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ACTION MEMORANDUM FOR THE ACTING DIRECTOR, USAID/BAMAKO

TO : A/DIR, Mr. Michael Dwyre

Date: July 19, 1979

FROM : Lewis Lucke, IDI Project Design Officer

SUBJECT: Project 688-0219 - Semi-Arid Tropics Research

I. Problem:

Your signature is required to authorize a grant of five hundred thousand dollars ($500,000) from the Sahel Development Program to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for the subject project

II. Background:

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), headquartered in Hyderabad, India, began agricultural work in Mali in 1976 through an initial grant from the Ford Foundation. The following year funding was assumed on a one year renewable basis by USAID/Mali under the Operation Mils-Mopti Project (688-0202) as a component of the National Research Program.

ICRISAT/Mali's major emphasis to date has been in the area of varietal improvement of sorghum and millet. Even though varietal improvement is a long-term process and funding under Operation Mils has been at a relatively low level ($90,000/year), ICRISAT has made satisfactory progress. Varieties of sorghum/millet were identified that outyielded local varieties while at the same time exhibiting improved pest and disease resistance. ICRISAT began tests on improved agronomic practices with greatest emphasis on intercropping research.

In the area of cereal production, sorghum and millet account for more than 70% of Mali's cereal production. These two grains are grown for the most part in the 400-1200 mm rainfall zone of Mali -- a zone classified as a semi-arid tropic. To date, ICRISAT/Mali has had its home base and has conducted most of its research in a rainfall zone of more than 1200 mm. At the request of the GRM, USAID/Mali will provide fuding to continue and expand ICRISAT research in varietal improvement and agronomic practices, with major emphasis being placed on the establishment of a research station in the 400-1200 mm zone. This grant to ICRISAT will be in conjunction with a $459,000 grant from the Ciba-Geigy Foundation of Switzerland.

III. Discussion:

A. Project Purpose: The purpose of the project is to develop a series of technical packages on millet, sorghum, and certain grain legumes in Mali's 400-1200 mm rainfall zone and to make them available to small farmers and herders. Varietal improvement work will include sorghum/millet breeding,

disease and pest resistance, introduction of new varieties, and social acceptibility trials. Agronomic practices research will focus on intercropping, forage production, animal traction, and pigeon pea production. A system of dissemination of research results to small farmers has been established utilizing existing GRM extension facilities and USAID funded crop operations and livestock projects.

B. Financial Summary and Implementation: The source and origin of commodities being procured for this project will be AID Geographic Code 941 countries, with the exception of two light vehicles for which a waiver to Code 935 countries has been requested. In view of the limited procurement anticipated, it is expected that all payment of goods will be made by ICRISAT.

BUDGET

1.	Technical Assistance (51 pm)	$190,000
2.	Commodities	30,000
3.	Construction and Land Development	122,000
4.	Research Operations and Supplies	105,000
5.	Contingency & Inflation	53,000
	TOTAL.....	$500,000

C. Initial Environmental Examination: An IEE was completed on February 16, 1979 as part of the PID preparation process. It recommended that a negative determination be made regarding effect on the environment.

D. PID Review, Project Committee Action and Congressional Notification:

1. The Semi-Arid Tropics Research Project Identification Document was reviewed in a meeting in AID/Washington held on March 23, 1979. There were no major criticisms of the project purpose or of the planned implementation and the PID was thereby approved allowing for Mission level project authorization.

2. The Project Committee met June 28, 1979, and was chaired by IDI Project Design Officer Lewis Lucke. The Committee consisted of Lance Jepson, A/ADO/Crops, David Delgado/Crops, Randall Casey/PROG, Larry Harms, A/ADO/Livestock. The Project Committee concluded that only minor changes were needed in the subject Project Paper and recommended approval of the project and the Project Grant Agreement.

3. An advice of Program Change and Activity Data Sheet has been prepared by AID/W for congressional notification.

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IV. Recommendation:

That, in accordance with the authority accorded to you under Delegation of Authority No. 141, you hereby approve Project 688-0219, Semi-Arid Tropics Research, as described in the Project Paper, and approve the procurement waiver as justified in the Project Paper for two pick-up trucks from a Code 935 source, and so indicate by signing the Project Authorization and Request for Allotment of Funds (PAF II) at TAB A for a grant in the amount of $500,000 to the International Crops Research Institute for the Semi-Arid Tropics.

Drafted by: AG: LLucke:fc-7/19/79

Clearance by:

GDO/ENG: GThompson
A/ADO : LJepson
MGMT : KBHickman
PROG : RCasey
CONT : EBordy

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

Part II

Country: Mali

Project: Semi-Arid Tropics Research

Project No.: 688-0219

Pursuant to Part I, Chapter 1, Section 121 of the Foreign Assistance Act of 1961, as amended, (the "Act"), I hereby authorize a grant to the International Crops Research Institute for the Semi-Arid Tropics ("Grantee" - hereinafter referred to as ICRISAT) of not to exceed five hundred thousand dollars ($500,000) to assist in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project shall consist of a two-year program designed to (a) continue and expand ICRISAT/Mali's varietal research program of developing improved sorghum/millet varieties through multi-locational trials, disease nurseries, and breeding; (b) improve and expand research into farming systems and agronomic practices in general; (c) construct, in collaboration with Foundation Ciba-Geigy and the Government of Mali, an agricultural research station in Mali's semi-arid zone; and (d) prepare yearly reports on results obtained, problems encountered, program potentials, and recommendations for future actions.

I hereby authorize the initiation of negotiations and execution of the Grant Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following terms, together with such other terms and conditions as A.I.D. may deem appropriate.

a). Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed under the Grant shall have their source and origin in Code 941 countries and the cooperating country, except as A.I.D. may otherwise agree in writing. Any ocean shipping to be financed under the Grant may be procured in any eligible source country except the Cooperating Country.

b). Waivers

Notwithstanding paragraph a. above and based upon the justification set forth in Annex B (Procurement Plan) of the Project Paper, I hereby:

1. approve a procurement source waiver from Code 000 (U.S. only) to Code 935 of the A.I.D. Geographic Code Book for the procurement of two pick-up trucks and spare parts, provided that the amount of such waiver shall not exceed $25,000.

2. certify that the exclusion of procurement of the above-described motor vehicles and spare parts from the requested countries in Code 935 would seriously impede attainment of U.S. foreign policy objectives and the objectives of the Foreign Assistance Program;

3. find that special circumstances exist to waive, and do hereby waive, the requirements of Section 636 (i) of the Act.

Michael Dwyre
Acting Mission Director

30 July 1979
Date

Clearances:

AG :	DDelgado		date 7/23
PROG:	R.Casey	RC	date 7/27
CONT:	EHardy	EH	date 7/30
AG :	LLucke		date 7/23
MGT :	KHickman		date 7/26

SEMI-ARID TROPICS RESEARCH

(688-0219)

PROJECT PAPER

June, 1979

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ACRONYMS

ARS.....Action Riz-Sorgho
CAR.....Centre d'Animation Rurale
CGIAR.....Consulting Group of International Agriculture Research
CMDT.....Compagnie Malienne pour le Développement de Textiles
CNRZ.....Centre National de Recherches Zootèchniques
DRA.....Direction de Recherche Agronomique
ECIBEV.....Establishment for Credit and Investment in the Livestock and Meat Sector
FAO.....Food and Agriculture Organization
FCG.....Foundation Ciba-Ceigy
ICRISAT.....International Crops Research Institute for the Semi-Arid Tropics
IER.....Institut d'Economie Rurale
ILCA.....International Livestock Center for Africa
IRAT.....Institut de Recherche Agronomique et Tropicale
ISA.....Ingénieur de Sciences Appliquées
ITA.....Ingénieur des Travaux Agricoles
OACV.....Opération Arachide et Cultures Vivrières
OHV.....Opération Haute Vallée
OMBEVI.....Office Malienne du Bétail et de la Viande (Meat Marketing Board)
OMM.....Opération Mils-Mopti
OMVS.....Organisation de Mise en Valeur du Fleuve Senegal
OPSS.....Opération de Production des Semances Sélectionnées
PSS.....Production Première du Sahel
SAFGRAD.....Semi-Arid Food, Grain Research and Development
SAT.....Semi-Arid Tropics
SRCFJ.....Section de Recherche sur les Cultures et Fibres Jutières
SRCVO.....Section de Recherche sur les Cultures Vivrières et Oléagineuses (Food Crops and Oilseed Crops)
UNDP.....United Nations Development Program
ZER.....Zone d'Expansion Rurale

Section 1 - Project Summary

1.1. Introduction

This project has been submitted to USAID/Mali for a grant to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), in the amount of $500,000 to assist the Government of the Republic of Mali in a 2-year project of adaptive grain research in Mali's semi-arid rainfall zone. The project will be implemented in conjunction with a $459,000 grant from the Ciba-Geigy Foundation.

The purpose of the project is to develop a series of technical packages from adaptive research in sorghum, millet, and certain grain legumes in the 400-1,200 mm rainfall zone, making them available through crops production units and livestock projects to farmers and herders.

The project and proposed plan of action have grown out of 3 years of experience, discussions, and studies involving, in various capacities, the GRM, ICRISAT, FCG, and USAID. The GRM recognizes the importance of agricultural research in this particular rainfall zone which encompasses a very large portion of Mali, and of these crops which constitute the caloric backbone of the national diet. Mali has had no major agricultural experiment station in this zone and, therefore, has been forced to conduct its varietal research at stations either to the north or the south, where climatic and soil conditions do not as nearly correspond to the normal environment of these crops. The creation of such a research facility in connection with this project has been unanimously recommended by the National Committee for Agronomic Research of the Ministry of Rural Development in all of its prior three annual meetings.

1.2. Phase 1 - The Project

Under this 2-year project, ICRISAT/Mali will work directly with Malian officials and technicians to:

(a) continue and expand ICRISAT/Mali's varietal research program of developing improved sorghum/millet varieties through multilocational trials, disease nurseries, and breeding,

(b) improve and expand research into farming systems and agronomic practices in general, particularly relative to improved millet and sorghum varieties. These will include addressing such areas as intercropping, soil and watershed management, forage production, and animal traction systems,

(c) construct, in collaboration with Foundation Ciba-Geigy (FCG) and the Government of Mali (GRM), an agricultural research station in the 400-1,200 mm rainfall zone, specifically near Ségou in the 4th Region,

(d) train additional Malian agricultural scientists and extension officials at ICRISAT Center in Hyderabad, India, at the expense of the ICRISAT Center, or other appropriate agency program,

(e) prepare a report by the end of Year 1 and Year 2 on results obtained, problems encountered, program potentials, and shortcomings and recommendations for future actions, and

(f) conceptualize and analyze potential Phase II inputs and directions.

1.3. Phase II - Possible Activities Beyond Year 2

Based on the first annual report and a meeting involving representatives of USAID, ICRISAT/Mali, and the GRM, a preliminary determination will be made regarding possible strategies for maintaining or expanding activities into a subsequent 2-year Phase II. A second 2-year phase could provide increased opportunity to expand and refine research techniques and findings, plus shift emphasis to extension activities reaching more small farmers and herders. Additional outside funding, such as will be provided by Foundation Ciba-Geigy in Phase I, may be sought at this time.

1.4. Technical, Social, Financial, and Economic Considerations

The technical feasibility of increasing both sorghum and millet yields in semi-arid tropical areas through the introduction of improved varieties and hybrids and the application of improved cultural practices and systems has already been proven in many areas of the semi-arid tropics, including India. ICRISAT has had a West African regional research program in progress since 1976 and has personnel stationed in Upper Volta, Senegal, Niger, and Nigeria, as well as Mali. This personnel is available to other West African countries upon request. At these sites and at ICRISAT's Center Headquarters in Hyderabad, India, various techniques have already been identified which give superior yields under test conditions. There are no reasons to believe that similar positive results will not occur in Mali's 400-1,200 mm semi-arid zone (see Section 5.1.).

Although it is not practical to attempt a quantitative assessment of this project's economic impact, the need for a research program designed to assist low-income farmers make more efficient use of their available scarce resources is self-evident from studied observation of field practices and available data. Given current cost/price relationships, it is not economical for local farmers producing basic food grains to employ agricultural methods developed in a different economic setting. Research must develop alternative technology acceptable within the subsistence-level milieu of the grain farmer by emphasizing techniques that minimize associated risks of acceptance and maximize potential returns.

Many social concerns normally dealt with in development projects are not relevant to this analysis in that the project consists of research, but other aspects must be mentioned. While there will be few immediate beneficiaries, improved varieties and agronomic techniques will potentially have positive results for all farm families in this ecological zone. An improved farming practice such as animal traction potentially will bring more land under cultivation while easing the burden of planting and weeding by hand. Other areas to be considered include farm family openness to innovation, the diffusion of project results to farmers, the acceptability to new varieties among farm families, and the process of selection of the research station

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site and its effect on indigenous farmers. These are examined in detail in Section 5.3. In summation, the project fills a gap in agronomic research whose social benefits far outweigh any potential problems. To their credit, ICRISAT/Mali personnel are well aware of the importance of sociological, as well as agricultural factors involved in project implementation.

1.5. Intended Beneficiaries

As this project is oriented toward research, by definition in the immediate sense, there will be few direct small farmer or herder beneficiaries. In the medium or longer run, however, the direct beneficiaries of improved millet and sorghum varieties will be all farm families living in the 400-1,200 mm rainfall zone of Mali, since these crops are grown almost without exception by all Malian farmers. This area constitutes more than half of Mali's agricultural land and a minimum of 3,000,000 people. Great care will be taken, however, to exploit the system whereby technical packages and research results are disseminated to individual farmers or herders, both in a formal sense where information is screened by the Commission Technique and Comité de Recherche of IER for spread to operation or project extension personnel and then to the farmer, and in an informal sense where ICRISAT personnel disseminate information and germplasm to contacts within livestock or crop production projects.

1.6. Host Country and Other Donor Contributions to the Project

Proposed host country contributions to the project in the form of in-kind support are expected to total approximately $135,000 over the two-year period. The Ciba-Geigy Foundation of Switzerland will contribute approximately $459,000 for the same time period. ICRISAT/Center will contribute appropriate technical consultancies and training.

1.7. Waivers

Essential to undertaking this project will be a source/origin waiver for two pick-up trucks. Justification for this waiver is contained in Annex B.

1.8. Other Considerations

ICRISAT/Mali and USAID representatives are presently awaiting a formal letter of request from the GRM for this project, which should be forthcoming by July 25, 1979. Signing of this grant agreement between USAID/Mali and ICRISAT should be contingent upon receipt of this properly executed letter. A signed project agreement suitable to the three parties should be achieved by August 15, 1979, assuming favorable action on the necessary Congressional notification.

This project is strongly consistent with GRM development goals and achievement of an agreement between the three parties will relate to finalizing administrative arrangements. The project is rated a high priority by USAID/Bamako since expanding adaptive research will have direct and immediate supporting benefits for existing USAID cereal and livestock production projects which deliver inputs to small farmers. Moreover, the project will be an important step toward an overall integrated system collaborating with ex-

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ternal inputs from the international research system, other donors, and the U.S. research institutions. This system will bring the resources and results of international and U.S. research programs in semi-arid tropical cereals and legumes into Mali, and with the aid of the SAFGRAD farmer field multilocational testing program, crop production project and extension programs, to the Malian small-scale farmer.

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Section 2- Project Background

Mali, a large land-locked country of some six million, bordered by Guinea, Ivory Coast, Upper Volta, Niger, Algeria, Mauritania, and Senegal, is one of the poorest nations in the world. Mali was self-sufficient in cereal grains--millet, sorghum, rice, and corn--and a net exporter of food until 1965. Since that time, grain deficits have occurred each year due to unfavorable climatic circumstances, growing populations, and changing dietary habits. Deterioration in food production in the Sahelian area of Mali reached a climax during the six years of drought which resulted in soil erosion, reduction in livestock herds, environmental degradation of forest lands, malnutrition and starvation of people, and deterioration of the agro-sector economy in general. Normal rainfall returned in 1974. Since then, agricultural production has improved, stimulated by intensive development operations and financial assistance by many donor agencies. Yet, vulnerability to drought still exists and meagre production is still the rule. These conditions are due in part to low rainfall, impoverished soils, limited production methods, varieties with limited productive potential, the high cost of physical inputs, and the general weakness of the infrastructure in the agro-sector. A high rate of population growth (2.5% per annum) and outmigration from rural communities are reasons why Mali must look to increase its agricultural efficiency and productivity.

In the area of cereal production, sorghum and millet represent more than 70% of Mali's cereal production. These two cereals are grown for the most part in the 400-1,200 mm rainfall zones of Mali which are classified as the semi-arid tropics. For significant increases in crop yields, the use of chemical fertilizers would be highly desirable, but with present production parameters and pricing policies, the cost/benefit situation for sorghum and millet is not clear. Other inputs therefore must be sought to increase yields. This project proposes to develop improved varieties of sorghum and millet and to introduce improved agronomic practices by means of adaptive research, training and close collaboration with the organizations concerned with field trials and extension services to farmers.

Within the scope of this project, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) will conduct research for two years in the Sudano-Sahelian zone - the principal millet and sorghum growing area in Mali. (Until now, ICRISAT has had its home base in Mali in the rainfall zone with more than 1,000 mm per year). ICRISAT will collaborate with the Swiss "Fondation Ciba-Geigy" which has agreed to provide parallel funding with USAID to this project. At the request of the GRM, a new research station will be built and staffed in the 4th Region, not far from Ségou. On the station and in other sites, ICRISAT and the GRM will conduct trials designed

to improve the stability, quality, and quantity of dry land cereal crop production in the semi-arid tropics. The goal of their endeavor is to develop ways to stabilize and increase food production through improved farming inputs and practices to help Mali meet its basic food needs and Malian farmers to increase their incomes.

2.2 The ICRISAT Program

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), based in Hyderabad, India, was founded in 1971 as an international agricultural research center committed to:

--improving the genetic potential for grain yield, nutritional quality, and consumer acceptability of sorghum, pearl millet, pigeon pea, chick pea, and groundnut.

--developing farming systems which will increase and stabilize agricultural production through more effective use of natural and human resources in the seasonally dry semi-arid tropics.

--identifying socio-economic and other constraints to agricultural development and evaluating technological and institutional changes to overcome them.

--assisting national and regional research programs through cooperation and support by sponsoring training and extension activities.

The Institute is supported by the Consultative Group on International Agricultural Research (CGIAR) which, in addition to the three principal sponsors (Food and Agriculture Organization of the United Nations, World Bank, and the United Nationals Development Program) consists of 35 organizations involving various international organizations, foundations, and governments representing approximately 20 countries.

The ICRISAT/Mali program began in 1976 through an initial grant from the Ford Foundation. The following year, funding was assumed on a one-year renewable basis by USAID/Mali under the Operation Mils-Mopti Project (688-0202) as part of the National Research Program.

Even though varietal improvement is a long-term process and funding under Operation Mils-Mopti has been at a modest level ($90,000/year), ICRISAT/Mali has made progress in the development of its program. A number of varieties have been identified, which under replicated yield trials have significantly outyielded local varieties while exhibiting improved disease and pest resistance. In addition, acceptable grain quality

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characteristics were reported in consumer acceptability trials. In addition to the above, ICRISAT has begun research on crop and soil management, including cultural practices permitting increased yields of new genotypes, and has begun tests with improved animal traction techniques and equipment. As well, ICRISAT/Mali has formed an expanding agronomy farming systems program. Greatest emphasis has been placed on intercropping research at the specific request of the Institut d'Economie Rurale (IER). Priority has been given to the most widespread traditional intercrop combinations, namely sorghum-cowpeas and millet-cowpeas.

ICRISAT/Mali is closely linked to the other West African regional ICRISAT programs and its headquarters in Hyderabad. Much of the variety source material has been generated from ICRISAT center in India, and most of this has been initial results have shown sources of resistance to several of the major problems including grain mold in sorghum and downy mildew in millet.

ICRISAT's regional staff includes millet breeders stationed in Senegal, Upper Volta, Niger and Nigeria; cereal pathologists in Upper Volta and in Nigeria who are who are conducting research on millet and sorghum disease problems, as well as an agronomist in Upper Volta, an entomologist in Senegal, a striga specialist in Upper Volta--all actively conducting research programs. Consultation and collaboration are frequent and important in several areas for ICRISAT/Mali including pathology, entomology, and watershed management. ICRISAT's regional office in Dakar coordinates the exchange of information and materials between these dispersed locations. This regional network enhances the ICRISAT program in Mali.

In the 4 months preceding the new project, ICRISAT/Center has provided financing for the stationing of ICRISAT Mali's cereal breeder whose funding was not provided within the Operation Mils-Mopti financing. This intervention has enabled ICRISAT/Mali to have experienced staff already in place and prepared for early project implementation (approx. $70,000).

Training is an integral part of ICRISAT's program in Mali. Since 1976, a total of eight agricultural scientists and two agricultural extension agents completed two months of English language training followed by six months at ICRISAT/Center. Upon their return they have joined production or research activities. One trainee from each of the two preceding groups was assigned by the GRM to ICRISAT/Mali upon the completion of his training in India. At present an additional six trainees are enrolled at ICRISAT/Center. The cost of this training has been and will continue to be provided by ICRISAT/Center and SAFGRAD.

2.3. ORGANIZATIONAL CHART

ICRISAT/Mali

IER

DRA

SRCVO

ICRISAT

Representative

Administrative Assistant

Agronomy Program

Technicians

Cereal Breeding Program

Technicians

Implementation
Northern and Eastern Zone

Implementation
Southern and Western Zone

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Section 3 - The Expanded Project

3.1 The Program

From an analysis of ICRISAT's objectives and activities in Mali to date, promising avenues of research have been opened and begun to be exploited. This potential is severely hampered and restricted, however, at present funding levels under project Operation Mils-Mopti (688-0202). In order to maximize ICRISAT's contribution to Malian agricultural research and development, an expanded program will be implemented, as well as adequate support provided for ongoing activities. Malian officials have made it clear from the beginning that to fulfill its international mandate effectively for Mali, ICRISAT would require a research facility in the target area (that is the 400-1,200 mm rainfall zone). Mali has had no agricultural experiment station in this particular zone, and, as a result, has been forced to carry out its varietal research on short-cycle sorghums (and to some extent millet) either at the Kogeni station in the north or at the Sotuba station in the south. In the first case, crops are grown largely under irrigation, and in the second, the rainfall pattern is somewhat greater and longer than in the central zone. In short, conditions at these two stations are not as representative of the semi-arid tropics regions where these crops are grown. The Ségou area, in the rainfall target zone, is more representative of the ecology of the Malian semi-arid zone.

To date in this central zone, ICRISAT and the GRM have relied on using several Centres d'Animation Rural (CAR's), Points d'Appui de Recherche (PAR's) and the OMVS research facility in Samé. Cooperation with these centers has been good and very effective for the multilocational aspects of the program, but they were not appropriate locations for the basic breeding work and initial agronomic investigations.

The creation of this research facility will allow ICRISAT to have the bulk of its staff and its fundamental work in the real zone of interest. The GRM will benefit similarly. Continued use will be made of facilities such as CAR's, PAR's and other appropriate sites for the advanced testing of promising varieties and cropping practices as they are developed.

The new research facility will cover some 100 hectares and encompass the major upland soil types of this ecological zone. It will be within easy commuting distance (no more than a 30 to 40 minute drive) from Ségou. It will be located adjacent to a relatively large farming community where frequent exchanges can be created and from which field staff and laborers can be hired.

The jointly undertaken site prospection, employing satellite photo-interpretation mapping techniques, soil and ecological surveying of the area is well advanced. The final report containing 6 suggested sites in the area

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will be ready for presentation to FCG, GRM and ICRISAT in July.

Project buildings will consist of a laboratory, workshed, livestock stable and feed store, six offices, cold rooms, an agronomic office, a supply building, a warehouse for storing seed, plus various equipment and supplies. A small agrometeorological station will be installed, as well as a sturdy durable fence to enclose and project experimental fields. A break-up of USAID, FCG, and the GRM's contributions are contained in Annex H.

The initial budget provides funds for the purchase of all necessary equipment including draft oxen and animal-drawn implements, as major emphasis is placed on the development of animal traction in the farming systems program. It is anticipated that the total cost to build and develop this experiment station will be approximately $300,000.

3.2 The ICRISAT/Mali Staff Positions

Since the program's inception in 1976 ICRISAT/Mali has been staffed by an agronomist who has also been the representative. In March 1979 a second position, that of a breeder, was filled with ICRISAT/Center funding in anticipation of the implementation of the project. It has been clear from the beginning in discussions with Malian officials, ICRISAT officials, and USAID representatives that one researcher was inadequate given the task at hand. To insure fulfillment of ICRISAT's role, a second position has been filled by a cereal breeder.

Most of the breeding work until the arrival of the ICRISAT cereal breeder consisted of screening material from ICRISAT/Upper Volta. However, agronomy questions continually showed their fundamental importance to the program -- but, because of the heavy work load, they did not receive the necessary attention. The two components are inextricably linked and ICRISAT staffing reflects this linkage.

The Agronomist position will be filled by the ICRISAT scientist presently in charge of the ICRISAT/Mali program. Freed from varietal improvement duties, he will have adequate time to have a significant impact upon the following areas:

1) Multiple and intercropping studies: recently Malian officials formally entrusted ICRISAT with the entire national responsibility for inter-cropping research; they are obviously hoping for and expecting a major effort and contribution.

2) Research directed at solving specific problems encountered by farmers and extension agents, especially those problems related to the more extensive and efficient use of animal traction.

3) In collaboration with ILCA (International Livestock Center for Africa) -- the USAID financed livestock projects -- studies of fodder resources for livestock production, especially those relating to sorghum, millet, cowpea, and pigeonpea in the Sudano-Sahelian zone.

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4) Research on basic agronomic questions such as crop and soil management techniques adapted to the new sorghum and millet varieties, development of "packages" of recommended practices for semi-arid zone farmers.

5) Pigeonpea agronomy in Mali.

6) Watershed management studies, in conjunction with the ICRISAT/Upper Volta program and as a part of the new station development.

7) Fallow period exploitation and intensification studies, also as a part of the overall development of the new station.

8) Striga and downy mildew control studies collaboratively undertaken with participation of the agronomist, cereal breeder, and other appropriate ICRISAT staff.

The Cereal Breeder will continue the varietal improvement of sorghums and millets for the cereal growing regions of Mali. He will work in coordination and complementation with the Malian government cereal improvement effort. The ICRISAT breeder will bring the following complements to the Malian program:

1) Provision and evaluation of introduced millet and sorghum germplasm showing promise in pest resistance, agronomic value, or culinary preference.

2) Provision and maintenance of sources of male sterility in both sorghum and pearl millet for genetic male sterile breeding and the production of hybrids based on cytoplasmic male sterility.

3) Direction and advice in the breeding of new sorghum and millet lines in collaboration with Malian colleagues.

4) Direction and advice of screening procedures for seedling vigor, yield potential, disease and insect resistance, striga resistance, and culinary preference.

5) Coordination and data collection of the economic advantage of Ridomil fungicide (seed dressing) for the control of pearl millet downy mildew.

6) Identification of high yield potential sorghum and millet varieties and hybrids to be passed on for multilocational testing by the SRCVO and SAFGRAD.

7) Introduction and preliminary multilocational evaluation of several minor millet and forage grass species.

8) Establishment and strengthening of technical liaison between Malian plant breeders and ICRISAT breeders in Africa and India.

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9) Establishment and strengthening of technical liaison between Malian plant breeders and breeders at U.S. land grant institutions (Texas A&M, Purdue, Arizona).

10) Provision of training in plant breeding procedures to college level Malian Katibougou students during their thesis preparation.

3.3 Dissemination of Research Results to Farmers:

As detailed above, the project research site will be located near Ségou - centrally located for USAID-supported livestock projects and Operation Mils-Mopti. The station's proximity to these projects coupled with the multi-locational test program in the operations will eventually serve to spread research results directly to thousands of farmers in various locations. With this informal exposure and the formally established extension avenues, the new varieties and farming system practices should diffuse to all beneficiaries in USAID project areas (and other cereal crop production organizations) that grow sorghum, millet, and selected legumes or raise cattle outside these project areas.

Technical packages developed by ICRISAT/Mali will be disseminated to individual farmers through a formal GRM network involving three steps. In the first step, research results are presented at the annual meetings of the Commission Technique and Comité de Recherche, which serve as the national coordinators for agricultural and livestock research for IER. These meetings are attended by representatives of crops, livestock, and integrated agriculture development projects. These officials recommend which will be disseminated after multilocational farmer field trials conducted by SAFGRAD. These recommendations will then be discussed by officials in the development projects who will decide what to disseminate. The second step in the flow of information will occur when an operation or livestock project uses its extension service to transfer what ICRISAT has developed. The extension agent will be the final step bringing the information to the farmer.

An informal side of this GRM process will take place as ICRISAT research personnel informally talk with contacts in the operations or livestock projects about their findings. Site visits will be arranged for appropriate personnel of the operations and projects. Knowledge of these findings will be transferred by the contacted staff to crops or livestock extension agents in the field who disseminate the information to individual farmers.

Another informal network will be utilized whereby ICRISAT/Mali and USAID staff will pass on research results to the staff of USAID-funded operations and livestock projects who in turn disseminate information to the extension staff.

A third type of informal network that will disseminate project research results will operate through SAFGRAD and Cellule des Essais Multilocaux which perform multilocational field trials. These two groups have locations

throughout the Sudano-Sahelian zone, and have provisions for individual farmers to test selected varieties and agronomic practices. Through them, ICRISAT/Mali will have its technical packages tested on-site by the farmers who, if convinced of the packages' efficacy will become the best channel for transfering any innovations to other farmers. (See Figure 1). The Comité National de Recherche will only recommend results to the operations and projects after they have passed through this step.

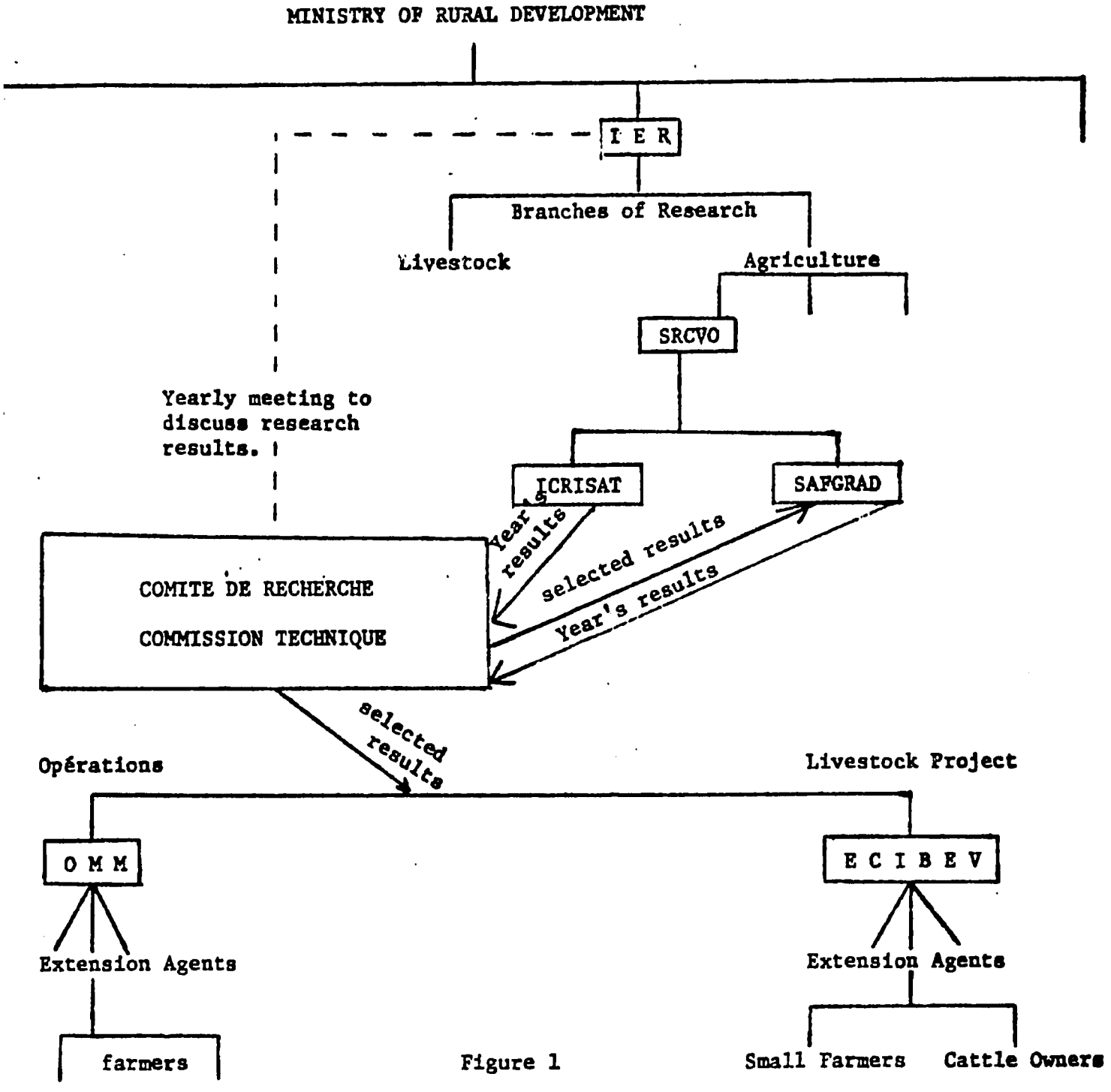
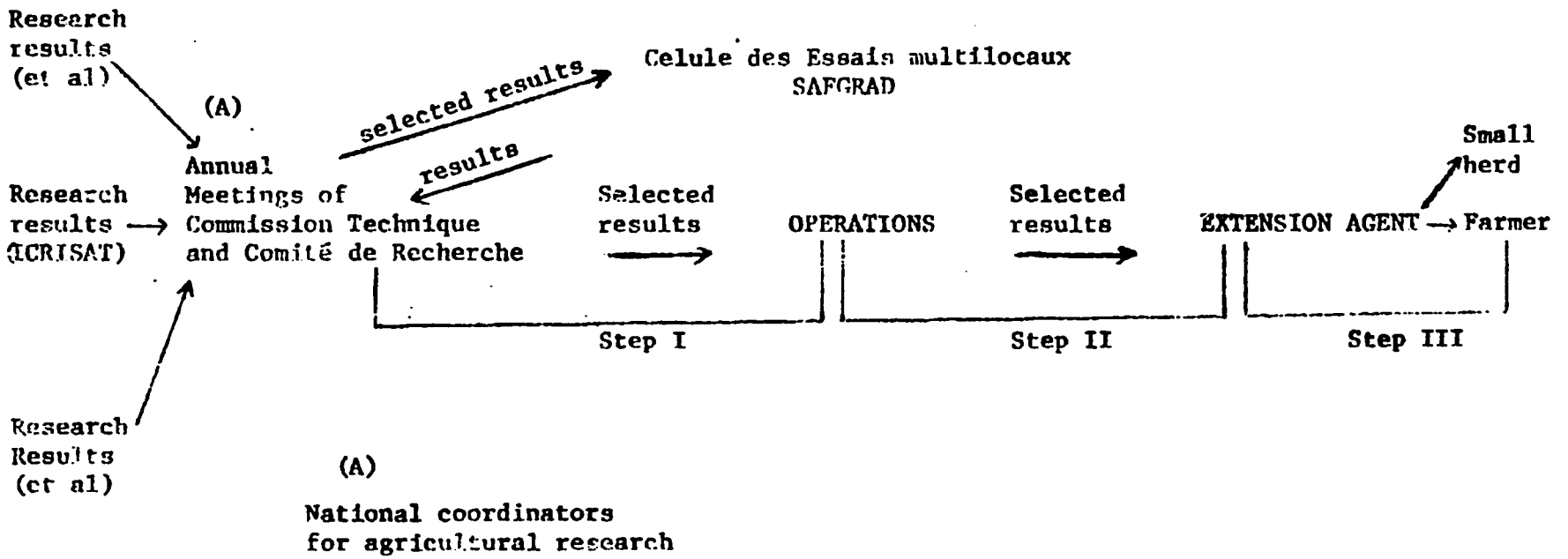

MINISTRY OF RURAL DEVELOPMENT
I E R
Branches of Research
Livestock
Agriculture
SRCVO
Yearly meeting to discuss research results.
ICRISAT
SAFGRAD
Year's results
selected results
Year's results
COMITE DE RECHERCHE
COMMISSION TECHNIQUE
selected results
Opérations
Livestock Project
O M M
E C I B E V
Extension Agents
Extension Agents
farmers
Small Farmers
Cattle Owners

Figure 1

Figure 2

FORMAL LINKAGES FROM ICRISAT/MALI

TO THE MALIAN FARMER



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4.1. Project Goal

A - Goal Statement

The goal of this project is to improve the productivity of Malian small farmers thereby assisting them to increase their cash incomes.

B - Measures of Goal Achievement

The development of improved cereal varieties and farming systems that increase agricultural production.

C - Means of Verification

Government records and statistics and independent studies. Research station results.

D - Important Assumptions

Adaptive research will lead to demonstrable methods for increased production.

A need exists for farmers to increase sorghum and millet production. Rainfall patterns will be relatively normal.

Government pricing policy will not act as a disincentive to increased sorghum and millet production.

4.2. Project Purpose

A. Purpose Statement

The purpose of the project is to develop a series of technical packages on millet, sorghum, and certain grain legumes in the 400 - 1,200 mm rainfall zone and to make them available through the crop production operations and livestock projects to small farmers and small herders.

B. Measures of Purpose Achievement

The establishment of an operational station and 6 - 8 site locations carrying out research of varietal improvements and farming systems for sorghum/millet and selected legumes.

Continuous linkages between research station, field trials, and crop production projects.

Development of a body of literature on sorghum/millet and selected legumes.

C. Means of Verification

Visits to the research site.
Station research literature.
Yearly reports.
Project Evaluation to be completed at the end of Project Year 1.

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D. Important Assumptions

Traditional varieties may be improved upon in the 400 - 1,200 mm rainfall/ environmental zone.

Improved varieties developed and tested through ICRISAT research can be usefully adapted to the Malian environment.

Traditional cultural practices and environmental exploitation can be improved upon in this environment.

4.3. Project Outputs

A. Outputs

1. Research results relevant to agronomic practices: More efficient use of the cropping environment through association of one or more crops with sorghum/ millet intercropping.
More efficient use of animal traction and associated equipment.
More efficient use of rainfall.
More efficient use of fallow periods for soil fertility regeneration and livestock fodder production.
More efficient use of crop and soil management techniques.
More efficient use of sorghum/millet and selected legumes for grain and forage production.

2. Research results relevant to plant breeding: Selection of more efficient sorghum/millet cultivars which better resist the major diseases and insect pests; initial introduction and evaluation of new cereal and grain legume species.

3. Trained Malian research, technical and administrative staff to assure continuity and suitability of research program: Five trained Malian research staff at the operational station and five trained Malian field trial staff at other sisite locations.

B. Magnitude of Outputs

10-20 trials of relevant intercrops with sorghum and millet. Sufficient number of trials to train 10-15 pair of oxen and experiment with 3-4 equipment systems.

Develop 2-3 relevant watersheds for study;
3-5 trials in fallow period exploitation;
5-10 trials in crop and soil management;
3-5 trials for forage production;
10-15 yield trials;
5-10 disease and insect resistance trials;
A selected crossing program;
Selected segregated nurseries.

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C. Means of Verification

Site visits, station reports, and literature checks.

D. Important Assumptions

There will be no natural catastrophe, major outbreak of disease or serious insect problem.

There will be continued GRM support to these activities

ICRISAT Center will continue its support.

Promising techniques developed elsewhere can be adapted to Malian environment.

The planned research program and the training of Malian counterparts will produce an institutional capacity to carry on useful work in this field. GRM will keep trained staff at post sufficiently long to realize benefits and pass knowledge to others.

4.4. Project Inputs

A. Technical assistance, commodities, construction, maintenance/salaries/primes, contingencies (15%).

B. Implementation Target

Technical assistance of 50 person/months including two years each for an agronomist and a plant geneticist (breeder).

Commodities:

-- Two vehicles, one generator, water equipment, meteorological equipment, livestock equipment, laboratory and field equipment, animal traction equipment, and tools.

-- Construction materials to build a garage, workshop, guard house, meteorological station, stable, holding pens, feedstore, well, water tower, and materials relevant to site prospection and land development.

C. Means of Input Verification

Receiving reports, site visits, ICRISAT records, USAID records.

D. Assumptions for Providing Inputs

The Ciba-Geigy Foundation grant will be made.
The GRM will provide qualified personnel for the project.
ICRISAT is capable of transferring technology to local counterparts.
Vehicles, equipment and commodities can be procured and will arrive on time.

BEST AVAILABLE DOCUMENT

Section 5 - Project Analysis

5.1. A. Technical Analysis

a. Crop Improvement

The technical feasibility of increasing both sorghum and millet yields in semi-arid tropical areas through the introduction of improved varieties and hybrids has already been proven in India. It is appropriate that the ICRISAT headquarters is located in India. Dr. L. R. House, a Rockefeller Foundation plant breeder who was involved in all stages of hybrid sorghum introduction to India, is now the head of the sorghum breading program at ICRISAT/Hyderabad and has direct and continuous contact with the ICRISAT/Mali team. The world collection of sorghum pearl millet, and six minor millets are maintained by ICRISAT/Center. The ICRISAT breeding program in Mali regularly requests and receives promising germ-plasm from the various cereal world collections. In 1977 and again in 1978 ICRISAT/Mali identified several world collection sorghums resistant to shootfly, sooty stripe, and grain mold. Similarly, several promising pearl millet sources have been identified which show a high resistance to downy mildew, a severe disease problem on millets in Mali.

The ICRISAT/Mali breeding program includes sorghum, millet and several minor millets. The program is carried out in coordination with the Malian cereal breeding program.

During the years 1976 through 1978 ICRISAT/Mali planted out and took complete agronomic data on over 1000 introduced sorghum varieites. Although many varieties and hybrids were very promising in terms of yield potential, pest resistance, or their short cycle, none of the varieties is immediately extendable -- due to shortcomings in the food quality of the grain, seedling vigor, or grain mold susceptibility. The introduced lines are generally susceptible to sooty stripe (Ramulispora sorghi) which is indigenous throughout Mali but rarely poses a threat to yield in other parts of the sorghum growing world. The introduced Indian hybrids (CSH-1 to CSH-8) are generally susceptible to charcoal rot (Macrophomina phaeseolina) and striga (Striga hermonthica). The introduced Texas hybrids also show susceptibility to sooty stripe and bacterial leaf stripe (Pseudomonas andropogoni). The local Malian varieities sustain remarkably low levels of disease incidence and their growth cycle generally fits in well with the cycle of the rains. The present thrust of the ICRISAT/Mali sorghum breeding program is to derive promising adapted F1 hybrids and pedigreed varietal derivatives from crosses between Malian and introduced sorghums. The Malian parents will be identified among the collection of 800 local sorghums collected by a FAO team in 1978. The introduced parents will include several time-tested Indian and Texas varieties as well as an array of promising Ethiopian "zerazera" varieties. The sources of cytoplasmic male sterility will be the new Texas female ATx623 (a white seeded zerazera) and the female parent line of the new Indian hybrid SCH-8, A2077. With existing arrangements, the breeding program will be able to realize two generations per year by use of the irrigated FAO seed multiplication facility at Babougou, near Segou. Hybrid and varietal selection will occur in tandem; i.e. in the same manner as the programs implemented at Texas A&M University and DeKalb Seed Company. The underlying principle is that promising male parents for hybrids also make promising [illegible] varieties.

Past breeding efforts by the French in Mali have identified a number of very high yielding, well adapted sorghum varieties which failed to be accepted by the Malian farmers on the basis of the unacceptable food quality of the grain. Screening precautions must be taken early in the breeding process to assure that the varieties are acceptable in all aspects of food preparation; i.e. threshing, decortication, reduction to flour, reaction with alkali, and overnight conservation. Already the ICRISAT/Mali team has developed a taste test procedure for teau preparation. Simple lab tests will be developed to replace tedious on-site food preparation. To date all of the tests have been executed and evaluated by local women (who have expressed delight and enthusiasm in the effort). It is hoped that the culinary tests will be defined by the consultations of Dr. Sally Vogel (IDRC) and Dr. Lloyd Rooney (Texas A&M). Their assistance will also be sought in finding an acceptable indigenous technology for pearling pigeon pea grain.

The pearl millet program is carried out in coordination with the Malian national breeding program. Since pearl millet is basically allogamous, the release of inbred lines or synthetics is futile in Mali. The breeding program is being carried out principally with hybrid millet in mind. Since downey mildew (Sclerospora graminicola) is the major pest factor on millet in Mali, at least the female parent must possess downy mildew resistance. During the years 1976 to 1978 ICRISAT/Mali reported excellent mildew resistance and yield potential in Indian millet hybrids which had the common female parent 111A. The ICRISAT/Mali program is now selfing the FAO/Mali collection of 300 entries. The selfed progeny will be crossed as males onto the 111A female and F1 hybrids will be observed at several locations. ICRISAT millet breeders from Upper Volta, Niger, and Senegal make regular germplasm and technical inputs into the ICRISAT/Mali millet program.

Five minor millets were introduced to Mali in 1979 by ICRISAT. They include several varieties each of the species Eleusine coracena, Echinochloa frumentacea, Panicum miliare, Panicum miliaecea, and Setaria italica. Preliminary data shows excellent adaptation in Mali. All of the species have potential as short cycle catch crops which can be planted early to obtain grain by mid rainy season or which can be planted late to exploit the late rains and residual soil moiture.

The forage interspecific hybrid (Pennesetum typhoides x P. purpureum) was introduced by ICRISAT in 1979. The hybrid has demonstrated excellent adaptation and vigorous growth under irrigated conditions. The germplasm nursery will be maintained by ICRISAT and cuttings will be distributed to interested research institutions within Mali.

5.1. B. Agronomic Practices

Mali has vast agricultural resources associated with the Niger and Senegal river basins. In these watersheds there are very large areas of alluvial and other soils amenable to permanent intensive and productive agriculture if appropriate farming systems/techniques/inputs (STI) can be developed, adapted, tested, and applied.

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While large portions of this land are currently involved in the cropping cycle -- a rotation characterized by long bush fallow periods and low input levels -- it is clear that the returns per unit area and worker are inadequate, vis-à-vis the rate of population growth and migration patterns. STIs have been developed elsewhere in the semi-arid tropics, especially at ICRISAT/Center, have been applied in peasant farming systems, and have been shown capable of significantly improving productivity. These STIs need to be adapted to and tested in Malian conditions.

During the four cropping seasons to date, ICRISAT/Mali's farming systems program has dealt with problems relating to intercropping patterns, forage and production systems, animal traction systems, pigeon pea production and other basic production agronomy questions albeit in a relatively exploratory phase. In 1979 initial efforts will be made in the area of striga and downey mildew control. As a part of the creation of the new station, studies of watershed and fallow period exploitation will be undertaken.

Intercropping

The GRM places a great deal of importance on ICRISAT's work on intercropping. In the intercropping research program, priority has been given to the most widespread traditional intercrop combinations, namely sorghum or millet with cowpeas. Village-level surveys are an integral part of ICRISAT's efforts to incorporate the cultural techniques and patterns used by farmers into their program. Using these present patterns as a control, useful information has been generated making ICRISAT/Mali optimistic about the eventual value of this phase.

Initial research has identified several factors crucial to successful intercropping: relative dates of planting, cowpea densities, spatial arrangements of the two species, and cowpea insect control. Preliminary observations suggest that in the higher rainfall areas, competition for light (shading), more than that for nutrients and/or moisture, is the most important limiting factor involved in the successful growing of mixed stands of cereals and cowpeas. In the north, however, competition for moisture appears more significant than competition for light or nutrients. This in part explains why farmers in the south generally plant their intercrops simultaneously while farmers in the Seno plain (OMM) sow cowpeas four to six weeks after millet.

Throughout the country, spacing and configuration have a large effect on interspecific competition. Traditional planting patterns, where sorghum or millet and cowpeas are sewn in the same pocket, have been shown to put the cowpea at a considerable disadvantage. This is consistent with the apparent desire of local farmers not to sacrifice sorghum or millet yield for cowpea yield. At the same time, this indicates that there are possibilities of increasing the performance of the intercrop. Wide spacing of the cowpea crop is the traditional practice farmers follow and is believed to account for the greatly decreased insect damage to cowpeas which can be terribly destructive in pure stands. In the higher rainfall areas in southwestern Mali, the intercropping of maize or sorghum with pigeon peas, has shown positive results. The application of

mechanized animal traction cultural techniques in intercropping situations appears to be more problematic than is often assumed. It is clear that intercropping is a productive avenue for future research. It is significant that the GRM has entrusted ICRISAT with national research responsibility in this area.

Forage

Initial efforts in the area of sorghum or millet forage production indicate that late, broadcast seeded forage crops can be efficient producers of forage and may well fit into the present cultural pattern. Techniques of this type can greatly reduce the labor investment in producing a forage crop and thus enable farmers to easily plant some land in relatively highly productive sorghums and millets for forage. This can give them a feed reserve for the lean months in the dry season. Now, most animals are so weak from lack of forage in the latter part of the dry season, that they are unable to perform tillage and other high energy requirement activities critical to the first two months of the growing season. This activity is thus critical for a successful animal traction program and very important for Malian farmers and herdsmen in general.

Animal Traction

The improved and expanded use of animal traction holds great promise for Mali. Presently, about 30% of the farmers in the target zone in Mali use some form of animal traction. In the past few years, there have been several successful innovations in this type of equipment that allow peasant farmers to do virtually every operation that can be performed with a tractor. Such equipment has been shown at ICRISAT/Center to be an especially effective cultivating tool, particularly when used in conjunction with broad ridges. Inasmuch as weed control tends to be the limiting factor on total acreage cultivated and the fact that much of it is done by the women, this type of equipment should increase acreage and free women from this backbreaking task.

Pigeon Pea

While pigeon pea is only rarely cultivated by farmers in Mali, it has been shown to be an adapted crop with considerable potential for human and livestock feed. Several varieties are being screened for forage and grain production and harvesting trials for both human and livestock feed are underway. Next year, pigeon pea will be included in the intercropping program based on very promising results in ICRISAT/Central where intercrops or sorghum and pigeon pea have given 100% of the pure stand yield of sorghum and 80% pigeon pea in associated stands.

Other

Seeding depth and timing, work with natural phosphates (Telemsi), and other agronomic questions have made up the rest of the program. This work is also ongoing and considered of integral importance to the program. There are no technical constraints, in summation, to carrying out the agronomic farming system's component of the research program.

Economic Analysis

Research is only one part of a process which delivers technology to farmers allowing for more optimum use of resources, either to increase output or lower cost. There must be an extension service to transfer research results to farmers, especially when the farmers are illiterate and thus do not possess the means of transferring the technology themselves.

Since project funding does not include an innate component to extend results to farmers, there will be no market measurable benefits generated which could be singly attributable to this project. Any attempt to assess the project's impact on production would have to include an analysis of the costs associated with extending these results to farmers. A further complicating factor is the multi-faceted nature of the research program, which will include trials relating to crops and livestock. In Mali the extension responsibility within the government organizations is divided not only between crops and livestock, but also among crops. There are separate entities to extend cultural practices for the production of millet/sorghum, peanuts, cotton, wheat, and rice. The analysis would have to include that portion of a given increase in production and associated costs attributable to an extension organization using results obtained from this project. An objective separation of these effects would likely be impossible, making inappropriate any cause-effect analysis to justify this program.

Why undertake research? Some 90% of Mali's population derives a livelihood from the agricultural sector. The country has about 11 million hectares suitable for annual crop culture. Less than 2 million hectares are cultivated in any given year with two-thirds of this area planted to millet/sorghum. The population is estimated to be 6.4 million. Self-sufficiency in cereals is somewhat arbitrarily established at 170 kg/capita or a total of 1.1 million metric tons. For the last three years weather has been good and official estimates of total production has been about 1.1 million tons which seems to indicate near self-sufficiency. However, when one considers replenishment of farmers' stocks from less productive seasons, inevitable losses, seeding requirements, clandestine exports and, in the case of rice, authorized exports, this figure falls far short of the self-sufficiency goal. This situation need not exist. Given proper technology and remunerative prices, the resources are available for this country to not only be continually self-sufficient in staple food commodities but also to regain the title of being the "breadbasket" of West Africa.

On-farm trials by SAFGRAD have shown that imported fertilizer will increase average yields of millet/sorghum by a sufficient margin to economically justify its application by farmers. A major problem with farmer acceptance is that most growers of millet/sorghum are subsistence farmers whose existence depends upon obtaining enough food from the land to survive the coming year. Most have no alternate source of income sufficient to provide food for their families. Given the large year-to-year variations in rainfall, they know that they risk losing about two crop years out of ten due to drought. When crops fail, they have no security sources to draw upon other than the previous years' stocks. They tend to be conservative and are unable to afford the luxury of considering themselves average farmers. Thus when confronted with the choice of a new cultural practice shown to be superior over an old technique, it is not surprising that many farmers do not accept it.

Farmers are receptive to new ideas if the risk involved with employing such an innovation is sufficiently low as to guarantee success under the least favorable conditions. Consider the wide-spread use of fungicide seed treatment. For about $0.25, a farmer can purchase enough chemicals to adequately treat all seed used for a given crop year. Even the least advantaged farmer can afford to risk such a minor investment and the associated risk of crop failure using treatment is no greater than without it.

Research must continue toward developing alternative technology acceptable within the subsistence-level milieu of the millet/sorghum farmer. This program will emphasize research on techniques that minimize associated risk of acceptance and maximize potential return.

GRM decision makers are undoubtedly aware of the value of research toward maintaining a well-functioning, modern, agriculture sector but probably have doubts concerning the capability of traditional, illiterate farmers being able to profit from such research. The major source of Mali's foreign exchange earnings is derived from agricultural products. Between 1975 and 1977, cotton, peanuts, and livestock respectively accounted for 51% of the total value of exports. This sector represents by far the largest base for generating tax revenues. Excepting net monetary transfers from other countries, any sustained real increase in government spending must come from an expanding productivity of the agricultural sector. Likewise, any significant increase in real per capita income can only be generated through agriculture.

5.3. Social Soundness Analysis

The emphasis in this project proposal is on agronomic research. In response to a Malian government request, ICRISAT will create a research station on which seed varieties and agronomic practices will be tested. The ICRISAT research itself will not directly involve Malian farmers and will thus have no immediate impact on the Malian people. Many of the social concerns which might be normally examined in a development proposal are, therefore, not relevant to this analysis and will be dealt with only briefly. In addition, the project design team and the designated project personnel, to their credit, seem to be fully aware of the social implications of the project.

Site Selection

The selection of the site will be made bearing in mind social, as well as agronomic concerns. The area tentatively identified is located between the Niger and Bani rivers on an axis between the major sities of Segou and San. This location is felt to be representative of the various ecological conditions farmers must cope with -- rainfall, soil types, hydrology, flora. Because of the many ethnic groups and social classes living in this ecological zone, various production strategies and practices particular to the different groups are also found. The agronomic problems to be researched at the selected site will be broadly representative of thosefaced by the resident population.

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Ethnicity

The many ethnic groups and social classes in the area -- millet and sorghum growers all -- include Bambara, Bozo, Somono, Rimbe, Marianka, Soninke, Maraka, Rimaibe, and Dogon. Since conditions and practices are not uniform throughout the entire zone, project personnel will have the opportunity to look at various production strategies. For example, while the duration and distribution of rainfall is a major concern of farm families, some Bambara growers prefer to cultivate a later maturing millet variety because early varieties fall prey to birds. The later variety, on the other hand, matures after the birds have departed, following their usual migratory pattern. For other families, baboons or wild pigs, pose problems. Some farmers directly in the path of the transhumant herds returning, for example, from the area of Hombori on their way to the inland delta, must contend with possible crop destruction by the cattle and thus plant varieties which mature just as the grass and water is exhausted to the east of Kona. For reasons such as these, farm families make conscious choices of seed varieties to plant. Potential yield is only one consideration. Ethnicity becomes a factor in varietal choice because, as indicated above, of differing social structures or historically effected geographical locations.

Beneficiaries

While the project activities will not immediately benefit specific recipients, positive test results and improved agronomic techniques will potentially benefit all farm families in this ecological belt. Moreover, it might be said that such potential benefits will be directed to the poorest of Mali's rural families. Where millet and sorghum are the major crops, the cash income of farm families is often less than that of families in other areas of Mali where, for example, cash crops of peanuts, cotton, tobacco, or dah are raised. Hence, the results of the crop research should in the long run benefit many of these cash-poor Malian families.

Women in Development

The potential beneficiaries of the ICRISAT research will be Malian farming families. There is no attempt herein to artificially identify project interventions that will specifically benefit women. The project has definite but limited goals. Farming in Mali is a communal endeavor among almost all ethnic groups and social classes. This means that women and children as well as men contribute their labor to the necessary agricultural tasks. All family members work hard. If the cash income of farm families can be increased through the cultivation of higher yielding, more pest resistant millet and sorghum varieties, all family members--women, children and men alike--will find their nutritional needs and material wants more easily satisfied. Further, improved animal traction practices will ease the labor burden that weighs heavily on the entire family. The particularly difficult tasks of breaking the soil and weeding by hand, the latter often performed by the female family members, might be completely done by animal drawn implements. A reduction of required labor brings the additional advantage of the potential increase in area cultivated and thereby holds promise of a further augmentation of farm family income which will, again, benefit all members of the family.

However, the negative impact that both an increase in area cultivated and higher yields can have on women must also be considered. Threshing and winnowing the grain crops are often the responsibility of the farm family's women. And women normally transport the produce to the granaries. So, although an increased harvest may benefit the entire family materially and nutritionally, and while more efficient animal traction practices may ameliorate the task of hand-weeding, manual labor required of women will be even more demanding. Hence, government development agencies which will attempt to diffuse the results of successful varietal research must also be able to provide credit, both to individual families and to womens' organizations, for the purchase of appropriate grinding and milling machines and for animal-drawn carts. Such foresight should counter the possible problems that an augmentation of farm production might pose for women. More will be said about the role of women in the ICRISAT project later on (under Social Acceptability).

Farm Family Openess to Innovation

The site for the new ICRISAT research station has been tentatively located on the east-west axis between the cities of Segou and San. In this general area, the USAID-financed program, Embouche Paysanne, has experienced the successful participation of many farmers who have taken advantage of proffered credit to buy cattle and feed to fatten the animals for the market. Farmer acceptance of this scheme, which contravenes the usual norm of accumulating livestock as capital, indicates a willingness to adapt practices that clearly bring economic or other benefits to the farm family. However, John V.D. Lewis has suggested that in this same geographical area there are Bambara villages composed of closed corporate lineages which, because of their tradition of communal village farming effort (as opposed to those of individual extended family effort), are resistant to the idea of individual credit and have not participated in the cattle fattening program. This, though, does not imply that these Bambara farmers would not adapt better seed varieties or growing techniques that had been proven to be more efficacious than their own.

Potential Diffusion of Benefits

One criticism often leveled at on-station agronomic research schemes is that testing in farmers' fields is neglected. While ICRISAT will conduct no test in individual farmers' fields, Malian government policy dictates that another agency, SAFGRAD, working closely with ICRISAT, will undertake this task once promising results have been achieved at the research station. Farmers who voluntarily participate in the field trial program will be guaranteed an amount of grain equal to their own average harvests to ensure that they will suffer no loss should the test variety prove to yield less than their own under local conditions.

When both research station and field tests have shown test varieties to provide superior yields, seed will be provided to the governmental agricultural agencies, the "Operations", which through their village-based agents will disseminate the new varieties to the farmers. Moreover, since the field agents will be trained in improved animal traction or other practices, these improved methods will also diffuse to the farm families. ICRISAT, then, will not directly participate in the diffusion of benefits, but the governmental agricultural development operations are structured so as to ensure that positive research results will reach the farm population.

Social Acceptability

ICRISAT scientists are aware of the sociological tests to which their results must be subjected. Millet and sorghum varieties that prove their worth in the fields (research station and individual farmers' plots) will be further tested by women for aesthetic attractiveness. Winnowing, milling, cooking, gelling, and conservation properties, as well as appearance, color, aroma, and taste are some of the many characteristics that will be rated by village women. These tests will be conducted in various locations and among different ethnic groups. Varieties that do not satisfactorily meet standards set forth by the female researchers, who ultimately will be occupied with such new or improved varieties in both field and kitchen, will be rejected. In this regard, it is interesting to note that ICRISAT has already conducted such tests in Mali. In the case of one variety that has been the subject of some ten years of agronomic research in Mali by agencies other than ICRISAT, it was found to lack all the characteristics deemed essential by the women. Earlier aesthetic testing of the variety would likely have saved years of research effort and much money.

The social acceptability of animal traction practices will likewise be subjected to testing by the ICRISAT personnel and government agricultural agents.

Problems

There are no difficulties we can identify that project personnel are not already aware of. However, there is one problem not adequately dealt with, probably because of its delicate nature, in the project paper. This concerns the acquisition of the 100 hectares of land for the research cneter. Malian law ensures that the government can exercise its right of eminent domain and confiscate land for purposes that are deemed to be in the interests of public welfare. We can rightly assume that usufruct rights to all lands in the project area, whether presently cultivated or in fallow, have been assigned to specific families. The project design does not address the matter of possible compensation to families who will lose these rights should their land be confiscated by the State for the research station. While it may be argued that Malian land use laws are not the concern of USAID/Bamako, it is the official policy of both the Malian and American governments that people must participate in their own development. Confiscation of family lands would generate ill will toward the project. Therefore, if and when tentative sites have been chosen, project personnel and their government counterparts should explain the purpose of their work to the villagers who stand to lose their land. It may be the case that villagers will determine that the creation of the research station will bring them immediate benefits in the form of available agronomic expertise and as such willingly donate the necessary hectarage without demanding compensation.

It may be the case that other land will be sufficiently available so that 100 hectares would be a willful village donation toward project success. We believe that the concerned farm families will donate land to the project if they are consulted in advance. We strongly recommend that this be done.

Conclusion/Remarks

This project is well designed with limited but important goals. It fills a gap in the agronomic research needed in Mali's less-watered areas. The designated personnel are impressively qualified--in education, knowledge, and first-hand experience in Africa and Mali--to successfully carry out the project design. The importance of sociological, as well as agronomic factors affecting production in Mali are known to the ICRISAT personnel. We see no constraints which will prohibit the success of the project.

5.4. Financial Analysis

ICRISAT/Mali will be responsible for the financial management of the project. ICRISAT/Mali will assist the appropriate agencies of the GRM--in most cases the I.E.R.--in carrying out the provisions of the program. Through its main representative in Mali, ICRISAT/Mali will act as controller for all grant funds expended on the project. Funds donated by Foundation Ciba-Geigy will be channeled directly to I.E.R.

As a non-revenue generating research project, a detailed analysis to establish the financial capability of the managing organization is unnecessary.

5.5. Financial Summary

AID-Financed	Year 1	Year 2	TOTAL
Personnel	$ 95,000	$ 95,000	$190,000
Commodities	20,000	10,000	30,000
Construction	102,000	20,000	122,000
Other	52,500	52,500	105,000
Contingency and Inflation	29,800	23,200	53,000
Subtotal	$299,300	$200,700	$500,000
Ciba-Geigy			
Personnel	$ 33,722		
Commodities	167,145		
Construction	188,373		
Operating costs	69,770		
Subtotal	459,310		
GRM Contribution			
Staff salaries	$ 20,000	$ 20,000	$ 40,000
Staff houses (2)	50,000	-	50,000
Construction expert	2,500	2,500	5,000
Land (100 ha at $400/ha).....	40,000	-	40,000
Subtotal	$112,500	$ 22,500	$135,000
GRAND TOTAL			$1,094,310

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SECTION VI

Project Management, Administration, and Support

6.1. GRM

In this project, the GRM and, specifically, IER will be responsible for:

1. Providing appropriate national staff for the following research and technical positions:

   A. 2 counterparts as available (qualifications to be mutually agreed upon with the GRM and will be dependent upon both experience and training);

   B. 4-6 researcher/technicians (with minimum training to the ETA level or equivalent experience);

   C. 4-8 moniteurs (agriculture extension agents) or equivalent.

2. Providing salaries and regular benefits for aforementioned employees.

3. Supervising and supporting the above-mentioned employees of the IER, and jointly with ICRISAT supervising and supporting all ICRISAT employees within the framework of its agreement with ICRISAT.

4. Developing with the ICRISAT/Center and FCG representative, a system suitable to all parties for the management and administration of all shared facilities, equipment, operational commodities, and funds provided by ICRISAT/Mali under the grant.

5. Maintaining in good operating condition all facilities provided and constructed under the grant.

6. Providing all land to be used at the station (envisioned at 100 ha.).

7. Providing appropriate personnel during the site selection phase for environmental analysis and interpretation within the abilities of the GRM.

8. Testing each prospective vehicle operator to ensure that the individual is capable of safely operating the intended vehicle(s) before appropriate driving permits are issued. Only when appropriate permits are issued will the Malian and ICRISAT workers be authorized to drive vehicles.

9. Providing medical examinations for all GRM candidates for project-related work at ICRISAT/Mali and training outside Mali. Participation will be limited to those candidates who are medically fit. All responsibility for the health, welfare, and actions of such candidates during their work/training at ICRISAT/Mali and ICRISAT/Center will rest with

those individuals and/or the GRM within the framework of their mutual understandings (except for insurance provisions for trainees during their actual stay at ICRISAT/Center).

10. Approving all buildings to be constructed in the project by USAID, IER, and Genie Rural prior to any construction.

11. Providing construction expert to supervise, assist, and facilitate the construction of the buildings and other installations.

12. Developing with ICRISAT the role and conduct of ICRISAT/Mali and the relations and obligations between them.

6.2. ICRISAT/Mali

1. Personnel Expatriate

A. Under this grant, ICRISAT will provide 2 researchers--1 agronomist and 1 sorghum/millet breeder--one of whom will be designated as the official ICRISAT representative and team leader of the ICRISAT program.

B. ICRISAT, under the grant, will provide all support, financial and otherwise for them.

C. This staff will be responsible to ICRISAT for all matters relating to the regional and international ICRISAT programs.

D. This staff will be responsible to the national (GRM) program for all matters which are mutually agreed upon.

E. ICRISAT will supervise and direct this staff in all matters relating to their regional and international program.

F. The GRM will supervise and direct this staff in all matters relating to the national (GRM) program.

2. ICRISAT Representative Mali

A. The ICRISAT Representative in Mali will be designated by ICRISAT/Center with the full accord of USAID, the GRM, and FCG.

B. ICRISAT's Representative in Mali will serve as resident liaison on behalf of ICRISAT with all parties and institutions in Mali, and in addition to managing ICRISAT's responsibilities in-country, he will be responsible for arranging ICRISAT/Center inputs, coordinating them with in-country activities, providing as necessary for the logistic support of ICRISAT actions, and reporting on the general and specific programs of ICRISAT in-country.

C. ICRISAT/Center will be responsible for the administration and accounting for of all expatriate salaries, benefits, and other related matters related to the Agronomist and Geneticist in this project.

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D. The ICRISAT Representative will also order and arrange for transport to the site of all local materials necessary for the project. He will order and arrange for delivery of those commodities to be purchased in neighboring countries. The Representative and his agents will arrange and supervise the construction aspects of the project during the first phase of the project. The Representative will be responsible for remitting receipts for all local material and labor cost that he pays during the term of his contract to ICRISAT/Center and will ensure that all transactions handled by him are conducted within pertinent laws of the Government of the Republic of Mali, particularly with respect to the hire and termination of laborers and skilled workers. Initial operational costs at the Research Station will be budgeted in advance on a yearly basis by the ICRISAT Representative in conjunction with representatives of FCG and USAID. A petty cash fund will be established and placed under the control of the ICRISAT Representative for local expenses and a checking account will be opened for local expenses and for deposit of funds by ICRISAT.

E. With respect to the Millet-Sorghum Research Station, the Representative will maintain a continuing liaison with GRM officials at the national and regional level and with in-country representatives of FCG and USAID, for the continued planning, supply, and all coordination of ICRISAT's inputs. Working with in-country and ICRISAT/Center staff, the Representative will recommend suitable communication and logistics systems for the management, support, implementation, and evaluation of the project. The Representative will arrange and manage in-country logistical support in the form of commodities to be procured in Mali and in neighboring countries. The Representative will be responsible for ensuring the complete and accurate maintenance of ICRISAT/Mali accounting records on local currency expenses financed by USAID, and will provide ICRISAT/Center any reports required on those expenses by ICRISAT/Center and USAID. The Representative will receive and analyze periodic narrative reports prepared by the staff at the Research Station, and will compile or condense these into the format suitable for submission to the GRM, ICRISAT/Center, and USAID. Annual progress reports will be submitted by the Representative to USAID.

3. <u>In-Country Personnel (GRM)</u>

A. "Primes and Indemnities" will be paid by ICRISAT/Mali in accordance with GRM policy and the agreement between the GRM and ICRISAT/Mali.

B. Non-GRM work supervisors who are a part of the ICRISAT/Mali program (excluding construction workers to be covered under competitive bids) will be paid for by ICRISAT/Mali.

4. <u>Trainees</u>

A. ICRISAT/Center will be responsible for all costs of persons selected by the GRM and approved for training by ICRISAT/Center,

including transportation from Mali to India, after they have presented themselves to ICRISAT/Mali.

5. Building

A. ICRISAT/Mali will be responsible for all construction under the project with the concurrence and participation of the GRM -- see section 6.1, art. 10 and 11, including:

1. design
2. letting of bids
3. materials procurement
4. construction

B. The structures to be built under this grant include:

1. laboratory and offices (170m^2)
2. stable, holding pens, and feed store
3. meteorological station

ICRISAT/Mali will consult closely with Genie Rural and IER regarding the design of the buildings, and their approval of the design of all buildings will be obtained whether or not Genie Rural is selected to do the design work. The selection of the construction contractor will be done by the competitive bidding process. Whether or not Genie Rural/OTER is the winning bidder, the GRM will provide a construction technician to advise and facilitate all construction work.

6. Accounting

ICRISAT/Center will be responsible for the execution and maintenance of all accounting procedures and records thereof for ICRISAT/Mali.

7. Equipment

A. ICRISAT/Mali will be responsible for the purchase, maintenance, and repair of all equipment under this grant. ICRISAT/Mali will be responsible for the procurement, supervision, maintenance, repair, insurance, and licensing of all equipment provided by ICRISAT for the project including:

1. land development equipment
2. workshop tools and equipment
3. meteorological station equipment
4. 2 x pick-ups

5. animal traction equipment
6. laboratory and field equipment
7. office furniture
8. any other equipment provided by ICRISAT under the grant

8. Research

Under this grant, ICRISAT/Mali will be responsible for the conduct, support, and interpretation of all research deemed appropriate and entrusted to it by ICRISAT/Center, ICRISAT/Regional, and the ICRISAT/GRM programs and as is agreed to by all parties by mutual consent.

9. Project Funds and Reporting

A. ICRISAT/Center will hold overall responsibility for the receipt and administration of project funds and for reporting on the project in writing to USAID.

B. The procurement and shipment of U.S. source and origin commodities to be sent to Mali for the project will be the responsibility of ICRISAT/Center. All grant funds received will initially pass to ICRISAT/Center and that portion intended for local currency expenses in Mali will then pass to ICRISAT's Representative in Mali to be managed by him there.

10. Consultancy Personnel

A. ICRISAT/Center or ICRISAT/Regional is responsible for consultancy personnel from ICRISAT/Center on visits to Mali.

B. ICRISAT/Mali is responsible for consultancy personnel hired by ICRISAT/Mali.

11. Salary for Sorghum Geneticist Prior to Phase 1

Note: ICRISAT/Center has been responsible for salary and other related costs of the Sorghum Geneticist hired January 1, 1979 for the first six months through June 30, 1979 of his tour in Mali.

6.3. Foundation Ciba-Geigy (FCG)

FCG is responsible for:

1. The creation of the buildings and other structures as agreed upon with the GRM and ICRISAT/Mali (see Annex H).

2. The procurement of the equipment and other inputs as agreed upon with the GRM and ICRISAT/Mali (see Annex H).

3. The provision of staff and other inputs as agreed upon with the GRM and ICRISAT/Mali (see Annex H).

4. The utilization, management, and administration of the shared equipment and facilities as mutually agreed upon in relevant accords with the GRM and ICRISAT/Mali.

6.4. Project Implementation (Assuming AID has signed obligation for funds no later than June 30, 1979)

1. Summary of Major Activities to be Undertaken

A. Preparatory (July 1, 1979)
Agreements signed between GRM, ICRISAT, and FCG.

B. Site selection in Segou area with appropriate soil sampling, vegetative cover analysis, topographic study, and environmental status, paying particular attention to possible effects that the station establishing may have on the environment on or around the station.

C. Building design in conjunction with GRM (Genie Rural) and FCG.

D. Stationing of the Sorghum genetist.

E. Procurement (July 1, 1979 - August 31, 1979 - January 1, 1981).

1) ICRISAT/Mali and ICRISAT/Center order all local and third-country materials needed for the project.

2) ICRISAT/Center and their agents order all U.S.-procured materials.

F. Construction (January 1, 1980 - June 30, 1981)
(for list of structures, see Annex A)

The GRM construction expert, in conjunction with the ICRISAT Representative, will construct with a contractor chosen with sealed bids based on designs acceptable to ICRISAT, USAID, and the GRM:

1) Laboratory and office for Agronomy Section (170 m^2)
2) Stable, holding pens, feed store.

G. Research July 1, 1979 - June 30, 1981

1) Sorghum improvement program
2) Agronomy program

H. Evaluation (September 1 - October 1, 1980)

1) ICRISAT/Center's evaluation of the first two years' activities and recommendations

2) USAID's evaluation of first two years' activities and recommendations

3) GRM's evaluation of the first two years' activities and recommendations.

SECTION VII

Evaluation

The project description (section 4) provides the logical framework and major outputs which should allow achievement of the project's purpose, given the critical assumptions stated. In September, 1980, there will be an evaluation of the project. It is anticipated that members on the evaluation team will include at least one representative from USAID's regional office and USAID/Mali, as well as representative(s) from the GRM/IER.

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Annex A

1. Engineering Analysis

Contemplated construction in this project is minimal and consists of the following:

1. Laboratory and agronomic office. Approximately 170m^2.
2. Meteorological station with fencing
3. Stable, holding pens, and feed store

All construction except well and water tower will be designed by a local engineer hired under contract by ICRISAT and based upon typical plans and advice of ICRISAT. Plans will be approved by USAID/Engineering and construction will proceed by force account or local construction contractor with the local engineer supervising construction using local qualified tradespersons approved by USAID/Engineering. ICRISAT and USAID/Engineering will monitor this construction.

Well and water tower will be contracted for based upon specifications prepared by the engineers and constructed by local contractors specialized in metal work and based upon typical designs.

Cost Estimate:

The cost of construction is based upon recent unit cost and lump sum costs for similar type construction performed in a like manner.

1.	Laboratory and Agronomic Offices	$75,000
2.	Meteorological Station LS.....	5,000
3.	Stable, Holding Pens, Feed Store LS.....	10,000
	TOTAL	$90,000

Certification Pursuant to Sec. 611(a) of the Foreign Assistance Act of 1961, as amended.

The project analyses demonstrate to the extent practical planning and design incorporated into all components of the ICRISAT project. Furthermore,

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the USAID engineer has reviewed and approved the planning and financial analyses for all engineering components in this project and recommends 611 (a) certification.

Therefore, I, Ronald D. Levin, Mission Director of the Agency for International Development in Mali, based upon the project analyses and the USAID engineer, do certify that in my judgement, adequate planning necessary to carry out project assistance and a reasonably firm estimate of all costs to the U.S. Government have been completed, and therefore, Section 611 (a) of the Foreign Assistance Act has been satisfied.

Ronald D. Levin
Mission Director

July 12, 1979
Date

Annex 3

Semi-Arid Tropics Research Project (688-0219)

Procurement Plan

1. Responsible Agency

All procurement of project goods and services financed by AID will be the responsibility of ICRISAT. If ICRISAT declines to accept responsibility for procurement implementation, it must do so in writing to the Director, USAID/Mali. The Director of USAID/Mali can then be authorized by ICRISAT to act on its behalf in procurement matters which will range from commodity procurement through contracts for technical assistance. However, in view of the limited procurement anticipated, it is expected that little or no assistance will be requested from the Director, USAID/Mali.

2. Equipment/Commodity List

2 pick-up trucks	$15,000
Lab and field equipment	10,000
Workshop tools and equipment	5,000
TOTAL	$30,000

The items listed above are those that are financed by AID for the life of the project. More exact details will be furnished in the purchasing documents that will be issued to enact procurement.

3. Source of Procurement

The source and origin of commodities being procured for this project will be AID Geographic Code 941 countries, and Mali, except for motor vehicles and as authorized under waivers or exempted as shelf items purchased under sanctioned local currency procurement.

4. Waivers

A waiver of the source and origin restriction is requested to permit procurement of the following from Code 935 countries:

2 Work Vehicles (pick-up trucks)	$15,000
	$15,000

Justification

This authorization is needed to allow timely procurement of project vehicles. The vehicles for which this waiver is requested are West European or Japanese made. They are more often readily available in Bamako or can be supplied within reasonable lead-time. In addition maintenance capability and spare parts are

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available locally. These vehicles will be needed by project personnel at the very beginning of project implementation for site selection and necessary topographic studies. The Mission has received authorization for proprietary procurement of International Harvester (IH) vehicles. However, the first quotations received from IH indicate 280-day FOB delivery for IH vehicles. To require the purchase of U.S. made vehicles would seriously delay project implementation.

For these reasons the waiver to permit Code 935 procurement of passenger vehicles is considered to be justified. In addition, it is found that special circumstances exist to waive the requirements of Section 636 (i) of the Act.

5. Shelf Items Procurement

As specified in Sections II B3 and II B4 of HB 15 and Section 18 A2, 16 A3 and 18 A4 of HB 1, Supplement B, items to be purchased as shelf items procurement shall be those imported into Mali and kept in stock in the form in which imported for sale to the general public.

Imported shelf items having their origin in Code 941 countries are eligible for financing if the unit cost doesn't exceed the equivalent of $2,500 and the total of such financing does not exceed 10% of the total local costs financed by AID or $10,000, whichever is higher.

Commodities mined, produced, or assembled in Mali are eligible for financing without restriction, except for the limitation on the total amount available for local procurement. However, the statutory restrictions on certain commodities are also applicable to locally-produced commodities, e.g., pharmaceuticals, fertilizers, motor vehicles (including motorcycles), etc. Imported shelf items produced in or imported from countries not included in Geographic Code 899 are not eligible for AID financing. Procurement of shelf items shall conform to good commercial practices, shall be at reasonable prices, and shall be consistent with local laws and practices. A supplier furnishing shelf items for the project must provide a statement attesting to the source and origin of the commodity sold.

6. Local Currency

Local currency authorization is required to purchase the following:

2 work vehicles (pick-up trucks)	$15,000
Shelf items	15,000
TOTAL	$30,000

7. Payment

In view of the limited procurement anticipated, it is expected that all payment of goods will be made by ICRISAT. Mission payment policies will be followed.

8. Procurement Dates

Procurement actions will be taken subsequently to meeting the normal conditions.

9. Receipt and Utilization

ICRISAT is required to put into project use all commodities procured for the project within one (1) year of receipt. USAID/Bamako will inspect the ICRISAT utilization reports as a matter of course.

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ANNEX C

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT LOCATION :	near Segou, Mali
PROJECT TITLE :	Semi-Arid Tropics Research
FUNDING :	$500,000
LIFE OF PROJECT (Funding):	2 years
IEE prepared by:	Lance Jepson, Phil Serafini DATE: 16 February 1979

ENVIRONMENTAL ACTION RECOMMENDED: Negative Determination

Concurrence NA
Ronald D. Levin
Mission Director

Date:

Approval

Approved: [signature]

Date: March 1, 1979

Disapproved: _____

Disapproved: _____

As pertains to AID Regulation 16, as a research activity this project is subject to no further examination as regards use of pesticides.

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ANNEXE D
MINISTERE DU DEVELOPPEMENT RURAL
INSTITUT D'ECONOMIE RURALE

REPUBLIQUE DU MALI
Un Peuple - Un But - Une Foi

/ -) CCORD ENTRE LE GOUVERNEMENT DU MALI
ET L'INSTITUT INTERNATIONAL DE RECHERCHE AGRONOMIQUE
DANS LES ZONES TROPICALES SEMI-ARIDES

PREAMBULE :

Les populations vivant dans les régions sahéliennes et sahélo-soudanniennes sont très fortement dépendantes pour leur subsistance des cultures de mil, de sorgho et de légumineuses alimentaires. Les conditions de cultures dans ces régions sont difficiles en raison de l'irréguralité et l'intensité des pluies, de la fertilité souvent médiocre des sols et enfin des faibles possibilités d'investissements des paysans.

Le Gouvernement de la République du Mali et l'Institut International de Recherches Agronomiques dans les zones Tropicales Semi-Arides (ci-dessous désigné ICRISAT) sont mutuellement concernés et préoccupés par les problèmes de production végétale du monde rural.

Les parties contractantes de cet accord s'engagent à travailler (d'accord parties) sur des problèmes d'études, de recherches et leurs applications en vue de l'amélioration de la production agricole dans les zones concernées et ce dans le cadre de programmes présentant un intérêt commun pour le Gouvernement de la République du Mali et pour l'ICRISAT.

A cette fin, les projets associés devront être approuvés par les représentants appropriés du Gouvernement de la République du Mali et de l'ICRISAT. Ces projets devront être suffisamment détaillés et spécifiques de manière à prendre aux buts principaux énoncés dans le programme général annexé au présent accord et dont il fait partie intégrante.

Le Gouvernement de la République du Mali et l'Institut International de Recherches Agronomiques dans les zones Tropicales Sémi-Arides désireux de coopérer dans le but de rechercher des solutions aux problèmes de la production agricole présentant un intérêt commun pour les deux parties.

Son convenu de ce qui suit :

ARTICLE I -

1 - L'ICRISAT se conformera, pour les conditions d'emploi pour les membres du personnel de l'ICRISAT au Mali, aux bases internationales, sans aucune

discrimination de nationalité ou d'origine ou de toute autre considérations que celles basées sur les qualifications et l'expérience, ainsi qu'il est nécessaire pour embaucher du personnel très qualifié et obtenir un travail de très haute qualité.

Le choix du personnel scientifique dans le cadre de la collaboration avec la République du Mali se fera selon les recommandations de l'ICRISAT qui prendra particulièrement en considération les candidatures d'experts de nationalité malienne, étant entendu que toute proposition d'affectation de personnel expatrié sera soumise à l'approbation du Gouvernement de la République du Mali.

Pour le personnel d'exécution et à qualification égale la priorité sera donnée au recrutement du personnel malien.

2) Les procédures d'entrée ou de sortie du Mali pour le personnel du projet et d'encadrement, pour les stagiaires, les étudiants et les visiteurs concernés par les programmes se feront conformément aux lois d'immigration et d'émigration au Mali.

3) Le Gouvernement de la République du Mali accordera l'autorisation de mouvement pour des matériels végétal à l'entrée et à la sortie du Mali, matériels pouvant être nécessaires à l'ICRISAT soit pour ses programmes au Mali, soit pour ses programmes associés dans d'autres parties du monde.

Ces mouvements seront assujetis aux lois et règlementations du Gouvernement de la République du Mali sur l'inspection, la quarantaine et la circulation de tels, notamment de manière à éviter l'introduction ou l'exportation de maladie.

Le Gouvernement de la République du Mali convient d'assurer l'inspection la plus rapide possible pour tous ces matériels et d'en réduire au maximum les délais de livraison.

4) La publication et la dissémination par l'ICRISAT des résultats de ses recherches se feront de commun accord avec les institutions maliennes compétentes.

DISPOSITIONS PARTICULIERES :

ARTICLE II.-

Pour faciliter la conduite des projets associés tels que actuellement agréés par les parties contractantes de cet accord, le Gouvernement de la République du Mali accordera à l'ICRISAT et à son personnel les facilités, privilégiées et immunités suivants, analogues à ceux des institutions spécialisées des Nations Unies :

1 - L'ICRISAT jouit de l'immunité de juridiction pour la protection légale de ses biens, fonds et avoirs.

BEST AVAILABLE DOCUMENT

2 - L'ICRISAT, ses biens, fonds et avoirs seront exonérés de toute imposition directe à l'exception des charges émises en fonction des services publics rendue.

3 - L'ICRISAT sera exonéré des droits et taxes sur les importations et réexportations de ses publications.

4. - Les revenus éventuels provenant de la vente de matériel (y compris matériel végétal) acquis dans le cadre du projet conjoint seront réutilisés par l'ICRISAT pour son programme au Mali.

5. - Le Gouvernement de la République du Mali accordera à l'ICRISAT toutes les facilités de communications nécessaires à l'accomplissement de sa mission.

6. - Le matériel scientifique et de laboratoire ainsi que les moyens de transport et tout autre équipement importés destinés à l'usage officiel de l'ICRISAT, sont exempts de tous droits de douanes, étant entendu qu'en cas de vente du matériel ou de véhicules à un tiers ne bénéficiant pas des mêmes privilèges, ils seront soumis au paiement des droits et taxes dans les conditions prévues par la réglementation en vigueur au Mali

7 - La contre-partie du Gouvernement de la République du Mali consistera :

a) à la mise à la disposition de l'ICRISAT de terrains convenables destinés :

- aux recherches sur le mil, le sorgho, l'arachide, le pois d'angol et d'autres légumineuses nécessaires à l'augmentation de la ration en protéines des populations.

- L'édification des bâtiments (bureaux, laboratoires, logements, locaux de travail) nécessaires pour mener à bien les travaux de l'ICRISAT. Il reste entendu que l'ICRISAT avancera les fonds - pour ces investissements dans la mesure de son budget.

b) à l'assistance pour les arrangements nécessaires pour le logement du personnel expatrié, chargé du programme de coopération et affecté au Mali. Il reste entendu que l'ICRISAT prendra à sa charge les loyers et pourra financer la construction de maisons d'habitation dans la mesure ou son budget le lui permet.

Après accord préalable, les maisons et bâtiments construits par l'ICRISAT reviendront au Gouvernement de la République du Mali lorsque le programme de coopération ou ses prolongements seront totalement terminés.

c) au détachement à l'ICRISAT du personnel nécessaire à la réalisation du programme conjoint et à la participation aux dépenses y afférentes.

d) à l'exonération de droits de douanes et taxes pour les matériaux, équipements et fournitures importés au Mali, et utilisés uniquement pour la construction des installations de l'ICRISAT.

8 - Tous les agents de l'ICRISAT (chercheurs-assistants de recherches, exports consultants adjoints administratifs) :

a) jouiront de l'immunité de juridiction pour les notes accomplis en leur qualité officielle y compris leurs paroles et leurs écrits.

b) seront exempt ainsi que leur conjoint, et les membres de leur famille qui sont à leur charge de l'application des dispositions limitant l'imigration et des formalités d'immatriculation des étrangers.

Le personnel de l'ICRISAT visé au paragraphe (b) de l'article précédent bénéficie de toutes les facilités d'entrée et de sortie en République du Mali.

c) seront exempts de toute obligation relative au service national.

d) jouiront des facilités monétaires et des facilités d'échange.

e) bénéficieront ainsi que leur conjoint et les membres de leur famille à leur charge des facilités au rapatriement en période de crise internationale.

f) seront exonérés de tous impôts et taxes sur les salaires et émoluments qui leur seront versés par l'ICRISAT.

g) jouiront du droit d'exporter sous le régime douanier de l'importation temporaire leur mobilier et objet personnel incluant un véhicule automobile lors de leur prise de poste en République du Mali ou dans les six mois après leur installation.

Le délai de validité de l'importation temporaire des véhicules appartenant aux agents de l'ICRISAT est de trois ans renouvelables jusqu'à la réexportation ou à la mise en consommation des-dits véhicules.

Le mobilier, les objets personnels et véhicules des agents en cas de vente à un tiers ne bénéficiant pas des mêmes privilèges, seront soumis au paiement des droits et taxes dans les conditions prévues par la règlementation en vigueur en République du Mali.

ARTICLE III.-

1) Les agents de nationalité malienne ou toute autre personne recrutée localement par l'ICRISAT, ne bénéficieront pas de facilités et privilèges tels qu'indiqués dans les sous-paragraphe.

b) à (g) du paragraphe (8) de l'article précédent.

2) Le personnel d'exonération de nationalité malienne ou toute autre personne recrutée localement sera regi par la législation malienne du travail.

ARTICLE IV.-

1) Le présent accord pourra être modifié ou complété à la demande de l'une ou l'autre des parties et d'un commun accord.

2) Tout différend relatif à l'interprétation ou à l'application du présent accord sera régler par voie de négociation.

3) Le présent accord entrera en vigueur à la date de sa signature. Il demeurera en vigueur tandis qu'il ne sera pas dénoncé par l'une des parties.

La dénonciation ne peut intervenir qu'après un préavis d'un an.

Addetif

Une autorisation d'achat de carburant en exonération des droits de douane et de taxes d'entrée sera accordée à l'Institut International de Recherche Agronomique dans les Zones Tropicales Semi-arides (ICRISAT).

Fait à Bamako, le 22 Mars 1976

POUR L'INSTITUT INTERNATIONAL DE RECHERCHES AGRONOMIQUES DANS LES ZONES TROPICALES SEMI-ARIDES.

POUR LE GOUVERNEMENT DE LA REPUBLIQUE DU MALI
LE MINISTERE DES AFFAIRES ETRANGERES ET DE LA COOPERATION INTERNATIONALE

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Annex E

ICRISAT Staff, Trial Locations, and Operational Linkages (to be provided by ICRISAT/Center and SAFGRAD (funding)).

1. Staff Functions - ICRISAT

Agronomist:	Philip Serafini, M.S. Agronomy
Administrative Responsibilities: Northern and Eastern Sites:	Cinzanna, Baramendougou, Barbe, Koporo Keniepe
Cereal Breeder:	Dr. John Scheuring, Ph.D. Cereal Breeding
Administrative Responsibilities:	Breeding program
Implementation Responsibilities: Southern and Western Sites:	Dalabali, Sotuba, Samé, and the special problem sites

Staff Functions - Malian

Administrative Assistant:	Seydou Toure, ITA
Administrative Responsibilities:	Administrative Assistant to the Representative
Technical Staff:	Mamadou Doumbia, ITA
Technical Responsibilities:	Agronomy Program
Implementation Responsibilities:	Coordination of northern and eastern sites
Technical Staff:	Balagi Kieta, ISA
Technical Responsibilities:	Breeding Program
Implementation Responsibilities:	Coordination of southern and western sites
Technical Staff:	Boucara Touré
Implementation Responsibilities:	Dalabani and Samé programs
Technical Staff:	Makono Coulibaly
Implementation Responsibilities:	Sotuba program

2. Trial Locations

Protection vététaux

Nature of the relationship:

- Collaborative work on downey mildew control is carried out by ICRISAT and PV.

The sites are:

Dalabani Seed Production Farm, OPPS
rainfall 1213.6 mm (1941-1975)
latitude 11°25N-7°30W

Other research organizations participating in the program:

SRCFT
Production Semance

External financing:

FAO, FED

Sotuba National Research Station
rainfall 1042.3mm (61-75)
latitude 12°39N-7°5[illegible]W

Other research organizations participating in the program:

SRCVO
IRAT
PPS
CNRZ
Administrative headquarters of: DRA, SRCVO, CNRZ, SAFGRAD, IRAT, ICRISAT

External financing:

IRAT
Dutch government

Cinzana, CAR
rainfall 938.6 mm (63-77)
latitude 13°1[illegible]N-5 -8W

Other research organizations participating in the program:

SRCFJ
SRCVO

External financing:

Karl Freidrich Foundation

Baramendougou, FAO
rainfall 577.9 mm (36-75)
latitude 14°01N-14°0[illegible]W

Other research organizations participating in the program:

SRCFJ

External financing:

FAO, FED

Samé, OMVS (Kayes)
rainfall 738.9 mm (41-75)
latitude 14°27N-11°30W

Other research organizations participating in the program:

OMVS

External financing:

Multi-donor

Barbe, CAR (Mopti)
rainfall 533 mm.8 (41-75)
latitude 14°31N-4°6W

Other research organizations participating in the program:

SRCVO

External financing:

Karl Freidrich Foundation

Koporo Keniépé, PAR (Bankass)
rainfall 645.0 mm (52-78)
latitude 14°04N-3°31W

Other research organizations participating in the program:

SRCVO

External financing:

OMM - USAID

Babougou Seed Production Farm, CPSS (Markala)
rainfall 640.2 mm (1941 à 1975)
latitude 13°41N-6°5W

Other research organizations participating in the program:

Production Semances

External financing:

FAO

Special Problem Sites:

Mintinbougou, village cooperative field ZER & OACV - Striga research

Comparisons made over such an extent of ecological variability can be extremely useful. A base further to the north will enhance and facilitate this coverage.

Work Supervisors - by site

Northern and Eastern sites:	Mamadou Doumbia, coordinator
Cinzanna:	Famagouri Diarra
Baramendougou:	Baba Touré
Barbé:	Kassim Touré
Koporo Keniepe:	Bakari Diarra
Southern and Western sites:	Balagi Kieta, coordinator
Sotuba:	Makono Coulibaly
Dalabali:	Boncana Touré
Samé:	Boncana Touré

3. Operational Linkages

The following serves to demonstrate ICRISAT/Mali's extensive linkages with various organizations conducting agricultural research in Mali--both on a national and international level:

International Research Organizations

ILCA

Nature of the relationship:

- ICRISAT serves as a germplasm source for ILCA's forage research program; sorghum, millet, pigeon pea, and minor millets.

IITA

Nature of the relationship:

- IITA serves as a source of germplasm for cowpeas and maize.
- ICRISAT conducts cowpea/maize intercropping trials for IITA.

OMVS

Nature of the relationship:

- ICRISAT is a germplasm source for OMVS; pigeon pea, sorghum, and millet.
- OMVS conducts trials for ICRISAT.

ICRISAT Central and Regional

Nature of the relationship:

- There is on-going consultation and collaboration on all aspects of the program.

National Institutions

SRCVO

Nature of the relationship:

- SRVCO is ICRISAT's supervisory institution (IER - DRA - SRCVO - ICRISAT).

- ICRISAT and SRCVO currently share facilities at several research sites, including Sotuba and Koporo Keniepe.
- Activities in common:
  - Entomology trials
  - Pathology trials
  - Breeding program - maintenance and breeding work with the Malian sorghum, millet, and fonio collection (FAO prospection, 1978).
  - Groundwork at Sotuba, animal traction component.

SAFGRAD

Nature of the relationship:

- ICRISAT is a germplasm source.
- SAFGRAD tests ICRISAT's varieties in its multilocational farmer field testing program.
- ICRISAT and SAFGRAD collaboratively multiply seed in the dry season.
- ICRISAT and SAFGRAD share office building and laboratory facilities.

OMM

Nature of the relationship:

- ICRISAT/Mali is funded under OMM grant to June 30, 1979.
- ICRISAT conducts trials at two sites in the OMM zone, Barbe and Koporo Keniepe.
- The station manager at Koporo Keniepe took the ICRISAT/Center training course.
- ICRISAT is supervising the research program at Koporo Keniepe.
- OMM is funding the research program at Koporo Keniepe.

CPSS (Seed Production Farm)

Nature of the relationship:

- The seed production farm in Bougouni (FAO-financed) will serve as the off-season multiplication and breeding program site.
- ICRISAT will be a source of germplasm as soon as sufficiently competitive varieties can be bred and/or selected.

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CAR's Pombe & Cinzanna

Nature of the relationship:

- Both are sites of multilocational testing programs.
- Cinzanna is located in the proposed new site zone and has a staff of 3 technicians and 7 workers putting in the largest of ICRISAT's 1979 programs.

IRCT

Nature of the relationship:

- Both share facilities in Baramendougou and Dalabani.

ECIBEV

Nature of the relationship:

- ICRISAT provides consultation for forage production.
- ICRISAT is a source of germplasm for the forage production program.
- ICRISAT is coordinating and supervising a pilot, village-level forage production trial in the Doukaloma, Embouche Paysanne zone of activity. This is a cooperative effort, involving Embouche Paysanne (ECIBEV), Peace Corps, and ICRISAT.

National Polytechnique College at Katibougou

Nature of the relationship:

- ICRISAT serves as a source of germplasm
- ICRISAT works with several students on final year research and thesis activities.

CNRZ

Nature of the relationship:

- CNRZ provides the bullocks for ICRISAT's animal traction program at Sotuba.
- ICRISAT provides germplasm for CNRZ's forage production program.

CVL

Nature of the relationship:

- CVL provides veterinary services for animal traction component.
- ICRISAT will monitor tsetse fly population around Cinzanna.

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ANNEX F

PROJECT DESI(
LOGICAL FR/

Project Title & Number: Semi-Arid Tropics Research - 688-0219

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	
Program or Sector Goal: The broader objective to which this project contributes: To improve small farmer productivity and increase their incomes.	**Measures of Goal Achievement:** 1. Improved varieties and farming systems for increased production. 2. Farmers make use of improved varieties and farming systems.	1. 2.
Project Purpose: To develop a series of technical packages from adaptive research done with sorghum/millet and certain grain legumes in the 400/1,200 mm rainfall zone and to make them available through the crops operations and livestock project to small farmers and small herders.	**Conditions that will indicate purpose has been achieved: End of project status.** 1. Operational station and 6-8 site locations carrying out research of varietal improvements and farming systems for sorghum/millet and selected selgumes. 2. Continuous linkages between research station, field trials and crop production projects. 3. Body of literature on sorhgum/millet and selected legumes.	1. 2. 3. 4.
Outputs: 1. Research results relevant to agronomic practices. a. More efficient use of cropping environment through association of one or more crops with sorghum/millet intercropping. b. More efficient use of animal traction and associated equipment. c. More efficient use of rainfall. d. More efficient use of locally available organic and natural fertilizers. e. More efficient use of fallow period for soil fertility regeneration and live stock fooder production.	**Magnitude of Outputs:** 1. Do 10-20 trials of relevant intercrops with sorghum and millet. 2. Do sufficient number of trials to train 10-15 pairs of oxen and experiment with 3-4 equipment systems. 3. Develop 2-3 relevant watersheds study. 4. Do 10-15 trials with use of natural and organic fertilizers. 5. Do 3-5 trials in fallow-period exploitation. (See next page)	1. 2. 3.
Inputs: 1. Technical assistance 2. Commodities 3. Construction 4. Maintenance/salaries/primes 5. Contingencies (15%).	**Implementation Target (Type and Quantity)** 1. Technical assistance of 50 person/months. 2. Commodities: a. 2 vehicles; b. 1 generator; c. Water equipment, d. Meteorological equipment; e. Livestock equipment; f. Laboratory and field equipment; g. Animal traction eq[illegible] and tools; 3. Construction mate[illegible]s.	1. 2. 3. 4.

DESIGN SUMMARY
L FRAMEWORK

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

	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	1. Government records and statistics and independent studies. 2. Research station results.	Assumptions for achieving goal targets: 1. Adaptive research will lead to demonstrable methods for increased production. 2. A need exists for farmers to increase sorghum and millet production. Rainfall patterns will be relatively normal. 3. Government pricing policy will not act as a disincentive to increased sorghum and millet production.
t- p	1. Visits to the research site. 2. Station research literature. 3. Yearly reports. 4. Project Evaluation to be completed at end of Project Year 1.	Assumptions for achieving purpose: 1. Traditional varieties may be improved upon in the 400-1200 mm rainfall/environmental zone. 2. Improved varieties developed and tested through ICRISAT research can be usefully adapted to the Malian environment. 3. Traditional cultural practices and environmental exploitation can be improved upon in this environment.
- - al	1. Site visits. 2. Station reports 3. Literature checks.	Assumptions for achieving outputs: 1. There will be no natural catastrophe, major outbreak of disease or serious insect problem. 2. There will be continued GRM support to these activities. 3. ICRISAT Center will continue its support. 4. Promising techniques developed elsewhere can be adapted to Malian environment. 5. The planned research and the training of Malian counterparts will produce an institutional capacity to carry on useful work in this field. GRM will keep trained staff at post sufficient to realize benefits and pass knowledge to others.
/	1. Receiving reports. 2. Site visits. 3. ICRISAT records. 4. USAID records.	Assumptions for providing inputs: 1. The Ciba-Geigy Foundation grant will be made. 2. The GRM will provide qualifed personnel for the project. 3. The GRM will provide qualified personnel for the project. 4. ICRISAT is capable of transferring technology to local counterparts. 5. Vehicles, equip., and commodities can be procured and will arrive on t

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ACCORD FONDATION CIBA-GEIGY - GOUVERNEMENT DU MALI

JUILLET 1979

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Entre la Fondation CIBA-GEIBY pour la coopération avec les pays en voie de développement d'une part,

et le Gouvernement de la République du Mali d'autre part

concernant

Le Projet d'implantation d'un centre de recherche sur l'amélioration et la multiplication de semences de base de riz au Mali (ce projet ainsi que l'implantation réalisée sont désignés ci-après "Projet").

Il a été convenu ce qui suit :

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Préambule :

La Fondation CIBA-GEIGY pour la coopération avec les pays en voie de développement, Fondation sans aucun but commercial (ci-après désignée "Fondation") et le Gouvernement de la République du Mali (ci-après désigné "Gouvernement du Mali"), dans le cadre de l'Accord de coopération technique entre la Confédération Suisse et la République du Mali, s'engagent à réaliser conjointement le Projet présent et conviennent à cet effet de ce qui suit :

ARTICLE 1 : Objectif général du projet

Le Gouvernement du Mali, ainsi que les organisations internationales comme la FAO et l'ICRISAT, ont signalé depuis des années le problème de l'insuffisance chronique de productions vivrières en zone de savane. L'urgence des efforts à entreprendre pour élever la productivité et finalement atteindre un approvisionnement autonome qualitatif et quantitatif a été soulignée après la série de sécheresses généralisées qui ont frappé le Sahel et les régions voisines. Dans le cadre de ces efforts le but du Projet consiste dans l'amélioration de la productivité en premier lieu du mil et éventuellement du sorgho. Puisqu'il s'agit des céréales de base dans les zones les plus défavorisées, ces cultures couvrent des centaines de milliers d'hectares au Mali ; en outre le rendement est bas et la teneur en protéine est faible, cet objectif prend une place de premier choix dans le plan malien de développement. Le mil et le sorgho étant cultivés sur de petits champs, les petites exploitations devraient être les premiers bénéficiaires du Projet par la mise à leur disposition des variétés améliorées et de techniques culturales adaptées.

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ARTICLE 2 : Objectifs spécifiques du Projet.

Le Projet vise, dans le cadre d'un programme national de Recherche et de développement :

- à promouvoir différentes méthodes de sélection destinées à la création de variétés de mil (et subsidiairement d'autres espèces, p. ex. du sorgho) hydrides synthétiques ou composites avec les qualités suivantes :
- meilleure adaptation à la zone semi-aride,
- rendement plus élevé que les variétés locales,
- haut pourcentage en protéine,
- résistance ou tolérance aux maladies et parasites,
- bon comportement à la sécheresse,
- cycle de végétation adapté
- goût acceptable
- à élaborer des techniques pour la production de semences de base à partir de ces cultivars. La multiplication semencière au-delà des semences de base est cependant exclue du Projet,
- à développer les techniques agricoles pour un meilleur usage des variétés ainsi crées et à consulter les cultivateurs sur ces technocologies.

ARTICLE 3 : Gestion du Projet.

Pendant la phase de recherche et de production (2e phase) le Projet est géré conformément aux règles de gestion des structures de recherche du Mali.

Un comité de surveillance et de contrôle sera créé pour coordonner et contrôler les activités du projet.

La composition de ce comité est definie dans l'annexe 1.

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ARTICLE 4 : Engagements des parties contractantes

1. La Fondation s'engage,

1.1 à participier, sauf obstacles de force majeure, à la réalisation du Projet et de ses objectifs,

1.2. à construire les installations conformément à l'Annexe I

1.3. à fournir l'équipement requis pour l'exécution du Projet conformément à l'Annexe I,

1.4. à mettre à la disposition du Gouvernement du Mali un Ingénieur Agronome qui assurera la gestion du fonds pendant la 1ère phase et siégera en tant que représentant de la Fondation au sein du comité de surveillance et de contrôle pendant la 2è phase.

1.5. à mettre à la disposition les services, l'exportise et les conseils des chercheurs de la section amélioration semences de CIBA-GEIGY S.A., Bâle, conformément au programme approuvé du Projet et autant que disponible,

1.6. à faire visiter le Projet une (ev. deux) fois par an par un spécialiste en génétique pour évaluer les résultats et pour aider à établir le projet de programme de recherche,

1.7. à former un sélectionneur malien dans une des stations de recherche et de développement de semences de CIBA-GEIGY S.A., ou dans une autre station choisie par les deux parties contractantes,

1.8. à effectuer des analyses de protéines pendant la durée du Projet,

1.9. à prendre à sa charge les frais de fonctionnement énumérés dans l'Annexe I.

1.10. Les engagements de la Fondation pour les prestations énumérées sous article 4, 1.2. et 1.3. sont limités à un maximum de 153 Millions de francs Maliens (FM),

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Les engagements devraient être terminés 24 mois après l'approbation du Projet. Une fois terminés la propriété des installations sera transférée au Gouvernement du Mali.

1.11. Les engagements de la Fondation pour les prestations énumérées sous article 4, 1.4., 1.5., 1.6., 1.7., 1.8., sont limités à un maximum de 37 Millions de FM par an.

1.12. Les engagements de la Fondation pour les prestations énumérées sous article 4, 1.9. sont limités à un maximum de 44,5 Millions de FM par an pour les premiers six ans du fonctionnement du Projet.

1.13. Après 6 ans de fonctionnement, le Projet entier sera transféré au Gouvernement du Mali.

2. Le Gouvernement du Mali s'engage

2.1. à mettre à disposition du Projet le personnel malien nécessaire énuméré dans l'annexe I,

2.2. à fournir au Projet tous les autres agents requis pour la bonne exécution,

2.3. à reprendre les frais de fonctionnement du Projet à partir de la fin de l'Accord,

2.4. à concourir à la bonne marche du Projet en lui assurant la jouissance des infrastructures générales ainsi que la collaboration du personnel des services compétents,

2.5. à mettre à disposition du Projet le terrain nécessaire (100 ha environ), ainsi que deux villas pour le logement du personnel.

2.6. à exonérer le matériel importé dans le cadre du Projet des taxes fiscales et douanières selon la règlementation en vigueur en République du Mali,

ARTICLE 5 :

1. L'état du Mali, représenté par le Ministère du Développement Rural du Mali, sera employeur du personnel malien.

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La Station sera implantée dans la zone semi-aride et fera partie des structures de Recherche du Ministère du Développement Rural.

2. Le Ministre du Développement Rural confie la gestion du Projet pendant la première phase d'environ 2 ans à la Fondation qui nomme un Chef de Projet.

Pour la 2è phase, le représentant de la Fondation siègera au sein du comité de surveillance et de contrôle en qualité d'expert agronome.

ARTICLE 6 : Régime fiscal et douanier.

1. Les biens matériels, matériaux et équipements qui devront être importés pour la réalisation du Projet seront soumis au régime de l'admission en franchise des droits et taxes conformément à la règlementation en vigueur en République du Mali.

2. Les coopérants expatriés qui seront mis à la disposition du Projet par la Fondation ainsi que les membres de leur famille seront exonérés de tous impôts directs et taxes assimilées.

3. Les effets et objets personnels des coopérants expatriés et de leurs familles bénéficient de l'exemption fiscale et de la franchise douanière à l'implantation et à l'exportation conformément à la règlementation en vigueur en République du Mali. Ce privilège ne s'applique pas aux boissons, cigarettes et denrées alimentaires.

4. Les coopérants expatriés qui importeront ou achèteront sur place un véhicule privé bénéficieront du régime de l'importation temporaire conformément à la règlementation en vigueur en République du Mali.

5. Les contrats et marchés passés dans le cadre de l'exécution du présent accord dont exonérés de tous droits de timbres et d'enregistrement.

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ARTICLE 7 : Modalités d'exécution.

1. La gestion de la totalité des fonds mis à la disposition du Projet (phase II) sera faite sous le contrôle du Comité de surveillance et de contrôle désigné par le Ministre du Développement Rural.

2. La Fondation est responsable de la gestion des fonds du matériel et des équipements pendant toute la 1ère phase du projet.

3. Les crédits correspondant aux frais de fonctionnement (2à phase) seront virés par tranches dans un compte ouvert par le Ministère du Développement Rural auprès de la Banque de Développement du Mali. Ce compte fonctionnera sous la signature conjointe d'un représentant désigné par le Ministre du Développement Rural et du représentant de la Fondation.

4. Les détails de l'exécution et de l'opération du Projet sont définis dans l'Annexe I, qui fait partie intégrante du présent accord.

ARTICLE 8 : Déroulement du Projet.

Le Projet est conçu en deux phases :

1ère phase : phase de construction - 2 ans environ

2ème phase : phase de recherche et de production de semences de base six ans à partir du commencement de la recherche; c. à. d. dès que les conditions matérielles le permettront.

Après la 2ème phase le Projet entier sera transféré au Gouvernement du Mali.

ARTICLE 9 : Modification de l'accord et règlement de différends

Toute modification du présent accord devra faire l'objet d'un échange de lettres entre les parties contractantes.

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ARTICLE 10 : Entrée en vigueur et Durée de l'Accord

Le présent Accord entre en vigueur dès sa signature pour une durée de deux (2) ans. Il sera reconduit jusqu'à la fin de la 2ème phase, sous réserve d'une dénonciation par écrit de l'une ou l'autre des deux parties contractantes avec un préavis de trois mois.

Fait à Bamako, le
en double exemplaires en français.

Pour la Fondation

Le Directeur

Dr. H. P. KOECHLIN

Pour le Gouvernement du Mali

Le Directeur Général de la
Coopération Internationale

Ousmane DIALLO

Annex 1 de l'Accord Fondation Diba-Geigy - Gouvernement du Mali

Entre la Fondation CIBA-GEIGY pour la coopération avec les Pays en voie de développement (ci-après désigné "Fondation "),

Et le Gouvernement de la République du Mali (ci-après désigné " Gouvernement du Mali "),

Concernant le Projet d'implantation d'un centre de recherche sur l'amélioration et la multiplication de semence de base de mil et éventuellement du Sorgho au Mali (ci-après désigné " Projet ").

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PARTIE I : Matériel et Investissements

1. Définitions

Le matériel, l'équipement et les investissements du Projet visé par le présent article sont ceux, sur lesquels la Fondation et le Gouvernement du Mali se sont mis d'accord et dont les listes sont jointes à la présente (pièce jointe 1).
D'un commun accord des modifications éventuelles pourraient être apportées à ces listes.

2. Commande du Matériel

La Fondation a la responsabilité de la commande du matériel retenu en consultant le Gouvernement du Mali.

3. Paiement du Matériel

Le coût du matériel rendu BAMAKO sera réglé par la Fondation à partir de la Suisse.

4. Assurance durant le Transport

Durant son transport, le matériel est assuré par la Fondation.

5. Réception du Matériel

Avant l'expédition du matériel faisant l'objet des contrats de fourniture, il sera procédé à une réception technique par la Fondation. A son arrivé à BAMAKO, le matériel sera réceptionné par le représentant de la Fondation CIBA et un représentant du Gouvernement du Mali qui adressera à la Fondation un accusé de réception détaillé faisant, le cas échéant, état des dommages et des pertes survenues en cours de transport.

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6. Statut du Matériel

Le Projet reste propriétaire du matériel jusqu'à ce qu'un accord de transfert soit conclu entre la Fondation et le Gouvernement du Mali.

PARTIE II : Personnel

7. Personnel expatrié et comptable responsable

1. Le recrutement du personnel expatrié engagé nouvellement incombe à la Fondation. Pour pouvoir être engagés, les candidats devront avoir été agréés par le Gouvernement du Mali.

2. La rétribution du personnel expatrié, toutes charges et frais de voyage compris, incombe à la Fondation.

3. Le personnel expatrié comprendra un ingénieur agronome, (chef du Projet pendant la 1 phase)..

4. L'Agent cité ci-dessus recevra un cahier des charges décrivant ses tâches et ses compétences de façon détaillé. Ces documents seront préparés par le Gouvernement du Mali conjointement avec la Fondation et devront être agréés et contre-signés par les interessés.

5. Les règles de cet article 7 s'appliquent aussi au comptable responsable Malien.

8. Personnel Malien

1. Le Gouvernement met à la disposition du Projet le personnel malien nécessaire à sa réalisation. La liste du personnel malien du Projet est jointe à la présente (pièce jointe 3).

2. L'ensemble de tout le personnel malien est à la charge du Gouvernement du Mali en ce qui concerne les salaires. Les indemnités et primes sont à la charge de la Fondation.

3. Les homologues des coopérants devront tous posséder, chacun dans leur domaine une formation de base suffisante pour pouvoir assumer seuls les responsabilités des coopérants expatriés au terme du projet.
Le personnel devrait être rôdé.

PARTIE III : Frais de Construction et de Fonctionnement

9. Le financement des frais de construction et du matériel acheté sur place se fera à partir d'un compte spécial que le Ministère du Développement Rural ouvrira auprès de la Banque de Développement du Mali à Bamako.

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10. Tous les frais de fonctionnement du projet, comme ils sont énumérés dans la pièce jointe 2 sont, pendant la durée du Projet, conformement aux articles 5 et 10 du présent accord, entièrement à la charge de la Fondation.

Toute modification importante dans l'exécution du budget devra être auparavant approuvée par le Comité de Surveillance et de contrôle.

Le contrôle de la gestion comptable incombera au Comité de Surveillance et de contrôle. Il sera assuré conformément à la règlementation en vigueur du Mali.

A la fin de chaque année, cette comptabilité, accompagnée des pièces justificatives correspondantes, sera envoyée à la Fondation par le Ministère du Développement Rural.

La Fondation a le droit d'exiger toutes les informations sur la comptabilité et de procéder à des expertises comptables du projet.

PARTIE IV . Principes Généraux d'organisation et de Fonctionnement :

11. La Station sera soumise aux règles générales de fonctionnement des Centres et Stations de Recherche Agricoles du Mali.

Elle sera dirigée par un Ingénieur Agronome malien.

Le Comité de surveillance et de Contrôle sera constitué comme suit :

Président : Le Chef de la Section de Recherche sur les Cultures Vivrières et Oléagineuses (SRCVO)

Membres: Le Directeur de la Station

Le représentant de la Fondation

Le Comptable de la Station

Ce Comité a les tâches suivantes :

- Etablissement de la proposition de programme de recherche,
- Proposition du budget des frais de fonctionnement,
- Evaluation des activités et contrôle financier.

PARTIE V : Projet de programme technique et budget :

12. 1°) - La proposition de Programme sera préparée par le Directeur du Centre de recherche et soumis au Comité technique du CNRA, Comité de surveillance et de contrôle, à la Fondation.
- Adoptée par le C.N.R.A.

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2) - De même la proposition de budget sera préparé par le Directeur du Centre, approuvé par le Comité de surveillance et de contrôle. Il sera ensuite soumis à la Fondation avant d'etre examiné et adopté par le Comité National de la Recherche Agronomique - (Commission Financière).

13. Les frais de construction (1ère phase) sont à contrôler par le représentant de la Fondation conformément au Code de frais de construction de CIBA - GEIGY adapté aux conditions maliennes.

Partie VI : Calendrier d'exécution

14. Les différentes étapes de la mise en route du Projet à partir de la signature de l'accord sont énumérées dans la liste " Calendrier " qui est jointe au présent accord (pièce jointe 4).

Le représentant de la Fondation devra se conformer aux directives générales du Gouvernement du Mali et agir en collaboration étroite avec lui et plus particulièrement avec l'Institut d'Economie Rurale (IER).

Bamako, le

Pour la Fondation

Pour le Gouvernement du Mali

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Matériel et Investissements — **Pièce jointe 1.**

1. Installation et édifices	Millions FM
- Laboratoire et bureaux	20
- Bâtiments de stockage et préparation des engrais et pesticide + chambre froide	20
- Hangar et garage 1[illegible] m²	9.5
- Air de séchage et de battage (200 m²)	6
- 1 case gardien	2
- Clôture 50 ha	10
- Puits citerne	3
- Groupe électrogène (40 KVA) + local	10,5
Total Installation et édifices	81

2. Equipement	
- 2 Toyota	10
- Camionnettes 404	6.5
- 1 Tracteur IF 650	6
- 1 Gyrobroyeur	3
- 1 Matériel de culture attelée	2
- Mobilier de bureau	3
- Equipement pour chambre froide	6
- Equipement pour irrigation par aspersion	10
- Matériel de pesée	2.5
- Equipement pour le laboratoire de génétique	3
- Outillage mécanique	2
Total Equipement	55
Imprévu	17
Total Matériel et Investissement	15[illegible]

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Pièce jointe 1

Deuxième Etape	Millions FM.
- Clôture [illegible]	[illegible]
- Campement	2[illegible]
- Car transport de personne	[illegible]
- 2 maisons d'habitation	[illegible]
TOTAL	12,5

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Piece jointe 2.

Frais de Fonctionnement (Annexe article 3)

	Millions FM	
1. Personnel		
- Main d'oeuvre saisonnière (50 x 7 mois)	5.5	
- Primes de recherche + indemnités de déplacement	7.0	
- Charges sociales	1.0	
- Pharmacie - Vêtement de travail	1.0	14.5
2. Matières consommables		
- Engrais - Pesticides - Herbicides	1.0	
- Sécherie	1.0	
- Carburant - Lubrifiants	8.0	
- Pièces de rechange et matériaux	2.0	12.0
3. Travaux fourniture et service extérieur		
- Entretien et réparation	3.0	
- Travaux effectués par des tiers	1.0	
- Documentation	1.0	5.0
4. Frais divers de gestion		
- Fourniture de bureau et frais postaux		3.0
		34.5
- Imprévu		10.0
Total Frais de Fonctionnement		44.5

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Pièce jointe 3.

Personnel malien (Article 8.1.)

- 1 Agronome Sélectionneur : Directeur de la Station
- 1 Agronome
- 1 Comptable
- 4 Techniciens
- 6 Moniteurs

- 1 Secrétaire + Planton
- 1 Magacinier
- 1 Mécanicien
- Chauffeurs
- Gardiens
- 1 Tractoriste.

Pièce jointe 4.

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Calendrier d'Exécution

(Article 14)

Les différentes phases de la mise en route du projet à partir de la signature de l'accord seront les suivantes :

Signature de l'Accord : Juillet 1979

1ère phase :

Phase de construction 1979 - 1981 (jusqu'à deux ans environ)

Juillet 1979
- détermination d'un terrain adéquat pour la station
- recrutement du personnel nécessaire pour la 1ère phase
- élaboration des plans et des devis pour les constructions
- élaboration d'un plan d'étape pour les constructions avec budget d'investissements

Juillet 1979

1ère étape de construction

Mai 1980 - Juin 1981

2ème étape de construction

2ème phase :

Phase de recherches et de production

Dès la fin de la première étape de construction, environs Juin 1980, commencement de la phase de recherche (suivant les possibilités).

Dès la fin de la deuxième étape de construction, environ mai 1981, phase de recherche et de production. Durée 6 ans à partir de la fin de construction (environ 1986/87).

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BUDGET

Annex H

USAID financing is as follows:

I.	**Technical Assistance:**		
	(a) Long-Term (48 pm).....	$ 180,000	
	(b) Short-Term (3 pm).....	10,000	
	TOTAL.....		$190,000
II.	**Commodities:**		
	1. Vehicles.....	$ 15,000	
	2. Lab equipment and field equipment.....	10,000	
	3. Workshop tools and equipment.....	5,000	
	TOTAL.....		$ 30,000
III.	**Construction and Land Development:**		
	1. Laboratory and Agronomic Office ($170m^2$)..	$ 75,000	
	2. Meteorological station.....	5,000	
	3. Stable, holding pens, feed store.....	10,000	
	4. Site prospection.....	12,000	
	5. Land development.....	20,000	
	TOTAL.....		$122,000
IV.	**Other Costs:**		
	1. Research Operations and Supplies.....	$ 105,000	
	TOTAL.....		$105,000
V.	**Contingency and Inflation:**	53,000	53,000
	GRAND TOTAL.....		$500,000

ANNEX H

Foundation Ciba-Geigy will provide the following:

I. Construction:

Genetic laboratory and offices (x 6)	$ 46,512	
1. Supply building	46,512	
2. Garage/workshop/hayloft	22,093	
3. Threshing/drying floor	1[illegible],953	
4. Guard quarters	[illegible],651	
5. Fencing (50 ha)	23,256	
6. Well cistern	6,977	
7. Generator (40 KVA)	24,419	
TOTAL		$188,373

II. Commodities:

1. 2 four-wheel drive vehicles	$ 23,256	
2. 2 pick-up trucks	15,116	
3. Tractor	18,605	
4. Rotary mower	4,651	
5. Animal traction equipment	4,651	
6. Office furnishings	6,977	
7. Cold room equipment	13,953	
8. Irrigation equipment	23,259	
9. Scales	5,814	
10. Genetic lab equipment	6,977	
11. Mechanics tools	4,651	
SUB-TOTAL		$127,910
Contingencies:	$ 39,535	39,535
TOTAL		$167,445

III. Operating Expenses:

1. Personnel

--Seasonal workers (50 x 7 months)	$ 12,791	
--"Primes et indemnités"	16,279	
--Social Security payments	2,326	
--Medical	2,326	
SUB-TOTAL		$ 33,822

2. Consumables

--Fertilizers, pesticides, herbicides	$ 2,326	
--Sacks	2,326	
--Fuel	18,605	
--Spare parts and equipment	4,651	
SUB-TOTAL		$ 27,908

3. Supplies and Service

--Maintenance and repair.....	$ 6,977	
--Third party work.....	2,326	
--Printing services.....	2,326	
SUB-TOTAL.....		$ 11,629

4. Miscellaneous

--Office supplies.....	6,977	
Contingencies.....	23,256	
TOTAL.....		$103,492
GRAND TOTAL.....		$459,300

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ANNEX I

MINISTERE DES AFFAIRES ETRANGERES
ET DE LA COOPERATION
INTERNATIONALE

DIRECTION GENERALE DE LA
COOPERATION INTERNATIONALE

Rec'd 7/27/79 at Embassy

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JUL 30 1979

REPUBLIQUE DU MALI
Un Peuple - Un - But - Une - Foi

Chg — mtg; USAID (originals) CLL (copies)

Koulouba, 25 JUIN 1979 19

N° 2332 /MAEC/DGCI/DCEB/S1

Le Ministre des Affaires Etrangères
et de la Coopération Internationale

à Monsieur le Directeur de l'USAID

- BAMAKO -

Monsieur le Directeur,

J'ai l'honneur de vous faire parvenir ci-joint la lettre n° 0998/MDR - IER du 13 - 7 - 79 relative au financement du programme recherche et participation à l'Installation d'une station en zone Semi-Aride.

Je vous en souhaite bonne reception et vous renouvelle les assurances de ma haute considération.

POUR LE MINISTRE P/O
LE DIRECTEUR GENERAL DE LA
COOPERATION INTERNATIONALE p,i

Alpha Abdoulaye SOW.-

LD/JMD
MINISTERE
DU DEVELOPPEMENT
RURAL

INSTITUT
D'ECONOMIE RURALE

RECHERCHE AGRONOMIQUE

8998 /MDR.IER

JUL 30 1979

-77-

REPUBLIQUE DU MALI
UN PEUPLE - UN BUT UNE FOI

90

Bamako le 13 JUIL. 1979

Le Ministre du Développement Rural

à Monsieur le Représentant de l'U.S.-A.I.D.
à BAMAKO

S/C de Monsieur le Ministre des Affaires Etrangères et de la Coopération Internationale à KOULOUBA

OBJET: Financement poursuite programme recherche et participation à l'installation d'une Station en Zone Semi-Aride.-

Monsieur le Représentant,

Dans le cadre du Projet ICRISAT/MALI financé par l'USAID et arrivant à terme le 30 Juin 1979, j'ai l'honneur de vous demander de bien vouloir prendre les dispositions nécessaires en vue d'une continuation de ce Projet dont l'intérêt pour le développement de la production céréalière en zone semi-aride du Mali n'est plus à démontrer.

Les résultats déjà acquis étant partiels, une poursuite des diverses expérimentations entreprises me paraît indispensable.

Je vous serais par ailleurs obligé d'une participation financière de l'USAID à l'installation de la nouvelle Station de recherche sur mils et sorghos prévue en zone semi-aride (Ségou), pour laquelle un accord va être signé entre la Fondation CIBA-GEIGY et le Gouvernement du Mali et sur laquelle l'ICRISAT mènera ses prochains programmes de recherches.

En vous remerciant d'avance pour cette très précieuse aide, je vous prie d'agréer, Monsieur le Représentant, l'assurance de ma considération distinguée.-

P/LE MINISTRE DU DEVELOPPEMENT RURAL,
LE DIRECTEUR DE CABINET,

Ministère du Développement Rural - Rép. Mali
Le Directeur de cabinet

Dr Ibrahimaoar Sada SY.-

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE

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

PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: Mali

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 DIGITS): 688-0219

6. BUREAU/OFFICE: A. SYMBOL AFR; B. CODE 06

7. PROJECT TITLE (MAXIMUM 40 CHARACTERS): Semi-Arid Tropics Research

8. PROPOSED NEXT DOCUMENT: A. 3 (2 = PRP, 3 = PP); B. DATE MM YY 05 79

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 79; b. FINAL FY 80

10. ESTIMATED COSTS ($000 OR EQUIVALENT, $1 = 425)

FUNDING SOURCE		PROJECT
A. AID APPROPRIATED		500
B. OTHER U.S.	1.	
	2.	
C. HOST COUNTRY		90
D. OTHER DONOR(S)		406.5
	TOTAL	996.5

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. FIRST FY ____ F. GRANT	E. FIRST FY ____ G. LOAN	LIFE OF PROJECT H. GRANT	LIFE OF PROJECT I. LOAN
(1) SH	211	967		324		500	
(2)							
(3)							
(4)							
			TOTAL	324		500	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

13. SPECIAL CONCERNS CODES (MAXIMUM SIX CODES OF FOUR POSITIONS EACH): 111

14. SECONDARY PURPOSE CODE: 080

15. PROJECT GOAL (MAXIMUM 240 CHARACTERS)

To improve small farmer productivity and increase their incomes.

16. PROJECT PURPOSE (MAXIMUM 480 CHARACTERS)

To develop a series of technical packages from adaptive research done with sorghum/millet and certain grain legumes in the 400-1000 mm rainfall zone and to make them available through the crops operations and livestock projects to farmers and herders.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

NONE

18. ORIGINATING OFFICE CLEARANCE

Signature

Title

Date Signed MM DD YY

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

AID 1330-2 (2-76)

ACRONYMS

ARS	Action Riz-Sorgho
CMDT	Compagnie Malien pour la Developpement de Textiles
ECIBEV	Establishment for Credit and Investment in the Livestock and Meat Sector
FCG	Foundation Ciba-Geigy
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d'Economie Rurale
ILCA	International Livestock Center for Africa
OACV	Operation Arachide et Cultures Vivrieres
OHV	Operation Haute Vallée
OMBEVI	Office Malien du Betail et de la Viande (Meat Marketing Board)
OMM	Operation Mils-Mopti
SAFGRAD	Semi-Arid Food, Grain Research and Development
SRCVO	Section de Recherche sur les Cultures Vivieres et Oleagineuses (Food crops and oilseed crops)

I. SUMMARY OF THE PROBLEM AND BACKGROUND

Mali, though one of the poorest countries of the world, was a net exporter of food until the middle 60's. Because of the drought years, from 1968 to 1974, Mali became a net importer of food. With recovery from the drought, it is now producing enough cereals to meet basic food needs when the rains are sufficient, and has demonstrated potential for producing a surplus. A high rate of population growth (2.5% per annum) and a high rate of outmigration from rural communities are reasons why Mali must look for ways to increase its agricultural productivity. Several factors threaten Mali's future capability to feed itself or meet its potential for producing a surplus. Among these are, use of traditional farming methods for cultivation (hand hoe) and use of traditional cereal seed varieties.

In the area of cereal production, sorghum and millet represent more than 70% of Mali's cereal production. These two cereals are grown for the most part in the 400-1000 mm rainfall zones of Mali which are classified as the semi-arid tropics. For significant increases in crop yields, the use of chemical fertilizers would be highly desirable, but Mali itself, and the entire farming community of the country, cannot afford the cost. Other inputs therefore must be southt to increase yields. This project proposed to develop improved varieties of sorghum and millet and to introduce improved agronomic practices by means of adaptive research closely tied to field trials and extension services to farmers.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) proposes to conduct research for two years in the Sudano-Sahelian zone, which comprises areas of less than 1000 mm rainfall per year, and the principal millet and sorghum growing areas of Mali. (Until now, ICRISAT has been conducting its research in Mali in rainfall areas greater than 1000 mm per year.) ICRISAT will collaborate with the Swiss Foundation Ciba-Geigy which has agreed to provide parallel funding with USAID to this project. At the request of the GRM, the research will be conducted in the 4th Region, not far from Segou. There a research station will be built where ICRISAT can conduct trials designed to improve the quality and quantity of crops of the semi-arid tropics and to develop ways to stabilize and increase food production through improved farming practices, at the same time helping Mali meet its basic food needs.

II. PROPOSED PROJECT

It is proposed that a two-year grant for $500,000 be given to ICRISAT/Mali to do research in selected rainfall areas of Mali's semi-arid tropics with sorghum, millet, and selected grain legumes. The project would be done by an agronomist and a plant breeder and their GRM colleagues plus a small staff of technical assistants. The Ciba-Geigy Foundation of Switzerland will also contribute financing for two years for this project.

The overall gramework of the proposed project is as follows (see Annex A for logical framework matrix):

(a) Goal: To improve small farmer productivity and increase their income.

(b) Purpose: To assist the GRM to develop a series of technical packages from adaptive research done with sorghum/millet and certain grain legumes in the 400-1000 mm rainfall zone, and to make them available through operations and livestock projects to the small farmers and small herders.

(c) Outputs: There will be two types of outputs. One set of outputs will be research relevant to agronomic practices while the other set will concern research done in plant breeding. Agronomic outputs will be methods for the more efficient use of intercropping, animal traction techniques and equipment, locally available organic and natural fertilizers, livestock fodder production feed-grade with sorghum/millet (to avoid criticism concerning deversion of human foods to livestock feeds) and selected legumes, fallow-period management for soil fertility regeneration and fodder production, crop and soil management and watershed management. Plant breeding outputs will be the growing and selecting of more efficient sorghum/millet cultivars which better resist the major diseases and insect pests.

(d) Inputs: Technical assistance needed for the project will be an agronomist and a plant breeder. Commodities and construction are needed for the establishment and maintenance of a research station with the prescribed climatic conditions.

(e) End of project status: There will be an operating research station carrying out research of varietal improvements and farming systems for sorghum/millet and selected legumes. This station will maintain continuous linkages between itself and other research and training organizations like SAFGRAD which conduct field trials and with extension services of crop and livestock production projects (i.e., OMM, OHV, CMDP, OACV, OMBEVI, ILCA, Kayes-Nord) which serve individual farmers. Finally, the station will have developed a body of literature on sorghum/millet and selected legumes. (See Annex B for organization of research and field trials system).

III. RELATIONSHIP OF THE PROJECT TO THE CDSS

This project falls within the scope of USAID/Mali's objectives. The long-range objective is to provide assistance to efforts that contribute to selected national needs (in this case help Mali reach national self-sufficiency in basic cereals) that have direct and specific impact on the people. The ICRISAT proposal is a response to the GRM's Institut d'Economie Rurale (IER), which has requested that research in sorghum, millet, and selected legumes be conducted in a rainfall zone that most closely approximates where these crops are largely grown. Both the IER and USAID/Mali assign this project high priority because adaptive research results can find their way into farmers' fields quickly as a result of various linkages (see Section VII, Overview) and can be obtained at a nominal cost.

This project can also meet a need of the small herders whose cattle comprise one of Mali's richest resources. The Mission has had wide-ranging involvement with Mali's livestock system since the mid-1970's. Now it is designing a comprehensive program of assistance for the livestock sector that will likely continue through the decade of the '80's. This project will help solve one of the biggest constraints to the production element of the livestock sector by developing cultivated forage for beef and draft animals. Forage feed suited for the Embouche Paysanne sub-activity of the Livestock project will allow this small farmer feeder program to expand to meet the demands of the small farmers. Forage suited for draft animals will allow farmers to adequately feed these animals through the end of the dry season, giving them enough strength to plow fields after the rains have begun and allowing farmers to increase numbers of draft animals as needed. No Malian or other donor funded research is being conducted to relieve this critical livestock feed constraint. ICRISAT's experience in millet and sorghum variety and cultural technique development is ideally suited to address this problem.

In the Malian development context, USAID believes cooperation with other donors is both desirable and necessary. Long-term planning and programming by USAID cannot realistically be accomplished without other donor coordination and collaboration. The proposed project includes participation from Ciba-Geigy, the Swiss private foundation, which has committed itself to financing 45 percent of the two-year project with a possibility of continuing financing over a period of six years.

IV. DISCUSSION OF AID POLICY ISSUES

This project is a small discrete activity that poses two possible major policy issues that will have to be addressed in the final submission of the proposal. This first issue is whether the GRM will be able to sustain this research facility beyond the life of the project. Mali is critically short of capital funding for projects. Whether the GRM will maintain its high priority for this type of a project when it has to furnish the financing once outside donor financing has ended is important. If ICRISAT continues to produce results that benefit Mali, the GRM will be able to

provide its scarce resources necessary to continue ICRISAT's work. ICRISAT has been able to create a great reservoir of goodwill for itself because it has broken down the stereotype within offices of the government that research is something done for its own sake without any benefits for the government or the people. Government officials are beginning to be able to make distinctions with research, and ICRISAT is seen as doing research that has immediate application. USAID/Mali recognizes that research is a long-term undertaking, but the Mission proposes an evaluation near the end of this grant which will try to determine how revenue can be raised that will help pay for this kind of research. We will attempt to assess the feasibility of adding a small fee onto the operations' credit fund to generate revenue and of adding a fee on the price paid to the farmer which can be passed on eventually to the consumer. If either approach seems workable, a means will be available for the GRM to help bear some of the cost of research.

A second issue is the form and role which the ICRISAT/outreach program is to take generally in West Africa. There has been considerable discussion of establishing required "sub-centers" in one or two key locations in the area. As envisioned, these sub-centers would directly serve ICRISAT/Central's research needs and only indirectly those of the national programs. The ICRISAT Quinquennial Review Committee, which met in October, 1978 in Ouagadougou and Dakar, recommended a go slow, wait and see, approach to this idea. It was their contention that the various ICRISAT/National programs should be allowed to mature before the sub-center idea is further considered. The Mission's view is that the proposal described in this PID is a national research program which draws on the research results from ICRISAT's Central and Regional programs, and therefore, can be properly funded in part from AID bilateral program funds. This issue was discussed in the telegram exchanges included as Annex C hereto.

The research station proposed in this paper is to be part of the national program, and is thus in accordance with the recommendations of the ICRISAT Quinquennial Review Committee. It remains to be determined how large a role ICRISAT/Central sees itself playing, and how AID should expect it to participate in the effort. Until now, ICRISAT/Central has not accepted any responsibility for directly funding its outreach programs. Financing for their programs in West Africa has been provided by UNDP, except in Mali, which has been USAID funded.

V. ESTIMATED PROJECT COST

The total cost for this two-year project will be $996,500. AID's share of the costs will be $500,000, Ciba-Geigy Foundation will fund $406,500, and the GRM will contribute $90,000.

The GRM will provide the land for the proposed research facilities and the ICRISAT office (about $50,000) and will pay the salaries of the entire Malian professional staff except for the accountant (about $40,000).

USAID financing will provide the following:

I.	Technical Assistance:		
	(a) Long-Term (48 pm)	$ 180,000	
	(b) Short-Term (3 pm)	10,000	
	TOTAL		$190,000
II.	Commodities:		
	1. Generator 40 kvg	$ 25,000	
	2. Vehicles	10,000	
	3. Lab equipment and field equipment	10,000	
	4. Workshop tools and equipment	5,000	
	TOTAL		$ 50,000
III.	Construction and Land Development:		
	1. Garage workshop (200 m^2)	$ 35,000	
	2. Guard house	5,000	
	3. Meteorological station	5,000	
	4. Stable, holding pens, feed store	10,000	
	5. Site prospection	12,000	
	6. Land development	20,000	
	7. Well and water tower	10,000	
	TOTAL		$ 97,000
IV.	Other Costs:		
	1. Animal traction	$ 20,000	
	2. Research	60,000	
	3. Operating expenses	25,000	
	TOTAL		$ 105,000
V.	Contingency and Inflation:	$ 58,000	$ 58,000
	GRAND TOTAL		$ 500,000

Ciba-Geigy proposes the following costing for their role in the project:

1. Construction

a.	Genetic laboratory, 50 m^2	$ 12,850	
b.	6 offices, 10m x 12m = 120 m^2	30,374	
c.	Supply building and preparation for fertilizers	28,037	
d.	Cold rooms, 16 m^2	4,673	
e.	Drying and threshing equipment	7,009	
f.	Encampment	46,729	
g.	Fenced areas	23,365	
	TOTAL		$ 153,037

2. Commodities

a.	2 four wheel drive vehicles	$ 28,037	
b.	2 pickup trucks	16,355	
c.	1 tractor	18,692	
d.	Farming implement	14,019	
e.	Office furniture	11,682	
f.	Laboratory equipment	39,720	
g.	Weighing material	4,673	
	TOTAL		$ 133,178

3. Personnel

a.	Seasonal labor (50 x 7 months)	$ 12,850	
b.	Accountant	4,673	
c.	Primes and Social Security	14,018	
	TOTAL		$ 31,541

4.	Operating Costs	$ 40,885	$ 40,885
5.	Contingency	$ 7,009	$ 7,009
	GRAND TOTAL		$ 406,542

VI. PROJECT PREPARATION STRATEGY

USAID/Mali has received a project proposal from ICRISAT/Mali. Since the cost of this proposal is $500,000, which qualifies the proposal components as a small project, the document replaces the project paper. Once AID/W approves the PID and the Mission receives AID/W comments, a project design group will take about three weeks to review and revise the proposal, as necessary, and prepare approval documents. Members of this group will be Randall Casey, Assistant Program Officer; Maurice Fleming, Agricultural/Education Officer; Lee Hall, Agricultural Economist, and Larry Harms, Livestock Advisor. The proposal will then be submitted to the Mission project review committee which will review and recommend action. This committee will be chaired by George T. Eaton, Assistant Director, with membership consisting of Michael Dwyre, Program Officer; Myron Smith, Agricultural Development Officer, and Lance Jepson, Assistant Agricultural Development Officer (Crops). Upon approval and recommendation of the project review committee, the Mission Director will approve the project.

At this time. no TDY or consultant studies essential to the further development of this proposal are foreseen.

Since 1976, USAID/Mali has funded under Operation Mils-Mopti (688-0202), as part of the National Research Program, limited support to ICRISAT to conduct its research. Oversight responsibility for this funding support has been exercised by the Project Manager of Operation Mils-Mopti. The Mission feels its present capacity to implement projects is sufficient to manage USAID inputs to this expanded research work. By exercising USAID oversight through the Agricultural Development Officer, who directs the work of USAID project managers of crops and livestock projects, the Mission plans to monitor and informally participate in the dissemination of research results described in the following section (VII Overview).

A source/origin waiver will be required for the procurement of two vehicles and one generator. This waiver will be prepared by the project design group and will be approved by the Mission Director when the project is approved. Laboratory and field equipment will be purchased locally as shelf items.

VII. OVERVIEW

This project proposed to do adaptive research in Mali's Dudano-Sahelian zone conducted by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for the GRM. A plant breeder will improve seed varieties of sorghum and millet whose grains constitute 70% of the national cereal production (85% of which is consumed by the small farmer) and an agronomist will develop better farming systems which means more efficient use of a limited water supply, intercropping, animal traction, and better soil management.

This research will be developed into technical packages at prices that small farmers can afford. Instead of costly new farming inputs, ICRISAT/Mali will be able to furnish new varieties to the farmer. One-half kg of seeds will be enough for a farmer to make a complete change-over to a new variety within a two-year period.

Sorghum and millet research has been conducted in Mali by ICRISAT since 1976, but most of it has been done with a few farmers who are unrepresentative of the majority of small farmers who grow these cereals. The GRM has now asked ICRISAT to conduct all its research in the 400-1000 mm zone of rainfa-l, build a research station on a site that is mutually acceptable and expand its program by adding a plant breeder to complement the agronomist.

The GRM and ICRISAT/Mali have agreed that a research station will be built. The site will be near Segou, which is centrally located for USAID-supported livestock projects and Operation Mils-Mopti. With the station's proximity to these projects, the immediate effects of the research results will reach 8,370 families in several locations. Over time, the new varieties and farming system practices should diffuse to all beneficiaries in USAID project areas that grow sorghum, millet, selected legumes or raise cattle, and to other Malian farmers outside these project areas.

A) Dissemination of Research Results

Technical packages developed by ICRISAT/Mali will be disseminated to individual farmers with 1-20 head of cattle through a formal GRM network that involves three steps. In the first step, research results are presented at the annual meetings of Commission Technique and Comite de Recherche, which serve as the national coordinators for agricultural and livestock research for IER. During these meetings, which are attended by representatives of crops, livestock, and integrated agriculture development projects, officials recommend which results might be disseminated. These recommendations are then discussed by officials in the development projects and they decide what to disseminate. The second step in the flow of information occurs when an operation or livestock project uses its extension service to transfer what ICRISAT has developed. The extension agent is the final step which brings the information to the farmer. (See Annex D.)

An informal side of this GRM process takes place when ICRISAT research personnel informally talk with contacts in the operations or livestock projects about their findings. Knowledge of these findings is transferred by the contacted staff to the crops or livestock extension agents in the field who disseminate the information to individual farmers.

Another informal network has been developed by ICRISAT/Mali with USAID staff who pass on worthy results to the staff of USAID funded operations and livestock projects who in turn disseminate this information to the extension staff.

A third type of informal network through which ICRISAT/Mali disseminates its research results is with SAFGRAD and Cellule des Essais Multiloco which do multi-locational field trials for ICRISAT. These two groups have locations spread around the country in the Sudano-Sahelian zone, and have provisions with individual farmers to test what ICRISAT/Mali has supplied. Through them, ICRISAT/Mali can have its technical packages tested on-site by the farmers who, if convinced of the packages' efficacity, become the best channel to transfer an innovation to other farmers.

B) Relationship to Other Research

The preceding sections describe the project's linkage to ICRISAT/Central and Regional research, its integration with the national research system and its support role to the extension services of the operations. In this context, the Mission foresees a role for this relatively small project in the longer-term strengthening of an integrated system.

The Mali CDSS briefly discusses a long-term approach to establishing an integrated agricultural education and research system closely linked to extension services of production-oriented projects. In January, this Mission stated its interest in participating in the Collaborative Research Support Program in Grain Sorghum and Pearl Millet (CRSP/GS/PM). We believe the CRSP/GS/PM approach could be applied successfully in the Mali context where ICRISAT is already operating. (The state telegram announcement of CRSP and Bamako's response are attached hereto as Annex E).

USAID/Bamako rates the ICRISAT proposal a high priority because expanding its adaptive research will have direct and immediate supporting benefits for existing USAID cereal and livestock production projects, which deliver inputs to small farmers. Moreover, we see the proposal as an important step toward an overall integrated system collaborating with external inputs from the international research system, other donors, and the U.S. research institutions. This system would bring the resources and results of international and U.S. research programs in semi-arid tropical cereals and legumes into the Malian situation, and through a strengthened extension program, to the Malian small-scale farmer.

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TAGS:

SUBJECT: SEMI-ARID TROPICS RESEARCH (688-0219) PID REVIEW

1. THE SEMI-ARID TROPICS RESEARCH PID WAS REVIEWED IN A PROJECT COMMITTEE MEETING HELD MARCH 23 AND ATTENDED BY USAID DIRECTOR LEVIN, AFR/SFWA, AFR/DR, DS/AGR, AND GC/AFR. THE PID IS HEREBY APPROVED BY AA/AFR. PP APPROVAL AND FUNDS AUTHORIZATION WILL BE AT MISSION LEVEL.

2. THERE WERE NO MAJOR CRITICISMS OF THE PROJECT PURPOSE OR OF THE PLANNED IMPLEMENTATION. THE COMMITTEE RAISED THE FOLLOWING AREAS OF CONCERN TO BE ADDRESSED IN THE PP.

A. PID DOES NOT CLEARLY DEFINE THE RELATIONSHIP OF THIS PROJECT TO INCREASED FARM PRODUCTION AND HIGHER INCOME FOR FARMERS AND HERDERS. THE PP (BOTH IN THE NARRATIVE AND LOG FRAME) SHOULD ELABORATE ON THE FOLLOWING: JUST HOW THIS INFORMATION WILL BE DISSEMINATED (PAGE 8 OF THE PID HAS SOME INFORMATION BUT MORE DETAIL IS NEEDED), THE TIME GAP BETWEEN DEVELOPMENT OF THE TECHNICAL PACKAGES AND THEIR ACTUAL DISSEMINATION TO FARMERS, PREVIOUS SUCCESS OF SIMILAR PROGRAMS, MEANS OF VERIFICATION OF USE OF PACKAGES AND ESTIMATION OF ACTUAL INCREASED YIELDS AND HIGHER FARM INCOMES.

B. THE TWO-YEAR TIME FRAME TO REACH PROJECT OBJECTIVES MAY NOT BE LONG ENOUGH. THE PROJECT REVISION SHOULD TAKE INTO ACCOUNT THE POSSIBILITY OF CONTINUATION OF THE PROJECT BEYOND THE TWO-YEAR TIME FRAME.

C. THE LOG FRAME SHOULD ADDRESS THE ATTAINMENT OF MORE PRODUCTION AT THE FARM LEVEL. THE LISTING OF OUTPUTS SHOULD BE MORE PRECISE. THE PACKAGE OF TECHNOLOGY AND THE RESULTS OF ON-FARM TESTS SHOULD BE IDENTIFIED.

D. WITH RESPECT TO TECHNICAL ASSISTANCE, WILL TWO EXPERTS BE ENOUGH TO ACCOMPLISH THE PROJECT'S PURPOSE?

E. WOMEN IN DEVELOPMENT. THE ROLE OF WOMEN IN THE PROJECT SHOULD BE INCLUDED.

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F. THE IEE SHOULD CONFORM TO REG. 16 WITH RESPECT TO THE USE OF PESTICIDES. IT SHOULD LIST THE PESTICIDES BEING USED AND DISCUSS THE EXTENT TO WHICH THEY WILL BE USED. THE RESEARCH EXEMPTION SHOULD BE CITED IF APPLICABLE.

G. THE PP NEEDS TO INDICATE CLEARLY WHO IS IN CHARGE OF THE PROJECT, NOT ONLY ON-SITE BUT IN A GENERAL SUPERVISORY CAPACITY. THE PP SHOULD CLEARLY DELINEATE THE GRM MANAGEMENT AND SUPERVISORY ROLES.

H. THE PP SHOULD INDICATE HOW ALL DONOR CONTRIBUTIONS TO THE PROJECT WILL BE COORDINATED, BOTH WITH RESPECT TO THE DAY-TO-DAY OPERATIONS AND THE CONSTRUCTION AND COMMODITY SUPPLY SCHEDULES. PID WEAK ON SWISS FOUNDATION'S INPUTS AS RELATED TO SPECIFIC ACTIVITIES FINANCED BY AID. AID/W NOW REVIEWING RELATIONSHIP BETWEEN CIBA-GEIGY COMPANY AND FOUNDATION ACTIVITIES. WILL ADVISE.

I. PP SHOULD ADDRESS ISSUE OF RECURRING COSTS AND ASSUMPTION OF FACILITIES BY GRM AT END OF PROJECT.

J. WITH RESPECT TO INCRISAT:

(1) PP NEEDS TO DISCUSS RESPONSIBILITIES OF ICRISAT, IN PARTICULAR WITH RESPECT TO TRAINING AND WORKING WITH HOST COUNTRY COUNTERPARTS.

(2) THE GRM COULD HAVE A HOST COUNTRY CONTRACT WITH ICRISAT FOR PROFESSIONAL SERVICES IF GRANT MADE TO GRM. (AT THIS POINT IT IS UNCLEAR WHETHER ICRISAT HAS BEEN CONTACTED WITH RESPECT TO THIS MATTER.) CONTRACT WOULD REQUIRE APPROVAL OF NEGOTIATION WITH SINGLE SOURCE BY AA/AFR BASED ON ONE OF JUSTIFICATIONS IN HB 11, PARA 2.4.2 AND A SOURCE/ORIGIN WAIVER FOR SERVICES BASED ON HB 11, PARA 2.6.2.3.

(3) IT DOES NOT APPEAR THAT CONTRACT WITH ICRISAT SHOULD INCLUDE RESPONSIBILITY FOR PROCUREMENT OF CONSTRUCTION SERVICES OR A SIGNIFICANT COMMODITY PROCUREMENT.

K. QUESTION WAS RAISED ABOUT RELATIONSHIP OF THIS PROJECT TO WORK BEING DONE UNDER SAFGRAD IN CONDUCTING OF FIELD TRIALS AMONG FARMERS RECEIVING NEW INPUTS. THE PP DESIGN TEAM SHOULD MAKE CLEAR THE DISTINCTION BETWEEN ICRISAT AND SAFGRAD ACTIVITIES.

L. THE GRANT AGREEMENT SHOULD HAVE THE CUSTOMARY CONSTRUCTION CP'S AND A COVENANT REGARDING A WORK PLAN OR OTHER ARRANGEMENTS FOR COORDINATING ALL DONOR INPUTS. VANCE

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