PD-AAC-120-B1 6750201 (2)

AGENCY FOR INTERNATIONAL DEVELOPMENT

# PROJECT PAPER FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE (X' APPROPRIATE BOX) [X] ORIGINAL [ ] CHANGE [ ] ADD [ ] DELETE

PP

DOCUMENT CODE 3 164

2. COUNTRY/REGIONAL ENTITY/GRANTEE: GUINEA

3. DOCUMENT REVISION NUMBER

4. PROJECT NUMBER: 675 0201

5. BUREAU: A. SYMBOL: AFR; B. CODE:

6. ESTIMATED FY OF PROJECT COMPLETION: FY 81

7. PROJECT TITLE - SHORT (STAY WITHIN BRACKETS): Guinea Agricultural Production and Trng.

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL MO. 01 YR. 73; b. FINAL FY 81

9. SECONDARY TECHNICAL CODES (MAXIMUM SIX CODES OF THREE POSITIONS EACH)

10. ESTIMATED TOTAL COST (000 OR EQUIVALENT, $1=)

| A. PROGRAM FINANCING | FIRST YEAR a. FX | b. L/C | c. TOTAL | ALL YEARS d. FX | e. L/C | f. TOTAL |
|---|---|---|---|---|---|---|
| AID APPROPRIATED TOTAL | 605 | | 605 | 4,890 | | 4,890 |
| (GRANT) | ( 605 ) | ( ) | ( 605 ) | ( 4,890 ) | ( ) | ( 4,890 ) |
| (LOAN) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| OTHER 1. | | | | | | |
| U.S. 2. | | | | | | |
| HOST GOV. MAINT | | 127 | 127 | | 1,651 | 1,651 |
| OTHER DONOR(S) | | | | | | |
| TOTALS | 605 | 127 | 732 | | 1,651 | 6,541 |

11. ESTIMATED COSTS (AID APPROPRIATED FUNDS) ($000)

| A. APPROPRIATION ALPHA CODE | B. PRIMARY PURPOSE CODE | C. PRIMARY TECH. CODE | FY a. GRANT | b. LOAN | FY c. GRANT | d. LOAN | FY e. GRANT | f. LOAN | g. GRANT | h. LOAN |
|---|---|---|---|---|---|---|---|---|---|---|
| TA/FN | | | 605 | | 3345 | | 580 | | 4,890 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TOTALS | | | 605 | | 3345 | | 580 | | 4,890 | |
| 12. ESTIMATED EXPENDITURE $ | | | | | 12600 | | 1200 | | | |

13. PROJECT PURPOSE(S) (STAY WITHIN BRACKETS) [ ] CHECK IF DIFFERENT FROM PID/PRP

The purpose of this project is to assist the Government of Guinea in the removal of constraints to development in the agricultural sector.

14. WERE CHANGES MADE IN THE PID/PRP FACESHEET DATA NOT INCLUDED ABOVE? IF YES, ATTACH CHANGED PID AND/OR PRP FACESHEET. [ ] YES [X] NO

15. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Philander Lyman

TITLE: Director, Office of Development Services, Bureau for Africa

DATE SIGNED: MO. DAY YR.

16. DATE RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MO. DAY YR.

AID 1330-4 (9-75) 2/3/76

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FEB 9 1976

ACTION MEMORANDUM FOR THE DEPUTY ADMINISTRATOR

THROUGH : ES

FROM : AA/PPC, Philip Birnbaum

SUBJECT : Guinea Agricultural Production Capacity and Training Project

Problem: Approval of Phase I of Project Paper.

Background: The attached Project Paper has been endorsed by the Project Committee subject to fulfillment of FAA 611(a) and (e) requirements. The Government of Guinea is anxious to receive an early A.I.D. commitment to assist its national agricultural research/education/extension programs. (See Conakry 1824 and Mulcahy/Scott Memorandum attached at Tab A.)

The project is intended to assist the GOG increase production of food crops through (1) development and strengthening of research/education/extension complex at the principal National Faculty of Agronomy and National Agricultural Research Institute, as well as one regional vocational school of agriculture, and (2) establishment of an agro-pastoral demonstration farm and research sub-station near the vocational school on the Niger River flood plain. AID's proposed involvement consists of: twenty man-years of U.S. resident technical services; twelve man-years of participant training in the U.S.; funding for equipment and supplies, and construction of research, demonstration and training facilities; and U.S. consultant services over the five-year life of the project. The total dollar cost of the project is estimated at $4.9 million and the GOG contribution of PL 480-generated local currency is estimated at $1.6 million.

In order to satisfy both the requirements of Section 611 of the FAA and the pressing request of the GOG, the attached Project Paper reflects project implementation in two phases:

- Phase I consists of initiation of A & E services for preliminary design and firmer cost estimates for construction, graduate-level participant training for seven Guinean agriculturalists and short-term U.S. consultant services to refine commodity requirements and to assist in the redesign of GOG research programs and agricultural curriculum.

- Phase II consists of implementation of full TA, construction and commodity elements.

While there is no capital component in Phase I, your authorization to proceed with Phase I at this time is requested in light of Phase II capital contributions of over $2 million. It is proposed to negotiate

and execute a Project Agreement with the GOG for Phase I at an AID cost of $188,000 in FY 1976 funds which will also provide that the U.S. will consider proceeding with Phase II subject to clarification of design and costing for construction, availability of funds, and AID approval of Phase II of the project. This project was included in the FY 1976 Congressional Presentation at a funding level of $605,000. We anticipate proceeding into Phase II in late FY 1976.

The only remaining issue is a GOG loan repayment delinquency. The GOG has not, to date, repaid $29,000 of principal and interest due on loan 007 since September 5, 1975. Because the period of default does not exceed six months, AID is not prohibited from providing assistance to the GOG. Pursuant to recent communication with the GOG, AID anticipates that the GOG will make the delinquent repayment in advance of the effective date for a 620(q) prohibition action. Accordingly, the ProAg will not be executed if the 620(q) prohibition is in effect at the time of execution, nor will the ProAg be executed, prior to the effective date of the 620(q) prohibition, if the Bureau has reason to believe that the GOG does not intend to bring their loan account current.

An A & E firm is prepared to conduct design/costing work under a SER/ENGR requirements contract as soon as the ProAg for Phase I is signed, and AID and the GOG are ready to negotiate the ProAg, subject to the authorization requested herein, in early February.

Recommendation: That you approve execution of a Project Agreement for Phase I activities as set forth above for a total initial AID commitment of $188,000 in FY 1976 TA funds and a GOG local currency commitment of $67,000.

APPROVED _____

DISAPPROVED _____

DATE _____

Clearance: AFR/DS:PLyman (draft)
AFR/CWR:DShear(draft)
AFR/GC:EDragon(draft)
SER/ENGR:JCabrero(phone)
AF/EPS:ESegall (draft)
AFR/DP:RHuesmann (draft)
DAA/AFR:DSBrown
AA/AFR:SScott
PPC/DPRE:AHandly
GC:CGladson

AFR/DS:LMMould:dm 2/3/76

M. Equipment List for Demonstration Farm/College
N. Equipment List for Research Stations
O. Conakry Airgram No. A - 53, L.O.U.
P. Conakry Telegram No. 1824, L.O.U.
Q. Mulcahy/Scott Memorandum, Confidential

# DEVELOPMENT OF GUINEA AGRICULTURAL PRODUCTION CAPABILITY AND TRAINING

## Part I - Summary and Recommendations

### A. Background

Guinea's economy is stagnant and per capita GDP ($79 in 1973) is declining. The agricultural sector employs about two-thirds of the labor force and produces nearly 50 percent of GDP. Bauxite and alumina are the primary foreign exchange earners (86% of export value) and agricultural exports constitute nearly the entire balance of hard currency receipts (13%). Guinea since independence in 1958 has been a deficit country and is one of the world's MSA countries.

All A.I.D. missions that visited Guinea since 1974 have been favorably impressed with the vast agricultural development potential in that country. The high rainfall, favorable climate, abundant resources and fertile soils (of which there are seven million cultivable hectares with less than 1.4 million hectares under cultivation) are the reasons for this assessment. However, certain constraints to the realization of this development potential have been given as the lack of sufficient available consumer products for the market, a soft national currency unsupported by gold reserves or production, absence of incentives for cultivators to increase production, lack of sufficient research/extension infrastructure and a dearth of qualified agricultural technicians, planners and administrators.

Other constraints to development include 90% illiteracy, weak agricultural infrastructure and weak governmental institutions. The paradox is that Guinea, once the breadbasket of West Africa and a major exporter of food crops

such as rice, has turned into a net importer of 60,000 tons of rice annually to meet the basic needs of its population growing at a rate of 2.6 percent per annum.

The relative isolation of Guinea from the several international and regional agricultural research organizations during the last two decades since independence in 1958, have deprived it from the many available research benefits that have accumulated during the last 17 years. Consequently, it agricultural research and training programs are relatively impoverished, leading in turn to continued underutilized agricultural productive capacity.

B. Project Description

In its request to A.I.D. for assistance in the agricultural development sector, the Government of Guinea has given priority to large agro-pastoral complexes that would have required considerable capital inputs. However, due to A.I.D. budget limitations and the limited absorption capacity of development by Guinea at this stage of its development, A.I.D. has opted to follow a course of action that will permeate the Guinean development strata and its infrastructure throughout the agricultural economy. This action is to assist in the development and strengthening of the Education/Research/Extension complex at the principal National Faculty of Agronomy and National Agricultural Research Institute at Foulaya, as well as the regional vocational school of agriculture in Faranah, located 94 and 220 miles respectively northeast of Conakry. The second major component of this proposed assistance consists of the establishment of an agro-pastoral demonstration farm and research sub-station on the banks of the Niger River 10 kilometers southeast of Faranah.

The purpose of this 5-year assistance program will be to train agricultural researchers, extensionists and administrators and to improve the depth and scope of agricultural research and production techniques. Also, this project will demonstrate to the GOG the benefits of an integrated approach to agricultural education, research, practical training, and production to achieve the goal of increased agricultural production for domestic self-sufficiency in food and for increased foreign exchange earnings.

A.I.D. project inputs will provide 20 man-years of U.S. resident technician services, 12 man-years of U.S. participant training, funding for equipment and supplies, construction of research, demonstration and training facilities and U.S. consultancies as required over 5 years. GOG counterparts consist of 8 experienced counterpart technicians and P.L. 480 local currency support for all project local costs. No other donor contributions to Guinea are directly related to this project activity.

The GOG will utilize A.I.D.-Africa Bureau procedures to employ IVS-type personnel for implementation of the TA component of the project. Participants and commodities will be handled in accordance with standard A.I.D. procedures. Responsibility for selection, preparation of specifications, documentation, etc. will be jointly shared among the GOG, A.I.D. project manager in Conakry and AID/W. REDSO/WA will provide the necessary A.I.D. approval/monitoring function for the capital component of the project in consultation with AID/Conakry and AID/W. Required reports and evaluations of the capital component will be prepared by REDSO/WA and concurred in by AID/Conakry and AID/W.

C. Summary Findings

The GOG's essential rural development strategy concentrates on raising the productivity of small farmers and on rapid basic mechanization of cooperative agricultural development units throughout Guinea. In order to achieve its goal of rapid increases in agricultural productivity, Guinea needs to greatly expand its pool of trained agricultural manpower and to expeditiously expand and strengthen its agricultural research programs. By assisting the GOG in these twin modalities to achieve increased production, A.I.D. assistance will help to transform peasant, small-holder agriculture into more viable, market-oriented operations.

According to a review of the checklist of statutory criteria, further exploration and definition of issues needs to be undertaken related to the generic topics of democracy, private enterprise and investments and plans for construction of project facilities.

D. Project Issues

The major issue arising in this project is the need to satisfy the requirements of section 611(a) and (e) of the FAA, i.e. firm construction cost estimates and determination of satisfactory prior country performance and potential for adequate implementation of this proposed project. Accordingly, it is envisaged that the project be authorized in two phases- Phase I to include:

- Initial Architectural and Engineering Design with cost estimates for construction and procurement.
- Short-term consultant services to verify and detail laboratory classroom and farm demonstration equipment and to assist in development of research and training curricula.
- Graduate level training of seven Guineans at U.S. universities and institutions in agricultural research and livestock practices.

Phase II to include:

- Procurement and construction within the limitations imposed by AID and the GOG review and approval of architectural and engineering design conducted under Phase I.

- Recruitment and assignment of four AID contract technicians.

At this time, it is strongly urged by the Acting Assistant Secretary of State for African Affairs and the U.S. Ambassador to Guinea that AID and the GOG negotiate and execute a Project Agreement embodying the actions proposed for Phase I which would include a declaration of intent, subject to architectural and engineering design approval, to move to full project implementation contained in Phase II. During its annual review of Guinean agricultural development in October 1975, the GOG signalled the potential contribution of this project and hoped for early agreement to proceed with project implementation. ( See Appendices P and Q .)

E. Recommendations

1. Authorization to proceed to: grant limited TA assistance to the GOG in the form of U.S. participant training, initiate a detailed architectural and engineering study by a U.S. firm for the construction aspects of this project, engage the services of several U.S. short-term consultants to assist the GOG in refining project activities related to the forthcoming revised GOG agricultural curriculum and to further refine equipment needs for agricultural research, and to enter into formal discussions with the GOG to develop and execute a project agreement at the approximate level of $188,000 in TA grant funds and $67,000 in Guinean-owned P.L. 480 local currency for Phase I and including a declaration of intent for Phase II subject to approval of architectural and engineering design.

2. Procurement source waivers will be requested as appropriate for financing the purchase of some construction materials from Geographic Code countries 941 (Third World) and some equipment from Geographic Code countries 935 (Free World). It is anticipated that the firm selected for construction activities will be from Geographic Code countries 941 (Third World), e.g. Mali, Liberia, Nigeria. Total non-U.S. source origin waiver requirements will be determined prior to request for authorization of Phase II activities.

3. It is recommended that AID take cognizance of the extraordinary conditions existing in Guinea and proceed to implement the steps outlined in paragraph 1 above in order that the U.S.G. may respond as rapidly as possible to the GOG's request for agricultural technical assistance.

F. Project Design Team

Fred Bergier, Engineer, REDSO/WA

Keith Byerge, Agronomist, TA/AG

Victor Lateef, Agricultural Education/Research Advisor, ADO/Dakar

Murray Mould, Project Design Officer, AFR/DS

Charles Thompson, Irrigation/Hydraulics Engineer, SER/ENGR

## II. Project Background and Detailed Description

### A. Background

Guinea, a West African country of approximately five million people and a land area total of ninety-five thousand square miles, is bordered by six countries (Guinea Bissau, Senegal, Mali, Ivory Coast, Liberia, Sierra Leone) and the North Atlantic Ocean. In terms of natural resource endowment, the country is among the richest in Africa with areas of arable land and large deposits of bauxite.

Since its independence in 1958, Guinea's economic development has been less than anticipated, and the country is among the least developed in Africa and the world. The primary factors for this retarded economic growth are: (1) the priority objective of socio-political infrastructural development with economic development being a secondary objective, (2) the country's early independence and related loss of support from the French economic community, and (3) Guinea's relative political isolation and lack of economic interaction with many of its African neighbors and the international community.

Recently, the Government of Guinea has demonstrated inclinations to focus more on its economic policies and move toward realization of the country's development potential. The majority of international developmental assistance is from "Eastern Bloc" nations, but development assistance from Western donors and commercial firms is increasingly being sought. The United States, despite the absence of a bilateral AID program in Guinea since 1966, has provided PL 480 sales assistance to Guinea in recent years, and has responded to food emergency drought assistance requests in FY 1975 U.S. commercial firms have $250 million invested in the bauxite industry.

Of Guinea's 95,000 square mile area only about 10% - the coastal plain, the valleys of the big rivers and scattered small tracts of bottom land is presently cultivated, more than half of which lies fallow because of the practice of shifting cultivation . Another 20% of the total area could be brought under cultivation by constructing terraces, embankments, and permanent borders of vegetation to protect the soil against erosion. The remaining land cannot be cultivated because it is subject to severe erosion or because the soil has already been destroyed.

The size of individual farms is limited to the area that a family can cultivate with the simple traditional implements available. No breakdown of farms by size groups is available, but according to estimates based on the size of farm families, total rural population, and total cultivable land, there is about 600,000 farms averaging approximately 10 acres each. Holdings in excess of 25 acres, including land in long-term fallow, are rare.

Ownership of land is communal, with rights to individual plots accruing because of use rather than legal title. While land tenure systems vary among tribes, a family settling a tract of land or clearing it generally is presumed to have obtained for itself and its descendants the right to use it. When a lineage ceases to use a holding, the land reverts to the local community and may be assigned to another lineage. The leader of the lineage group traditionally divides the land among the heads of constituent families, and within the same household various family members may have use rights to different pieces of land.

Beginning in 1960, under the first development plan an effort was made to change the traditional pattern of land tenure to a system of collectives. A Center for Agricultural Modernization was set up in each administrative

As a result of serious 1973 and 1974 food shortages in Guinea, the GOG's present emphasis on agricultural development, and the recognized U.S. expertise in agricultural technology, the U.S. and the GOG agreed to explore possibilities of cooperation in the area of food production. In FY 1974, an AID team travelled over most of the country in an attempt to identify potential areas of assistance in the agricultural sector.

During the course of their travels, A.I.D. project teams found abundant good land and agricultural water throughout Guinea. Even though Guinea is considered to be well endowed when compared to other West African nations with respect to rainfall and agricultural land, crop yields are distinctly low and agricultural production, on the whole, is well below the national potential. Contributing factors to the retarded development of the agricultural sector are both technical and economic in nature. The wide range of natural conditions in the country allows for considerable crop diversification. The major cash crops are bananas, coffee, palm kernels, pineapples, peanuts and citrus fruits, and the principal food crops are rice, cassava, corn, fonio, sweet potatoes, and sorghum. In recent years the government has encouraged the cultivation of cotton, tea, and tobacco to meet the requirements of some newly established processing plants, but output is considerably short of the capacity of these plants. Development of agriculture has been hampered by soil exhaustion, plant diseases, the lack of fertilizers and spare parts, and transportation and marketing difficulties. Moreover, in the past, agriculture had been given a low priority in development plans, and long-term bank credit for rural development has been lacking.

region to provide equipment, training and extension services, but this support proved inadequate - primarily because of poor planning and lack of skilled personnel - and forced collectivization was given up after a few years. A more limited effort to promote voluntary collectivization was made in 1968, but agriculture production still originates almost entirely from family plots. Some isolated cases of collective production activities operate under politically appointed officials.

Rice is the most important food crop produced in Guinea, accounting for more cultivated area than any other commodity. Despite some increases in rice production, domestic output is still well below demand, and large quantities are imported, mainly from the United States and China.

Both upland (dry) rice and swamp (wet) rice are grown. Yields of upland rice are approximately 525 pounds per acre, about half the yields of swamp rice. Upland rice is grown without flooding and may be interplanted with other crops such as corn. Between 30 and 50 inches of rain are required to produce a good crop. As the production of upland rice has been extended and fallow periods shortened, soils have deteriorated. Swamp rice which must stand in water, is grown along the coast and in the flood plains of the Niger River and its tributaries.

The expansion of rice growing into new areas is severely limited by climate and technology. The productivity of the land now under rice cultivation could be greatly increased by improved techniques and by shifting from upland to swamp rice.

During the growing season, diseases and pests are not serious threats, although rice stem borers are believed to be present. The deterioration of

rice during storage, however, is a serious problem, especially in the more humid areas.

Corn of which cultivation is limited to rather small regions because of climatic conditions is grown more intensively than other crops. Frequently, it is planted in the enclosed areas around houses, where the soil is improved by manure and compost. The most serious threats to corn are mildew, leaf blight, smut and rust.

Fonio, an annual grass about 1½ feet high, is second only to rice in area planted, but low yields result in a lower output than corn. Although fonio is grown in a number of places in West Africa, in Guinea is it an essential part of the diet. It is grown in most regions of the country, except in the extreme southeast. Fonio is planted instead of upland rice at elevations above 2,500 feet.

Sorghum and millet are minor crops that are often interplanted with rice or corn, since they are more drought-resistant than either of these crops.

The contribution of livestock to the agricultural economy is small, even though livestock numbers are large. Cattle owners regard their animals more as a status symbol than as a source of food, farm work, or income. Estimates of the livestock population range between 2 million and 3 million head, one-half to three-fourths consisting of cattle and most of the remainder of sheep and goats. Several hundred thousand hogs, donkeys, and poultry are raised. Roughly 110,000 head of cattle are slaughtered each year, and perhaps another 10,000 are exported (on the hoof) to neighboring countries. The quality of meat is generally poor. Domestic meat consumption is less than 9 pounds per capita annually. Livestock raising remains largely traditional and is concentrated in the Fouta

Djallon, which has an abundance of pastureland and springs. Most of the rest of the country is infested by the tsetse fly and therefore is unsuitable for livestock. The animals are generally undernourished and susceptible to disease. They are almost entirely dependent on grazing because no forage crops or hay are produced, and very little grain is used for feed.

The N'Dama breed of cattle predominates, and though well adapted to local conditions, it is small and not very productive. An adult male animal in good condition can reach a weight of up to 725 pounds, but the average carcass weight is about 185 pounds. In parts of neighboring Ivory Coast, where cattle are better cared for, average weights of N'Dama cattle are 25 % to 30% higher.

Guinea's economic policies have also militated against increased agricultural production. There is little incentive for farmers to produce more than is needed for subsistence needs. The softness of the currency unit, the syli, which has no gold backing and is non-convertible discourages increased production for export purposes.[1/] Also, due to a dearth of trade and consumer goods in Guinea, farmers have little incentive to produce more than for their subsistence needs. Consequently, the urban areas (Conakry, in particular) suffer severe food shortages.

Guinean authorities now place considerable emphasis on development planning. The present five-year development plan (1974-78) places the highest priority on development of the agricultural sector. Emphasis is to be placed on achieving self-sufficiency in food crops, expanding the

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1/ The official exchange rate - $1.00 to 20 sylis; unofficial rate (black market) -$1.00 to 200 sylis.

output of export crops, and increasing the production of industrial crops for local processing industries.

Limited technology and economic factors such as the soft-purchasing power of the syli and the lack of consumer goods in the country are major reasons that the farmer has little or no incentive to produce more food than will meet his own needs. While the GOG is moving to generate greater incentives to increase production, these factors have led the Project Identification Team to preclude serious consideration of AID assistance to a pure food production project at this time. This project will direct AID inputs into selected agricultural institutions and create a pilot extension/demonstration farm. The thrust of the project is the transfer of learning and technology which will enhance the capability of those who produce food in Guinea. This package approach will enable the GOG to effectively move toward agricultural development until the economic situation changes to provide more incentives for increased production.

The project as proposed was concurred in by the GOG as it meets their request for assistance in agriculture, and it satisfies the U.S. objective of assisting the GOG in the area of agricultural production.

## II. Detailed Description

This five-year technical assistance project consists of the development of agricultural research, training and extension functions in Guinea in order to contribute to achievements of Guinean self-sufficiency in food production and expansion of agricultural exports. Using a combination of resident U.S. advisors,* short-term U.S. consultants, U.S. training and equipment inputs, training in improved cropping, livestock techniques and agricultural research will be provided to approximately 2,000 junior college students, extensionists, local farmers and agricultural instructors in one of Guinea's seven provinces - Faranah, located in the east central savannah region. Also, equipment, training and short-term consultant services will be provided to the National Agricultural Research Institute at Foulaya, 94 miles northeast of the capital city, Conakry. The twin purposes of the project are to improve the quality of agricultural education and its application, and to improve Guinea's agricultural research programs and capacity.

The complex in the Faranah region will include: (1) establishment of a 110 hectare agro-pastoral demonstration farm at Tindou to serve as a pilot production and training center for students, technicians, local farmers and agricultural faculty; (2) establishment of a small research unit (sub-station of the National Agricultural Research Institute, INRAF) at the Tindou location which will engage in adaptive research required to advance agriculture in the Faranah area and which will also provide limited training for researchers from INRAF and students from Faranah College; (3) upgrading facilities and curriculum at Faranah Agricultural Junior College for a student body of 1,000, and providing practical and research training at the College and the Tindou complex for students and faculty.

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* See Appendix B for Job Descriptions of U.S. long-term advisors.

The second project component will be assistance to the National Agricultural Research Institute at Foulaya (INRAF). Support to this institution will consist of upgrading research facilities through the provision of research laboratories, equipment, supplies, and related logistics items and short-term U.S. consultant services for installation of and training of researchers in research equipment usage and for improved design of research programs. Limited consultant services are planned also for ad hoc classroom instruction of students at the National Faculty of Agronomy which shares facilities with INRAF at the Foulaya complex. In order to insure continuation of high quality research programs beyond the life-of-project, seven experienced GOG technicians/professors will receive long-term U.S. training - 5 professors/researchers for M.S. degrees in agricultural research disciplines and two GOG veterinarians for one year of practical training at a U.S. veterinary institution.

During the five-year project life, in addition to providing practical demonstration and research training, A.I.D. advisors and the involved GOG institutions will design an integrated training/research program which will consist of rotational training and research assignments for staffs of INRAF, Faranah College and the Tindou complex and for GOG technicians assigned to Faranah and the six other GOG administrative regions .

These project components will provide the basis for the eventual achievement of the dual goal of increasing agricultural production for domestic self-sufficiency in food and for increasing agricultural exports. Currently, the GOG views the U.S. and especially A.I.D. as the repository of the most advanced, efficient and rapid techniques for assisting developing countries in agricultural research, education and production programs. The GOG understands and now accepts the need to first create an integrated

research and training infrastructure in order to provide the foundations for eventual self-sustained, high levels of agricultural production. Therefore, this small-scale but high impact project, while training researchers, technicians, farmers and students, also presents the opportunity to transform the Guinean agricultural sector from its current condition of paltry, fragmented operations into a production-efficient sector with integrated planning and management of educational, research and production components.

The current philosophical and operational backdrop in Guinea for agricultural education is ideal for this project's technical assistance package, in that practical (field) training comprises 60% of the national agricultural curriculum. The balance of the curriculum is theoretical (classroom) and laboratory instruction. Heavy emphasis is placed on theoretical instruction which can be readily applied to on-farm situations, i.e. with the presentation of curriculum units in the classroom, simultaneous practical training and demonstration at campus sites and at farm locations provides students with first hand observation and experience in applying theoretical techniques to directly productive farm situations. Furthermore, the GOG's requirement that agricultural education institutions become financially self-sufficient operations through agricultural production for their own sustenance and for revenue to finance their non-food needs, means that there already exists a strong inducement for students and faculty to utilize the most efficient and productive technology in classroom and practical training exercises.

Given these underlying GOG policies, it is assumed that the training and research components of this project will be met with high acceptance among participating institutions and will have excellent prospects for eventual

replication at educational and research centers to be created and upgraded at the regional level throughout rural Guinea. However, besides the technical and managerial constraints to increased Guinean agricultural production, the absence of economic incentives (the lack of free market-pricing and/or realistic government controlled pricing) severely retards production for off-farm consumption, except for limited surplus commoditie which are black-marketed into neighboring countries. Given the absolute stagnation of agricultural production and the overall deteriorating condition of the Guinean economy, it is therefore assumed that prior to the end of the current five-year development campaign (1974 - 1978) the GOG will effect adequate incentives to induce increased agricultural production. Failing this action, the project still will help to create the requisite infrastructure for improved agricultural education, research and production.

Description of Project Facilities and AID/GOG Inputs

The Government of Guinea is attempting to utilize the triangular approach to agricultural development that has worked so successfully in the U.S., i.e., an integrated and coordinated melding of teaching, research and extension. The Faranah/Tindou complex contains all three of these elements. The National Agricultural Research Institute and the Faculty of Agronomy at Foulaya are directly involved through the research sub-station and close ties to the Faranah Agricultural Junior College. Although the Ministry of Rural Development will most probably have major GOG responsibility for implementing the Faranah College and direct control of the Tindou complex the GOG plans to ensure close cooperation and coordination with the Ministry of Education and its Faculty of Agronomy and INRAF. This is motivated and encouraged by political action groups who have a strong role in development projects of the GOG.

Project outputs would result in higher yields from food crops and livestock, providing a model extension/demonstration unit at the Faranah regional level to translate research into practical application by farmers.

A. The Agro-pastoral Demonstration Farm at Tindou

The primary realization of the project will be near the village of Tindou on the Niger River flood plain 10 kilometers southeast of the town of Faranah. This site provides both flood plain and up-land conditions served by a good, hard-surfaced road between the major towns of Faranah and Kissidougou. Aside from a rough dirt road running from the highway to the flood plain and mediocre rice cultivation on the flood plain, nothing but scrub trees, brush and tall grasses exist at the site. The optimum size for the farm has been determined by the design team at 110 hectares. While the size of the farm is considered to be relatively conservative by the GOG, it is deemed to be in line with the administrative absorptive capacity of the GOG and the interests of the USG at this time.* Twenty hectares of the farm flood plain will be devoted to floating, deep water and free flooded rice cultures; 80 hectares of upland will demonstrate renovated livestock range, native livestock range, four-year crop rotation and continuous row-cropping (20 hectares each); and the balance of 10 hectares will be for farm, administrative and classroom facilities and for student, worker and staff housing.

The four A.I.D. project technicians will reside and work primarily at the farm site, accompanied by four resident GOG counterpart technicians

*Also, 110 hectares is the size of "revolution farms" currently being managed by local party units and mechanized work brigades.

and ten farm laborers. Classroom and dormitory facilities for 34 persons* will be used for trainees from Faranah College, INRAF, the Faculty of Agronomy and extension agents from all over Guinea.

A.I.D. technical assistance will be required in the areas of agricultural engineering (construction, mechanics, irrigation and drainage), production agronomy, veterinary medicine, range land development and rice culture (surveying for diking, water control and pump irrigation). One senior level agronomist (contract) and three IVS (International Voluntary Service) types are proposed for the farm and project. Rather than engaging the services of higher paid technicians, the three IVS-type technicians will be more appropriate for the nature of the work and rural conditions in Guinea. The project requires the services of technicians who are strong in community action at the grass-roots level and who function in a manner which enhances the desire of trainees and local farmers to share in decision-making and in the development of technical practices appropriate to local condition

B. The Research Sub-station at Tindou

Contiguous with the Tindou Demonstration Farm will be the Research Sub-station of INRAF. Twenty-five hectares of flood plain will be diked for controlled experimentation in rice culture, staple food crops (corn, sorghum, cassava, millet and yam), vegetable crops, forage crops, and fruit crops - 5 hectares each. Equipment, office, laboratory and residential facilities for four Guinean research technicians and laborers will be provided as part of the administrative area designed for the Demonstration

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*The classroom/dormitory capacity originally was planned for 25 persons but at the request of President Toure has been raised to 34 in order to correspond to the number of administrative districts (arrondissements) in Guinea. It is planned that virtually all technicians (GOG) from each of the 34 districts will be cycled through the demonstration training program.

Farm. The Guinean staff will be selected from among experienced researchers at INRAF and their program will be developed and monitored by the A.I.D. resident technicians, INRAF and short-term U.S. consultant specialists. Equipment for the sub-station will be installed and demonstrated by the latter on a time-phased basis in synchronization with the expansion of research activities.

Extension agents, INRAF and Faculty professionals and agricultural students, as part of their practical demonstration training at the Tindou complex, will directly experience the step-by-step application of agricultural research techniques at the sub-station which are in turn applied to crops and livestock at the Farm. Also, results and recommendations from the sub-station will be passed to INRAF for subsequent distribution of technology for replication in other areas of Guinea having production characteristics similar to the Faranah region.

C. Faranah Agricultural Junior College

Just as the Tindou complex serves as the focal point for demonstration of U.S. agricultural technology adapated to Guinea, the College serves as the proving ground for integration of theoretical and practical training into a cohesive, three-year curriculum for prospective extension workers. It is planned to expand enrollment from the present level of nearly 300 agricultural students* to 1,000 by 1977-1978. All students at the College have completed the Baccalauriat educational level and graduates with the highest grade average, usually five students per year, proceed to Foulaya for continued university training in agriculture leading to

*Faranah College has been a combined facility for agricultural education and teacher training with total enrollment of nearly 800. However, during a meeting with Guinea's President Toure, he indicated to the PP team leader that henceforth the College will have an exclusively agricultural curriculum and expand enrollment to 1,000 students as soon as practicable.

a B.S. degree. The bulk of the College graduates work for the Ministry of Rural Development as extension agent assistants (animateurs) or in other rural service capacities.

Currently, the College is operating in rather primitive and shabby quarters left over from the colonial period. Six classrooms, a small administrative office, two 100-bed dormitories and two medium-sized equipment barns comprise the physical plant to service students, 21 faculty and staff (1974) and 1,530 hectares of rich flood plain under cultivation. The College has no research equipment, laboratory space, audio-visual aids, or potable water, and has only limited textbooks, farm equipment and electric power. Therefore, proposed A.I.D. project assistance includes the construction of three 100 bed dormitories, an infirmary, six more classrooms, a library, three research laboratories and administrative, servicing, equipment and livestock farm buildings. Also, the existing 30-foot, seasonal well will be deepened and improved with purification and distribution equipment. (During the dry season, contaminated Niger River water is trucked to the College).

To round out the College's functional requirements, textbooks and teaching aids, laboratory equipment and limited farm machinery, vehicles and implements will be granted to the College during the second and third years of the project. Concurrent with laboratory equipment deliveries, short-term consultants (US.) will assist in installation of this equipment and its demonstration to faculty and students; subsequent instruction and demonstration training will be provided, as need be, by INRAF staff. On-going technical advice will be provided to the College by the staff from the Tindou complex on appropriate cropping and livestock methods for the 1,530 hectare operation. As mentioned above, the GOG anticipates that the College will

(as well as most other agricultural operations in Guinea) become totally self-financing from its own productive capacity and consequently project technicians will have a major role in assisting the College in applying appropriate techniques in farm management. Thus, the College will not be just an academic exercise, but will provide students and faculty with a total cooperative experience in practical education applied for self-sustained operations.

D. National Agricultural Research Institute at Foulaya (INRAF) and Faculty of Agronomy

This joint university and research complex has been a combined operation since early 1974 when the Faculty of Agronomy was transferred to Foulaya from Conakry.

The Faculty is an integral part of the University of Guinea at Conakry and Kankan and annual enrollment at Foulaya averages 400 students. Its five year Bachelor of Science (equivalent) degree curriculum graduates approximately 140 students each year in the following specialized fields: livestock, agronomy, forestry, soil science and agricultural engineering. The fifth year is devoted to applied agricultural training and to preparation of a thesis or specialized study courses in a particular agricultural discipline.

The campus encompasses an area of 5,000 hectares divided into ten farms of varying sizes including the 800 hectare experimental station. There are laboratories for soils, agro-chemistry, insecticides and herbicides, physiology, cyto-genetics, entomology, radio isotopes, phytopathology, agro-meteorology, fruit technology and a photo laboratory.

Under this project the GOG has requested the following for the Faculty of Agronomy and National Institute of Agricultural Research:

1. Commodities, scientific equipment and laboratory instruments (See Appendix N) to equip the various laboratories, classrooms and the library.

2. The construction of four laboratories on the campus for the following subject matters:

a. Biology
b. Physiology
c. Genetics and Cytogenetics
d. Phytopharmacy

3. Renovation of potable water system, butane gas generating plant, and refrigeration and ventilation systems for research storage areas (including isotope storage facilities).

4. Academic/research consultant services to assist in scientific equipment installation and demonstration and to assist in redesigning research programs. The Dean of the Faculty (who also is the director of INRAF) proposed to the project design team that six resident U.S. professors be made available for a minimum of two years, but the U.S. Embassy has determined that such a large presence of U.S. personnel is inappropriate in terms of the currently desirable U.S. profile in Guinea and also would far exceed the capacity of shared Embassy/A.I.D. logistic support facilities. Therefore, it is recommended that six short-term U.S. consultants be detailed to Foulaya for varying lengths of time for a total of six months per consultant in the following fields:

a. One Nematodist with at least an M.S. degree level and two years of experience. Club, root, and other nematode types heavily infest the banana, pineapple and vegetable crops in the field and at the experimental station. Their identification, study and biological or chemical control are required.

b. One Entomologist with an M.S. degree equivalent and two years of experience. There is a heavy infestation of cereal, vegetable and fruit crops with a wide range of insects and pests which are abundant in the tropical climate of Guinea. They need to be identified, studied and controlled since they are responsible for the destruction of considerable food crops.

c. One Plant Pathologist with a Ph.D. equivalent and two years experience. The heavy infestation of food crops with organisms, fungus, virus and bacteria causes considerable loss of crops due to the warm tropical Guinean climate in which these pathogens thrive. Their identification, study and control is of utmost importance to the Guinean agricultural economy.

d. One Phytopharmacist with an M.S. degree equivalent and two years of field experinnce. He is to identify and study the application and effectiveness of chemicals, insecticides and pesticides on plants and their analyses and tolerance.

e. One Soil Scientist with an M.S. degree and a minimum of two years experience. He is to start a soil classification program,with surveys and soil maps according to new USDA soil classification and soil genesis techniques.

f. One Livestock/Veterinary Specialist with an M.S. degree and two years field experience. He is to revitalize the livestock management and breeding program at INRAF with particular attention to be devoted to training of Guineans in artificial insemination techniques (these services were explicitly requested by President Toure).

All consultants must be able to teach, at least part time, at the Faculty of Agronomy. A fluent knowledge of French, although valuable, is not essential for a highly-qualified technician, according to the Dean. Yet consultants should have a minimum R-2+, S-2+ FSI French capability. These

consultants also will periodically assist programs at Faranah and the Tindou complex for research design, farm management and research equipment installation/instruction.

5. U.S. Participant Training for seven experienced Guinean professors/researchers from Foulaya in the following fields: nematology, entomology, pathology, phytopharmacy, soil-genesis, and veterinary management. Trainees in the five aforementioned scientific disciplines will participate in M.S. degree programs at appropriate U.S. universities (the Dean suggested the University of California at Davis - his alma mater) and the two veterinary technicians will receive one year each of practical advanced training at an appropriate U.S. veterinary institutions. Total training is programmed at 12 man-years at U.S. institutions, plus requisite English language training prior to the commencement of academic/practical training programs. These participants upon completion of U.S. training will return to senior-level teaching/research positions at Foulaya.

6. Short-term training for Foulaya staff, as well as for personnel from the Tindou complex, at U.S. and African agricultural institutions, will be made available as appropriate to the progress of project implementation.

Summary

Technicians, equipment, supplies and construction of facilities form the basis for the refurbishing and energizing of a viable national agricultural training and research system based on limited U.S. technological inputs to the Guinean national research institute and faculty of agriculture, to Faranah College and to the Tindou demonstration farm and research sub-station. The outputs will be the physical plant and curriculum for improved training in and dissemination of improved agricultural technology through existing Guinean educational and extension systems. This trial project will

determine Guinean acceptance and adaptability to advanced technologies introduced by a non-Guinean entity. Based on evaluations of this initial effort, subsequent expanded A.I.D. assistance could build on the solid infrastructure and experience already created and gained in Guinea.

## III. Project Analyses

The following analyses (technical, financial, social and economic) provide evidence as to the worthiness of Guinea (an MSA) as a recipient of this kind of technical assistance grant. However, due to the lack of reliable and current statistics on the Guinean economy, especially in the agriculture and education sectors, and the reluctance of the GOG to provide further quantitative and qualitative information on project components and modalities until A.I.D. is ready to negotiate the Project Agreement, the analyses are cursory. Also, in visualizing the Guinean context, the reader should bear in mind that Guinea has no functioning economy, no finished or semi-finished construction or equipment stocks, no private enterprise and very limited governmental managerial manpower.

### A. Technical Analysis

#### 1. Introduction

The basic concept of education/research/extension is at the heart of agricultural development in the United States and other parts of the world. This concept, followed by the land grant colleges in the U.S., is also envisaged by the Government of Guinea. The combined programs of education by the Faculty of Agronomy and National Institute of Research at Foulaya with the extension program emanating from the Faculty of Agronomy to be implemented in the Faranah region, and the educational facilities at Tindou and Faranah form the basis for realizing this concept. During a meeting with President Toure, he emphasized to the design team leader that

this basic concept underlies all GOG planning and implementation in the agricultural sector. Furthermore, he lauded the "A.I.D." approach to training and extension activities for the Tindou and Faranah elements of the proposed project.

2. Tindou Agro-pastoral Demonstration Farm Site

Located 10 kilometers southeast of Faranah in the east/central region of Guinea, the farm site lies in a savannah rolling plain area with 1.5 meters average annual rainfall and an average temperature of 77 degrees. The 110 hectare area proposed for the site has varied degrees of slope and a total topographic variation of approximately 100 feet. However, no topographic or soil maps are known to exist for the area (except those made and ferreted away by the former French colonial administration). Since such maps are a prerequisite for the erection of dikes and irrigation perimeters in order to determine the contour of the land and suitability of soil for dike-fill material, new maps will need to be prepared prior to initial land-leveling and dike construction activities.

A few surface soil samples taken by the design team have been forwarded to INRAF at Foulaya and the USDA soils laboratories for nutrient analysis. The soil profile observed at one eroded point at a depth of five feet showed no hardpan. Overall, the soil is alluvial loam, superior in tilth, permeability and capillary action and of medium texture which makes it suitable for growing a wide range of food and forage crops. Such crops can include all the best adapted and highest yielding cereal, vegetable, forage and fruit crop varieties grown at the experimentation demonstration station including the possibility of seed multiplication, vegetable and fruit tree nurseries. With proper scientific management the application of fertilizers, insecticides, pesticides, weed control, and supplemental irrigation when

required, the demonstration farm will be transformed into an excellent pilot project for the entire region.

Facilities at the Tindon Farm will consist of farm buildings, residences for A.I.D. project technicians, their Guinean counterparts and farm laborers, and a classroom/demonstration area and a dormitory for 34 students.* Appendix D provides a detailed listing and preliminary cost estimates for these facilities as well as estimates for diking, irrigation perimeters and improvement of the Farm's service road.

As stated above, the Farm will provide training and demonstration in improved cropping techniques and livestock management based on current local crop and livestock preferences and on introduction of superior adaptive crop and livestock strains developed by international research centers. Appendix C details the farm schema and crop rotation patterns. Requisite farm equipment and supplies are specified in Appendix M. In addition to these basic requirements, a potable water system and a reliable electrical supply system are necessary for the Farm; these facilities will also serve the adjacent INRAF research sub-station.

During the initial year of the project, major emphasis will be focused by the Farm technicians on operationalizing the farm, i.e. supervision of equipment installation, seeding of cropped areas, purchase and management of livestock material, and integration of Faranah region agriculturalists into the planning of rotational training for local farmers, extensionists and students from Faranah College. Second and third-year activities will consist

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*A small kitchen/dining facility will be included in the dormitory to provide basic meals to short-term student/staff residents. This facility will be operated periodically in response to varying short-term training programs.

of continued farm management and supervision with particular emphasis on development of adaptive technologies for dissemination through training programs and through training of extensionists. Fourth and fifth year operations will emphasize transfer of training and management functions to Guinean counterparts and extension agents as well as moving toward self-financed operations with the possibility of expanding the demonstration and rice production areas to the flood plain adjacent to the 110 hectare site to include mass production techniques suited to the capacities of local mechanized production brigades.

3. Tindou Agricultural Research Substation

Contiguous to the Tindou Farm will be the Faranah region agricultural research substation of INRAF. The initial establishment of this substation will be a joint undertaking of this project in cooperation with INRAF.

The selected site for the experimentation/demonstration station borders on the Niger River which inundates the area annually from August to October. Cultivators usually plant the land in rice immediately after the recession of the river thus making use of the underground moisture to grow a successful crop. A dirt filled dike, 3 meters high, will be constructed to protect the land from the overflow and to impound water for application of the experimentation/demonstration tests throughout the year. Land levelling and a network of irrigation and drainage canals with facilities for a sprinkler irrigation system also will be installed (See Appendix C for earthwork design).

The station will be divided into five equal tracts of five hectares each for the following crops:

1. Rice cultivation including varietal, fertilizer application, weed control, cultivation methods and management demonstrations of the various types of rice.

2. Staple food crop demonstrations of corn, sorghum, cassava, millet and yam. Uniform varietal tests, fertilizer applications, spray schedules, herbicide use, supplemental irrigation application to be included.

3. Vegetable crop demonstrations to include potatoes, tomatoes, eggplants, onions, okra, carrots, squash, lettuce, peppers, cucumbers, beans, peas, spinach and melons. Varietal demonstrations with different rates of fertilizer application, pesticide spray, dates of planting and harvesting, weed control, irrigation, application and use of scientific management techniques of production will be included.

4. Forage crop demonstration of different forage crops, their periodic cutting, weighing and placement of silage in a demonstration silo to be dug at the station for livestock consumption.

5. A fruit demonstration section to include all adapted fruit in the region and which can grow in abundance as observed in the Faranah region. These fruits will include pineapples, bananas, mango, papaya, oranges, tangerines, grapefruit, lemons and other tropical and subtropical fruits.

An office building, storage building and a medium-sized research laboratory (50 square meters) will adequately serve the needs of the four Guinean resident researchers, of the research program and of the research demonstration program. The 34-student classroom facility of the Farm also will be available for the sub-station training program. Equipment for the sub-station is included in the equipment and supplies specified in the list

for INRAF (Appendix N) and will be apportioned according to results of consultation among INRAF and project staff and consultants. A small contingency fund of $10,000 will be reserved for supplemental equipment purchases as needs are determined during the course of project implementation. Potable water, electric power and cropping equipment for the sub-station will be shared with the Tindou Farm.

Sub-station operations should commence during the second year of the project concomitant with construction and equipment deliveries at INRAF. Thus, the short-term consultants advising INRAF also will guide the establishment of coordinated research and training at both facilities. During the fourth and fifth years of the project, research findings and recommendations obtained at the sub-station will be available for integration into the Faranah College curriculum, INRAF programs and for dissemination to extensionists working in similar climatic/crop areas throughout Guinea. Sub-station staffing by four experienced researchers from INRAF will be supplemented by short-term U.S. consultant services and will be under the general direction of U.S. and Guinean project managers.

4. Faranah Agricultural Junior College

Appendix D details items requested by the GOG for Faranah College. The planned increase in agricultural student enrollment to 1,000 by 1977/78 far exceeds current capacities. Existing facilities, constructed in the pre-independence period are primitive and rundown; without a doubt, adequate conditions for even passing essential information to students currently do not exist: classrooms are poorly lighted, not weather-tight and often are used for non-teaching purposes, e.g. shelling peanuts and making cloth sacks. Two medium-sized, old dormitories house approximately 450 resident students.

As noted above, potable water is seasonal from an open 30-foot well, and during the dry season, contaiminated Niger River water serves the College.

Therefore, additional modest structures are required to up-grade the College to the point of providing minimal conditions for an educational environment. Specifically:

- 3 Dormitories of 100-bed capacity for a total College residential capacity of 750 students.
- 6 Classrooms of 50-student capacity* for a total College capacity of 12 classrooms for simultaneous instruction of 600+ students.
- Library for 34 persons.
- 25-bed Infirmary building.
- 8-Room office building. Currently there is one large office which serves the entire College administrative and faculty staff.
- Farm and equipment buildings as specified in Appendix D.

At present, the College has been recessed since January 1975 and is planned for re-opening in early 1976, following the national review and development of revised curriculum for all educational levels and institutions in Guinea. Therefore, it will be necessary to delay final design of buildings and determination of equipment needs until the College is again operational. To this end, the A.I.D. project manager in Conakry will follow initial implementation of the new curriculum and request appropriate short-term U.S. consultant services required to round out this portion of the project design.

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* The College proposed 3 classrooms, each to hold 50 two-student benches. Clearly, this crowding would detract from optimum learning conditions.

Foulaya Complex: National Agricultural Research Institute (INRAF) and Faculty of Agronomy

A full description of the capacities and operations of Foulaya are provided at Appendices F and F. It should be noted that while the overall level of academic sophistication currently in evidence will serve as an adequate base upon which to build a viable national agricultural research and university facility, the following provides a general characterization of the extant constraints to be ameliorated by proposed A.I.D. project assistance:

a. Research Programs and Facilities: Despite the presence of eleven Bulgarian research technicians, research programs are sophomoric and casually pursued with little integration of work between Bulgarians and Guineans.* No evidence exists to support INRAF's claim that there are planned and time-phased research programs. Rather, great attention is paid to directly productive activities to ensure maintenance of the Foulaya farm's seasonal productive capacity - the only source of revenue and food stuffs for these institutions. All facilities date to the pre-WW II era and while sturdy, are either crowded or disfunctional, e.g. non-functional water supply system and a few old and [sparse] rudimentary research instruments to be shared among many.

b. Administration: The Dean of the Faculty (and Director of Research) assumes managerial and decision-making responsibility for all aspects of institutional operations. Lack of adequate management staff and the Guinean style of collaborative group decision-making mean that

* Observation: At the close of one protocol/work session at Foulaya, the Governor for the administrative region lauded the probability of the provision of U.S. advisors who would be "real research technicians". His statement was met with roaring applause and smiling acknowledgments from the Guinean staff.

the Dean must enter into matters of the most mundane nature.

c. Health and Sanitation: All residents of the Foulaya Complex are relatively healthy compared to the norm of the Guinean population. However, diets do not have high protein content, the water supply is polluted and sanitary facilities are sparse and nearly inoperative. Nearly all persons there exhibit low energy and limited capacity for sustained intellectual and physical activity.

d. Given the GOG policy of self-sufficiency in institutional operations (i.e. agricultural institutions no longer receive recurrent or capital budget allocations) funds for building and equipment are very marginal.

This portrait of the Foulaya Complex shows a strong need for a competent, outside technical assistance at all levels of operations. However, A.I.D. cannot assume the full burden of making Foulaya a viable national agricultural entity - the needs are too grand and the predetermined level of U.S. presence in this project is essentially fixed. Therefore, it is proposed that the combination of provision of four additional research laboratories, laboratory equipment and supplies and rejuvenation of electrical and water supply systems from the core of initial commodity assistance. The vital element of the A.I.D. input will be carefully time-phased injections of superior technical services by senior-level, U.S. short-term consultants. As indicated in the PIP, these specialists will further analyze equipment requirements related to an in-depth consideration of existing and realizable research programs during the first project year. When equipment arrives at Foulaya, these same consultants will supervise its installation and the training of Foulaya researchers and professors in its use toward achieving revised research objectives.

On the return of the seven Guineans selected for U.S. training (2 in veterinary services returning in the second project year and 5 in M.S. degree programs returning in year three) the same U.S. consultants would assist in integrating the returned participants into the redesigned, ongoing research programs. Thus, continuity over the first three project years and continued viability beyond that time will be assured.

6. Technological Assumptions

The Guinean agricultural situation poses a classical dichotomy between traditional and modern technological practices. On one hand, most agricultural activity is primitive, subject to the vagaries of weather, pests and health of the peasant farmers. Typically, villages of 50-100 people farm by hand and very limited animal traction up to 10 hectares of food crops. While extensionists attempt to impart to peasants improved, simple cultural practices, cultural constraints and the almost total lack of economic incentives to produce beyond subsistence needs holds overall production at a low, stagnant level.

On the other hand, building on the relative successes of cooperative farm production in 1973, during 1975 the GOG strongly supports 434 Mechanized Production Brigades throughout Guinea. Their production goals during the current agricultural campaign are to manage 110 hectares each, consisting of 70 hectares in rice, 30 hectares in cassava and sweet potatoes and 10 hectares in groundnuts to obtain total estimated production of 100,000 tons in these products this year. Furthermore, in 1976, 2,200 local political production committees (Pouvoir Revolutionnaire Local) assisted by the brigades are to expand production of cash crops to 110 hectares each.*

*An additional 15 hectares each is to be planted to fruit and vegetable crops for local needs.

This plan calls for the provision of mechanized farm equipment and related inputs to each of these production units. By 1976, the GOG plans to have all of the PRL's sufficiently mechanized to produce food and cash crops on 275,000 hectares which is planned to meet the minimum needs of the total Guinean farm and non-farm population. This extremely ambitious and optimistic program depends on the successful garnering of several thousand tractors and cultivating/harvesting equipment from donor sources - a doubtful enterprise. It also demands intensive concentration of technical manpower on directly productive activities, etc. While it is very unlikely that the 1975/76 production goals will even be partially met, this ambitious program does indicate the major thrust in GOG design and management of agricultural production.

Therefore, since the dye is cast for the next several years in terms of the direction taken for agricultural development, the technological packages offered at the Demonstration Farm, in the classrooms and laboratories at Faranah and Foulaya must be both simple and sophisticated. Simple for small improvements in existing traditional peasant methods and advanced for the mechanized programs designed to transform the rural sector in a short space of time. Accordingly, varying levels of farm management and cultivation practices will be demonstrated at the Farm, taught at the Farm and at Faranah College and be further refined in terms of productive efficiency through INRAF services. For example, local animal traction methods will be studied, reviewed and improved through addition of small changes such as recommendations on plowing and seeding techniques (e.g. training in contour cultivation and recommendations on how to make adjustable plows and seed drills).

At the research centers and at Faranah College, emphasis will be placed on achieving increased production through low cost inputs and methods such as

achieving optimum fertilization using local, natural, organic materials and recycling instead of expensive imported fertilizers and wasteful practices of slash and burn land preparation. Instead of importing high-nutrient supplemental cattle and poultry feed, readily available local products, such as ground bone, blood and ash will be tested for optimum weight gains and quality by-products.

Similar to this technical research, training and production package is the planned utilitarian, low-cost approach to construction of facilities at the three project sites. While existing structures in the Faranah region are structurally and functionally unacceptable, their basic simplicity will be mirrored in proposed buildings and facilities at Faranah College and the Tindou complex. Especially in Guinea, with its emphasis on pragmatic, functional and low cost constructions, anything tending toward a monumental structure (fine finishing, much glass and metal, etc.) will be avoided in the architectural designs. However, the research equipment to be installed at Foulaya and the Tindou sub-station will be of the most efficient and appropriately advanced technology for Guinean conditions and potential research capacities. Again, in buildings and equipment as with approaches to agricultural production, due regard will be given to relating simple structures and methods to advanced, modern techniques and equipment.

7. Environmental Implications of the Project

The environmental implications of the project may be effectively summarized in stating that there will be null detrimental impact on the project sites, and a minimal positive impact on the agricultural environment.

First, two of the three project sites, Foulaya and Faranah have existing, simple structures for research, training and production activities. The buildings. structures and equipment proposed for them will make modest additions to

physical plant and will not generate noise, visual, organic or chemical pollution of the local environments. This assessment also holds true for the Tindou Complex at which site there currently exists just the natural vegetated Niger River flood plain. The design of buildings and structures will conform to local design and natural materials in as far as this is feasible and practical.

Second, renovation and addition of water and waste disposal facilities will have a positive effect on the habitat and people at Foulaya and Faranah sites. Utilization of natural and organic agricultural production inputs will assure avoidance of chemical pollution and related ecological imbalances. And finally, proper cultivation, harvesting and storage techniques communicated through the project's training mechanisms will improve the quality of products consumed by Guineans.

B. Financial Analysis

Total A.I.D. TA dollar funding over the five-year life-of-project is $4,890,000 with high first and second year initial inputs of $605,000 and $3,345,000. Based on the anticipation of construction completed before the end of the second year, the third, fourth and fifth year dollar funding sharply declines to $586,000, $174,000, and $180,000, respectively. If construction delays occur, then a portion of the second-year costs (including equipment for construction facilities) can be slipped to year three.

GOG PL 480 local currency contributions for the five years is 32,698,050 Guinean Sylis ($1,651,000 equivalent at 19.805 Sylis/dollar) and provides local support of operations including an estimated 30% of total construction costs.

It is proposed that A.I.D. contribute 75 percent of the total project cost and the GOG will contribute 25 percent of direct project costs. Not included in this calculation are the recurring costs of facilities, salaries and training costs which are provided to participating institutions through normal GOG financing of their operations.

1. Technical Assistance. It is proposed that A.I.D. finance the total foreign exchange costs attributable to this component. It is anticipated that except for a portion of construction, equipment and short-term training (codes 935 and 941) these funds will be utilized to procure goods and services from the United States.

2. Capital Assistance. The proposed A.I.D. grant will finance approximately 70% of the construction costs (the foreign exchange portion of construction) the balance, local costs, to be financed by the GOG. Should

the detailed construction design prove the feasibility of using more Guinean materials and labor for construction, then the dollar and local currency shares would correspond proportionately.

3. Financial Plan and Programming. The attached budget provides an analysis of obligations by fiscal year which also corresponds to disbursements estimated to occur in each succeeding fiscal year. Currently, the estimates for construction and equipment are tentative. Upon further detailed construction design and equipment analysis firm estimates will be available. It is unlikely that project construction and equipment costs would increase as a result of these analyses for initial engineering cost estimations (REDSO/WA and SFR/ENGR) have been generous.

# LIFE OF PROJECT FUNDING
(\$000)

| | FY 1976 | | | FY 1977 | | | FY 1978 | | | FY 1979 | | | FY 1980 | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ | L.C. | MM | $ | L.C. | MM | $ | L.C. | MM | $ | L.C. | MM | $ | L.C. | MM | $ | L.C. | MM |
| **I. Personnel Costs** | | | | | | | | | | | | | | | | | | |
| U.S. - Contract | | | | | | | | | | | | | | | | | | |
| 4 - LT | 156 | 26 | 48 | 161 | 26 | 48 | 167 | 30 | 48 | 174 | 33 | 48 | 180 | 37 | 48 | 838 | 152 | 240 |
| ST (60 mm) | 120 | 24 | 24 | 90 | 18 | 18 | 90 | 18 | 18 | - | - | - | - | - | - | 300 | 60 | 60 |
| 1 - REDSO Engineer (15 mm) | No Charge | 1 | 2 | No Charge | 3 | 7 | - | 3 | 6 | - | - | - | - | - | - | - | 7 | 15 |
| Sub-Total | 276 | 51 | 74 | 251 | 47 | 73 | 257 | 51 | 72 | 174 | 33 | 48 | 180 | 37 | 48 | 1,138 | 219 | 315 |
| COG | | | | | | | | | | | | | | | | | | |
| 4 - Farm Counterparts (Logistics Support) | - | - | - | - | 6 | 48 | - | 7 | 48 | - | 8 | 48 | - | 9 | 48 | - | 30 | 192 |
| 4 - Research Workers (Support) | - | - | - | - | 3 | 24 | - | 7 | 48 | - | 8 | 48 | - | 9 | 48 | - | 27 | 168 |
| 10 Farm and Res. Laborers | - | - | - | - | 17 | 100 | - | 17 | 100 | - | 18 | 100 | - | 20 | 100 | - | 72 | 400 |
| Sub-Total | - | - | - | - | 26 | 172 | - | 31 | 196 | - | 34 | 196 | - | 38 | 196 | - | 129 | 760 |
| Grand Total - Personnel | 276 | 51 | 74 | 251 | 73 | 245 | 257 | 82 | 268 | 174 | 67 | 244 | 180 | 75 | 244 | 1,138 | 348 | 1,075 |
| **II. Participant Training Costs** | | | | | | | | | | | | | | | | | | |
| U.S. - Long-term | | | | | | | | | | | | | | | | | | |
| 5 - Masters Degree in Agric. Research Disciplines (call forward April 1976) | 48 | 4 | 60 | 64 | - | 80 | - | - | - | - | - | - | - | - | - | 112 | 4 | 140 |
| 2 - Practical Livestock/ Breeding (call forward March 1976) | 20 | 2 | 24 | 10 | - | 12 | - | - | - | - | - | - | - | - | - | 30 | 2 | 36 |
| | 68 | 6 | 84 | 74 | - | 92 | - | - | - | - | - | - | - | - | - | 142 | 6 | 176 |

BEST AVAILABLE COPY

BEST AVAILABLE COPY

| | FY 1976 $ | FY 1976 L.C. | FY 1976 MM | FY 1977 $ | FY 1977 L.C. | FY 1977 MM | FY 1978 $ | FY 1978 L.C. | FY 1978 MM | FY 1979 $ | FY 1979 L.C. | FY 1979 MM | FY 1980 $ | FY 1980 L.C. | FY 1980 MM | $ | L.C. | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | | | | | | | | | | | | | | | | | | |
| 6-Practical Training at African and U.S. Institutions | - | - | - | 15 | 2 | 18 | 15 | 2 | 18 | - | - | - | - | - | - | 30 | 4 | 36 |
| Grand Total Participants | 68 | 6 | 84 | 89 | 2 | 110 | 15 | 2 | 18 | - | - | - | - | - | - | 172 | 10 | 212 |
| **I. Construction/Procurement Costs** | | | | | | | | | | | | | | | | | | |
| A. National Research Center (Foulaya) | - | - | - | 404 | 174 | - | - | - | - | - | - | - | - | - | - | 404 | 174 | - |
| B. Demonstration Farm (Tinlou) | 174 | 60 | - | 458 | 211 | - | - | - | - | - | - | - | - | - | - | 632 | 271 | - |
| C. Research Sub-station (Tandou) | - | - | - | 259 | 97 | | | | - | - | - | - | - | - | - | 259 | 97 | - |
| D. Agricultural Junior College (Faranah) | - | - | - | 575 | 246 | - | - | - | - | - | - | - | - | - | - | 575 | 246 | - |
| Contingencies (20%) | - | - | - | 373 | 157 | | | | - | - | - | - | - | - | - | 373 | 157 | - |
| Engineering and Construction (14%) | 26 | - | - | 286 | 123 | | | | - | - | - | - | - | - | - | 312 | 123 | - |
| TOTAL | 200 | 60 | 0 | 2,355 | 1,008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,555 | 1,068 | - |
| **IV. Equipment and Supplies** | | | | | | | | | | | | | | | | | | |
| A. National Research Center (Foulaya) | - | - | - | 220 | 20 | - | 220 | 20 | - | - | 10 | - | - | 10 | - | 440 | 60 | - |
| B. Demonstration Farm (Tindou) | 61 | 10 | - | 100 | 35 | - | 29 | 35 | - | - | 20 | - | - | 20 | - | 190 | 120 | - |
| C. Research Sub-station (Tindou) | - | - | - | 30 | 5 | - | 30 | 5 | - | - | 5 | - | - | 5 | - | 60 | 20 | - |
| D. Agricultural Junior College (Faranah) | - | - | - | 100 | 10 | - | 35 | 5 | - | - | 5 | - | - | 5 | - | 335 | 25 | - |
| TOTAL | 61 | 10 | | 650 | 70 | | 314 | 65 | | | 40 | | | 40 | | 1,025 | 225 | |
| PROJECT GRAND TOTAL | 605 | 127 | | 3,345 | 1,053 | | 586 | 149 | | 174 | 107 | | 180 | 115 | | 4,890 | 1,651 | |

(Local currency = sylis; 19.805 sylis = $1.00. Total estimated sylis cost of $1,651,000 = 32,698,050 Guinean sylis.)

C. Social Analysis

Two-thirds of Guinea's estimated 5.2 million population is directly engaged in agricultural production activities. The rural population is essentially Muslim (98% Muslim nationwide) and except for the two dozen major towns and cities, lives close to the land in a traditional manner. Women provide the majority of labor for agricultural activities while the men engage in hunting, small commerce and supervision and management of farm operations. Most rural residents live in circular, thatched-roofed, dirt-floored homes; cultivated land encircles village clusters and migration over short distances of entire villages and hamlets to new fallow land is common.

The preceding paragraph describes the second eschelon target population of this project (the first eschelon being students, extensionists and professors/researchers) and is characteristic of the population in the Faranah province (see Appendix 7 for description of Faranah province and its 5-year plan targets). Within Faranah province, eight kilometers from the town of Faranah, is the village of Tindou. The most direct impact on the rural population of this project will be at Tindou village, 2.5 kilometers from the Tindou Farm/Research Complex. The following profile presents a fairly valid synopsis of Tindou village:

- Population: 475
- Age Distribution: Nearly ½ of the population never reaches the age of 20 yrs. (WHO estimate is 40-50% mortality before age 20.) The average life expectancy is 38-42 years.
- Village Income: All income is from agricultural production and bartering of peanuts and rice is primary, with very little money exchange. The village is completely self-sufficient for their restricted diet.

- Health Facilities: None available at Tindou; acceptable facilities at dispensary in Faranah.
- Transportation: Foot and animal.
- Education: Most children between the ages of 7 and 18 attend classes; primary school taught by village instructor, junior high and high school at Faranah.
- Agricultural Production: Crops - 250 hectares of which rice crop on 200 hectares on Niger River flood plain. The balance of 50 hectares is planted to peanuts, corn and garden vegetables.
  - Livestock - Approximately 100 assorted head of livestock, including 18 cows, 1 bull, 45 goats, 4 bullocks, garden chickens. All livestock is scavenger feed with no controoled maintenance or breeding program.
  - Services - Under the general direction of the Faranah province Secretary-General for Rural Development, there are two assistant extensionists in livestock and agronomy who are responsible for rural animation in the Tindou area. In addition, one mechanized work brigade assists Tindou villagers with rice cultivation on the flood plain. All other operations are a combination of manual labor and animal traction. There is some slash and burn cultivation of upland areas, which after being cultivated for several years, lie fallow and new land is cleared. Very limited repair services and spare parts for tractors, trucks and implements exist at Faranah. Transportation to Faranah and other areas is greatly facilitated by a good hard-surfaced road which passes through the village; however, trucking is somewhat unreliable

because of frequent mechanized breakdowns and shortage of fuel.

The effect of the creation of the project complex near Tindou should have an unprecedented impact on villagers. Interviews with village notables showed open curiosity and high anticipation of benefits to be derived from the demonstration/training facilities just a short walk from their homes. This proximity and interest will greatly augment the rapid development by Tindou Complex staff of an adaptive technological package to be regularly tested by the Tindou villagers for gradual replication throughout Faranah province.

D. Economic Analysis

The immediate primary beneficiaries of the proposed project are the agricultural research and training institutions in Guinea which will receive unprecedented injections of the most highly-developed agricultural technical assistance currently available. While insignificant in monetary terms, the peasant farmers in the Faranah region will also derive increased production resulting from direct technological benefits emanating from the Tindou complex and from extensionists trained at Faranah College. At the end of the first year of project implementation, baseline data on peasant income in the Tindou region as well as the potential income effect on overall Guinean farm production will be developed in order to provide the basis for annual measurement of changes in agricultural production and farmer income attributable to project activities.

Overall, the relatively modest A.I.D. input over a five-year period will provide the foundations for a radical transformation of GOG agricultural research, training and production policies and achievements.

## IV. Implementation Arrangements

### A. Arrangements

1. At this moment, the GOG has indicated that naming of the ministry responsible for overall direction of the project will be made when A.I.D. is ready to negotiate the project agreement. Almost certainly the recently-created Ministry of Rural Development will assume this role. Essentially, this new ministry has responsibility for coordination of development programs in the rural area which are implemented by the ministries of education, livestock and agriculture. A classified airgram describing the Ministry of Rural Development is attached at Appendix O.

Management of rural development projects and requisite coordination of project inputs is one of the major factors retarding development in Guinea. For this reason, the nearly full time attention of the A.I.D. agricultural officer in Conakry will be required to ensure that the project is implemented in a timely manner. The GOG has been used to donor assistance which is essentially self-contained to achieve certain discrete production objectives with very little transfer of managerial and technical know-how. For this project, in which such transfers are of vital importance, the GOG administering agencies will need to receive special nurturing in the processes of design, contracting, implementation, etc. Accordingly, the project agreement will be an extremely well-detailed document that specifies rights and responsibilities. As a prelude to this agreement, the AID design team presented a list of A.I.D. personnel and project requirements to the GOG for advance consideration of the requisite operational modalities. (See Appendix L.)

In essence, the GOG decision-making structure is concentrated in three GOG individuals - the President, the Prime Minister and the Minister of the Interior (who is also Minister of Cooperation for Foreign Relations). While the President and the Minister of the Interior gave the design team full assurances of complete cooperation and rapid action for project implementation, the collective experience of the design team and the American Embassy in Conakry indicates that delays, frustrations, sporadic management, but especially delays in decision-making, will be the rule rather than the exception in project implementation.

In terms of the two primary action agents - the Dean of the Faculty of Agronomy and the Minister of Rural Development for the Faranah region - their full cooperation has already been gained for 100% backing of project operations in their respective areas of jurisdiction. The former is a dedicated administrator and architect of agricultural development, and with the firm guidance of President Toure and the Ministry of Rural Development, bureaucratic disputes over prerogatives and duties should be almost unknown.

2. A.I.D. implementation of the project will require nearly the full-time service of the A.I.D. project manager resident in Guinea as well as the half-time services of a REDSO engineer to supervise construction during the first two years of the project. P.L. 480 local currency disbursements for project costs should be carefully monitored by the A.I.D. project manager and perhaps joint GOG/A.I.D. authorization should be required prior to each major local currency expenditure. Transportation and communications facilities are fair when operating but are subject to breakdowns. Therefore, provision for frequent project staff "R&R" in Conakry will be necessary. The GOG has

agreed that a radio communications facility will be permitted to operate among project sites and Conakry but has yet to specify the precise operations of this radio linkage.

B. Implementation Plan

1. Provided in technical appendices are time estimates for various phases of implementation of project components. Summarized below are the major actions and their estimated time schedules. It is anticipated that even these generous estimations will be superseded by events as the project is implemented.

2. Summary PIP

a. Technical Assistance

| | |
|---|---|
| PP authorized | January 15, 1976 |
| ProAg signed | February 15, 1976 |
| PIO/T issued | March 1, 1976 |
| PIO/P's issued | April 15, 1976 |
| T.A. Contracts initiated | August 1, 1976 |
| Participants placed | July 1, 1976 |
| Technicians placed | January 1, 1977 |
| PIO/Cs issued for farm equipment | January 15, 1977 |
| Annual Evaluation | June 1977 |
| Veterinary Participants return | August 1977 |
| Annual Evaluation | June 1978 |
| M.S. [illegible] ree Participants return | August 1978 |
| Mid-term Evaluation | December 1978 |

| | |
|---|---|
| Replanning | March 1979 |
| Annual Evaluation | June 1979 |
| Annual Evaluation | June 1980 |
| Grant Completion Report and Final Evaluation | June 1981 |

b. Construction

| | |
|---|---|
| A & E Design begun | March 1976 |
| Tindou Complex initial A & E design completed | June 1976 |
| Tindou Construction Begins | December 1976 |
| Faranah and Foulaya initial design completed | June 1976 |
| Faranah and Foulaya construction begins | December 1976 |
| Tindou Construction completed | May 1977 |
| Faranah and Foulaya Construction Completed | May 1978 |
| Final Evaluation of Construction | December 1978 |

3. Evaluation Plan

Project evaluation will occur annually. The evaluation in FY 1977 and FY 1978 will be performed by A.I.D./Conakry with assistance from ADO/Dakar and REDSO/WA staff with AID/W assistance if required. The FY 1979 mid-term evaluation (2 1/2 years after project initiation) will be an external evaluation performed with AID/W funding and in cooperation with the GOG/REDSO/WA and ADO/Dakar.

The purpose of the annual evaluations will be to ascertain if the project is on schedule, both in the capital and technical assistance areas, and if any essential remedial actions are required. Special concern will include reviewing of participant schedules, assignment of counterpart staff, review of contract performance on provision of technical assistance,

review of GOG administration of the project, review of construction progress against estimated targets and an assessment of the roles of AID/W, REDSO/WA and ADO/Dakar as to the quality, timeliness and effectiveness of their support for the project and success in achieving project purposes.

The 2½ year mid-term project evaluation will be similar to annual evaluation will be similar to annual evaluations and will also include the identification and analysis of the impact the project is having on research and training in the agricultural development sector.

A

4

AID 1020-20 (11-73)
SUPPLEMENT 1

PROJECT DES[illegible]MARY
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

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

PAGE 1

Project Title & Number: Guinea Agricultural Production Capability [illegible]d Training

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Program or Sector Goal: The broader objective to which this project contributes: (A-1) | Measures of Goal Achievement: (A-2) | (A-3) | Assumptions for achieving goal targets: (A-4) |
| To contribute to the achieve- of self-sufficiency in food uction (crops and livestock) uinea.<br><br>To contribute to the expansion gricultural exports for oved and diversified foreign ange earnings. | a. Annual increases in basic food production (crops and livestock products).<br><br>b. Annual increases in agricultural export earnings. | Government of Guinea annual statistical reports. | a. GOG continues to pursue its stated goal of agricultural self-sufficiency.<br><br>b. GOG creates pricing policies and market mechanisms to encourage increased agricultural production. |

0-20 (1-73)
ENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

:t Title & Number: Guinea Agricultural Production Capability and Training

PAGE 2

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| :ub-goal Level (B-1) | (B-2) | (B-3) | (B-4) |
| To help strengthen :inean agricultural infra-:ructure through the up-:ading of research, train-:g and extension activities. | a. Establishment of self-sufficient national agricultural research center and one regional sub-station, fully staffed by Guineans.<br>b. Establishment of institutional linkages between Guinean agricultural research operations and international agricultural research organizations.<br>c. Strengthening of national agricultural training facilities for teachers, researchers and extension agents.<br>d. Integration of the concept of applied research and demonstration training on a regional basis into Guinean national agricultural planning and educational operations. | a. Research center and one sub-station staffed by Guineans in major research fields and relevant research on select agricultural commodities is operational.<br>b. Agro-pastoral demonstration farm fully operational as training element in Guinean agricultural education system.<br>c. Active exchange of information, seed varieties, and personnel exists between Guinean agricultural research service and West African and other research institutions.<br>d. Regular and effective utilization of A.I.D.-financed facilities and equipment. | a. Same as "Goal Level" above.<br>b. GOG provides requisite counterpa staff and experienced technicians fc advanced degree training in U.S. |

AID 1020-28 (11-73)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: Guinea Agricultural Production Capability and Training



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Purpose (C-1) | End of Project Status (C-2) | (C-3) | (C-4) |
| To establish limited research i training facilities for the inean National Agricultural search Institute and for the aining of students, teachers, searchers and extension agents in plied research and in improved, aptive farming techniques, in e provincial region of Faranah.<br><br>To demonstrate to the GOG the nefits of an integrated approach agricultural education, research actical training and production. | a. All construction completed and all equipment installed and demonstrated.<br>b. Full complement of Guinean counterpart staff assigned and actively working at project facilities.<br>c. Guinean technicians, trained in U.S., returned to Guinea and working at project sites.<br>d. Establishment of integrated training program for teachers, researchers, extension agents and local farmers at project facilities.<br>e. Training of:<br>(1) over 2,000 junior college students at Faranah Agricultural College and at Tindou demonstration farm.<br>(2) 136 extension agents at Tindou farm.<br>(3) 400 agricultural instructors at Faranah College and Tindou Farm and research sub-station.<br>(4) over 50 university and junior college agricultural faculty. | a. Site inspections and annual project implementation/evaluation reports. | a. Forthcoming GOG agricultural education curriculum (January-March 1976) wil reflect current stated goal of 60% theoretical/40% practical education, using a modular, rotating system of instruction for teachers, extension agents and student<br><br>b. The first five years of A.I.D. renewed assistance to the GOG will be devoted to establishing infrastructure for the improvement of Guinea agricultural production, research and training system. |

PROJECT ( N SUMMARY
LOGICAL FRAMEWORK

ject Title & Number: Guinea Agricultural Production Capability and Training

puts (D-1)

National Agricultural Research Institute (Foulaya)

1. Construct one laboratory building containing four laboratories.
2. Provide research equipment and supplies and short-term consultants for training of Guineans in equipment use.
3. Assist in establishing modern, adaptive research program in crop production and livestock breeding.
4. Provide potable water system for Institute and Faculty of Agronomy (both share common facilities at Foulaya).
5. Provide U.S. training for 5 professors/researchers (M.S. degrees) and two veterinarians (1 yr. practical training).

Agricultural Research Sub-stations (Tindou)

1. Construct laboratory building, equip laboratories and train four COG researchers in equipment use.
2. Develop 25 hectares of diked Niger River flood plain for varietal trials.
3. Assist in integrating sub-station activities with the National Agricultural Research Institute's research program.
4. Assist in integrating research results into training and extension activities carried out in the Faranah region.

Agricultural Junior College (Faranah)

1. Construct additional classroom, laboratory, dormitory, administrative and farm buildings and related facilities in order to provide for doubling of agricultural student enrollment, i.e. increase to 1,000 students (1976-1978).
2. Equip laboratories and supplement farm with cultivating/harvesting equipment and related commodities.
3. Provide potable water supply and constant voltage electrical system.
4. Assist in integrating practical training at agro-pastoral demonstration farm at Tindou into college curriculum; and assist in integrating research training from Foulaya and Tindou research centers into college curriculum.
5. Provide practical and laboratory research training for 2,000 students during 1976-1980.

Agro-pastoral Demonstration Farm (Tindou)

1. Dike 25 hectares of Niger River flood plain.
2. Level land and construct residential, demonstration and farm buildings and facilities on 10 hectares.
3. Level land and provide facilities for pasturage and irrigated crop production on 75 hectares.
4. Equip demonstration farm with necessary farm equipment and instructional supplies and aids.
5. Provide potable water and reliable electric supply systems.
6. Establish demonstration program ranging from improved local practices (labor intensive) to modest mechanized practices (capital intensive) based on current local cultures and potential export crops.

PROJECT D[illegible] SUMMARY
LOGICAL [illegible]EWORK

ject Title & Number: _____ _____

:puts (D-1) continued.

7. Provide practical demonstration and training in farm management and in improved agronomic and livestock technology for local farmers, agricultural research technicians, extensionists, teachers and students from Faranah Junior College and the National Faculty of Agronomy (Foulaya) .
8. Assist in integrating agro-pastoral demonstration training into national agricultural education and extension service systems.
9. Train 4 Guinean counterparts in full management and training functions of the demonstration farm.

iputs (E-1) :

See Budget Sheet on page 40.

B

## JOB DESCRIPTIONS

## DUTIES, RESPONSIBILITIES, AND QUALIFICATIONS

1. Project Manager (USAID/Conakry)

a. Duties and Responsibilities: Located in Conakry he, with his Guinean Counterpart, has full responsibility for project implementation. This includes provision of the necessary inputs, support of the technical staff and consultants located at Faranah and Foulaya and liaison between the GOG and USG as well as with other research, educational and agri-services institutions in Guinea and with pertinent international research and educational institutions.

He will be responsible for selecting and processing participant trainees and short-term consultants.

He will also be familiar and liaison with other donor agency programs in agriculture and other USG development programs in Guinea.

While technical responsibility will be with technical staff assigned to the project, the manager must have overall technical responsibility to observe problem situations and provide remedial measures.

Assisted by other staff, project planning, analysis and evaluation and related documentations are the manager's responsibility.

Realizing many factors influencing the project are out of the control of the project manager and his Guinean counterpart, when such factors arise that could cause delay in or jeopardize project implementation,

these factors must be immediately brought to the attention in writing of the U.S. Ambassador to Guinea, the AID Area Development Office in Dakar and AID's Africa Bureau, Guinea Desk Officer in Washington. Decisions can then be made at these levels as to actions required.

b. Qualifications: French required. MS in Agriculture preferred, BS with additional experience accepted; five years minimum experience working in agricultural development in under-developed countries; part of this experience should be as a project manager supervising other agriculture specialists. The project manager must be able to work with a minimum of supervision, have sound judgement in dealing with people and the ability to function with a high degree of efficiency under hardship conditions.

2. Faranah Demonstration and Training Farm Manager

a. Duties and Responsibilities: The farm manager, with his Guinean counterpart, is responsible for overall management of the Farm's production and training activities and the supervision of assigned staff.

Further he will be responsible for total farm planning, economic and financial analysis and farm activity evaluation. He also will provide periodic farm management training sessions for students at Faranah Junior College and for students from the Faculty.

b. Qualifications: French required. BS in Agricultural Economics and Farm Management or equivalent experience. Five years experience in Agricultural development work in under-developed countries. The ability to work with and supervise technical staff and to work efficiently under extreme hardship conditions.

3. Faranah Farm Agronomist

a. Duties and Responsibilities: Will be responsible, with his Guinean counterpart, for all crops program development and implementation, preparing training programs, demonstrations, field days and teaching informally and practically technical information on crops grown successfully on the Farm. Training will be done both at the Farm and at Faranah Junior College.

He will design, analyze and make recommendations from adaptive demonstration plots of new crops grown on the Farm, and provide this information to the Research Center, both directly and through the sub-station.

b. Qualifications: French required. BS in Agronomy; two years experience in developing countries; the ability to work efficiently under extreme hardship conditions.

4. Faranah Farm Livestock Specialist

a. Duties and Responsibilities: With Guinean counterpart, manages the cattle and sheep herds and poultry flock of the Farm. With the agronomist, supervises range management, hay and silage production. Is responsible for feed formulation and animal health. Prepares, analyzes and makes recommendations from adaptive demonstrations conducted on livestock management, care and feeding. Provides informal and practical training to trainees assigned to the Farm and to students from the Junior College.

b. Qualifications: French required. BS in Animal Husbandry; two years experience working in developing countries; the ability to work efficiently under extreme hardship conditions.

5. Agricultural Engineer

a. Duties and Responsibilities: With Guinean counterpart, installs and maintains farm irrigation and domestic water system, including both sprinkler and flood irrigation, land forming, diking, canals and drainage. Maintains all mechanical equipment, shops, buildings and electrical systems on the Farm. Helps upgrade maintenance, repair and spare parts facilities for Faranah Junior College working with local mechanics and officials of Faranah Junior College and the Ministry of Rural Development for the Faranah Region. Provides training materials and informal and practical training to trainees assigned to the Farm, and at Faranah Junior College, he will assist in conducting classes in agricultural engineering and farm equipment management.

b. Qualifications: French required. BS in Agricultural Engineering; two years experience working in developing countries; and the ability to work efficiently under extreme hardship conditions.

K. Byergo
July 2, 1975
Redrafted: July 14, 1975

## Elements of Tindou Demonstration Farm

### A. LIVESTOCK PRODUCTION

Currently in Guinea, livestock and poultry are primarily scavenger operations. Ranges are overgrazed and little has been done to improve breeding stock at the farmer level. Cattle particularly are held more as an indication of wealth and status than for beef and milk production.

State farms are the exception to this traditional pattern where improved breeding and management are being done for all types of livestock. Given sufficient economic farmer incentive, adapted U.S. technical practices can be demonstrated and extended to farmers in order to encourage increased and more efficient livestock production.

A strong demand for livestock and livestock products is evident both in the form of domestic and foreign markets. Prices of livestock and livestock products are now strictly controlled. However, limited parallel markets exist which provide much higher returns than the yield from government-controlled markets.

Livestock enterprises to be demonstrated at the Tindou Farm are as follows:

1. N'Dama Cow Calf Herd.

Grazing and forage for a minimum of 18 animal units on 40 hectares of range is projected. This would include 17 cows and one bull grazed as indicated in the section on range management. Dry season (7 months) feed would be provided by 30 tons of silage; 10 tons of hay harvested from forage plots would provide dry season hay.

Seventeen cows purchased in May, 1976, will be impregnated and should produce a 90% live calf crop. Range would be adequate for these calves until the dry season. Winter feed for calves would consist of 20 tons of maize silage and five additional tons of hay from the forage plot. In the event of hay production failure, rice straw can be substituted one-for-one for hay and 1/2 pound per head per day of peanut cake, locally available, as supplement.

During the wet season (5 months) feeding period, an additional 30 tons of silage and 8 tons of hay will be required to finish the yearlings at about 16 months of age at the end of the wet season feeding period.

No estimate has been made on rates of gain or size at the end of the feeding period as no data is available on feeding N'Dama calves.

Feed requirements for one year's feeding period including (a) dry season feed for cow herd, and (b) feeding out of calbes can be met by ensiling five hectares of maize at 20 tons per hectare (for a total of 100 tons) and cutting hay from 10 hectares of forage at 4 tons per hectare (for a total of 40 tons of hay). This is in excess of indicated demand but will also cover dry season feeding of a small local breed sheep flock which will graze building site areas and crop residue areas.

2. Local Breed Sheep Flock

Ten bred ewes and a ram will be purchased in May, 1976, as the demonstration flock and will be fed as indicated above. Lambs will be grain fed via creep method to a maximum of four months of age. Grain requirements would be for an expected 150% lamb crop, i.e. 400 kilograms of grain and 30 kilograms of peanut cake.

3. Poultry Flock - 100 layers, 500 broilers

Poultry development has advanced satisfactorily at the Institute of Agricultural Research. However, in order to assure pure breeding, layer and broiler chicks will be imported to meet the farm's needs. A standard management program should be installed following the Institute's recommendations as a demonstration for students, farmers and extension agents. Maize available from farm production along with local protein supplements and imported vitamin and mineral premixes would constitute the poultry rations. These can be prepared from facilities on the farm. The economic benefits of using bone and blood additives, available at Mamou, 200 kilometers from the farm also will be tested.

4. Summary

The same procedures and management techniques to improve returns on farm investment should be incorporated in all phases of livestock, as is the case in crop production. Farm and financial management techniques are the principal factors to be demonstrated in harmony with improvements in crop and livestock production. Since cattle and sheep are the prime converters of otherwise non-productive but extensive range lands in Guinea into essential human food, emphasis should be placed on the role of livestock in agricultural development. Livestock marketing is inherently less problematical than other agricultural production for it provides its own transportation and is not perishable until ready to be consumed. Also, there is a strong demand locally and in export markets.

Finally, poultry production, well known and praced throughout Guinea, is the best and most efficient converter of grains into animal protein. It requires small investment capital and modest production facilities. Therefore, in demonstrating optimum practices at the Tindou farm, particular emphasis will be given to poultry production.

B. AGRICULTURAL ENGINEERING

Irrigation, care and maintenance of machinery, tools and buildings are of great need to be properly and efficiently demonstrated. This farm in its day-to-day cropping and livestock operations can demonstrate and train local agriculturalists in correct methods to follow to gain the greatest return on investments.

It should be remembered, however, that in a labor surplus, area as is Guinea, labor intensive operations equally productive to mechanized operations should be given first priority. Only when the inability to perform a task or the timeliness of intensive cropping operations require mechanization should machine replace animal or human power in the present economy of Guinea. Many of the advanced techniques and improved varieties can be as efficiently adapted to animal power as to mechanical power and to the greater total benefit to the society.

In introducing and demonstrating new technology, emphasis should be placed on the following:

a. High return, quick pay off

b. Labor intensive methods

c. Neutral to scale

d. More food at less cost per unit of input

C. DEMONSTRATION AND TRAINING

As per the schedule outlined in the implementation plan, training for province agricultural staff, the Faranah Agricultural College and farm leaders should encompass all phases of operations at the Tindou Farm. This should be accomplished on a timely seasonal basis corresponding to the farmers' work schedule. As work progresses important crops such as rice may be planted continually on a scheduled basis to give an opportunity for a two-week rice production training course to cover all phases of rice culture from planting to harvesting.

Inclusion of provincial, Agricultural College and University staff on the training faculty will help develop close liaison with these institutions. This is essential in developing a consensus on recommended farming practices and of developing the essential factor of everyone telling the farmer consistently the same procedures for improving various agricultural enterprises.

The primary objective of the Tindou Farm is to demonstrate and train agriculturalists. This must be foremost in the minds of the farm's management as they plan operations and set policy. The people of Tindou, Faranah and adjoining areas must feel the farm is theirs to visit and learn from. Only when this atmosphere is established will the farm be a true success.

KEY TO: TINDOU AGRO-PASTORAL COMPLEX
(Demonstration Farm and
Research Sub-Station)

A. Office, training rooms, dormitories and staff housing

B. Hay, silage, and grain storage area

C. Shops and machinery storage

D. Livestock shelter and lots

E. Renovated Range - 20 hectares, cleared, fertilized, and reseeded as required. Potential carrying capacity 12-15 animal units annually with controlled grazing and ensiling of excess grass produced in the wet season.

F. Native Range - 20 hectares, minimum of claring and controlled grazing. Carrying capacity 7-9 animal units annually.

G. Four Year Crop Rotation - 20 hectares. 1st year maize, 2nd year oil seeds, 3-4 year forage. Supplemental sprinkler irrigation as required.

H. Continuous Row Cropping - 20 hectares. Maize, potatoes and oil seeds. Supplemental sprinkler irrigation as required.

NOTE: A through H are on gently rolling upland.

I. Flood Plain Rice Production - 20 hectares

1. Improved floating rice culture in water depth over one meter- 5 hectares

2. Improved deep water rice culture in water depth less than one meter - 5 hectares

1 and 2 occupy land from May through November, yield one to two ton and two to three ton respectively of paddy rice per hectare. The consideration is that for many years much of Guinea's rice will be produced in this way. Improved varieties and cultural methods can easily double current floating rice yield in Guinea. This will also serve as a valid check plot to compare new rice growing methods being tested and demonstrated. With irrigation, a short season oil seed or vegetable crop can be grown from December through April.

3. This diked, controlled irrigation, five hectare plot will demonstrate the best combination of crops and practices as recommended by research data. Rice may or may not be a major crop grown under these controlled conditions. High land development costs of leveling, diking and providing irrigation will dictate that high income crops be produced.

4. Free Flooded area for two rice crops annually - 5 hectares

Capitalization on new research and production data from the Phillipines short season 100 day varieties suited to dryland rice production will be direct seeded with early rains in late March or early April. With fertilizer -and weed control a 3 to 4 ton per hectare crop can be harvested in early July before high water hits.

As water receds in September, a second short season crop can be transplanted in the shallow receding water and be harvested in 80 to 90 days from transplanting depending on late rains and residual moisture to produce a 3 to 4 ton crop.

J. Research Farm - 25 hectares. This will be a research sub-station of the National Institute of Agricultural Research at Foulaya. The object is to give area specificity to basic research accomplished at Foulaya and eventually research local agricultural problems of the Faranah region. Research proven at this station will be demonstrated and taught to local and regional agricultural staff, agricultural technical school staff and farm leaders through the previously described Demonstration and Training Farm.

The Station will be divided into five plots of five hectares each for different types of research as follows: rice production, vegetable production, fruit production, maize and other staple food crop production, such as lentil and oil seeds and forage crops production.

Diking and controlled irrigation will allow environmental variations required to do specific research. All types of cultural, varietal, soils and water requirement trials will be conducted at this station.

Appendix C.

# TINDOU AGRO-PASTORAL DEMONSTRATION FARM

## Crop Production and Rotation Program

The first season 1976/1977 will be largely prepared by the project manager, his Guinean counterparts and short term consultants as facilities for resident farm staff will not be ready until June or July of 1977. By fields (ref. fig. 1 map) the three cropping patterns will be as follows:

### Field E - Range Renovation

First Year. Range is cleared of trees and brush and other obstruction to facilitate machinery operations and reduce competition for moisture and nutrients. Fertilizer according to soil test is applied. One half of the range is field cultivated following the first heavy spring rains and experimental grass and legume seeds are seeded in native range. Controlled grazing is practiced with animal units on each plot grazing ½ of the plot at a time. Any excess is harvested for hay or silage depending on season. Close records will be kept of animal gain or loss and changes in the second year carrying capacity made accordingly.

The program for the second through fourth years will be essentially the same with annual fertilizer applications made according to plant growth and soil tests. Close observations of seedings will be required to determine the success or failure of new seeds substituted for failures.

OBJECTIVES: Within three seasons, indications of carrying capacity, fertilizer requirements and new range crop combinations will be available. Further refinements and variations will require longer study before recommendations to farmers can be made.

Field F - Native Range

Area will be cleared of brush and small trees. Wood or lumber potential trees should be left. The field should be divided into two areas for controlled rotational grazing. Three animal units per area are recommended initially. In the second and third years, animal units can be varied according to conditions. Excess forage will be harvested for hay or silage. Records of animal gains and losses will be maintained.

OBJECTIVE: To determine the carrying capacity of native range and compare cost and returns with renovated range.

Field G - Four-year Maize, Oil Seed, Forage Rotation

1977 - One-fourth of the field will be planted to maize, one-fourth to an oil seed and one half to forage. Best recommended varieties will be used. Fertilizer applied according to soil tests and insects, weeds and disease fully controlled by chemical, biological or mechanical means. Close accounting will be made of variety performance and frequency of all pests. Cost and return data will be collected and comparisons and full analysis made. Sprinkler irrigation will be applied to prevent moisture stress. Make observations on soil losses from water and wind erosion. Determine irrigated winter crop options.

1978 - Maize and oil seed field will be rotated and the forage remain for the second year. Appropriate changes to assure optimal production, based on the previous years experience will be made. Other factors being equal rate of return will determine optimal production. Test winter crop options, in maize and oil seed area.

1979 - Forage will be rotated to the maize to oil seed area and one half the forage area planted maize and one half to oil seeds, otherwise follow 1977 and 1978 procedures.

1980 and 1981 - continued rotation using cultural changes indicated by past experiences in order to gain optimum production.

OBJECTIVE: To provide a cropping pattern that will reduce soil erosion and fertilizer requirements, as compared to intensive cropping, allow for a dry season crop, livestock forage and human food, and provide cultural practice and economic analysis comparisons with intensive cropping and unirrigated range under similar ecological conditions.

Field H - Intensive Cropping

1977 - Dividing the field into thirds - maize, potatoes and oil seeds are planted following first heavy rains. Land is fertilized to soil test recommendations and all pest control measures are taken. Sprinkler irrigation to prevent water stress should be provided. The same accounting and observations as indicated in Field G should be followed.

1978 - Maize is to be planted following the oil seed crop, potatoes following maize and oil seed following potatoes. The same precautions, accounting and observations made as in 1977. Winter crops as indicated from the 1977 winter season should be planted. Currently no winter crop of significance is planted due to cool weather and no irrigation.

1979 - Make the shift in crops as indicated in 1978 and making variations as indicated by the 1977 and 1978 experience follow previously indicated procedures.

OBJECTIVE: To determine and demonstrate the intensive cropping potential on gently rolling land where sprinkler irrigation is available to make maximum use of the long growing season. Current slash and burn cropping practices and range depleting grazing produce little return per unit of land area and cause rapid depletion of land resources.

## DETAIL OF FLOOD PLAIN CROPPING SYSTEMS-Demonstration Farm

I.1. Floating rice in area flooded more than one meter deep. Much of Guinea's rice will for sometime be grown in areas of free flooding. Varieties and cultural practices are available that can double and triple current one ton per hectare yields. The cultural practices include small amounts of fertilizer, weed, insect and disease control.

In field I.1. improved varieties will be introduced and improved cultural practices used within the same cropping season as is currently used, i.e. seeded in May and harvested in November.

All accountings and observations as previously indicated for upland cropping will be done. Dry season crops will be determined from the 1976 season and planted in the 1977-1979 dry seasons. Otherwise, allowing for improvements indicated by experience, the same cropping system will be followed all three years.

I. 2. Deep water rice in areas flooded less than one meter. Free standing varieties adapted to flooding of less than one meter are available that out yield the floating varieties. The same procedures as outlined in I-1. should be followed in I-2 except for the change in variety.

OBJECTIVE I. 1 and 2 - To demonstrate how to improve the current most prevalent form of rice culture in Guinea.

I.3. This diked controlled water area is suitable for all types of cropping depending on the season. Rice is the logical rainy season crop. High yielding varieties and optimum cultural practices should be followed as previously outlined.

The best, highest return crops for other seasons will be determined from research conducted at the Faranah Research sub-station.

Optimum rice production should be accomplished all three years during the rainy season. Observations and accounting as previously outlined will be done.

OBJECTIVE - To determine and demonstrate optimum crop returns from controlled water situations on the river flood plains.

I.4. Free Flooded area for two rice crops annually

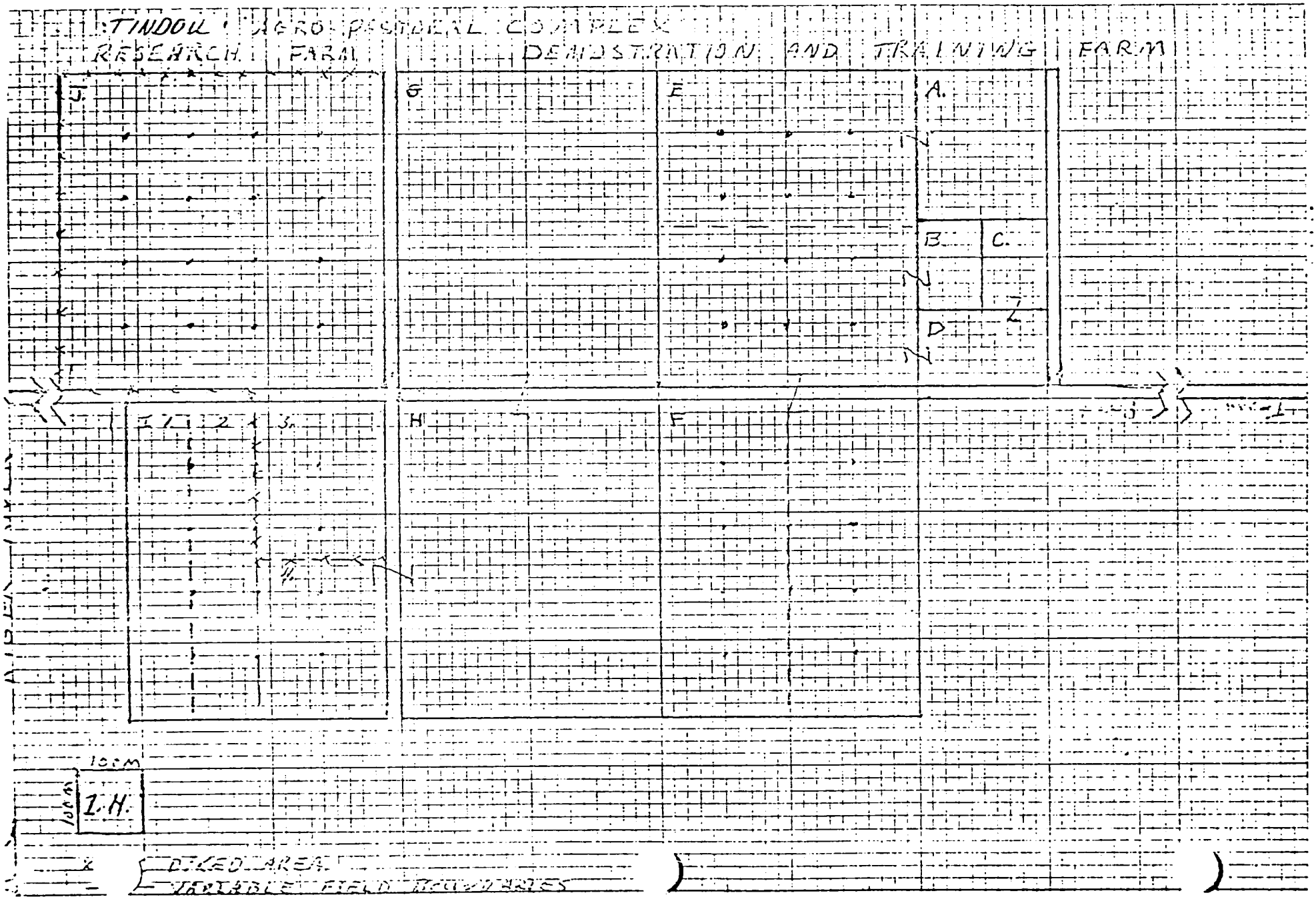
Using new 100 day IRRI varieties from the Philippines the first crop will be direct seeded following the first heavy rains in spring. This usually occurs by mid-April. All improved cultural practices will be used and the crop harvested by mid-July just before deep flooding occurs, usually the first day of August.

The land is fallow during August and September with the second crop being transplanted in the receding flood waters in late September and early October. Transplanting of seedlings 20 to 25 days old will allow a crop to be harvested 80 to 90 days from transplanting. All cultural practices for optimum seedling growth and grain production should be followed, yields of 3 to 3 1/2 tons per crop are to be expected.

While some moisture stress may be expected early in the growth cycle of the first crop and late in the maturing cycle of the second crop, optimum moisture can be expected in critical booting and flowering stages of both crops. Above normal rainfall can materially increase yields to four or five tons per crop and below normal rainfall can reduce yields to one or two tons per crop. Timing is the key to success with this proposed system.

The same system should be followed all four years with a dry season being planted as recommended by the research sub-station as irrigation will be available on the farm.

OBJECTIVE - To demonstrate a much higher yielding rice culture under the current free flooded ecological system that produces most of Guinea's rice.


TINDOU AGRO-PASTORAL COMPLEX
RESEARCH FARM
DEMONSTRATION AND TRAINING FARM
J.
G
E
A.
B.
C.
D
I
2
3
H
F
100M
100M
I.H.
DIKED AREA
VARIABLE FIELD BOUNDARIES

## SUMMARY

| | | |
|---|---|---|
| 1. | Research Institute - Foulaya near Kindia | $ 578,300 |
| 2. | Demonstration Farm at Tindou | 904,100 |
| 3. | Agricultural Sub-Station at Tindou | 356,000 |
| 4. | Agricultural College at Faranah | 884,100 |
| | Net total construction and procurement | $2,622,900 |
| | Contingencies — 20% of above | 580,900 |
| | TOTAL | $3,101,800 |
| | Cost of Engineering and Construction Supervision — 14% | [illegible] |
| | GRAND TOTAL | $3,530,196 |
| | SAY | $3,650,000 |
| | $ Cost 70% | $2,555,000 |
| | Local Currency 30% | 1,095,000 |

## RESEARCH INSTITUTE IN FOULAYA, NEAR KINDIA

| No. | Item | Cost ($) |
|---|---|---|
| 1. | Building, consisting of 4 laboratory halls and accessory facilities (unequipped) 53M x 20M = 1060 sq. m. @ $350 | $371,000 |
| 2. | Replace plant for production of butane gas for use in laboratories (tank capacity 30 cubic meters) | 45,000 |
| 3. | Replace plant for refrigeration of cold chamber (5 - 12 degrees Centigrade) and cold water supply (5000 liters per 24 hours) | 28,000 |
| 4. | Two refrigerators for Isotope Storage room about 16,000 BTU each | 1,000 |
| 5. | Replace ventilation system for mineralization room | 3,000 |
| 6. | Voltage regulators for 6 labs. | 1,800 |
| 7. | Intake structure with screens | 3,000 |
| 8. | Package treatment plant - including chlorinator | 40,000 |
| 9. | Pumping Station Building | 5,000 |
| 10. | Electric, high-lift pump with diesel standby | 15,000 |
| 11. | Transformer and transmission line | 10,000 |
| 12. | Pumping main 1200 ft. - 8 in. pipe | 15,000 |
| 13. | Connections to reservoirs and swimming pool | 3,000 |
| 14. | Improvements to distribution system | 30,000 |
| 15. | Spare parts for pumping unit | 1,500 |
| 16. | Chemicals (3-year supply) | 6,000 |
| | TOTAL | $578,300 |

TINDO DEMONSTRATION FARM

| No. | Item | Cost ($) |
|---|---|---|
| 1. | Office Building - four twin offices and accessory facilities 4 x 90 eq. m. @ $400 | $144,000 |
| 2. | Eight apartment units in four duplex buildings 8 x 100 sq. m. @ $450 | 360,000 |
| 3. | Training room and Dormitory for 34 trainees 210 sq. m. @ $300 | 63,000 |
| 4. | Quarters for ten laborers | 6,000 |
| 5. | Open Shed for 25 cattle 100 sq. m. @ $80 | 8,000 |
| 6. | Hen Laying house for 100 birds 0.4 sq. m. x 100 @ $50 | 2,000 |
| 7. | Broiler house for 500 birds 0.3 sq. m. x 500 @ $50 | 7,500 |
| 8. | Repair and Storage shed for Machinery 150 sq. m. @ $40 | 6,000 |
| 9. | Feed Mixing and Storage Building for 100 T feed 130 sq. m. @ $90 | 11,700 |
| 10. | Silo (pit type) 5000 cubic ft. Concrete | 4,000 |
| 11. | Fencing for 110 ha | 4,500 |
| 12. | Dike 3.5 m. high, 1.7 km. long | 60,000 |
| 13. | Pumping station (combination for irrigation and drainage) | 47,000 |
| 14. | Irrigation network (70 ha.) | 46,200 |
| 15. | Drainage system (70 ha.) | 28,500 |
| 16. | Land clearing (upland only) 40 ha. | 9,600 |
| 17. | Land leveling and farm irrigation works (30 ha.) | 11,100 |
| 18. | Roads | 50,000 |
| | Carried Over | $869,100 |

| No. | Item | Cost($) |
|---|---|---|
| | Carried Over | $869,100 |
| 19. | Well, 6 in. casing, depth 100 ft. | 4,000 |
| 20. | Elevated tank (5000 gal.) 30 ft. tower and chlorinator | 5,000 |
| 21. | Pump (diesel drive) 50 gpm Head-Head 150 ft. | 3,500 |
| 22. | Distribution system and stock tanks | 2,500 |
| 23. | 2 fully equipped house trailers (for 2 persons each) 2 x 10,000 | 20,000 |
| | TOTAL | $904,100 |

## TIMBOU AGRICULTURAL SUB-STATION

| No. | Item | Cost($) |
|---|---|---|
| 1. | Office building - 4 twin offices and accessory facilities 4 x 90 sq. m. @ $400 | $144,000 |
| 2. | Laboratory 50 sq. m. @ $400 (w/o equipment) | 20,000 |
| 3. | Four apartments in 2 duplex buildings 4 x 100 sq. m. | 160,000 |
| 4. | Machinery repair and storage bldg. 150 sq. m. @ $40 | 6,000 |
| 5. | Laborers' quarters | 4,000 |
| 6. | Fencing | 2,000 |
| | TOTAL | $336,000 |

D

## FARANAH AGRICULTURAL COLLEGE

| No. | Item | Cost ($) |
|---|---|---|
| 1. | 3 dormitories @ 100 beds 18 rooms @ 50 sq. m. 900 sq. m. @ $300.00 | $270,000 |
| 2. | 6 classrooms @ 35 sq. m. 210 sq. m. @ $320 | 67,200 |
| 3. | 1 library with reading room for 34 persons 60 sq. m. @ $350 | 21,000 |
| 4. | 1 infirmary for 1000 students 25 beds 300 sq. m. @ $400 | 120,000 |
| 5. | 1 office building 8 rooms @ 20 sq. m. = 160 sq. m. @ $300 | 48,000 |
| 6. | 1 tool stock room 25 sq. m. @ $60 | 1,500 |
| 7. | 1 agricultural implement shed 150 sq. m. @ $40 | 6,000 |
| 8. | 1 spare parts shed 30 sq. m. @ $60 | 1,800 |
| 9. | 1 agricultural equipment shed L.S. | 4,000 |
| 10. | 1 automobile garage ( 4 bays) 100 sq. m. @ $60 | 6,000 |
| 11. | 1 automobile repair shop L.S. | 3,000 |
| 12. | 1 carpentry shed L.S. | 3,000 |
| 13. | 3 research laboratories 3 x 70 sq. m. @ $350 | 73,500 |
| 14. | 3 hangars - 150 sq. m. each 3 x 150 = 450 sq. m. @ $80 | 36,000 |
| 15. | 1 barn for 85 cattle 360 sq. m. @ $120 | 43,200 |
| 16. | 1 pig house for 150 animals L.S. | 22,000 |
| 17. | 1 hen laying house for 2000 birds 0.2 sq. m. x 2000 = 400 sq. m. @ $50 | 25,000 |
| 18. | Improvements of existing electric installation L.S. | 5,000 |
| | Carry over | $757,200 |

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DATE RECD.

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TO. SECSTATE WASHDC TOAID A 69 X
AMEMBASSY CONAKRY X

ACTION

INFO.

DATE SENT
December 12, 1974

FROM. ADO/DAKAR

SUBJECT. Institute of Agricultural Research and College of Agriculture - Kindia, Guinea.

REFERENCE. A) State 242683 B) Dakar 6081

Terms of Reference:

The drafting officer spent November 27 and 28, 1974 in Kindia, Guinea. Much of his time, prior to proceeding to Kindia, was spent awaiting permission from Guinean Central Authorities to proceed on his inland trip reftel State 242683 and Dakar 6081. However, prior to his trip to Kindia, he visited Coyah with the visiting AID/W team to observe a selected agricultural area and local infrastructure in the region.

Agricultural Research and the College of Agriculture:

The National Institute of Agricultural Research and the College of Agriculture of the University of Guinea are located at Kindia, 94 miles Northeast of Conakry. The site is lush green in a tropical setting with year round average temperatures of 78°F, reaching a maximum of 95°F in April and dropping for short periods in December to 45°F. The countryside is dense with various species of accacia, neem, mango, palm oil, doum palm, coconuts, guava, papaya, banana, pineapple, citrus, grapefruit, shrubbery and wild vegetation. Cassava, corn, rice, millet, sorghum, and different vegetables are cultivated.

Soils are predominantly sandy loam, rich in humus with fair to good tilth. Spontaneous vegetation sprouting in this 2,500 to 3,000 millimeter rainfall zone (50 to 60 inches) have kept soil erosion in the lowlands to a minimum. Consequently, herds of N'Dama cattle, sheep and goats freely graze in the forest grounds. Considerable numbers of these animals are sold on the Conakry market and elsewhere in Guinea.

PAGE 1 OF PAGES 5

DRAFTED BY: ADO: Victor Lateef/al | TITLE | PHONE NO. | DATE Dec.12/74 | APPROVED BY: ARDO: David A. Walsh

AID AND OTHER CLEARANCES

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| No. | Item | Cost ($) |
|---|---|---|
| | Carried over | $787,200 |
| 19. | Voltage regulators for 3 laboratories 3 @ $300 | 900 |
| 20. | Drilled well, depth approx. 300 ft., 8 in. casing equipped with industrial well screen | 10,000 |
| 21. | Pump 500 gpm., head 100 ft., driven by 25 HP diesel engine | 8,000 |
| 22. | Elevated tank, 20,000 gal. and chlorinator | 20,000 |
| 23. | Distribution system | 25,000 |
| | TOTAL | $846,900 |

The drafting officer saw the herd of one husbandryman with 400 heads of N'Dama cattle and some sheep and goats in their forest pens. All the animals were reported vaccinated and had no apparent tse-tse fly infestation. The Director General of Research stated that Holstein, Jersey, Guernsey and Ayshire cattle breeds at the Foulaya station have not shown sighs of Trypanosoniasis so far and all the stock appeared to be in good condition.

The Dean and Director General of Research:

Mr. Mansaré Nongoh is both Dean of the Faculty of Agriculture and Director General of the Guinean National Institute of Agricultural Research. He is a graduate of the University of California, College of Agriculture, Davis Campus, where he had received his Master of Science degree in soil science in 1965 after which he received eighteen months of applied agricultural training at the University of Puerto Rico. In addition, he is a National Deputy in the Guinean parliament. He is also a community leader who was one of ten recipients of the "Médaille d'Honneur du Travail" in Guinea last year. He showed me the University farms and experiment station far into the night, and when we departed, he had faculty members and students awaiting him to discuss their problems. However, he was quick to point out that he had assistants in each of his departments on whom he relied to implement the day-to-day work in order for him to give more of his time to research and academic policy matters.

Campus, Research Facilities and Infrastructure:

In early 1971, the campus of the College of Agriculture of the University of Guinea was transferred from Conakry to its present location, five miles west of Kindia. It encompasses an area of 5,000 hectares divided into ten farms of varying sizes, including the 800 hectare experiment station which is subdivided into smaller tracts.

The college has an enrollment of 400 students with a five year curriculum leading to the Bachelor of Science degree level. The last year is spent in applied agricultural training and preparation of a thesis, or in relevant special studies. About 140 men and women graduate annually from this institute, which in addition to graduates from the Kankan School of Agriculture in Northern Guinea, produce an annual national total of some 200 graduates in all available disciplines of agricultural science.

The college has the following departments of instruction: Livestock, Agronomy, Agricultural Engineering, Soil Science and Forestry. Plans are underway to add a department of veterinary medicine in 1975.

Students are fully subsidized by the GOG for their tuition, room and board. Those who attain a scholastic B grade average, or higher, receive an additional incentive of 1,000 sylis per month (one US dollar equals twenty sylis at the official rate of exchange). Some twenty students are now on scholarships in Eastern Bloc countries to pursue their agricultural studies in livestock, soil science, forestry and agricultural engineering at the PHD level.

The college has a faculty of thirty-nine professors and instructors aided by twelve

Bulgarian instructors provided under Bulgarian technical cooperation.

The research institute consists of the following eleven laboratories and their staff:

Soil Laboratory (2 Guinean research workers and 1 Bulgarian)
Agro Chemistry (3 Guineans and 2 Bulgarians)
Insecticides and Herbicides (3 Guineans)
Physiology (1 Guinean)
Cytogenetics (3 Guineans)
Entomology (1 Guinean)
Radio Isotopes (1 Guinean)
Phytopathology (1 Guinean)
Agro Meteorology (2 Guineans)
Fruit Technology (2 Guineans)
Photo Laboratory (1 Guinean)

These laboratories were established since independence in 1960 with the exception of the Physiology, Entomology, Phytopathology and Fruit Technology Laboratories which were reported established during the French Administration. The Animal Husbandry Research Department includes the following divisions:

Veterinary Medicine (4 Guinean veterinarians and 1 Bulgarian)
Poultry Science (4 Guinean research workers and 1 Bulgarian)

A Bulgarian electrical engineer is attached to the Animal Husbandry Department and assists with the operation and repair of all electrical appliances on the campus. Another Bulgarian corn research worker is attached to the research institute which brings the total Bulgarian technical research staff to seven.

The crossing of various poultry breeds by Guinean and Bulgarian research workers has been going on for the last four years in order to produce an adapted ideal bird for the Guinean climate. Under this program, the production of 6 million broilers and 60 million eggs are envisaged under the GOG five year plan (1974-1978). Already seven million dollars are reported to have been spent on this activity.

In the Veterinary Medicine Division some 5 million capsules for livestock vaccination are reported produced annually. These include Rinderpest, Pleuro-Pneumonia, Anthrax, Blackleg and other antibiotics for animal diseases prevalent in Guinea.

The University Farm:

A total of 800 workers are employed at the University farm. Also 37 diesel motor pumps for pumping water from the river for the sprinkler system network are maintained. The pumps are of "Rudolph Bauer" manufacture (made in Austria) and of Bulgarian manufacture. These are reported kept in use with sprinkler irrigation personnel irrigating, during the dry season, from the latter part of each day of the week until the early hours of the morning to minimize the evapotransporation loss. Four tracts of land, 6, 12, 20, and 30 hectares each, planted in pineapples were observed. They were cultivated in applied research/production tests with different planting dates and fertilizer treatments. Also large tracts planted in banana plants, corn

and cassava were observed. All are irrigated by sprinkler irrigation. No traces of salinity problems were observed.

The proceeds from the sale of these crops, of which pineapples alone are estimated by Mr. Nongoh to bring 15 million sylis will be reinvested in the operational costs of the college of agriculture and research program.

Desired American Technical Assistance:

1. Serious infestation of various species of nematodes were reported and observed in the soils of the university farm. Mr. Nongoh expressed interest in the assistance of an American nematodist expert to research, study and identify the various nematode species and recommend ways and means of their control.

2. The warm tropical climate in this area encourages a wide range of disease organisms attacking bananas, pineapples, cassava, corn and vegetable crops; therefore, the services of an American plant pathologist to research, identify and recommend control of these diseases was suggested.

3. Because Guinea has not been receiving international and regional research information, during the last few years, there is evident need for renewed liaison with these organizations to introduce and test cereal and root crop materiel from IITA and other organizations. Also IRAT and ICRISAT sorghum and millet varieties can be tested under local Guinean soil and climatic conditions to good advantage.

4. Limited and selected vegetable seeds of tomatoes, egg-plants, onions, peppers, cabbage, lettuce and carrots were requested for testing by the research department.

5. The Dean of Agriculture expressed interest in American automatic livestock milking equipment and hammer mills with a possibility of obtaining the services of a short term American livestock technician to operate this equipment, as the Bulgarians are now doing with their poultry equipment.

6. American soil analysis equipment and agricultural machinery to equip the College Agricultural Machinery Shop were suggested and specifications of desired equipment were to be forwarded to the American Embassy, Conakry, when they are ascertained.

7. Research equipment for the Physiology and Radio Isotope Laboratories were suggested by the research director. A list was to be prepared by the Research Institute and forwarded to the American Embassy, Conakry, for possible consideration

8. American Agricultural scientific books covering all fields of agricultural scien were eagerly sought. The Dean of Agriculture emphasized the need of his school for American textbooks dealing with scientific agricultural research methodology at the post graduate level.

Further detailed study and review of the agricultural curriculum and research programs will probably be required to ascertain the possibility and extent of U.S. consideration of their request for assistance to their college of agriculture and research programs.

AGGREY

F

MEMORANDUM FOR: L. Murray Mould, AFR/DS Team Leader

FROM : Victor Lateef, Agricultural Education/Research Advisor, AHO/Dakar

SUBJECT : Development of Guinea Agricultural Production Capability and Training: Findings during TDY July 16-26, 1975, in Guinea

BACKGROUND

All A.I.D. missions that visited Guinea since 1974 have been favorably impressed with the vast agricultural development potential in that country. The relatively high rainfall, favorable climate, abundant resources and fertile soils of which there are seven million cultivable hectares with less than 1.4 million hectares under cultivation are the reasons for this assessment. However, certain constraints to the realization of this development potential have been given as the lack of sufficient available consumer products for the people, a soft national currency unsupported by gold, reserves or production, absence of ancillary motivation for cultivators to increase production, lack of sufficient research/extension infrastructure and a need for qualified agricultural technicians, planners and administrators.

The relative isolation of Guinea from the several international and regional agricultural research organizations during the last two decades since its independence in 1958, have deprived it from the many available research benefits that have accumulated during the last 17 years. For example, superior staple grain and root crops that are high yielding with high lysine content and disease resistance have been developed. Also a world-wide collection of various germplasm, new scientific breeding techniques, management of plants and animals, insect and disease identification and control, all of which are applicable to Guinean conditions, were achieved.

Other constraints to development include low per capita income of $80, 90 percent illiteracy, weak agricultural infrastructure and weak institutions that culminated in listing Guinea among the least 25 developed countries of the world by the World Bank. The paradox is that Guinea, once the breadbasket of West Africa and a major exporter of food crops such as rice, has turned into a net importer of 60,000 tons of rice annually to meet the basic needs of its population growing at a rate of 2.6 percent per annum.

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DETAILED DESCRIPTION

In its request to A.I.D. for assistance in the agricultural development sector, the Government of Guinea gave priority to large agro-pastoral complexes that would have required considerable capital inputs. However, due to A.I.D. budget limitations and the limited absorptive capacity ~~of development~~ of Guinea at this stage of its development, A.I.D. opted to follow a course of action that would permeate the Guinean development strata and its infrastructure throughout the agricultural economy. This action is to assist in the development and strengthening of the Education/Research/Extension complex at the principal National Faculty of Agronomy and National Research Center at Foulaya as well as the regional vocational school of agriculture in Faranah, both located 94 and 280 miles respectively northeast of Conakry. In addition, a 25 hectare experimentation/demonstration station will be established at Tindou (10.3 kilometers south of Faranah) and a nearby 80 hectare demonstration farm at Sembakro (2.5 kilometers further south from the referenced station).

The selected experimentation/demonstration station borders on the Niger River which inundates the area annually from August to October. Cultivators usually plant the land in rice immediately after the recession of the river thus making use of the underground moisture to grow a successful crop. A dirt filled dyke, 3 meters high, will be constructed to protect the land from the overflow and to impound water for application of the experimentation/demonstration tests throughout the year. Land levelling and a network of irrigation and drainage canals with facilities for a sprinkler irrigation system will be installed at that station.

The station will be divided into five equal tracts of five hectares each for the following crops:

1. Rice cultivation including varietal, fertilizer application, week control, cultivation methods and management demonstrations of the various types of rice.

2. Staple food crop demonstrations of corn, sorghum, cassava, millet, and yam. Uniform varietal tests, fertilizer applications, spray schedules, herbicide use, supplemental irrigation application to be included.

3. Vegetable crop demonstrations to include potatoes, tomatoes, eggplants, onions, okra, carrots, equash, lettuce, peppers, cucumbers, beans, peans, spinach and melons. Veriotal demonstrations

with different rates of fertilizer application, pesticide spray, dates of planting and harvesting, weed control, irrigation, application and use of scientific management techniques of production will be included.

4. Forage crop demonstration of different forage crops, their periodic cutting, weighing and placement of the sillage in a demonstration silo to be dug at the station for livestock consumption.

5. A fruit demonstration section to include all adapted fruit in the region and which can grow in abundance as observed in the Faranah region. These fruits will include pineapples, bananas, mango, papaya, oranges, tangerines, grapefruit, lemons and other tropical and subtropical fruits.

This area has varied degrees of slope but no topographic or soil maps are known to exist. Since such maps are a prerequisite for the erection of the dyke to determine the contour of the land and its soil composition to assess its suitability as dyke fill material, these maps will need to be prepared for the dyke construction.

A few surface soil samples taken by the design team were forwarded by the design team coordinator to the Foulaya Research Center and the USDA soils laboratories for nutrient analyses. The soil profile observed at one eroded point at a depth of five feet showed no hardpan. The soil is of clay loam texture, medium tilth, permeability and capillary action. However, the soil at the demonstration farm, 2.5 kilometers further south at Sembakro, is alluvial loam, superior in tilth, permeability and capillary action and of medium texture which makes it suitable for growing a wide range of food and forage crops. Such crops can include all the best adapted and highest yielding cereal, vegetable, forage and fruit crop varieties grown at the experimentation demonstration station including the possibility of seed multiplication, vegetable and fruit tree nurseries. With proper scientific management the application of fertilizers, insecticides, pesticides, weed control, and supplemental irrigation when required, the demonstration farm will be transformed into an excellent pilot project for the entire region. The installation of two aspersion type water pumps (about 50 horsepower each on the adjacent Niger River) capable of irrigating 50 hectares each for the future expansion of the farm will be included in the design of this demonstration farm. In addition, a sprinkler irrigation system covering 10 hectares, in each setting, will be included on the farm.

THE FOULAYA-FARANAH RESEARCH RELATIONSHIP

The National Institute of Agricultural Research at Foulaya is the principal agricultural research center in Guinea. It is part of the combined research/education/extension concept where basic and adaptive research are carried out. The Dean of the Faculty of Agronomy is also the Director General of the National Agricultural Research Institute, as the case is in many land grant colleges in the United States.

The Foulaya experiment station has an area of 800 hectares subdivided into small tracts of land and from which all research work emanates. It considers the Faranah experiment demonstration station as its sub-station and proposes to appoint its director from Foulaya who has responsibility for the plans, programs, operation and management of the station.

THE FACULTY OF AGRONOMY AT FOULAYA

The College of Agronomy is an integral part of the University of Guinea in Conakry and Kankan. It was transferred from Conakry to Foulaya late in 1974 and has an enrollment of 400 students. It has a five-year curriculum leading to the Bachelor of Science degree level in the following departments of instruction: livestock, agronomy, forestry, soil science and agricultural engineering. The last year is spent in applied agricultural training and preparation of a thesis or relevant special courses in agriculture.

The campus encompasses an area of 5,000 hectares divided into ten farms of varying sizes including the 800 hectare experimental station. There are laboratories for soils, agro-chemistry, insecticides and herbicides, physiology, cyto-genetics, entomology, radio isotopes, phytopathology, agro-meteorology, fruit technology and a photo laboratory.

Under this project the GOG has requested the following for the Faculty of Agronomy and National Institute of Agricultural Research:

1. Commodities, scientific equipment and laboratory instruments (Appendix A) to equip the various laboratories, classrooms and library and to augment instruction material with U.S. scientific equipment.

2. The construction of four laboratories on the campus for the following subject matters:

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a. Biology

b. Physiology

c. Genetics and Cytogenetics

d. Phytopharmacy

The dimensions and specifications will be determined by the REDSO Civil Engineer and the Dean of the Faculty of Agriculture.

3. American staff required for the project are the following:

a. A project manager to coordinate all elements of the project including procurement of commodities, construction of buildings, coordination of staff, documentation of participants and consultation with concerned authorities on the project.

b. A Nematodist with at least an M.S. degree level and two years of experience for a 6-month to 2-year assignment. Club, root and other nematode types heavily infest the banana, pineapple and vegetable crops in the field and at the experimental station. A need for their identification, study and biological or chemical control are required.

c. An entomologist with an M.S. degree equivalent and two years of experience for a 6-month to 2-year assignment. There is a heavy infestation of cereal, vegetable and fruit crops with a wide range of insects and pests which are abundant in the tropical climate of Guinea. They need to be identified, studied and controlled since they are responsible for the destruction of considerable food crops.

d. A plant pathologist with a Ph.D. equivalent and two years experience for a 6-month to 2-year assignment. The heavy infestation of food crops with organisms, fungus, virus and bacteria cause considerable loss of crops due to the warm tropical Guinean climate in which these pathogens thrive. Their identification, study and control is of utmost importance to the Guinean agricultural economy.

NB: The nematodist and pathologist functions could be combined in one expert.

e. A phytopharmacist with an M.S. degree equivalent and two years of field experience. He is to identify and study the application and effectiveness of chemicals, insecticides and pesticides on plants and their analyses and tolerance.

f. A soil scientist with an M.S. degree and minimum of two years experience for a 6-month to 2-year assignment. He is to start a soil classification program, with surveys and soil maps according to new USDA soil classification techniques and soil genesis.

All recruited staff must be able to teach, at least part time, at the Faculty of Agriculture. A fluent knowledge of French, although valuable, is not essential for a highly-qualified technician, according to the Dean of the Faculty of Agronomy. A minimum of three man years to a maximum of 12 man years will be required for the staff.

4. A participant training program in which qualified Faculty of Agriculture graduates will be selected for training in the United States. Each will be given two-year training at an institute of higher learning leading to an M.S. degree in the fields of nematology, entomology, pathology, phytopharmacy and soil-genesis. One-year advanced training for two veterinarians or veterinarian workers will be also included. This will culminate in 12 man years of training plus prerequisite English language training prior to the commencement of classroom training.

THE REGIONAL VOCATIONAL SCHOOL IN FARANAH

This school was transferred from Foulaya to Faranah late in 1974 and has a three-year curriculum in vocational agricultural training consisting of 40 percent classroom and 60 percent field work. It is composed of the Ecole Nationale des Instituteurs (ENI) and the Ecole Nationale d'Agriculture (ENA), who share the same facilities and faculty staff of 21 instructors.

Applicants must have completed the Baccalaurate educational level to be accepted by either school. Graduates with the highest grade average, usually five students per year, are accepted at Foulaya for continued college training in agriculture leading to the B.S. degree level. The bulk of ENA graduates work for the Ministry of Rural Development as extension agent assistants (animateurs) or in other rural work.

The two schools have a combined enrollment of 766 students as follows:

| Year | ENA | ENI | Total |
|---|---|---|---|
| First Year | 85 | 107 | 192 |
| Second Year | 84 | 204 | 288 |
| Third Year | 79 | 207 | 286 |
| TOTAL | | | 766 |

The principal crops grown on the school's 1,530 hectare farm, including the campus area, are rice, corn, cassava, peanuts, vegetables, bananas, pineapples and mangos.

Although the school has modest infrastructural and construction facilities to accommodate the needs of its programs of training, these are below the minimum requirements of the school. Therefore, the GOG is hard pressed and has requested assistance from A.I.D. for the construction of buildings (Appendix B) and for commodities, equipment, laboratory instruments, training and demonstration material and vehicles (Appendix C) in order to upgrade their training program.

THE EXTENSION PROGRAM

The extension or outreach programs at both Foulaya and Faranah are not formalized as an institutional element at this time, although both programs point into that direction as soon as formal extension agents graduate from Foulaya and train abroad. Nevertheless, there is a build-in element of an effective extension program culminating in a national effort for these schools to contact and train farmers. Some 300 students (mostly upper classmen) from the Faculty of Agronomy were ordered in February of this year to proceed into the countryside until the end of 1979 in order to contact, work, train and live with the farm population at the village and hamlet levels. A brigade consists of 10 students, 2 drivers, 4 laborers and 15 farmers who are assigned an arrondissment or district.

Similarly, the Faranah student body from the two upper classes have been working with brigades in the countryside since last February.

INSTITUTE ADMINISTRATION

Both Foulaya and Faranah fall under the administrative jurisdiction of the Ministry of Education, but their agricultural programs, research facilities and farming operations are under the Ministry of Rural Development which was decentralized recently into seven departments to serve the seven regions of Guinea for more effective and direct contact with the agricultural farming sector.

ROLE OF WOMEN IN PROGRAM

Women play an important role in all strata of Guinean social, economic and political life. All schools are co-educational including the Foulaya and Faranah schools. There are 48 women enrolled in the Foulaya school out of a total enrollment of 400, and at Faranah, women constitute 9 percent of the total student body.

REGIONAL AND INTERNATIONAL RESEARCH RELATIONSHIP

There has been two decades of Guinean isolation from the world research community. It was felt by high GOG officials engaged in agricultural research that they would like to enter the international research fold gradually. They were informed of WARDA, IITA, CIMMYT, CIP, INTSOY and J.P. 26 operations, programs and objectives. They informed the team that they would prefer a gradual entry into these organizations whereby they wish to receive seeds of the respective crops first and test them on their own. Then, as favorable results appear, they will make contact with each organization for advice and personnel assistance. They requested Mr. Lateef, ADO/Dakar, to assist them in providing them with the different, newly-developed seed crops and the experimental research designs for the present, and he agreed.

The officials stated that their entry into technical and economic cooperation with Bulgaria, for example, started with 1000 eggs provided by the Bulgarians. These gave successful results that convinced the higher echelons in the GOG to request more assistance in personnel and equipment from Bulgaria.

RECOMMENDATIONS

The basic concept of education/research/extension is at the heart of agricultural development in the United States and other parts of the world. This concept, followed by the land grant colleges in the U.S., is also envisaged by the Government of Guinea. The combined programs of education by the Faculty of Agronomy and National Institute of Research at Foulaya with the extension program emanating from the Faculty of Agronomy is the program of development followed by the GOG.

The GOG request for four laboratories to be constructed on the campus of the Faculty of Agronomy, U.S. equipment, commodites and scientific instruments, six specialist technicians in nematodology, entomology, pathology, phytopharmacy and soil classification, and seven participants to train in the U.S. at the M.S. degree level (12 man years) in the same subjects plus short term training in veterenary medicine, are urgently required and highly desirable in an A.I.D. program of assistance and cooperation for the development of the Guinean agricultural economy.

the required height. A small ground tank, constructed of reinforced concrete (capacity approx. 10 m.), is the only storage currently available and it does not create sufficient pressure to deliver water to the dormitories and several other buildings. At one time the ground tank was served by 330 m. of 200 mm. cast iron pipeline but the joints are in bad shape and it is no longer in service.

The system is currently supplied water by a Bauer centrifugal pump driven by a 25 HP Deutz diesel engine and is conveyed through a 75 mm. galvanized iron pipe equipped with quick-opening couplings such as used on a portable irrigation system. In fact, the diesel pump and the pipe have obviously been pressed into service from the school's stock of irrigation equipment.

The source of the water supply is a small stream which is apparently fed by springs located in the mountains some distance from the school. The source is reportedly reliable and the appearance of the water was reasonably clear, but with a slight yellow tinge.

From the preceeding it can be seen that the existing system is inadequate in many respects, i.e., the quantity is insufficient, the delivery pressure is too low and the water is definitely not potable. As a tentative minimum, with a modest provision for future requirements and increased usage, the following is proposed to provide a greatly improved practical supply for the agricultural facility:

| | |
|---|---|
| Design average daily consumption | 50,000 gal. |
| Pump capacity assuming 12 hr. pumping/day | 500 gpm. |
| Height of water tower to top water level | 40 ft. |
| Difference in elevation between pump and tank base | 30 ft. |
| Friction loss in 1200 ft. of 8 in. pipe at 500 gpm. | 8 ft. |
| Suction head | 6 ft. |
| Total head | 84 ft. |
| Power required for pumping | 20 HP |

The question of a power source for pumping was discussed with the Director of the Station and it was learned that Foulaya receives its supply from a hydroelectric project located in the Kindia area which is considered to be reliable. In view of this, the use of electricity is recommended for pumping.

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The following is a tabulation of estimated costs for the project:

## COST ESTIMATE

| No. | Item | Cost($) |
|---|---|---|
| 1. | Intake structure with screens | 3,000 |
| 2. | Package treatment plant - including chlorinator | 40,000 |
| 3. | Pumping Station Building | 5,000 |
| 4. | Electric, high-left pump with diesel standby | 15,000 |
| 5. | Transformer and transmission line | 10,000 |
| 6. | Pumping main 1200 ft. - 6 in. pipe | 15,000 |
| 7. | Connections to reservoirs and swimming pool | 3,000 |
| 8. | Improvements to distribution system | 30,000 |
| 9. | Spare parts for pumping unit | 1,500 |
| 10. | Chemicals (3-year supply) | 6,000 |
| | SUB TOTAL | $128,500 |
| 11. | Plans, specifications, supervision of construction and environmental analysis (12%) | 15,400 |
| 12. | Contingencies (25%) | 32,000 |
| | TOTAL | $175,900 |
| | Say..... | $200,000 |

It is believed that the proposed water supply system can be constructed within an 18 month period. The suggested implementation schedule is given below:

## IMPLEMENTATION SCHEDULE

| No. | Item | 1975 J | F | M | A | M | J | J | A | S | O | N | D | 1976 J | F | M | A | M | J | J | A | S | O | N | D | 1977 J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Survey of existing system | | X | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | Prepare plans and specs and environmental analysis | | | X | X | | | | | | | | | | | | | | | | | | | | | |
| 3. | Order equipment | | | | | X | X | | | | | | | | | | | | | | | | | | | |
| 4. | Ship & deliver equipment | | | | | | X | X | | | | | | | | | | | | | | | | | | |
| 5. | Negotiate const. contract | | | | | | X | | | | | | | | | | | | | | | | | | | |
| 6. | Perform preliminary const. work | | | | | | | X | | | | | | | | | | | | | | | | | | |
| 7. | Execute major construction | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 8. | Supervision of const. | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |

Notes:

1. Survey of existing system, including measurement of distances and elevations, pipe diameters, exact tank capacities, etc., to be accomplished by local engineering firm (possibly Nippon Koei, a Japanese firm currently preparing plans for a new railway).

2. Preparation of plans and specifications and supervision of construction could be by either local or U.S. company. (Probably use a local firm for A&E services since project may be too small to interest U.S. contractors.)

3. Equipement and materials to be procured from USA.

FARANAH

Faranah is the site of the Regional School of Agriculture. It is located approximately 409 km. east of Conakry. This school trains agricultural technicians and assistants just below the Bachelor of Science/Engineering Agronome level. The current water supply at the school is a shallow, hand-dug well approximately 30 ft. deep. It goes dry for two months of the year and is completely inadequate. The present estimated population of the school is as follows:

| | |
|---|---|
| Students | 766 |
| Faculty | 21 |
| Dependents & Assistants | 50 |
| TOTAL | 837 |

Assuming an average daily water demand of 50 gal/capita/day, the water requirements for the school would be 837 x 50 = 41,850 gal. (158 m.). Since the present water use in this area is very low (probably 10 gal/capita/day or less) it will probably be several years before 50 gpcd will be reached. Therefore, the design capacity of the proposed system will only be increased to 50,000 gal/day (a surplus of approximately 19% over the projected daily requirement).

The following is proposed as a practical water supply system for the school:

## COST ESTIMATE

| No. | Item | Cost($) |
|---|---|---|
| 1. | Drilled well, depth approx. 300 ft., 8 in. casing equipped with industrial well screen | 10,000 |
| 2. | Pump 500 gpm., head 100 ft., driven by 25 HP diesel engine | 8,000 |
| 3. | Elevated tank, 20,000 gal. and chlorinator | 20,000 |
| 4. | Distribution system | 25,000 |
| | SUB TOTAL | $63,000 |
| 5. | Plans, specifications, supervision of well drilling, system construction and environmental analysis (12%) | 7,550 |
| 6. | Contingencies (25%) | 15,750 |
| | TOTAL | $86,300 |
| | Say..... | $90,000 |

A time frame of 15 months, during which it is believed reasonable to implement the project, is given below:

[illegible]

| No. | Item | 1978 | | | | | | 1979 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. | Preparation of plans and specs and environmental analysis | | X | | | | | | | | | | | | | | | | |
| 2. | Order equipment and materials | | | X | X | | | | | | | | | | | | | | |
| 3. | Ship and deliver equipment and materials | | | | | X | X | | | | | | | | | | | | |
| 4. | Mobilize well driller | | | | | | X | | | | | | | | | | | | |
| 5. | Drill and case well | | | | | | | X | X | | | | | | | | | | |
| 6. | Construct elevated tank | | | | | | | | | X | X | X | X | X | X | | | | |
| 7. | Construct distribution system | | | | | | | | | | | X | X | X | X | X | X | X | X |
| 8. | Supervision of construction | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X |

Notes:

1. Preparation of plans, specifications and supervision of construction could be performed by either local firm (Nippon Koei) or by a U.S. firm.

In addition to the provision of a water system at Faranah, it is also intended to construct a 135 ha. agro-livestock demonstration farm which will serve both as a pilot production and training center for students and farmers and as a small research unit (sub-station for the National Institute of Agricultural Research). This station is to be located approximately 13 km. south of Faranah near the village of Tindou. The tract selected is nicely situated on the flood plain adjacent to the Niger River and access is very easy since it is on the bituminous-surfaced highway connecting Faranah and Kissidougou. Approximately 45 ha. of the tract are being cultivated with a floating rice crop currently in place. The remaining area (90 ha.), which is located on land which slopes gradually upward from the flood plain to the highway, is presently covered with tall grass, underbrush and scattered trees. The soil in this area is obviously quite fertile and the Niger River reportedly never goes dry in this region; therefore, it appears to be an ideal location for a demonstration facility.

The land use pattern of the farm will be approximately as follows:

| Item | Area(ha) | Method of Irrigation |
|---|---|---|
| Research Plots | 25 | various |
| Rice (controlled flooding | 5 | flooding |
| Forage | 20 | sprinkler |
| Maize | 20 | sprinkler |
| Rice (uncontrolled flooding) | 15 | flooding (dry season) |
| Renovated range | 20 | none |
| Native range | 20 | none |
| Building site | 10 | none |
| TOTAL | 135 | |

| Item | Area(ha) |
|---|---|
| Area Irrigated | 85 |
| Area Non-irrigated | 50 |
| Total gross area | 135 ha. |
| Total net area | 108 ha. |

Details are shown on the attached map.

Gross area in flood plain - 45 ha.

Gross area in upland area - 90 ha.

Since approximately 40% of the area within the farm boundaries lies in the flood plain of the Niger River, a system of dikes approximately 3.5 meters high and 1700 meters long will be required.

A cost estimate for the hydraulic features of the project is as follows:

COST ESTIMATE

| No. | Item | Cost($) |
|---|---|---|
| 1. | Dike 3.5 m. high, 1.7 km. long | 32,200 |
| 2. | Pumping station (combination for irrigation and drainage) | 47,000 |
| 3. | Irrigation network (70 ha.) | 46,200 |
| 4. | Drainage system (70 ha.) | 28,500 |
| 5. | Land clearing (upland only) 40 ha. | 9,600 |
| 6. | Land levelling and farm irrigation works (90 ha.) | 11,100 |
| 7. | Roads | 12,800 |
| 8. | Well, 6 in. casing, depth 100 ft. | 4,000 |
| 9. | Elevated tank (5000 gal.) 30 ft. tower and chlorinator | 5,000 |
| 10. | Pump (diesel drive) 50 gpm Head-Head 150 ft. | 3,500 |
| 11. | Distribution system and stock tanks | 2,500 |
| | SUB TOTAL | $202,400 |
| 12. | Preparation of plans and specifications, supervision of construction and environmental analysis (12%) | 24,400 |
| 13. | Contingencies (25%) | 50,600 |
| | TOTAL | $277,300 |

A proposed implementation schedule for the major features of the project follows:

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G.

MEMORANDUM FOR: L. Murray Mould, Team Leader, AFR/DS, AID/W

FROM : C.B. Thompson, SER/ENGR, AID/W

SUBJECT : Development of Agricultural Production Capability and Training (Guinea)

DATE : June 26, 1975

In compliance with the scope of work prepared by L.S. Peek (dated 6/12/75) and your verbal instructions, tabulated below are data and calculations relative to the hydraulic engineering aspects of the Foulaya and Foranah Agricultural Schools.

FOULAYA

Foulaya is the site of the Faculty of Agronomy of Guinea and also of the National Institute of Agricultural Research. This facility is located about 9 kilometers from Kindia (regional governmental center) and approximately 133 kilometers northeast of Conakry (the national capital). The educational complex and the research station are served by a common system for domestic water. The present estimated population is as follows:

| | |
|---|---|
| Students | 400 |
| Faculty | 39 |
| Dependents & Assistants | 60 |
| TOTAL | 499 |

Assuming a demand of 50 gal/capita/day, the average daily requirement would be 499 x 50 = 24,950 gallons (93.5 m.). Approximately 1/3 of the average daily demand should be provided in elevated storage and this volume is currently available in a 30 m. reinforced concrete tank which has been constructed having four 9 m. high supports. However, this tank has not been used for some time due to the lack of a pumping unit which is sufficiently powerful to deliver water to

The establishment of a 25 hectare experiment/demonstration station with a dyke at Tindou and a demonstration farm at Sembakro as well as the provision of selected commodities, equipment and scientific equipment for the regional vocational school of agriculture at Faranah are also urgently needed. A construction program on the campus of this school to meet the basic needs of the agricultural training program was found reasonable and necessary by the team if the desired Guinean training program is to be achieved and its objectives fulfilled as envisaged by the faculty of the school and the GOG.

H

L. Murray Mould, AFR/DS Team Leader

F. M. Bergier, ENG/REDSO/WA

July 2, 1975

Guinea Agricultural Production Capacity and Training Project

The following memo represents the input of the REDSO/WA Civil Engineer whose services were requested by AID/W in connection with the design of Subject Project. His TDY in Conakry lasted from June 26 to July 3, 1975.

1. Characteristics of the Construction Component of the Project.

The project includes a great variety of construction, such as office buildings, laboratories, residential housing, agricultural structures, irrigation, water supply and roads, among others. There is also a large component of imported agricultural machinery and various equipment for which specifications have to be prepared, orders placed, inspection carried out, etc. The project is thus predominantly an engineering one with a certain component of training and institution building and, in order to be properly executed and implemented, requires a substantial input by DER/AID/W, and a full-time resident AID engineer with supporting staff.

2. Construction Materials and Technologies.

The strictly engineering elements of the program (as distinct from its architectural aspects, i.e., buildings) present no problems other than those present in typical AID overseas projects of this nature, including the use of construction machinery and the procurement of equipment for incorporation in the project (e.g., pumps, piping, sprinklers, etc.), all of which will be imported. Those elements having essentially local components are earthwork and concrete construction (although the latter again requires imported cement and reinforcing bars.) There thus is very little or no possibility of adaptation to local materials and practices.

As to the buildings, this writer attempted to ascertain the type of construction practiced and the materials used locally so as to be able to recommend improvements and/or alternatives which may be more advantageous either technically or financially. It was found, inter alia, that undue emphasis was placed on marginal aspects of construction such as finishing the surface of foundations in concrete, whereas more important matters were handled in a relaxed manner: hand mixing of concrete on soil without the benefit of separation, casual and mostly insufficient dosage of cement, concrete pours with large nests of clay, etc. The brick used is essentially

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## IMPLEMENTATION SCHEDULE

| No. | Item | 1975 | | | | | | 1976 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | j | a | s | o | n | d | j | f | m | a | m | j | j | a | s | o | n | d |
| 1. | Topographic survey and preparation of maps, soils tests, etc. | X | X | | | | | | | | | | | | | | | | |
| 2. | Preparation of plans, specifications and environmental analysis | | X | X | X | | | | | | | | | | | | | | |
| 3. | Order equipment and materials | | | | | | X | | X | | | | | | | | | | |
| 4. | Ship and deliver equipment & materials | | | | | | | | X | X | | | | | | | | | |
| 5. | Engage drilling contractor | | | | | | X | | | | | | | | | | | | |
| 6. | Drill well | | | | | | | | X | X | | | | | | | | | |
| 7. | Construct major project | | | | | | | | | | X | X | X | X | X | X | X | X | X |
| 8. | Supervision of construction | | | | | | | | X | X | X | X | X | X | X | X | X | X | X |

A recapitulation of the costs of the hydraulic features of the total project is as follows:

FOULAYA

| | |
|---|---|
| Water supply system | $200,000 |

FARAFAH

| | |
|---|---|
| Water supply system and agricultural school | $ 90,000 |
| Research sub-station and demonstration training farm irrigation system including domestic water supply system | $277,600 |
| TOTAL | $567,600 |

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Redrafted: July 22, 1975

sun-dried clay, with a core of raw, humid material. The use of concrete blocks is quite common; these blocks are produced in small hand operation presses and the product is highly non-uniform as far as quality is concerned.

Existing construction was inspected at the Agricultural College in Faranah and the National Institute for Agricultural Research at Foulaya near Kindia. The type most frequently encountered is so-called mixed construction, i.e., reinforced concrete framing with walls of brick or concrete blocks. In both locations the buildings date back several decades, i.e., to the pre-liberation period. On the other hand, it was difficult to find construction executed under the present social and political conditions.

Nevertheless, in this writer's opinion, the country offers numerous alternative construction materials, e.g., quarry stone and timber. Other systems worth investigation are pre-fabricated housing either in the form of metal or plywood panels, or pre-fabricated steel framing in conjunction with good quality brick. The latter system may be practical particularly in the interior of the country, where there is no danger from corrosion due to excessive humidity. Metal panels would have to be provided with a layer of baked-on-enamel in order to be weather-resistant. Research into the best suited and most economical types of material and systems of construction will have to be carried out prior to the design of the buildings. This could be done conveniently by the same firm of Architects/Engineers who will have the contract for the design and supervision of the buildings and structures involved.

3. Construction Management and Supervision.

It was already mentioned that a permanent presence of AID engineering will have to be provided for the entire duration of the design and construction period. Inquiries with locally based expatriate construction personnel indicated that the Government of Guinea has no capacity for either design or construction supervision of major engineering or architectural projects. There evidently exist government engineers; they are engaged in the design and execution of minor buildings and other structures which are executed by work brigades under the engineer's guidance--the preferred system of construction in this country.

This writer cannot warn enough from having the project carried out along these lines for the following reasons:

a. The design and layout of the buildings would not follow up-to-date principles of architecture such as those available in certain other countries, including the USA. Similarly, it would not safeguard the best utilization of structural materials and of engineering techniques.

b. The cost will probably be much higher than in the case of a conventionally managed project.

c. AID would have no way of really controlling the funds assigned to the project. This is particularly important in the case of a grant, such as the proposed project.

d. The construction time will be indefinite and most probably substantially higher than in the case of construction by contract.

The recommended way of managing the construction is as follows:

a. Grant funds should be reserved for the services of a competent firm of consulting engineers for carrying out preliminary studies (as explained under Section 2) and the preparation of construction plans and specifications for the architectural and engineering elements of the project. The designers would work in consultation both with the AID representative and the GOG agencies concerned with, and interested in, the project. This firm should be selected by SEN/ENG from a list of consulting engineers specialized in rural construction and agricultural engineering available with that office.

b. The same firm of consultants to call for worldwide bids for the construction of the project, and after their receipt to recommend the most advantageous proposal to AID and GOG.

c. Construction by the Contractor thus selected will be supervised by the same Consultants or, if AID and GOG so decides, by another suitable firm. Strict financial and overall technical control by the AID engineering representative is an indispensable prerequisite for the success of the project.

The system recommended in the foregoing has the following advantages:

a. High quality of construction.

b. Expenditures in accordance with a pre-determined budget.

c. Timely completion (because of penalty clauses for delays in the construction contract).

It was ascertained that there are construction contractors--both local and branches of foreign firms--in existence and operating in Guinea, and that the method of constructing under the supervision of a firm of consulting engineers is the customary form of implementing foreign-funded projects such as the one on hand.

4. Estimated Project Cost.

Due to the special social-economic conditions prevailing in this country, it was extremely difficult to make realistic predictions as to the cost of

construction which would be applicable to the project on hand. This writer, in the following, has limited himself to estimating the cost of various buildings and miscellaneous structures while the engineering components as such, particularly those relating to irrigation and water supply, have been the subject of a report by another member of the group.

To the cost of all construction, a contingency factor of at least 15% but preferably 20% should be added. A separate item will be represented by the cost of procurring the needed Agricultural Machinery and Implements.

To the above should be added the cost of engineering as follows:

1. Design and specifications, plus other required bid documentation.....8% of construction cost

2. Construction supervision.....6% of construction cost

3. Procurement services.....10% of cost of Machinery and Implements

The following construction estimate for buildings makes certain assumption both in regard to the size of the buildings or structures in question and to the unit cost (e.g., per square meter area) of the same. They are quoted in U.S. Dollars, and contain both the local and foreign cost component. The average proportion of local and foreign currency required is estimated at 30 and 70% respectively.

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# FIVE-YEAR ECONOMIC AND SOCIAL DEVELOPMENT PLAN FOR THE FARANAH ADMINISTRATIVE REGION (1973-78)

## I. Situation Actuelle et Perspective de Developpement

La population de Faranah, composée essentiellement de paysans, est de 135,466 habitants repartie entre 9 Arrondissement et 334 PRL.

| | | No. PRL* | Population | No de CER | No d'Eleves | Govt Employees |
|---|---|---|---|---|---|---|
| 1. | Kobikoro | 40 | 15,427 | | | |
| 2. | Beindou | 26 | 10,067 | | | |
| 3. | Sandénia | 14 | 10,583 | | | |
| 4. | Banian | 77 | 24,310 | | | |
| 5. | Passayah | 27 | 8,597 | | | |
| 6. | Marella | 37 | 10,837 | | | |
| 7. | Tiro | 27 | 13,650 | | | |
| 8. | Faranah | 67 | 33,380 | | | |
| 9. | Heremakono | 19 | 9,615 | | | |
| | TOTAUX | 334 | 135,566 | 170 | 5,695 | 829 |

CER=Centre d'Education Revolutionaire=school which in combination with each other provide through high school education level (1ere, 2eme, 3eme cycles)

Faranah est une region a vocation agro-pastorale. Les principales activités de la population sont:

--Les cultures vivrières, notamment les céréales (riz, mais, fonio, etc.....) les tubercules (pâtates, manioc, ignames, etc...); l'arachide, etc.

--Les cultures d'exportation; le café, la banane.

*PRL= Pouvoir Revolutionnaire Local

--L'élèvage: les bovins (16,037 têtes en 1970), les ovins (3,172 en 1970) et les caprins (1951 en 1970).

L'artisanat est peu développé à Faranah. On ne signale que 30 Fours à briques en 1970-71. L'équipement agricole est composé essentiellement de charrues (3080 en 1972) herses (2270 en 1972) et de tracteurs (120 en 1972 dont 96 en bon état).

1. Evolution de la Production Rurale (1973 -1978)

| Actions | Product en ton | Valeur million sylis | Product. en tonnes en 78 | Observations |
|---|---|---|---|---|
| PRODUCTION AGRICOLES | | | | |
| I. Cultures Vivrieres | | | | |
| Riz | | | 59,000 | |
| Mais | | | 20,000 | |
| Fonio | | | 2,000 | |
| Patate | | | 5,000 | |
| Arachide | | | 5,000 | |
| Igname | | | 3,000 | |
| Manioc | | | 20,000 | |
| Nyébé (Legumineuse comme les haricots verts) | | | 100 | |
| II. Cultures Fruitières | | | | 10 plants par famil et par an et pour les 5 ans |
| III. Cultures Industrielles | | | | |
| Tabac | 120T | | | |
| Coton | | | 200 T | à promouvoir |
| IV. Cultures d'Exportation | | | | |
| Café | | | To be determined | |
| Banane - Loko (big) | | | To be determined | |
| V. Cultures maraicheres | | | | à promouvoir |

| Designation | QUANTITE 1973 | 1978 | Observations |
|---|---|---|---|
| 1. - Elévage | 17,037 | 30,000 | |
| Bovins (Beef) | 3,928 | 6,000 | |
| Ovins (sheep) | 2,701 | 8,000 | |
| Caprins (Goat) | | | |
| Apiculture (honey) | | | 25 Ruches par PRL à promouvoir |
| 2. - Eaux et Forets | | | |
| Reboisement | | 3,500 hectares | |

Infrastructure et Equipement

Many categories but everything blank for number and cost except Transport - Camions, Land Rovers, Jeeps. --"Prévoir au moins un camion et un véhicle tout terrain par Arrondissement pendant 5 ans."

Recapitulation Générale du Plan Financier

| Actions | Cout total pour tout le plan Sylis/ Investissement/ Humain | | Total | % |
|---|---|---|---|---|
| Prod. Agricole | 3,500,000 | | | 25 |
| Elevage | 980,000 | | | 7 |
| Eaux et Forets | 1,400,000 | | | 10 |
| Artisanat | 280,000 | | | 2 |
| Education & Santé | 3,920,000 | | | 28 |
| Infrastructure et Equipement | 3,920,000 | | | 28 |
| Totaux | 14,000,000 | 20,000,000* | 34,000,000 | 100 |

*This is the estimated sum of the work which will be performed voluntarily, as is the case with most regional development activities.

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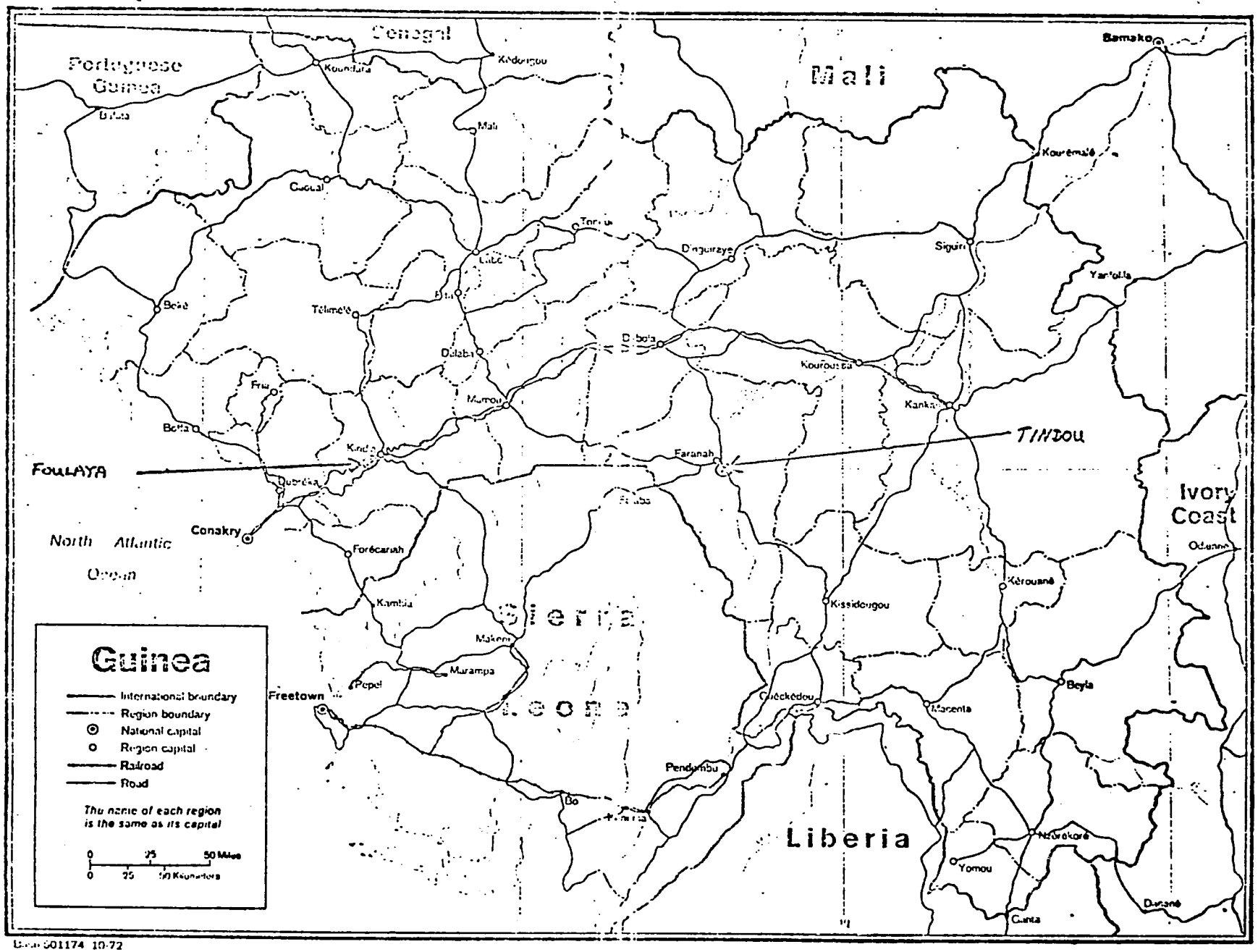


Map 501174 10-72

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## Cooperation between the Government of the Republic of Guinea and the United States Agency for International Development

As part of the continued cooperation between the United States and the Republic of Guinea, and as requested by President Ahmed Sekou Touré, the United States Agency for International Development (AID) proposes an intensive three-year program in agricultural research and training for agricultural production. Assuming final approval by the Governments of Guinea and the United States, the project will be centered at two locations: (1) Foulaya (at the Faculty of Agronomy and at the National Institute for Agricultural Research (INRAF); and (2) Faranah. In Faranah, the project will include assistance to the National School of Agriculture (ENA), assistance in establishing a sub-station of INRAF for applied research, and construction of an agro-pastoral demonstration farm at Tindou on the Niger River flood plain.

Based on preliminary estimates the project will cost over a three-year period approximately 4.4 million dollars. This will include a donation by the United States Government of approximately 2.2 million dollars to the Government of the Republic of Guinea. It will be supplemented by approximately 43.6 million sylis, using funds now on deposit in Guinea which were generated over the past years by sale of agricultural commodities provided under U.S. PL 480 programs. These funds, destined only for economic development, may be used by agreement between the Guinean Government and the United States Government.

The United States Government intends to make major contributions of equipment for agricultural research and for the demonstration of agricultural production to INRAF, to its proposed sub-station at Faranah (Tindou) and to the National School of Agriculture (ENA). United States experts will supervise installation of this equipment and train Guinean technicians in its use.

The United States also proposes to provide two-year scholarships for six Guineans, to obtain advanced degrees in various agricultural disciplines. Upon completion of their training, these Guinean experts would be assigned to the project to ensure its continuation. United States agricultural experts assigned in Guinea will also provide research training at the project institutions. Special training facilities will be made available at the Tindou demonstration farm complex.

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The Tindou agro-pastoral complex will be initially designed to encompass 135 hectares of flood plain and of adjoining upland under intensive cultivation in order to demonstrate improved cropping, livestock, and farm management techniques. This will require amenagement of the flood plain, including construction of dikes and irrigation systems. The farm will be designed for cultivation of rice, other cereals, vegetables, fruits, and other cash crops. It will also include a livestock component. During the initial three years of the project, four permanent AID agricultural advisors will help supervise production, research and demonstration training at the Tindou complex and will also assist in formation of students at Faranah and Foulaya.

During intensive discussion between United States and Guinean agricultural experts over the past several weeks, the latter have proposed considerable new construction of research and training facilities. The AID design team is studying these requests, and will recommend appropriate increases in financing of the project to AID/Washington.

Following these fruitful work sessions with the Faculty of Agronomy at Foulaya and representatives of the Ministry of Rural Development for the Faranah Region, the AID project design team is in the process of completing a draft project agreement. This draft agreement will be submitted for consideration and financing to the Governments of the United States and Republic of Guinea. The team anticipates AID approval for financing of the project sometime during autumn 1975.

The Embassy of the United States of America and the AID design team suggest that favorable decisions on the following matters will facilitate the final work of the AID project design team and preparation of the project agreement:

1. Designation by the Guinean Government of one office in Conakry charged with full powers to coordinate all aspects of cooperation between the two principal Guinean ministries involved in the project--the Ministère du Domaine de la Culture et de l'Education and the Ministère du Domaine du Développement Rural--and the resident AID project manager in Conakry.

2. Duty-free privileges for all commodity assistance destined for the project.

3. Approval of full non-resident privileges for all AID personnel during the life of the project, including duty-free privileges for automobiles, personal and household effects.

4. Free and unrestricted travel for AID personnel between Conakry and project implementation sites at Foulaya and Faranah.

5. Installation and use by project personnel of radio communications facilities between project sites (Foulaya and Faranah) and the AID Project Manager in the American Embassy in Conakry.

6. Agreement to assign qualified Guinean counterpart staff to involved institutions at the commencement of project training, research and production activities.

7. Agreement to the principle of AID-financed scholarships for training for a period of up to two years at educational and research institutions outside of Guinea for Guinean personnel assigned to the project.

With successful resolution and agreement on these items, we may look forward to deepened cooperation between our two governments and to profound and dedicated joint efforts to increase agricultural production in Guinea over the coming years.

/8

Appendix M

National [illegible] of Agriculture

Project

[illegible]

Equipment requisitions submitted to the A.I.D. Mission

| Number | Description | Quantity | Remarks |
|---|---|---|---|
| | I. In the [illegible] | | |
| | 1. Agricultural [illegible] | | |
| 1 | Complete tractors, [illegible] | 3 | |
| 2 | Complete mini-tractor | 1 | |
| 3 | Power-driven cultivator | 2 | |
| 4 | Stump-puller | 1 | |
| 5 | Combine, self-propelled $35,000 total [illegible] 60" = $70,000 | 1 | |
| 6 | Motor-driven pumps with two or three sprouts | 2 | |
| 7 | Pedal-driven threshing machines | 4 | |
| 8 | Rice husker | 2 | $88,000 (63,000) |
| | 2. Small Agricultural Implements | | |
| 1 | Hoes | 300 | |
| 2 | Axes | 150 | |
| 3 | Picks | 200 | |
| 4 | Shovels | 250 | |
| 5 | Spades | 200 | |
| 6 | Rakes | 150 | |
| 7 | Sickles | 600 | |
| 8 | Grafting knives | 60 | |
| 9 | [illegible] | 30 | |
| 10 | Watering cans | 50 | |

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| | Description | Quantity | Remarks |
|---|---|---|---|
| 1 | Pruning Shears | 10 | $12,650 |
| | **3. Plant-Treatment Products** | | |
| 1 | HCH. | 200 kg. | |
| 2 | Dieldrin | 4 cans | |
| 3 | Parathion | | |
| 4 | Plantation oil | 10 drums | |
| 5 | Slophocne [?] | 2 drums | |
| 6 | Aluminum carbide | 50 kilograms | |
| 7 | Hexagon | 2 drums | |
| 8 | Copper oxychloride | 100 kg. | |
| 9 | Gesapax | 6 bags | |
| 10 | Fenlate | 2 cans | |
| 11 | 60 .P.C. Ekatdine | 2 cans | |
| 12 | Karmex | 50 kg. | |
| 13 | D.C.M.U. | 1 drum | $12,300 |
| | **4. Chemical Fertilizers** | | |
| 1 | Urea | 20 tons | |
| 2 | Superphosphate | 30 tons | |
| 3 | Ammonium sulfate | 15 tons | |
| 4 | Potassium sulfate | 120 tons | |
| 5 | Magnesium sulfate | 5 tons | |
| 6 | Potassium chloride | 5 tons | |
| 7 | Dolomite | 5 tons | |
| 8 | 17.17.17 | 30 tons | $54,000 |

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| Number | Description | Quantity | Remarks |
|---|---|---|---|
| | **5. Other Materials** | | |
| 1 | Solo atomizers | 2 | |
| 2 | Injecting tubes | 2 | |
| 3 | Sprayers | 4 | |
| 4 | Dusters | 4 | |
| 5 | Plastic grafting paste | 50 kg. | |
| 6 | Rolls of barbed wire | 60 | $600 |
| 7 | String | 80 kg. | |
| 8 | Gloves | 200 pairs | $400 |
| 9 | Scales | 5 | $3,000 |
| | **II. In the Cultivation Area** | | |
| 1 | Chemistry laboratory, equipped | 1 | |
| 2 | Physics laboratory, equipped | 1 | |
| 3 | Biology laboratory, equipped | 1 | $90,000 |
| | **III. In the Transportation Area** | | |
| 1 | Truck, 5 to 8 tons | 1 | |
| 2 | Dump trucks, 3 to 5 tons | 1 | |
| 3 | Cross-country vehicle | 1 | |
| 4 | Wheelbarrows | 30 | $30,000 |
| | **IV. Miscellaneous** | | |
| | Replacement parts for the vehicles and the agricultural machinery | $12,000 (10%) | In sufficient quantity |

## Equipment for Tinsan D[illegible] [illegible]eration Farm

| [illegible]tegory and Item Number | Description | Quantity | Total Estimated Price |
|---|---|---|---|
| **[illegible]assroom Materials** | | | |
| 1 | Blackboards and Display Boards | 2 each | $ 100 |
| 2 | Chairs, work tables | | 500 |
| 3 | Wet lab w/chemicals | 1 | 2,000 |
| | Total - Classroom Facilities | | 2,600 |
| **[illegible]raining Materials** | | | |
| 4 | 16 mm Sound Movie Projector w/ PA System | 1 | 250 |
| 5 | 35 mm Slide Projector | 1 | 150 |
| 6 | 35 mm Camera and 20 rolls B&W film | 1 | 200 |
| 7 | Newsprint Paper (for flip charts) | | 50 |
| 8 | Easels | 3 | 50 |
| | Total - Training Materials | | 700 |
| **[illegible]ropping Equipment, Materials, and Supplies** | | | |
| 9 | 65 HP Tractor w/ cultivation, earth moving and land leveling equipment | 1 | 12,000 -14,000 |
| 10 | 35 HP Tractor w/ cultivation equipment | 1 | 10,000 |
| 11 | 10 ft. Self-Propelled Combine | 1 | 35,000 could be pull-type, at $12,000 |
| 12 | Power Tillers w/cultivation equipment | 2 | 3,000 |

| Category and Item Number | Description | Quantity | Total Estimated Price |
|---|---|---|---|
| 30 | Hand Equipment for grain, hay, and silage handling | | 250 |
| 31 | Scale Bridge, 5 ton | 1 | 3,000 |
| | Total-Livestock Equipment | | 71,450 |
| GRAND TOTAL | DEMONSTRATION FARM | | 163,250 |

Equipment for Research Sub-Station at Tindou

| Item Number | Description | Quantity | Total Estimated Price |
|---|---|---|---|
| 1 | 65 HP Tractor w/ cultivation equipment | 1 | 12,000 - 14,000 |
| 2 | 35 HP Tractor w/ cultivation equipment | 1 | 10,000 |
| 3 | 12 HP Diesel Power Tillers w/ cultivation equipmenr | 3 | 4,500 |
| 4 | Plot Combine | 1 | 10,000 |
| | Seed Cleaner and Treatment set | 1 | 1,000 |
| | Miscellaneous Hand Tools | | 750 |
| | Total Equipment for Sub-Station | | 38,250 - 40,250 |

| Category and Item Number | Description | Quantity | Total Estimated Price |
|---|---|---|---|
| 13 | Seed Cleaner and Treatment Set | 1 | 700 - 1,000 |
| 14 | Seed Drill | 1 | 1,500 |
| 15 | Chain Saw | 1 | 250 |
| 16 | Silage Field Cropper | 1 | 500 |
| 17 | Mover | 1 | 500 - 750 |
| 18 | Side-Delivery Rake | 1 | 500 - 750 |
| 19 | Hay Baler | 1 | 2,000 - 6,000 |
| 20 | Wide-bed Trailers | 2 | 2,000 |
| 21 | Welding Set | 1 | 500 |
| 22 | Hand Tools (Mechanic and Woodworking) | | 1,000 |
| 23 | Propagation Material for rice, maize, grass, oilcrop, vegetables and fruits | | 2,000 |
| 24 | Fertilizer - 20 tons each of N,P,K | | 12,000 |
| 25 | Insecticides, Herbicides and Fungicides | | 5,000 |
| | Total - Cropping Items | | 88,450 - 88,950 |
| **Livestock Equipment** | | | |
| 26 | Feed Grinder | | 1,000 |
| 27 | Feed Mixer | | 750 |
| 28 | Premixes - Vitamin and Mineral | | 1,000 |
| 29 | Veterinary Kit | | 500 |

Appendix N

13-51149

SUMMARY

I. Animal Research and Production

A. The Hacienda Andino Tovar Livestock Farm

B. The Poultry Farm and Proposed Complex

II. Experimentation and Basic Research

A. Truck Farming

B. Genetics, Cytogenetics, and the Selection of Corn

C. Entomology Laboratory

D. Phytopathology Laboratory

E. Herbicide and Insecticide Laboratory

F. Pedology Laboratory

G. Agrochemistry Laboratory

H. Plant Physiology Laboratory

I. Radioisotope Laboratory

J. Photography Laboratory

K. Electrotechnical Section

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# RESEARCH AND EXPERIMENTATION ACTIVITIES

I. Animal Research and Production

A. The Madame Andree Toure Livestock Farm

At the farm level it is a matter of:

-improving the Guinean breeds of animals. The studies are presently based on the morphology, behavior of the animals, the checking of their performance, the yield (of milk and dairy products)

-eliminating the inadequate sires and using them for slaughter and draft purposes

-increasing the number of sires

-improving husbandry techniques

-genetic and veterinary research

adapting the imported breeds (Jersey, Holstein, Ayrshire, wool sheep) to the ecological and climatic conditions of Guinea

-growth, fertility, yield of milk, butter, meat, milk, and manure

-multiplication of the pure breeds

-crossbreeding with Guinean breeds (particularly N'Dama) and the production of crossbreeds.

Objectives:

1. It is necessary to obtain, through crossbreeding, animals that have the hardiness of the N'Dama and the good genetic qualities from the standpoint of milk production of the breeds that have been introduced.

2. Feeding: preparation of hay, green fodders (guatemala, elephant grass, concentrated feeds), range and rotational grazing planning.

| Item No. | Description | Quantity |
|---|---|---|
| 1 | Stethoscopes | 5 |
| 2 | Pleximeters | 5 |
| 3 | Probangs | 4 |
| 4 | Costotomes | 4 |
| 5 | Hemostatic Forceps | 20 pairs |
| 6 | Spring pincers | 5 |
| 7 | Dissecting forceps, toothed | 10 |
| 8 | Dissecting forceps, smooth | 10 |
| 9 | Kocher forceps, chrome, 15,18,20,22 cm. | 5 |
| 0 | Straight clamps, chrome, 18,20,22 cm. | 5 |
| 11 | Curved clamps, chrome, 18,20,22 cm. | 5 |
| 12 | Michel forceps, dual use, chrome | 5 |
| 13 | Pean forceps, chrome, 14,16, and 18 cm. | 5 |
| 14 | Foot-probing forceps, 14,16, and 18 cm. | 2 |
| 15 | Fixed scalpels, large handle | 10 |
| 16 | Straight scalpels, large handle | 10 |
| 17 | Convex scalpels, large handle | 10 |
| 18 | Straight scissors, blunt, 14,16, 18 cm. | 10 pairs |
| 19 | Curved scissors, blunt, 14,16,18 cm. | 10 " |
| 20 | Pointed scissors, chrome, 12 cm. | 10 " |
| 21 | Hair scissors, chrome | 10 " |
| 22 | Curettes, chrome | 10 |
| 23 | Retractors, chrome | 10 |
| 24 | Spatulas | 10 |

| Item No. | Description | Quantity |
|---|---|---|
| 25 | Michel clamps, 12,14,16,18, 22 c . | 1,000 |
| 26 | Suture needles, curved | 10 |
| 27 | Suture needles, half-curved | 10 |
| 28 | Reverdin's needles, strong | 10 |
| 29 | Syringes, 100 cc | 20 |
| 30 | Syringes, 50 cc | 20 |
| 31 | Syringes, 20 cc | 20 |
| 32 | Syringes, 10 cc | 20 |
| 33 | Syringes, 5 cc | 20 |
| 34 | Syringes, 2 cc | 10 |
| 35 | Syringes, 1 cc | 10 |
| 36 | Corresponding needles | 1,200 |
| 37 | Tips for syringes | 250 |
| 38 | Petri dishes | 12 |
| 39 | Wash bottles, water | 12 |
| 40 | Dropping bottles | 20 |
| 41 | Test-tubes, 1,000 ml | 20 |
| 42 | Test-tubes, 500 ml | 20 |
| 43 | Test-tubes, 250 ml | 20 |
| 44 | Test-tubes, 100 ml | 20 |
| 45 | Test-tubes, 50 ml | 20 |
| 46 | Test-tubes, 25 ml | 20 |
| 47 | Glasses with foot, 250 | 12 |
| 48 | Glasses with foot, 100 | 12 |
| 49 | Glasses with foot, 50 | 12 |
| 50 | Sterilizers (fish kettles) | 6, electric |

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| Item No. | Description | Quantity |
|---|---|---|
| 51 | Flat-bottomed flasks | 12 |
| 51b | Glass to be used for spare parts for syringes | 300 |
| 52 | Medical thermometers | 20 |
| 53 | Thermometers for incubators | 20 |
| 54 | Hygrometers for incubators | 12 |
| 55 | Koch's dishes for plate culture for incubators | 12 |
| 56 | Washing tanks | 6 |
| 57 | Electric cauteries | 2 |
| 58 | Gas cauteries | 2 |
| 59 | Mortar and pestle, glass | 6 |
| 60 | Burdizzo forceps (cattle) | 3 |
| 61 | Burdizzo forceps (small ruminants) | 3 |
| 62 | Enameled trays | 10 GF |
| 63 | Enameled trays | 10 m |
| 64 | Enameled trays | 10 P |
| 65 | Latex gloves | 100 |
| 66 | Trocars (cattle) | 10 |
| 67 | Trocars (small ruminants) | 10 |
| 68 | Catgut | 30 Tbes |
| 69 | Plaster of Paris bandages | 50 |
| 70 | Coltsfoot | 6 |
| 71 | Measuring apparatus | 3 |
| 72 | Pen-meter measuring tapes | 3 |
| 73 | Embryotomes | 2 |
| 74 | Complete autopsy kits | 2 |
| 75 | Work smocks | 40 |

| Item No. | Description | Quantity |
|---|---|---|
| 76 | Rubber boots | 25 pairs |
| 77 | Shearing machines (for sheep) | 5 |
| 78 | Absorbent cotton | 100 P. |
| 79 | Carded cotton | 50 |
| 80 | Compresses | 50 |
| 81 | Gauze bandages | 50 |
| | | $19,500 |

II. EQUIPMENT

| | | |
|---|---|---|
| | Operating tables | 2 |
| 83 | Hospital lamps (adjustable) | 4 |
| 84 | Glass cabinets on feet | 3 |
| 85 | Refrigerators | 3 |
| 86 | Autoclaves | 2 |
| 87 | Electric sterilizers | 2 |
| 88 | Double boilers | 2 |
| 89 | Chamberland filters | 10 |
| 90 | Pipette flasks | 12 |
| 91 | Erlenmeyer flasks | 10 |
| 92 | Gayon flasks | 10 |
| 93 | Dechandt forceps | 4 |
| 94 | Straight platinum wire | 2 |
| [illegible] | Vacuum bell jars | 2 |
| 96 | Platinum wires with handles | 2 |
| | | $14,600 |

| | Description | | Quantity |
|---|---|---|---|
| 97 | Heating stages | | 2 |
| 98 | Monocular microscopes | 2,000 | 2 |
| 99 | Binocular microscopes | 3,000 | 2 |
| 100 | Slides | | 500 |
| 101 | Object slides | | 500 |
| 102 | Cedar oil | | 30 Fl |
| 103 | Filter paper | | 400 |
| 104 | Test tubes | | 100 |
| 105 | Bunsen burners | | 3 |
| 106 | Carbide lamps | | 1 |
| 107 | Glass funnels | | 20 |
| | Pipettes | | 50 |
| 109 | Various dyes | | P.M. |
| 110 | Delivery forceps for cattle and small livestock | | 4 |
| 111 | Calipers for measuring animals | | 2 |
| 112 | Models of various quantities of wool | | 10 |
| 113 | Dental charts for ruminants | | 1 |
| 114 | Platform scale to weigh large animals | 3,000 | 1 |
| 115 | Insemination pipettes | | 20 B. |

III. PRODUCTS

| | | |
|---|---|---|
| 116 | Acaprune | 20 cases |
| 117 | Antaphron | 10 liters |
| 118 | 5 percent Avirogil, in 10 ml ampoules | 50 cases |
| | Adrenalin (one word illegible), 100 ml | 5 |
| 120 | Analgin, for injections, in 20 ml. ampoules | 30 |
| 121 | Peronil (sachets) | 1,000 grs. |

| No. | Description | Quantity |
|---|---|---|
| 122 | Detanin | 100 P. |
| 123 | Hydrocortisone, amp. | 100 ampoules |
| 124 | Infadin, in 50 ml. flasks | 200 flasks |
| 125 | Lactovet, for injections, in 100 ml. flasks | 100 |
| 126 | Lotagin, injectable, 100 ml lots | 15 |
| 127 | Neguvon Neaphos | 300 kgs. |
| 128 | Odylen, in 10-liter cans | 2 bts. |
| 129 | Odylen , in 1 -liter cans | 2 |
| 130 | Omnadin, in 10-ml ampoules | 10 cases |
| 131 | Thoromangan | 20 |
| 132 | Trisalin, in 5-ml ampoules | 20 |
| 133 | Trisalim, in 1-ml ampoules | 10 |
| 134 | Trivitavinin, in 100 ml ampoules | 100 |
| 135 | Injectable novocaine | 50 |
| 136 | Carbocholine, in 5-ml injectable ampoules | 20 |
| 137 | Novalgin | 40 boxes |
| 138 | Procaine, in 5-ml ampoules | 50 |
| 139 | Cardiotonin, in 5-ml ampoules | 50 |
| 140 | Vitestrol, in boxes of 50 ampoules of 1 ml each | 5 |
| 141 | Benzacillin | 500 flasks |
| 142 | Penicillin, 200,000-300,000 T.U. | 1000 |
| 143 | Pendysin | 1000 |
| 144 | Procillin | 500 |
| 145 | Tetracycline | 500 |
| 146 | Streptomycin | 500 |
| 147 | Bronchocillin | 300 |

| Item No. | Description | Quantity |
|---|---|---|
| 148 | Terramycin | 100 |
| 149 | Quinine, in 0.25 and 0.50-strength tablets | 20,000 tablets |
| 150 | Quinacrine, in 0.25 and 0.50-strength tablets | 5,000 |
| 151 | Artroquine | 20,000 |
| 152 | Quinoform, in 0.25 and 0.50-strength ampoules | 3,000 |
| 153 | Tincture of iodine | 20 liters |
| 154 | Alcohol at 95° C | 100 |
| 155 | Alcohol at 90° C | 100 |
| 156 | Mercurochrome | 20 |
| 157 | Potassium permanganate (in crystals) | 5 kgs. |
| 158 | Potassium iodide | 20 liters |
| 159 | Methylene Blue | 10 " |
| 160 | Glycerin | 20 " |
| 161 | Sodium benzoate | 10 kgs. |
| 162 | Sodium borate | 10 " |
| 163 | Boric acid | 10 " |
| 164 | Cade (cade tar or oil) | 10 liters |
| 165 | Formol | 20 |
| 166 | Miscellaneous disinfectants | 500 kgs (liters) |
| 167 | Caffeine Natriso-Benzoicum, in injectable 10-ml ampoules | 50 boxes |

$25,500

V. Experimentation and Basic Research

A. Truck Farming

In connection with this section, it is a matter of:

-conducting a number of chemical tests on the various kinds of tomatoes, watermelons, eggplants, cucumbers, lettuce, etc.

-making hybridisation tests that will make it possible to crossbreed the local varieties representing the female line and the varieties that have been introduced, representing the male line, and thereby to obtain hybrid grains on the basis of heterosis.

Requirements

(a) Truck-farming seeds:

Seeds $45,000 but question whether can buy present stocks; may signed of Missouri

| No. | Seed | Variety | Quantity (Kgs.) |
|---|---|---|---|
| 1 | Tomato | No. 10 (female line) | 5 |
| 2 | | Pison (male line) | 3 |
| 3 | | Triumph | 2.3 |
| 4 | | 10 x Pison | 3 |
| 5 | Watermelon | Dessert (dessertni) | 5 |
| 6 | | Kramorni | 2 |
| 7 | Pimento | Kourtovska Kania | 3 |
| 8 | | Gold medal (Zlaton medal) | 3 |
| 9 | | Kakinkov | 3 |
| 10 | Bean | Black Staroznagorski | 50 |
| 11 | Eggplant | No. 12 | 1 |
| 12 | Onion | Pioneer | 10 |
| 13 | Carrot | Chantenay | 3 |
| | | Nantes | 2 |
| | Cabbage | No. 1 Ditcarque | 2 |
| 15 | Potato | Kalifov (Maritsa Institute) Bulgaria | 200 |

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(b) Instruments:

10 (ten) [illegible] of instruments for public use and research $1,000

of authors in connection with [illegible] fowl pox.

(c) Chemical products:

500 kg. of colchicine $20

B. The Poultry Farm and Improved Complex

The immediate purpose of this center is to carry out a piece of work involving study, research, and investigation bearing on all the problems relating to technology, genetics, feeding, the health of livestock, and industrial production.

The Center's activities are divided between two sectors which complement each other.

Incubation and the Livestock Center .

Thus it will be possible henceforth for the farm to produce on the spot hybrid chickens and fresh eggs for consumption while, at the same time, multiplying the parent stock which is to serve as the basis for the future complexes which will soon make it unnecessary to import any fresh eggs or chicks.

REQUIREMENTS:

(a) Products and Instruments

| Description | Quantity |
|---|---|
| Altra salt (in one-kilogram bags) | 20 kgs. |
| Anybind (in boxes containing 4 packets each, 5-grain strength) | 100 boxes |
| Ascaridcrasine (poultry), in 60-ml. bottles | 100 bottles |
| Vitamin B complex (Jonspharm), in 50-ml. bottles | 100 bottles |
| [illegible]erasulfa (poultry), in 100-ml. bottles | 30 " |
| Dioccocin-spiramix, [illegible] | 50 kgs. |

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| [illegible] | Quantity |
|---|---|
| Predop B.1.2.6. [illegible] boxes containing 5 ampoules, 5ml strength | 20 boxes |
| Ino-veto-[illegible]ine, [illegible] boxes containing 6 ampoules, 5 ml strength | 50 |
| Oligo-supplement ([illegible] for [illegible]) | 50 |
| Podix [illegible], in [illegible]-kilogram kegs | 3 kegs |
| Supple-vite A.D$_3$, E, in boxes containing 100 sachets each | 50 boxes |
| Urocyclin, in 50-mg. capsules | 20 " |
| Vetodecalcin (drinkable soil), in 100-ml bottles | 100 bottles |
| Veto-sulfaquinoxaline, in 50-ml bottles | 50 " |
| Vitamin A and D3, drinkable, in 50 ml bottles | 20 " |
| Cod-liver oil, in 1-liter cans | 50 cans |
| Stress-vite, in (figure illegible) ampoule boxes | 100 boxes |
| [illegible]ecial brewer's yeast for fodder purposes | 2 tons |
| Vitaminized mineral compounds | 2 tons |
| Vitamin complex | 3 tons |
| Miscellaneous antibiotics (general list) | $8,600 |

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(b) Library

1. Works:

| | |
|---|---|
| Vade-Mecum veterinaire (latest edition) | 3 |
| Vade-Mecum du Praticien " | 3 |
| Maladies infectieuses (Buxasson) | 2 |
| Parasitologie (Neveu-Lemaire) | 2 vol. |
| Alimentation du betail | 2 " |
| Genetique appliquee a l'elevage | 2 |
| Les maladies de la basse-cour | 2 |

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1. Books-continued

| | |
|---|---|
| Precis d'aviculture | 3 |
| Les maladies des animaux de basse-cour | 3 |
| Technique de l'incubation | 2 |
| Les maladies des bovins | 2 |
| Les maladies du mouton et de la chevre | 2 |
| Les maladies du porc | 2 |

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$500

2. Periodicals:

Revue de l'elevage

Courrier avicole

---

(c) Special Equipment

| | |
|---|---|
| ITPA radiant heating units (for warming chicks) | 20 |
| CIDAIE pumps (for all types of cleaning-30 and 50 kg) | 2 |

$1,500

---

B. Genetics, Cytogenetics, and the Selection of Corn

In this section the short-term objective is to perfect a hybrid form with a high yield in order to meet the requirements of the two poultry complexes provided for in the Foulara Plan.

Requirements:

(a) Seed:

| Item No. | Description | Characteristics | Quantity |
|---|---|---|---|
| 1. | K P x No. 2-02 | Simple hybrids, very rich in lysine and very productive per kilogram | 5 |

| Item No. | Denomination | Characteristics | Quantity |
|---|---|---|---|
| 2 | KP x No. 3-02 | Simple hybrids, very rich in lysine and very productive, in kilograms | 5 |
| 3 | KP x No. 4-02 | " " " | 5 |
| 4 | Kn 611 | Simple hybrids, rich in lysine and very productive, in kilograms | 25 |
| 5 | Kn 36 | " " " | 25 |
| 6 | Kn 602 | " " " | 10 |
| 7 | Rup 42 | " " " | 25 |
| 8 | M - 829-5 | Mutant lines, rich in lysine | 1 |
| 9 | 38 - 11 | " " " " | 1 |
| 10 | O - 103 | " " " " | 1 |
| 11 | 38 - 11 | Regular lines, rich in lysine, in kilograms | 5 |
| 12 | C. 103 | Regular lines, rich in lysine, in kilograms | 5 |
| | | Total, in kilograms | 128 |

(b) Equipment: ($ 20,000 ?)

Supplies for a complete laboratory for genetic research, for improvement through pedigreed breeding, induced mutations, and hybridization of the plants cultivated.

---

C. Entomology Laboratory

It studies the biological characteristics of each animal parasite and the connection between the useful insects and the harmful insects.

Furthermore, on the basis of the biological characteristics of the species as learned about and the influence of the environment, this laboratory will create a method of warning of their appearance and will determine the best times

combating them and the amounts of insecticides required.

Requirements:

(a) Equipment

| Item No. | Description | Quantity |
|---|---|---|
| 1 | Thermographs | 2 |
| 2 | Hydrographs | 2 |
| 3 | Miscellaneous thermometers | 2 |
| 4 | Rain gauges | 2 |
| 5 | Luminous traps | 1 |
| 6 | Pins | 10 boxes |
| 7 | Wire netting for cages (tube) | 100 meters |

$ [illegible]

(b) Personnel

One entomological research worker with a doctor's degree.

This research worker will take part in the advanced training of the students at the Agronomy School, explaining to them the results of his research work.

D. Phytopathology Laboratory

It studies the main diseases caused by mushrooms which attack cultivated plants in Guinea in order to determine their method of action so as to consider the preventive and curative treatments that are necessary.

Its present program is aimed at the following diseases: mango phytophthora, phytophthora scab, banana-tree cercosporiosis, and cassava mosaic.

Requirements:

(a) Equipment:

| Number | Description | Remarks |
|---|---|---|
| 1 | Stereoscopic microscope | |

(a) Pathological-anatomical:

| Number | Description | Remarks |
|---|---|---|
| 1 | Strong stereomicroscope | |
| 1 | Laboratory centrifuge | 5,000-6,000 revolutions per minute with German K 23 cooler |
| 1 | Autoclave | |
| 1 | Thermostat | |
| 1 | Dry sterilizer | |
| 1 | Koch sterilizer | |
| 1 | Microtome | |
| 2 | Dessicators | |
| 1 | Improved camera | |
| 50 | 300, 100, and 500 mm retorts | 500 units of each type |
| 1,000 | 160 x 16 mm and 180 x 18 mm test tubes | 500 units of each type |
| 3 | Stage micrometers | |
| 3 | Eyepiece micrometers | |
| 500 | Petri dishes, 10-15 cm | |
| 10 | Graduated cylinders | Various types |
| 80 | Pipettes, 1,3,5, and 10 ml. | 20 units of each type |
| 10 | Bathtubs | |
| 50 | Tweezers | |
| 50 | Microbiological needles | |
| 100 | 75 x 26 mm-slide boxes | |
| [illegible] | 10 x 10 and 20 x 20 mm slide boxes | |
| 3 | Fungicide spraying machine for use on banana plantations | |

| Nos | Description | Remarks |
|---|---|---|
| 1 | Special tractor for the spraying machine | |
| 1 | Refrigerator | $80,000 |
| | **Chemical Products:** | |
| 5 | Liters of pure ethyl alcohol | |
| 10 | Liters of carbolic acid | |
| 10 | Liters of formol | |
| 3 | Kilograms of lactic acid | |
| 3 | Liters of glycerin | |
| 2 | Kilograms of sodium hyposulphite | |
| 0.5 | Liter of congorote | |
| 10 | Liters of denatured alcohol | $200 |

I. **Fungicides:**

| | | |
|---|---|---|
| I. | With a zineb basis | 10 kgs. |
| | With a maneb basis | 10 kgs. |
| | With a zirm basis | 10 kgs. |
| | With a TMTD basis | 10 kgs. |
| | With a Captan basis | 10 kgs. |

$100

II. **Mercuric Organic Products:**

| | |
|---|---|
| Falisan nasbalce | 2 kg. |
| Ceresan nasbalce | 2 kg. |
| Falisan Trokonbalce | 2 kg. |
| Ceresan Trokonbalce | 2 kg. |

?

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III. Self-[illegible] of Colloidal Products: 10 kgs.

(b) Personnel:

One phytopathology research worker with a doctor's degree, specialized in tropical pathology and particularly nematology.

This research worker will also train students at the Agronomy School.

---

E. Herbicide and Insecticide Laboratory

This laboratory studies the efficacy of herbicides on various crops. Taking into account the degree of selectivity, the toxicity of the products used on the plant, and the soil (Karmex, Gesapax 80, Basudin, Gesaprim, Gardoprim, Dieldrin, Parathion, etc.), the studies will make a choice of periods of application possible.

Requirements:

(a) Materials:

| Number | Description | Remarks |
|---|---|---|
| 10 | Protective smocks | |
| 10 | Protective masks | |
| 50 kg. | New insecticides | 30 kg. of each type |
| 50 kg. | Selective and new total herbicides | 50 kg. of each type |
| 10 | Pairs of gloves | |
| 50 kg. | New fungicides | 50 kg. of each type |
| 1 | Rotary duster | |
| 6 | Scales, 200 grs., 20 kgs. | 4 and 2 respectively |

$2000

(b) Identification:

1. Lamotte [illegible] - two copies
2. Clefs de determination des plantes d'Afrique - two volumes of each
3. Phytopathologie des pays chauds

F. Pedology Laboratory

It studies the physical properties of the soil, their influence on the increasing of productivity, the evolution and the conservation of soils with a view to classifying them from an agricultural standpoint.

The laboratory trains cadres and forms ~~[illegible]~~ prospecting teams to assist the production cooperatives of the Republic.

Requirements:

(a) In connection with prospecting.

| Quantity | Description | Remarks |
|---|---|---|
| 5 | Augers | |
| 2 | Standard Wheatstone bridge | Equipment for rapid |
| 50 | Thermometer-model 545, code 1066 | field tests, as per the |
| 50 | soil texture classification | catalogue of the Lamotte |
| 4 | The Lamotte pH meter, model | Chemical firm, U.S.A. |
| | MA, code 1906 | |
| 2 | The Lamotte conductivity meter- | |
| | model MA, Code 1913 | |
| 3 | pH test paper kits, code 2924, 2914, | |
| | 2903, 2904, 2915, 2905, 2916, 2906, | |
| | 2907, 2908, 2902, 2909, 2910, 2912 | |

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| Quantity | Description | Remarks |
|---|---|---|
| 4 | Model AM-31, Code 5928 | |
| 4 | Model AM-31, Refill unit, code 5929 | |
| 4 | Model AM-32 Outfit, code 5933 | |
| 4 | pH test set, model ST - H code 5023 | |
| 4 | Model ST-P Code 5025 | |
| 2 | Model ST-N Code 5017 | |
| 20 | Model ST-K Code 5027 | |
| 50 | Combination pH, nitrate, phosphorous, potassium outfit, code 5679 | |
| 4 | Model AM-41 hydroponics outfit, code 5406 | |
| 4 | Model A-41 refill unit, code 5407 | |
| 4 | Plant nutrition chemical package, code 5940 | |
| 4 | The Lamotte Model pT-04 plant tissue test kit, code 5261 | |
| 10 | Soil texture classification and sedimentation unit, code 1067 | |
| 10 | Munshell colorchart | complete set |
| 4 | Cross-country vehicle | jeep, land-rover |
| | (b) In the category of Cartography: | |
| 1 | Machine for reproducing maps | |
| 1 | Machine for interpreting aerial photographs | With a view to drawing up topographic maps |

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$24,000

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| Quantity | Description | Remarks |
|---|---|---|
| 1 | Photocopying machine | |
| 1 | Heliograph | |
| 3 | Mimeograph machine | |
| 5 | Planimeters | |
| 5 | Pantographs | |
| 5 | Calculating machines | Portable, battery-powered Japanese model $4,000 |
| 2 | Glissimetres ? | packets ? |

(c) In the category of Chemical Analysis;

| | | |
|---|---|---|
| ~~10~~ | Platinum crucibles ? | |
| 1 | Deionizer | |
| 2 | Double boilers | |
| 20 | Triplex pH-meters guessing (Truog and Heiligo) | $2,400 |

(d) In the category of Documentation

It would be necessary to take out subscriptions for the laboratory to periodicals on soils and agrochemistry.

Sols d'Afrique

Soil Science

Plant and Soil

Cahier de l'ORSTOM; serie pedologie

Soil Bulletin FAO

Soil science, translated from Russian-Potchroredenie)

A Study of Soil Science, by Dr. Henry D. Foth, professor of soil science, Michigan State University

The Lamotte Soil Handbook, by the staff of the Lamotte Chemical Products Company

Investigating Water Problems: A Water Analysis Manual by Dr. Dr. Charles E. Reny

A Study of Water Quality, by Dr. Charles E. Reny

G. Agrochemistry Laboratory

This laboratory is to furnish, on the national leve, a scientific response to the problem of crop planting based on an agrochemical map drawn up as a result of soil analyses.

Furthermore, on the basis of plant and food analyses, it must watch over the soil-plant-fertilizer system balance in order to guide production toward rational utilization of fertilisers and the improvement of soils for crops.

Requirements:

(a) Equipment

| Quantity | Description | Remarks |
|---|---|---|
| 5 | Magnetic stirrer for titration | 220 volts |
| 4 | Semimicro-Kjelldall digestion stands | |
| 3 | Water distillers | |
| 4 | Nitrogen distillers | Parrass Wagner cm. |
| 2 | Peckmann pH-meter | |

| Quantity | Description | Remarks |
|---|---|---|
| 2 | Analytical balances | Sartorius |
| 1 | Photocolorimeter | |
| 1 | Barometer | |
| 10 | 1-mm sieves<br>0.25 mm sieves | of varying dimensions |
| 2 | Platinum crucibles | |
| 6 | Mortars and pestles | of varying dimensions |
| 500 | (one word illegible) cartridges | |
| 1200 | Beakers, 100, 150, 250, 400, 500, 1000 cm3 | 200 units of each type |
| 200 | Conical Erlenmeyer flasks, 50, 100 cm3 | 200 units of each sort |
| [illegible] | Calibrated flasks, 25, 50, 100, 250, 500, 1000, 2000 cm3 | 100, 100.80, 100.50 50, and 20 units, respectively |
| 90 | Pipettes, 1, 2, 5, 10, 15, 20, 25, 50, 100 cm3 | 10 units of each type |
| 100 | Micropipettes, 1 and 5 cm3 | 10 units of each type |
| 400 | Funnels with long and short stems | 200 units of each type |
| 100 | Burettes, 10, 25 cm3 | 50 of each type |
| 250 | Test tubes Ø 1 cm | |
| 25 | Thermometers, 200°C, 300°C | 25 of each type |
| 25 | Densimeters | various sorts |
| 150 | Rubber jointed rules | various diameters |
| 500 | Rubber and cork stoppers | various diameters |
| [illegible] | Flat-bottomed flasks | various volumes |
| 10 | 20-liter carboys | |
| 5,000 | Filter paper without ash content (blue band) | |

$18,000

| Quantity | Description | Remarks |
|---|---|---|
| 5,000 | Ordinary filter paper | |

(b) Chemical Products

| | |
|---|---|
| Potassium ferricyanide, in kilograms | 10 |
| Potassium ferrocyanide, in kilograms | 5 |
| Potassium iodide, in kilograms | 36 |
| Potassium permanganate | 10 |
| Potassium chromate | 16 |
| Potassium dichromate, in kilograms | 20 |
| Potassium chloride, in kilograms | 15 |
| Potassium sulfocyanide, in kilograms | 10 |
| Potassium nitrate | 10 |
| Potassium sulfate | 20 |
| Potassium phosphate, acid, in kilograms | 15 |
| Aluminum sulfate and potassium sulfate, in kilograms | 10 |
| Potassium periodate, in kilograms | 5 |
| Ammonium sulfate, in kilograms | 20 |
| Ammonium nitrate, in kilograms | 15 |
| Ammonium chloride, in kilograms | 20 |
| Ammonium molybdate, in kilograms | 15 |
| Ammonium vanadate, in kilograms | 5 |
| Barium chloride, in kilograms | 10 |
| Barium acetate, in kilograms | 25 |
| Lead acetate, in kilograms | 10 |

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(b) Chemical Products continued

| | |
|---|---|
| Calcium lactate, in kilograms | 10 |
| Calcium carbonate | 10 |
| Calcium nitrate | 20 |
| Calcium sulfate | 15 |
| Calcium chloride | 25 |
| Sodium sulfate, in kilograms | 20 |
| Sodium carbonate | 20 |
| Sodium thiosulfate | 10 |
| Sodium cobaltous nitrate | 15 |
| Sodium nitrate | 4 |
| Sodium phosphate, acid | 20 |
| Disodium phosphate | 15 |
| Disodium oxalate, in kilograms | 10 |
| Potassium tartrate and sodium tartrate, in kg. | 10 |
| Sodium chloride, in kilograms | 10 |
| Ferrous sulfate, in kilograms | 10 |
| Ferric sulfate, in kilograms | 10 |
| Copper sulfate, in kilograms | 15 |
| Ferric chloride, in kilograms | 5 |
| Cobalt chloride, in kilograms | 5 |
| Sodium chloride, in kilograms | 8 |
| Magnesium chloride, in kilograms | 5 |
| Magnesium sulfate, in kilograms | 10 |
| Silver sulfate, in kilograms | 5 |
| Silver nitrate, in kilograms | 5 |

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(4) Chemical reagents:

| | |
|---|---|
| Tin chloride, in kilograms | 4 |
| Selenium sulfate, in kilograms | 2 |
| Mohr's salt, in kilograms | 25 |
| Diphenylamine, in kilograms | 10 |
| Mercuric chloride, in kilograms | 2 |
| Potassium nitrate, in kilograms | 15 |
| Chloroform, in liters | 10 |
| Metallic mercury, in kilograms | 5 |
| Boric acid, in kilograms | 15 |
| Salicylic acid, in kilograms | 20 |
| Tartaric acid, in kilograms | 15 |
| Citric acid, in kilograms | 12 |
| Sulfosalicylic acid, in kilograms | 15 |
| Ethylenediaminetetraacetic acid, EDTA, per kg. | 20 |
| Potassium ferrocyanide, in kilograms | 5 |
| Ammonium fluoride, in kilograms | 8 |
| Ammonium acetate, in kilograms | 20 |
| Caustic soda in pellets, in kilograms | 30 |
| Caustic potash, in kilograms | 30 |
| Zinc granules, in kilograms | 6 |
| Powdered zinc, in kilograms | 5 |
| Powdered iron, in kilograms | 5 |
| Soluble starch, in kilograms | 4 |
| Devarda's metal, in kilograms | 2 |
| Ethyl alcohol, 96°, in liters III | 50 |
| Alcohol, in liters III | 50 |

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(b) Chemical products-continued

| | |
|---|---|
| Methyl alcohol, in liters P.M. | 50 |
| Ether, in liters | 25 |
| Acetone, in liters | 25 |
| Benzene, in liters | 25 |
| Glycerin, in liters | 15 |
| Nessler reagent, in liters | 10 |
| Hydrochloric acid, in liters | 60 |
| Sulfuric acid, in liters | 60 |
| Fumaric acid, in liters | 40 |
| Orthophosphoric acid, in liters | 20 |
| Nitric acid, in liters | 25 |
| Potassium ferricyanide, in kilograms | 5 |
| Acetic acid, in liters | 20 |
| Ammonia, in liters | 60 |
| Perchloric acid, in liters | 15 |
| Hydrogen peroxide, in liters | 20 |
| Heteroauxin, in G | 100 |
| Saccharose, in kilograms | 1 |
| Gelatin, in kilograms | 1 $29,000 |

Non losses [?]

| | |
|---|---|
| Normal KOH alcohol solution, in ml | 500 |
| Normal soda solution, in ~~[illegible]~~ ampules | 10 |
| Soda solution, 1/10 N, in ampules | 10 |
| Soda solution, 1/2 N, in ampules | 10 |
| Alcoholic acidimetric soda solution, 1/10 N | 10 |
| Red fen remedores | 10 |

Remedoses-continued

| | |
|---|---|
| Hydrochloric acid solution, N, in ampules | 10 |
| HCL solution, 1/10 N, in ampules | 10 |
| Iodine solution, 1/10 N, in ampules | 3 |
| Potassium permanganate solution, N, in ampules | 10 |
| Permanganate solution, 1/10 N, in ampules | 15 |
| Silver nitrate tincture, in ampules | $600 |

Colored Indicators

| | |
|---|---|
| Diphenylamine, in grams | 200 |
| Methyl blue, in grams | 25 |
| Bromocresol green, ~~Green bromocresol~~, in grams | 25 |
| Indigo carmine, in grams | 25 |
| Orange III | 25 |
| Congo red | 25 |
| Thymol blue, in grams | 50 |
| Erichrome black, in grams | 50 |
| Cresol red, in grams | 50 |
| Bromothymol blue, in grams | 50 |
| Phenolphthalein, in grams | 250 |
| Phenanthroline ortho, in grams | 50 |
| Thymolphthalein, | 50 |
| Methyl violet, in grams | 150 |
| Methyl orange, in grams | 100 |
| Kolthoff universal reagent, in grams | 100 |
| Universal paper, P.H. 1-10, ~~Universal paper P.H. 1-10~~, in boxes | 10 |
| Stopper solution, PH 7, in tubes | 24 $800 |

Documentation

Memento de Chimie (a publication)

II. Plant Physiology Laboratory

In this laboratory the laws of growth and plant development are studied in order to control them and apply them along the lines of obtaining superior yields according to the varied conditions of cultivation. It determines the physiological diseases especially, that is to say, deficiencies of nutritive mineral elements. In order to accomplish this, it makes use of methods of operation that are essentially biochemical, such as microanalysis and semimicro-analysis.

Requirements:

(a) Special Equipment: One (1) amino acid analyser ?

(b) Equipment for chromatography on plates and accessories

| No. | Description | Quantity |
|---|---|---|
| 1 | Uniplan leveler | 1 |
| 2 | Adjustable pourer | 1 |
| 3 | Set of 12 Chromoplate plates | 2 |
| 4 | Rack for Chromoplate | 1 |
| 5 | Calibrated, perforated templet plate | 1 |
| 6 | 25-microliter micropipettes | 4 |
| 7 | Single plate Chromotanks | 3 |
| 8 | Multiplate Chromotank | 1 |
| | Miscellaneous Equipment | |
| 1 | Drawing prisms | 10 |
| 2 | Needles for microscopic preparation | 500 |

| | Description | Quantity |
|---|---|---|
| 3 | Packets of slides and small slides | 30 |
| 4 | Lancets | 20 |
| 5 | 6 (two letters illegible)/n chronometers | 20 |
| 6 | Pairs of scissors | 10 |
| 7 | Marlis | 10 |
| 8 | Aspirators | 10 |
| 9 | Double-walled Duare beaker | 1 |
| 10 | 250, 500, and 1,000 ml. jars | 5 |
| 11 | Thermostats | 300 |
| 12 | Coffee grinder | 1 |
| 13 | Sterilizers | 5 |
| 14 | Saccharimetric polarimeter | 1 |
| 15 | Pins | 500 |

Chemical Products - to analyze amino acids and vitamins

| Quantity | Description | Remarks |
|---|---|---|
| 5 | Liters of N-butanol | |
| 5 | Liters of N-propanol | |
| 5 | Kilograms of collidine | |
| 10 | Kilograms of cobalt chloride | |
| 10 | Kilograms of cyclohexylamine | |
| 1 | Kilogram of (one word illegible) | |
| 2 | Kilograms of sodium 1-2 Naphthoquine 4 sulphonate | |
| 5 | Kilograms of hexane (1) chlorine | |
| 10 | Kilograms of tolidine | |

| Quantity | Description | Remarks |
|---|---|---|
| 1 | Kilogram of oxine | |
| 5 | Kilograms of nitroprusside | |
| 5 | Kilograms of sodium naphtholate | |
| 1 | Kilogram of vanillin | |
| 1 | Kilogram of piperazine 12 dinitrobenzene with on-dio reaction | [7] |
| 2 | Kilograms of F. dimethylaminobenzaldehyde | |
| 5 | Kilograms of cinnamaldehyde | |
| 10 | Liters of formaldehyde | |
| 5 | Kilograms of diazotized sulphanilic acid | |
| 5 | Kilograms of diazotized ethyla-naphthylamine | |
| 5 | Kilograms of β-nitrosobetanaphthol | |
| 4 | Kilograms of A-phthaldehyde | |
| 5 | Kilograms of phosphomolybdic tungstic acid | |
| 50 | Grams of biotin | |
| 1 | Kilograms of calcium pantothenate | |
| 2 | Kilograms of niacin | |
| 1 | Kilogram of asparagine | |
| 200 | Grams of D.L. tryptophan | |
| 200 | Grams of L-cystine | |
| 4 | Folin-Denis reagent | |
| 3 | Millon's reagent | |
| 10 | Grams of standard lysine | |
| 10 | Grams of standard tryptophan | |
| 10 | Grams of standard vitamin C | |
| 10 | Grams of standard vitamin B | |

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| Quantity | Description | Remarks |
|---|---|---|
| 10 | Grams of standard vitamin A | |
| 10 | Grams of standard vitamin $B_6$ | |
| 10 | Grams of standard vitamin $B_{12}$ | |
| 1 | Kilogram of antimony trichloride | |
| 10 | Petroleum ether | |
| 5 | Kilograms of 2,5 dichlorophenyl diphenyl | |
| 5 | Kilograms of 2,4 dinitrophenylhydrazine | |
| 2 | Kilograms of thiourea | |
| 200 | Grams of bromine | |
| 20 | Grams of thiamine | |
| 4 | Kilograms of phosphatase | |
| 10 | Kilograms of manganese sulfate | |
| 2 | Kilograms of potassium citrate | |
| 1 | Kilogram of inositol | $5,000 |

Personnel

One (1) physiologist-research worker with a doctor's degree capable of taking part in training students at the agronomy school, teaching them the results of his research. Contract duration one (1) year.

This research worker must be trained in analysis by the radioisotope method.

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I. Radioisotope Laboratory

An annex of the plant physiology laboratory, this laboratory makes it possible to concentrate the radioactivity of the plant with the aid of tracing elements (carbon 14, phosphorous 32, etc.) which can be identified later with the aid of a Geiger counter

Requirements ?

One analyser of radioisotopes and accessories, German Democratic Republic (D.D.R.) model

J. Photography Laboratory ?

This laboratory is an auxiliary laboratory for all the others and supplies them with photographs of all sorts.

Requirements

| Quantity | Description | Remarks |
|---|---|---|
| 1 | Composite enlarger | |
| 2 | Tanks, 30 x 40 | |
| 1000 | Reels, 24 x 36 | |
| 2 | Pairs of scissors for photographs | |
| 500 | Liters of developer | |
| 700 | Liters of fixing solution | |
| 2 | Folding tripods | |
| 100 | Packets of various sizes, 13 x 24, 9 x 14, 30 x 40 (50, 50, and 100 packets, respectively) | |
| 1 | Camera (Type, 24 x 36) | |
| 1 | Electronic Flash | |

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$13,000

V. [illegible] Workshop

The workshop of this section do the maintenance work and repair of the electrical and electronic instruments used in basic research. The technicians of the section also construct in the certain specific equipment for any given research work, at the request of the interested research worker.

Requirements:

| Number | Description | Quantity |
|---|---|---|
| 1 | Saw blades - 5 - | 30 |
| 2 | Miscellaneous types of pliers | 4 |
| 3 | Miscellaneous types of screwdrivers | 10 |
| | Packets of tin | 30 |
| 5 | Resistances, 205-watt, 220-volt | 100 |
| 6 | Resistances, 300-watt, 220-volt | 100 |
| 7 | Resistances, 600-watt, 220-volt | 100 |
| 8 | Resistances, 00-watt, 220-volt | 100 |
| 9 | Resistances, 1,000-watt, 220-volt | 20 |
| 10 | Porcelain holders for resistances, diam. 5-6 mm/Kg | 50 |
| 11 | Test bulbs, 10-watt, 220-volt | 10 |
| 12 | Test bulbs, 15-watt, 220-volt | 10 |
| 13 | Armature wire, diam. 0.10/Kg | 100 |
| 14 | Armature wire, diam. 0.12/Kg | 100 |
| 15 | Armature wire, diam. 0.15/Kg | 100 |
| 16 | Armature wire, diam. 0.18/Kg | 100 |
| | Armature wire, diam. 0.21/Kg | 100 |
| 18 | Armature wire, diam. 0.22/Kg | 100 |

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| Number | Description | Quantity |
|---|---|---|
| | **Drill bits** | |
| 19 | Drill bits, diameter 2 mm. | 10 |
| 20 | Drill bits, diameter 2.4 mm. | 10 |
| 21 | Drill bits, diameter 3 mm. | 10 |
| 22 | Drill bits, diameter 3.2 mm. | 10 |
| 23 | Drill bits, diameter 3.50 mm. | 10 |
| 24 | Drill bits, diameter 4 mm. | 10 |
| 25 | Drill bits, diameter 5 mm. | 10 |
| 26 | Drill bits, diameter 5.5 mm. | 10 |
| 27 | Drill bits, diameter 6.0 mm. | 10 |
| 28 | Drill bits, diameter 6.5 mm. | 10 |
| | **Dies for Cutting Threads** | |
| | (a) Female dies: | |
| 29 | Diameter 3 mm. | 5 |
| 30 | Diameter 4 mm. | 5 |
| 31 | Diameter 5 mm. | 5 |
| 32 | Diameter 6 mm. | 5 |
| | (b) Male dies: | |
| 33 | Diameter 3 mm. | 5 |
| 34 | Diameter 4 mm. | 5 |
| 35 | Diameter 5 mm. | 5 |
| 36 | Diameter 6 mm. | 5 |

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| [illegible]er | [illegible] | Quantity |
|---|---|---|
| | **Replacement parts for Spectral Photoelectricters** | |
| 37 | Bulbs, 5V-86/[illegible] | 2 |
| 38 | Resistances, 100 K-6 lm V | 2 |
| 39 | Resistances, 2 K-6 lm V | 2 |
| 40 | Fuses, 0.5 A | 4 |
| | **Replacement Parts for U.V.A. Photoelectricters** | |
| 41 | Bulbs, 8 V, 35 W | 4 |
| 42 | Photo elements | 2 |
| | **Carpentry Equipment** | |
| 43 | Screw clamps, [illegible].20 meters long | 4 |
| 44 | 90° squares | 3 |
| 45 | Small sheering saws | 4 |
| 46 | Large saws, 1-meter long | 2 |
| 47 | Brace and bits | 2 |
| 48 | Planes | 4 |
| 49 | Jointer Planes | 4 |
| 50 | Jointer planes for planing to a thickness of 40 mm. | |
| 51 | Jointer planes for planing to a thickness of 50 mm. | 4 |
| 52 | Oilstones | 2 |
| 53 | Cans of strong glue | 3 |
| 54 | Cans of putty, [illegible] kilograms | 4 |

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$25,000

| | Description | Quantity | Remarks |
|---|---|---|---|
| 11 | Leaning Sheers | 1 | $12,650 |
| | **3. Plant-Treatment Products** | | |
| 1 | HCH. | 200 kg. | |
| 2 | Dieldrin | 4 cans | |
| 3 | Parathion | | |
| 4 | Flotation oil | 10 drums | |
| 5 | Slo-boom [?] | 2 drums | |
| 6 | Aluminum carbide | 50 kilograms | |
| 7 | Pesmon | 2 drums | |
| 8 | Copper oxychloride | 100 kg. | |
| | Gesagard | 6 bags | |
| 10 | Fenlate | 2 cans | |
| 11 | 60 W.C. Basidine | 2 cans | |
| 12 | Karmex | 50 kg. | |
| 13 | D.C.M.U. | 1 drum | $12,300 |
| | **4. Chemical Fertilizers** | | |
| 1 | Urea | 20 tons | |
| 2 | Superphosphate | 30 tons | |
| 3 | Ammonium sulfate | 15 tons | |
| 4 | Potassium sulfate | 120 tons | |
| 5 | Magnesium sulfate | 5 tons | |
| 6 | Potassium chloride | 5 tons | |
| | Dolomite | 5 tons | |
| 8 | 17.17.17 | 30 tons | $54,000 |

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| No. | Description | Quantity | Remarks |
|---|---|---|---|
| 11 | Insecticides | [illegible] | $12,650 |
| | **3. Plant-Treatment Products** | | |
| 1 | BHC. | 200 kg. | |
| 2 | Dieldrin | 4 cans | |
| 3 | Parathion | | |
| 4 | Flotation oil | 10 drums | |
| 5 | Slo-Boom [illegible] | 2 drums | |
| 6 | Aluminum carbide | 50 kilograms | |
| 7 | Pomecron | 2 drums | |
| 8 | Copper oxychloride | 100 kg. | |
| | Semesan | 6 bags | |
| 10 | Fenlate | 2 cans | |
| 11 | 60 W.G. Basiding | 2 cans | |
| 12 | Karmar | 50 kg. | |
| 13 | D.C.M.U. | 1 drum | $12,300 |
| | **4. Chemical Fertilizers** | | |
| 1 | Urea | 20 tons | |
| 2 | Superphosphate | 30 tons | |
| 3 | Ammonium sulfate | 15 tons | |
| 4 | Potassium sulfate | 120 tons | |
| 5 | Magnesium sulfate | 5 tons | |
| 6 | Potassium chloride | 5 tons | |
| | Dolomite | 5 tons | |
| 8 | 17.17.17 | 30 tons | $54,000 |

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| | Description | Quantity | Remarks |
|---|---|---|---|
| | **5. Other Materials** | | |
| 1 | Solo atomizers | 2 | |
| 2 | Injecting tubes | 2 | |
| 3 | Sprayers | 4 | |
| 4 | Dusters | 4 | |
| 5 | Plastic grafting paste | 50 kg. | |
| 6 | Rolls of barbed wire | 60 | $600 |
| 7 | String | 80 kg. | |
| 8 | Gloves | 200 pairs | $400 |
| 9 | Scales | 5 | ~~$3,000~~ |
| | **II. In the Cultivation Area** | | |
| 1 | Chemistry laboratory, equipped | 1 | |
| 2 | Physics laboratory, equipped | 1 | |
| 3 | Biology laboratory, equipped | 1 | ~~$90,000~~ |
| | **III. In the Transportation Area** | | |
| 1 | Truck, 5 to 8 tons | 1 | |
| 2 | Dump trucks, 3 to 5 tons | 1 | |
| 3 | Cross-country vehicle | 1 | |
| 4 | Wheelbarrows | 30 | ~~$30,000~~ |
| | **IV. Miscellaneous** | | |
| | Replacement parts for the vehicles and the agricultural machinery | $12,000 (10%) | In sufficient quantity |