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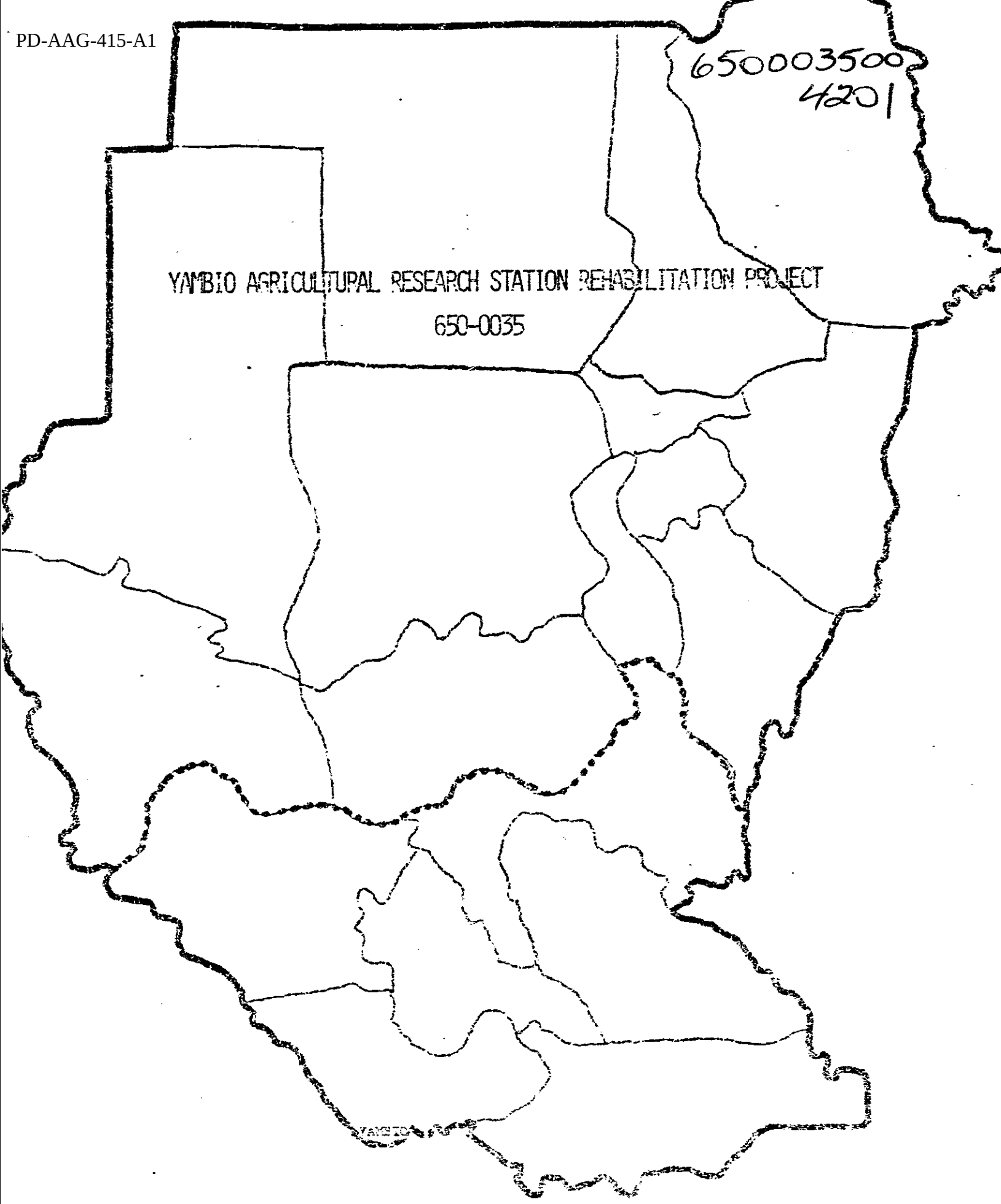

BEST AVAILABLE COPY

DATE: June 20, 1979

ACTION MEMORANDUM FOR THE DIRECTOR

Problem: To approve an unsolicited initial project proposal[1/] presented by International Voluntary Services (IVS) for the Yambio Agricultural Research Station Rehabilitation Project (No. 650-0035).

Discussion: In accordance with authority delegated to you to approve and authorize projects up to $500,000, you are requested to accept and approve the initial project proposal submitted by IVS. The initial proposal will be further developed into a final project proposal for your approval and authorization as an Operational Program Grant (OPG).

The Yambio Agricultural Research Station Rehabilitation Project delineates a three-year plan to help reestablish the physical plant and research activities at the Yambio Agricultural Research Station in Western Equatoria Province of southern Sudan. The project calls for technical assistance to renovate the research station physical plant and expand agronomic research trials, and to provide farm and laboratory equipment.

The Southern Regional Ministry of Agriculture requested IVS to provide assistance and that request has the full support of the national Ministry of Agriculture and the Agricultural Research Corporation. The project is consistent with the guidelines set forth in USAID's Country Development Strategy Statement which emphasizes assistance to the South and agricultural development.

Estimated life-of-project cost totals $985,000, of which the A.I.D. contribution would be $500,000.

Recommendation: That you approve the initial unsolicited proposal thus authorizing its further development into a project proposal for future A.I.D. approval.

APPROVED O/Holtaway

DISAPPROVED _____

DATE 6-20-79

1/ Treated as a PID for internal USAID purposes

Program Office
USAID/Sudan
June 20, 1979

UNITED STATES POSTAL ADDRESS
AMERICAN EMBASSY- KHARTOUM (ID)
DEPARTMENT OF STATE
WASHINGTON: D. C. 20521

INTERNATIONAL POSTAL ADDRESS
OFFICE OF THE AID REPRESENTATIVE
AMERICAN EMBASSY
P. O. BOX 699
KHARTOUM - SUDAN

January 15, 1980

17 JAN 1980

Mr. Michael Bohn
Director for the Sudan
International Voluntary Services
Box 1926
Khartoum, Sudan

Dear Mr. Bohn:

SUBJECT: Yambio Agricultural Research Station Rehabilitation Project, Number 650-0035

I am pleased to advise you that pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development hereby amends the Grant made to International Voluntary Services (hereinafter referred to as "I.V.S." or "Grantee") on August 30, 1979 to provide an additional sum of $566,000. These funds, which bring the total made available for the project to $1,066,000, provide support for the program described in the attachment to the original Grant of August 30, 1979 entitled "Program Description".

This Grant Amendment is effective and obligation is made as of the date of this letter and shall apply to commitments made by the Grantee in furtherance of program objectives during the period October 1, 1979 through September 9, 1981.

This Grant is made to I.V.S. on condition that the funds will be administered in accordance with the terms and conditions set forth in Attachment A entitled "Program Description" and Attachment B entitled "Standard Provisions" of the original Grant of August 30, 1979, to which your organization has agreed.

Please sign the original and seven (7) copies of this letter to acknowledge your acceptance of the conditions under which these funds have been granted.

If I may be of further assistance to you in this matter, please let me know.

Sincerely,

Gordon K. Pierson
USAID DIRECTOR

ACCEPTED:

International Voluntary Services

BY: [illegible]

TITLE: SUDAN COUNTRY DIRECTOR

DATE: 28-1-1980

FISCAL DATA

Appropriation: 72-1101021.3

Allotment: 043-50-650-00-69-01

Project No.: 650-0035

Grant Obligation to Date: $1,066,000

Anticipated Total Amount of Grant $1,066,000

AGENCY FOR INTERNATIONAL DEVELOPMENT

UNITED STATES POSTAL ADDRESS
AMERICAN EMBASSY KHARTOUM (10)
DEPARTMENT OF STATE
WASHINGTON D. C. 20521

INTERNATIONAL POSTAL ADDRESS
OFFICE OF THE AID REPRESENTATIVE
AMERICAN EMBASSY
P. O. BOX 699
KHARTOUM - SUDAN

August 30, 1979

Mr. Michael Bohn
IVS Director for the Sudan
International Voluntary Services,
Box 1926,
Khartoum, Sudan

Dear Mr. Bohn:

Subject: Yambio Agricultural Research
Station Rehabilitation Project
(650-0035)

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "A.I.D." or "Grantor") hereby grants to International Voluntary Services (hereinafter referred to as "I.V.S." or "Grantee") the sum of $500,000 to provide support for a program in Sudan as more fully described in the attachment to this Grant entitled "Program Description". An estimated $566,000 may be provided in future increments if funds are available, and the parties agree to continue with the Grant Activity.

This Grant is effective and obligation is made as of the date of this letter and shall apply to commitments made by the Grantee in furtherance of program objectives during the period September 10, 1979 through September 9, 1981.

This Grant is made to I.V.S. on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment A entitled "Program Description", and Attachment B entitled "Standard Provisions", which have been agreed to by your organization.

Please sign the St tement of Assurance of Compliance, enclosed herein, and the original and seven (7) copies of this letter to acknowledge your acceptance of the conditions under which these funds have been granted.

Please return the Statement of Assurance of Compliance and the original and six (6) copies of the Grant to this office.

Sincerely yours,

"Orig

Embassy of the U.S. KHARTOUM

Janet L. Andres
U. S. Vice Consul

Gordon K. Pierson
Director, USAID

Mr. Michael Bohn

August 30, 1979

Attachments:

A. Program Description
B. Standard Provisions
C. Statement of Assurance of Compliance

Accepted:

International Voluntary Services

By:

Title: SUDAN COUNTRY DIRECTOR

Date: 10 TH. SEPTEMBER 1979

Fiscal Data

Appropriation: 72-1191021.3

Allotment: 943-54-650-00-69-91

Project No.: 650-0035

Grant Obligation to date: $ 500,000

Anticipated total amount of Grant: $ 1,066,000

Project Description

A. Purpose of the Grant.

The purpose of this Grant is to provide support to the Grantee's program at the Yambio Agricultural Research Station in the Southern Region of the Sudan. This program will assist the Agricultural Research Corporation to re-establish the Yambio Agricultural Research Station as an integral element of the agricultural research and development network in the Southern Sudan.

B. Background.

Yambio Agricultural Research Station occupies about 1,000 feddans (1 feddan = 1.04 acres) of land, 3 kilometers from the town of Yambio in Western Equatoria Province in the southern region of Sudan. The station has been non-functioning since 1964, when it was stripped of all its equipment and abandoned during the civil war. The station is under the purview of the Agricultural Research Corporation (ARC) headquarted at Wad Medani, near Khartoum.

Financial constraints, shortages of skilled scientists and staff, and distances involved have mitigated against reactivation of the facility up to the present time. Existing buildings have been maintained and a small number of plots have been kept up by a residual maintenance staff of 60. In order for applied research to resume and provide a key element in the development of small farmer productivity, reactivation of the research station is required.

C. Specific Objectives.

By the end of period funded by this Grant, it is anticipated that the following objectives will have been achieved at the Yambio Station:

1. renovation of all existing physical plant including laboratories, administration block, stores and workshops, seed processing sheds, senior staff housing, and junior staff housing to the extent permitted by budgetary consideration;

2. re-equipment of laboratory facilities;

3. provision of farm equipment and tools essential to conduct of agronomic field research;

4. training of research station personnel in related research station activities; and

5. Institution of all necessary preparations and backup for proposed an applied research program to be carried out by ARC in cash and food crops for the "greenbelt" area of Southern Sudan.

D. Project Implementation.

To achieve these objectives, the Grantee will implement the project in cooperation with the Agricultural Research Corporation, which bears operational responsibility for the Yambio Research Station excluding activities specified in this Grant, and the Southern Regional Ministry of Agriculture, and carry out the following.

1. Renovation of the Yambio Agricultural Research Station Physical Plant. The project will rehabilitate existing buildings, including: one four-bedroom house, 3 senior staff houses, a number of junior staff houses as permitted by the budget, 3 laboratories, workshops and storage buildings, and the administration block, in that order of priority. This work will entail renovation with no new construction. Electrical and water distribution systems will be installed to provide electricity and water to all buildings. Laboratory and meteorological station equipment will be procured and installed. The Grantee will provide requisite technical assistance, a civil or agricultural engineer, or a person with other appropriate qualifications or work experience to direct the work of this activity. Candidate will be approved by the ARC in consultation with the Southern Regional Ministry of Agriculture.

2. Reactivation of Crop Trials and related Research Activities. Requisite farm equipment and tools for land clearance and cultivation of crops will be procured by the Grantee. Crop Trials in cotton, tea, rice, kenaf, cereals, fruit and vegetable propagation on a minimum of two hundred feddans will be realized by ARC by the end of the project. Trials will be conducted in an applied manner to examine:

a. effects of stocking on yield and quality;

b. effects of sustained weeding, stocking, early dry season cultivation, blanket weeding between first rains and sowing, on soil moisture content, seed competition, yields and manpower requirements;

c. effects of simple soil and water conservation practices on run-off and crop yields; and

d. maintenance and, to the extent possible, building up of soil fertility by means of leguminous rotation crops, bush-fallow crops, soil cover crops, and use of manure, if possible, bulked up with crop residue to form compost.

Research activities will concentrate on farming practices within the reach and capacity of local farmers. Any new practices introduced should utilize available local materials only. The Grantee will provide the services of two agronomists, one to be the Farm Manager, working under the direction of the Yambio Agricultural Research Station Director, to implement the necessary preparations for this activity.

3. Training of Scientists and Laboratory Technicians. In addition to re-establishing the station and re-activating research activities, the project will have a major training component to accelerate localization of research station staff. The project will fund training courses of 3-6 months duration for three artisans at the Juba MTC. Upon completion of the courses, they will return to Yambio and receive additional on the job training under Yambio Agricultural Research Station senior scientists. Three research assistants will be sent to the International Institute for Tropical Agriculture (IITA) at Ibadan for 3-6 months courses on cereal, tuber, and root crop production. Two research officers with B.Sc. degrees will study for M.Sc. degrees; one will be enrolled at IITA in Green Legumes, and one at a University in the united States in Soil Science. Trainee research officers will be selected by the director of the Yambio Research Station in consultation with ARC, Wad Medani and the Regional Ministry of Agriculture and the concurrence of IVS Project manager.

The Grantee will provide all necessary logistical and administrative project management support from its in-country field staff. Overall management of the project will be the responsibility of the IVS Project Manager. Administrative and logistical support will be provided by the IVS Juba Projects Officer and other IVS personnel as appropriate. This support will include:

1. coordination and administration of external donor funding;

2. maintainance accounts and records;

3. execution of local and overseas purchase and supply;

4. execution of customs clearance and despatch of commodities to Yambio;

5. liaison with ARC and GOS officials as necessary;

6. preparation of evaluation and progress reports;

7. participation in future program development and planning; and

8. evaluation of the need, and preparation of submissions, for further funding.

IVS will provide the services of three technicians to implement this project.

A Support Services Manager, with a BSc in Civil Engineering, Agricultural Engineering or other appropriate qualifications or work experience will manage support services required by the project and senior scientists at the research station during the two year project implementation period. This individual will be the Project Manager and responsible to the Yambio Station Director. He will receive and store incoming materials and equipment, purchase local building materials, plan and supervise renovation of research station buildings, be responsible for installation of electrical and water distribution system, laboratory equipment, and workshops, and supervise the transport and procurement of fuel supplies. The candidate must have extensive practical experience in the construction trades at a relatively unsophisticated level, i.e., using hand labor as opposed to mechanization. The target date for the technician's arrival is November/December 1979.

The Grantee will procure the technical services of one Farm Manager to arrive in Yambio by January/February 1980. The individual will have a BSc in agronomy, with at least three-years experience in the practical implementation of agronomic trials, preferrably in tropical or semi-tropical areas.

He/she will supervise the layout of trial plots, planting, irrigation, fertilization, and cropping, and the recording of yield results, etc., as required by the senior scientific staff at the Yambio Research Station.

A third IVS technician, an Agronomist, will have a BSc in Agronomy, with at least two years practical experience in the implementation of agronomic trials, preferably in tropical or semi-tropical conditions. This individual will work under the Farm Manager's supervision and will assist in the layout of trial plots and other agronomic duties as required by the senior scientific staff at the research station. He/she will arrive at post by May/June 1980.

Responsibility for ordering, procuring, shipping and receiving non-indigenous services and commodities is the responsibility of IVS.

E. Reporting and Evaluations

Quarterly progress reports will be prepared by the Grantee and submitted to USAID/Sudan. The content of these reports and that for any other reports which U.S.A.I.D. may reasonably request, will be the subject of future discussion between USAID/Sudan and the Grantee and agreed to by them in writing.

The first comprehensive evaluation will be conducted approximately one year after the Support Services Manager arrives in Yambio. The precise timing of this and other evaluations as well as their content will be the subject of future discussions between USAID/Sudan and the Grantee and agreed to by them in writing. The initial comprehensive evaluation will be the responsibility of the IVS Country Director acting in consultation with the GOS and USAID/Sudan. The evaluation will be conducted on the project site and will generally follow the format of A.I.D.'s PES.

A final evaluation will be conducted at the end of the project. The responsibility for securing base line data required for on-going and end of project evaluations will rest with IVS Country Director for the Sudan. IVS/Washington will provide assistance to IVS/Sudan, as appropriate, for project evaluation purposes.

F. Budget

The following is illustrative of AID funding levels for the life of the project:

Cost Element	1979	1980	Total
Personnel	$ 20,000	$95,000	$115,000 **
Training	---	$83,000	$ 83,000
Equipment (Farm equipment, lab equipment, vehicles)	$367,000	$88,000	$455,000
Facilities reconstruction	$ 34,000	$81,000	$115,000
Fuel	$ 2,000	$28,000	$ 30,000
Shipping	$ 50,000	$25,000	$ 75,000
Travel	$ 5,000	$10,000	$ 15,000
Contingencies & Inflation	$ 22,000	$156,000	$178,000
Overhead	*	*	*
TOTAL	$500,000	$566,000	$1,066,000

* IVS will assume all other overhead costs and will not be reimbursed under the Grant.

** Includes cost of transportation and local overhead support.

The Grantee may not exceed the total amount of the Budget financed by A.I.D. The Grantee may transfer amounts between line items, except that prior approval will be required where the cumulative amount of transfers has the effect of increasing or decreasing a line item by more than 20 percent.

The sum of $500,000 was obligated by A.I.D. in FY 79, will be referred to as the limitation of funds hereunder, and will be governed by Standard Provision 9 of Attachment B - "Limitation of Funds" which is attached hereto and made a part hereof.

G. Special Provisions

1. Notwithstanding anything in this Grant Agreement and Attachments thereto to the contrary, the vehicles procured for the project may have their source and origin in countries included in A.I.D. Geographic Code 935.

2. Logistic support such as office space and equipment, housing and utilities, interpretter and secretarial services, and medical facilities will be provided by the GOS. The Grantee will provide all other logistic support, except that specifically allowed in this Grant Agreement, including transportation within Sudan, international transportation, and office equipment (in part financed by A.I.D.). The Grantee will arrange for the duty free entry into Sudan of all commodities and personal effects of its technicians.

3. Prior to the first disbursement under the Grant, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., written evidence that cooperating country and other donor support for the project will be forthcoming on a timely basis.

4. The following clauses of the attached Standard Provisions are not applicable to this Grant and are hereby deleted: 2, 6, 7, 8, 11, 12, 15, 17, 19, 20, 23, 24, 25, 26, 27.

5. Pursuant to Clause 35 of the Standard Provisions hereto, notices or other official communication may be sent to the principal officer of A.I.D. in Sudan.

6. Responsibility for the overall monitoring of the Grantee will rest with the A.I.D. Mission to Sudan.

H. Overhead Rates.

IVS will assume all overhead costs and these will not be reimbursed under the Grant.

I. Title to Property.

Title to all equipment, commodities, and vehicles procured under the Grant will vest in the Grantee.

ASSURANCE OF COMPLIANCE WITH THE AGENCY FOR
INTERNATIONAL DEVELOPMENT REGULATION UNDER TITLE VI
OF THE CIVIL RIGHTS ACT OF 1964

INTERNATIONAL VOLUNTARY SERVICES (hereinafter called the "Grantee")
(Name of Grantee)

HEREBY AGREES THAT it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352) and all requirements imposed by or pursuant to the Regulation of the Agency for International Development (22 CFR Part 209, 30 FR 317) issued pursuant to that title, to the end that, in accordance with Title VI of that Act and the Regulation, no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Grantee receives Federal financial assistance from the Agency; and HEREBY GIVES ASSURANCE THAT it will immediately take any measures necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the Grantee by the Agency, this assurance shall obligate the Grantee, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Grantee for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Grantee for the period during which the Federal financial assistance is extended to it by the Agency.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Grantee by the Agency, including installment payments after such date on account of applications for Federal financial assistance which were approved before such date. The Grantee recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Grantee, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Grantee.

International Voluntary Services
(Grantee)

BY (Signature): [signature]

TITLE Director

TYPED NAME Michael Bohn

DATE 10 TH SEPTEMBER 1979

New Material

Best Available Copy

INTERNATIONAL VOLUNTARY SERVICES INC.

PROJECT PROPOSAL

REHABILITATION OF YAMBIO AGRICULTURAL RESEARCH STATION

MAY 1979

C O N T E N T S

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A. PROJECT PURPOSE AND DESCRIPTION

(see logframe attached)

(I) Project purpose is to rehabilitate and re-equip Yambio Agricultural Research Station, which will form an integral part of the national agricultural research and development programme.

(II) Target Group Beneficiaries

Over 90% of the population of Western Equatoria are engaged in subsistence or small holder farming. Thus the long term social and economic benefits derived from applied research at Yambio will be shared by the majority. In the short term, up to 400 families will benefit economically by direct and indirect employment on the station. Local purchase of building materials will provide some cash stimulation to the local market.

(III) Summary Description of Project

Yambio ARS occupies approximately 1000feddans of land, 3 km. from the town of Yambio, Western Equatoria. The station has been non-functioning since 1964, when during the Civil War it was abandoned and stripped of all equipment. Agricultural Research Corporation, based in Wad Medani, 100 miles from Khartoum, are responsible for the facility. However, financial constraints, shortage of skilled scientists and staff, added to the distances involved, have prevented the reactivation of the facility so far. A small maintenance staff (60) have continued to maintain the existing buildings in reasonable and recoverable condition,

and have kept up existing cleared plots. Some small cultivation activities continue, with pineapples, vegetables, herbs and spices. In order for applied research to resume in the areas, and to provide a key element in development of small holder production, reactivation of the station is urgently required. The first (2 to 3 years) phase of the project calls for renovation of existing buildings, some new building, complete re-equipment of laboratory facilities, equipping of the farm, training of personnel and institution of a programme of applied research in cash and food crops. International technical and financial assistance will be required for this phase, at a proposed cost of US $1,066,000.

The project will closely co-operate with the development of extension services in the area, and with overall agricultural research and development programmes of the Regional Ministry of Agriculture.

(IV) End of Project Conditions

At the end of the initial 2-3 years life of the project, the Station is expected to be fully operating, viz:

1. All existing buildings renovated - including 3 laboratories, administration block, stores and workshops, 3 senior staff houses, seed processing sheds.
2. 3 new senior staff houses built.
3. Electrical system installed.
4. Piped water system installed.
5. Laboratories equipped.
6. Meteorological station equipped.

7. Farm equipped (tractor plus accessories).

8. Transport - 1 station wagon, 2 pickups, 1 lorry in use.

9. Personnel - agronomist, support services manager, soil scientist, entomologist will be on post; horticulturist and pathologist will return from post graduate MSc training and take posts.

10. 6 laboratory technicians will have completed short courses at ARC, Wad Medani, and will continue to be trained on the job at Yambio.

11. ARC will have obtained approval of budgets, taking into account full recurrent costs of operating Yambio ARC.

12. There will be on-going trials in cotton, coffee, tea, rice Kenaf, fruit and vegetables - minimum 200 feddans.

13. Yambio Agricultural Technicians will be sending selected students for on the job training at Yambio ARC. This OJT training will be incorporated into the curriculum for trainee extension workers.

14. The Southern Region Ministry of Agriculture will utilize results of adaptive research in the Regional Agriculture Extension programme.

15. A detailed plan for expansion and intensification of activity at Yambio ARC will be designed and submitted for future funding, if indicated by the needs and circumstances in GOS agriculture sector planning at that time.

B. PROJECT BACKGROUND

In this section, we discuss the history of the proposal development and the consultations between IVS and the various instrumentalities of the GOS which have led to this proposal.

In 1954, a report by the S. Region Development Investigation team gave five main constraints which limited increased agricultural production:

1. Although marginal land is plentiful, all available high value land is fully utilized. Other fertile areas require drainage or irrigation with consequent high capital investment.
2. Manpower shortage, poor nutritional levels causing disinclination for heavy work, lack of trade goods to stimulate market economy.
3. Inaccessibility of the area, poor standard of communications.
4. Lack of knowledge and data on basic resources, need for much greater investigation and research.
5. The need for capital from the North to overcome these deficiencies, which would be a burden in the economy as a whole.

From 1954 to 1972 Civil War ravaged whatever services had been developed. Roads were damaged and went unrepaired, bridges and culverts destroyed.

Coffee, tea and timber plantations were abandoned, soon to become overgrown. The Zande Scheme at Nzara ceased to function, as did the Agricultural Research Station at Yambio. Over 1 million people fled their homes either to nearby countries or to the bush. Schools and hospitals were abandoned.

A complete generation received little or no education. Among the refugees who, with international assistance, completed their education, a large

number succeeded in obtaining employment abroad and did not return at the end of the war. During this period, the economy of the Region reverted to basic subsistence or survival level.

At the termination of hostilities and signing of the Addis Ababa agreement in 1972, the Region was granted a measure of autonomous self government - the task of rehabilitation was begun. Although a great deal of financial and technical assistance has been brought in from the Government of Sudan, and from international donor agencies, progress has been severely handicapped by poor communications, lack of skilled man power and poor infrastructure.

First priority in development of the Region's natural resources has been given to the agricultural sector, with particular emphasis on encouragement of production of small holder farmers.

The majority of farmers in the Region are poor, illiterate and widely scattered. Like farmers everywhere they are reluctant to accept any changes in methodology if it entails risk of crop failure, or failure to turn their production into profit. Thus on the short term the best hope for increasing production is by introduction of reliable higher yield seeds - giving increased production without significant other requirements.

The greenbelt of Western Equatoria holds the most promise for successful programmes to increase production of food and cash crops. Massive capital

inputs for irrigation and drainage will not be necessary, since rainfed agriculture is possible all year round (800-1400 mm of rain per year).

The main impetus to agricultural research and development in the Region is through the IBRD assisted Project Development Unit centered at Yei, and with eight substations throughout the Region, but not at Yambio. Here, the agricultural research station is owned and operated by the Agricultural Research Cooperation, based at Wad Medani, 100 miles from Khartoum. (See appendix 1). Due to lack of financial resources, skilled manpower and the difficulty of communication between Wad Medani and Yambio, the station has not been re-equipped or re-named as have other facilities since the war.

60 low level workers have continued to operate at the station at a purely maintenance level, with a maintenance budget of £ S.5,000 per year. Only approximately 10 feddans out of a total area of 1,000 feddans remain clear of bush under cultivation.

In November 1977, at the request of the Regional Ministry of Agriculture, an ARC team visited Yambio to determine what resources would be required to reactivate the Station. Their report is attached (appendix 2). A full-time Director has been appointed by ARC and is on post.

The following proposal has been designed by IVS, in consultation with:

Central Ministry for Agriculture, Khartoum.
H.E. The Minister and Technical Staff.

S. Region Minister for Agriculture, Juba

H.E. The Minister
Dr. D. Bassiounni, Director General
Technical Staff

Agricultural Research Corporation, Wad Medani
Dr. Borhan
Director, Senior Technical Staff.

Project Development Unit, Yei (IBRD)
Mr. A Bennett
Crop Development Officer
Scientific Staff.

Yambio ARS, Yambio
C. Bennett
Director (and agronomist)

Yambio Institute for Agricultural Technicians (FAO)
Mr. M. Cunliffe
Director
Senior Extension Training Staff.

IVS Water Engineer Bill Laakonnen.

AID Mission, Khartoum

These consultations have taken place, and the proposal developed, from an elaborate series of meetings and visits by IVS design staff to Khartoum, Wad Medani, Juba, Yei and Yambio. This elaboration was considered to be necessary in order to ensure that the project will benefit from the active and enthusiastic co-operation of all concerned parties listed.

The inputs specified will enable the station to function in all necessary disciplines, e.g. agronomy, horticulture, soil science, plant pathology and entomology, to minimum levels of operation and contribution to the overall research and development in agriculture in Western Equatoria.

A second phase of development of the station will subsequently be required to fully utilise the 1,000 feddans which are available and to

expand R & D services to farmers in the Region.

IVS/GOS Technical Assistance agreements are appended. Also appended are letters from the Central and Regional Ministers for Agriculture requesting IVS participation in the proposed project. The proposal also conforms with proprities stated in the USAID Sudan Mission PID for the Agricultural Sector.

C. PROJECT ANALYSIS

(i) The Area and the People Impacted

The population of the Sudan is 17 million on 2.5 sq. km. The population of the S. Region is 3.5 million on 650,000 sq. km.

The predominant tribe in the Yambio area are the Azande; Yambio lies within 20km. of the border with Zaire. Azande population on the Sudanese side of the border is estimated at 70,000, most of whom are settled farmers (over 90%). Shifting cultivation is practiced, using only handtools, since poor communications and cash availability prevent use of fertiflisers and more sophisticated tools. Pesticides are not generally used. Crop yields as low, representing the lack of modern technology.

The present gap between average farm yields and those achieved under research conditions is more a question of poor farm practice than of yield potential. However, changes in farming practice are always slower and more difficult to achieve than introduction on higher yield seeds, which justifies the present emphasis on varietal improvement.

During the British Colonial administration, the people were forcibly removed from the riverside areas in an effort to reduce infection by tzetze flies. Thus the people are settled mostly along the roads, making access more than usually convenient.

Houses are usually of mud-brick 'tuckle' type, with thatched rooves. In this area they are quite substantially built. Burnt bricks are made locally from clay soil, for those with higher than average income.

The Azande area is largely self-sufficient in food, compared to the rest of the less fertile region.

IVS in the Sudan

International Voluntary Services, Inc., is a private, non-profit making organisation. IVS has had grant and contract funding relationships with AID and its predecessor agencies since 1953. IVS is currently registered with AID and approved for purposes of PVO funding; IVS now receives OPG funding (for the Sudan, Botswana and Bangladesh).

DPG support, and general core support funding on a matching basis, is also received. In addition to AID

funding, IVS receives substantial support from a variety of non-governmental donors in the United States (estimated at some $400,000 for the year ending June 30, 1978), external aid agencies in other countries (UK, Sweden, Switzerland), and host governments and institutions.

IVS employs local and expatriate technical personnel in development projects directly addressing the causes and effects of poverty, hunger and powerlessness. IVS expatriate personnel are skilled technicians from many countries, serving as volunteers for a minimum of two years. These volunteers are provided with in-counter support by IVS staff, who also work with host country and community people and officials in project identification, structure and evaluation. IVS is currently working in programmes and projects in nine countries: Bangladesh, Bolivia, Botswana, Ecuador, Honduras, Mauritania, Papua New Guinea, The Sudan and the Yemen Arab Republic. The IVS home office is in Washington DC, USA.

Subsequent to several exploratory visits to the Sudan in 1972 and 1973, IVS in October 1975 appointed a Field Director, Alan Williams, to follow up initial interest

of the Government of the Democratic Republic of the Sudan in IVS mid-level technical assistance and co-operation. The terms of reference set for Mr. Williams' appointment were threefold:

(a) To research and identify a useful, appropriate development role for IVS in the Sudan consistent with the Government's priorities and IVS's operation principles.

(b) To enter into a working relationship with the Government, specifying the terms and conditions of IVS programme operation in the Sudan.

(c) To determine a feasible strategy for IVS to respond to mid-level technical needs according to IVS capacities, financial considerations and periodic review of our programme participation.

An IVS office was set up in Juba in December 1975 to initiate Phase I of our activities. Prior to setting up this office, IVS had begun its first volunteer activities in the Sudan in the North, Providing personnel as department heads and lecturers at Ahfad University for Women in Omdurman. Although the first IVS office in Sudan, and first resident staff activities were located in the Southern Region, it was contemplated that the staff activities and further programming would encompass the entire country and not be limited to the Southern Region. Thus on 10 January 1977, IVS entered into a "Technical Assistance Agreement' with the Government of the Sudan which specified the terms and conditions

for IVS programme participation in the country, including programming both in the North and the South. Under this agreement, IVS is permitted to import without payment of duty all materials and supplies required for technical assistance programmes.

Based on initial programme exploration in the South (which commenced with the opening there of an IVS staff office in December 1975), IVS chose to concentrate its participation in the Government programmes designed to develop traditional agriculture and livestock, rural water resources and co-operative development. It was also concluded by IVS that its programme activities in the Sudan would include project management responsibilities and not become limited to volunteer placement and support. Thus, IVS's programme role in the Southern Region (and of late in the North) has included marshalling resources and materials, both external and local, necessary for project implementation. In addition, IVS has in some instances taken on a project programme management role in conjunction with Sudanese institutions.

In December 1975, Alan Williams, IVS Field Director for the Sudan, established the country staff office for IVS in Khartoum. Mr. Williams' staff function in the Southern

Region was assumed by Associate Field Director Garry Bargh. As of January 1978, IVS had ten expatriate volunteer technicians working in the Sudan in a variety of projects. In the Southern Region these include:

> An extension training officer and roads construction engineer at Yei with the Project Development Unit of the Regional Ministry of Agriculture;
>
> A water engineer assigned to the Rural Water Resource Department;
>
> A Co-operatives Manager working with a grinding mills project under the auspices of the Regional Ministry of Co-operation.
>
> A nutritionist at a vocational training centre in Juba with the Regional Ministry of Public Services;
>
> Senior Planning Economist with the Southern Region's Ministry of Agriculture Project Planning Unit;
>
> In addition to IVS's volunteer placement and support activities for these projects, IVS undertook basic management responsibility (including project resources procurement and management) for the grinding mills co-operative project (budget of $300,000). At the same time, IVS currently has three volunteers assigned to the Ahfad College for the academic years 1977/78 and 1978/79.

At about the time IVS established its staff office in Khartoum (in December 1977) IVS was asked by the Government of the Sudan to assist in the development and planning of a community development project at Wadi Halfa.

This project was launched in November 1978 with a total external budget of $531,000 and involves activities in:

Irrigated Crop Production
Municipal Water Supply
Sanitation
Nutrition

(ii) The Contemplated Role of the Yambio Agricultural Station

Yambio ARS will form an integral part of the agricultural research and development services of the Southern Region, with particular emphasis on Western Equatoria. The aim is to draw together the research and extension services with the local farmer, in a concerted tripartite effort to increase production of food and cash crops. Since over 90% of the population is supported by subsistence agriculture, it follows that success in the development of the agricultural sector will have far reaching effects on the social and economic conditions of the population as a whole. The knowledge and experience gained at Yambio will, through ARS, be made available throughout the Sudan where relevant.

Yambio ARS occupies the only land in the area set aside for agricultural research and development. Failure to reactivate the station has resulted in a complete bottle

neck in agricultural research and development in the area. Unless it is quickly rehabilitated, the most fertile green belt area in which it lies will lag behind in the overall agriculture sector development plans.

The recent agreement by ODM to rehabilitate the Nzara scheme accelerates the problem. Nzara will provide ginning, spinning and weaving facilities and will, in order to operate successfully, require heavy purchases of raw cotton from local farmers. It is essential that cotton trials and resulting extension services to farmers be instituted in advance of the Nzara scheme.

While there is no specially defined role for women within the reactivation phase of the Yambio Station, women of suitable educational background can be and are recruited by the Regional Ministry of Agriculture, but they are in a minority.

In the farming sector itself, to which this project is addressed, women play a very pronounced role in crop cultivation. It is, thus, at the extension level that women will be more concerned, rather than at the research level. The possibility of recruiting women for training as lab technicians is under investigation. If suitable candidates can be found they will be appointed.

(iii) Relation of Research to Extension

Transfer of knowledge and technology to farmers, especially small, traditional and subsistence farmers, is a major problem throughout the developing world and the Sudan is no exception. All indications suggest the efforts of the extension service are very limited. Agriculture extension is the responsibility of the Department of Agriculture Extension and Education. It is one of the departments under the administration of the Under-Secretary for Agricultural Services. The extension service is relatively small, about 125, with only a quarter of them being university graduates. That is probably about one extension officer for every 30 to 40 thousand farmers.

Transfer of research results has been more feasible with the farmers of the more modern sector, like the Gezira scheme and other schemes of the Agricultural Production Corporation. In these situations, the research results are obtained by the managers of the schemes and applied directly to the farms. Examples are the distribution of seeds of improved, high-yielding varieties of crops, use of aerial spraying of recommended insecticides, rates of fertilizer applications, and the like. Numerous field inspectors play a role in convincing the farmers in the schemes to follow recommended practices.

But the vast region outside these schemes, in the rainfall areas of the West, Southwest and South, are the real challenge to extension occurs. The problems are different in working with the thousands of small scale traditional farmers. The extension agencies need to be greatly strengthened and the agricultural research organizations and station also must play a more significant role than they have in the past if research is to be effective in agricultural development in this huge sector of the country. These farmers belong to widely varying social, cultural and economical systems, they all follow settled semi-nomadic or fully nomadic group village patterns whichever are difficult to reach because of lack of roads and transport, or if there are roads, they may be impossible during the rainy-season.

One step has been taken that may be helpful in the establishment of direct links between research and extension. Plans are being developed to post "Subject Matter Specialists" at the research stations. One man already has been placed in such a post at one of the regional stations. For such people to work effectively they must be as well trained to function as the applied, adaptive research personnel so they can work as part

of the team in field research and translating the results for practical use. Further, working with the applied research staff, these specialists can establish demonstrations on farmers' fields and assist in bringing problems to the researcher. In spite of all of the constraints, there is much that can be done with a relatively small input. One procedure already being followed in a limited way is to send a junior scientist to the University of Khartoum for their academic course work and then do their research problem at one of the ARC stations or at one of the International Centres. This requires suitable graduate level studies at the University.

Another alternative is to work out arrangements with universities abroad, especially in the United States for doctoral candidates to return to the Sudan, or a country of similar environment, to conduct their thesis research. Where satisfactory supervision of the project can be provided, this procedure has advantages in giving the candidates an opportunity to do his thesis research on a problem relevant to his own country. It shortens the candidates time away from his country and helps him get his own research programme initiated earlier.

If linkage for co-operative research are developed further with some of the International Research Centres, this might provide another alternative for advanced training of junior scientists. It is now common practice at some universities in the United States for doctoral candidates to do their courses work at the University and then go to one of the Centres, such as IRRI, ICRISAT or IITA for their research. The candidates get excellent training and experience, and the research often can be more relevant to one's own country than might otherwise be the case.

(iv) Training

In addition to re-establishing the research station site itself, the project will, from the outset, have a major training component to accelerate localization of the research station staff.

1. 6 Laboratory Technicians will be required initially. On appointment by the Director of YARS they will be sent for a 3-4 month training course at ARC, Wad Medani. Their training will continue on the job at Yambio under the senior scientists.

2. 2 BSc scientists will be sent for 2 years training to MSc at IATA Ibadan.

3. 2 research assistants will be sent on short (3-6 months) courses at IATA Ibadan, on cereal and root crop production.

(v) Crop Trials

As soon as suitable land crops can be cleared, the Research Station will commence. The crops, all relevant to small holder farming practices in the area, will include:

Cotton
Coffee
Tea
Rice - H.I.B. upland varieties
Sorghum
Cereals
Pineapple
Citrus
Vegetables

Trials will be conducted in an applied manner, on plots of realistic size to examine:

Effects of stocking on yield and quality of grain.

Effects of sustained weeding, stocking, early dry season cultivation, blanket weeding between first rains and sowing on soil moisture content, weed competition, yields and manpower requirement.

Effects of simple soil and water conservation practices on run-off and crop yields.

Maintenance and if possible build up of soil fertility by means of leguminous rotation crops, bush fallow crops and soil cover crops (e.g. coffee), use of manure if possible bulked up with crop residues to form compost.

Apart from variant improvement of programmes, research will include:

Agronomic technical and social aspects of farm and village co-operative storage.

Ecological and agronomic and social aspect of bird damage.

Coffee-care of soil and water conservation in lay-out, care of plant holes, use of compost and ground cover, pruning, picking, combined co-operative processing marketing.

Rice development of a directly sewn rained opening crop and a yearly riverine irrigated crop.

Cassava selection of virus resistant or tolerant clones and use of tissue culture on contact. (Ref. IBRD Phase 3 report 1978)

The PDU (IBRD funded) has for the past 5 years formed the main basis of agricultural research and development throughout the Southern Region. The R & D Headquarters is at Yei, Western Equatoria, with 8 sub-stations including Wau, Maridi, Rubmek, Malakal and Juba. Considerable progress has been made in testing multiplication and distribution of seed by small holder credit operation. Keen farmers have been identified and included in extension programmes. Rather than developing in isolation Yambio ARC station will follow lines of R & D already proven by PDU to be beneficial for the area; as specified in the above listed lines of investigation. By doing so, Yambio will be complementing the work of units working towards the same goals.

D. PROJECT DESIGN AND IMPLEMENTATION

PROBLEMS

The main problem is that of logistics. All supplies, equipment and fuel will be transported overland from Mombassa, via Uganda to Juba. From Juba to Yambio is a further two day journey by laterite road. Although this is being reconstructed (German aid) it is far from complete and has some very difficult patches, particularly in the wet season. Building manpower should not in this case be a problem, as brickmakers, masons, carpenters, etc, are available in Yambio. The proximity of Yambio Agricultural Technician Institute next door (FAO) will enable valuable technical co-operation in the initial stages, e.g. sharing of workshops, fuel storage, transport and radio link to Juba and Khartoum.

TECHNOLOGY

The tractor and accessories are required in order to more quickly clear the bush and bring the 1000 feddan area under cultivation without delay. Research will continue to concentrate on farming practices within the reach and capacity of local farmers. Any new practices introduced, including new farms of grain stores, will utilise available local materials only.

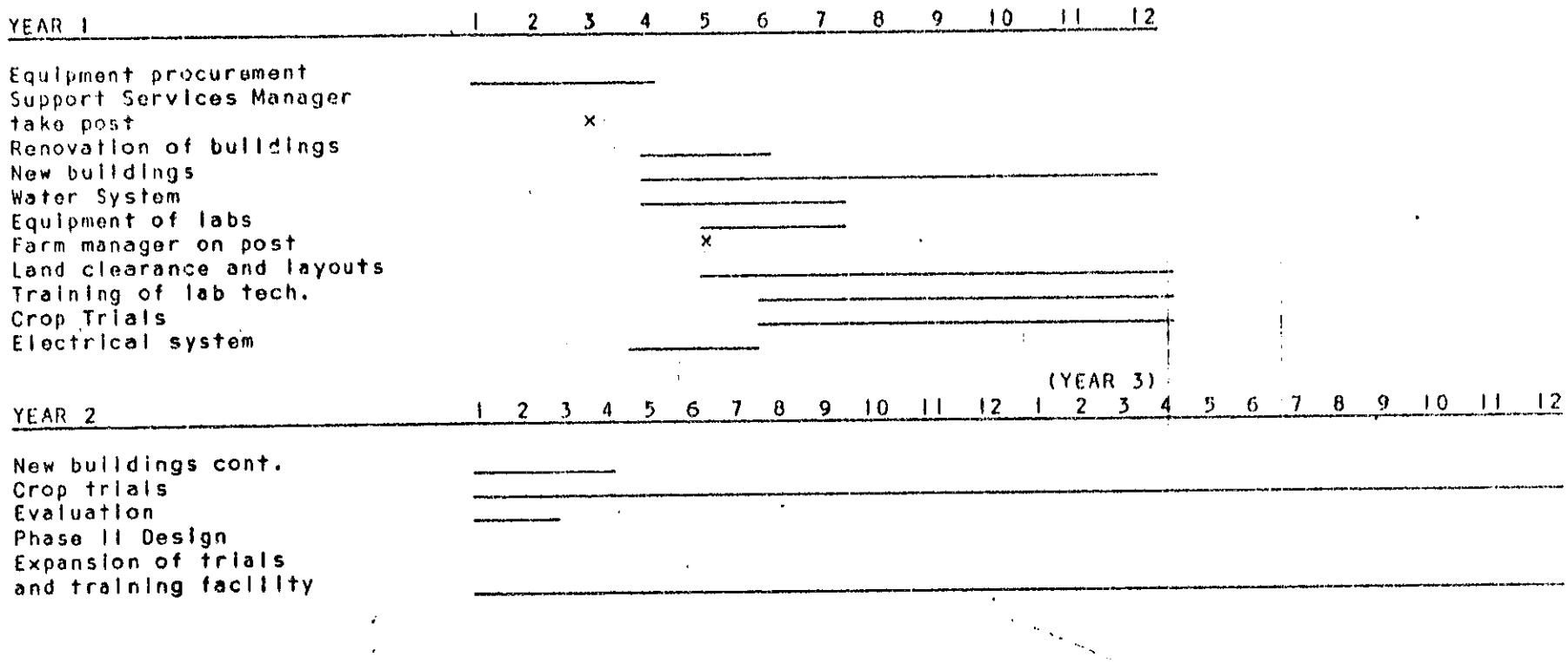
SELF MOTIVATION

The 60 workers remaining at Yambio have had no transport, no equipment and only a few old hand tools. They have nevertheless continued to cultivate various vegetables such as pineapple, rice, sorghum, coffee, cocoa and spices on about 10 feddans. The buildings have been moderately maintained and are recoverable. In meetings with ARC officials, determination to reactivate the station has been practically expressed by appointment of personnel, availability of local budgets, etc.

WORKPLAN

All project equipment and supplies will be ordered and handled by the IVS Regional Director Office in Juba. Delivery Mombassa/Juba delay time is 2-3 months. Project timetable targets are as follows:-

PROJECT TIMETABLE



The first IVS Technician to take post at Yambio will be the Support Services Manager. Responsible to the Station Director, he will manage the support services required by the senior scientists for implementation of the R & D programme, including reception and storage of incoming materials and equipment, local purchase of building materials, renovation of building new construction (plan at appendix 3), installation of electricity and water systems, laboratory equipment, workshops, transport and fuel.

QUALIFICATIONS

BSc in Civil Engineering or recognised apprenticeship to ONC. The candidate will need extensive practical experience in construction trades at a relatively unsophisticated level, in using hand labour as opposed to mechanisation.

OR: An agricultural engineer with appropriate experience.

The second IVS Technician (Agronomist) will undertake land clearance and plot layouts. He will take post 3 months after the Support Services Manager.

FARM MANAGER

BSc in Agronomy, with at least 3 years experience in the practical implementation of agronomic trials, preferably

in tropical or semi-tropical conditions. He will supervise the layout of trial plots, planting, irrigation, fertilization, cropping, yield results, etc, as required by the senior scientific staff.

I.V.S. Agronomist

BSc. In Agronomy, with at least 2 years experience in the practical implementation of agronomic trials, preferably in tropical or semi-tropical conditions.

He/she will work under the IVS Farm Manager and will assist in the layout of trial plots, planting, irrigation, fertilization, cropping, yield results, etc., as required by the senior scientific staff.

Second agronomist to be at post by May 1980.

I.V.S. Project Management

The provision of all necessary logistical and administrative support and assistance to the project will be by the IVS field staff in both Juba and Khartoum.

In addition it includes the assistance to be rendered by IVS volunteers from other projects in the Southern Region, with special reference to the water system sector.

It is estimated that this assistance will amount to:-

Country Director	6 man months
Juba Projects Officer	9 man months
Other IVS personnel	3 man months

SPREAD EFFECT

Yambio ARC will form an integral part of the agricultural R & D services of the Southern Region, with particular emphasis on Western Equatoria. The aim is to draw together the research and extension services with the local farmer, in a concerted tripartite effort to increade production of food and cash crops. Since over 90% of the population is supported by subsistence agriculture, it follows that success in the development of the agricultural sector will have far reaching effects on the social and economic conditions of the population as a whole. The knowledge and experience gained at Yambio will, through ARC, be made available throughout the Sudan where relevant.

E. EVALUATION PLAN

The first evaluation will take place one year after project initiation. The evaluation team will consist of:

Director of Yambio ARS (ARC)
Southern Region Ministry of Agriculture Assist.
Director for Research
IVS Project Leader
PDU Representative
AID Representative will be invited to participate.

This evaluation will concentrate primarily on measurements of achievement of physical targets, i.e. buildings, equipment, land clearance, presence of personnel, etc.

Two years after project initiation, the second evaluation exercise will be conducted. As well as assessing progress towards full completion of the physical rehabilitation, this evaluation will assess the extent to which reactivation is contributing towards agricultural R & D in the area, and the extent to which Yambio is co-operating and complementing the work of PDU and the extension services. At that time recommendation will be made for possible expansion of activities at Yambio, and towards design of a further phase of international assistance should the circumstances and conditions warrant.

F. COST BENEFIT AND RECURRENT COSTS

The station is currently undergoing minimal maintenance with a budget of LS5,000. Re-equipping and reactivating the station will entail re-establishment of full operating costs and recurrent budgets by ARC.

Already budgeted for the first year of full operation are:

		LS
a)	Salaries - Senior Staff	9,095
	Support Staff	60,990
b)	Operating costs	9,000
		LS79,085

ARC draws its fund directly from the Ministry of Finance, Khartoum. We are assured by the Director of ARC that this Corporation does not find difficulty in obtaining funds under approved budgets. Approval of budget for fiscal year 1979/80 will be given in February 1979.

COST BENEFIT ANALYSIS

The external project cost totals one million dollars mainly in capital costs for equipment. Rehabilitation will result in full-time employment on the station for a total of 95 classified staff and 21 daily-paid workers, in addition to senior research staff (5-7).

It is not possible to assess the financial benefits which are expected to result to local farmers who will utilise the results of applied research, as this will take several years to become evident. However, it is clear that the farming population are the direct target beneficiaries who will eventually profit from the research activities at Yambio. Due to the prevalence of Tzetze fly infestation, animal husbandry is hardly practiced at all in Western Equatoria. Apart from the small number working in Government service, the population is exclusively concerned with small holder farming. Thus any programme which contributes to a general increase in small farmer income will tend to benefit the socio-economic status of the population of the area as a whole, estimated at between one half and three quarters of a million.

G. ENVIRONMENTAL IMPACT ASSESSMENT

No significant environmental effects are expected as a result of this project.

The installation of a pumped water system will enable water treatment and purification. Since agriculture in this area is rainfed, there will not be the problems which can sometimes be encountered by introduction of irrigation systems. Land clearance for cultivation consists largely of secondary bush clearance. Large trees will be left standing.

Since there is no point in utilising large amounts of fertiliser and pesticides which could not be afforded by local traditional farmers, experimentation with these items will be kept to a minimum.

The three new staff houses will be sited so as to blend in with their surroundings and will be constructed from local brick.

The provision of research equipment to an already existing station is not expected to cause any measurable deleterious environment effects.

The applied agriculture research carried out at YARS is designed to improve social and economic conditions of local farming population by increasing production and incomes.

IMPACT IDENTIFICATION AND EVALUATION FORM

IMPACT AREAS AND SUB-AREAS	ADAPTIVE RESEARCH	PROJECT DEVELOPMENT, IMPLEMENTATION AND EVALUATION
1. Land Use		
(a) Changing the character of the land through:		
(i) Increasing the population	N	N
(ii) Extracting natural resources	N	N
(iii) Land clearing	L	N
(iv) Changing soil character	N	N
(b) Altering natural defenses	N	N
(c) Foreclosing important uses	N	N
2. Water Quality		
(a) Physical state of water	N	N
(b) Chemical and biological states	N	N
(c) Ecological balance	N	N
3. Atmosphere		
(a) Air additives	N	N
(b) Air pollution	N	N
(c) Noise pollution	N	N
4. Natural Resources		
(a) Diversion, altered use of water	N	N
(b) Irreversible, inefficient committments.	N	N
(c) Wildlife	N	N
5. Cultural		
(a) Altering physical symbols	N	N
(b) Dilution of cultural traditions	N	N
(c) Damage to primitive cultures	N	N
6. Socio-Economic		
(a) Changes in economic/employment patterns	N	N
(b) Changes in population	N	N
(c) Changes in cultural patterns	N	N
(d) Dislocation of population	N	N

7.	Health		
	(a) Changing a natural environment	N	N
	(b) Eliminating an ecosystem element	N	N
	(c) New pathways for disease vectors	N	N
	(d) Safety provisions	N	N
8.	General		
	(a) International impacts	N	N
	(b) Controversial impacts	N	N
	(c) Larger programme impacts	N	N

Symbols Used: N - No environmental impact

L - Little environmental impact

M - High environmental impact

U - Unknown environmental impact

BUDGET AND FINANCIAL ANALYSIS (US DOLLARS)

SUMMARY.

1.	PERSONNEL	115,000
2.	TRAINING	83,000
3.	COMMODITIES:	
	a. SOIL LAB.	40,000
	b. PATHOLOGY LAB.	10,000
	c. ENTOMOLOGY LAB.	10,000
	d. AGRONOMY EQUIPMENT	20,000
	e. METEOROLOGICAL STATION	5,000
	f. LIBRARY	10,000
	g. GENERAL OFFICE	10,000
	h. FARM EQUIPMENT	81,000
	i. OTHER FARM EQUIPMENT	20,000
	j. FARM HAND TOOLS	5,000
	k. OTHER EQUIPMENT	12,000
	l. WATER SYSTEM	55,000
	m. ELECTRICS	41,000
	n. VEHICLES	136,000
	o. FUEL	30,000
	p. BUILDINGS	115,000
	q. PROCUREMENT COSTS	75,000
	r. MISCELLANEOUS	15,000
	TOTAL OPG REQUEST	888,000
	20% CONTINGENCY & INFLATION	177,600
	T O T A L	1,065,600

H. BUDGET AND FINANCIAL ANALYSIS (US DOLLARS)

1. PERSONNEL

	M.MTHS.	AID	ARC	IATA
Director (Horticulturalist)	24		20,000	
Soil Scientist	24			15,000
Entomologist	24		15,000	
Horticulturalist	24		15,000	
Support Staff	2,400		325,000	
IVS Support Services Manager	24	30,000		
IVS Farm Manager	24	30,000		
IVS Agronomist	24	30,000		
IVS Project Management:				
Country Director	6	10,000		
Southern Region Projects Officer	9	11,250		
Other IVS Sudan Personnel (not included above)	3	3,750		
T O T A L S	2,586	115,000	390,000	15,000
			115,000	

2. TRAINING

a. ~~One B.Sc. X 2 years at IATA to M.Sc. (Green Legumes)~~	~~25,000~~
b. One B.Sc. X 2 years at Florida University to M.Sc. (Soil Science)	35,000
c. Three X 6 month short courses on root, tuber, and cereal crops at IATA	18,000
d. Three X 3 - 6 month short courses for artisans at Juba M.T.C.	5,000
	83,000

3. COMMODITIES (all prices CIF Mombasa)

*Denotes 2 years spares included (10% commodity price)

(a) SOIL LAB.

PH meters complete
Conductivity meters
Soil sieves
Khendahl apparatus
Soselet apparatus
Flame photometer (gas)
Colorimeter
Gas cupboard EEL
Shaker
Distilled water apparatus
Water de-ioniser
Stirring plate
Weighing balance
Centrifuge
Moisture Meter
Drying oven
Soil augers
General lab. equipment
Glassware
Chemicals
Ceramics
Plastic bags
Shovels, mattocks, etc.

40,000

(b) PATHOLOGY LAB.

Incubator
Sprays
Petrie dishes
Tallicounters
Dissecting kits
Monocular microscope

10,000

(c) ENTOMOLOGY LAB.

Rearing cages
Light trap
Setting boards
Killing jars
Cabinets
Disecting kits
Nets
Pouters
Binocular microscope
Portable sprayers
Swingfog
ULV
Knapsack sprays
Tractor mounted spray
Chemicals
Glassware

10,000

(d) AGRONOMY EQUIPMENT

Greenhouses and laboratory 20,000

(e) METEOROLOGICAL STATION

Thermoliggograph
Anemometer
Constant recording rain guage
Campbell-Stokes sunshine guage
Stevenson screen
Soil (wet, dry) thermometers

5,000

(f) LIBRARY

Reference books and journals 10,000

(g) GENERAL OFFICE

6 X adding machines
1 X Duplicator
1 X Photocopier
3 X Typewriters
4 X Two draw filing cabinets
5 X four draw filing cabinets
Other assorted office equipment

10,000

(h) FARM EQUIPMENT

Massey Ferguson MF275 tractor	24,000 *	
Massey Ferguson MF235 tractor	18,000 *	
Tinkabi tractor system	5,500 *	
Mouldboard Plough	3,500	
Complete set steel wheels for MF275	2,000	
Rotaslasher	3,000	
Tractor Winch	1,500	
Fertiliser spreader	3,500	
Tractor trailer	10,000 *	
Rotary cultivator	4,000	
Disc plough	4,500	
Miscellaneous spare parts	1,500	
	81,000	
		81,000

(i) OTHER FARM EQUIPMENT To include:

Hand operated: maize sheller
Flour grinding mill
Rice huller
Coffee huller
Ground nut decorticator
Cassava scraper
Palm oil press

Hand pushed seed drill
2 X chain saws
Bruch cutter
Monkey winch
Weighing scales.

20,000

(j) FARM HAND TOOLS

Spades	Sickles
Forks	Cross cut saws
Axes	Bow saws
Crowbars	Machetes
Wheel-barrows	Garden trowels
Picks	Slashers
Racks	Bill hooks
	Buckets

5,000

(k) OTHER EQUIPMENT

One complete set of propogation horticultural tools (including budding knives, pruning saw, and shears)	250
One survey equipment kit (including theodolite, pole, chain, and tape measure)	1,000
One welding unit	5,000
One angle grinder	250
One electric drill and attachments	500
Comprehensive tool kits for the following artisans: (a) carpenter	500
(b) plumber	250
(c) mechanic	1,000
(d) brick layer	250
(e) black smith	1,000
(f) electrician	500
Miscellaneous hardware	1,500
	12,000

(l) WATER SYSTEM

Pumps - one 25 HP water pump one 2 inch lifter water pump	25,000 *
Piping- one mile of 2" Ø water pipe with thread and dockets one mile of 1" Ø water pipe with thread and sockets	16,000
Tanks - three 200 gallon tanks	5,000
Constructing 40,000 gallon reservoir	7,000
Miscellaneous plumbing fittings	2,000
	55,000

(m) ELECTRICS

Generator 25 KVA	28,500 *
Wiring installation	12,500
	41,000

(n) VEHICLES

1 Landrover diesel engine station wagon	18,500 *
3 Toyota diesel engine pick-ups	51,500 *
1 nine ton lorry	50,000 *
Additional spare parts & tools (5%)	6,000
Vehicle insurance	10,000
	136,000

(o) FUEL

Diesel: 15,000 litre fuel tank	5,000
50,000 litres of diesel	20,000
25 drums of petrol	3,000
Engine oil and grease	2,000
	30,000

(p) BUILDINGS

Renovate the former ARS Director's house on ATI compound, the laboratory block, the workshops, the storage buildings, the seed drying sheds, the administration block, and the existing junior staff houses	35,000
Complete the three founded senior staff houses	60,000
Furniture and equipment	20,000
	115,000

(q) PROCUREMENT

1. Inland transportation from Mombasa to free Yambio for all commodities to include insurance, border charges, and other miscellaneous charges.	50,000
2. Purchasing, storage, handling, and transport in Juba (to include use of IVS Juba Office).	25,000
	75,000

(r) MISCELLANEOUS

Travel Consultations Evaluations	15,000
TOTAL OPG REQUEST	888,000
20% CONTINGENCY & INFLATION	177,600
T O T A L	1,065,600

Appendix I

LOGFRAME MATRIX

GOALS	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1. To increase the income and living standards of farmers in the Southern Region of Sudan.	1. Increase in per capita income, increase in area of land under cultivated.	1. Regional Ministry of Agriculture and Planning Statistics.	1. Roads, marketing and storage systems will be developed as planned.
2. To attain self-sufficiency in food with adequate reserves to stabilise prices.	2. Cessation of seasonal purchases from Northern Sudan.	2. Ministry of Commercial Statistics.	2. Price incentives will be sufficient to encourage increased production.
3. To produce sufficient tea, coffee, rice and Kenaf to achieve national self-sufficiency, and to increase production of these and other crops for export where feasible.	3. Locally produced products in the shops at prices cheaper than imported brands.	3. Ministry of Commercial Statistics.	3. Price incentives will be sufficient to encourage increased production.
4. To develop production of new crops, fruits and vegetables to improve nutrition and supply urban markets.	4. Year round supply of fruits and vegetables to Juba and Meridi markets.	4. Observation of local markets.	4. Demand will continue. Roads will continue to be improved giving access to markets.
5. To increase production of coffee and cotton to encourage agro-industries.	5. Raw cotton supplied by local farmers to Nzara ginning facility.	5. Records and Nzara mills.	5. Reactivation of Nzara project will proceed as planned.
PURPOSE To re-establish Yambio Agricultural Research Institute as an integral element of the Agricultural Research and Development network in the Southern Sudan.	Information and materials on new and improved crops being supplied to farmers via Regional extension services. High yield and disease resistant seeds being multiplied and distributed.	PDU and Yambio extension services records. Yambio ARC production records.	Ministry of Agriculture will continue to develop extension services as planned.

OUTPUTS	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1. Existing buildings renovated.	3 laboratories 3 senior houses Seed sheds Stores	Building in good condition and in use.	Equipment, materials and personnel will be produced and recruited on time.
2. New staff houses built and equipped.	3 houses completed	3 houses occupied by senior staff.	ARC will fulfill plans to recruit and train personnel.
3. Laboratories equipped. a) Soil b) Pathology c) Entomology	Equipment in use.	Experimental work in progress.	Workforce will continue to receive financial support from ARC.
4. Meteorological Station equipped.	Almatic data obtained.	Met. records.	
5. Farm equipped.	Tractor and tools in use.	Land cleared to 200 feddans.	
6. Electricity installed.	Lab equipment in use.		
7. Water system installed	All labs and houses getting piped water.		
8. Personnel on post	IVS agronomist IVS G. Services Manager ARC soil scientist ARC agronomist		
9. Lab technicians in training	Min. 6 L.T.s appointed and training OTJ.	Yambio send students for training. PDU and YARS exchange materials & information.	
10. On-going crop trials Seed multiplication in progress.	200 feddans min. in crops On-going active co-operation with PDU and Yambio ATI.		

INPUTS

IVS SUPPORT SERVICES MANAGER

IVS FARM MANAGER
IVS AGRONOMIST
SOIL LABORATORY EQUIPMENT

PATHOLOGY LABORATORY EQUIPMENT

ENTOMOLOGY LABORATORY EQUIPMENT

AGRONOMY EQUIPMENT

METEOROLOGICAL STATION

LIBRARY

GENERAL OFFICE EQUIPMENT

FARM EQUIPMENT

LIBRARY

WATER SYSTEM

ELECTRICAL SYSTEM

1 STATION WAGON

3 PICKUPS

1 LORRY

TOOLS, FUEL AND SPARES

RENOVATE EXISTING BUILDINGS

BUILD 3 NEW STAFF HOUSES

PURCHASING, WAREHOUSING, ADMINISTRATION

AND TRANSPORT SERVICES

..../43

ARC WAD MEDANI

YAMBIO STATION DIRECTOR ARC

PDU/S. REGION MINISTRY OF AGRICULTURE

SOIL SCIENTIST PATHOLOGIST ENTOMOLOGIST AGRONOMIST SUPPORT SERVICES (IVS)

IVS FARM MANAGER

FIELD SUPERVISOR CEREALS | FIELD SUPERVISOR COFFEE | FIELD SUPERVISOR FRUIT | FIELD SUPERVISOR VEGETABLES | FIELD SUPERVISOR COTTON

YAMBIO AGRICULTURAL TECHNICAL INSTITUTE WILL UTILISE YARS FOR TRAINING STUDENTS IN UP TO DATE RESEARCH RESULTS APPLICABLE TO EXTENSION WORK.

MINISTRY OF AGRICULTURE WILL EMPLOY GRADUATES OF YAMBIO AGRICULTURAL TECHNICAL INSTITUTE IN ITS PROGRAMME OF APPLIED EXTENSION CARRIED THROUGH PDU.

Appendix III

MINISTRY OF AGRICULTURE, ANIMAL RESOURCES,
FORESTRY AND IRRIGATION,
SOUTHERN REGION
JUBA

MINISTER'S OFFICE DATE: 5th OCTOBER

(C O P Y)

Mr. Alan Williams
International Voluntary Service
Director
PO Box 1926
Khartoum

Dear Mr. Williams

During your stay in the Southern Region you must have definitely had the opportunity to visit Yambio and see for yourself the sad state in which the Yambio Agricultural Research Station is.

The Station needs to be rehabilitated in the quickes time possible so as to allow it to participate more fully in solving the problems that the farmers face in developing agriculture in the Southern Region.

A concise and comprehensive report has already been prepared by a team of scientists from the Agricultur Research Corporation at Wad Medani on the rehabilitation and reactivation programme for the station. We concur fully with the team's recommendations. Recently, the International Institute for Tropical Agriculture (IITA) in Ibadan, Nigeria, has shown interest in assisting the station in programming and providing supporting scientists. I turn to your agency to assist us in securing the necessary funds and scientists for rehabilitating Yambio Research Station. You can work in close collaboration with my colleague, H.E. Abdullah Ahmed Abdullah, Minister of Agriculture, Food and Natural Resources, Khartoum, and his research staff on this proje

Awaiting your quickest response,

Sincerely yours,

BENJAMIN BOL AKOK
MINISTER,
REGIONAL MINISTRY OF AGRICULTURE
ANIMAL RESOURCES, FORESTRY ANF

Ref.: MAFNR/MO/5/A/9

Date: 22nd./October/1978.

(C O P Y)

Mr. Alan Williams,
Director,
International Voluntary Service,
P.O. Box 1926,
Khartoum.

Dear Mr. Williams,

This is with reference to the letter from Mr. Benjamin Bol Akok, Minister, Regional Ministry of Agriculture, Forestry, Irrigation and Animal Resources, Southern Region addressed to you with copy to me.

The request for assistance in the rehabilitation of Yambio Research Station is in close harmony with our plans and Mr. Benjamin Bol's letter has my full support. I was also pleased to note that you concur fully with the recommendations of the team from the Agricultural Research Corporation (ARC) on the rehabilitation and re-activation programme for the station.

Further plans of the assistance programme and details of the project can, therefore, be pursued in collaboration with the Directorate of ARC and the Head of Yambio Research Station.

Best regards.../..

Yours sincerely,

Dr. Abdallah Ahmed Abdallah
Minister of Agriculture,
Food and Natural Resources

Appendix V

AGRICULTURAL RESEARCH CORPORATION

ARC was originally set up in the 1920's as the Gezira Research Station. In 1977 the corporation was established in its present form by the Agricultural Research Corporation Act, with responsibility for almost all agricultural research in the Sudan.

Based at Wad Medani, 100 miles south of Khartoum, ARC is a semi-autonmous body administered by the Agricultural Research Council, a sub-council of the National Council for Research, and directly responsible to the Minister for Agriculture and Natural Resources. The Director General of ARC is nominated by the Minister and appointed by the President; he is also chairman of the Management Board. Board members include:-

Deputy Director ARC, Directors General of Gezira Public Agricultural Production, Merchandised Farming and Rahad Corporation, Under-Secretary for Agriculture, Director for Agriculture - Southern Region, Dean of Faculty of Agriculture at Khartoum and Juba Universities, representatives of finance and Industry Ministries and Agricultural Bank, and three members appointed by the President.

The Board meets twice annually and approves the budget, plans agricultural research policy for the coming year, approves and appoints scientists and officials, submits proposals to the Minister for appointment of Deputy Director General, Heads of Sections and main stations.

ARC is funded by an annual GOS contribution based on the Board's budget proposals, from the sale of crops and other products, grants from local and international institutions, and income from sale of publications and services. Recurrent fund allocations in 1977/78 totalled LS 3.1 million. ARC operates five Regional Stations and twelve sub-stations. Current staff is approximately 250 senior staff, 420 technicians, 175 administrative support staff and about 3000 labourers.

ARC headquarters is expected to be moved from Wad Medani during 1979 under the planned reorganisation and expansion programme.

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Appendix VI

ARC PROPOSAL OF YAMBIO ARS

REACTIVATION OF YAMBIO RESEARCH STATION

Introduction:

A team of three research scientists was designated by the Minister of Agriculture, Food and Natural Resources to pay a visit to Yambio Research Station and other related centres in the Southern Region, hold discussions with those concerned and prepare a report on the reactivation of the station.

The team was formed of the following:

(a) Dr. M Bakheit Said, Head of Soil Science Section (Team Leader).

(b) Dr. M Salih Hassan, Head of Horticultural Researc Section (Member).

(c) Dr. B Ahmed Saleem, A/Head of Agronomy and Crop Physiology Section (Member).

The team arrived at Juba on 6 November 1977, but due to lack of transport it was not possible to depart from Juba to Yambio on 9 November as originally planned. As a result, the original itinerary was altered and a copy attached.

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The contents of this report are discussed under the following three headings:-

1. Establishment and Past Research Achievements.
2. Present Status of the Station.
3. Reactivation of the Station

1. Establishment and Past Research Achievements

Yambio Research Station was established in 1948 to cater for the development of the Zande area. Until 1955, the scientific staff of the station comprised two agronomists, a soil scientist and an entomologist. From 1955, the number of scientists was reduced to only one agronomist until the early sixties when the number was again increas to three (two agronomists and a soil scientist). Followi the civil disturbances in 1964, all senior staff were withdrawn and the experimental work at the station was practically abandoned.

Since the initiation of experimental work at Yambio Research Station, various studies have been made on a number of crops, including cotton, food and plantation crops, but the first work was mainly in connection with cotton production to support the Zande Cotton Scheme. One of these early carried out studies was the Socio-Agricultural Survey which provided information as to the

nature of Zande agricultural practice and helped in sharing the experimental programme. The trials undertaken included cotton variety trials, spacing, dates of sowing, crop association, crop rotations, rate of soil exhaustion, response to fertilizers and mulches and residual effects of treatments.

Information obtained from the trials showed that it was better to grow cotton alone, but it was also practical to sow cotton in June into leguminous crops sown early in April. This was found to be the earliest reliable time for planting to obtain a good early crop without seriously affecting cotton yield. The local practice of sowing cotton in the first half of June was found to be near optimum ensuring that the crop would grow in the second half of the rains and that picking would take place at the beginning of the dry season.

The results of experiments on continuously cropped plots indicated that crops yields dropped to uneconomic levels after about three years continuous cropping on the same piece of land. This finding supported the local practice of bush fallowing after the second or third year of cultivation. The decline in yield was believed to be a result of exhaustion of plant nutrients from the soil. The practice of bush fallowing was also found to keep

the troublesome weeds mainly Imperata cylindrica, under control.

Results from further experiments showed that crops responded to the application of nitrogen, phosphorus and light grass mulch, but made no response to the application of potassium or calcium. The response to mulching appeared to depend largely on whether moisture was a critical factor or not. Another effect of the mulching was the depression of weed growth. The results also indicated a response to the residual effects of the treatments.

In another Continuous Cultivation Experiment, the effects of different methods of seedbed preparation, mulches, chemical fertilizers and farmyard manure were compared. The results showed that the applications of grass mulch, farmyard manure and chemical fertilizers were effective in increasing yields of seed cotton. Crosstying to conserve moisture was beneficial in some seasons, and failure to keep fields clean of weeds decreased crop yields. The results also indicated the carrying over effects of the manure and the chemical fertilizers to various crops.

Work on soils was mainly directed to nutrient and moisture studies and most of the soil sampling was done in conjunction with the long-term experiments. The soils are generally of low nutrient status and susceptible to erosion. Soil moisture studies indicated the great porosity of these soils and the very rapid movements of water which occurred. Drying out was found to be quickest under forest growth, next under grass and crops which withered in December and slowest under conditions of dry farming. Studies on local soils indicated that drying out was much slower on a juvenile norite profile than on a mature ironstone propile, suggesting a higher field capacity on the former which might partly explain the higher productivity of norite soils in terms of permanent plantations. The lack of laboratory facilities and the absence of the essential services of gas, electricity and water seriously hampered the experimental work.

Entomological work in the station and in the district showed that stainer bug, pink bolloworm and Helopeltis were the most serious cotton pests, stainer bug being the predominant entomological factor in lowering yields in the district. Stainer bug was also found to affect cotton seed viability and to decrease its oil content. Control by spraying was done on a limited scale. Precautions suggested to minimise deterioration in cotton seed were: picking of cotton without delay, adequate drying of the

seeds, storing the seeds in a cool, dry rainproof place, and use of seeds for sowing only from Grade I cotton from the early picks. During our visit to Yambio, we have been informed that poor seed germination is one of the problems facing cotton production at present.

In addition to the above mentioned studies, observation and propogation plots and trials on a variety of food and cash crops were carried out. These included groundnuts, elusine, maize, sesame, rice, cowpea, gram, soya bean, pigeon pea, cassava, coffee, pineapple, oil palm, tea, tobacco, banana, cocoa, tung oil, cashew nuts, pachira nuts, citrus, sugar cane and fibre.

As mentioned previously, more work was devoted to cotton than to any other crops, but when the experimental work was resumed in 1956, it was decided to turn more attenti to crops other than cotton, especially perennial horticu ural crops and food crops. The potential for tropical perennial crops in Equatoria is very high. For this purpose coffee, cocoa and oil palm nurseries were established and coffee, banana, pineapple experiments were laid down. These included banana varieties, pineap spacing, coffee spacing and coffee fertilizers, mulch

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and shade trials. Variety trials and propogation plots of cash and food crops were also carried out. Unfortunately, most of these experiments were discontinued at a very early stage following the break-out of the civil disturbances in 1964.

2. Present Status of the Station

A list of the present staff is attached (Appendix II). It comprises the experimental officer who is in charge of the station, 7 technical assistants, 91 unclassified staff, 4 on consolidated pay and 21 daily-paid labourers. This list should, however, be taken with reservation since a number of the staff are unfit for work because of old age and/or illness. The staff complain from delay of wages, annual increments and promotions. It is the opinion of the team that the station staff should be re-evaluated as to records of service, fitness for work, increase of pay and promotions.

Offices, laboratories and stores are generally in a satisfactory condition and may need minor repairs. The blacksmith and carpenter's workshops require major repair and provision of tools. Apart from a few cultivation implements, e.g. axes, hoes, and slashing knives, the

station is devoid of equipment. Office furniture is limited to a few old tables, and laboratory equipment is lacking. Although all offices and laboratories are provided with electricity wiring and fans, there is no electricity service, but according to the Commissioner of Western Equatoria, the station is considered in Yambio electrification scheme and water supply scheme, which is to be implemented.

(a) With the shift in emphasis to plantation crops, e.g. coffee, cocoa, pineapples and tea, intensive research should be started to solve the problems facing the development and production of these crops. A comprehensive approach to deal with the problems simultaneous should be adopted. The problems of young seedlings as wel as mature trees should be considered.

(b) Agronomic trials on both annual food and cash crops should be continued with the objective of determining the best agricultural practices under the conditions.

(c) Investigations on crop rotations in connection with the soil fertility question should be continued. The

present practice of shifting cultivation as a means of restoring fertility is a wasteful practice and may not be possible if the population increased. Results already obtained from the long-term Continuous Cultivation Methods Experiment showed that the application of grass mulch, farmyard manure and chemical fertilizers all helped to maintain fertility. At the present, there is very little animal husbandry for the production of farmyard manure, and the use of chemical fertilizers may not be economic, though it might be profitable for plantation crops. Use of compost, refuse and cotton seed meal from the ginneries should be tried.

(d) One of the main factors that faces plantation crops production is the length and severity of the dry season extending from 3-4 month from mid-November to early March. Also, high temperatures and erratic rainfall during the growing season sometimes result in reduced yields because of lack of moisture. The need for research on methods of moisture conservation both for annual and for plantation crops cannot be overemphasised.

(e) Expansion in crops cultivation and the introduction of new crops will bring with it an increase in pests and disease, some of which have already been mentioned.

The control of pests and diseases and the enforcement of quarantine regulations are the most vital problems.

(f) The control of perennial grass weeds is a very pressing problem and it should receive great attention in the research programme. The inability of the cultivator to cope with severe weed competition may make him abandon a plot which may still be in good heart and capable of bearing fair crops.

(g) Trials of new crops and use of improved varieties should form an important part of the station's work. It is noteworthy that the Project Development Unit (PDU) at Yei is at present carrying out studies in agronomy, plant breeding, seed multiplication, extension and nutrition. Emphasis is given to food crops, mainly sorghum, maize and groundnuts, with little work on coffee and cotton. On the other hand, Juba University Authorities are exploring the possibility of establishing a sub-campus at Yambio. Co-operative work on problems facing agriculture in the region can be developed between Yambio Research Station and these organizations.

II Staff Requirement

To carry out the proposed experimental programme, a minimum number of nine research scientists is required.

These include a chief agronomist and eight senior scientists specialized in the fields of horticulture, entomology, soil science, botany bredding, pathology, agricultural engineering and agricultural economics. In addition, two senior administrators, namely an inspector of administration and a farm manager are required to run the service work and alleviate some of the administration burden falling on the Head of the station. The chief agronomist, the senior horticulturist and the two senior administrators should be posted to the station in the first year, followed in subsequent years by other disciplines. As for the supporting staff, 19 technical assistants, 44 field and laboratory assistants, 5 clerks, 2 accountants, 1 store-keeper and 181 skilled labourers are required. Many of the supporting staff posts can be filled by suitable persons from the present staff of the station. Staff requirement and phasing out are given in Tables 1, 2 and 3. There will be need to provide training for the staff in Agricultural institutions in neighbouring countries having similar conditions, e.g. Nigeria, Uganda and Kenya. The International Institute of Tropical Agriculture (IITA) has already shown willingness to consider the possibility of assisting in short-term training courses, workshops, visits and post-doctoral fellowships.

III Transport, Farm Machinery and Equipment

The need for reliable transport in this remote area cannot be overemphasised. Money is budgeted for buying a station wagon for group travelling, 11 pickups for staff movement and 3 trucks for transporting supplies and labourers. Machines required for farm operations include a plough, a harrow, trailers, sprayers, a mower, a seed drill, a fertilizer spreader, a hole digger, a disc terracer and a rice huller. Additional money will be required for the purchase of laboratory equipment. Details of transport, machinery and equipment and their phasing out are shown in Tables 4 and 5.

IV Buildings

The present office and laboratory space is adequate for four scientists, two senior administrator and some of the supporting staff, e.g. clerks, accountants and technical assistants. With the proposed number of scientists, there will be need for another five offices and three laboratories. Office and laboratory furniture will be required for both old and new buildings. A workshop, a machinery shed and a car shed will also be required and are included in the proposals. In addition to the present five senior houses will be needed to

accomodate the research scientists and senior administrators. Eight new middle and fifteen junio houses will be required for the supporting staff. In addition, a bachelor quarter will be provided for. Phasing out of the building programme is given in Table 6.

The summary of the proposed budget is presented in Table 7. As will be seen from the table, an operation budget is included to cater for casual labour, stores and supplies, stationery, travels, etc. It should be mentioned that these proposals cater for only one scientist in each discipline, but with future expansion of the work more than one scientist will be needed in some disciplines. Other research disciplines may also be initiated, e.g. forestry.

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Acknowledgements

The team would like to thank H.E. Dr. Gama Hassan, Regional Minister of Agriculture, Animal Resources, Forestry and Irrigation, and the staff of the Regional Ministry for their help. Thanks are also due to the Commissioner, Western Equatoria, for a useful discussion, to the staff of Juba University and Yambio Agricultural Institute for their help with transport to and back from Yambio, and to S/James Hakim, Manager E.P.A.P.C. Nzara, and Mr. Bennett and the staff of PDU for their cordial reception, accommodation, and acquainting the team with their activities.

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2. Ferguson, H. (1954). The Zande Scheme. Bull. No. 14, Ministry of Agriculture, Sudan.

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4. McCall, K. G. and Lea-Wilson, K. L. (1954). Some notes on Zandeland. Memo No. 6, Ministry of Agriculture, Sudan.

TABLE (1) - STAFF REQUIREMENT FOR YAMBIO RESEARCH STATION

JOB DESCRIPTION	SALARY SCALE (LS)	NUMBER REQUIRED
SENIOR STAFF		
Chief Research Scientist	3800	1
Senior Scientist	2800	8
Inspector of Administration	1350	1
Farm Manager	1055	1
SUPPORTING STAFF		
Head Clerk	960	1
Clerk	400	2
Typist	400	2
Head Accountant	960	1
Accountant	400	1
Storekeeper	400	1
Technical Assistants	700	19
Filed Lab. Assistants	400	44
Car Drivers	360	15
Tractor Drivers	360	2
Huller Operator	360	1
Fitter Mechanic	700	1
Welder	360	1
Blacksmith	360	1
Electrician	360	1
Carpenter	360	2
Aprentices	290	2
Labourers (general)	400	150

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TABLE (2) - PHASING OUT THE PROGRAMME FOR REACTIVATING YAMBIO RESEARCH STATION

(Senior Staff - Value in LS)

JOB DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Agronomist	3890	3890	3890	3890	3890
Horticulturist	2800	2800	2800	2800	2800
Entomologist		2800	2800	2800	2800
Soil Scientist		2800	2800	2800	2800
Botanist (Weeds)			2800	2800	2800
Agricultural Engineer				2800	2800
Plant Breeder				2800	2800
Pathologist					2800
Agricultural Economist					2800
Inspector of Administration	1350	1350	1350	1350	1350
Farm Manager	1055	1055	1055	1055	1055
TOTAL FOR SENIOR STAFF	9095	14695	17495	23095	28695

TABLE (3) - PHASING OUT THE PROGRAMME FOR REACTIVATING YAMBIO RESEARCH STATION (Cont'd)

(Support Staff - Value In LS)

JOB DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
(Clerical and Accountancy)					
Head Clerk	960	960	960	960	960
Clerk	400	400	800	800	800
Typist	400	400	800	800	800
Head Accountant	960	960	960	960	960
Accountant			400	400	400
Storekeeper	400	400	400	400	400
SUBTOTAL III	3120	3120	4320	4320	4320

TABLE (3) - Continued

JOB DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
(Skilled Labour)					
Car Drivers	1800	2520	3240	3960	5400
Tractor Drivers	360	360	720	720	720
Huller Operator		360	360	360	360
Fitter/Mechanic	700	700	700	700	700
Welder	360	360	360	360	360
Blacksmith	360	360	360	360	360
Electrician	360	360	360	360	360
Carpenter	600	960	960	960	960
Apprentices	2030	2030	2030	2030	2030
Labourers	40000	48000	50000	56000	60000
SUBTOTAL IV	46570	56000	59090	65810	71250
TOTAL FOR SUPPORT STAFF	60990	78020	85310	96550	106470

TABLE (4) - LIST OF TRANSPORT AND FARM MACHINERY REQUIREMENT FOR YAMBIO STATION

ITEM	PRICE PER UNIT (LS)	NUMBER REQUIRED
Station Wagon	12000	1
Pickups	6000	11
5 T. Truck	9000	1
3 T. Truck	7000	2
Tractors	5175	2
Disc Plough	765	1
Disc Harrow	1635	1
Trailer	1200	2
Motorized mist sprayer	3270	1
Motorized khapsack sprayer	160	6
Knapsack sprayer	60	4
Rotary mower	550	2
Dees drill	1000	1
Fertilizer spreader	500	1
Hole digger	400	1
Disc Terracer	500	1
Rice Huller	3000	1

TABLE (5) - PHASING OUT THE PROGRAMME FOR TRANSPORT, FARM MACHINERY AND EQUIPMENT FOR YAMBIO STATION

ITEM (Transport)	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Station Wagon	12000	-	-	-
Pickups	12000	12000	600	12000
5 T. Truck	9000	-	-	-
3 T. Truck	7000	-	7000	-
SUBTOTAL I	40000	12000	13000	12000
(Farm Machinery)				
Tractors	5175	-	5175	-
Disc Plough	765	-	-	-
Disc Harrow	1635	-	-	-
Trailer	1200	-	1200	-
Motorized Knapsack Sprayer	320	320	320	-
Motorized Mist Sprayer	-	-	-	-
Knapsack Sprayer	-	240	-	-
Rotary Mower	550	-	550	-
Seed Drill	-	-	-	1000
Fertilizer Spreader	-	500	-	-
Hole Digger	-	400	-	-
Disc Terracer	-	500	-	-
Rice Huller	3000	-	-	-
SUBTOTAL II	12645	1960	7245	1000
Lab Equipment	16000	16000	3000	5000
SUBTOTAL III	16000	16000	3000	5000
TOTAL FOR TRANSPORT, FARM MACHINERY AND EQUIPMENT	68645	29960	23245	18000

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TABLE (6) - PHASING OUT THE BUILDING PROGRAMME FOR YAMBIO

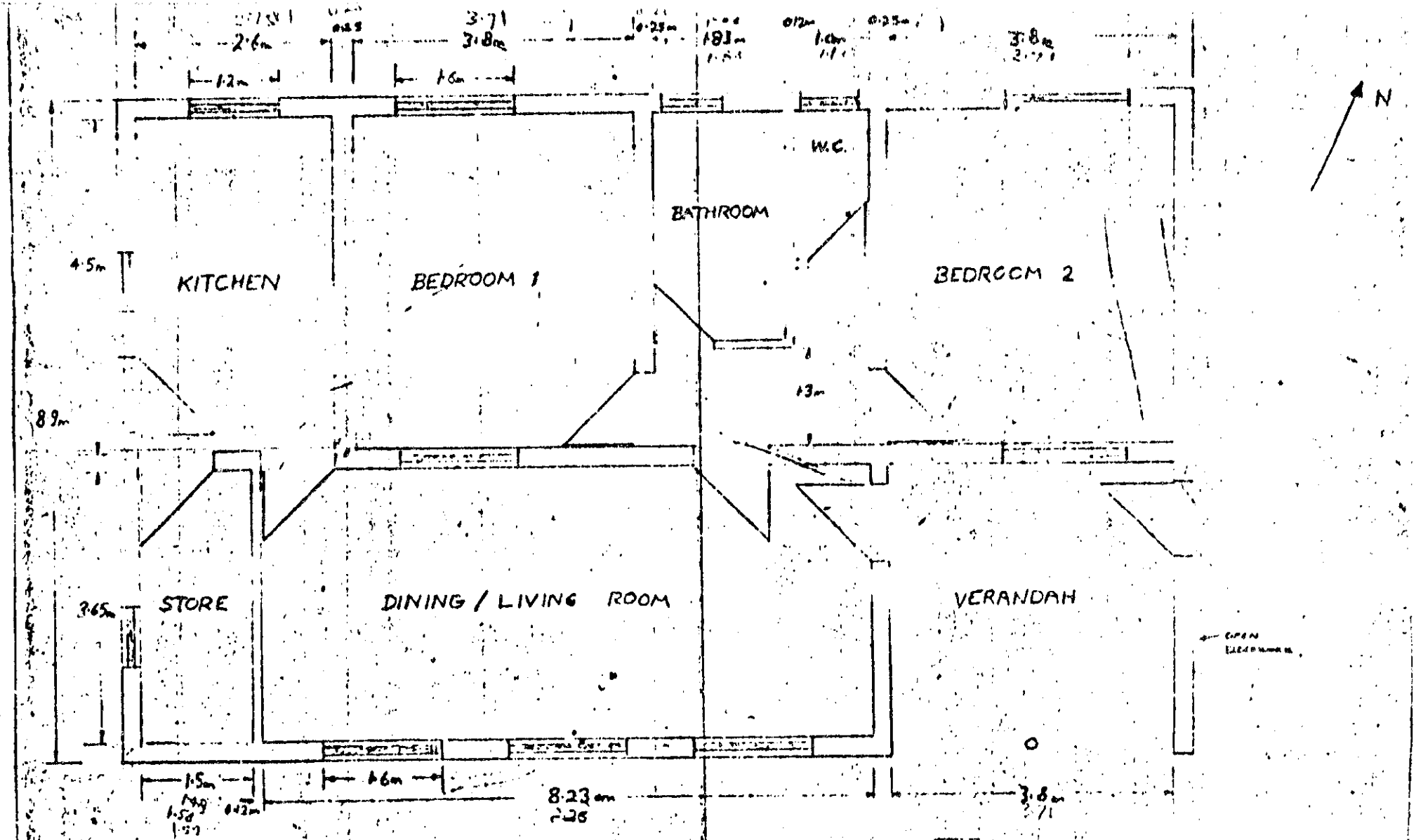
(Costs in LS)

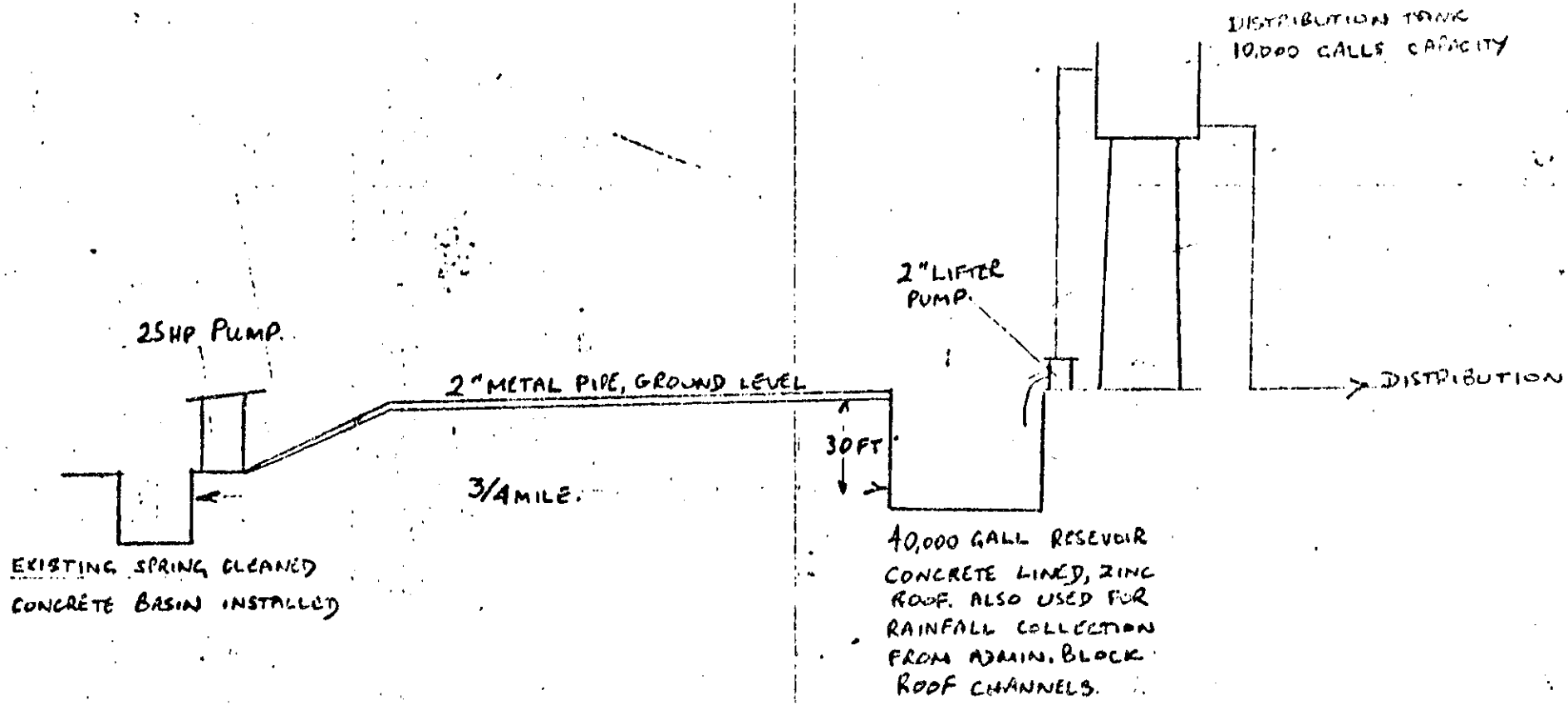
ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Senior Houses		13000	13000	26000
Senior Rest House	13000			
Middle House	9000	18000	9000	18000
Junior Houses I		12000	12000	12000
Junior Houses II		8000	8000	8000
Bachelor Quarters				13000
Offices & Lab		15000	10000	
Workshop	6000	2000		
Car Shed		2500		
Machinery Shed	1500			
Nursery	2000	1000		
SUBTOTAL I	31500	71500	52000	77000
(Furniture)				
Offices	2000	1000	500	1000
Lab	4000	10000	2000	2000
SUBTOTAL II	6000	11000	2500	5000
TOTAL FOR BUILDING & FURNITURE	37500	82500	54500	80000

TABLE (7) - SUMMARY SHEET FOR DEVELOPMENT AND OPERATION BUDGET FOR YAMBIO RESEARCH STATION

(Costs in LS)

ITEM		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Salaries:	Senior Staff	9095	14695	17495	23095	28695	93075
	Support Staff	60990	78020	85310	96530	106470	427320
Transport, Machinery & Equipment		68645	29960	23245	18000	39270	179120
Building & Furniture		37500	82500	54500	80000	61000	315500
Operation		9000	17000	20000	26000	32000	104000
TOTAL		185230	222175	200550	243625	267435	1119015



YAMBIO SENIOR STAFF HOUSE Nº 5 : PROPOSAL [3]

SKETCH OF PROPOSED WATER SYSTEM YAMBIO A.E.S.