PD-ABP-472

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: _____

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: REGIONAL (CAMEROON)

3. PROJECT NUMBER: 698.0408.1

4. BUREAU/OFFICE: AFR

5. PROJECT TITLE (*maximum 40 characters*): HEALTH CONSTRAINTS TO RURAL PRODUCTION

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 03 DD 31 YY 90

7. ESTIMATED DATE OF OBLIGATION (*Under 'B.' below, enter 1, 2, 3, or 4*)
A. Initial FY 83 B. Quarter 3 C. Final FY 89

8. COSTS ($000 OR EQUIVALENT $1 = 300 F CFA

A. FUNDING SOURCE	FIRST FY 1983 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	950.0	550.0	1,500.0	5,003.3	2,349.6	7,352.9
(Grant)	(950.0)	(550.0)	(1,500.0)	(5,003.3)	(2,349.6)	(7,352.9)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country		213.9	213.9		2,982.0	2,982.0
Other Donor(s)				369.9		369.9
TOTALS	950.0	763.9	1,713.9	5,373.2	5,331.6	10,704.8

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) HE	511	544				1,500.0		7,352.9	
(2)									
(3)									
(4)									
TOTALS						1,500.0		7,352.9	

10. SECONDARY TECHNICAL CODES (*maximum 6 codes of 3 positions each*)

11. SECONDARY PURPOSE CODE

12. SPECIAL CONCERNS CODES (*maximum 7 codes of 4 positions each*)
A. Code
B. Amount

13. PROJECT PURPOSE (*maximum 480 characters*)

To develop a schistosomiasis research facility in Yaounde, Cameroon capable of (a) mapping the prevalence, distribution and intensity of schistosomiasis infection and disease; (b) developing effective schistosomiasis control activities that are economical, environmentally sound and socially acceptable; (c) training Africans in laboratory and field research methodology; and (d) serving as a major sub-Saharan regional center for schistosomiasis research.

14. SCHEDULED EVALUATIONS
Interim MM 07 YY 87 MM YY
Final MM 12 YY 89

15. SOURCE/ORIGIN OF GOODS AND SERVICES
[X] 000 [X] 941 [X] Local [ ] Other (*Specify*) _____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (*This is page 1 of a _____ page PP Amendment.*)

17. APPROVED BY
Signature: Ronald D. Li
Title: Mission Director
Date Signed: MM 01 DD 12 YY 83

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

AID 1330-4 (8-79)

INSTRUCTIONS

The approved Project Data Sheet summarizes basic data on the project and must provide reliable data for entry into the Country Program Data Bank (CPDB). As a general rule blocks 1 thru 16 are to be completed by the originating office or bureau. It is the responsibility of the reviewing bureau to assume that whenever the original Project Data Sheet is revised, the Project Data Sheet conforms to the revision.

Block 1 -Enter the appropriate letter code in the box, if a change, indicate the Amendment Number.

Block 2 - Enter the name of the Country, Regional or other Entity.

Block 3-Enter the Project Number assigned by the field mission or an AID/W bureau.

Block 4 - Enter the sponsoring Bureau/Office Symbol and Code. *(See Handbook 3, Appendix 5A, Table 1, Page 1 for guidance.)*

Block 5 - Enter the Project Title *(stay within brackets; limit to 40 characters).*

Block 6 - Enter the Estimated Project Assistance Completion Date. *(See AIDTO Circular A-24 dated 1/26/78, paragraph C, Page 2.)*

Block 7A. - Enter the FY for the first obligation of AID funds for the project.
Block 7B. - Enter the quarter of FY for the first AID funds obligation.
Block 7C. - Enter the FY for the last AID funds obligations.

Block 8 - Enter the amounts from the 'Summary Cost Estimates' and 'Financial Table' of the Project Data Sheet.
NOTE: The L/C column must show the estimated U.S. dollars to be used for the financing of local costs by AID on the lines corresponding to AID.

Block 9 - Enter the amounts and details from the Project Data Sheet section reflecting the estimated rate of use of AID funds.
Block 9A. - Use the Alpha Code. *(See Handbook 3, Appendix 5A, Table 2, Page 2 for guidance.)*

Blocks 9B., C1. & C2. - See Handbook 3, Appendix 5B for guidance. The total of columns 1 and 2 of F must equal the AID appropriated funds total of 8G.

Blocks 10 and 11 - See Handbook 3, Appendix 5B for guidance.

Block 12 - Enter the codes and amounts attributable to each concern for Life of Project. *(See Handbook 3, Appendix 5B, Attachment C for coding.)*

Block 13 - Enter the Project Purpose as it appears in the approved PID Facesheet, or as modified during the project development and reflected in the Project Data Sheet.

Block 14 - Enter the evaluation(s) scheduled in this section.

Block 15 - Enter the information related to the procurement taken from the appropriate section of the Project Data Sheet.

Block 16 - This block is to be used with requests for the amendment of a project.

Block 17 - This block is to be signed and dated by the Authorizing Official of the originating office. The Project Data Sheet will not be reviewed if this Data Sheet is not signed and dated. Do not initial.

Block 18 - This date is to be provided by the office or bureau responsible for the processing of the document covered by this Data Sheet.

BEST AVAILABLE COPY

Date : 11 January, 1983.

ACTION MEMORANDUM FOR THE DIRECTOR

From : Samuel Scott, PDE

Subject : Health Constraints to Rural Development 698.0408.1

I. Problem: Your approval is requested to execute a grant of $7,352,900 from Foreign Assistance Act Section 104 (Health) appropriation for a regional project to be implemented through the Government of the United Republic of Cameroon's General Delegation for Scientific and Technical Research (DGRST) with the assistance of long-term U.S. and other donor technicians and various short-term consultants. Dependent upon availability of funds, it is planned that at least $1,500,000 of the total grant amount will be obligated in Fiscal Year 1983.

II. Discussion:

A. Project Description: The goal of the project is to develop an effective, economical and environmentally sound strategy for control of the three forms of endemic human schistosomiasis found in sub-Saharan Africa. To accomplish this goal the project has as its purpose the development of a scientific schistosomiasis research facility in Yaounde, Cameroon which will conduct laboratory and field investigation, mapping and related training activities. AID grant funds will be provided to the Government of Cameroon to help finance project activities. In addition to AID and Government of Cameroon funds, a WHO supported technical advisor will be provided to assist in the investigation of behavioral aspects of schistosomiasis transmission in Cameroon.

B. Financial Summary: Total cost of the project is $10,704,800. Of this amount AID will provide $7,352,900 over the seven year life of project. The GURC will provide the local currency equivalent of $2,982,000 to the project. The GURC contribution equals 28% of the total AID and GURC supported costs. The WHO will contribute an estimated $369,900 to the project basically in the form of long and short-term technical assistance and related support costs.

The overall breakdown of the AID contribution is as follows:

($000)	FY 1983 Expenditure/Earmarking	Life of Project
Technical Assistance	243.0	2,621.0
Training	178.0	1,141.0
Commodities	480.0	550.0
Construction/Renovation	255.0	255.0
Other Costs	32.0	863.0
Contingency/Inflation	119.0	1,923.0
GRAND TOTAL AID FUNDS:	1,307.0	7,353.0

BEST AVAILABLE COPY

C. Socio-economic, Technical and Environmental Determinations:

1. The Project Committee has determined that the project is socially and economically acceptable.

2. The Project Committee has also determined that the project is technically sound and that the physical construction/renovation elements are both technically and financially feasible (see 611(a) determination, Annex F).

3. The Initial Environmental Examination (IEE), Annex H, has been reviewed and approved by AID/Washington. Therefore, no further environmental analyses are necessary.

D. Implementation: The implementation arrangements described in Section V of the Project Paper have been carefully reviewed by the Project Committee and found to be both realistic and sufficient to carry out the project over the seven year life-of-project period.

E. Waiver Requirement: A proprietary procurement waiver is required in the amount of $70,000 for the purchase of AMC type 4 wheel drive utility vehicles for use by the technical assistance team to carry out the projects scientific field research activities. Detailed discussion and justification is located in the Project Paper's Procurement Plan (Annex I). As this amount exceeds your authority under Africa Bureau DOA 140, approval of the waiver is being requested from AID/W.

F. Congressional Notification: This project has been included in the FY 83 Congressional Presentation under Africa Regional projects. An AID/W initiated Congressional Notification will be required to notify Congress of the revised LOP costs and revised FY 83 funding requirement prior to execution of the Project Grant Agreement.

G. Responsible Officers: Both AFR/RA and AFR/DR/HN are involved in backstopping this project in AID/Washington. The officer responsible for managing and implementing the project at USAID/Cameroon is Mr. Raymond Martin.

III. Recommendation: That you sign the attached Project Authorization, and hereby approve life of project funding in an amount not to exceed $7,400,000 in grant funds.

Approved: Ronald W. L.

Disapproved: _____

Date: January 12, 1983

PROJECT AUTHORIZATION

Name of Country	:	Cameroon
Name of Project	:	Health Constraints to Rural Production - Sub-Project, Cameroon.
Number of Project	:	698.0408.1

1. Pursuant to Section 104 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Health Constraints to Rural Production Sub-Project for Cameroon involving planned obligations not to exceed $7,400,000 in grant funds over a seven-year period from date of authorization, subject to the availability of funds, to assist in financing foreign exchange and local currency costs for the project.

2. The purpose of the project is to assist the Government of the United Republic of Cameroon to develop a schistosomiasis research facility in Yaounde capable of (a) mapping the prevalence, distribution and intensity of schistosomiasis infection and disease; (b) developing effective schistosomiasis control activities that are economical, environmentally sound and socially acceptable; (c) training Africans in laboratory and field research methodology; and (d) serving as a major sub-Saharan regional center for schistosomiasis research. These objectives will be accomplished through an AID grant to the Government of the United Republic of Cameroon to finance the technical assistance, training, construction/renovation, and commodities required to carry out research on this disease and find ways to control its spread throughout sub-Saharan Africa. This research and scientific investigation will be undertaken by Cameroon's General Delegation for Scientific and Technical Research (DGRST) both in Yaounde and intensive study areas at selected locations in Cameroon.

3. The Project Agreement shall be subject to the following essential terms and covenants and major conditions together with such other terms and conditions as AID may deem necessary.

4. a. Source and Origin of Goods and Services Financed Under the Grant.

Except as provided herein or as AID may otherwise agree in writing, goods and services financed by AID under the Project shall have their source and origin in the Cooperating Country or in countries included in AID Geographic Code 941. Ocean shipping financed by AID under the project shall be financed only on flag vessels of the United States or the Cooperating Country.

b. Condition Precedent.

Prior to any disbursement or the issuance of any commitment documents under the Project Agreement, the Government of Cameroon shall furnish in form and substance satisfactory to AID, evidence that the Government-owned physical facility and adjacent land in the Melen district of Yaounde, currently used by the Ministries of Livestock, Fisheries and Animal Industries and Public Health, have been officially made available for the Project's proposed construction/renovation activity, scheduled to begin immediately after the signing of the Project Agreement.

c. Covenants.

a) The Government will identify and release for training within 120 days of signing of the Project Agreement the first two Cameroonian technicians to be trained under the Project.

b) The Government will assign to the research facility all personnel required by the Project upon completion of renovation/construction of the proposed research facility.

c) The Government will establish a Technical Advisory Council, composed of representatives from the various organizations capable of making important technical contributions to this project and to advise on the planning and implementation of research activities both at the Cameroon and Africa regional level.

Date: 1/12/83

Ronald D. Levin
Director
USAID/Cameroon

TABLE OF CONTENTS

FACE SHEET

		PAGE
I.	SUMMARY AND RECOMMENDATIONS	1
II.	DESCRIPTION OF PROJECT	6
III.	PROJECT SPECIFIC ANALYSIS	16
	Economic Feasibility Social Soundness Analysis Technical Feasibility Administrative Feasibility Environmental Feasibility	
IV.	FINANCIAL ANALYSIS AND PLAN	24
V.	IMPLEMENTATION PLAN	31
VI.	EVALUATION ARRANGEMENTS	37
VII.	CONDITIONS COVENANTS AND NEGOTIATIVE STATUS	38

ANNEXES

A. Logical Framework

B. Background Information Concerning Schistosomiasis in Cameroon and Sub-Sahara African

C. 611(e) Certification

D. Request for Assistance

E. Personnel Qualifications and Responsibilities

F. Renovation of Existing Facility and New Construction, 611(a)(1) Certification.

G. Laboratory Equipment List

H. Threshold Decision Based on Initial Environmental Examination.

I. Procurement Plan

J. Bibliography

K. Statutory Checklist

L. DGRST Research Projects (1981-83) and Research Staff at I.M.P.M.

M. Authorization Package.

I. SUMMARY AND RECOMMENDATIONS

A. PROJECT SUMMARY

1. The program goal is to control schistosomiasis which reduces productivity through incapacitation of the economically most active age groups of the general population. The project goal is to develop an effective, economical and environmentally sound strategy for the control of the three forms of endemic human schistosomiasis found in sub-Saharan Africa. The ultimate GURC goal is the eradication of schistosomiasis.

2. The project purpose is to develop a schistosomiasis research facility in Yaounde, Cameroon capable of (a) mapping the prevalence, distribution and intensity of schistosomiasis infection and disease; (b) developing effective schistosomiasis control activities that are economical, environmental sound and socially acceptable; (c) training Africans in laboratory and field research methodology; and (d) serving as a major sub-Saharan regional center for schistosomiasis research. Although not the primary purpose of this project, the research experience gained and the training provided will enhance the institutional capacity of Cameroon to conduct medical research.

3. The project outputs include:

a. A schistosomiasis research center capable of conducting a broad range of studies including laboratory studies on the clinical, malacological, parasitological and water chemistry aspects of schistosomiasis, experimental animal studies, epidemiological studies of the disease and the snail host, anthropological and behavior studies on the dynamics of disease infection and transmission, and socio-economic studies on its impact on the population. The center will contain required laboratory space and equipment, data processing and storage space, training facilities, and office space.

b. Increased knowledge about schistosomiasis, such as the bionomics, taxonomy, distribution and population dynamics of the six known species of snails found in Cameroon, snail control using molluscicides as well as biological and other natural methods, clinical features in humans of various species of schistosomiasis parasites, the incidence and distribution of the disease, the environmental and behavioral dynamics of schistosomiasis infection and transmission, schistosomiasis control techniques, the pathological effects, the extent of incapacitation of infected humans and its economic implications on workforce productivity. Areas considered for intensive study include Bertoua, Yagoua, Eseka, Kumba, and the city of Yaounde.

c. A cadre of trained Africans capable of staffing the research center and continuing multi-disciplinary research on schistosomiasis in the sub-Saharan Africa region. Twenty-two Africans will receive post-graduate participant training: ten Cameroonians (four at the Doctoral level and six at the Master's level) and twelve from other sub-Saharan African countries at the Master's level. Fields of training include epidemiology, malacology, parasitology, water chemistry, biostatistics, environmental health, economics,

8

and behavior science. Fifteen people from other sub-Saharan African countries will receive on-the-job training at the Yaounde center. Twenty laboratory and field technicians will receive third-country, in-country, or on-the-job training.

d. An inter-agency and regional research network of governments and other institutions cooperating in schistosomiasis research, training, and dissemination and application of new knowledge to be achieved through participant and on-the-job training, regional conferences, a newsletter, collaborative research relationships, and a Technical Advisory Council to the project.

4. The AID-financed inputs include:

a. Technical Assistance. An institutional contract or other contractual arrangements providing approximately 150 person-months of long-term and 39 person-months of short-term Cameroon based expatriate assistance will be financed. Long-term assistance includes epidemiology, malacology, parasitology, and administrative support. Short-term assistance includes biostatistics, laboratory science, epidemiology, programmer/systems analysis, economics, socio-anthropology, and evaluation. Funds are also provided for a minimum of U.S. based technical and administrative support to the project. The World Health Organization has pledged to provide a long-term anthropologist and support for complementary training and research not included in the AID portion of the project.

b. Training. AID will finance post-graduate degree training for 10 Cameroonians and 12 Africans from other countries. Non-degree formal and informal training will be financed for approximately 20 Cameroonian laboratory and field staff and for training at the Yaounde center for 15 Africans from other countries.

c. Commodities. AID will finance purchase of four vehicles, laboratory furniture, equipment and supplies, office furniture, equipment and supplies, and household furniture for the long-term members of the technical assistance team.

d. Construction. AID will finance the renovation of an existing 125 square meters building and the construction of 35 square meter of office space addition. Some minor alterations to existing ponds will also be financed by AID. The building and the ponds are located in the Melen district of Yaounde.

e. AID will finance vehicle and equipment operating costs for the first two years, laboratory and field supplies, experimental programs and field investigations, and local support personnel for technical assistance team.

5. GURC inputs:

The GURC will supply personnel, building facilities (existing) POL and other local costs support items required to implement the project at Melen site in Yaounde. These inputs include:

a. Personnel. The GURC will pay the salaries of participant trainees from Cameroon, researchers and technicians assigned to the project, laboratory personnel and field personnel.

9

b. Training. Local training facilities will be made available.

c. Building Facilities. Existing office and laboratory facilities and ponds at the Melen side will be provided as part of the GURC's in-kind contribution (see Condition Precedent, Part VII) prior to commencement of AID-funded construction/renovation activities.

10

d. Travel/Per diem. The GURC will assume all costs for in-country operational travel of Cameroonian laboratory staff and field investigation teams.

e. Other Costs. The GURC will fund all operating costs of vehicles and equipment starting in the third year, all inland transport of commodities, and all laboratory operating costs.

f. Inflation. Inflation is computed at 12% and compounded annually.

B. BUDGET SUMMARY

The total cost of the project over a seven-year period (FY 1983 through FY 1989) is estimated at $10,705,000. AID's contribution is $7,353,000 or 68%; the GURC will contribute $2,982,000 or 28%; and other donor (WHO) contributions total $370,000 or 4%.

Fiscal Years 1983 through 1989 ($000)

	AID	GURC	OTHER DONOR (WHO)	TOTAL
Technical Assistance	2,620.9	-	252.9	2,873,8
Personnel	-	1,563.9	-	1,563.9
Training	1,141.0	11.8	-	1,152.8
Commodities	550,0	-	-	550.0
Building Facilities	-	75.0	-	75.0
Construction/Renovation	254.8	- xx	-	254.8
Travel/Per Diem	-	291.2	-	291.2
Other Costs	863.1	127.1	30.0	1,020.2
Contingency	543.0	-	28.3	571.3
Inflation	1,380.1	913.0	58.7	2,351.8
TOTAL	7,352.9	2,982.0	369.9*	10,704.8
	(68%)	(28%)	(4%)	(100%)

C. SUMMARY OF FINDINGS

The project committee has reviewed the technical, economic, social, financial, administrative, engineering and environmental analyses, and finds the project to be feasible and beneficial. The project meets all of AID's statutory requirements, including Foreign Assistance Act (FAA) Sections 611(a) and 611 (e).

---

* Illustrative budget estimate made on the basis of AID standard costs for two person years of long-term and five person months of short-term technical assistance plus modest research support costs.

xx It is expected that one floor, costing an estimated $400,000, of the planned GURC financed laboratory and office complex at Nkomo, Yaounde, will be allocated to schistosomiasis research.

D. RECOMMENDATIONS

A grant of $7,352,900 from the Foreign Assistance Act Section 104 for a seven-year period commencing in fiscal year 1983, should be authorized for the Government of the United Republic of Cameroon (GURC) to implement the project. Fiscal year 1983 funding totaling $1,500,000 should be approved.

E. GRANTEE AND EXECUTING AGENCIES

The grantee will be the Government of the United Republic of Cameroon (GURC), represented by the Ministry of Economic Affairs and Planning. The General Delegation for Scientific and Technical Research (DGRST) is the executing agency.

II DESCRIPTION OF THE PROJECT

A. BACKGROUND

In recognition of the great impact of three major endemic parasitic diseases on health and on economic development in Africa, AID/Washington, in September, 1976, approved a PID for a regional project entitled "Health Constraints to Rural Production". The PID proposed to assist African governments in the development of practical and economical control programs to combat schistosomiasis, onchocerciasis and trypanosomiasis, with a focus on applied operational field research complementary to the newly created IBRD/UNDP/WHO Program for Research and Training on Tropical Disease (TDR).

Since approval of the PID, several events have narrowed the focus of the project from three diseases to one--schistosomiasis. First, the Onchocerciasis Control Program (OCP), currently in its seventh year, is making a major effort to control that disease in seven West African countries. Second, the creation of a large-scale multi-donor, WHO-administered, trypanosomiasis control program, the International Laboratory for Animal Disease in Nairobi, and Trypanosomiasis control programs for Upper Volta and Zambia, left schistosomiasis as the natural focus of this project.

Schistosomiasis is a slowly progressive, chronic disease transmitted to humans by a parasite released by snails into water. Endemic throughout much of Africa, the spread and severity of schistosomiasis is closely related to increased water availability due to introduction of man-made impoundments, small dams, irrigation systems, and ponds. Schistosomiasis can cause cirrhosis of the liver, scarring of the urinary bladder and obstruction of the ureter, and bladder cancer. Severe schistosomiasis can lead to kidney failure and death.

There is only sketchy information on the dynamics of transmission of African schistosomiasis. Because of the chronic nature and slow development of the disease, it has been difficult to measure quantitatively the morbidity of schistosomiasis and to develop effective control measures, without the benefit of longitudinal population studies, very few of which have been conducted in Africa. (See Annex B for background information on schistosomiasis in Africa).

In summer of 1978 the Africa Bureau selected countries in which schistosomiasis research projects would be implemented. The selection included countries with endemic schistosomiasis and which considered the disease a significant public health problem, giving it a high priority in their national strategies for disease control. Also, countries had to have expressed a desire for technical and financial assistance from AID.

Cameroon and Sudan were chosen as the two countries and in March of 1979 an Africa Bureau Design Officer and the Development Support Bureau Tropical Disease Advisor visited Cameroon to assess the feasibility of designing and implementing a project. Detailed discussions were held with officials of the Ministry of Health, the University Center for Health Sciences (CUSS), the General Delegation for Scientific and Technical Research (DGRST), the Regional

Organization for Endemic Disease Control (OCEAC) and USAID/Yaounde. The positive findings of the assessment resulted in AID's financing a multidisciplinary team that spent some two months in Cameroon designing this project.

In December 1979, the Cameroon Government established DGRST as the primary organization responsible for research in Cameroon. The GURC gave the proposed project high priority and requested AID assistance with DGRST as the implementing agency, see Annex D.

B. DETAILED PROJECT DESCRIPTION

The Program goal is to control schistosomiasis, one of the most important endemic diseases in sub-Saharan Africa. The project goal is to develop an effective, economical and environmentally sound strategy for the control of three forms of human schistosomiasis found in sub-Saharan Africa.

The project purpose is to develop a regional schistosomiasis facility in Yaounde, Cameroon capable of (a) mapping the prevalence, distribution, and intensity of schistosomiasis infection and disease; (b) developing effective schistosomiasis control activities that are economical, environmentally sound, and socially acceptable; (c) training Africans in laboratory and field research methodology; and (d) serving as the sub-Saharan regional data processing, storage and dissemination center for schistosomiasis research activities.

Although the research activities and project inputs will be concentrated in Cameroon, the Health Constraints to Rural Production project will have important components and major implications throughout the region. For this reason it will be funded as an Africa Regional project. A complementary activity funded under this project is conducting research to develop an African regional strategy for control of schistosomiasis in large irrigation projects. This four year subproject, authorized in December, 1980, has an AID life of project funding of $2,122,000. It is being carried out in conjunction with the WHO supported Blue Nile Health Project in the Gezeira agricultural area of Sudan.

It is expected that the research findings of the Cameroon project will be relevant and applicable on a regional basis. The project will tie in with research on schistosomiasis and other tropical diseases being conducted throughout the region. The Yaounde laboratory will become an African center for certain kinds of analyses that presently are conducted in European laboratories.

Specific project components with regional dimensions include (a) training at the Master's Degree level of 12 regional participants, (b) travel by U.S. contract technicians to other African countries to encourage and assist in schistosomiasis research, (c) travel and per diem for researchers from other African countries to train at the Yaounde center, (d) two regional conferences, and (e) a newsletter which will receive wide distribution.

Project components include:

1. The Laboratory and Experimental Ponds

This research facility will be the central location from which the project will be administered and where research activities will be conducted. In addition to the experimental ponds it will contain a main laboratory where research related to animal study, water chemistry, snail identification and experimental molluscicide studies will be performed. It will also have laboratories for malacology, parasitology and clinical investigations and facilities for mapping and data processing. It will contain offices for the technical staff and facilities for technician training. This center will provide a base for launching field studies.

The Project Paper design team have surveyed and inspected the facilities which exist in the Melen district of Yaounde. With proper alterations and minor rehabilitation the building will meet the needed requirements to conduct the above research by the expatriate and the host country personnel. In addition, a new building will be needed to provide office space for the Chief of Party and his/her secretary. Sufficient space for this addition may be obtained at the South end of the existing building. Facilities of the medical research complex to be constructed eventually by the GURC will be made available to the project.

Minor alteration will also be required to make the existing experimental ponds effective for the intended research. The project technicians will determine the appropriate characteristics which each pond must have to satisfy their needs. Potable water and electricity are available but telepone service will need to be installed. Other utilities which may be needed for the laboratories, direct current, gas, distilled water, etc., may be furnished by portable units or packaged as expendable supply.

Since the existing toilet and septic tank are completely out of order and inconventiently located it is planned that new toilets and sewer disposal system be installed. For complete details of renovation and new construction and a reasonable cost estimate see Annex F.

a. The Malacology Laboratory will serve as a focus for studies on the bionomics, taxonomy and population dynamics of Cameroonian snails. An important task of the malacologist will be the preparation of maps of the geographic distribution of these snails, with emphasis on species involved in transmission of human schistosomiasis.

b. The Medical Parasitology Laboratory will perform standardized diagnostic laboratory tests including large scale quantitative examinations of stool and urine specimens for schistosomiasis eggs. The laboratory tests will be those received for screening and study by the World Health Organization (WHO). The laboratory will be responsible for quality control of diagnostic field tests.

c. The Laboratory for Water Chemistry will validate water sampling techniques and procedures, prepare reagents for field use, and perform more complicated chemical, physical and water bateriological tests sent in from the field.

15

d. A library/conference room, data processing facilities and office space for technical and support staff are also provided.

e. The existing experimental ponds at Melen will be improved to permit the following types of research:

Experimental studies of Molluscicides. Recent advances in the use of chemicals and natural plant products to kill snails offer new approaches to schistosomiasis control. Further laboratory and field studies are urgently needed.

Protocols to study the effects of various molluscicides, principally those that are available on the open market, are easily established in a laboratory which has an inexhaustible supply of snails and both indoor and outdoor testing facilities.

In addition to the traditional test methods, novel methods of molluscicide introduction (e.g., the use of slow-release elastomers) will be tested.

In preparing protocols, consideration will be made of the characteristics and size of the body of water proposed for control, i.e. surface area, depth, presence of flowing water, permanence. Some chemicals, for example Bayluscide (niclosamide) already have a bad reputation for killing aquatic fauna indiscriminately, and may be useful in Cameroonian studies only on a comparative basis, and under strictly controlled conditions.

Considerable attention will be paid to the relatively new tributyl tin oxide (TBTO) incorporated into rubber pellets, rubber sheets or strings, and rubber-base paints. This preparation has been tested in the field against planorbid snails in Zimbabwe, Brazil and St. Lucia. It should be compared with the performance of other compounds such as copper sulfate, sodium pentaclorophenate, and Yurimin-99. Natural products such as the Ethiopian Soap Berry (ENDOD) will also be included in the field trials.

Experimental studies on biological control of snails and schistosomes. Biological control of transmitting snails has had little field testing in spite of the rather large number of theoretical "systems" proposed on the basis of laboratory observations. Excellent opportunities will be provided at the research facility to make systematic, controlled tests in field conditions of certain approaches which would seem to be especially adapted to the Cameroonian situation. Thus, fish pond control techniques might include the use of ducks against shallow-water planorbs and the use of malacophagous fish (Astateo-chromis sp.) in combination with the commercially interesting species. Long-range prospects would include a continued search for protozoan parasites including snails, which might have a measurable effect on snail colonies in enclosed spaces such as fish ponds; such parasites might be sought in the sporozoan group Microsporida.

The effect of natural control methods such as periodic lowering of water levels in impounded waters, and the systematic clearing of aquatic or partially submerged vegetation at the edges of ponds and canals will be tested.

2. Mapping of Schistosomiasis

Surveillance is the continuous scrutiny of the environmental, biological, behavioral, social and economic factors that determine the occurrence and distribution of disease and other conditions of ill health. Surveillance is essential for effective disease control and prevention and includes the collection, analysis, interpretation and distribution of relevant data.

This effort will not only pinpoint the location of foci of infection with the three species of schistosomiasis, but also will correlate this information with such important variables as age, sex and occupation, water quality and use, distribution of intermediate snail hosts and relationship to development activities.

The mapping will result from the following studies in the vicinities of Yaounde, Bertoua, Yagoua, Eseka, and Kumba.

a. Malacological studies on the bionomics, taxonomy and population dynamics of the six kinds of Cameroonian snails which are potential intermediate hosts to human schistosomiasis will be undertaken in the five areas. The primary task of this research will be the preparation of maps of the geographic distribution of these snails, with emphasis on species involved in transmission of human schistosomiasis. These studies will be correlated with parasitological and clinical field studies for each of the three known species of human Schistosoma (Mansoni, Hematobium, Intercalatum).

b. Parasitological studies of population groups within the five areas will be undertaken. The planning calls for the quantitative examination of single stool and/or single urine specimens from persons selected for study. A concentration technique will be used for each type of specimen. Selection of persons to be examined will be the responsibility of the epidemiologist. Laboratory personnel will have the responsibility for the collection and proper identification of the specimens from selected individuals. The selected concentration test will be performed by laboratory technicians in the field and the microscopic examination completed. The results of the examination including all eggs, cysts, or parasites observed will be recorded on approved standard forms. Any specimens of particular interest or importance will be preserved for future use at the central laboratory.

c. Epidemological studies

(1) The first source of information will be the records required by the Ministry of Health from its health service institutions in the country. With slight modification of the presently available record forms, the project could have information made routinely available.

(2) One study in each field survey area to be conducted is the incidence and prevalence of the disease in primary school children. The sampling methodology can be readily adapted from the approach used in Puerto Rico (Kagan et al, 1963:USPHS (CDC) Monograph) to establish the island-wide prevalence and distribution of schistosomiasis in a fifth grade school population.

17

Basically, the steps involve:

- Identification of all primary schools, including the number of students by age and sex;

- Appropriate stratification (by geographic or ecological region) and consideration of limiting factors such as minimal size, expected co-operation, and accessibility to field teams. The number of schools studied in each region may be selected to be proportional to the population in that region;

- The age group (or grade level) to serve as the index population must be carefully selected. If too young, they will not be a sensitive measure of prevalence; if too old, the duration of infection is less certain. Analysis of age-prevalence data from preliminary surveys will identify the most appropriate index population; and

- Active cooperation (and participation) of classroom teachers will greatly enhance the school participation, and school officials or teachers must be promptly provided the results of parasitologic surveys. Referral of heavily infected students to treatment facilities should be encouraged.

d. Longitudinal and comprehensive studies in communities

Although the parasitological survey in primary schools will provide valuable descriptive information, it will not generate indepth and integrated data on the dynamics of transmission. Consequently, several small communities, each with no more than 1,000 inhabitants and preferably nearer 500, will be selected as representative of the various ecological zones of Cameroon, and will include communities with endemic *S. mansoni*, *S. hematobium*, and *S. intercalatum*. These communities will be studied logitudinally for a period of two to three years to determine for the entire population:

- Prevalence and intensity of human infection and disease patterns;

- Incidence of human infection (the rate at which uninfected individuals acquire infection);

- Behavioral patterns as they relate to contamination of and contact with local waterbodies (to be determined by observation and interview); and

- Migration patterns.

In addition, snail observations will be made at regular (monthly) intervals to determine:

- The intermediate host snails: by species, number, size, and infection rates with human schistosomes;

- Factors associated with snail breeding--e.g. water velocity, substrate, vegetation, shade cover, and water quality parameters;

- The degree of human contamination with schistosome eggs measured using caged sentinel snails in selected sites; and

- Possible animal reservoirs of schistosome parasites.

e. Socio-economic study of schistosomiasis morbidity. The extent to which schistosomiasis is involved in incapacitation of a work force, predisposition of infected individuals to subsequent disease, long-term pathological effects and the rate of spontaneous cure is a matter of conjecture. The longitudinal study will include a component to measure these effects in relation to other important personal, household, community and environmental variables. It is expected that the socio-economic research unit of WHO/UNDP/World Bank Tropical Disease Research Program will participate in the program by making available a full-time expert as well as consultants to study the socio-economic aspects of schistosomiasis and of its control.

For the socio-economic and behavioral impact study, the project will develop several questions on (a) general health status, (b) schistosomiasis related morbidity, (c) market and non-market activities, (d) socio-demographic variables, (e) water use and contact, and (f) knowledge attitudes, beliefs about and practices related to the transmission and contraction of the infection and disease. These would be incorporated with the proposed epidemiological studies.

The socio-economic study would analyze water use for at least the following: (a) personal cleanliness, particularly for clothes washing and bathing; (b) consumption--drinking and cooking; (c) recreation, e.g. children's play, boating, cooling off; and (d) economic uses, e.g. irrigation, fishing, and transport.

3. Training/Information Dissemination

a. Long-term

The individuals to be trained include 10 Cameroonians and 12 participants from other countries in sub-Saharan Africa. Four Cameroonians will receive training at the PhD level for senior level research responsibilities. The remaining participants will receive Master's level education in the U.S. or a third country. The 12 non-Cameroonian participants will be picked from those countries which have expressed interest in conducting research on schistosomiasis. The specialities in which these persons will receive further education include: epidemiology, malacology, biostatistics, environmental health engineering, parasitology, water chemistry, health economics, and behavioral science.

Cameroonian specialists, once trained, will eventually replace U.S. technicians. The Cameroonians will be nominated by the DGRST and their training will be staggered throughout the first four years of the project. Each trainee will carry out any thesis research in his/her own country, upon return home. Non-Cameroonian trainees will be selected by officials in their own countries, in conjunction with appropriate USAID Missions and coordinated by the U.S. Contractor with approval of USAID/Cameroon. All participants will be contract funded.

b. Short-Term and In-Country Training

Approximately 20 junior-level field workers, interviewers, laboratory technicians and clerical staff will be recruited and trained as part of the project. The technical training will be started by the U.S. technicians and completed by the Cameroonian specialist trainees on their return from their own programs of study. Much of the training will be on-the-job training. However, it is anticipated that intensive didactic training will occur prior to the initiation of any field research project. Each U.S. technician will develop a protocol for providing the training necessary for related personnel. The categories of junior personnel to be trained include health inspectors, field and laboratory technicians (clinical and water chemistry), clerks and medical equipment service personnel.

c. Regional conferences

Two regional conferences will be hosted by the project. The first will be held at the end of year two of the project. Its purpose will be to introduce African researchers from outside Cameroon to the facility, establish information exchange systems, and review research protocols and methodologies. The second conference will take place during the final year of project activities. Its primary purpose will be to review the results of the data gathering and research completed up to that time.

d. Information dissemination

While many of the findings of investigators and associates of the project will be published in national periodicals and international journals, the immediate and practical needs for information dissemination throughout the region will be met by a newsletter published and distributed as part of the project. This newsletter will carry information concerning progress in meeting objectives, new findings, significant observations and innovative techniques. It will also serve as a vehicle to distribute operations research studies to WHO, OCEAC, and other similar institutions.

C. U.S. TECHNICAL ASSISTANCE

1. Long-term Assistance

To assist the GURC in establishing the research program and in developing the skills of its own national staff to carry out the laboratory and field investigations of the project, four U.S. long-term technical specialists will be hired under an institutional or other contractual arrangement. These services, totalling 150 person-months of time, will be provided as follows:

--Epidemiologist/Chief-of-Party	48 p/m
--Malacologist	18 p/m
--Parasitologist	24 p/m
--Administrative Officer	60 p/m

In addition, a biostatistician will be hired on a short-term basis for six months under this project. WHO/Geneva has pledged to fund the services of an expatriate socio-anthropologist (24 p/m), who will work with the U.S. team.

The administrative officer will arrive as soon as possible after signing of the institutional contract to carry out the following tasks:

- Establishing lines of contact with Cameroon officials;
- Coordinating training of Cameroonians and other Africans;
- Assisting USAID/Yaounde in the procurement of commodities, and laboratory equipment and furnishings;
- Arranging housing for the U.S. team; and
- Assisting with organization of field research.

The rest of the U.S. team will arrive about six months after the signing of the contract. The chief of party/epidemiologist will have key responsibility for day-to-day management of laboratory operations and field research activities, as well as for supervision of the other AID contract advisors. The malacologist will work with the chief of party on conceptualization and initiation of field research, including mapping of geographic distribution of Cameroonian snails and schistosome types. The medical parasitologist will supervise the Cameroonian staff of microscopists and survey techicians. The biostatistician will have major responsibility for appropriate collection, storage, retrieval and analysis of data generated by the project's various data collection systems. Finally, the WHO provided socio-anthropologist will manage the socio-economic and behavioral impact studies to be conducted as part of longitudinal research. (for details on job qualifications and descriptions of the technical assistance team, see Annex E.)

2. Short-term Assistance

The long-term technicians will be assisted in their duties by a back-up team of short-term specialists who may be mobilized at notice to participate in project activities. The institutional or other contractual arrangement for the long-term team will also provide funds for the support of short-term specialists. The specialists of these technicians will depend on the nature of the problems to be solved but might be expected to include the following: clinical epidemiologist, medical equipment technician, program systems analyst, senior laboratory specialist, health economist, environmental health engineer, evaluation specialists.

A medical equipment technician will arrive shortly after the administrative officer to assist in ordering laboratory equipment, commodities and furnishings. The finalizing of the alterations and construction drawings and specifications will be done by an architectural engineering (A/E) firm operating in Cameroon. An A/E services contract will be signed between DGRST and the consultant and approved and monitored by the USAID Mission Engineer in Yaounde. The consultant will also prepare all necessary bid documents and assist DGRST

in entering into a contract for construction which will also be approved and monitored by the USAID Mission Engineer. Also during the first two years of implementation, a short-term anthropologist and health economist will do preliminary work on setting up research protocols and field studies, organizing early surveys where appropriate.

3. Contractor Home Office Support Staff in the United States

The contract will provide for a senior faculty project coordinator (one-fifth time) and an administrative assistant/secretary (one half time) to provide necessary backstopping support to the project. They will be active in identifying and orienting U.S. technicians and short-term consultants, providing home office support, both technical and logistic, to the field team, assisting in the placement and monitoring of participants in the U.S., providing liaison with AID/W, and assuring an effective linkage between the project and other institutions and similar projects carrying out schistosomiasis research. Beginning in the fourth year of the contract, the level of U.S. technical assistance diminishes; accordingly the funding for the coordinator and assistant will be reduced to about one-tenth and one-fourth respectively.

D. OTHER DONOR PARTICIPATION

The regional focus of this project is underscored by pledges of participation from various international and African donor organizations. Some of these will also be members of the project's Technical Advisory Council (see Administrative Feasibility Analysis section).

First the Organization for the Coordination of the Fight Against Endemic Disease in Central Africa (OCEAC) will open its Yaounde facilities to the project, giving logistical and training support to researchers and trainees from OCEAC member countries. Second, WHO's TDR program has pledged to fund the project's long-term expatriate anthropologist. Third, the WHO Division of Parasitic Diseases plans to make funds available for training and certain research which, while integral to gaining a more complete understanding of schistosomiasis control and treatment, is not covered by AID in this project--e.g. chemotherapy for treatment of schistosomiasis patients. Fourth, the WHO Scientific Working Group on Socio-economic Aspects of Tropical Disease will support detailed study in conjuction with this project on the impact of schistosomiasis on productivity, and the behavioral aspects of water contact by affected populations.

Following signing of the Project Agreement, AID and the GURC will see firm commitments from these and other potential donors for participation in the project.

III. PROJECT SPECIFIC ANALYSIS

A. ECONOMIC FEASIBILITY OF THE PROJECT

The project design team finds this project economically justifiable for the following reasons:

First, this project is a research-oriented project focussing on one of the most important diseases in the world, a disease increasing in Africa particularly due to increased water development activities. The project will shed light on six key areas of uncertainty which affect economic viability of schistosomiasis control: (1) the spatial distribution of schistosomiasis in the United Republic of Cameroon is incomplete; (2) the dynamics of the three types of human schistosomiasis transmission are poorly known; (3) the seriousness of schistosomiasis as a disease of public health importance is not well understood; (4) the presently available diagnostic tools are not readily applicable on a large scale; (5) the extent to which the disease will be a major negative externality of expanded programs in water per the goal of the UN water decade is uncertain; and (6) the behavior of individuals and communities to both development in the form of improved water sources and potential new income earnings opportunities as well as the possible debilitation which may occur as a correspondence thereof is unknown.

Second, lack of recent data on the prevalence and spatial distribution of schistosomiasis in the ecologically different parts of Cameroon seriously hampers the development of an effective, environmentally safe and economically feasible national strategy of schistosomiasis control, particularly since there is no one chemotherapy intervention which is necessarily effective against all species of schistosomiasis. This project will not only monitor the effectiveness of new chemotherapeutic agents but also will test alternative demand and supply side interventions. Of particular note is the extent to which water contact behavior can be altered via health education.

Third, if through this project one can ascertain the extent of true labor and time savings to women and children going up to 10 kms 4 times per day for water, which they then can utilize in a variety of other productive ways in household or in market-related activities, the study will be worthwhile. At present the true time savings cannot be ascertained due to the lack of information over time of the debiliation impact of schistosomiasis which may be controlled at the more available source of water.

Fourth, there is even uncertainty about the true cost to health of schistosomiasis. Some consider it a serious disease while others question the magnitude of its importance to public health. It is a disease that can have a long range cumulative effect. The children now affected who show only slight symptoms of morbidity may be the crippled, anemic and sickly members of tomorrow's work force. This may be the cost of doing nothing about schistosomiasis. On the other hand, even present efforts at schistosomiasis control may be unjustified if the danger of serious morbidity is light. The correct course of action will only become apparent with further information on the seriousness of the disease. Inadequate diagnosis at the level of the infirmary-dispensary or health clinic leads to a "shotgun" approach to treatment.

Two or three drugs are prescribed where one might have done the job. One cost is the cost of excess medication which may be borne by the patient or the health facility. Another might be the cost of sickness not cured. The data collected from the field research endeavors is designed to ascertain the short and long run costs of the disease.

Fifth, the data collected in this project will assist in ascertaining the impact of multisectional intervention on the social and economic well-being of an entire area. By virtue of developing a longitudinal micro level data set on a population where many projects and programs are underway or envisioned and other changes in the environment are occurring, it is possible to evaluate the short and long term social, economic and health effects of such coordinated endeavors. At present USAID has the capacity to evaluate effort in such a systematic and quantitative way in only one other area of the world - the Bical River Basin. There is no capacity to conduct such a review in Africa. The capacity would exist if this study were to be undertaken. This capacity represents a positive and significant externality of the endeavor.

Sixth, the past social and economic research on the impact of schistosomiasis and other related helminthic diseases has been carefully reviewed. This project is designed to surpass past research efforts which were largely cross-sectional in design. Further, many other related household and market activities as well as water contact behavior will be monitored over time to pick up many other important aspects of the impact of the disease. The questionnaire design will be facilitated by the present efforts of WHO/World Bank/UNDP's Tropical Disease Research (TDR) program to develop a common data gathering approach based on the experience of past research efforts and newer theoretical and methodological approaches available today. The biological, malacological, parasitological, epidemiological, and medical components of this research endeavor are also building on the theoretical and malacological strengths and weaknesses of past research efforts.

Seventh, the findings of this research will be relevant and to some extent applicable on a regional basis. Through participant training and short-term consultancies other sub-Saharan African countries will gain a better understanding of the dynamics of schistosomiasis and how to control it.

B. SOCIAL SOUNDNESS ANALYSIS

The project design has been reviewed for its social and behavioral soundness and found to be acceptable in large part since one of the most important components of this project precisely addresses the social issues of the problem of schistosomiasis. The population groups in Cameroon which will be directly involved in this research project are limited to those age groups in the Yaounde, Eseka, Bertoua, Yagoua and Kumba areas which will be surveyed. There will be a systematic investigation in these areas of the bahevioral factors which influence people's contact with water. These behavioral aspects and an outline of the type of behavioral information which will be collected are addressed in Part II, Section 2.6 and are described below. Perhaps one of the most useful reviews of the social and behavioral impacts of new water sources in their potentially adverse health impacts is contained in the Mandara Mountains Water Project Social Soundness study (see the Mandara Mountains Water Project Paper No. 631-0012).

Briefly, the behavior of populations concerning water utilization differs according to whether they live in the southern or northern part of Cameroon. As in most of Africa, it is the women and children who have the primary responsibility for providing the family with water for hygienic and cooking purposes, thus putting them at greater risk of becoming infected with schistosomiasis.

In the South there is a year-round choice in the utilization of various water sources: piped water in the houses, privately bored wells, "bornes fontaines" or street fountains set up by the SNEC, and streams and rivers. In the North, however, people residing in the few urban areas can choose between a few stand pipes, fountains, wells, and rivers ("mayos"). Many rural people have little access to water; particularly in the long dry season lasting from November to May, most walk long distances to a well or "mayo".

To summarize the behavior of people toward water, the following water sources can be identified:

Running water: used by a few people only for all domestic purposes.

Mayos and Rivers: Water is used for drinking or other purposes. At the beginning of the rainy season the underground water comes up and people dig holes in the mayo beds and wait for the water to come up through the sand. Children come there to bathe and play for long hours and to wash their clothes. They often urinate and defecate in the water. Women also come to mayos and rivers to bathe and wash their clothers. Men, however, come rarely. In houses with no wells, men wash themselves with water brought to them by women and children. Sometimes in the mountains, small rivers can be found and some places have been arranged for drinking water. But the arrangements are not a guarantee against contamination with dirt and microbes.

Wells: In many cities and villages, well water is used for all purposes. It should be noted that these wells are often improperly protected or covered.

Ponds: They are intended to be used by cattle, to cultivate fish, or for irrigation, but they are frequently used for other purposes such as washing and bathing. As they are found far from houses, herders or farmers bathe in these ponds while watching their cattle or after work.

Dams: Reservoir water is also used by people. Most of the time children come fishing, grown-ups wash their clothes and even during the dry season, they use the water for their daily needs. This daily utilization of surface water can often spread schistosomiasis infections as people urinate and defecate in the water.

The testing of different schistosomiasis control measures such as molluscid or chemotherapy will be well-controlled, limited in scope and involve small numbers of people. All the project's diagnostic field tests and behavioral studies will be done in close cooperation with the Ministry of Health personnel and the local traditional and government authorities.

The purpose of the project and the methods used will be thoroughly explained to all interviewees and will be scientifically acceptable and ethical. If there is any behavioral or attitudinal changes as a result of the research procedures, it will likely have a positive impact on the health of the persons sampled, given the education received about how schistosomiasis is transmitted. Certainly, the government health workers and school teachers involved in the project will become more informed health educators.

It is expected that the results from the research in this project will supply insights about how to design schistosomiasis prevention programs which will reach those populations most seriously affected by schistosomiasis.

C. TECHNICAL FEASIBILITY

It is believed that the high prevalence of schistosomiasis has a negative impact on rural production in Cameroon and throughout the region. Fear that expansion of water sources development projects planned by the GURC may contribute to the spread of schistosomiasis are realistic and should be addressed by a practical strategy. Lack of basic information concerning the biology and distribution of infection of the parasites and their intermediate snail hosts, as well as lack of information regarding water use and demand, hampers the design of an effective and economically feasibly control strategy that could be used currently without undue risk to populations or to the environment.

The specialists comprising the design team endorse the proposed program of field research and training as the most technically reasonable approach to addressing schistosomiasis control in Cameroon and in the region at the present time. The technology proposed for implementation of this project is consistent with USAID policies concerning the following:

- It will strengthen host-country and regional capability in the development of skills for the eventual control of schistosomiasis.

- It proposes a course of action which is environmentally sound.

In summary, the technical resource pool that will result from the successful implementation of this project will be unique in Africa.

D. ADMINISTRATIVE FEASIBILITY

1. CAMEROON GOVERNMENT

The administration of the project will be the responsibility of the General Delegation for Scientific and Technical Research (DGRST). DGRST was established by Presidential Decree of December 4, 1979. Its purpose and functions are as follows:

- stimulating, coordinating and supervising scientific activity throughout the country;
- encouraging and facilitating scientific and technical research intended to promote the economic, social and cultural development of the nation within its own institutes or in associate bodies;
- ensuring the training and promoting of the research workers and technicians it needs to achieve its aims;
- assembling collections, compiling scientific and technical documentation and publishing or ensuring the publication of results;
- facilitating the registration of inventions by submitting applications for patents and licences to the competent bodies, and developing and using them for economic purposes;
- ensuring the transfer of adapted and efficient technology;
- maintaining special relations with the university and institutions and technical bodies attached to certain services, so as to confer a united approach to scientific and technical research in Cameroon;
- ensuring liaison, on behalf of the Government, with foreign, national and international scientific and technical organizations.

The Institute of Medical Research and Medicinal Plant Studies (IMPM) is one of five research institutes under DGRST. Its purpose is to draw up programs, carry out research and develop experimental activities with a view to improving the health conditions of citizens. It consists of four centers: the Medical Research Center, within which the Health Constraints Project would be located; the Nutrition Center; the Medicinal Plants Studies Center; and the Vaccines and Serums Production Center.

The Medical Research Center is responsible for developing appropriate methods for the improvement of health conditions through biomedical investigations for the prevention, diagnosis and treatment of human diseases and the study of infectious and parasitic diseases and the measures to be taken to check the propagation of such diseases. It consists of five laboratories and one station: the Functional Exploration Laboratory, the Traditional Medicine Laboratory, the Pathological, Anatomy and Cytology Laboratory, the Human Biology Laboratory, and the K mba Medical Research Station. Some of these laborarories are still in the conceptual and development phases; nevertheless, the Medical Research Center and IMPM as a whole are already engaged in a substantial number of research activities. A list of current IMPM research projects is given in Annex L . A list of researchers and technicians presently in the service of IMPM activities is given in Annex L .

DGRST/IMPM has decided that research on schistosomiasis will be its highest priority effort in its 1983/84 program.

Although DGRST permanent staff cannot themselves implement all its research programs, DGRST has the responsibility and authority to coordinate with other government institutions and private organizations to mobilize the necessary personnel and other resources. IMPM plans to form a Technical Advisory Council to the Health Constraints Project consisting of members from a variety of government and international organizations interested in and capable of contributing to its implementation. The collaboration of other organizations such as the University of Yaounde, University Center for Health Sciences (CUSS) and the Ministry of Health will be required.

The GURC gives high priority to research and provides good working conditions to DGRST staff and collaborators. Examples are the fact that researchers are paid higher salaries and benefits than comparable personnel in the various Ministries. Researchers on study leave continue to receive their salaries while personnel from the Ministries do not.

2. TECHNICAL ADVISORY COUNCIL

In recognition that many individuals and many organizations in Cameroon have important contributions to make to the successful implementation of a research program on schistosomiasis, DGRST will establish a Technical Advisory Council to give guidance on the planning and implementation of the research activities and to encourage collaboration and cooperation both in Cameroon and internationally. This Council will be advisory only. It would not have executive or decision-making authority. DGRST will be ultimately responsible for the GURC inputs into the project both with respect to management and technical matters. The Council will advise on research priorities, research methodology, scheduling of various project activities, review of candidates for participant training, requirements for physical facilities and equipment, and personnel requirements.

DGRST/IMPM plans to call the first meeting of the Council soon after the project agreement is signed in order to advise on initial implementation activities. The Council will meet at least once a year with additional meetings as required. The members of the Council are expected to include DGRST as Secretariat, the Ministry of Health, CUSS Medical School Public Health Unit, CUSS Clinical Health Unit, CUSS Biomedical Unit, OCEAC, the University of Yaounde Faculty of Sciences, the Ministry of Animal Breeding, and the Community Development Bureau of the Ministry of Agriculture, WHO and AID.

3. AID

The Director of USAID/Cameroon has responsibility for monitoring the project. The USAID project officer has available in the Mission a broad range of expertise to call upon when needed. In addition to the services of the engineer, program office, controller's office, supply management office and

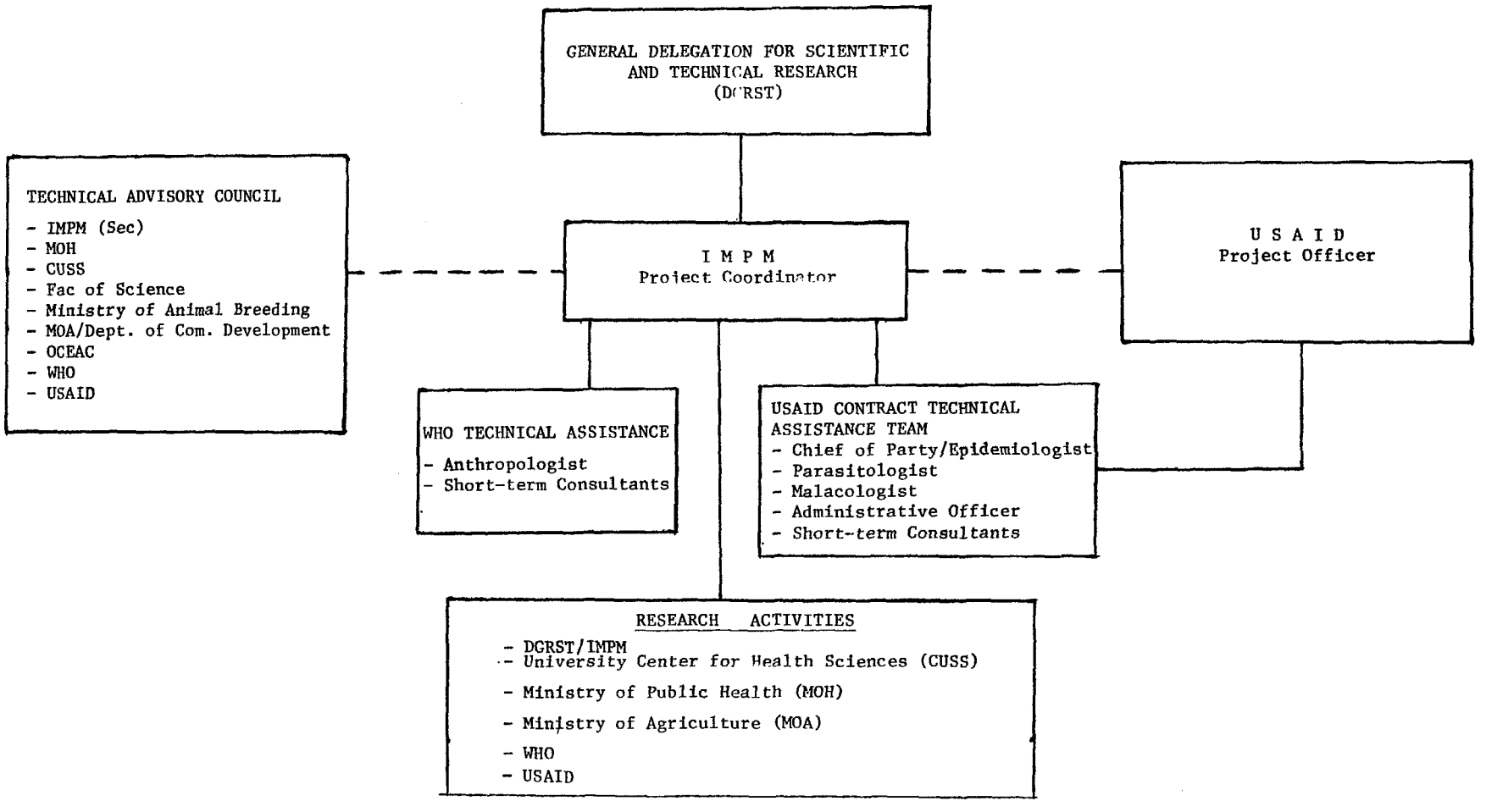
management office, there are health professionals in the Health, Nutrition and Population office available for consultation. Also, the USAID project officer can call upon the services of REDSO/CWA and AID/W for additional assistance as needed. The Mission Evaluation Officer will provide guidance for project evaluation. A chart showing project organizational relationships follows on the next page.

E. ENVIRONMENTAL FEASIBILITY

The project has been reviewed for its possible environmental impact and no adverse effects are foreseen resulting directly from its implementation. On the contrary, by focusing part of its activities on water resource development projects in Cameroon, the project will make a significant contribution toward solving some of the equivocal questions concerning the environmental impact of man-made water impoundments in the field of health. It has been noted that care must be taken in the design and operation of the project's proposed facilities and programs. Monitoring and maintenance of the activities and facilities is an important aspect of the project, both for the development of Cameroonians staff capabilities and to assure an environmentally sound operation.

An Initial Environmental Examination was approved on March 20, 1980 at the time of PID approval. It is attached as Annex H. Although there have been some subsequent minor modifications in the project design, there is no substantive change in the project as it currently exists.

PROJECT ORGANIZATIONAL RELATIONSHIPS



IV. FINANCIAL ANALYSIS AND PLAN

A. USAID CONTRIBUTION

USAID's participation in this project will amount to $7,352,900 in grant funds over the life of the project and represents 68% of total project costs. The contribution may be broken down as follows:

1. Technical Assistance - $2,620,900

Technical Assistance includes 150 person-months of long-term assistance and 39 person-months of short-term assistance to be provided under an institutional contract. The budgeted figures include salaries, allowances, support (i.e. housing, maintenance, and assignment to post, travel) backstopping costs and in-country travel.

2. Training - $1,141,000

USAID will finance 4 doctoral and 18 Master's level participants at US or African universities at an estimated cost of $816,400. Ten of the participants are from Cameroon and 12 from the region.

These costs are based on current participant training program costs. The in-country training funds of $276,000 will cover travel and per-diem costs for on-the-job training as well as in-country seminars and regional workshops. $48,600 is budgeted for training at the Yaounde center of Africans from other countries.

3. Commodities - $550,000

Funding is included for 4 US-manufactured 4-wheel drive vehicles at an estimated cost of $70,000. USAID will provide household furnishings and appliances for the 4 US Technicians costing $100,000. A complete breakdown of laboratory equipment costing $330,000 is found in Annex G. Laboratory and office supplies and furnishings costing $50,000 are also included.

4. Renovation and Construction of Laboratory, Offices and Ponds - $254,800

USAID will finance the renovation and new construction needed for research facility and experimental ponds. Costs are estimated on current A/E practices and fees and construction costs in Cameroon.

5. Other Costs - $863,200

$569,200 is allotted to expendable supplies for the laboratories and field investigation teams. Operating costs for vehicles ($50,000) and equipment ($7,000) are based on current costs. GURC will assume these costs after the second year. Also included in this category is $52,000 for

experimental programs to be designed, implemented and montored during the project: $135,000 to conduct field investigations to gather data; and $50,000 for other local personnel as needed.

6. Contingency - $543,000

The allowance for contingencies is computed at 10% of total project costs before inflation.

7. Inflation - $1,380,100

Influation is computed at 12 percent compounded annually on all costs excluding the contingency.

B. GURC CONTRIBUTION

GURC will provide $2,982,000 or 27.9% of total project cost. This contribution consists of the following items:

1. Personnel $1,563,900

The GURC will pay all salaries of personnel selected for participant training, as well as core staff for the Central Laboratory (Cameroonian researchers, skilled and semi-skilled technicians, two secretaries, an accountant, three drivers, a messenger and two guards. Field investigation teams will be composed of provincial medical personnel/technicians on a part-time basis. All cost estimates were provided by the GURC.

2. Training $11,800

Facilities and materials at CUSS will be made available for short courses/seminars.

3. Building Facilities $75,000

It is expected that the existing office and laboratory facilities and ponds at the Melen site in Yaounde will be supplied by the GURC. (See Conditions Precedent in Part VII.) The medical research complex to be conducted by the GURC at Nkomo, Yaounde will also be available to the project.

4. Travel/Per Diem $291,200

The GURC will assume all costs for in-country operational travel of Cameroonian lab staff and field investigation teams.

5. Other Costs $127,100

Operating cost of vehicles and equipment will be assumed by the GURC after the second year of the project. To keep the project's vehicles completely operational for the duration, sufficient funds will have to be allocated and budgeted specifically for this purpose. Operating cost for the lab. building will be the GURC's responsibility from the inception. The GURC will also pay all inland transport of project commodities.

6. Inflation $913,000

Inflation is computed at 12% and compounded annually.

C. RECURRING COSTS TO GURC

Continuing costs to the GURC after USAID withdrawal from this project are estimated at $406,000 per year, of which only $166,700 or 41% would be new recurring costs, the remainder being a reallocation of personnel and assets already on board. The figures also include annual provision of $25,000 for vehicle depreciation to allow for replacement of vehicles.

Analysis of GURC budgetary capabilities and assurances received from the GURC indicate both capability and commitment on the part of the GURC to meet the recurring costs of this project.

D. WORLD HEALTH ORGANIZATION CONTRIBUTION

WHO will provide $369,900 consisting of one senior anthropologist for 24 person-months, 5 person-months of short-term consultants, and research support.

TABLE I SUMMARY OF COST ESTIMATE AND FINANCIAL PLAN
(IN US $000's)

	USAID		GURC		WHO		TOTAL	
	FX	LC	FX	LC	FX	LC	FX	LC
Technical Assistance	1930.7	690.2	-	-	252.9	-	2183.6	690.2
Personnel	-	-	-	1563.9	-	-	-	1563.9
Training	840.0	301.0	-	11.8	-	-	840.0	312.8
Commodities	452.0	98.0	-	-	-	-	452.0	98.0
Building Facilities	-	-	-	75.0 */	-	-	-	75.0
Construction/Renovation	-	254.8	-	-	-	-	-	254.8
Travel/per diem	-	-	-	291.2	-	-	-	291.2
Other Costs	463.3	399.9	-	127.1	30.0	-	493.3	527.0
Subtotal	3686.0	1743.9	-	2069.0	282.9	-	3968.9	3812.9
Contingency	368.6	174.3	-	-	28.3	-	396.9	174.3
Inflation	948.7	431.4	-	913.0	58.7	-	1007.4	1344.4
Total Costs	5003.3	2349.6	-	2982.0	369.9	-	5373.2	5331.6
% of Project Total	46.7%	21.9%		27.9%	3.5%		50.2%	49.8%

* In addition, DGRST/IMPM intends that one floor, estimated to cost $400,000, of its medical research complex to be constructed at Nkomo, Yaounde, will be allocated to schistosomiasis research.

TABLE II U.S. AID EXPENDITURES BY PROJECT YEAR

YEAR	1	2	3	4	5	6	7	TOTAL
Technical Assistance:								
a) Long-term	128.5	729.3	609.1	284.3	333.3	16.3	16.3	2117.1
b) Short-term (1)	114.0	97.1	127.5	56.4	58.3	5.7	44.8	503.8
	242.5	826.4	736.6	340.7	391.6	22.0	61.1	2620.9
Training (2)	179.4	211.8	373.8	210.4	98.3	67.3	-	1141.0
Commodities	479.5	70.5	-	-	-	-	-	550.0
Construction	254.8	-	-	-	-	-	-	254.8
Other Costs	32.1	216.5	163.1	133.9	131.2	112.6	73.7	863.1
Subtotal	1188.3	1325.2	1273.5	685.0	621.1	201.9	134.8	5429.8
Contingency (10%)	118.8	132.5	127.4	68.5	62.1	20.2	13.5	543.0
Inflation (12% compounded)	-	159.0	323.5	276.7	335.9	153.8	131.2	1380.1
Total	1307.1	1616.7	1724.4	1030.2	1019.1	375.9	279.5	7352.9

Note (1) Includes Evaluation Services
(2) Includes International and U.S. travel, per diem for participants as well as training materials and supplies.

TABLE II GURC AND WHO EXPENDITURES BY PROJECT YEAR (CONT'D)

($000)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	TOTAL
GURC								
Personnel	167.8	223.7	242.6	252.0	252.0	239.3	186.5	1563.9
Training	-	9.4	2.4	-	-	-	-	11.8
Travel/Per Diem	-	-	60.2	60.2	60.2	60.2	50.4	291.2
Other Costs	46.1	9.5	14.0	15.0	15.0	15.0	12.5	127.1
Subtotal	213.9	242.6	319.2	327.2	327.2	314.5	249.4	1994.0
Inflation (12% Compounded)	-	29.1	81.2	132.5	187.6	239.7	242.9	913.0
Total GURC Expenditures	213.9	271.7	400.4	459.7	514.8	554.2	492.3	2907.0
WHO								
Technical Assistance	-	115.9	121.9	15.1	-	-	-	252.9
Other Research Costs	-	10.0	10.0	10.0	-	-	-	30.0
Subtotal	-	125.9	131.9	25.1	-	-	-	282.9
Contingency	-	12.6	13.2	2.5	-	-	-	28.3
Inflation (12% Compounded)		15.1	33.5	10.1	-	-	-	58.7
Total WHO Expenditures	-	153.6	178.6	37.7	-	-	-	369.9

TABLE IV

RECURRING COSTS TO GURC
($000)

Personnel	239.3
Travel/Per Diem	60.2
Operating Costs:	
Building	7.2
Vehicles	3.0
Equipment	4.8
1/Depreciation Vehicles	25.0
Expendable Supplies	66.5
TOTAL	406.0

1/Provision for replacement of vehicles

37

V. IMPLEMENTATION RESPONSIBILITIES

A. GOVERNMENT OF CAMEROON

DGRST as implementing agency will assume overall administrative responsibility for the project. DGRST will delegate responsibility for project implementation to a senior researcher, who will coordinate field implementation of the project through various DGRST/IMPM laboratories and where necessary with provincial and departmental officials of the Ministry of Public Health, particularly the Division of Preventive Medicine and Public Hygiene. DGRST is also responsible for assigning the personnel to fill the staff positions at the central research facility and for nominating participants for long-term training.

To facilitate organization of field activities, DGRST will develop local coordinating committees with the participation of the Division of Preventive Medicine of the Ministry of Public Health, CUSS (Public Health Unit, Biomedical Science Unit, and Clinical Science Unit), and OCEAC. These committees will also include the Division of Community Development of the Ministry of Agriculture. The local committees will work closely with the epidemiologist and behaviorial scientist. DGRST will be responsible for assuring the transport of biological and other laboratory specimens and survey instruments for the central research facility in Yaounde.

Although responsibility for project administration and management clearly rests with DGRST, The Technical Advisory Council, which will include all organizations in Cameroon capable of contributing to the project, will play a major role in advising on project priorities and implementation.

Finally, responsibility for customs exonerations and other GURC documentation, as well as for the transportation of all project commodities from Douala to Yaounde and other project sites will rest with DGRST. The selection of an A/E firm to design, and of a construction firm to renovate and build the laboratory will also be the responsibility of DGRST, subject to USAID approval.

B. USAID/YAOUNDE

A member of the USAID/Yaounde Office of Health/Nutrition/Population will be the Project Officer. A Project Committee will assist the Project Officer, USAID/Yaounde will prepare the Project Agreement and issue all Project Implementation Orders for commodities and technical assistance. The USAID/Yaounde Engineer will review and approve bid documents and monitor construction as needed.

C. U.S. CONTRACT TECHNICAL ASSISTANCE

Four long-term Cameroon-based American technicians will be recruited under an institutional or other contractual arrangement to manage initial project activities and train Cameroonian field and laboratory personnel. Participant training will be funded under the contract. The technicians include an epidemiologist (chief of party), administrative officer, malacologist and medical parasitologist. WHO/Geneva will finance services of a long-term anthropologist.

In addition to the long-term advisory services, 39 person-months of short term consulting services will be programmed. Also to be covered under the institutional contract, these break down as follows:

- Biostatistician	8 P/M
- Epidemiologist	2 P/M
- Medical equipment technician	2 P/M
- Anthropologist	3 P/M
- Programs systems analyst	2 P/M
- Senior laboratory specialist	7 P/M
- Health economist	3 P/M
- Environmental health engineer	2 P/M
- Evaluation specialists	10 P/M

Implementation Plan by Quarter 1/

Project Year

(Each "x" equals 3 months)

Description		-1	1	2	3	4	5	6	7
Project Authorized		x							
Project Agreement Signed		x							
PIO/T for TA Contract Issued		x							
Technical Assistance Contract Signed		x							
PIO/Ps Issued		x	x	x	x				
Training of Cameroonian Specialists									
Epidemiologist	8/83-7/86	xx	xxxx	xxxx	xxx				
Malacologist	8/84-1/86		xx	xxxx	x				
Epidemiologist	8/83-7/86	xx	xxxx	xxxx	xxx				
Biostatistician	8/83-1/85	xx	xxxx	x					
Environmental Health Engineer	8/84-1/86		xx	xxxx	x				
Behavioral Scientist	8/85-1/87			xx	xxxx	x			
Biostatician	8/85-1/87			xx	xxxx	x			
Health Economist	8/83-1/85	xx	xxxx	x					
Medical Parasitologist	8/84-7/87		xx	xxxx	xxxx	xxx			
Health Economist	8/85-7/88			xx	xxxx	xxxx	xxx		

1/ Since most project activities are dependent on the U.S. long-term technicians, year 1 is shown as beginning with the arrival of the epidemiologist, malacologist and parasitologist.

Implementation Plan

Description		-1	1	2	3	4	5	6	7
Technical Assistance									
Long-Term									
Administrative Officer	8/83-7/88	xx	xxxx	xxxx	xxxx	xxxx	xxx		
Epidemiologist	1/84-12/87		xxxx	xxxx	xxxx	xxxx			
Malacologist	1/84-6/85		xxxx	xx					
Parasitologist	1/84-12/85		xxxx	xxxx					
Short-Term									
Biostatistician			xx	x	x				
Epidemiologist			x	x	x				
Medical Equipment Technician		x							
Programs Systems Analyst					x	x			
Senior Laboratory Specialist				x	x				
Health Economist			x						
Environmental Health Engineer				x					
Evaluation Specialists						x		x	

Implementation Plan

Description	-1	1	2	3	4	5	6	7
Training of Master's Regional Participatants								
12 Participants		xx	xxxx	xxxx	xxxx	x		
Training of Participants								
In-country training of field staff		x	x	x				
In-country participant Workshops					x	x	x	
Capital Assets								
GURC Awards A/E Contract	x							
Construction/Renovation	xx							
Equipment Ordered	x							
Equipment Installed		x	x					
Vehicle Ordered	x							
Microcomputer in place		x						
- Collection of clinical specimens		xxx	xxxx	xxxx	xxxx	xxxx	xxxx	x
- Collection of Malacological and water sampling data		xxx	xxxx	xxxx	xxxx	xxxx	xxxx	x
- Collection of Behavioral Data		x	xxxx	xxxx	xxxx	xxxx	xxxx	x
- **Data Processing Analysis**				xxxx	xxxx	xxxx	xxxx	x
- **Experimental Snail Colonies**			xxx	xxxx	xxxx	xxxx	xxxx	x
- **Broadening of Selected Lab. Methods for Clinical Research**					xxx	xxxx	xxxx	x

42

Implementation Plan (Con'd)

Description		-1	1	2	3	4	5	6	7
- Pilot Control Studies						xx	xxxx	xxxx	x
- Lab. Research on Chemical and Biological Methods for Snail Control					xxx	xxxx	xxxx	xxxx	x
- Experimental Ponds					xxx	xxxx	xxxx	xxxx	x
- Newsletters				x	x		x	x	x
- Annual Review of Operations			x	x	x	x	x	x	x
- Evaluation						x		x	
- Regional Workshops				x				x	
- Technical Advisory Committee Meetings.		x	x	x	x	x	x	x	x

43

VI. MONITORING AND EVALUATION ARRANGEMENTS

A. Project Monitoring System:

This section describes who the key decision makers are with monitoring responsibility for the project, their sources of monitoring information, and how they will employ the information to improve project implementation.

1. Key Decision Makers:

There are two project-specific groups which must monitor project activities. These include:

a. USAID: The Project Officer, the Mission Engineer and the Project Committee.

b. The Government of Cameroon: Delegate General for Scientific Research (DGRST): The Project Coordinator.

In addition, a Technical Advisory Council (see Part III) will monitor the project and provide technical guidance to DGRST in the planning and implementing of research activities.

2. Source of Monitoring Information:

a. Reports of Technical Assistance Team: The U.S. contractor will be responsible for submitting quarterly reports to USAID and to DGRST. In addition, a yearly report will be submitted summarizing the project's progress and listing project activities planned for the subsequent year, as well as a workplan for each technician.

b. Site Visits: Information on project activities will also be gathered by regular visits to the project site. Site visits will be conducted by the USAID Project Officer and GURC Project Coordinator.

c. Visit Reports of Short-term Technicians from AID/Washington: Technicians from the AID Washington Bureau of Science and Technology will periodically visit Cameroon to observe project activities and will be responsible for preparing reports on their findings.

d. Minutes of Technical Advisory Council Meetings: The observations and suggestions of the Council members will be recorded.

3. Use of Monitoring Information:

The information gathered from the above-described sources will be discussed in regularly scheduled meetings of the USAID project committee and in meetings scheduled between the USAID Project Officer, the technical assistance team and the GURC Project Coordinator.

B. Project Evaluations

1. There will be a yearly internal evaluation of the project conducted by USAID, AID/Washington, the technical assistance team and the GURC. These standard formative evaluations will assess progress in achieving objectives.

2. An in-depth evaluation by an external, multi-disciplinary team of experts is planned for the project's 52d and 81st month. This evaluation team will include a physician/epidemiologist, a malacologist, a sanitary engineer, a social scientist and an economist. The evaluation will assess results to date in the achievement of project objectives. The evaluation design will be developed during the first year of the project and necessary baseline data will be collected to assure that project progress can be measured. One hundred fifteen thousand dollars ($115,000) has been earmarked for evaluations.

3. The Technical Advisory Council will meet at least once a year to evaluate research progress and give guidance to DGRST on future activities.

VII. Condition Precedent and Special Covenants

Prior to any disbursement or the issuance of any commitment documents under the Project Agreement, the Government of Cameroon shall furnish, in form and substance satisfactory to AID, evidence that the Government owned physical facility and adjacent ponds at the Melen site, currently used by the Ministries of Public Health and Livestock, Fisheries and Animal Industries, have been officially made available for the project's proposed renovation and construction activity, scheduled to begin immediately after the signing of the Project Agreement.

Covenants

a. The Government will identify and release for training within 120 days of signing of the Project Agreement the first two Cameroonian technicians to be trained under the project.

b. The Government will assign to the research facility all personnel required by the project upon completion of renovation/construction of the proposed research facility; and

c. The Government will establish a Technical Advisory Council, composed of representatives from the various organizations capable of making important technical contributions to this project, to advise on the planning and implementation of research activities at both the Cameroon and Africa regional level.

45

ANNEX A-1

LOGICAL FRAMEWORK

Life of Project:
From FY 83 to FY 90
Total U.S. Funding
Date Prepared:

Project Title Number: Health Constraints to Rural Production (698-0408.1)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
GOAL: To control schistosomiasis. SUB-GOAL: To develop an effective, economical and environmentally sound strategy for the control of the three forms of endemic human schistosomiasis found in sub-Saharan Africa.	Prevalence and severity of illness will be reduced to acceptable control levels established by WHO	- epidemological surveys - surveillance - MOH health records.	1. Control strategy will be implemented.
	Operational steps, implementation schedule, and budget available, which fulfills criteria established	- interviews with GURC officials, experts	new knowledge gained will be sufficient.
PURPOSE: To develop a schistosomiasis research facility in Yaounde, Cameroon, capable of: a) mapping the prevalence, distribution and intensity of schistosomiasis infection and and disease; (b) developing effective schistosomiasis control activities that are economical, environmentally sound, and socially acceptable; (c) training Africans in laboratory and field research methodology; (d) serving as a major sub-Saharan regional center for schistosomiasis research.	following in place: (a) facilities (b) trained personnel (c) methodology (d) budget commitment (a) facilities (b) trained personnel (c) methodology (d) budget commitment (a) no. of courses (b) no. of participants (c) subjects of courses (d) facilities (a) newsletter published (b) 2 regional conferences held (c) no. of countries involved (d) answers info. requests (e) collaborative research relationship.	- site visits - expert opinion - interviews with users - reports published - formal evaluation reports - annual and quarterly contractor reports - Technical Advisory council minutes - requests for information, assistance, and training from other sub-Saharan African countries.	- GURC and other African countries will nominate participants. - GURC will budget necessary funds - Pledged WHO assistance will be provided - Melen ponds and laboratory will be made available - GURC will give high priority to schistosomiasis research. - Various ministries and agencies will collaborate effectively.

46

ANNEX A-2

LOGICAL FRAMEWORK

Life of Project:
From FY 83 to FY 90
Total U.S. Funding
Date Prepared:

Project Title Number: Health Constraints to Rural Production (698-0408.1)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OUTPUTS:			
a) schistosomiasis research center	renovation/construction/equipping of: - malacology laboratory - medical parasitology laboratory - water chemistry laboratory - experimental animal study space - experimental ponds - fish and snail aquariums - library/conference/training room - data processing and storage room - office space transport for field studies	- on-site visits - expert opinion	- Melen site will be made available
b) Increased knowledge about schistosomiasis	Studies yielding new information about snails, snail control, parasites and their effect on humans, distribution and spread of schistosomiasis, control techniques economic significance	- reports, papers, newsletters and other documentation - expert opinion	- studies will yield new information
c) Cadre of trained Africans	- 4 Cameroonian doctorates - 6 Cameroonian Master's degrees - 12 Africa Regional Master's degrees - 15 Africa Regional trainees with on-the-job training at Yaounde center - 20 lab and field technicians trained.	- diplomas, reports - interviews with trainees - interviews with experts	- governments will nominate candidates - trained Africans will be assigned to research

ANNEX A-3

LOGICAL FRAMEWORK

Life of Project:
From FY 83 to FY 90
Total U.S. Funding
Date Prepared:

Project Title Number: Health Constraints to Rural Production (698-0408.1)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OUTPUTS: (CONT'D)			
d) Inter-agency and regional research network	- no. of non-Cameroonian trained - 2 regional conferences held - newsletter published at least annually - Technical Advisory Council meetings at least annually - no. of collaborative research relationships established between DGRST and other agencies - no. of communications and consultancies between Yaounde center and other countries	- reports - minutes of meetings - conference reports - interviews with officials - interviews with experts	- other Africans countries are interested in schistosomiasis research - desire for cooperation - administrative arrangements to establish collaboration possible

ANNEX A-4

LOGICAL FRAMEWORK

Life of Project:
From FY 83 to FY 90
Total U.S. Funding
Date Prepared:

Project Title Number: Health Constraints to Rural Production (698-0408.1)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
INPUTS:			
Technical Assistance - 150 person months of long-term assistance - 39 person months of short-term assistance	See detailed Budget Table - Part IV.	1. USAID Controller Records 2. AID/W Controller Records 3. DGRST/IMPM and Other Donor Financial Records	1. AID Funding availability on timely basis 2. GURC and Other Donor support continues.
Training - 22 participants trained			
Personnel - core staff of Central Laboratory salaries of participants			
Commodities - 4 US made 4 wheel drive vehicles, - household furnishings - miscellaneous equipment - lab. equipment and supplies			
Construction - Renovation of research facility and experimental ponds			

49

ANNEX B

BACKGROUND INFORMATION CONCERNING SCHISTOSOMIASIS IN CAMEROON AND SUB-SAHARAN AFRICA

1. The schistosomiasis situation in the United Republic of Cameroon

There are three major agents of human schistosomiasis in Cameroon, namely, *Schistosoma hematobium*, *S. mansoni*, and *S. intercalatum*.

Schistosomiasis intercalatum is the least well-known of the four types of human schistosomiasis (including *S. japonicum*) and occurs only in certain parts of Central and West Africa, including Cameroon, Gabon, the Central African Republic, and in small foci in the People's Republic of the Congo and in Zaire. Its intermediate snail host, *Bulinus forskalii* shows surprising adaptability to different habitats and is capable of rapid population growth. It is suspected that several animals may be susceptible to infection and, as such, contribute to the transmission of the parasite. If this suspicion is correct, control of transmission may be more difficult than presently expected.

Based upon the investigations of the Service des Grandes Endemies, the Government Health Service, OCEAC, the British Medical Research Council and those of independent investigators, schistosomiasis is an important public health problem in Cameroon and in the region. While the Government and other African countries are committed to the control of the transmission of schistosomiasis, no effective control program can be designed until there is further knowledge about the transmission and etiology of the disease.

2. Public health implications of schistosomiasis in relation to rural development

In Africa the spread and severity of schistosomiasis has been closely related to how the population reacts to increased water availability due to man-made impoundments, construction of small dams to retain water during the dry season, irrigation systems, and ponds. Because of the rapid and intensive exploitation of the available water resources for agricultural projects, fish culture, hydroelectric power and for reservoirs of urban water supply systems, it is expected that the prevalence and severity of schistosomiasis will increase. Clinical experience in various parts of Cameroon indicates that infections with *S. hematobium* and *S. mansoni* often cause disabling disease. The chronic nature of the infection and the slow development of the disease make it difficult to assess the morbidity of schistosomiasis quantitively without conducting longitudinal studies. For the same reason, it is difficult to measure the impact of schistosomiasis on morbidity either as a direct cause or as an underlying cause of death.

Of particular concern amongst many health and development experts on schistosomiasis, besides the obvious humanitarian one, is the extent to which it either by itself, or in concert with other health problems, affects the present and future economic productivity of those afflicted. However, as Prescott recently concluded, "Micro research has so far failed to establish a clear empirical basis for the assumption that schistosomiasis seriously impairs labor productivity..."[1] He went on to further conclude that there has not been a well-designed and implemented micro based study which would be able to disentangle the multiplicity of impacts which a disease like schistosomiasis, perhaps in concert with others, has on a set of important economic and social measures of development, one of which is labor productivity. Insights as to what are the present research questions and how they might be addressed would also benefit from such a study.

3. Issues of the importance of schistosomiasis to Africa

In the late 1960's issues relating to the health consequences of economic development initiatives in Africa were raised in a seminal article by Hughes and Hunter. With respect to schistosomiasis several such issues are important to address. Of prime importance is the effect of water-related development projects in Africa. Large irrigation projects such as the Volta River Project in Ghana, the Kainji Dam in Nigeria, and the Kariba Dam in Zambia and Zimbabwe, had been analyzed to determine whether there has been an increased incidence of schistosomiasis infection in the population.

Secondly, the issue of mobility, both of people and parasites, must be considered. There has been large scale migration of human populations in Africa between rural areas and from rural to emerging urban agglomerations. As a consequence, many infections and parasitic disease vectors, including those of schistosomiasis, are transmitted throughout a population and across country boundaries. For example, many people who work in the Gezira in the Sudan are on their way to and from Mecca. Since rivers and other bodies of water cut across boundaries, the problem of defining the potential interventions and the most cost-effective ones for schistosomiasis control is made more difficult in the African context.

Third, as it is not completely clear how subsets of the population are at risk, it is impossible to design carefully targeted interventions for prevention, cure and control of schistosomiasis and related diseases.

---

[1] Nicholas Prescott, "Schistosomiasis and Development," World Development, 7, 1 (Jan. 1979) 1-14.

For example, in the case of malaria, it was only after studying the water collection behavior of rural households in Uganda that an understanding was reached as to why DDT spraying of each home was not as effective as expected in reducing the incidence of the disease. A similar analogy can be made in the case of schistosomiasis and is addressed more fully in the section of the proposed research agenda.

Finally, in Africa there is an increasing urban population. There are many instances of crowded living conditions in these urban areas which contain a large, potentially under and unemployed subset of the population. Not only is it more difficult to understand schistosomiasis transmission in an urban setting but it will become more necessary to do so as African urban populations continue to grow over the next 10-20 years. Certainly in Cameroon, with the increased incidence of schistosomiasis in the urban areas of Douala and Yaounde, there is a heightened awareness of the importance of socio-economic studies of the impact of schistosomiasis on an increasingly urban population.

4. Importance to Cameroon

The general topic of this project - the impact of health on development, and specifically schistosomiasis - is a basic concern of Cameroon with regards to all agricultural and water control investments which are under active consideration by the Government of Cameroon and donor agencies. Further, the increased awareness of the existence of schistosomiasis in the major urban areas has raised additional concern among public health officials as to its impact and what may be done to control it. In 1982 the Department of Preventive Medicine and Public Hygiene of the Ministry of Public Health has been trying to develop new lines of action to control the disease.

With respect to the agricultural sector, a major source of economic activity in all African countries, Cameroon has been given assistance in expanding irrigated rice production in the northern part of the country; developing ponds in the southern part for increasing fresh water fish production, and creating a number of small to medium dams in the Mandara Mountain region for multiple uses including personal household usage, fishing and possible irrigation. Given that all of these activities are water supply related and have the potential for increasing the incidence of schistosomiasis and other water borne diseases, the Government is interested, as are many other African countries, in the possible health impact of these endeavors. Further, given its general interest in increasing economic growth, it is concerned with the potentially adverse health impact on labor productivity in both the rural and urban areas of water related development activities.

In response to what appears to be a great public health problem in Cameroon, and one that may interfere with economic growth and affect the quality of life of the people of Cameroon, the Government for several years has undertaken a modest program of schistosomiasis control. This program has been entrusted to the Service for Hygiene and Sanitation in the Department of Preventive Medicine, in the Ministry of Health. Its initial goal is the systematic collection of data concerning the prevalence, distribution and severity of the three forms of human schistosomiasis in Cameroon, in relationship to how human populations use and contact water from various water sources and the extent to which functional health status is adversely affected and household activities are altered.

Although active transmission of schistosomiasis has been known to occur in some urban fringe areas of African cities for some time, this phenomenon has been treated as a curiosity rather than as a serious public health problem. The Government of Cameroon has indicated that it considers the schistosomiasis problem in urban areas as an important public health problem, especially in Yaounde, Limbe and Douala. Population surveys in these cities, especially in Yaounde, have indicated that there is a high prevalence of schistosomiasis among people who have no access to a safe urban water supply. About 40 percent of the urban population of Yaounde have no access to safe water. In view of the fact that there presently exist potentially cost-effective methods of schistosomiasis control for use in areas of high population per infected water source, such methods should be tested in the urban areas and those proven cost-effective included in the national schistosomiasis control program.

5. The Interrelationship Between the Parasite, the Snail and Human

Some facts about the schistosome - man relationship are helpful in considering a program designed to quantify the extent of infection and disease in a national population. Unlike many acute infectious diseases in which illness is obvious but the cause obscure, for schistosomiasis it is usually easier to confirm infection than disease. This is because schistosomiasis is a slowly progressive, chronic disease which for some individuals may be inconsequential, but for others may have a debilitating and sometimes fatal outcome. The reasons for this wide clinical spectrum are not clearly understood, but two factors are considered paramount in determining whether or not infection progresses into disease: (1) intensity of infection (number of gravid female worms in the host's bloodstream) and (2) the duration of infection.

The adult worms are long-lived (over 5 years half life of *S. mansoni*) but do not multiply in the human host. Since infection apparently confers only a low level of immunity, reinfection occurs commonly, and individuals with repeated heavy exposure to cercariae (the infective larval form of the parasite released by snails into the water) are in general those who acquire a heavy intensity of infection. They are also at the greatest risk of developing severe pathology. The adult worm *per se* causes little or no damage; that which occurs in the liver, intestinal tract, and urinary system results from inflammation and scarring around the parasite eggs deposited in the tissues. Each gravid female worm releases up to hundreds of eggs per day and although some eggs exit via the feces or urine, many are retained and accumulate in the tissues where the initiate inflammation and subsequent organ damage and dysfunction. In the liver, scarring causes elevated blood pressure in the circulatory system of the liver and intestines, and when severe, may cause life-threatening complications such as rupture of veins in the esophagus. In the large intestine, eggs cause inflammation, minute hemorrhages, blood loss, intestinal dysfunction, and benign tumors which often bleed. Damage to the urinary tract commonly begins with bleeding and small benign tumors in the bladder, but may progress to obstruction of urinary outflow from the kidney, loss of kidney function, and death. *S. Haematobium* infection is also believed to be an important cause of bladder cancer. Schistosome worms and eggs are also known to migrate to aberrant sites, such as the spinal cord, and may cause paralysis or other neurological abnormalities.

In general, those most heavily infected are school-aged children; consequently prevention and/or treatment will prevent the evolution of disease in this critical population.

6. The Need for Information Concerning the Distribution of Schistosomiasis (Survey and Maps)

Random sampling of the entire national population is neither feasible nor necessary to establish the prevalence and distribution of infection. Primary school children are ideal for this purpose and offer many advantages:

(1) Accessibility and cooperation;
(2) Critical role in the transmission cycle;
(3) Potential for collecting baseline data in a systematic manner which can be replicated in future years on a nationwide scale; and
(4) Potential for effective health education intervention in this population (utilizing school teachers).

The school enrollment rates from the 1976 General Population and Housing Census supports the use of the primary school population for mapping the distribution of schistosomiasis infection in Cameroon. The overall enrollment rate of 67.5% ranges from a high of 92.1% in the Central-South Province to a low of 30.9% in the North Province. Only in that latter province may low enrollment rates introduce a significant bias, but this problem can be dealt with by an additional survey of children in the North Province who are not attending school.

The methodological details of the parasitological surveys will be dealt with under implementation. One critical consideration is the selection of the most appropriate fecal examination technique. Qualitative examinations are adequate for the survey, but a subsample of specimens (every 10th for example) should be examined quantitatively (output of eggs per gram of stool or eggs per 10cc urine). In this way, data on intensity of infection, as well as prevalence, can be determine on a systematic, nationwide basis.

To help insure that transmission areas do not escape detection by the school survey system, additional studies should be conducted in a representative sample of all age groups in selected communities in which there is reason to believe that transmission occurs primarily in older age groups (because of occupational exposure, for example).

Lastly, observations will also be made on the health and disease in the community, including diseases such as malaria, filariasis, infection with intestinal helminths and protozoa, and malnutrition as well as on information relative to schistosomiasis.

Taken together, the information generated by the community studies will provide a comprehensive understanding of transmission dynamics in a given population, and the interaction of various transmission factors can be evaluated. For example, it may be learned that in a given community (and by extrapolation in similar communities) transmission occurs only at certain time of the year during the dry season, and that young boys provide the major man-to-snail link in the infection chain by swimming in certain well-defined pools at that time of year. This type of information would make it possible to plan effective and economic control measures.

The logical conclusion of the community studies is to institute the most appropriate control measures, and to carefully evaluate the impact on transmission levels and disease occurrence. In this manner the methodology for evaluating control can be improved, and the end-point of control programs better defined. Although it is difficult to reach the theoretical "break point" of transmission, beyond which the parasite cannot perpetuate itself, newer and improved control methodologies offer the hope that in many areas the "break point" can be reached. In areas with more persistent transmission, control of disease may be accomplished without total interruption of transmission.

7. The Increased Risk of Schistosomiasis Promoted by Rural Development Projects

a) Construction of Dams

In order to assure year round availability of water to populations in semi-arid regions, the Government is interested in the construction of small dams.

b) Fish Ponds

To ensure the amount and quality of protein in the diet of the rural population, USAID is supporting a project on fish farming (Small Farmer Fish Production No. 631-0022) with a total estimated budget of 650,000 U.S. dollars utilizing the expertise and manpower of the U.S. Peace Corps. The project aims at doubling the number of the available fish ponds from 6,000 to 12,000 within a five year period. The operation of the fish ponds carries health hazards with regard to schistosomiasis, as detailed in the analysis of the

environmental assessment of the project design paper. High priority was given to the fish pond project by the design team who visited the areas of Bertoua to assess the specific health hazards involved in the operation and extension of fish ponds.

c) Irrigated Rice Production

In 1979 there were about 5,000 ha. or irrigated rice fields in northern Cameroon adjacent to the Logone River. All irrigation projects in tropical areas carry with them the risk of the spread of certain water-borne diseases, notably malaria and schistosomiasis. During the six week stay of the design team in Cameroon, no special attention could be given to the irrigated rice fields in the northern parts of Cameroon. However, these ecological conditions must be considered as the schistosomiasis project evolves.

8. The Special Case of Urban Schistosomiasis in Cameroon

Schistosomiasis is commonly viewed as a disease of rural populations, but it is essential to recognize that urban foci of transmission occur frequently and are of critical importance. Urban transmission tends to be overlooked because of insufficient awareness of its likelihood. For example, although certainly present for many years, major areas of schistosomiasis transmission have only recently been recognized in Kinshasa, Zaire. In Cameroon, urban transmission is known to occur in at least 3 major cities: Yaounde, Douala and Limbe, and almost certainly it occurs in other cities. The first human case in Yaounde was detected in 1956 in a member of the military personnel, with the infection apparently acquired in a pond adjacent to a military compound.

Preliminary investigations by the Laboratoire de Melen in selected sections of Yaounde have revealed overall infection rates of 13.6% (116/850) and 2.5% (22/850) for *S. mansoni* and *S. haematobium* respectively. In some quarters, the *S. mansoni* infection rate was as high as 20% (Obili). These figures may be viewed as conservative estimates because of the relative insensitivity of the parasitologic techniques. Infection rates with *S. intercalatum* have not been determined systematically in Yaounde.

The need to agressively investigate and control urban schistosomiasis seems obvious. In some instances, relatively simple measures can be taken which effectively protect large segments of the population. For example, if investigations reveal that transmission occurs in an isolated body of water such as a reservoir or fish pond, appropriate safeguards may be taken to control snail populations and to limit contamination and human access to the water-body. Although the solution is not always as simple as the example cited, the need for systematic efforts to detect and control foci of urban transmission must be emphasized in a national program. In Yaounde such studies can be incorporated into the initial training and field activities of project personnel.

Yaounde should be designated as an area for pilot studies in the early stages of project implementation. Systematic parasitologic surveys, snail surveys, mapping of cases and their relationship to potential transmission sites, and appropriate water contact observations indicate where people are being infected and provide the information required for planning rational, cost-effective control measures. Evaluation of the contribution of man-made water impoundments to schistosomiasis should have high priority in urban as well as in rural settings.

9. Behavioral Aspects as Determinants of Schistosomiasis

The problem of water utilization in the South of the country is likely to be different from what it is in the North. In the South, water is available all the year round. However, in the North, drought is a crucial problem as regards to water access and utilization.

In the South, there is a year-round choice in the utilization of various water sources: running water in the houses, privately dug wells, standpipes set up by SNEC, and streams and rivers.

Water Sources:

- Some people have piped water in their houses and use it for all domestic purposes.

- Some take water from the stand-pipe for all purposes except washing, which requires a great quantity of water. People are not willing to go back and forth to the street hydrant several times and they would rather wash their clothes near the hydrant or go to a river or a lake.

- Those who live in the neighborhood of the cities or in villages where there are no central standpipes take their water from dug wells for domestic purposes, but go to the river to do their laundry. It should be noted that river water is used only when the river is near the house. It is generally thought that clothes washed in a river or a lake are cleaner because boulders can be arranged in the river bed to facilitate the work. Also, there is a large quantity of water available to rinse the clothes without much effort.

- Lastly, those who live in remote villages have no other water source than rivers or springs from which they draw water for all household and personal purposes. Even though water from wells and hydrants is available, people still use river water for bathing. Children up to fifteen years of age like to play in rivers. Adults, too, find it easier to bathe in a river because of the large quantity of water available and because the water is cooler.

In the North of the country the problem is different:

- People living in towns and cities can choose among several sources of water: piped water, standpipes, wells and temporary rivers (called "mayos"). The first three sources are used equally for drinking, dishwashing, bathing, cooking and sometimes laundry. But most of the time laundry is washed in the mayos. The mayo water is used for that purpose and occasionally women bathe in it. Children spend long hours bathing and playing in the mayos.

- People living in the villages and especially in the Mandara Mountains have no choice. They are obliged to use any water available whether it is clean or not, particularly during the dry season when the few wells dug by SNEC or by the local population are dry. Water is used by humans for all their needs and also by animals. However, some people will walk long distances to find water which is more or less drinkable. Many children like to bathe and play in the ponds which have been dug for cattle. The neighboring populations come to wash their clothes there and sometimes to bathe.

To summarize the behavior of people toward water, the following water sources can be identified:

Piped Water is used, by a few people only, for all domestic purposes.

Mayos and rivers. Children from 4 to 15 years old come there to bathe and play for long hours and to help their mothers do the laundry. It is very likley that they urinate and defecate in the streams. Women also come to mayos and rivers to bathe and wash their clothes. Men, on the contrary, come very rarely. Mayo water is also used for drinking. At the beginning of the rainy season, the underground water comes up and the people dig small holes in the mayo banks and wait for the water to seep up through the sand. This filtered water is then collected in containers. It is probable that in houses which do not have a well, men wash themselves with mayo water which is brought to them by women and children. Sometimes, in the mountains, small rivers can be found and some places have been arranged for collecting drinking water. But these simple facilities are no guarantee against contamination of the water with dirt and microbes.

Wells. In the cities, as in the villages, well water is used for all purposes. It should be noted that these wells are often improperly protected. Whether constructed by SNEC or individually, they are usually uncovered

Ponds. Ponds are intended to be used by cattle, to cultivate fish or for irrigation, but they are also frequently used for other purposes such as washing and bathing. As they are located far from the village, herders or farmers bathe in these ponds while watching their cattle in the heat of the day or after work.

Dams. Reservoir water is also used by people. Throughout the year, children come fishing, adults wash their clothes, and during the dry season households use reservoir water for their daily needs. Obviously, this daily utilization of surface water provides opportunities for schistosomiasis infection as people urinate and defecate in the water.

The main problem seems to be the question of why certain water sources are preferred to other sources. People's use of water is motivated by their needs. These causes can be grouped in three categories:

- the pleasure of bathing in the rivers, especially among children who remain in water for long hours;

- expediency, since it is easier to bathe in the river on the way back from the fields than waste time and strength taking water from the well or standpipe. Also, surface water is attractive because of its large quantity, and because it can be used for washing and bathing without extra trouble.

- non-availability of water, especially in the North during the dry season. At that moment, any source of water is utilized, and whatever precautions may be taken, it is not always safe. The unavailability of water could explain the extent of schistosomiasis in the North.

But above all, the general impression is that people are not aware of the dangers that they are exposed to when utilizing stream water. They are completely ignorant of how water-borne diseases are transmitted. Consequently, it will be necessary to develop health education at all levels. As far as schistosomiasis is concerned, education methods could be used. Generally speaking, people know the clinical signs of schistosomiasis, but they do not know anything about the cause of the disease.

Education should help people become aware of the dangers of infection caused by the utilization of the water taken from contaminated rivers, ponds and reservoirs, and also of the consequence of the disease such as sterility, anemia, possible urinary problems, and eventual death.

Health education could start at the hospital level for the patients who come voluntarily. In this case, it will be necessary for health workers also to become health educators. They should, along with the treatment and control of the disease, give the patient all the necessary information on the transmission of the disease and how to avoid contracting it.

At the school level, the teams systematically examining the children should take the same action and inform the children.

At the village level, it will be necessary to train health educators, who will constitute health committees as part of hygiene and sanitation campaigns. These health educators can be trained in the field and will include the villagers and traditional healers. Information will be given to the villagers concerning the dynamics of the transmission of schistosomiasis and the ways to avoid contracting it. The participation of the villagers in health education would give better results.

Another problem will arise. While being advised not to use water from mayos, rivers and reservoirs, the populations should be given alternative sources of water. The number of public standpipes should be increased in the neighborhood of the cities and wells should be dug deeply enough to be able to retain water all through the dry season. These wells should be properly protected, hermetically closed and their surroundings cemented. Measures could also be taken to treat water, which will require in each district an inventory and a localization of the wells in use in each village.

The control of the access to the reservoirs should also be reinforced.

The main point is to encourage villagers to change their behavior and adopt safer attitudes, without feeling they are frustrated. Obviously this is a long term task, requiring time and patience. It should be noted that the idea of health education is not a new one, but it should be made more direct and intensive, and aimed at the needs of schistosomiasis control.

10. Longitudinal and comprehensive studies in communities

Although the nationwide parasitological survey in primary schools will provide valuable descriptive information, its broad and cross-sectional design will not generate in-depth and integrated data on the dynamics of transmission. Consequently, in order to develop a rational and effective strategy for control efforts, several small communities, no larger than 1,000 inhabitants in size and preferable nearer 500, should be selected as representative of the various ecological zones of Cameroon, and should include communities with endemic *S. mansoni*, *S. haematobium*, and *S. intercalatum*. These communities will be studied longitudinally for a period of 2-3 years to determine for the entire population:

(1) Prevalence and intensity of human infection; and disease patterns;

(2) Incidence of human infection (the rate at which uninfected individuals acquire infection);

(3) Behavioral patterns as they relate to contamination of and contact with local waterbodies (to be determined by observation and interview); and

(4) Migration patterns.

In addition, snail observations will be made at regular (monthly) intervals to determine:

(1) The intermediate host snails by species, number, size, and infection rates with human schistosomes;

(2) Factors associated with snail breeding--e.g. water velocity, substrate, vegetation, shade cover, and water quality parameters;

(3) The degree of human contamination with schistosome eggs measured using caged sentinel snails in selected sites; and

(4) Possible animal reservoirs of schistosome parasites.

ANNEX C

CERTIFICATION PURSUANT TO SECTION 611(e)
OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

SUBJECT: CAMEROON - HEALTH CONSTRAINTS TO RURAL PRODUCTION PROJECT (698-0408.1)

Having taken into account, among other things, the maintenance and utilization of projects in Cameroon previously financed or assisted by the United States, I certify hereby that in my judgement Cameroon has the financial capability and the human resources (when supplemented by the external technical assistance to be provided under the project) to maintain and utilize effectively the proposed Health Constraints to Rural Production Project.

This judgement is based primarily on the facts developed in the Project Paper for the proposed Grant which discusses in detail the capabilities of the Government of Cameroon and the General Delegation for Scientific and Technical Research (D.G.R.S.T) and finds them in possession of adequate financial and human resource capability to effectively utilize and maintain the project

Date: 1/12/83

Ronald D. Levin
Director

ANNEX D

UNOFFICIAL TRANSLATION
OF A LETTER RECEIVED IN FRENCH FROM

MINISTRY OF ECONOMIC AFFAIRS AND PLANNING

ADDRESSED TO: THE DIRECTOR, USAID

DATED: February 23, 1982

REF: No. 1115/MINEP/PROG/P2

SUBJECT: PROPOSAL FOR A SCHISTOSOMIASIS RESEARCH PROGRAM

Dear Mr. Director:

I have the honor to forward herewith a schistosomiasis research program developed by the Institute of Medical Research and Medical Plants of the General Delegation to Scientific and Technical Research with the agreement in principle of USAID which would agree to finance it.

This program is very important for Cameroon as it is intended to control schistosomiasis, one of the most prevalent endemic diseases in Sub-Saharan Africa and particularly in Cameroon.

Therefore, any kind of foreign assistance to help with the implementation of this program would be highly appreciated and considered as essential for the Country's economic and social development.

(French closing)

/s/ Bello Bouba Maigari
Minister

REPUBLIQUE UNIE DU CAMEROUN
Paix — Travail — Patrie

Ministère de l'Economie et du Plan

DIRECTION DE LA PROGRAMMATION

UNITED REPUBLIC OF CAMEROON
Peace — Work — Fatherland

Ministry of Economic Affairs and Planning

DIRECTION OF PROGRAMMING

RECEIVED
USAID YAOUNDE
FEB 24 12 25 PM '82

N° 1115 /MINEP/PROG/P2

Yaoundé, le 23 FEVR. 1982
the

OFFICIAL FILE COPY
DO NOT REMOVE

Le Ministre de l'Economie et du Plan
The Minister of Economic Affairs and Planning

OBJET : Proposition d'un programme de recherche sur la Bilharziose.-

à Monsieur le Directeur de l'US/AID
to

B.P. 817

- Y A O U N D E -

ACTION / COPY
TO. HNP / DUE 3/3
TRANS
TAKEN. 1685
INIT. DATE

Monsieur le Directeur,

J'ai l'honneur de vous adresser ci-joint un programme de recherche sur la Bilharziose établi par l'Institut de Recherche Médicale et d'Etude des Plantes Médicinales de la Délégation Générale à la Recherche Scientifique et Technique avec l'accord de principe de l'USAID qui accepterait de le financer.

Ce programme est d'une très grande importance pour le Cameroun d'autant plus qu'il a pour but de lutter contre la Bilharziose, l'une des maladies endémiques les plus sévissantes en Afrique Sub-Saharienne et au Cameroun en particulier.

Aussi, toute aide extérieure destinée à mettre ce programme en oeuvre serait très hautement appréciée et considérée comme capitale pour le développement économique et social du Pays.

Veuillez agréer, Monsieur le Directeur, l'expression de ma considération distinguée./-

(w/att.)
ACT. HNP DUE 3/3
Info. DIR
APDIR
PRM
HRD
069/82 CHRON
RF

BELLO BOUBA MAIGARI

65

ANNEX E

PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

U.S. TECHNICAL ASSISTANCE TEAM

1. Chief of Party/Epidemiologist

A. Duties and Responsibilities

The chief of party will have key responsibility for implementing and coordinating day-to-day laboratory operations as well as field research activities, especially those activities involving the human population. The Coordinating role includes appropriate communications with the USAID project manager, DGRST officials, members of the Technical Advisory Council, and all other national, voluntary, and supranational organizations with which the project relates.

The position includes supervision of the other expatriate senior staff. The chief of party has a crucial role in maintaining the quality control of all data systems, and also has direct responsibility, with the assistance of the biostatistician (data processing manager) for the collection, storage, and analysis of data. The chief of party will also be responsible for preparing program reports at specified intervals. (See Chapter VI, Monitoring and Evaluation Arrangements)

The chief of party's duties as epidemiologist will include the following:

1. Review available data on the epidemiology of schistosomiasis in Cameroon and the sub-Saharan Africa region.

2. Determine the geographic areas and population groups that will be the subjects of epidemiological studies over the life of the project.

3. Design, implement and provide technical guidance on field studies to obtain current baseline data on distribution and intensity of schistosomiasis infections in selected areas of Cameroon.

4. Coordinate work of the various project components, i.e. the laboratory and experimental ponds, the schistosomiasis mapping activity and the training and information dissemination activity.

5. Maintain quality control of all data systems and, with the assistance of the biostatistician, be responsible for the collection, storage and analysis of data.

6. Direct and participate in the preparation of such program reports as may be considered desirable and useful by project personnel or as may be required by USAID and the Government of Cameroon.

7. Serve as the principal spokesman of the U.S. technical assistance team in all dealings with the USAID project manager, DGRST officials and with all other organizations with which the project may relate.

B. Qualifications

- M.D. degree from U.S. medical school or equivalent.
- One or more years of clinical internship or residency.
- Post doctoral degree in public health with a major in epidemiology (Dr. P.H. preferred but would accept experienced candidate with M.P.H. or equivalent degree).
- Fluency in French at the FSI level of 3.
- Prior field experience essential, with Africa work experience strongly preferred.
- Demonstrated communication skills, including scientific publications in referred journals. Research experience essential.
- Experience with data processing and analysis, preferably with data from large population based field studies.
- Demonstrated leadership and management qualities.

2. Medical Parasitologist

A. Duties and Responsibilities

The medical parasitologist will have primary responsibility for ensuring that the project has high quality parasitolotical laboratory support. Duties will include:

1. Establish a laboratory to diagnose human and animal schistosomiasis infections.

2. Develop a management system for the laboratory which will include inventory, reordering supplies, maintenance of equipment, processing of large volumes of materials submitted for diagnosis, and a record system for the identification of specimens and results of examinations in the laboratory.

3. Train and supervise laboratory technicians and support personnel in all procedures essential to the proper operation of the laboratory.

4. Develop quality control procedures that will ensure that the results of studies conducted both in the field and in the laboratory will be scientifically sound.

5. Participate as required by the chief of party in the preparation of reports on the project as well as in the preparation of manuscripts for publication in scientific journals.

8. Provide such other specialized parasitological support to the project as may be needed.

B. Qualifications

- Minimum Master's Degree with major in parasitology.
- Two years of field oriented work in parasitoloty.
- Experience in a developing country, preferably Africa.
- French at FSI level of 2.
- Knowledge of experimental design and survey techniques.
- Strong capability in use of quantitative diagnostic techniques.

3. Malacologist

A. Duties and Responsibilities

The malacologist will have broad responsibilities for those elements of the program which are concerned with the snail intermediate hosts of schistosomiasis. These duties and responsibilities include but are not necessarily limited to the following:

1. Develop and manage the malacology laboratory so that it can serve three essential functions--first, be a snail reference laboratory for sub-Saharan Africa; second, provide necessary laboratory support to field studies on taxonomy, bionomics, population dynamics of snails, and efficiency of different snail species in transmitting schistosomiasis; and, third, provide training in malacology, schistosomiasis epidemiology and control of schistosomiasis.

2. Develop and supervise the mapping of snails in areas which are designated for study.

3. Design and supervise research projects which will be conducted in the experimental ponds on snails and their control.

4. As appropriate, conduct studies to assess the feasibility of controlling schistosomiasis by biological methods.

5. Plan and implement studies that will provide a basis for predicting the effects that different environmental changes will have upon the population dynamics and geographic distribution of snail intermediate hosts of schistosomiasis, and upon the transmission of infection to man.

6. Participate in planning and carrying out comprehensive longitudinal community studies of schistosomiasis.

B. Qualifications

- Ph.D. (or Ph.D. candidate), or M.D. with equivalent preparation and interests, preferably with experience in directing/conducting field research on snail transmission of schistosomiasis;

- Experience (or interest) in making, maintaining and curating museum collections of malacological specimens; or with educational background in tropical biology;

- Some experience working in tropics under field conditions is desirable;

- French at FSI level of 2.

4. Biostatistician

A. Duties and Responsibilities

The biostatistician will develop and manage a data system for the project. As a key team member he/she will develop techniques for obtaining the data base, coding, collating, analyzing and interpreting the research data. The biostatistician will also provide for the management and logistical aspects of the surveillance component of the project.

The tasks will include but not be limited to:

1. Assisting in determination of the geographic areas and population groups to be studied over the period of the project.

2. Develop sampling methods for the target population, calculate sample size and frequency of sampling.

3. Develop a monitoring system for the collection and processing of data.

4. Develop a coding system for individuals studied and for communities and/or geographic locations.

5. Retrieve the data bases in an efficient and timely manner as appropriate to the project needs.

6. Analyze data using routine statistical treatment such as correlation regression analysis, geometric means, significance tests, multivariate analysis and other methods as needs indicate.

7. Conduct statistical analyses that will assist in developing and instituting cost-effective interventions for control of schistosomiasis.

8. Develop simple mathematical models of interventions, and test mathematical models of schistosomiasis transmission and control.

9. Draft annual research and experimental plan of action for the surveillance system.

10. Identify need for short-term technical consultants; assist in selection of participant trainees.

11. Coordinate logistics for commodities related to the information system.

B. Qualifications

- Master of Science in Biostatistics.
- Experience in data collection procedures, data base design and statistical analysis.
- Must be able to train staff in the intricacies of the management of the data and surveillance system.
- Field experience in LDC strongly preferred.
- French language capability desirable.

5. Administrative Officer

A. Duties and Responsibilities

The administrative officer, as the first long-term technician on the ground, will have primary responsibility for laying the logistical foundations of the project. Specifically, the administrative officer will:

1. Establish lines of contact with Cameroonian officials. In this he/she will work closely with the USAID project manager.

3. Organize training of Cameroonians and other Africans. In particular, assist GURC in identification of Cameroonian long-term trainees, and manage paperwork requirements pertaining to their placement abroad.

4. Assist USAID/Yaounde in procurement of commodities, laboratory equipment and furnishings.

5. Arrange housing for U.S. technical assistance team.

6. Assist in organization of field research.

B. Qualifications

- Bachelor's degree.
- French at FSI level of 3.
- French West African experience desirable.
- Demonstrated facility for working in an African environment. Good communication skills.

ANNEX F

RENOVATION OF EXISTING FACLITIES AND NEW CONSTRUCTION

1. General

The construction program for this project will consist of renovation and new construction classified as follows:

i) Demolition
ii) Rehabilitation of Existing Facilities
iii) New Construction within the Existing Building
iv) New Construction
v) A/E Technical Services

2. Cost Factors Affecting Work within the Existing Building

A unit cost increase of construction for the work of alteration must be considered for the following factors:

i)	Cut and patch to match	5%
ii)	Dust protection	5%
iii)	Area limitation for Material and Equipment	8%
iv)	Protection of existing work	7%
v)	Shifting of Work Requirements	30%
	Total cost increase to be considered for alteration work	55%

3. Reasonable Cost Estimate

	UNIT	QUANT.	UNIT COST	$ TOTAL COST
i) Demolition:				
Remove Concrete Shelves	m	5	150	750
Remove Concrete Counters	m^2	8	75	600
Remove Sinks	ea.	2	100	200
Remove Walls	m^2	20	50	1,000
Remove Wood Partition	m^2	12	20	240
Remove Toilet	L.S.	-	-	250
Open-up New Windows	ea.	9	300	2,700
Open-up New Doors	ea.	2	400	800
Remove Old Piping	L.S.	-	-	500
Total Demolition		U.S. Dollars		7,040

	UNIT	QUANT.	UNIT COST	TOTAL COST
ii) Rehabilitation:				
Block-up Windows	ea.	3	250	750
Block-up Doors	ea.	5	350	1,750
Patch-up	L.S.	-	-	2,500
Upgrade Existing Ponds	L.S.	-	-	50,000
Total Rehabilitation		U.S. Dollars		55,000
iii) New Construction in Existing Building				
15 cm Walls	m^2	15	50	750
Plaster	m^2	60	75	4,500
Concrete Counters, Tiled	m	11	250	2,750
Cabinet under Counters	m	11	750	8,250
Install Sinks	ea.	4	350	1,400
Install Toilet	ea.	1	500	500
Prepare Ceilings for Paint	m^2	125	5	625
Prepare Walls for Paint	m^2	475	3	1,425
Prepare Floors for Paint	m^2	125	7	875
Paint Ceilings	m^2	125	30	3,750
Paint Walls (interior)	m^2	380	25	9,500
Paint Walls (exterior)	m^2	240	35	8,400
Paint Floors (epoxy)	m^2	125	60	7,500
Install Doors 60 cm	ea.	1	100	100
80 cm	ea.	6	150	900
90 cm	ea.	3	200	600
Install Windows	ea.	32	150	4,800
Install New Plumbing	L.S.	-	-	10,000
Total New Construction in Existing Building				66,625
iv) New Construction:				
Building Addition:	m^2	35	850	29,750
Septic Tank and Cess Pool	L.S.	-	-	8,000
Site Work	L.S.	-	-	10,000
Installation of Telephone Services	L.S.	-	-	10,000
Total New Construction:				57,750
			say	58,000
v) A/E Technical Services:				
Survey, Prepare Bid Documents	mo.	1.5	12,000	18,000
Assist in Evaluating Construction Bids	mo.	1.0	5,000	5,000

Supervise Construction	mo.	6.0	2,000	12,000
Total A/E Fees				35,000

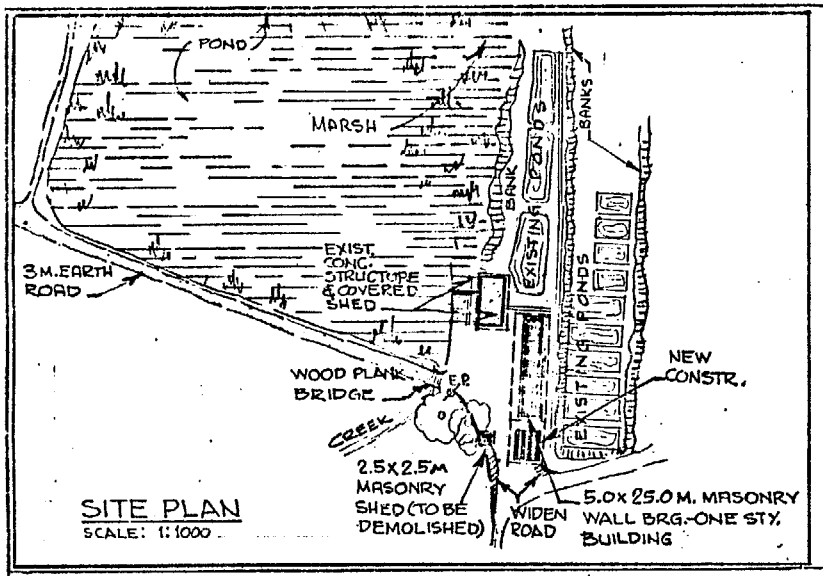
Summary of Cost Estimate:

Demolition	7,040
Rehabilitation	55,000
New Construction in Existing Building	66,625
Subtotal Renovations:	128,665
Contingencies for Renovation only (± 12%)	15,335
Total Renovations:	144,000
Total New Construction	58,000
Total A/E Technical Services	35,000
Subtotal Construction Program =	237,000
Construction Contingencies (± 7.5%)	17,800
Grand Total Construction Program	254,800

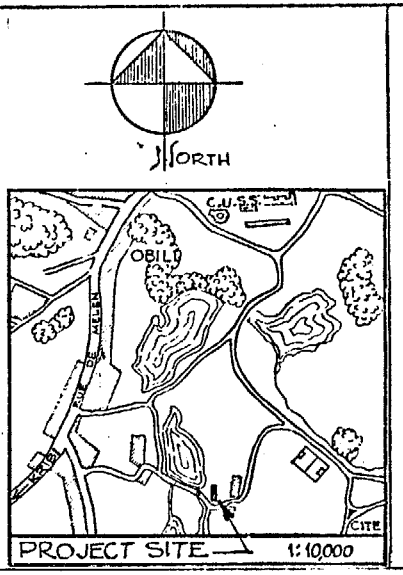
Construction Program Implementation Plan by Month

PROAG Signed

	1	2	3	4	5	6	7	8	9	10	11	12
DGRST prepares RFTP	xxxx											
A/E response to RFTP		xxxx										
DGRST awards A/E Constract			xx									
A/E Prepares Bid Documents			xx	xxxx								
Presidency Advertises for Bids					xxxx							
Bids are evaluated and Construction Awarded						xxxx						
Construction phase completed							xxxx	xxxx	xxxx	xxxx	xxxx	xxxx



SITE PLAN
SCALE: 1:1000



PROJECT SITE 1:10,000

FIELD NOTES

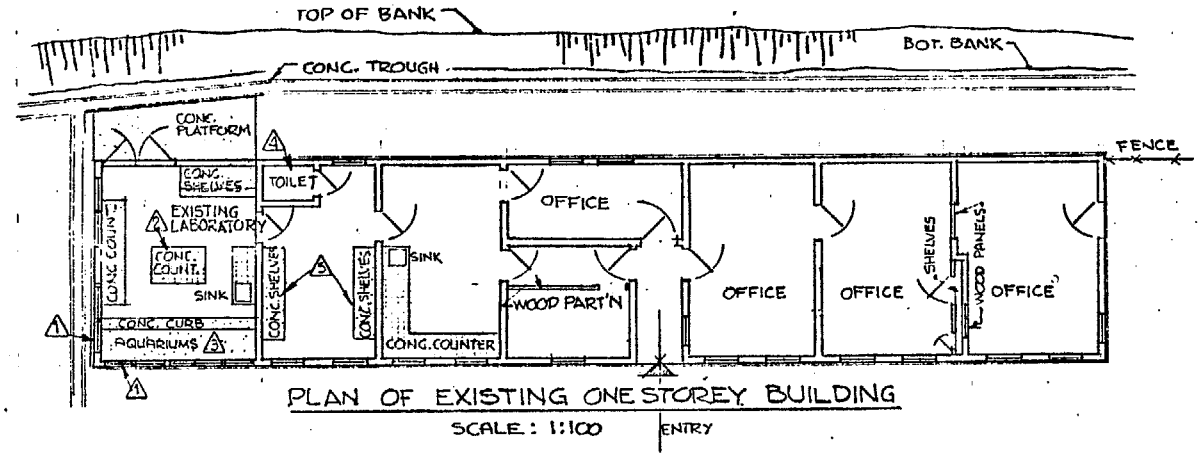
A. EXISTING LABORATORY IS FURNISHED W/ A DUAL WATER SYSTEM: a) IMPOUNDED (NON-POTABLE); b) PUBLIC (POTABLE)

B. ALL WALLS ARE 15 cm. CONC. BL'K OF SOUND CONSTRUCTION.

C. THE ENTIRE BUILDING NEEDS PAINTING, NEW DOORS & WINDOWS.

D. DETAILED OBSERVATIONS:
- 1 BROKEN WINDOW PANES
- 2 BROKEN TILES; ENTIRE COUNTER TOP NEEDS REPLACEMENT.
- 3 THREE OF FIVE AQUARIUMS NEED NEW PLATE GLASS.
- 4 TOILET AND SEPTIC TANK ARE OUT OF ORDER (UNUSABLE)
- 5 SCREEN ENCLOSURES ARE BROKEN AND NON-FUNCTIONAL.

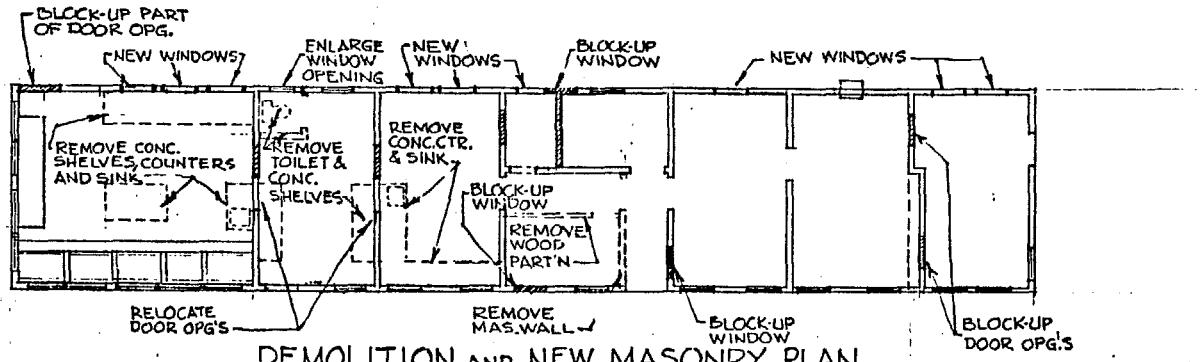
E. FOR ADDITIONAL DETAILS SEE SK-02



PLAN OF EXISTING ONE STOREY BUILDING
SCALE: 1:100

USAID / YAOUNDE		
HEALTH CONSTRAINT TO RURAL PRODUCTION (698-0408)		
EXISTING FACILITIES		
BY GEO	DEC. 20, 1982	SK-01

F-5



DEMOLITION AND NEW MASONRY PLAN

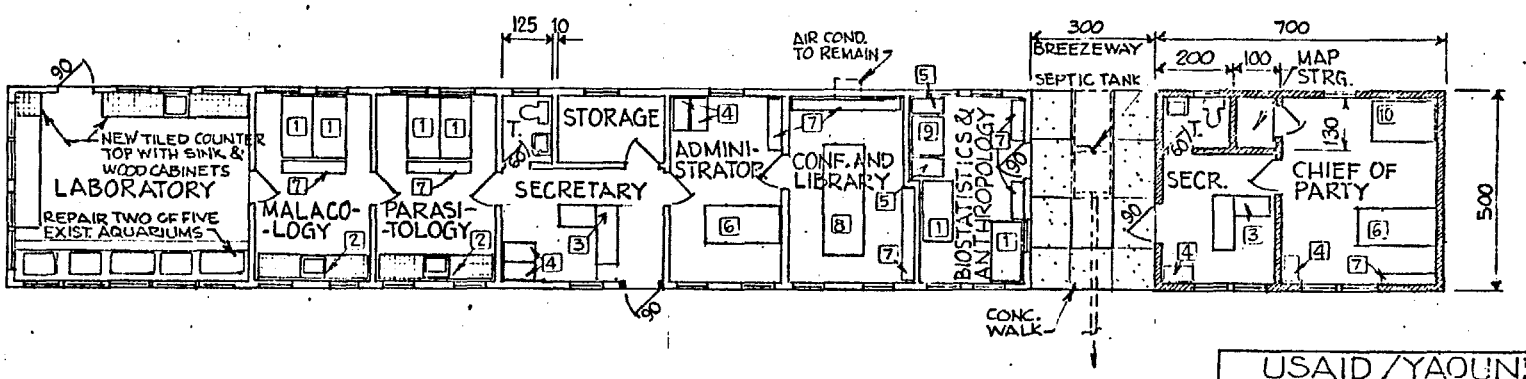
SCALE : 1:100

LEGEND

1. 75x150 OFFICE DESK WITH CHAIR
2. 60x260x100 STORAGE CABINETS & WORK COUNTER
3. SECRETARY DESK (UNIT WORK STATION)
4. 46x69x132 4-DRAWER FILE CABINET
5. 46x69x75 2-DRAWER FILE CABINET
6. 97x183 EXECUTIVE DESK WITH CHAIR
7. FULL HEIGHT BOOK SHELVES
8. 100x275 CONFERENCE TABLE W/10 CHAIRS
9. MICROCOMPUTER DESK W/CONSOLE
10. DRAWING TABLE

NOTES

A. ALL DOORS 80 cm. WIDE EXCEPT AS NOTED



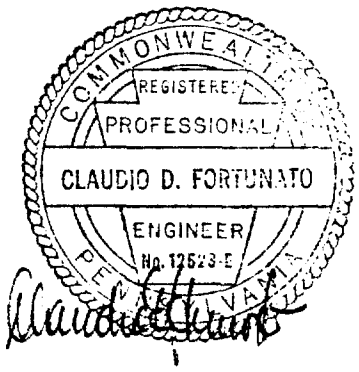
USAID / YAOUNDE			
HEALTH COSTRAINT TO RURAL PRODUCTION (698-0408.1)			
PROPOSED ALTERATIONS AND CONSTRUCTION			
BY (N)	G.E.O.	DEC. 23, 1982	SK-02

I-6

5. 611(a)(1) Determination

I have examined the description of the project and after surveying the existing facilities, as shown in drawing SK-01, I have prepared this Annex F which describes the construction program with drawings SK-01 and SK-02, cost estimate, and the implementation plan.

Through site observations and studies relative to the above activities as presented in this annex, I determine that the requirements of Section 611(a)(1) of the Foreign Assistance Act (FAA, 1961) for the renovation and construction components of the project have been met.



C.D. Fortunato, P.E.
GEO/USAID/Yaounde

ANNEX G

LABORATORY EQUIPMENT LIST

Laboratory equipment required by central laboratory and field teams.

Item[1/]	Number	1979 Unit Cost	Total
Microscopes, dissecting with lights	10 ea.	$ 800	$ 8,000
Microscopes, compound binocular	12 ea.	2,000	24,000
Balance, digital (Mettler or equivalent)	1 ea.	2,400	2,400
Balance, top loading electrical	1 ea.	2,000	2,000
Balance, double beam	4 ea.	80	320
Spectrophotometer (spectronic 20 or equivalent)	1 ea.	1,200	1,200
Centrifuge, size 2, 12 cup and attachments	1 ea.	3,400	3,400
Centrifuge, table top, complete	6 ea.	350	2,100
Incubator, bacteriological	1 ea.	2,400	2,400
Incubator, biochem. oxy. demand	1 ea.	3,000	3,000
Water Bath	3 ea.	1,000	3,000
Oven, hot air, large	1 ea.	1,200	1,200
Oven, paraffin embedding	1 ea.	400	400
Generators, electric, gasoline, 3,000 watts	6 ea.	2,000	12,000
Still for distilled water, electrical	1 ea.	4,000	4,000
Deionizer	1 ea.	300	300
Meter, pH	1 ea.	800	800
Comparator, chlorine	1 ea.	300	300
Comparator, color	1 ea.	300	300
Comparator, pH	1 ea.	300	300
Kit, water test, field	5 ea.	600	3,000
Sterilizer, auto clave, electric	1 ea.	2,500	2,500
Refrigerators, 4-6 degrees C., upright, single door	7 ea.	900	6,300
Freezer (-70 degrees C) Revco or equivalent	1 ea.	3,000	3,000
Racks and cages, small animal 30 cages/rack	6 racks	500	3,000
Aquariums, glass, 20 gallon (without metal fittings)	200 ea.	15	3,000
Diagnostic Equipment			70,000
Microcomputer 16K bytes			12,000
Field Investigation Kits for Epidemiological Surveys			30,000
	Subtotal		$ 204,220
Transportation and Packing 28%)			57,180
Estimated Price Increase since 1979			68,600
	Total		$ 330,000

1/ All electrical items 220V.

MAR 18 1980

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR, BUREAU FOR AFRICA

FROM: AFR/RA, E. G. Ruoff, Acting Director by E. Gerald Ruoff

Problem: Approval of the Initial Environmental Examination (IEE) for the Health Constraints for Rural Production Project 698-0408.

Discussion: The subject project is presently in the final stage of development. A team of experts in the field of endemic diseases and other disciplines recently completed a draft project paper to develop an environmentally sound, effective and economical strategy for operational research in the control of the three forms of endemic schistosomiasis that affect the rural and urban populations of Africa.

A final draft to be cleared by the GURC Government of The Republic of the Cameroons is being prepared by the design officer in the Cameroons. The subject IEE will become an attachment to the project paper. It has been reviewed and approved by the Director, USAID/Cameroon, who requested that in order to expedite it that I sign his concurrence for him.

Recommendation: That you sign the attached IEE which recommends a negative determination.

Clearance:
AFR/DR:BBoyd (draft)
AFR/CA:JWedberg
DS/AGR:FWhitmore (draft)
GC/AFR:EADragon (draft)

JBC

AFR/RA:JBCarson:rg:12/3/79:X22928

80

Threshold Decision Based on Initial Environmental Examination

Project Location: Regional/Cameroon

Project Title: Health Constraints to Rural Production

Funding, Life of Project: $7,796,300

IEE Prepared by: Dr. Kazuyoshi Kawata, Ph.D.
Acting Director, Division of Environmental Health Engineering, School of Hygiene and Public Health, The Johns Hopkins University

Environmental Action Recommended: Negative Determination

Concurrence: _____
James E. Williams, Director
USAID/Cameroon

Bureau for Africa Decision:

Approved: _____

Disapproved: _____

Date: _____

Initial Environmental Examination

Narrative Discussion

Project Location: Regional/Cameroon

Project Title: Health Constraints to Rural Production 698-0408

Project Funding/Life of Project: FY 1982-88 - $7,796,300

IEE Prepared by: Dr. Kazuyoshi Kawata, Ph.D.
Acting Director, Division of Environmental Health Engineering, School of Hygiene and Public Health, The Johns Hopkins University

Environmental Action Recommended: Negative Determination

Project Description:

The project is designed to develop an environmentally sound, effective and economical strategy for the control of the three forms of endemic schistosomiasis that affect the rural and urban populations in Africa. This will be accomplished through the development of a laboratory facility located in Yaounde, Cameroon, which will serve the West Africa Region. The laboratory facility will have the capability of servicing the laboratory analysis and personnel training needs of those countries in West Africa interested in undertaking investigation and control activities in schistosomiasis.

The project will provide:

a. funding for the construction and equipping of a central laboratory,

b. training for the laboratory staff, and

c. training and supplies for field investigation teams so that the biological and social factors that affect the transmission and development of schistosomiasis in the region can be better understood. This will be

accomplished through a series of well designed operational research studies to be conducted in the field and in the laboratory by project personnel. The studies will include clinical surveys of infected populations, in-depth investigations of the dynamics of snail population growth, laboratory and field studies of biological methods for control of transmission and investigations of the factors that promote the conversion of infection into serious disease, and cost factors of the various approaches.

The results of the projects activities will be made known to personnel in health organizations in the region through the publication and distribution of a semi-annual newsletter. The primary beneficiaries of the project will be the professional and support staff members of health organizations who will be trained by the project or receive the results of its investigating in the newsletter. The secondary beneficiaries will be the African rural and urban poor of the region who will benefit from the strategies developed by the project to control schistosomiasis.

Environmental Setting:

Identification and Evaluation of Environmental Impact:

A. Land Use: The project will construct a laboratory building and research facility to be located at Yaounde. There will be little environmental impact on the land use by the construction of these facilities.

B. Water Quality: The pisciculture station of the Ministry of Agriculture is located at Melen. The existing ponds are fed from surface runoff into which community wastewater finds its way. The ponds are, therefore, eutrophic and provide cash crop of fish. The central laboratory will have, in addition to a building for laboratories, offices and ancillary

facilities, its own fish ponds for molluscicide testing. The location of these test ponds are extremely important in their relationship to the existing fish culture ponds. There will be snails in the ponds and various molluscicides will be tested. Special attention to the security and the effluent of the ponds is necessary. With proper provisions and frequent monitoring the environmental impact can be held minimally. The central laboratory will also have domestic and laboratory wastes. There are no sewers in the immediate locality so that septic tank and laboratory waste holding tank will be required. If these are properly designed and serviced, they should have little environmental impact on water quality.

The effluent of the test ponds should preferably be discharged downstreat of the existing fish culture ponds. Its location, therefore, must take this into consideration. They should be ample in total volume (assuming several ponds with provisions to operate them in series and in parallel) to minimize the concentration of molluscicide leaving the last pond. The effluent should be monitored and controlled as necessary. The test ponds should be fenced. Wastewater from the laboratory, both domestic and laboratory, should be collected in properly designed receiving tanks (septic tank and holding tank) and finally disposed safely. The disposal of laboratory wastes may require the services of a commercial scavenging firm.

C. Atmospheric Pollution : The project will have no impact on air pollution.

D. Natural Resources: The project will have no impact on natural resources.

E. Cultural and

F. Socio-economic: There is no expected socio-cultural or economic impact during the life of the project.

G. Health: There are no expected health impacts during the life of of the project.

H. General and

I. Other Possible Impacts: There are no other impacts expected from this project.

85

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas 1/	Impact Identification and Evaluation 2/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
5. Other factors	
_____	N
_____	_____
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	L
3. Ecological balance	N
4. Other factors	
_____	N
_____	N

1/ See Explanatory Notes for this form.

2/ Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

86

IMPACT IDENTIFICATION AND EVALUATION FORM 2

C. ATMOSPHERIC

1. Air Additives ---------- N
2. Air pollution ---------- N
3. Noise pollution ---------- N
4. Other factors

_____ N

_____ N

D. NATURAL RESOURCES

1. Diversion, altered use of water ---------- L
2. Irreversible, inefficient commitments ---------- N
3. Other factors

_____ N

_____ _____

E. CULTURAL

1. Altering physical symbols ---------- N
2. Dilution of cultural traditions ---------- N
3. Other factors

_____ N

_____ _____

F. SOCIOECONOMIC

1. Changes in economic/employment patterns ---------- N
2. Changes in population ---------- N
3. Changes in cultural patterns ---------- N
4. Other factors

_____ N

_____ _____

IMPACT IDENTIFICATION AND EVALUATION FORM 3

G. HEALTH

1. Changing a natural environment ---------- N

2. Eliminating an ecosystem element ---------- N

3. Other factors

_____ N

_____ _____

H. GENERAL

1. International impacts ---------- N

2. Controversial impacts ---------- N

3. Larger program impacts ---------- N

4. Other factors

_____ N

_____ _____

1. OTHER POSSIBLE IMPACTS (not listed above)

_____ N

_____ _____

_____

ANNEX I

PROCUREMENT PLAN

As indicated in the financial plan, USAID will contribute the following vehicles, commodities and equipment:

	$
Four (4) U.S. manufactured 4-wheel drive vehicles	70,000
Miscellaneous Laboratory Equipment and Field Investigation Kits (See Annex G for detailed listing)	330,000
Household furnishings and appliances for Technical Assistance Team Members (Four complete sets to be provided)	100,000
Miscellaneous office equipment, furniture and supplies.	50,000
Total:	$ 550,000

I. Responsibilities

Project procurement will be accomplished in several ways, depending upon the commodities to be procured. USAID/Yaounde will act on behalf of the GURC for procurement of vehicles, spare parts, household furnishings and appliances for the Technical Assistance team. USAID/Yaounde will assist DGRST to obtain the services of a professional Procurement Services Agent (PSA) for the procurement of laboratory equipment, and field investigation kits. DGRST will act on behalf of the GURC to procure office equipment and supplies and also imported shelf items. USAID/Yaounde will prepare and transmit the PIO/T for Technical Services to AID/W.

II. Shelf Items

Imported shelf items having their origin in the United States, Code 000, can be purchased without restrictions. Shelf items having their origin in Geographic Code 941 countries are eligible for local cost financing in unlimited quantities, save for the limit on local procurement funding. Shelf items having their origin in any country included in Code 899 but not in Code 941 are eligible if the price of one unit does not exceed $5,000. For goods sold by units of quantity, e.g. tons, barrels, etc., the unit to which the local currency equivalent of $5,000 is applied is that which is customarily used in quoting prices. The total amount of imported shelf items purchases from countries included in Code 899 but not in Code 941 may not exceed $25,000 or 10% of the total local costs financed by AID for the project, whichever is higher, in no case will the total amount of such purchases exceed $25,000 without first obtaining a specific geographic source waiver. Procurement in excess of the limits will be authorized only as source waivers in accordance with the provisions and limitations of Africa Delegation of Authority No. 140,

Revised, and any redelegation thereunder. Imported shelf items produced in or imported from countries not included in Geographic Code 899 are ineligible for AID financing. Procurement of imported shelf items shall confirm to good commercial practices, shall be at reasonable prices and shall not be in a manner which conflicts with local laws and practices.

III. Source/Origin

The source of all commodities financed under this project will be the United States, Code 000, except for those items to be procured locally.

IV. Delivery and In-Country Transport

All imported commodities will be shipped CIF Douala, port of entry in Cameroon. AID shipping requirements will be observed. In-country transportation from Douala to the project sites will be the responsibility of the GURC and will be paid by DGRST.

V. Customs Clearance

It is the responsibility of DGRST to initiate documentation required for customs exoneration prior to the arrival of goods in Douala, and to ensure that such documentation is made available to the freight forwarder to permit goods to be removed from Douala promptly upon arrival. Project funds may not be used for storage fees and fines connected with delays in clearing the commodities through customs.

VI. Condition of Goods upon Arrival

It is the responsibility of DGRST to inspect goods upon arrival and to report to the USAID Project Officer as soon as possible thereafter any shortages or damages so that a viable insurance claim can be initiated.

VII. Procurement Schedule

Target Dates	Action(s) to be taken
Day 1	Project Agreement signed (USAID & GURC)
+ 30 days	Designate and appoint Authorized Agents to do the procurement of U.S. and non-U.S. manufactured commodities (USAID/HNP and SMD) PIO/T for technical services prepared, signed and transmitted to AID/W. (USAID/HNP and PRM)
+ 45 days	PIO/Cs prepared (USAID/SMD)
+ 60 days	Advertising for U.S. source equipment (Authorized Agent). Procurement of non-U.S. source equipment initiated (USAID/SMD and DGRST)

90

+ 105 days	Bids for U.S. source commodities received and evaluated (Authorized Agent)
+ 110-115 days	Award(s) made and Purchase Orders issued for U.S. source commodities. (Authorized Agent)
+ 120 days	Award made to an Educational Institution for technical services (AID/W).
+ 180 days	Administrative Officer of technical services team arrives in Cameroon.
+ 240-270 days	Technical services team arrives in Cameroon.
+ 300-360 days	Arrival of all U.S. source commodities in Douala. Transport to project site (DGRST).

VIII. Request for proprietary procurement of 4 each 4-wheel drive utility vehicles.

A)	Cooperating Country	: Cameroon
B)	Authorizing Document	: Project Authorization
C)	Project	: Health Constraints to Rural Production-Cameroon (698-0408.1)
D)	Nature of Funding	: Grant
E)	Description of Goods	: Four AMC type 4 wheel drive utility vehicles
F)	Approximate Value	: $70,000
G)	Probable Source	: U.S.A.
H)	Probable Origin	: U.S.A.

Discussion: The purpose of this project is to develop a regional schistosomiasis research facility in Yaounde, Cameroon, capable of (a) mapping the prevalence, distribution and intensity of schistosomiasis infection and disease; (b) developing effective schistosomiasis control activities; (c) training Africans in laboratory and field research methodology; and (d) serving as a major sub-saharan regional center for schistosomiasis research. A Technical Assistance team of 4 persons will come to Cameroon and will need vehicles immediately upon arrival.

91

Justification: AID Handbook II, Chapter 3, Section 2.4.2.b permits you to waive the rule regarding nonrestrictive specifications of equipment and materials and thereby allow proprietary procurement when substantial benefits such as economies in maintenance of spare parts inventories, better repair facilities, or greater familarity by operating personnel can be achieved through standardizing on a particular brand. The only U.S. manufactured vehicles which can be supported in the project area are AMC vehicles. Renault-Cameroon has fully equipped service facilities for AMC vehicles in Yaounde, Douala, Nkongsamba. Renault-Cameroon has trained mechanics and is able to provide spare parts and maintenance support.

Cameroon Trading Distribution (CTD), located in Douala, is the GM dealer in Cameroon. In the past it has promised vehicle support but Mission experiences during the past 18 months were mostly negative and it was decided not to deal with CTD because it can not provide the vehicles, spare parts and maintenance support. There are no other U.S. manufacturing vehicle dealers in Cameroon. The Mission is in the process of standardizing on AMC type vehicles in Cameroon.

Conclusion: The waiver authorizing procurement of 4 AMC type 4 wheel drive utility vehicles is justified because AMC types are the only vehicles of the type needed with available in-country maintenance and spare parts.

Recommendation: For the above reasons it is recommended that a proprietary procurement waiver be approved to authorize procurement of 4 AMC 4 wheel drive utility vehicles for subject project.

ANNEX J

BIBLIOGRAPHY

Barbaross, F.S. and Voss, H. — "Evolution of the Clinical Gradient of Schistosoma Marsoni Infection in a small town in North-Eastern Brazil" Bulletin of the World Health Organization (March, 1976) 40:966-969.

Collins, K.J., Brotherhood, R.J., Davies, C.T.M., Dore, Caroline, Hackett, A.J., Imms, F.J. Amin, M.A., Musgrove, J., Weiner, J.S., Karim, E.L., Ismaic, M., Omer, H.M., Sukkar, M.Y. — "Physiological performance and work capacity of Sudanese cane cutters with schistosoma Mansoni infections", American Journal of Tropical Medicine and Hygiene (May, 1976) 25:410-421.

Farooq, M., — "A possible approach to the evaluation of the economic burden imposed on a community by schistosomiasis," Annals of Tropical Medicine and Parasitology (September, 1963) 57:325-331.

Farooq, M., — "Medical and economic importance of schistosomiasis" Journal of Tropical Medicine and Hygiene (May, 1964) 67:389-404.

Fenwick, A., and Jorgensen, T.A. — "The effect of a control programme against schistosoma Mansoni on the prevalence and intensity of infection on an irrigated sugar estate in Northern Tanzania," Bulletin of the World Health Organization (1972) 47:579-586 (a).

Fenwick, A., — "The costs and a cost-benefit analysis of an S. Mansoni control programme on an irrigated sugar estate in Northern Tanzania", Bulletin of the World Health Organization (1972) 47:573-578 (c).

Foster, R. — "Schistosomiasis on an irrigated estate in East Africa I. The Background" Journal of Tropical Medicine and Hygiene (June, 1967) 70:133-440 (a).

Foster, R., — "Schistosomiasis on an irrigated estate in East Africa II. Epidemiology". Journal of Tropical Medicine and Hygiene (July, 1967) 70:159-168 (b).

Kamarck, Andrew M. "Review of Wesbrod et al., Disease and economic development: The impact of parasitic diseases in St. Lucia", Journal of Economic Literature (March, 1975). 13:107-109.

Weisbrod, B.A., Kelley, A.K. Anoreawo, R. and Baldwin, R. Disease and economic development: Health and productivity in St. Lucia. Madison, Wisc., University of Wisconsin Press, 1974.

ANNEX K

COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY ELIGIBLITY

1. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotic 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 U.S. unlawfully?	No
2. FAA Sec. 620(c). If assistance is to a 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) the debt is not denied or contested by such government?	No

3.	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
4.	FAA Sec. 532(c), 620(a), 620(f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq, or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver?	No
5.	ISDCA of 1981 Secs. 724, 724, and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727 and 730 of the ISDCA of 1981.	N/A
6.	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

7.	FAA Sec. 620(l). Has the country failed to enter into an agreement with OPIC?	No
8.	FAA Sec. 620(o): Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters?	No
	(b) If so, has any deduction required by the Fishermen's Protective Act been made?	
9.	FAA Sec. 620(q); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriate funds?	
10.	FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? (Reference may be made to the annual "Taking into Consideration" memo:	Yes, taken into consideration by the administrator at time of approval of Agency OYB.

	"Yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)	
11.	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
12.	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? (Reference may be made to the Taking into Consideration memo.)	The GURC's payment are not in arrears.
13.	FAA Sec. 620A: FY 1982 Appropriation Act Sec. 520. Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? Has the country aided or abetted, by granting	No

	sanctuary from prosecution to, any individual or group which has committed a war crime?	
14.	FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA?	No
15.	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 transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.)	No
16.	ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of Sept. 25 and 28, 1981, and failed	Cameroon did reserve on various aspects of the communique which were detrimental to US interests. This was taken into account by the Administrator at time of approval of Agency OYB.

to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)	
17. ISDCA of 1981 Sec. 721. See special requirements for assistance to Haiti.	N/A
B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY	
1. Development Assistance Country Criteria.	
a. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy?	No
2. Economic Support Fund Country Criteria	
a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest?	ADS No

100

b. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?	N/A
c. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?	N/A

PROJECT CHECKLIST AND STANDARD ITEMS CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b)

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;	Through Congressional Notification - FY 1983
(b) is assistance within (Operational Year Budget) country of international organization allocation reported to Congress (or not more than $1 million over that figure).	N.A.

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	Yes.
(b) a reasonably firm estimate of the cost to the U,S, of the assistance?	Yes.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is hasis 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): FY 1982 App. Sec. 501.

If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1978?	Yes.

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 and Regional Assistant Adminstrator taken into consideration the country's capability effectively to maintain and utilize the project?	N.A.
6. FAA Sec. 209. 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.	Yes. The project has been conceived and designed as a regional project.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to:	
(a) increase the flow in international trade;	N.A.
(b) foster private initiative and competition;	N.A.
(c) encourage development and use of cooperatives, credit unions, and savings and loan associations;	N.A.
(d) discourage monopolistic practices.	N.A.
(e) improve technical efficiency of industry, agriculture and commerce; and	N.A.
(f) strengthen free labor unions.	N.A.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	All services and commodities supplied by USAID under this project (except for those items procured locally) will be United States origin.

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	The GURC is making a substantial local currency contribution to this project for local currency costs and operating costs for facilities and vehicles. It is expected that this will amount to of the total LOP costs. The U.S. Government does not own any local currencies in Cameroon.
10.	FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.
11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12.	FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?	N.A.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 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 and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions;	The project is designed to develop environmentally sound, effective and economical strategy for the control of the three forms of endemic schistosomiasis that affect the rural and urban populations of Africa.
(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;	N.A.
(c) support the self-help efforts of developing countries;	(c) The participant training in this project will further the capability of Cameroon to conduct further research into endemic disease problems.
(d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and	(d) Women will be given equal access to opportunity to participate in both degree and on-the-job training.
(d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and	
(e) utilize and encourage regional cooperation by developing countries?	(e) The Schistosomiasis Research Center is designed to be available to researchers in schistosomiasis throughout the region.

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

(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;

(2) (104) for population planning under sec. 104(b) or health under sec. 104(c). if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

The project is designed as a research project which has as an ultimate goal to improve the quality of life of men, women and children who suffer from one of the most important agriculturally related diseases of the region.

(3) (105) for education, public administration, or human resources development; if so, extent to which activity strengthens non-formal 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;

(4) (106) for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development organizations;

(ii) to help alleviate energy problems;

(iii) research into, and evaluation of, economic development processes and techniques;

(iv) reconstruction after natural or manmade disaster;

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(vi) for programs of urban development, especially small labor-intensive enterprise, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. (107) is appropriate effort placed on use of appropriate technology?	
d. FAA Sec. 110(a). Will the recipient country 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)?	No. This is a regional project, therefore FAA Sec. 110(a) is not applicable.
e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed?	No.
f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capabilities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental and political processes essential to self-government.	The project has been developed in close collaboration with DGRST officials and will utilize Cameroonian personnel to administer and implement the project's activities.
g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase or productive capacities and self-sustaining economic growth?	Yes.
2. Development Assistance Project Criteria (Loans Only)	
a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the laon, including reasonableness of repayment prospects.	N.A.
b. 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 provent 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 Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? N.A.

b. FAA Sec. 533. will assistance under this chapter be used for military, or paramilitary activities? No.

STANDARD ITEM CHECKLIST

Has the Standard Item Checklist been reviewed for this Project?

Yes X No

DGRST/IMPM Research Programs Listed in Order of Priority

1983 - 1984

1. Schistosomiasis
2. Onchocerciasis
3. Malaria
4. Food and the nutritional status of Cameroon Populations
5. Infectious Diseases
6. Medicinal Plants
7. Traditional Medicine
8. Tumeral Diseases
9. Acquired and Inherited Physiological (Functional) Diseases.

GENERAL DELEGATION FOR
SCIENTIFIC AND TECHNICAL RESEARCH

INSTITUTE OF MEDICAL RESEARCH
AND STUDY OF MEDICINAL PLANTS

ADMINISTRATIVE AND FINANCIAL DEPT

UNITED REPUBLIC OF CAMEROON
PEACE - WORK - FATHERLAND

LISTING OF RESEARCHERS AND TECHNICIANS WORKING AT I.M.P.M.

A) CENTER FOR MEDICAL RESEARCH

N° d'ordre	NOMS ET PRENOMS	DIPLOME	GRADE	CLASSE	ECHELON
1	Prof. ABONDO Antoine	Agrégé d'Anatomie Pathologie	Directeur de Recherche		
2	Prof. TSALA MBALLA Pierre	Agrégé en physiologie	Maître de Recherche	4è	
3	Prof. JATO JOHNSON G.	Ph.D. en pharmacie	Maître de conférence		
4	Dr. NJIFUTIE NJIKAM	Ph.D. en physiologie animale	Maître de recherche	4è.	
5	Mme MANGUELLE DICOUM	Doctorat 3è cycle en physiologie	Chargé de recherche		
6	Dr. TEBERE NGANGA Simon	Docteur en médecine	Attaché de recherche		I-2
7	Dr. FOUMBI Joseph	Docteur en médecine	"		
8	Dr. MELAMAN SEGO Frédéric	Docteur en médecine	"		
9	Dr. ESSAME OYONO Jean	Docteur en médecine	"		
10	Dr. LOGMO Bienvenu	Docteur d'Etat en médecine(Anthropologue certifié)	Chargé de recherche		
11	Mme MBA MEZOUI Anne	Bachelor of Sciences	Attaché de recherche		
12	Mr. ASONGANYI Michael	Ph.D. en Biochimie	Chargé de recherche		
13	Mr. TITANJI P.K. Vincent	Ph.D. de Biochimie	"		
14	Mme Rose GANA FAMBAN LEKE	Ph.D. en microbiologie et Immunologie	"		
15	Dr. NIAT Georges	Docteur d'Etat en médecine	"		
16	Dr. AMBASSA Paul	Docteur en médecine	Attaché de recherche		
17	Dr. MOYOU SOMO Roger	Docteur en médecine et Doctorat ès Sciences	Maître de recherche		
18	Dr. KOUAMOU JONAS	Doctorat en Pharmacie	Attaché de recherche		

.../...

110

19	Dr.	DINGA SAMA John	M.S. Chimical et Biomedical	Attaché de recherche
20	Dr.	BEYONO NDJEMBA	Docteur d'Etat en médecine	Attaché de recherche
21	Mr.	ENYONG PETER AYUK	D.E.A. en entomologie médicale	"
22		MONGOUE Marie	Infirmière diplomée d'Etat	Technicienne
23		MESSI Constantin	Technicien Adjoint de laboratoire	Technicien Adjoint
24		NOAH ZINGUI Jacques	Technicien supérieur paramédical	Technicien supérieur
25		NEONSI Louis	Technicien Adjoint de laboratoire	Technicien Adjoint
26		MENDOUGA Maurice	- " -	"
27		NGA NSENE Barthélémy	- " -	"
28	Mme	MOUMIE Elisabeth	- " -	"
29	Mlle	NGO MBOCK Julienne	- " -	"
30	Mlle	ATANGANA Alphonsine	- " -	"

GENERAL DELEGATION FOR
SCIENTIFIC AND TECHNICAL RESEARCH

INSTITUTE OF MEDICAL RESEARCH
AND STUDY OF MEDICINAL PLANTS

ADMINISTRATIVE AND FINANCIAL DEPT

UNITED REPUBLIC OF CAMEROON
PEACE - WORK - FATHERLAND

LISTING OF RESEARCHERS AND TECHNICIANS WORKING AT I.M.P.M.

B) CENTER FOR NUTRITION

N° d'ordre	NOMS ET PRENOMS	DIPLOME	GRADE
1	Dr. GLADYS E. Martin	Docteur en médecine + M.P.H. , D.A.B.P.	Maître de recherche
2	Dr. MBA MEZOUI Christophe	Ph.D. en nutrition et aliments	Chargé de recherche
3	Dr. OTTO PONDI Louis	Docteur en médecine + C.E.S. de Pédiatrie et Puériculture	Chargé de recherche
4	Dr. NOUMBI LOuis	Doctorat en Nutrition	Chargé de recherche
5	Mlle RIKONG ADIE Honorine	Doctorat 3e cycle en Biochimie	Chargé de recherche
6	Mlle NGO SOM Julienne	Ph.D. en Nutrition et aliments	"
7	Mr MBOME LAPE Israël	Doctorat 3e cycle en Biochimie	"
8	Mr NGUIMATSIA François	Doctorat en pharmacie	Attaché de recherche
9	Mme GARBA Marie Thérèse	D.E.S. en Biochimie	"
10	Mlle BELL Alice	Doctorat 3e cycle en Nutrition	"
11	Mme KOMBOU Marie	Master of Science in Nutrition	"
12	Mr AGBOR EGBE TOM	M.S.C. (Food Science)	"
13	Mme NUSONGE Patience	Technicienne de laboratoire	Technicienne
14	OTELE MBEDE Jean	- " -	"
15	Mme HAGBE Brigitte	- " -	"
16	Mlle TABI Bernadette	Technicienne Adjoint de laboratoire	Technicienne Adjoint
17	Mlle ABENG Justine	- " -	"

.../...

18	Mlle MBOGUE Elise	Technicienne Adjoint de laboratoire	Technicienne Adjoint
19	ABONA MBIDE Marcellin	- " -	"
20	ACHEGUI Nestor	- " -	
21	MESSINA Vincent	- " -	
22	LACTHIH Valentin	- " -	

GENERAL DELEGATION FOR
SCIENTIFIC AND TECHNICAL RESEARCH

INSTITUTE OF MEDICAL RESEARCH
AND STUDY OF MEDICINAL PLANTS

ADMINISTRATIVE AND FINANCIAL DEPT

UNITED REPUBLIC OF CAMEROON
PEACE - WORK - FATHERLAND

LISTING OF RESEARCHERS AND TECHNICIANS WORKING AT I.M.P.M.

C) CENTER FOR STUDY OF MEDICINAL PLANTS

d'ordre	NOMS ET PRENOMS	DIPLOME	GRADE
1	Dr. BOUM Bernard	Doctorat d'Etat ès Sciences Pharmaceutiques	Chargé de recherche
2	Dr. NSO MBI Christinna	Doctorat d'Etat ès Sciences Pharmaceutiques	Chargé de recherche
3	Mr NBOONE Martin	D.E.S. en Chimie	Attaché de recherche
4	Mr. MBAFOR TANYI Joseph	Docteur 3e cycle en Chimie	Attaché de recherche
5	Mme NYEMBA Marie	Master of Science	"
6	Mr. MBENKUM FONKI Tobias	Botaniste	"
7	EBOUTOU M. Louise	Pharmacien	"
8	BIYITI L. Françoise	Pharmacien	"
9	Dr. MBANGA Paul	Doctorat d'Etat es Sciences Pharmaceutiques	Chargé de recherche
10	Mlle RAFIDISON Patricia	Pharmacien	Attaché de recherche
11	Mr DJOKO Ernest	"	"
12	ATIBALENTJA NDEME	Ingénieur Agronome	Attaché de recherche
13	POTCHANYOU SILE Prochore	Technicien Adjoint de laboratoire	

D) CENTER FOR THE PRODUCTION OF VACCINES AND SERUMS

1	Mme TANTCHOU Justine	Ph.D. en Biochimie	Chargé de recherche
2	Dr. BODO Jean Marie	Doctorat 3è cycle	"
3	Mr BIAKOP LEHJOU Charles	D.E.S. en Biochimie microbiologiste	Attaché de recherche
4	Mr MBIDA André Dieudonné	Licence en Biochimie	Technicien
5	Mr MANANG Michel	Technicien Supérieur paramédical	