites and cultivation methods. Thus, the AID funds provided to this department will in the end make Liberian farmers more productive.

5. Summary. The overall project to develop Liberian agricultural research capacity is technically sound. Assistance to the Field Crop and the Appropriate Technology Departments will provide improved farming technique and inputs which improve small farmer productivity and thus his income and nutritional level.

D. Economic Analysis

First this analysis will evaluate the contributions that improved agricultural techniques and human resource development have made in other developing and developed countries in order to show the consistent pattern of high economic return for agricultural research. Then the cost effectiveness and benefit cost ratio of this specific program will be determined.

1. Agricultural Research Benefits and Cost Effectiveness of the Project

The recent AID "Agricultural Development Policy Paper" points out the importance of improved farming techniques and training for production increases and economic growth. It states:

"A major tenet of A.I.D. agriculture development policy is that a substantially greater commitment of resources is required for the development of agricultural technology and its delivery to farmers. It is anticipated that nearly all missions will support some activities in the technology area, perhaps particularly those to strengthen nationwide agricultural research systems and to train the requisite personnel at the appropriate levels. This reflects the

recognition that: (1) cost-reducing technology is the primary engine of agricultural production growth; (2) effective nationwide systems for linked agricultural research, education and extension remain very deficient or even nonexistent, especially in the lowest income countries, yet are crucial for the utilization and adaptation at the country level of the results of the international agricultural research centers ..."

A growing body of literature supports the AID position. Hayami and Ruttan in Agricultural Development; An International Perspective have determined that the main factors contributing to higher agricultural productivity and thus higher economic benefit are non-material inputs consisting of know-how, information, skills and improved organizational arrangements, methods, and procedures. The greater use of technical inputs is associated with more effective institutions, superior organizational forms, better and more widely disseminated information, a larger pool of technical knowledge and superior methods and procedures. Essentially a better agricultural research, extension and training system. The conclusion of the Hayami and Ruttan work is that 62% of the difference in labor productivity between developed and developing countries is due to differences in the agricultural skills of the labor force and the use of technical inputs; only 33% of the difference is due to resource endowments. Studies by Simon Kuznets and Dana Dalrymple have reached similar conclusions. Thus the accumulating evidence shows that skilled human resources and effective institutional and organizational forms within which they work are a requisite to agricultural growth and sustained economic progress. Furthermore, the effective and productive utilization of many types of capital investment -- irrigation systems, rural feeder roads, farm credit, etc. -- require both previous and simultaneous investments in generating new knowledge or adapting existing knowledge to local conditions, developing human resource skills to effectively use, manage and administer such investments, and establishing institutions and organizations to support economic and social systems associated with such investments.

The proposed project through the reorganization of the ARI, the provision of technical assistance for applied local research, and 477 person/months of training,provides exactly the type of inputs that have contributed most substantially to agricultural and economic growth elsewhere.

Overcoming the research/technology adaptation constraint without efforts to overcome the farmer outreach and feedback limitation is futile. Reorganization of the extension system by the MOA and its new commitment to expanding extension services mean that the timing is right to strengthen agricultural applied research so that as the extension service expands, improved technical packages will be available for the outreach effort. Improved crop

packages and techniques that flow from applied research are needed to test and expand a farmer outreach and feedback system.

The next major consideration of the analysis is the cost effectiveness of the proposed project compared to other alternative that might meet the project purposes. There is no reasonable alternative to using the ARI and its facilities at Suakoko for food crop, cocoa, coffee and livestock research. Because the food crop research program focuses on the average farmer in Liberia who grows for subsistence, it is unlikely that a private concern would do applied research on crops. Likewise, the tree crop research focuses on the methods of the small grower, not a large plantation system. Again a public institution doing research for the small producer is the only alternative. Secondly, the ARI is not duplicative in its research because it depends on other centers (IITA, IRRI) for basic research and focuses on applied experiments with the assistance of WARDA. The system of international contacts into which Suakoko is linked is cost effective in its division of research. Thirdly, because of the relatively small size of Liberia with similar agro-climatic conditions throughout, a single central agricultural research station is most cost-effective. Fourthly, since the benefits of agricultural research take years to achieve, AID's long-term commitment to applied research assures that the program will have time to mature and contribute to agricultural development. Finally, the selection of Louisiana State University as project contractors taps one of the most experienced US institution in rice, roots and tubers, and livestock. Its experience in the relevant research topic areas will help ARI develop its capacity more quickly and thus in a cost-effective manner.

Thus, in summary based on the four points presented, the proposed project is the most cost-effective alternative to achieving the end of project status.

2. Benefit/Cost Analysis and ERR Calculations

Finally the following cost/benefit analysis will make an estimate of the projects economic value assuming certain project achievements.

The Liberian traditional sector GDP, largely consisting of the subsistence sector's contribution to overall GDP, has shown an average annual "real" growth rate of about 5% over the past six years. In 1979 this sector's contribution to total GDP constitutes $83.5 million at 1971 constant factor cost.

Assumptions: Since the Agricultural Research project aims at disseminating improved packages of technology to subsistence farmers, and since the subsistence farmers constitute the

Traditional Economy in Liberia, one may assume that the traditional sector GDP will over time show additional growth above and beyond its average annual growth rate, as packages of improved technology are increasingly used by the target group.

It is further assumed that (1) during phase I of the project, the Traditional Sector will continue its average annual real growth rate of 5 percent per annum; (2) the rate will increase to an average annual real growth rate of 6 percent during phase II and to 7 percent during phase III.

Traditional Sector GDP projections (with project) for years 1-12 based on a 1979 contribution of $83.5 million may be compared with standard average annual growth rates, and as a result, additions to the Traditional Sector GDP can be calculated as follows:

TRADITIONAL SECTOR GDP PROJECTIONS

YR	GDP GROWTH RATE (PERCENT)		TRADITIONAL SECTOR GDP PROJECTIONS ($ MILLION)		ADD'L CONTRIBUTION ($ MILLION)
	WITHOUT PROJECT	WITH PROJECT	WITHOUT PROJECT	WITH PROJECT	
1980	5	5	87.7	87.7	0
1981	5	5	92.1	92.1	0
1982	5	5	96.7	96.7	0
1983	5	5	101.5	101.5	0
1984	5	6	106.6	107.1	0.5
1985	5	6	111.9	113.5	1.6
1986	5	6	117.5	120.3	2.8
1987	5	6	123.4	127.5	4.1
1988	5	7	129.6	136.4	6.8
1989	5	7	136.1	145.9	9.8
1990	5	7	142.9	156.1	13.2
1991	5	7	150.0	167.0	17.0

The currently proposed project constitutes phase I of a projected 12 year commitment, both on the part of AID and on the part of GOL.

Finally, it is assumed that GOL and AID inputs into the project will be as follows:

(US $ MILLION)

YEAR	GOL INPUT	AID INPUT	TOTAL INPUT
1980	1.292	.862	2.154
1981	1.292	1.273	2.565
1982	1.292	1.120	2.412
1983	1.292	.954	2.246
1984	1.500	1.000	2.500
1985	1.500	1.000	2.500
1986	1.500	1.000	2.500
1987	1.500	1.000	2.500
1988	1.800	1.000	2.800
1989	1.800	1.000	2,800
1990	1.800	1.000	2,800
1991	1.800	1.000	2.800

The present value of inputs (cost) may be calculated as follows, using a discount factor of 10%.

YEAR	COST ($ MILLION)	FACTOR	PV ($ MILLION)
1	2.154	.909	1.958
2	2.565	.826	2.119
3	2.412	.751	1.811
4	2.246	.683	1.534
5	2.500	.621	1.553
6	2.500	.564	1.410
7	2.500	.513	1.283
8	2.500	.467	1.168
9	2.800	.427	1.187
10	2.800	.386	1.081
11	2,800	.350	.980
12	2.800	.319	.893
		TOTAL	$15,443

Using the addition to Traditional Sector GDP (with project) as the benefit, the present value of benefits may be calculated as follows, using a 10% discount factor.

YEAR	BENEFIT ($ MILLION)	FACTOR	PV ($ MILLION)
1	0	.909	0
2	0	.826	0
3	0	.751	0
4	0	.683	0
5	.500	.621	.311
6	1.600	.564	.902
7	2.800	.513	1.436
8	4.100	.467	1.915
9	6.800	.424	2.883
10	9.800	.386	3.783
11	13.200	.350	4.620
12	17.000	.319	5.423
		TOTAL	$21.273

The benefit/cost ratio is calculated as follows:

PV of benefits : $21.273
PV of costs : $15.443 = 1.4

The economic rate of return (ERR) may be calculated as follows:

PV of benefits : 21.273
PV of costs : -15.443
PV net benefit 5.830

PV net benefit : 5.830
PV of costs 15.443 = 0.4 = ERR

In summary, it can be concluded that if the assumptions presented prove to be valid, the economic return of the proposed project are good. The economic benefits will be 40% greater than the costs.

LOGICAL FRAMEWORK

ANNEX A

PROJECT DESIGN SUMMARY

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
PROGRAM OR SECTOR GOAL: The broader objective to which this project contributes: Increased rural income through cash crop and livestock production and improved self-sufficiency in food production	Measures of Goal Achievement: 1. Increase in per-capita rural income. 2. Increase in per-capita agricultural output. 3. Increase in amount of rural household output entering the commercial sector.	1. Statistical reports for benchmark and succeeding years on net increases in production, net incomes, and imports and exports. 2. Surveys and analyses of the Liberian economy.	Assumptions for achieving goals targets: 1. Continued support by GOL of policies and programs for increasing agricultural production and for raising level of living in rural sector. 2. Concurrent improvement in infrastructure-roads, markets, credit, cooperatives, production inputs, pricing mechanisms, etc.
PROJECT PURPOSE: To foster development of an effective functioning agricultural research system in Liberia which will: 1. Interface effectively with regional and international agricultural research centers 2. Conduct applied research on appropriate food and cash crops and livestock for Liberia. 3. Cooperate effectively with extension programs in developing viable production packages for improving food and cash crop and livestock production in Liberia.	End Project Status: Conditions that will indicate purpose has been achieved. 1. Staff capable of administering the agricultural research system and producing valid, reliable research results. 2. Sound and appropriate food, cash crop and livestock production technology packages being infused into extension and development programs. 3. Appropriate research results from regional and international research centers being utilized in the Liberian program.	1. Research reports. 2. Reviews of research projects - methodology and findings. 3. Reviews of extension and development programs.	Assumptions for achieving purpose: 1. MOA will organize a discrete administrative structure for support, provide an adequate budget and give the unit operational budget control. 2. Personnel incentive and reward structure conducive to effective research performance. 3. Regional and international agricultural research institutions will provide research results and plant materials.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
PROJECT OUTPUTS			1. GOL will provide adequate financial support.
1. Administrative structure for research	1. Operational administration in place and in control of research program	MOA records	
2. Equipment for research	2. Research equipment in use in: 1) analytical laboratory 2) engineering workshop 3) Field work 4) Other	CAES records	2. MOA will provide suitable candidates for graduate training.
3. Staff Development	3. a) Post graduate degrees for Liberian personnel as follows: 1) agricultural engineering (2) 2) agricultural economics (2) 3) agronomy (4) 4) animal nutrition (1) 5) biochemistry (1) 6) extension (1) 7) fishery (1) 8) rural sociology (2) 9) soils (1) 10) library sciences (1)	Returned participants	3. Other donors will provide planned contributions.
	b) Short-term training 1) agricultural research administrator 2) veterinary technicians 3) soil survey technicians 4) crop production assistants		
	4. Leaflets and other notifications prepared on research projects	CAES records	
4. Standard procedures for getting research results to field			

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
5. Rice Production Research 6. Root and Tuber Crop Research 7. Plant Protection Research 8. Socio-Economic Research 9. Engineering Research 10. Animal Production 11. Research Library 12. Extension Information and Training Component	5. Field tests and demonstrations on varietal selections and cultural practices. 6. Results obtained on varietal selections and cultural practices 7. Results obtained on pest control problems of rice, root and tuber crops and other major crops 8. Results obtained on social and economic probelsm affecting food and cash crops and livestock production 9. Results obtained on appropriate technology research for rice, root and tubers and other crops 10. Results obtained on disease control and livestock production practices 11. Collection of periodicals, journals and research reports developed 12. Training courses and publications developed for extension and development workers	Research reports Research reports Research reports Research reports Research reports Research reports CARS records CASE records	
PROJECT INPUTS USAID $4.210 million 1. Technical assistance personnel	1. a) Long-term as follows (210 PM): PHASE I Research Coordinator Socio-Economic Officer Extension Officer Agronomist - Field Crops Chemist Agricultural Engineer b) Short-term assistance as needed and requested - 22 PM		

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
2. On-campus assistance personnel	2. a) Administrative support - 24 PM b) Clerical support - 12 PM		
3. Participant training	3. a) Post-graduate training - 420 PM b) Short-term training - 57 PM		
4. Commodities	4. a) Vehicles - $.086 million b) Research and field equipment - $.4 million c) Household furniture - $.050 million d) Library materials - $.020 million		
5. Other costs	5. a) Vehicle maintenance and operation - $.07 million b) In-country and regional travel - $.07 million c) Research supplies - $.90 million		
6. Construction	6. Six houses - $270 million		
GOL $5.720 million			
1. Personnel	1. $3.352 million		
2. Commodities	2. Equipment - $.202 million		
3. Other costs	3. Services - $.456 million Supplies - $1.140 million		

REPUBLIC OF LIBERIA
MINISTRY OF PLANNING AND ECONOMIC AFFAIRS
P. O. BOX 9024
MONROVIA

OFFICE OF THE MINISTER

Annex B
72

Rec'd 6/21/79
ACTION: RD
INFO: AD
PR
RF

MPEA-1037/D-7.18/79

June 21, 1979

Mr. Director:

I have the honour to submit through you a request of the Government of Liberia to the Government of the United States of America for assistance in developing a strong research capability within the Ministry of Agriculture.

As you well know, Agricultural Development is of top priority to the overall development programme of Government and research is no doubt an essential element of this effort. At present, the research facilities that exist at the Central Agricultural Experimental Station (CAES) at Suakoko, Bong County are inadequate to keep pace with the tempo of activities in the agricultural sector. Unless the research gap posed by this situation is closed or significantly narrowed, agricultural development will suffer in the long run.

Concerned about this serious state-of-affairs, the Government has decided to improve and strengthen the capability of the Ministry of Agriculture itself, so as to make it more effective in the planning and execution of agricultural projects.

There is no doubt that an activity of the nature and scope that Government envisages will demand significant technical, human and financial resources. Given the constraints that the country already faces in all these areas, it is not difficult to guess what would happen if the Government attempted to undertake the project single-handedly.

In view of these facts and considering your Government's abiding interest in building up capabilities in all areas as well as its experience with us in the agricultural research field, the Government of Liberia wishes to request the Government of the United States of America for both financial and technical support in carrying out the project.

I should be grateful were you to give this request your timely consideration in following through with the requisite actions.

Kind regards,

Sincerely yours,

D. Franklin Neal
MINISTER

October 1, 1979

LIBERIA COUNTRY CHECKLIST

(This checklist includes the applicable statutory criteria from the Foreign Assistance Act of 1961, as amended, affecting Liberian eligibility for U.S. assistance.)

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights?	All USAID/Liberia assistance is directed at helping the needy. Further, Liberia has no pattern of gross vidations of human rights
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the United States unlawfully?	No
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	Yes, the State Department has determined that Liberia is not controlled by Communists.
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?	No such case exists for Liberia.
5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?	No, the GOL has taken no such action.

A.

6. FAA Sec. 620(a), 620(f); FY 79 App. Act, Sec. 108, 114 and 606. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola?	No
7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	No
8. FAA Sec. 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?	No
9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	Liberia has an Investment Guaranty Agreement with the U.S.
10. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters:	No such action taken by Liberia.
a. has any deduction required by the Fishermen's Protective Act been made?	N/A
b. has complete denial of assistance been considered by AID Administrator?	N/A
11. FAA Sec. 620; FY 79 App. Act, Sec. 603. (a) Is the government of the recipient country in default for more than 6 months on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds?	(a) No (b) No
12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the	Approximately 3.7% of budget is for military expenditures. The U. S. dollar is legal tender in Liberia so all military expenditures can be considered both domestic resources and foreign exchange. Liberia is not a purchaser of sophisticated weapons.

A.12.

amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s)." This report is prepared at time of approval by the Administrator of the Operational Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)	
13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?	No
14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?	Liberia is not in arrears in UN obligations.
15. FAA Sec. 620A, FY 79 App. Act, Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?	No
16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?	No
17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty?	No

B. FUNDING CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy?	Yes, Liberia is committed to involve the poor in development and has programs to foster development for the poor in each of the six ways listed.

B.1.

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?	Every USAID/Liberia activity contributes to at least one modification of economic and social conditions as listed.
2. Economic Support Fund Country Criteria	
a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights?	No
b. FAA Sec. 533(b). Will assistance under the Southern Africa program be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President determined (and reported to the Congress) that such assistance will further U.S. foreign policy interests?	N/A
c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	Yes
d. FY 79 App. Act, Sec. 113. Will assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?	No
e. FAA Sec. 620S. Will security supporting assistance be furnished to Argentina after September 30, 1978?	N/A

PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

   (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure plus 10%)?

   (a) A CN will be forwarded after Project Committee Approval.

   (b) Yes

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U. S. of the assistance?

   (a) Yes

   (b) Yes

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   N.A.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

   N.A.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U. S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	Yes
6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?	Partially, the project will link in with regional research centers and utilize the basic research already done. This basic research must be adapted to Liberian conditions and this will be a primary purpose of this project.
7. FAA Sec. 601 (a); (and Sec. 201 (f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	a) Very limited b) Yes, it will strengthen the economic status of the peasant farmer. c) Yes d) Yes e) Yes f) No effect
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U. S. private trade and investment abroad and encourage private U. S. participation in foreign assistance programs (including use of private trade channels and the services of U. S. private enterprise).	The project will provide U.S. technical assistance and commodities. Most of these inputs will be obtained in the U.S.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U. S. are utilized to meet the cost of contractual and other services.	GOL contributions to this activity will be assured through normal budget allocations.

10. FAA Sec. 612(d). Does the U. S. own excess foreign currency and, if so, what arrangements have been made for its release? — No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

a) Strong effect! The primary beneficiary will be the peasant farmer.
b) Indirectly in the sense that this project will complement other USAID projects in agricultural development and cooperatives development by providing the applied technology.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph -- e.g., a, b, etc.-- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.) — Yes

(1) (103) for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; (103A) if for agricultural research, is full account taken of needs of small farmers;

1) Yes! The research effort is specifically aimed at production technology packages designed to increase production and income of the small farmer.

(2) (104) for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor; — N.A.

(3) (105) for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;	N.A.
(4) (106) for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:	
(a) technical cooperation and development, especially with U. S. private and voluntary, or regional and international development, organizations;	a) Closely tied-in with IITA, WARDA and UNDP/FAO activities in Liberia and in the region.
(b) to help alleviate energy problem;	N.A.
(c) research into, and evaluation of, economic development processes and techniques;	N.A.
(d) reconstruction after natural or manmade disaster;	N.A.
(e) for special development problem, and to enable proper utilization of earlier U. S. infrastructure, etc., assistance;	a) Not applicable
(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.	N.A.

(5) (107) by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.	N.A
c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?	Yes, host country contributions defined within Project Agreement includes a minimum 25 percent contribution.
d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?	No
e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.	1) Economic impact because it provides basic agricultural technology for production. 2) Self-help, aimed at increasing food production 3) Assistance in developing trained manpower for agricultural research 4) Indirectly, because of potentially better nutrition. 5) Not applicable 6) Women are involved integrally in the project.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	Projects fit within goals of the Ministry of Agriculture, fostering institutional development in research and increasing productive capacity in food and cash crops and livestock production.
g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1) - (3) and - (8). Does the activity give reasonalbe promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?	It is consistent with other projects and provides information on the activity's economic and technical soundness.
h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U. S. economy, with special reference to areas of substantial labor surplus, and extent to which U. S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U. S. balance-of payments position.	No adverse effect on U.S. economy. All commodities and technical assistance will be furnished from the U.S.
Development Assistance Project Criteria (Loans only)	
a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U. S.	N.A.

b. FAA Sec. 201(b)(2); 202(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U. S.) of lending and relending terms of the loan.	N.A
c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?	N.A.
d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?	N.A
e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?	N.A.
f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U. S. with U. S. enterprise, is there an agreement by the recipient country to prevent export to the U. S. of more than 20% of the enterprise's annual production during the life of the loan?	N.A.

3. Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability? N.A.

4. Additional Criteria for Alliance for Progress

(Note: Alliance for Progress projects should add the following two items to a project checklist.)

a. FAA Sec. 251(b)(1),-(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America? N.A.

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities? N.A.

Annex D

LIBERIA: AGRICULTURAL RESEARCH AND EXTENSION PROJECT (669-0135)

I, Remo Ray Garufi, Director of the USAID Mission to Liberia, do hereby certify that in my judgment the Republic of Liberia will have the financial and human resources capability to implement, maintain, and utilize effectively the subject grant technical assistance and training project. This certification takes into consideration the requirements placed on the Republic of Liberia to maintain and utilize other projects previously financed or assisted by the United States.

This judgment is based on the fact, inter alia, that:

1. The Government of Liberia has given high priority to the development of agricultural research and extension to increase agricultural production.

2. It has utilized successfully, capital assistance provided under other AID projects and has given assurances of improved performance in maintaining ~~these~~ His projects.

Edward E. Anderson, Jr
for Remo Ray Garufi

June 13, 1979
Date

ANNEX E

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT LOCATION: Suakoko, Liberia

PROJECT TITLE: LIBERIA - Agricultural Research and Extension 669-0135

FUNDING: $3,465,000

LIFE OF PROJECT: 5 years (1st Phase)

IEE PREPARED BY: Bernard E. Donnelly
Engineer
June 8, 1979

RECOMMENDED THRESHOLD DECISION:

NEGATIVE DETERMINATION (See Attached)

MISSION DIRECTOR's CONCURRENCE: Edward E. Crawford for Remo Ray Garufi, Director

June 13, 1979
Date

ASSISTANT ADMINISTRATOR/AFR DECISION:

RECOMMENDATION APPROVED: _____

RECOMMENDATION DISAPPROVED: _____

The Project

The purpose of this project is to foster the development of an effectively structured and functioning agricultural research system in Liberia.

In order to achieve this goal the project proposes to train a staff both administrative and research for the Central Agricultural Experiment Station (CAES) at Suakoko, Liberia by in-country, on-the-job training and participant training in the United States. In addition the project will provide the small amount of facilities and equipment to carry out the project purpose. During the project life, research will be carried out in the areas of agronomy, engineering, livestock and soils. Also liaison will be established with regional and international research centers to utilize their work as it applies to Liberia.

The first phase of a 12 to 15 years project will be 5 years. The land area involved for research is relatively small consisting of approximately 50 acres and a few small out-field test plots of above one acre. All seeds, fertilizer, pesticides, etc will be strictly controlled due to their experimental nature.

DISCUSSION

AID Handbook 3 Appendix 4B paragraph 216.2(a) and (b) of AID's Environmental Regulations do not require the preparation of An Environmental Assessment (or an Environmental Impact Statement) for such projects as (a) Education or Training Programs not directly effecting the environment and (b) controlled experimentation exclusively for the purpose of research which is confined to small areas and carefully monitored.

CONCLUSION AND RECOMMENDATION

It is concluded this project meets the requirements of the exception noted above. Therefore based upon these considerations, a Negative Determination is recommended.

EQUIPMENT REQUEST OF THE
MINISTRY OF AGRICULTURE
CENTRAL AGRICULTURAL EXPERIMENTAL STATION
SUAKOKO, BONG COUNTY

I EQUIPMENT LIST FOR ENGINEERING WORKSHOP

2 - Bush Hogs with blades
5 - M/T Tractors (135) for Station Cleaning
10 - M/T Tractors (165)
24 - Acetylene Cylinders (full)
24 - Oxygen Cylinders (full)
24 - Packs Welding Rods
24 - Bars Solder
12 - Tins Soldering Paste
24 - Packs Patches
12 - Cans Solution
40 - Gallons Acid
12 - Dozens Brake Fluid
288 - Tons Floor Jack
25 - Yards Water Hose
48 - Friction Tape
1 - Electric Drill
2 - Sets Drill Bits (Standard)
2 - Sets Drill Bits (Metric)
12 - Dozens Wire Brushes 1/4"
4 - Ridge Removers
2 - Battery Cable Remover
2 - Oil Filter Remover
1 - Set Tap and Dices (Metric)
1 - Set Tap and Dice (Standard)
1 - Length Air Compressor Hose
2 - Ring Squeser
2 - Hydrometer
3 - Grease Gun (Heavy Duty)
2 - Sets Battery Tester
2 - Sets Battery Chargers
2 - Sets Compressor Gauges
2 - Sets Coil and Condenser Testers
2 - Sets Tube Benders
1 - Dozen Tools Boxes
1 - Dozen Tyre Pressure Gauges
2 - Sets Engine tune up Kits
1 - Dozen Adjustable Wrenches. (6" and 15")
1 - Dozen Ignition Points Files
1 - Dozen Filler Gauges

PLUMBING TOOLS

1 - Water Pump Plier (1 Dozen)
2 - Adjustable Wrench (1 Dozen)
2 - Pipe Wrench (1 Dozen) 12"
1 - Pipe Wrench 24" (1 Dozen)
2 - Screw Driver Plastic Handle (1 Dozen)
2 - Philip Screw Driver (1 Dozen)
6 - Hammers (3 lbs)
6 - Round Nose Chisel
2 - Files (Assorted 1 Dozen)
2 - Fish Line
6 - Face Basin Wrench

WELDER

6 - Ball Pin Hammer (2½ lbs)
6 - Welding Shade (2)
6 - Bench Grinder
1 - Hack Saw

CARPENTER TOOLS

4 - Hand Plane #4 steel
4 - Hand Saw
4 - Squares 2'
4 - Steel Tape 12'
1 - Steel Tape 100'
3 - Pinch Bar
4 - Hammer

PAINTER

1 - Dozen Paint Brush
1 - Dozen Roller
4 - Roller Pans
1 - Dozen Putty Knife
4 - Bucket
1 - Steel Ladder

MASON

3 - Levels
3 - Trowels
3 - Hammers

AIR CONDITION AND REFRIGERATION

1 - Side Cutting Plier (1 Dozen)
1 - Pinch Plier (6)
1 - Vise Grip Plier (1 Dozen)
2 - Pairs flat and Philip screw driver (2 Dozens)
1 - Ampere Meter (ante type) 1 Dozen
11 - Can of Freon 12 - Ice Boxes
1 - Can of Freon 22 - Air conditional
6 - 1/8 Compressor - Air conditional
6 - 1/3 Compressor - Ice Boxes
2 - Dozen Silver Solder
2 - 1/6 Fan Motor
1 - Roll of 3/4 Cooper pipe

Air Condition and Ice Boxes

ELECTRICIANS

4 -	Pairs of electric plier	12
2 -	Side cutting plier	12
1 -	Vise Grip plier	12
2 -	Adjustable wrench 12"	12
1 -	Set screw driver	12 (Assorted)
1 -	High Voltage meter	2 sets
1 -	Pipe Wrench	6
1 -	600 ampere puller	6
1 -	Amps meter	6
1 -	2 lbs hammer	6
1 -	Hacksaw	2 Dozens
2 -	Cold Chisels	2 Dozens
1 -	Concrete Drill	6
1 -	Set Climbing suit	3
1 -	Breast Drill	1 Dozen
1 -	Set stud extractor	1 Dozen

WORKSHOP TOOLS

1 - Bush hog with blade
5 - M/F Tractor (135) for Station Cleaning
10 - M/F Tractor (165)
24 - Acetylene Cylinders
24 - Oxygen
12 - Pkg Welding rods
12 - Tin Solder & Paste
12 - Patches & Solution
10 - Galc. Acid 40
24 - Tins Brake Fluid 288 tins
1 - Floor jack, 10 tons
1 - Length garden water hose 25 yds.
24 - Friction Tape 78
1 - Electric Drill
1 - Set Drill bits (standard)
3 - Wire Brushes (1 Dozen ½")
1 - Set Drill bit (Metric)
1 - Ridge Remover
1 - Battery Clamp remover
1 - Oil filter remover
1 - Set taps & dices (Metric)
1 - Set taps & dices (Standard)
1 - Air hose (compressor)
1 - Ring Squeser (1 Dozen)
1 - Hydrometer
1 - Grease gun (Heavy duty) 3
1 - Battery Tester 2 sets
1 - Battery Charger 2 sets
1 - Compression Guage 1 set
1 - Coil & Condenser tester 1 set
1 - Tube bender
5 - Tools Boxes 1 Dozen
1 - Tyre Pressure guage 1 Dozen
1 - Engine tune up kit 2 sets
6 - Adjustable wrenchs (6" & 15") 1 Dozen
2 - Ignition point file 1 Dozen
2 - Filler guages 1 Dozen

SPECIAL ITEMS

HORTICULTURE - TREE CROPS

Budding Knifes	-	24
Secateurs	-	12

EQUIPMENT

Vehicles

1 Peugeot Car

1 Land Rover

2 Pick-ups

3 Motor cycles

Gasoline - 5,000 gallons/year

Available - Nil

II Field Equipment Requirement

Amount Require for Each Section

Fish.	Land Resources	Maint.	Animal	Rice	Field Crops	Eng.	Hort.	Lab.	
4	12	6	3	-	-	12	10	-	Axes
-	48	6	12	-	-	12	10	4	Spades-small
12	36	6	12	15	12	12	10	-	Shovels - big
10	12	6	12	15	24	12	10	-	Hoes
4	48	4	12	-	-	6	10	-	Pingalin
10	12	4	6	6	6	12	10	-	Mattocks
4	6	2	12	3	6	6	10	2	Wheel borrows (Tyre type)
4	6	4	12	20	24	6	8	2	Rakes
-	6	-	3	-	12	2	5	-	Prunning saws
12	12	48	18	20	24	12	20	-	Whippers
3	6	-	6	4	6	6	12	6	Water cans
-	6	12	3	-	6	2	8	-	Prunning knives
1	6	3	3	1	-	2	2	-	Power saw - 1 meter
									Pipes 3" } Elbow 3" } Hort. Sprinkler 3" }
3	6	6	12	4	12	1	6	3	Hand sprayer - 5 gals.
-	-	2	2	-	-	-	1	-	Power sprayer
4	24	2	8	3	3	6	3	2	Measuring tape 50' steel
2	24	6	2	4	3	2	4	2	" " 100'
		10							Cutlass (cases of 100 each)
		10							Scale(weighing up to 100 kg
3	12	6	6	12	6	4	6	6	" (" 10 kg)
		3							Spraying machine (high volume)
			Special order						Polythene(sheets & machines)
1	2	2	4	1	1	1	1	2	Refrigerator
2	6	6	12	5	5	3	3	6	Air conditioner (18,00 BTU
									Towel - local
									Duster- "

Fish.	Land Resources	Lab.	Maint	Animal	Rice	Field Crops	Eng.	Hort.	
2	6	10	12	6	4	3	6	4	Steel cabinet (standard office)
24	12	12	24	24	5	6	12	12	Buckets 5-gal wt.
									Wire screen
									Aquaria - Fisheries
									Research microscopes (specific)
									Dissecting "
									" instruments
									" dishes (sp.
									" trays "
									Bone cutter "
				CHEMICALS & FERTILIZERS (Bags)					
2	20	5	5	10	30	40	-	8	Urea - bags
2	6	3	6	3	15	10	-	8	Muriate of potash
1	4	3	5	3	-	3	-	4	Sulphate " "
3	3	2	3	3	-	3	4	4	" ammonia
-	6	2	3	2	6	3	-	-	Nitrate "
3	6	2	3	3	6	3	-	2	Single supersulphate
3	6	3	6	1	15	5	-	8	Triple "
10	12	4	6	10	10	3	3	10	Agric. lime
-	3	1	2	12	4	3	-	4	Chloride of Mg
			4	6				4	Sulpher " "
40	10	2	15	600	25	50	-	30	15-15-15
-	4	1	5	10	5	5	-	6	12-12-17-2
-	4	1	5	3	8	3	-	4	Basic slag
-	6	1	5	3	8	3	-	3	Rock phosphate
				HERBICIDES					
-	5	1	10	1	20	25	-	10	Stam-34
	3	1	5	-	25	10	-	10	MCPA
-	5	1	5	-	10	10	-	10	Grammoxone

Fish.	Land Resources	Lab.	Maint.	Animal	Rice	Field Crops	Exp.	Hqrt.	
				INSECTICIDES					
-	3	1	10	3	20	10	-	3	Azodrine
-	3	1	20	5	10	5	-	10	Ardrine
-	5	1	10	20	10	15	-	10	Malathion
-	-	-	5	50	-	-	-	-	Asuntol
				FUNGICIDES					
100 bags	1	-	5	-	1	-	-	3	Cu-oxychloride
100 "	-	-	2	1	-	-	-	-	Su. sulpher

III ANALYTICAL LABORATORY EQUIPMENT LIST

Quantity	Glassware and Hardware
50 doz. each	Volumetric flask (50,100,200,1000,2000,ml)
50 " "	Breakers (50,150,200,500,1000,ml)
20 " "	Pipet (1,2,3,4,5,10,15,20,25,50,100,ml)
20 " "	Pipette, graduated (10,25,17.5 ml)
10 " "	Autematic buret (25, 50ml, with reservior bottle)
10 " "	Glass Tubing, all sizes
10 " "	Reagent bottles, pyrex, 1 liter, 500ml
6 " "	Water Storage bottle (6, 12 gals)
15 " "	Filtering flask, pyrex (750ml)
40 " "	Erlemeyer Flask (25,50,100,150,300,500,750ml)
40 " "	Filtering funnel, 75mm top diameter & 75mm stem
40 " "	" " 100mm top " & 95mm "
40 " "	" " 15cm top " & 150mm "
10 " "	Cylinder, graduated (5,10,250,50,100,500,1000ml)
10 " "	Separatory flask (500, 750ml)-buchner
4 " "	Desicater, charged
10 " "	Porcelain funnels
10 " "	Water bottle, plastic, 250, 500, 1000ml
20 " "	Sedimentation cylinders, 113 and 1205ml marks
25 " "	Buret stand
15 " "	Buret clamp
20 " "	Filtering rack
10 " "	Crucible tongs
10 " "	Abestos pads
6 " "	Safety gogles
20 " "	Laboratory coat
6 doz "	" aprons
10 " "	Pipet bulbs
10 " "	Acid gloves
15 boxes "	Breaker brush
15 " "	Graduated cylinder brush
15 " "	Flask brush

ANALYTICAL LABORATORY EQUIPMENT CONTD.

Quantity	Glassware and Hardware
15 Dez. each	Conical flask
15 Boxes "	Buret brush
15 " "	Test tube brush
4 " "	Narrow tube brush
" "	Dust brush
4 " "	Scrub brush
4 " "	Table dusting brush
10 Dez. "	Squeeze bottle (250ml)
6 boxes "	Rubber tubing, all sizes
10 boxes	Glass tubing, all sizes
6 "	Glass marker
4 Dez.	Triangular file
10 boxes	Sponge
20 "	Rubber steppers, all sizes
20 "	Cork steppers, all sizes
25 " "	Filter paper No. 5 5.0cm
150 " "	" " Quantative 11.0cm
250 " "	" " " 12.5cm
150 " "	" " "11.0cm
150 " "	" " " 12.5cm
150 " "	"Student grade 15.0cm
250 " "	" " S and S No. 597 45.0cm
250 " "	" " No. 42 11cm and 15cm
4 Dez. "	Ph paper 1-14, 1-4, 4-6, 6-8, 8-10,10-12, 12-14
10 boxes	Meter stick
7 "	Graph paper
8 "	Buffer tablets
8 Dez. "	Lead pencils
15 " "	Ball points pens
15 " "	Note books (large), ledger
4 " "	Desk calculater
5 " "	Laberatery cement, 5-minute epoxy, pyseal

ANALYTICAL LABORATORY EQUIPMENT CONTD.

Quantity	Apparatus and Equipment
20 Doz. Each	Paper Towels
30 " "	Detergent (sparkleen)
3 " "	Demineralizer 2-Bed
8 " "	Liquid-Solid extrater, Soxhlet
4 " "	Improved crude fibre diggetion apparatus
18	Porcelian plate
3	Analytical balance - digital
3	Precision balance, digital
6	Standard packs of 10cc cubicle
250	Evaporating dishes
250	Khedhal flasks
6	Standard packs of 6 weighing bottles
25	Porcelians spoons
20	Stand, porcelain base
8	Stop watches
5	Steam bath
55	Moisture cans
20	Thermometer
30	Hydrometers (5 to 60g/liter)
8 sets each	Sieve (200, 100, 80, 40, 20, 10 mesh)
700	Plastic boxes (1 liter cap city)
20	Glass cutter - diamond tip
5 Doz each	Pipet shaks (for 50 to 1500ml beakers)
20	Glass cutter - diamond tip
20	Pipet racks
15	Plastic buckets (5 liters capacity)
15	Plastic bucket, graduated, 5liter
250	Test tubes (20ml, 10ml

APPARATUS CONTD:

Quantity	Apparatus and Equipment
24 Each	Centigrade tubes (200ml, 100ml, 50ml, 25ml)
5	Magnetic stirer - wheater Biostir
12	Ph Electrodes (reference, glass) combination
2	Divalent cation electrodes
2	Surface measuring conbination Ph electrodes
1	Geiger counter
5	Desk lamp
3	combination washer and dryer
1	Automatic diluter
5	Flat tray
10	Fire Extinguisher
5	First aid kits
10	Lab carts
2	Planter digester unit
2	Vehicles
5	Thermostal (safety suetined)
50	Water sampling bottles, 50ml

10:/

ANALYTICAL LABORATORY EQUIPMENT CONTD.

Quantity	Apparatus and Equipment
1 each	Atomic absorption unit
2 "	Flame photometer with complete filter sets
1 "	Macro-kjedhal digestion/distillation units (12 heaters)
2 "	Micro-kjehal digestion/distillation units
2 "	Calorimeter-spectronic 70
15 "	pH meters, electric
10 "	pH meter, battery
10 "	Conductivity units
3 "	Muffle furnance
5 "	Vaccum pump
5 "	Analytical balance-mettler E2000
6 "	Drying oven
4 "	Centriguge-multiple speeds
5 "	Analytical balance
20 "	Mechanical stirrer and cups
5 "	Griding mills
4 "	Sample shakers, mechanical
1, "	Water distiller, large 8 L/H
5 "	Hot plates
2 "	Fume cupboard
5	Dehumidifiers
5	Soil test kits and refil solutions
6	Voltage regulators

1 kg Anhydrous sodium sulphate
2 kg Calcium sulphate
5 kg Sodium chloride
3 kg Aluminium nitrate
50 og Cresol red
50 ag Indigo carmine
50 ag Methyl orange
50 ag Xylene cyanol FF
5 kg Merruric nitrate
20 liter Nitric acids 1 N
20 liter Hydrochloric acid, 1 N
20 " Sulphuric 1 N
20 " Sodium hydroxide, 1 N
3 kg Barium chromate
10 liter Ammonium hydroxide, 5 N
10 kg Sodium sulphate
20 kg Calcium hydroxide
2 kg Silver sulphate
5 kg Phenol crystal, pure
5 kg Sulfur trioxide
10 kg Potassium Nitrate
10 kg Zinc sulphate
5 kg Potassium sodium tartrate (te-trahydrate)
5 kg Dipotassium hydrogen phosphate
10 kg Ammonium chloride, anhydrous
5 kg Powered carmine
50 ag Carminic acid
5 liters Superoxide
5 liters N-octyl acohol
5 liters alchol
4 kg Ammonium metavandate
300 liters Sulferice Acid
1 kg Orthr Phenanthroline, monohydrate
10 kg Silica gels 6 to 16 mesh, grade 5
1 kg Phenolpthalein indicator and
30 liters Hydrogen peroxide, 30%

30 liters Formaldehyde, 40%
20 ag O-phenanthroline ferrous complex
10 kg Sodium hexa metaphosphate
10 kg Sodium fluoride, crystals
10 kg Potassium dichromate, crystals
30 kg Sodium hydroxide, pellets
50 leters Hydrochloric acid, conc.
50 liters Ethanol
100 liters Glacial acetice acid
100 gs Bromcresol green indicator
100 gs Thymol blue
100 gs Methyl red indicator
2 kg Soluble starch
2 kg Ammonium fluoride, crystal
10 kg Ammonium molybdate, power crcrystal
2 kg Mercury crystal tablets
5 kg Potassium sulfate, lump
5 kg Mercuric oxide
5 kg Potassium hydrogen pholate
10 kg Potassium dihydrogen phosphate
10 kg Disodium hydrogen phosphate
10 kg Sodium borate
4 kg Potassium cyanide
3 kg Brucine sulfate
3 kg Potassium ferrocyanide
30 liters Ethanolamine (2-hydroxyethylamine sp. gr. 1.017)
2 kg Eriochrome blue-black B
2 kg Ethylenediaminetetraacetic acid
10 kg Magnesium chloride
30 liters Triethanolamine
30 kg Potassium hydroxide, pelets
10 liters Potassium hydroxide, 8 N
3 kg HHSNN indicator

500 g Pumic stone
500 g Aluminum
5 liters Ethylene glycol
500 g Methy blue indicator
10 liters Benzene
5 kg Silver sulfate
200 g Selenium Power
5 kg Sucrose
30 liters Phosphoric acid
30 liters Ammonia solution
10 liters Perchloric acid
1 kg Vanado molybdate
20 liters Ammonium
2 kg Stannous chloride
1 kg Charcoal
2 kg Ammonium citrate
1 kg Sodium diethyedithiocarbamate
1 kg Dithiozone
2 kg Soluble starch
2 kg Sulpharic acid
2 kg hydrogen carbonate
2 kg Sodium Acetate
2 kg Soda lime
1 kg Salicilic acid
1 kg Potassium sodium carbonate
1 kg Tartaric acid
2 liters Thioglycollic acid
2 liters Toluene
200 g Thymol blue
5 liter Thiethanolamine
50 g Vranyl acetate
5 kg Uiea
2 kg Vanadium Pentoxide

10 liters Xylene
10 kg Zinc Carbonate
10 " " Chloride
10 " " Oxide
10 " " Sulphate
10 " " Sulfite
5 kg Sodium natrate
5 kg Sodium tetraborate
10 kg Ammonium Acetate
10 kg " chloride
10 kg " dichromate
10 kg " ferric sulphate
10 kg " Oxalate
10 kg Aniline
10 kg Banin Carbonate
10 kg promine
5 kg Bromophenol blue
5 kg Bromothymol blue
1 liter Buffer salt - 6,84
1 liter Buffer Solvlcon p44
1 " " " p4 7
1 " " " p4 11
10 liters N-Butyl alcohol
10 kg Camphor
25 liters Carbon tetra chloride
25 liters chloroform

5 kg Cobalt carbonate
5 " " chloride
5 " " nitrate
5 " " sulphate
50 g Congo red
50 g Cresol red
10 kg Cupire carbonate
10 " " chloride
10 " " nitrate
10 " " Oxide
50 liters Absolute ethanol
20 liters Diethyl ether
500 g Ferric nitrate
2 kg Ferrous ammonium sulphate
5 " " sulphate
5 " " carbonate
5 " " sulphide
4 kg Formic acid 90% W/U
5 kg Fussion mixture
10 liters hydro flourine
5 liters hydroxylamine hydrochloride
2 kg 8 - hydroxyquindine
2 liters Universal indicator
10 pks Universal indicator paper
20 liter 180 propyl alcohol
20 liters isopropyl ether

5 kg.	Lead acelate
5 kg.	" Carbonate
5 kg.	" dioxide
5 kg.	oxide
3 kg.	Litmus carbonate
4 kg.	" hydroxide
10 bxs.	lithmus paper (blue)
10 "	" " (red)
10 kg.	Magnesium Carbonate (bright)
10 kg.	" hydroxide
10 kg.	" nitrate
10 kg.	" oxide (bright)
5 kg.	" powder
5 kg.	" sulphate
10 kg.	Mercuric sulphate
4 kg.	" chloride
4 kg.	" nitrate
20 liters	Methenol
500 gm.	Methalene , blue
10 liters	Millon reagent
10 kg.	Molybelic acid
5 kg.	Napthalene suptals
5 liters	Nebbhers Reagent
50 g.	Neutral red
20 litters	Nitric acid
5kg.	Oxalic acid

5 liters Petroleum spirit
50 g 1 - 10 phenanthroline
3 kg Potassium acetate
3 kg " alum
3 kg " bicorbonate
3 kg " bisulphate
2 kg " carbonate
3 kg " chlorate
2 kg " chromate
2 kg " ferric cyanide
2 kg " iodate
2 kg " iodide
2 kg " nitrate
2 kg " Oxalate
4 kg " Permanganote
4 kg " phosphete monobasic
2 kg Sodium hypophosphite
1 kg Selenium Powder
5 liters Phenol disulphonic acid
5 kg Devarda's alloy
2 kg disodium ethylene diaminetetro acetate
2 kg Sodium Cabaltinitrite

OPTIONAL FORM NO. 10
JULY 1973 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

Annex G

TO : Mr. Remo Ray Garufi, Director

DATE: October 22, 1979

FROM : Bernard E. Donnelly, ENG

SUBJECT: Liberian Agricultural Research and Extension Project 669-0135
FAA of 1961 as Amended Section 611 (a)

I have examined the plans for the six staff residences, currently being prepared by a consultant and find they will be adequate to satisfy the requirements of Section 611 (a) of the Foreign Assistance Act of 1961 as amended. The detailed specifications and cost estimates will be reviewed prior to obligation.

ANNEX H

Justification for Waiver of U.S. Advertising
of Technician Housing Construction Contract ($375,000)

Because of the lack of adequate housing in the project area of Suakoko, it is necessary to build technician houses on the project site. It is critical to have these houses available upon technician arrival in country or soon thereafter. Accordingly, the Mission has put together a plan to expedite the construction. To save time and because of the small size of the contract, this plan calls for a direct AID contract competitively bid following local Liberian procedures and no advertisement of an IFB in the U.S.

It is AID policy that, to the greatest extent practicable and consistent with the purposes of the FAA, information about purchases of supplies and services will be made available to U.S. firms (ref: AID PR 7-1.10). Part of the usual advertisement process is the publication of a synopsis of the invitation for bids in the Commerce Business Daily. However, in this case, the general AID PR policy of formal advertising to ensure competitiveness and openness to small independent enterprises will be met by following local Liberian advertising procedures. Experience has shown that the small size of the contract ($375,000) and the isolation of the area where the houses will be constructed mean that the contract will not be attractive to American firms that do not already have offices and construction capability in Liberia. Those U.S. firms with local representatives will learn of the construction

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through local announcements. Local procedures ensure wide dissemination of the IFB. Additionally, to announce the IFB in the Commerce Business Daily requires 45 days in lead time, while only seven days lead are needed to advertise in Liberia.

Thus, following the usual procedures of IFB advertising provides no additional bidders and delays completion of construction by over a month.

ANNEX I

Requests for Annex I, "Proposals For the Establishment of a Central Agricultural Research Institute" (October 1979), should be directed to USAID/Liberia, Development Resources Division. Its Table of Contents is included herein.

ANNEX I - "Proposals for the Establishment of a Central Agricultural Research Institute (October 1979)

113

TABLE OF CONTENTS

114

AMB
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VV TWA01 ESC082
RR RUTVMA
DE RUEHC #2920 2161246
ZNR UUUUU ZZH
R 041138Z AUG 79
FM SECSTATE WASHDC
TO AMEMBASSY MONROVIA 1650
BT
UNCLAS STATE 202920

KWM 06 AUG 79
1046Z

PROJ. FILE

DUE DATE: 8/10/79
ACTION: RD
INFO: AD
CON
EO
DP
CHRON
RF

AIDAC

E.O. 12065 N/A

TAGS:

SUBJECT: AGRICULTURAL RESEARCH (669-0135)

REF: MONROVIA 4624

REFTEL REQUESTS (A) PERMIS ON TO AUTHORIZE SUBJECT PROJECT IN THE FIELD, (B) WAIVER O REQUIREMENT TO ADVERTISE IN THE USA FOR SCHOOL CONSTRUCTIO CONTRACT AND (C) AUTHORITY FOR TA CONTRACTOR TO HIRE TWO) COUNTRY TECHNICIANS.

(A) PERMISSION TO REVIEW A AUTHORIZE SUBJECT PP IN THE USAID IS HEREBY GRANTE BUT THE MISSION IS URGED TO UNDERTAKE A CAREFUL "AR LENGTH" REVIEW DESPITE ANY "TIME PRESSURES" OR THE "E. NT OF COLLABORATION" TO DATE. PARTICULAR ATTENTION HOULD BE DIRECTED TO GOL INSTITUTIONAL ARRANGEMENTS TO ACCOMODATE AND OVERSEE THIS PROJECT ACTIVITY. OTHER AFR/DR CONCERNS WILL BE COMMUNICATED TO USAID CAPITAL DEVELOPMENT OFFICER CHUCK MUSSICK PRIOR TO HIS DEPARTURE FROM AID/W.

(B) WAIVER OF REQUIREMENT TO ADVERTISE IN THE USA FOR SCHOOL CONSTRUCTION COMPONENT IS ONLY NECESSARY IF THE MISSION ENVISIONS A DIRECT USAID-LIBERIAN CONTRACTOR ARRANGEMENT. BASED ON DISCUSSIONS WITH JACK CORNELIUS,

AND FURTHER CORNELIUS DISCUSSIONS WITH LSU REPRESENTATIVES, WE ASSUME THAT A DIRECT USAID CONTRACT IS INTENDED. ON THIS BASIS, MISSION DIRECTOR CAN WAIVE PUBLICATION IN ACCORDANCE WITH FEDERAL PROCUREMENT REGULATIONS HANDBOOK 14, SUBPART 1-1.10 AND THE REDSO/WA CONTRACT OFFICER HAS AUTHORITY TO SIGN SUCH A DIRECT CONTRACT.

(C) RE PERMISSION FOR TA CONTRACTOR TO HIRE 3RD COUNTRY TECHNICIANS" MISSION IS ADVISED THAT PURSUANT TO HANDBOOK 1, SUPPLEMENT B THERE IS NO NECESSITY FOR A WAIVER TO HIRE 3RD COUNTRY TECHNICIANS UNLESS FROM A CODE 935 SOURCE. VANCE
BT
#2920

669-0135

A.I.D. Project No. 669-0135

PROJECT
GRANT AGREEMENT

BETWEEN

THE REPUBLIC OF LIBERIA

AND THE

UNITED STATES OF AMERICA

FOR

AGRICULTURAL RESEARCH
AND EXTENSION

DATE: March 10, 1980

AID Project No. 669-0135

Project Grant Agreement

Dated March 10, 1980

Between

The Republic of Liberia (Grantee)

and

The United States of America

Acting Through

The Agency for International Development
(A.I.D.)

Article 1. The Agreement.

The purpose of this Agreement is to set out the understanding of the parties named above ("Parties") with respect to the undertaking by the Grantee of the Project described herein, and with respect to the financing of the Project by the Parties.

Article 2. The Project.

Section 2.1 Definition of the Project

The Project, which is further described in Attachment A to this document, is designed to foster the development of an effectively structured and functioning agricultural research system in Liberia, which will:

a) Interface effectively with regional and international agricultural research institutions.

b) Conduct applied and adaptive research on appropriate food and cash crops.

c) Cooperate effectively with extension and other development program efforts in developing viable production technology packages for improving food and cash crop production in Liberia.

To achieve these objectives it will be necessary to develop the research and extension capabilities of the Ministry of Agriculture.

Annex 1 to this document amplifies the definition of the Project contained in this Section 2.1. Within the limits of the definition of the Project in this Section 2.1, elements of the amplified description stated in Annex 1, may be changed by written agreement by authorized representatives of the Parties named in Section 8.2 without formal amendment to this Agreement.

Section 2.2 Incremental Nature of the Project

(a) A.I.D.'s contribution to the Project will be provided in increments, the first one being made available in accordance with Section 3.1 of this Agreement. Subsequent increments, for a total A.I.D. contribution of $4,209 million, will be subject to availability of funds to A.I.D., for this purpose, and to the mutual agreement of the Parties, at the time of a subsequent increment, to proceed.

(b) In the event that A.I.D. does not add a contemplated increment of funding in a timely fashion, it is understood that either Party may elect to terminate this Agreement in accordance with Grant Project Standard Provisions Annex Section D.1 provided that within the limits of these available funds committed to the

Project by the Parties, the termination period may be extended beyond a period of 30 days to provide for orderly arrangements, and that each party will do all it believes appropriate to retain and extend the benefits of Project activity which have already taken place.

(c) Within the overall Project Assistance Completion Date stated in this Agreement, A.I.D., based upon consultation with the Grantee, may specify in Project Implementation Letters appropriate time periods for the utilization of funds granted by A.I.D. under an individual increment of assistance.

Article 3. Financing.

Section 3.1 The Grant (A.I.D.)

To assist the Grantee to meet the costs of carrying out the Project, A.I.D., pursuant to the Foreign Assistance Act of 1961, as amended, agrees to grant the Grantee under the terms of this Agreement a total of eight hundred and sixty-two thousand United States (U.S.) dollars ($862,000).

Grant funds, made available in this and subsequent increments, will be used to provide the following:

a) Approximately 210 staff months of long-term technical services comprised of three senior advisors to the Director of ARI (one Research Coordinator; one Liaison Officer for Research, Extension and Training, and one Economic and Social Analysis Officer) and three senior Research Officers (Departmental Coordinators). These will comprise a Departmental Coordinator for Crop Sciences and Propagation; a Departmental Coordinator for Engineering and Appropriate Technology; and a Head Chemist for the Analytical Laboratory.

b) Approximately 18 person months of short term consultants in disciplines to be determined by the implementing team. Of these, three person months will be used for project evaluation.

c) Approximately 48 staff months of "On-campus" Assistance (24 person months of administrative and 24 person months of clerical services).

d) Training: 420 person months of long-term and 57 person months of short-term training.

e) Project related commodities, such as vehicles, equipment, furniture and library materials.

f) Other costs, such as vehicle operation and maintenance, travel, supplies, and services.

g) Construction of housing.

Section 3.2 Grantee Resources

(a) The Grantee agrees to provide or cause to be provided for the Project all funds, in addition to the Grant, and all other resources required to carry out the Project Activity effectively and in a timely manner.

(b) The resources to be provided by the Grantee for the Project will be no less than the equivalent of five million one hundred and sixty-eight thousand ($5,168,000) U.S. dollars, including costs borne on an "in-kind" basis.

The Grantee's contribution will consist of approximately three million three hundred and fifty-two thousand ($3,352,000) U.S. dollars for costs of personnel services; two hundred and twenty thousand ($220,000) U.S. dollars of equipment; and one million five hundred and ninety-six thousand ($1,596,000) U.S. dollars of supplies and services.

Section 3.3 Project Assistance Completion Date

(a) The "Project Assistance Completion Date" (PACD) which is September 30, 1983, or such other date as the Parties may agree to in writing, is the date by which the Parties estimate that all services financed under the Grant will have been performed and all goods financed under the Grant will have been furnished for the Project as contemplated in this Agreement.

(b) Except as A.I.D. may otherwise agree in writing, A.I.D. will not issue or approve documentation which would authorize disbursement of the Grant for services performed subsequent to the PACD or for goods furnished for the Project, as contemplated in this Agreement, subsequent to the PACD.

(C) Requests for disbursement, accompanied by necessary supporting documentation prescribed in Project Implementation Letters, are to be received by A.I.D. no later than nine (9) months following the PACD, or such other period as A.I.D. agrees to in writing. After such period A.I.D., giving notice in writing to the Grantee, may at any time or times reduce the amount of the Grant by all or any part thereof for which requests for disbursement, (accompanied by necessary supporting documentation prescribed in Project Implementation Letters), were not received before the expiration of said period.

Article 4. Conditions Precedent to Disbursement.

Section 4.1 Conditions Precedent to Initial Disbursement

Prior to the first disbursement under this Agreement, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. the following:

a) Evidence that the Ministry of Agriculture has placed all program budgets and personnel at the Institute under the research committee and the director.

b) Evidence that the Ministry of Agriculture has given the Director of the Institute the budgetary authority to expend funds for the research programs in a timely and propitious manner.

c) A statement of the name of the person holding or acting in the office of the Grantee specified in Section 8.2, and of additional representatives, together with a specimen signature of each person specified in such statement.

Section 4.2 Additional Disbursement

Disbursements after the first year will be made pursuant to satisfactory performance of the Project as determined by the special joint GOL/AID evaluation as provided in Section 5.2 of this Agreement. There are no further conditions precedent to additional disbursement.

Section 4.3 Notification

When A.I.D. has determined that the conditions precedent specified in Section 4.1 and Section 4.2 have been met, it will promptly notify the Grantee.

Section 4.4 Terminal Dates for Condition Precedent

If all the conditions specified in Section 4.1 have not been met within 30 days from the date of this Agreement, or such later date as A.I.D. may agree to in writing, A.I.D. at its option, may terminate this Agreement by written notice to Grantee.

Article 5. Special Covenants.

Section 5.1 Life of Project Covenants

In undertaking this four year project, the Parties agree to the following:

An Evaluation Program shall be part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

a) Evaluation of progress toward attainment of the objectives of the Project;

b) Identification and evaluation of problem areas of constraints which may inhibit such attainment;

c) Assessment of how such information may be used to help overcome such problems; and

d) Evaluation, to the degree feasible, of the overall development impact of the Project.

Section 5.2 Evaluation Program

The United States Government participates in the financing of this Project in order to assist the Government of Liberia in fostering the development of an effectively structured and functioning agricultural research system in Liberia.

To mutually assure themselves that these objectives are being met, two project evaluations are planned for Phase I of the Project, with the design of Phase II functioning as a third review of the Project. The first will occur early 1981. It will be an administrative type of evaluation in which representatives from the GOL, USAID/Liberia and the contractor will collaborate. The following outputs will be reviewed at that time to measure progress:

- administrative structure for research
- facilities and equipment for research
- staff development
- field crop production research
- socio-economic research
- appropriate technology development
- research library.

The evaluation will focus on reviewing the results achieved to that point and the utilization of the planned inputs in achieving outputs in the first year of the Project.

The second evaluation will occur in May/June 1982 at the end of the second year of Project implementation and will be an in-depth evaluation. It will be conducted by a joint GOL/AID team including two outside consultants, a research administrator with extensive experience at a major agricultural research institution and an agronomist with tropical experience.

The following outputs will be reviewed to measure progress:

- administrative structure for research
- coordination of research efforts
- facilities and equipment for research
- research/extension linkages
- staff development
- field crop production research
- socio-economic research
- engineering - appropriate technology research
- research library development

The evaluation will include inspection of the work going on at the Institute, discussion with the ARI contractor staff, review of reports, observations of outfield plots, and visits with the extension and development program officers. The visit with the latter would be for the purpose of reviewing the research extension linkage to determine if research results are beginning to get to the

field. Visits will also be made at some village farms to review problems and to determine the relevancy of work going on at ARI. A formal report will be submitted to the Ministry of Agriculture, USAID, and the contractor.

The final evaluation will occur in early 1983. It will focus on the accomplishments, progress, and determine the extent to which the end-of-project status conditions of Phase I have been met. These conditions are as follows:

1. Staff capable of administering the agricultural research system and producing valid, reliable research results.

2. Sound and appropriate food, cash crop and livestock production technology packages being infused into extension and development programs.

3. Appropriate research results from regional and international research centers being utilized in the Liberian Programs.

Section 5.3 Failure to Comply with Special Covenant

Failure to comply with the provisions of Section 5.1 and 5.2 of Article 5 may result in the termination of the Project. A.I.D. will notify the Grantee in writing should Grantee-initiated action be required as a result of the evaluation under Section 5.2. Failure of the Grantee to respond in writing and/or to take measures to rectify problems which were identified in the course of the evaluation under Section 5.2 may be cause for A.I.D. to cancel the then undisbursed balance of the Grant and/or to terminate this Agreement by written notice to the Grantee.

Article 6. Procurement Source.

Section 6.1 Foreign Exchange Costs

Disbursements pursuant to Section 7.1 will be used exclusively to finance the costs of goods and services required for the Project having their source and origin in the United States (Code 000 of the A.I.D. Geographic Code Book as in effect at the time orders are placed or contracts entered into for such goods and services (Foreign Exchange Costs") except as A.I.D. may otherwise

agree in writing, and except as provided in the Project Grant Standard Provision Annex, Section C.1 (b) with respect to marine insurance.

Section 6.2 Procurement Regulations

With regard to plans, specifications and contracts the Grantee will follow, except as the Parties may otherwise agree in writing, the provisions set forth in Article C in the Project Standard Provisions Annex which outlines procedures for pre-qualification of contractors and solicitation of proposals for goods and services financed under the Agreement. Aspects of these procurement procedures may be the subject of Project Implementation Letters.

Article 7. Disbursement.

Section 7.1 Disbursement for Foreign Exchange Costs

(a) After satisfaction of the conditions precedent, the Grantee may obtain disbursements of funds under the Grant for the Foreign Exchange Costs of goods and services required for the Project in accordance with the terms of this Agreement, by such of the following methods as may be mutually agreed upon:

(1) by submitting to A.I.D., with necessary supporting documentation as prescribed in Project Implementation Letters, (A) requests for reimbursement for such goods or services, or (B) requests for A.I.D. to procure commodities or services in Grantee's behalf for the Project; or

(2) by requesting A.I.D. to issue Letters of Commitment for specified amounts (A) to one or more U.S. banks, satisfactory to A.I.D., committing A.I.D. to reimburse such bank or banks for payments made by them to contractors or suppliers, under Letters of Credit or otherwise, for such goods or services, or (B) directly to one or more contractors or suppliers, committing A.I.D. to pay such contractors or suppliers for such goods or services.

(b) Banking charges incurred by Grantee in connection with Letters of Commitment and Letters of Credit will be financed under the Grant unless Grantee instructs A.I.D. to the contrary. Such other charges as the Parties may agree to may also be financed under the Grant.

Section 7.2 Other Forms of Disbursement

Disbursements of the Grant may also be made through such other means as the Parties may agree in writing.

Article 8. Miscellaneous.

Section 8.1 Communications

Any notice, request, document or other communication submitted by either Party to the other under this Agreement will be in writing or by telegram or cable, and will be deemed duly given or sent when delivered to such Party at the following addresses:

To the Grantee:	(Mail Address)	Ministry of Agriculture Monrovia, Republic of Liberia
To the Grantee:	(Cables)	Ministry of Agriculture Monrovia, Republic of Liberia
To A.I.D. :	(Mail Address)	Director of USAID P.O. Box 1445 Monrovia, Liberia
To A.I.D. :	(Cables)	USAID c/o American Embassy Monrovia, Liberia

Other addresses may be substituted for the above upon the giving of notice.

Section 8.2 Representatives

For all purposes relevant to this Agreement, the Grantee will be represented by the individual holding, or acting in, the office of Minister of Agriculture and A.I.D. will be represented by the individual holding, or acting in,

the office of USAID Mission Director, each of whom, by written notice, may designate additional representatives for all purposes other than exercising the power under Article 2 to revise elements of the amplified description in Annex 1. The names of the representatives of the Grantee, with specimen signatures, will be provided to A.I.D., which may accept as duly authorized any instrument signed by such representatives in implementation of this Agreement, until receipt of written notice of revocation of their authority.

Section 8.3 Standard Provisions Annex

A "Project Grant Agreement Provisions Annex" (Annex 2) is attached to and forms part of this Agreement.

IN WITNESS WHEREOF, the Grantee and the United States of America, each acting through its duly authorized representative, have caused this Agreement to be signed in their names and delivered as of the day and year first above written.

FOR THE REPUBLIC OF LIBERIA

By _____

Title: Minister of Agriculture

By _____

Title: Minister of Finance

By _____

Title: Minister of Planning and Economic Affairs

FOR THE UNITED STATES OF AMERICA

By _____

Title: Ambassador, United States of America

By _____

Title: Director, USAID Mission to Liberia

Date: March 10, 1980

ANNEX I

PROJECT GRANT AGREEMENT

A.I.D. PROJECT No. 669-0135

AMPLIFIED DESCRIPTION OF THE PROJECT*

AGRICULTURAL RESEARCH

AND EXTENSION

NOTATION: * The Agricultural Research and Extension Project Paper provided the detailed description and will be used in the implementation of this Project.

I. BACKGROUND

Agricultural development in Liberia is faced with major obstacles which include: (1) limited flatlands and highly acidic and iron toxic soils of low fertility and low yield; (2) traditional land clearing techniques which are limited to slash and burn operations; (3) lack of knowledge of the available and proven technologies in land preparation cropping patterns, village practices, and harvesting techniques that will produce higher yielding varieties. These obstacles contribute to Liberia's inability to meet its domestic food needs and its potential for cash crop and livestock production.

To address these problems the Ministry of Agriculture (MOA) in its declared policy objectives has called for intensified research and extension activity aimed at increasing crop and livestock production. This requires the existence of a viable, productive adaptive agricultural research institution which can provide cash and food crop and livestock production, and generate appropriate technologies which are more relevant to the needs of the small farm family.

Recognizing the need to develop the research and extension capabilities of MOA, the Government of Liberia requested in June 1979 technical assistance from U.S. Agency for International Development to assist in developing an adaptive crop, livestock and soils research and extension system responsive to the needs of the small farm subsistence family.

II. PROJECT SUMMARY

The project will develop the capacity within the Ministry of Agriculture to conduct adaptive crop, soils, and livestock research, and to disseminate research results and other information to the extension service. It involves three factors: (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 system linkages.

A. Sector Goal

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 has a per capita GNP of $120.00, according to the World Bank, compared with the monetized sector of the economy which has a per capita GNP of $870.00.

B. Project 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 onboard, 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 achievement of these end-of-project is most unlikely within Phase One which is planned as a four-year effort in this project paper. On the basis of time along, it could not succeed even if the most favorable conditions prevailed. It would be impossible, for example, to select, train and put together, as an effectively functioning entity, the large cadre of scientists that will be necessary in order to make the Central Agricultural Research Institute at Suakoko the kind of institution the project envisions. Rather, a more modest level of progress is expected at the end of Phase One toward each of the above four conditions. Some staff will be trained and in-place, some research results will have been translated into production packages, some research from international and regional centers will be utilized, and most facilities and equipment will be in place.

C. Project Outputs

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 any 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 conductive 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 do the 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.

In more detail, the following outputs are seen as the products of this project:

1. An effective administrative structure for research - An operational administration will be in place and in charge of the research program.

2. Scientific and field equipment for research on site - Additional or expanded facilities are planned for each research department, the library, and a central agro-chemical laboratory. AID will provide equipment for the central laboratory and appropriate technology shop, library materials, and funds for miscellaneous equipment.

3. Staff development - A comprehensive staff development program is planned involving postgraduate training for twenty persons in twelve disciplines and short-term training involving four areas of work.

4. Standard procedure for getting research results to the field.

5. Research results in the following areas: (AID supported only).

   a. Rice production - varieties and cultural practices.

   b. Root and tuber crops - varieties and cultural practices.

   c. Other crops - Varieties and cultural practices.

   d. Socio-economic - social and economic problems affecting food and cash crops and livestock production.

   e. Engineering research - appropriate technology and minimum tillage for rice. roots and tubers and other crops.

6. Expanded Library - A collection of appropriate journals, periodical and research reports will be on hand to support the scientific work of CARI.

7. Extension information and training - Training courses and publications are to be developed for extension workers, based on the production technology packages produced by research at CARI.

D. Project Inputs

1. A.I.D. will provide 228 person months of long and short-term assistance (including 3 p/m for evaluation) available to advise and help the Agricultural Research Institute (ARI) 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 $4,209,000.

2. 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.

III. IMPLEMENTATION PLANNING

A. Administrative Arrangements

1. GOL

The GOL Ministry of Agriculture will undertake full responsibility for overall project administration. Organizationally, the project will function within the central Agricultural Research Institute at Suakoko.

Operationally, the responsibility for detailed project implementation and monitoring will be vested in the Agricultural Research Council. The Minister or his Deputy will chair the Council whose members include high ranking government and private individuals. The Council will coordinate AID and other donor assistance with the on-going GOL programs, and review research direction. Working under the Council and with the Deputy Minister for Technical Services will be the Technical Committee. This Committee shall examine the various proposals for research in agriculture. It shall suggest (when necessary) new topics or lines of research and continuously review all rese rch work in progress and give directions for further investigations. It will seek to establish working relationships with other agricultural research institutions and organizations throughout the world and particularly with those in the neighbouring countries.

The Technical Committee will meet at least four times in a year - once every quarter. Additional meetings may be called by the Chairman when necessary. The Chairman may invite persons who are not members of this committee to attend its meetings as observers or advisors. The members of the Technical Committee will be:

1.	Deputy Minister of Agriculture for Technical Affairs	-	Chairman
2.	Director of the Institute	-	Secretary
3.	Pesearch Coordinator	-	Member
4.	One representative of each of the members of the Agricultural Research Committee at the Technical level	-	Members
5.	(Ex-officio members) all Senior Research officers of the Institute	-	Members

These two bodies will act as as a board of directors to the Institute with the Institute Director responsible for the day-to-day operations, employment and promotion at the Center. Ministry will provide line item budget support to the Institute with the Council deciding general areas of

funding, the Committee responsible for technical analysis and director responsible for the actual research expenditures of the Departments. (On the organizational chart, the Departments appear as boxes at the bottom.) In summary the Agricultural Research Institute will be a semi-autonomous organization within the Ministry of Agriculture, designed to address the agricultural constraints that limit farm production.

The Ministry of Agriculture in its new plan for agricultural research has identified expanded facilities and additional equipment as a high priority for successful adaptive research. Ministry plans call for the creation or expansion of the following laboratories at Suakoko:

a. General Chemistry
b. Entomology and plant pathology
c. Land and water resources
d. Veterinary science and microbiology
e. General agronomy
f. Appropriate technology workshop

The Ministry has money available from a World Bank loan and its own development budget to expand facilities. However, funds immediately available are not sufficient to upgrade all facilities. Thus there will be a phasing of facility development over the next 4 - 5 years. USAID will contribute some of the cost of purchasing equipment for the laboratories and field research. AID will not fund any laboratory construction.

For the development of the library, the MOA will hire a professionally trained librarian or college graduate capable of receiving training in library science.

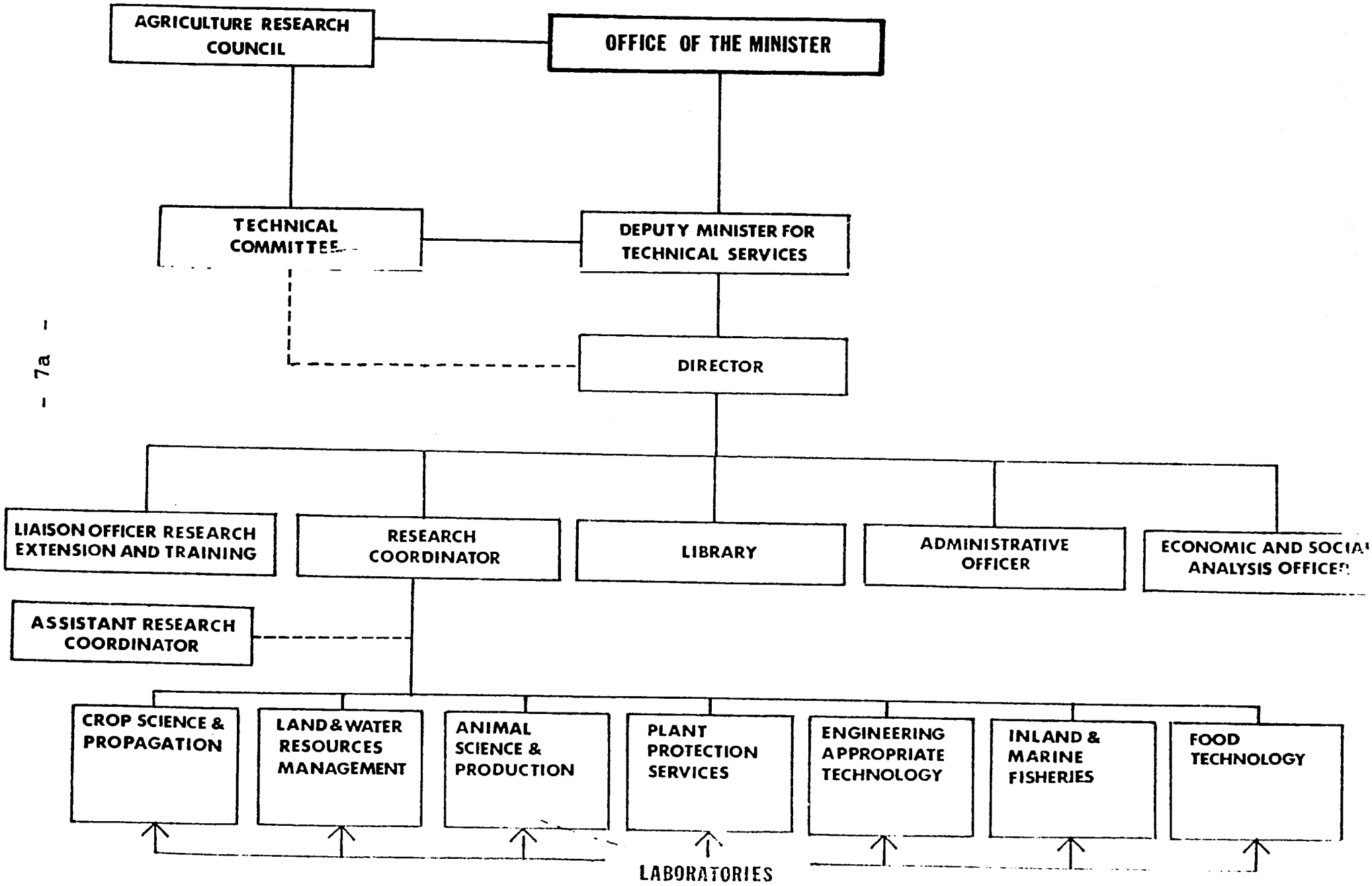
Support for laboratory and field equipment will be an estimated total of $220,000.

MOA will provide international travel cost for all participants.

2. AID

This project will be monitored and supervised by the Rural Development Office of USAID/Liberia. A collaborative assistance institutional contract will be entered into with Louisiana State University.

MINISTRY OF AGRICULTURE RESEARCH ORGANIZATION CHART



The contract technicians will function as staff in the Institute. A deputy will be appointed to work with each American technician, and depending on the deputy's training and capability, he will be expected to take the technician's place on the staff. However, some of the technical assistance positions are expected to continue into Phase II. (Research Coordinator and Research Extension Liaison Officer are likely to be expatriates in Phase II).

Staff development will be provided at the Master's and Ph.D and post-graduate levels. The mix of training, as to level of training and type of candidate, will be based on the need to balance the requirements for on-going research and long-term staff development. It is expected that five Liberians per year will be selected from the present staff or from promising recent graduates to train in the U.S., at third country African universities, or at specialized universities in other third world countries. Preliminary decisions will be made individually on the level of education required and the institutions to attend. The final decision will rest with student desires, student acceptability to specific institutions, cost factors, and agreement between the CARI and the contractor institution. As a matter of principle,institutions with the best applied research-oriented graduate programs would be selected, and degrees from varied institutions would be best for persons with any specific discipline to avoid in-breeding.

In terms of doctoral level training, those who do well on a Master's degree will be considered for doctoral training. The more immediate objective would be to get the professional staff basically trained at the Master's level, with the departmental coordinators trained to the doctorate degree. In the later phases, doctoral level training could be provided to some of the senior operational research scientists.

In order to support the main project purpose of institution building, training will be provided in a wide range of disciplines. Table 1 lists the disciplines, planned level and timing of the education. This list is only suggestive and it is expected that the Director, the Research Council and the Technical Committee will modify this schedule as a better understanding of training needs and constraints unfold. The training is not limited to those areas supported with US technicians, but there is an emphasis on food crop production.

Table 1. Patricipant Training

Discipline	Person/Months FY80	FY81	FY82	FY83	Total
Long-term training					
Agricultural engineering-machinery	12	12	12		36
Agronomy-Rice Production	12	12			24
Horticulture-roots & tubers	12	12			24
Biochemistry	12	12			24
Agricultural Economics/ Administration & Management	12	12	12	12	48
Rural Sociology		12	12		24
Agronomy-Rice Breeding		12	12		24
Animal Nutrition		12	12		24
Extension		12	12		24
Soil fertility		12	12		24
Library science		12	12		24
Rural Sociology			12	12	24
Agronomy-forage crops			12	12	24
Agronomy-cereals			12	12	24
Fishery production			12	12	24
Agricultural economics			12	12	24
Sub-total	60	132	156	72	420
Short-Term Training					
Agricultural research administration	3				3
Library science		3			3
Soil Survey Techniques		6	6	6	18
Agronomy		9	12	12	33
Sub-total	3	18	18	18	57
GRAND TOTAL	63	150	174	90	477

In terms of laboratory and field equipment, the planned level of specific laboratory support is as follows:

- Agro-chemical laboratory equipment	$150,000
- Engineering (appropriate technology) workshop equipment	48,000
- Farm equipment	75,000
- Other laboratory equipment	125,000

An initial purchase of priority items for the two labs and field operations will be delayed until the summer of 1980 in order to benefit from consultation with the American technicians and to give the Director time to find additional funds and set out a phased laboratory building program. One hundred twenty five thousand dollars ($125,000) in non ear-marked funds will be used to pruchase equipment at the discretion of the Research Council and Director.

For the development of the library, the following assistance will be provided:

- $20,000 to build the collection of scientific journals and publications in disciplines appropriate to the work at CARI,
- Short-term technical assistance in the development of a classification system to properly catalogue and store materials and to set up a procurement system for journals and research publications,
- Short and long-term training for Liberians.

B. Implementation Plan and Activities

There are several key requirements which must be met before this project can get underway. Housing and vehicles must be available for the technical assistance personnel when they arrive. The Research Council and Technical Committee should be established and begin operation as soon as possible. An outline of key monthly events is as follows:

Month/Year	Event	Action Office
January 1980	PP Review, Revision, and Approval.	USAID
January 1980	Project Agreement signed; PIO/T issued, construction planning begins	USAID/MOA/MOF/ MPEA
February 1980	Temporary housing for technical assistance personnel arranged.	USAID

MOA - Ministry of Agriculture

MOF - Ministry of Finance

MPEA - Ministry of Planning and Economic Affairs

B. Implementation Plan and Activities (cont'd)

Month/Year	Event	Action Office	Comments
February 1980	Contract for Technical Assistance signed; vehicles procured; furniture ordered.	USAID	
February 1980	Construction contracts on houses and facilities at Suakoko signed.	Contractor	
March 1980	Construction begins.	Contractor	
May 1980	First three technical assistance personnel arrive (Agricultural Economist, Research Coordinator and Departmental Coordinator for Crops). Vehicles arrive.	USAID/Contractor	
June 1980	Research and field equipment procurement begins. Rice and root crop experiments begin.	USAID	
August/ September 1980	First group of participants sent for training. Rice harvest begins; houses completed; furniture arrives.	USAID	
January 1981	Remaining technicians arrive; establish dry season swamp rice trials.	USAID/Contractor	
February 1981	Order additional supplies and equipment.	USAID	
March 1981	First Evaluation completed	USAID	

Month/Year	Event	Action Office	Comments
May/June 1981	Establish variety trials for all crops; establish first outfield plots; establish trials on production techniques for major crops in cooperation with agricultural engineering specialist.	MOA/ Contractor	
August/September 1981	Harvest and evaluate all experimental trials, including first cassava crop; establish dry season sweet potato and cassava trials.	MOA/ Contractor	
December 1981/ January 1982	Establish dry season swamp rice trials, including outfield plots.	MOA/ Contractor	
April/May 1982	Harvest and evaluate dry season swamp rice trials; construction planning for second group of technicians, begin.	MOA/ Contractor	
May/June 1982	Second Evaluation Completed.	USAID	
May/June 1982	Repeat and expand research tests on production practices for all major crops, involving agronomists and plant protection and agricultural engineering specialists.	MOA/ Contractor	
August/September 1982	Harvest and evaluate all experimental trials, establish dry season sweet potato and cassava trials.	MOA/ Contractor	
December 1982 January 1983	Repeat dry season trials, including outfield testing; contract for second phase of project signed.	MOA/ Contractor	

Month/Year	Event	Action Office	Comments
February/March 1983	First production technology packages developed for utilization by extension and development agencies.	MOA/Contractor	
March/April 1983	Project Paper for second phase prepared and reviewed.	USAID/MOA	
May 1983	Third year of rice and root crop trials begin.	MOA/Contractor	
September 1983	First phase of project ends.	USAID/MOA	

IV. Evaluation

Two project evaluations are planned with the design of Phase II functioning as a third review of the project. The first would occur early 1981. It would be an administrative type of evaluation in which representatives from the GOL, USAID/Monrovia and the contractor would collaborate. The following outputs would be reviewed at that time to measure progress:

- administrative structure for research
- facilities and equipment for research
- staff development
- field crop production research
- socio-economic research
- appropriate technology development
- research library

The evaluation would focus on reviewing the results achieved to that point and the utilization of the planned inputs in achieving outputs in the opening months of the project.

The second evaluation would occur in May/June 1982 at the end of the second year of project implementation and would be an in-depth evaluation. The evaluation will be connected by a joint GOL/AID team including two outside consultations, a research administrator with extensive experience at a major institution and an agronomist with tropical experience.

The following outputs would be reviewed to measure progress:

- administrative structure for research
- coordination of research efforts
- facilities and equipment for research
- research/extension linkages

- staff development
- field crop production research
- socio-economic research
- engineering-appropriate technology research
- research library development

The evaluation would include inspection of the work going on at the Institute, discussion with the CARI contractor staff, review of reports, observations of outfield plots, and visits with the extension and development program officers. The visit with the latter would be for the purpose of reviewing the research-extension linkage to determine if research results were beginning to get to the field. Visits would also be made to some village farms to review problems and to determine the relevancy of work going on at CARI. A formal report would be submitted to the MOA, USAID and the contractor.

The final evaluation will occur in early 1983. It will focus on the accomplishments, progress, and determine the extent to which the end-of-project status conditions of Phase I have been met. These conditions are as follows:

1. Staff capable of administering the agricultural system and producing valid, reliable research results.
2. Sound and appropriate food, cash crop and livestock production technology packages being infused into extension and development programs.
3. Appropriate research results from regional and international research centers being utilized in the Liberian Program.

V. Procurement Plan

A. Technical Assistance

Because of the special long-term nature of the project and the desire to foster an institutional linkage between an American agricultural research instiution and CARI, the collaborative assistance contracting mode was selected. Louisiana State University was chosen to design and implement the project subject to availability of funds and the applicable AID regulations. This contracting mode provides flexibility to LSU to adjust its technical assistance to the changing needs of CARI and the MOA.

Included within the collaborative assistance contract will be those purchases which are made day to day in the provision of technical assistance (vehicle maintenance, supplies, travel, library materials and miscellaneous other costs including a short wave radio).

B. Vehicles

Because of USAID/Liberia experience and expertise in vehicle procurement and shipping control, six vehicles will be purchased directly by the Mission. Once cleared through customs and prepared for operation, the vehicles will be turned over to LSU which will be responsible for operation and maintenance.

C. Laboratory Equipment

Detailed specifications and ordering of laboratory equipment, will be the responsibility of LSU. CARI and LSU have worked together in identifying appropriate equipment. Although LSU will be responsible for detailed specifications and equipment procurement, USAID will assist in expediting and clearing the goods.

D. Construction of Technician Housing

A direct AID contract will be let to a Liberian or U.S. contractor following the normal Liberian procedures for competitive bidding. Justification to waive the U.S.

advertising requirement for the six houses being financed under this grant will be requested by USAID. Because of the importance of having the houses ready for the technicians when they arrive at the up-country site, an AID direct construction contract is necessary to provide control over the tight construction schedule. A Host Country contract would take longer and would be more difficult for the AID engineers to monitor.

E. Waivers

No other waivers besides the advertisement of the construction will be sought. All purchases will be from U.S. source and origin with the exception of some shelf items purchased by LSU. The shelf item limitations of $2,500 per item, $10,000 total, will not be exceeded.

VI. Project Personnel

The project will provide three senior advisors to the director, three research officers to coordinate CARI Departments and 18 person/months of short-term assistance to be used as consultants in problems or special interest areas:

Senior Advisors to the Director three (3)

Organizationally, underneath the Director will be number of senior positions which are crucial to the institutional development of the Institute. First and most importantly is the Research Coordinator position. This person will assume the duties of the Director during his absence and be responsible for the coordination of all research programs including field trials. The individual Department Coordinators will report through him to the Director and he will be responsible for advising the Director and the Technical Committee on the status of research and suggest priorities and modifications. This person will have a Ph.D.and 8 - 10 years of experience in research management and administration.

The second position is that of Liaison Officer for Research, Extension and Training. The Liaison Officer must be basically an extension or production specialist, competent in economics, farming practices and extesnion work. He will have a basic understanding of agricultural

science and be able to interpret field experiments to determine whether innovations would be feasible and profitable for farmers. He will have an understanding of socio-economic costs and benefits, appropriate input packages, cropping systems and marketing alternatives. Because he will serve as the principle link between research and extension, he must be able to understand new ideas and communicate them effectively to the rural people through the extension channel. He will plan, prepare and present appropriate information for the target audiences and obtain feedback from them. This officer will have a Ph.D and at least six years of experience in research and extension.

The third position is that of the Economic and Social Analysis Officer who will engage himself, under the supervision of the Director, in the translation of agricultural research into data usable by other sectors of the economy and assess the socio-economic impact or potential impact of research activities at the Institute. This person will be called upon to assist and advise the Institute's Administrative Officer in the first year of operation. The candidate for the position will have a Ph.D in agricultural economics and five years of experience.

The research coordinator, extension liaison officer and socio-economic officer should be senior people, highly experienced in agricultural research administration snd management. All members of the team should have substantial capability and experience in applied, adaptive research under tropical and semi-tropical conditions, particularly in the area of rice and root and tuber crops.

Initially each of the senior staff positions will have a Liberian Deputy who will work with the American technicians and receive educational training as required. It is planned that by end of Phase I or early Phase II, the U.S. technicians will become advisors. The Deputy to each of the Americans will be promoted to the top position. American senior technicians will continue in a counterpart relationship, but with the goal of phasing themselves out as Liberian capacity develops.

AID proposes to assist the Ministry by providing senior research officers as Departmental Coordinators for Crop Science and Propagation, the largest and most important department at the Institute, Agricultural Engineering, and the Analytical Laboratory. The D epartmental Coordinators will be the key "hands-on" researchers in each of the research areas. Although a coordinator will be working on the particular problems and constraints within his own discipline, the responsibilities of each will be functionally quite similar. The responsibilities are as follows:

a. Supervise and manage technicians and support staff.

b. Lend technical assistance in all phases of research in his department to ensure the proper functioning of the research unit.

c. Report to the Research Coordinator and Director departmental research results and status of operations. Success, problems, and constraints should be clearly identified.

d. Suggest priorities and modifications in research and research methods to the Research Coordinator, Director and Technical Committee.

e. Coordinate and control logistic support to the Department.

f. Coordinate all aspects of his department with other technical departments and keep all other Departmental Coordinators advised of his Department's activities.

The Ministry has requested a level of education and experience for the individual Departmental Coordinators as follows:

a. The Departmental Coordinator for Crop Sciences and Propagation should hold a Ph.D in Agronomy with at least six years of research experience in a tropical country. The position will be filled by an expatriate with a tenure of service

of three years with a Liberian counterpart to be trained to fill the position thereafter.

b. Departmental Coordinator for Engineering and Appropriate Technology should a MS Degree in Agricultural Engineering and Appropriate Technology. He should have at least five years general experience and some work experience in appropriate technology. It is expected that this position will be filled by an expatriate with a Liberian counterpart who will be promoted to the Coordinator position when properly trained.

c. Head Chemist, Analytical Laboratory will hold a Ph.D. and have five years experience in chemical and physical analysis and some experience working at an agricultural research station. It is expected that this position will be filled by an expatriate while a Liberian counterpart is trained to replace this technician at the end of Phase I.

Each of the six long-term U.S. technicians will be provided with housing at Suakoko. This project will fund construction of the houses at an estimated cost of $375,000.

3. Short-Term Assistance

Eighteen person months of short-term assistance in disciplines to be determined by the implementing team will be provided over the course of the project. Approximately two person months of the total will be used for project evaluations. Assistance may be provided in any of the following: library science, animal sciences, entomology, plant pathology, storage technology, marketing, vegetable production, seed multiplication, or others. The purpose of the consultant fund is to allow the research coordinator or other team members flexibility to bring in expertise in needed areas.

Appendix I

ILLUSTRATIVE

ITEMS	COST (Estimate)
Agro-Chemical laboratory	$205,000
Engineering (appropriate technology) workshop equipment	103,000
Farm equipment	130,000
Other laboratory equipment	180,000
Furniture	50,000
Library materials	20,000
Supplies	1,140,000
Vehicles	97,000
	$1,925,000

Appendix 1

Financial Analysis and Plan

A. Summary Cost Estimate and Financial Plan

The summary cost estimate and financial plan is presented in Table 2. A total project cost of $9,377,000 is envisioned, with the GOL providing $5,168,000 and AID contributing $4,209,000. Of the total cost, GOL is contributing 55.1 percent and AID 44.9 percent. Technical assistance and personnel cost constitute the largest single expenditure, with $3,352,000 to be spent on Liberian personnel and $1,746,000 on technical assistance for a total of $5,098,000. This amounts to 57.7 percent of the directly budgeted items other than contingency and inflation. The cost of training GOL personnel, $794,000 raises the percentage figure to 66.5 percent.

A second large category of expenditures is "other costs" where a total of $1,826,000 is budgeted. Within the category, the largest single item, "supplies", is projected at a cost of $1,230,000. Services represent another major expenditure in the "other costs" category, with $456,000 being budgeted to this item. The bulk of these items are not specified but they include the normal operating expenses for an experiment station. Included in these two categories would be maintenance and repair of facilities, janitorial service, day labor, office supplies, GOL vehicle and equipment operation. (The vehicle and operation line item under "other costs" is only for the 6 U.S. technicians' vehicles and expendable research supplies.)

Commodities are a third major source of expenditure. CARI lacks many essentials for development as an agricultural research center, and the $785,000 budgeted to that category will go a long way toward overcoming some of these deficiencies. Research and farm equipment is the biggest need and $618,000 is budgeted for that purpose.

Table 2.

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US$ 000)

Item	AID FY	AID LC	GOL LC	Total
Technical Assistance				
Long-term	1,632			1,632
Short-term	114			114
Sub-total	1,746			1,771
Personnel			3,352	3,352
On-Campus Assistance				
Administrative	56			56
Clerical	32			32
Sub-total	88			88
Participant Training				
Long-term	638			638
Short-term	156			156
Sub-total	794			794
Commodities				
Vehicles	97			97
Equipment	390	8	220	618
Furniture	50			50
Library materials	20			20
Sub-total	557	8	220	785
Other Costs				
Vehicle Operation & Maintenance	20	50		70
Services			456	456
Travel	20	50		70
Supplies & services	75	15	1,140	1,230
Sub-total	115	115	1,596	1,826
Construction		375		375
Contingency	291			291
Inflation	115	5		120
GRAND TOTAL	3,706	503	5,168	9,377

At CARI at the present time, there are 29 houses in which the senior administrative and technical staff live. The six new houses, which will be built under this project for technical assistance personnel, will place them on a comparative basis with their counterparts, This is considered a very crucial element in the project.

B. Schedule of Annual Expenditures

The schedule of annual expenditures (see Table 3) depicts budgeted items across the anticipated four year time span of the project, FY 1980 - FY 1983. The length of the project itself will be four years, with technical assistance activity actually scheduled to begin in mid-FY 1980 and extending through FY 1983.

Expenditures for phase one of the project will run at a fairly stable level for the four full years of activity from FY 1980 to FY 1983. The costs projected for FY 1980 funds include start-up costs, such as construction of houses at CARI, and the purchase of vehicles for the technical assistance personnel.

The expenditures of the GOL are shown at a relatively constant level in the four years of the project. GOL has financial constraints which are causing it to hold budgets at current levels. The projected GOL expenditure are held constant at the present low levels. This is the most conservative estimate of its contribution, Hopefully a modest increase in personnel and in support moneys from the GOL will be forthcoming later, and with AID's projected assistance, the Institute should be able to plan and implement the improved foods crop production program in phase one, expanding to cash crops and livestock production in phase two.

Table 3

SCHEDULE OF ANNUAL EXPENDITURES
(US$ 000)

	FY80	FY81	FY82	FY83	TOTAL
AID Totals	862	1,273	1,120	954	4,209
Technical Assistance					
Long-term - 210 pm	237	465	465	465	1,632
Short-term - 18 pm	-	38	38	38	114
Sub-total	237	503	503	503	1,746
On-Campus Assistance					
Administrative - 24 pm	14	14	14	14	56
Clerical - 24 pm	8	8	8	8	32
Sub-total	22	22	22	22	88
Participant Training					
Long-term - 420 pm	52	194	277	115	638
Short-term - 57 pm	12	48	48	48	156
Sub-total	64	242	325	163	794
Commodities					
Vehicles	64	-	-	33	97
Equipment	15	337	46	-	398
Furniture	50	-	-	-	50
Library materials	-	10	5	5	20
Sub-total	129	347	51	38	565
Other Costs					
Vehicle Operation & Maintenance	10	20	20	20	70
Travel	10	20	20	20	70
Supplies	15	25	25	25	90
Sub-total	35	65	65	65	230
Construction	375	-	-	-	375
Contingency (10%)	-	94	107	90	291
Inflation	-	-	47	73	120

GOL Totals	FY80	FY81	FY82	FY83	Total
Personnel	1,292	1,292	1,292	1,292	5,168
Commodities					
Equipment	55	55	55	55	220
Other Costs					
Services	114	114	114	114	456
Supplies	285	285	285	285	1,140
Sub-total	399	399	399	399	1,596
GRAND TOTALS	2,154	2,565	2,412	2,246	9,377

Percent of Contribution:

AID - 44.9

GOL - 55.1