ZAMBIA

AGRICULTURAL DEVELOPMENT, RESEARCH AND EXTENSION (611-0201)

SEP 17 9 29 AM '80

EXECUTIVE SECRETARIAT

SEP 10 1980

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AAA/AFR/DR, ~~John W. Koehring~~ JWKoehring

Problem: Your signature is required for the attached Action Memorandum to the Administrator recommending a grant of $12,515,000 from the Section 531, Economic Support Fund appropriation, to the Government of the Republic of Zambia (GRZ) for the Zambia Agricultural Development Research and Extension Project (611-0201). It is planned that a total of $3,000,000 will be obligated in FY 1980.

Discussion: The purpose of the project is to assist the Government of the Republic of Zambia in strengthening the agricultural research capacity of the Ministry of Agriculture and Water Development and increasing the effectiveness of the extension service in transferring relevant agriculture technology, with special emphasis on small farmers. The life-of-project funding of $12,515,000 will be expended over a five year period. A waiver is requested in the amount of $260,000 for the procurement of Code 935 vehicles. A justification is contained in Annex H of the Project Paper. The IEE was approved at the time of PID approval. The proposed project has been thoroughly reviewed by the appropriate committees and the analyses were found to be acceptable in all respects.

Recommendation: That you sign the Action Memorandum to the Administrator recommending authorization of the project and the requested waiver. Also, please clear the Project Authorization (Attachment A).

Attachments:
1. Action Memorandum for the Administrator
2. Project Authorization

Clearances:
DAA/AFR:WHNorth
AFR/DR:NCohen
AFR/SA:MDagata
AFR/SA:RWrin (draft)
AFR/DR/ARD:BWhittle (draft)
AFR/DR/SDP:JHester (draft)
AFR/DR/ENG:FZobrist
GC/AFR:NFrame (draft)
SER/COM/ALI:PHagan (phone)
AAA/AFR/DP:RStacy

AFR/DR/SAP:WWolff:bjs:8/26/80:x28818

16 SEP 1980

ACTION MEMORANDUM FOR THE ACTING ADMINISTRATOR

THRU : ES

THRU : AA/PPC, Mr. Alexander Shakow

FROM : AA/AFR, Goler T. Butcher

SUBJECT: Project Authorization - Zambia Agricultural Development, Research and Extension (611-0201)

Problem: Your approval is required for a grant of $12,515,000 from the Section 531, Economic Support Fund appropriation, to the Government of the Republic of Zambia (GRZ) for the Agricultural Development, Research and Extension Project (611-0201). It is planned that a total of $3,000,000 will be obligated in FY 1980.

Discussion: The proposed Zambia Agricultural Development, Research and Extension Project represents A.I.D.'s response to a critical need for increasing food production in rural areas of Zambia. The project will contribute to the goal of improving the welfare of small farmers and increasing national food production through the development and adaptation of relevant technologies. The purpose and principal focus of the project is to assist the GRZ in strengthening the agricultural research capacity of the Ministry of Agriculture and Water Development (MAWD) and increasing the effectiveness of the extension service in transferring relevant agricultural technology, with special emphasis on small farmers.

The project will provide the resources required to increase the small farmer production of oilseed crops (sunflower and soybeans) and maize in the Central Province of Zambia, as well as improving the understanding and knowledge base of small farmers by focusing research extension activities on small farmers' needs.

In order to accomplish the purpose and objectives of this project, a total of $3,000,000 is requested for obligation in FY 1980. The life-of-project funding is $12,515,000, which will be expended over a five-year period. The following table illustrates the specific areas in which funds will be required.

($000s)

	FY 1980			
	FX	L/C	Total	L.O.P
Technical Assistance	1,053.0	-	1,053.0	5,223.0
Training	250.0	10.0	260.0	2,662.0
Commodities	607.0	136.0	743.0	834.0
Construction	-	405.0	405.0	405.0
Other*	191.0	348.0	539.0	3,391.0
Totals	2,101.0	899.0	3,000	12,515.0

* Includes inflation, contingency and budget support in meeting operating expenses on a declining scale.

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The GRZ will contribute the equivalent of $4,255,700 or 25.2 percent of the total project costs. This contribution will cover salaries and housing costs of GRZ officials in training, operational expenses on an increasing scale, costs of land for the research stations and the houses to be constructed.

It has been concluded from the analyses included in the project paper that:

(1) the project approach is technically and economically sound and socially acceptable;

(2) the technical design and cost estimates are reasonable, and adequately planned, thereby satisfying the requirements of Section 611(a) of the Foreign Assistance Act of 1961, as amended;

(3) the timing and funding of project activities are appropriately scheduled;

(4) sufficient planning has been done for the implementation, monitoring and evaluation of project progress; and

(5) all statutory criteria have been satisfied.

The Initial Environmental Examination, which can be found in Annex I of the Project Paper, has been thoroughly reviewed by my staff, and the negative determination for this project was approved at the time the PID was approved.

There are two conditions precedent which must be met. They are:

1. Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement to finance each construction activity, the GRZ will furnish, in form and substance satisfactory to AID, a) evidence that suitable sites have been allocated for such construction activity, and b) appropriate plans and specifications, cost estimates and time schedules for carrying out such construction activity.

2. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance commodities, other than vehicles, the Cooperating Country shall furnish to A.I.D. the following information on all pesticides to be used on the MAWD research stations in connection with this project: (a) generic names of pesticides; (b) manufacturers' toxicological and environmental data; and (c) recommendations for tolerances, rates, frequency of application and preharvest intervals as established by U.S.E.P.A. or FAO/WHO.

There are eight covenants which can be found in the attached project authorization (Attachment A).

The following waiver is required:

-- Waiver of the source and origin requirements from A.I.D. Geographic Code 000 (U.S.) to Code 935 (Special Free World) for the procurement of 12 project vehicles, one tractor, and 52 motorcycles which have an approximate cost of $260,000. The justification for this waiver can be found in Annex H of the Project Paper (Attachment B).

It was intended that this project be designed in final form and implemented under the Title XII Collaborative Assistance Mode. However, there proved to be insufficient time for the Title XII selection procedures to be completed early enough to permit project authorization and obligation in FY 1980. Instead, AID/W used an existing Cooperative Agreement with a U.S. university (Michigan State) to undertake preparation of the Project Paper. To implement the project, a direct AID-university contract is proposed, with a source list of eligible universities to be drawn up by the AID Project Committee based, on recommendations from, inter alia, the GRZ, USAID/Zambia, REDSO/EA, and BIFAD.

The Project Review was held on August 8, 1980. The ECPR Meeting was held on August 12, 1980. There are no unresolved issues. A Congressional Notification advising Congress of a program change was forwarded on September 8, 1980, and the waiting period will expire on September 23, 1980. The responsible A.I.D. Officer in the field will be the A.I.D. Representative, or his designee, and the AID/W backstop will be Alfred Harding, AFR/DR/SAP.

There are presently no significant human rights issues in Zambia.

Recommendation: That you sign the attached Project Authorization and thereby authorize the proposed project and the requested waiver.

Attachments:
1. Project Authorization
2. Project Paper

Clearances:
GC:NHolmes 9/16/80
AAA/PPC/PDPR:JEriksson 9/16/80
GC/AFR:EDragon
DAA/AFR:WHNorth

AFR/DR/SAP:AHarding:bjs:8/26/80:x28818

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

PROJECT AUTHORIZATION

Name of Country:	Zambia
Name of Project:	Agricultural Development, Research and Extension
Project Number:	611-0201

1. Pursuant to Sections 531 and 533 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorize the Agricultural Development, Research and Extension Project for Zambia (the "Cooperating Country") involving planned obligations of not to exceed $12,515,000 in grant funds over a five-year period from date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

2. The project consists of the provision of technical assistance, training and commodities to assist the Cooperating Country in its efforts to strengthen the agricultural research capacity of the Ministry of Agriculture and Water Development (MAWD) and increase the effectiveness of the extension services in transferring relevant agriculture technology to small farmers. The assistance will specifically support the national Commodity Research Teams in Oilseeds and Cereals/Grains, an Adaptive Research Planning Team (ARPT) in one region, and the extension service.

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

4.A. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by AID under the project shall have their source and origin in the Cooperating Country or in the United States, except as provided in paragraph D. below and except as AID may otherwise agree in writing. Ocean shipping financed by AID under the project shall, except as AID may otherwise agree in writing, be financed only on flag vessels of the United States.

B. Conditions Precedent

(1) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance each construction activity, the Cooperating

Country will, except as the Parties may otherwise agree in writing, furnish in form and substance satisfactory to AID:

(a) plans and specifications, cost estimates, and time schedules for carrying out such construction activity; and

(b) evidence that a suitable site has been allocated for such construction activity.

(2) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance commodities, other than vehicles, the Cooperating Country shall furnish to A.I.D. the following information on all pesticides to be used on the MAWD research stations in connection with this project:

(a) generic names of pesticides;

(b) manufacturers' toxicological and environmental data; and

(c) recommendations for tolerances, rates, frequency of application and preharvest intervals as established by U.S.E.P.A. or FAO/WHO.

C. Covenants

(1) The Cooperating Country shall covenant to provide on a timely basis a professional counterpart to each of the seven U.S. technical advisors furnished under the project.

(2) The Cooperating Country shall covenant to provide suitable housing prior to the arrival of the U.S. technicians in Zambia.

(3) The Cooperating Country shall covenant to make available qualified candidates for long-term academic training in the U.S. and to ensure by bonding or other means that such trainees are assigned upon their return to suitable positions within the Ministry of Agriculture and Water Development and required to carry out assignments related to activities under this project, unless AID otherwise agrees in writing. The period of required service will be equal to twice the duration of the training financed under the project.

(4) The Cooperating Country shall covenant that the equipment and motorcycles procured under the project will be exclusively used for project activities, unless AID otherwise agrees in writing.

(5) The Cooperating Country shall covenant that use of all vehicles, other than motorcycles procured under the project, will be under the supervision and direction of the U.S. technical assistance team leader and the MAWD Director of Agriculture or their respective designees.

(6) The Cooperating Country shall covenant that housing constructed under this project shall be used solely for AID-financed technicians under the project or upon completion of this project by AID-financed technical assistance personnel assigned to other projects in Zambia until and unless AID otherwise agrees in writing.

(7) The Cooperating Country shall covenant that it will provide the project with a rural sociologist on a regular consulting basis to work with the ARFT in the execution of its programs.

(8) The Cooperating Country shall covenant to share with AID, vehicle fuel and maintenance costs under the project, according to the sliding scale formula set forth in Annex E-8 of the project paper.

D. Waivers

Based upon the justification in Annex H of the Project Paper, I hereby:

(1) Authorize a waiver from AID Geographic Code 000 (U.S.) to Code 935 (Special Free World) to permit procurement of 12 project vehicles, one tractor and 52 motorcycles at an approximate cost of $260,000;

(2) Certify that exclusion of procurement from Free World countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program; and

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

Date: 9/18/80

A Shakow for
Douglas J. Bennet, Jr.
Administrator

Clearances:
GC:NLHolmes _____ date 9/15/80
AA/AFR:GTButcher _____ date 9/11/80
AA/PPC:AShakow _____ date 9/16/80

GC/AFR:NFrame:ckg:8/14/80:X23808

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: [A] A = ADD, C = CHANGE, D = DELETE — PP
2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: ZAMBIA

4. DOCUMENT REVISION NUMBER: 0

5. PROJECT NUMBER (7 digits): 611-0201

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

7. PROJECT TITLE (Maximum 40 characters): AGRICULTURAL DEVELOPMENT (RESEARCH & EXTENSION)

8. ESTIMATED FY OF PROJECT COMPLETION: FY 85

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 80; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 84

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

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	(2,101)	(899)	(3,000)	10,417	2,098	12,515
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY	-	443	443	-	4,255	4,255
OTHER DONOR(S)						
TOTALS	2,101	1,342	3,443	10,417	6,353	16,770

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 80 F. GRANT	E. 1ST FY 80 G. LOAN	H. 2ND FY 81 I. GRANT	H. 2ND FY 81 J. LOAN	K. 3RD FY 82 L. GRANT	K. 3RD FY 82 M. LOAN
(1) ESF	181 B	070		5,000		2,000		2,000	
(2)									
(3)									
(4)									
TOTALS				3,000		4,000		2,000	

A. APPROPRIATION	N. 4TH FY 83 O. GRANT	N. 4TH FY 83 P. LOAN	Q. 5TH FY 84 R. GRANT	Q. 5TH FY 84 S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) ESF	3,515		-		12,515	
(2)						
(3)						
(4)						
TOTALS	3,515				12,515	

12. IN-DEPTH EVALUATION SCHEDULED: MM 01 YY 83

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

[1] 1 = NO, 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE:

TITLE: John A. Patterson, AID Representative, Lusaka, Zambia / A.R. Love, Dir., REDSO/EA.

DATE SIGNED: MM 07 DD 26 YY 80

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

AID 1330-4 (3-76)

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ANNEXES

PROJECT PAPER DESIGN TEAM

Michael Bratton	-	Ph.D, Political Science Department, Michigan State University.
George K. Dike	-	Ph.D, Michigan State University, Agricultural Extension Specialist.
Carl Eicher	-	Ph.D, Professor of Agricultural Economics, Michigan State University.
David Norman	-	Ph.D, Professor of Agricultural Economics, Kansas State University.
Niels Roling	-	Ph.D, Professor of Agricultural Extension Information, Wageningen University, The Netherlands.
John Yohe	-	Ph.D, Research Agronomist, AID/ Washington.
Morgan Gilbert	-	Design Officer, REDSO/EA, Team Co-Leader.
Calvin L. Martin	-	Agricultural Officer, REDSO/EA, Team Co-Leader.
Ann Williams	-	AID Regional Legal Adviser.
John A. Patterson	-	AID Representative to Zambia.
Susan A. Johns	-	Team Secretary.

LIST OF PEOPLE CONSULTED (Continued)

Dr. Evans	-	Director, Rural Development Studies Bureau, University of Zambia
Dr. Collinson	-	CIMMYT - Nairobi
Dr. Jiggins	-	Research Fellow, Rural Development Studies Bureau, University of Zambia
Mr. Kale	-	Officer -in-Charge, Magoye Regional Research Station
Mr. Sikazwa	-	Officer-in-Charge, Kabwe Regional Research Station
Mr. Zimba	-	Farm Systems Analyst, MAWD
Mr. Chanda	-	Farm Systems Analyst, MAWD
Mr. Savory	-	Commercial Farmer

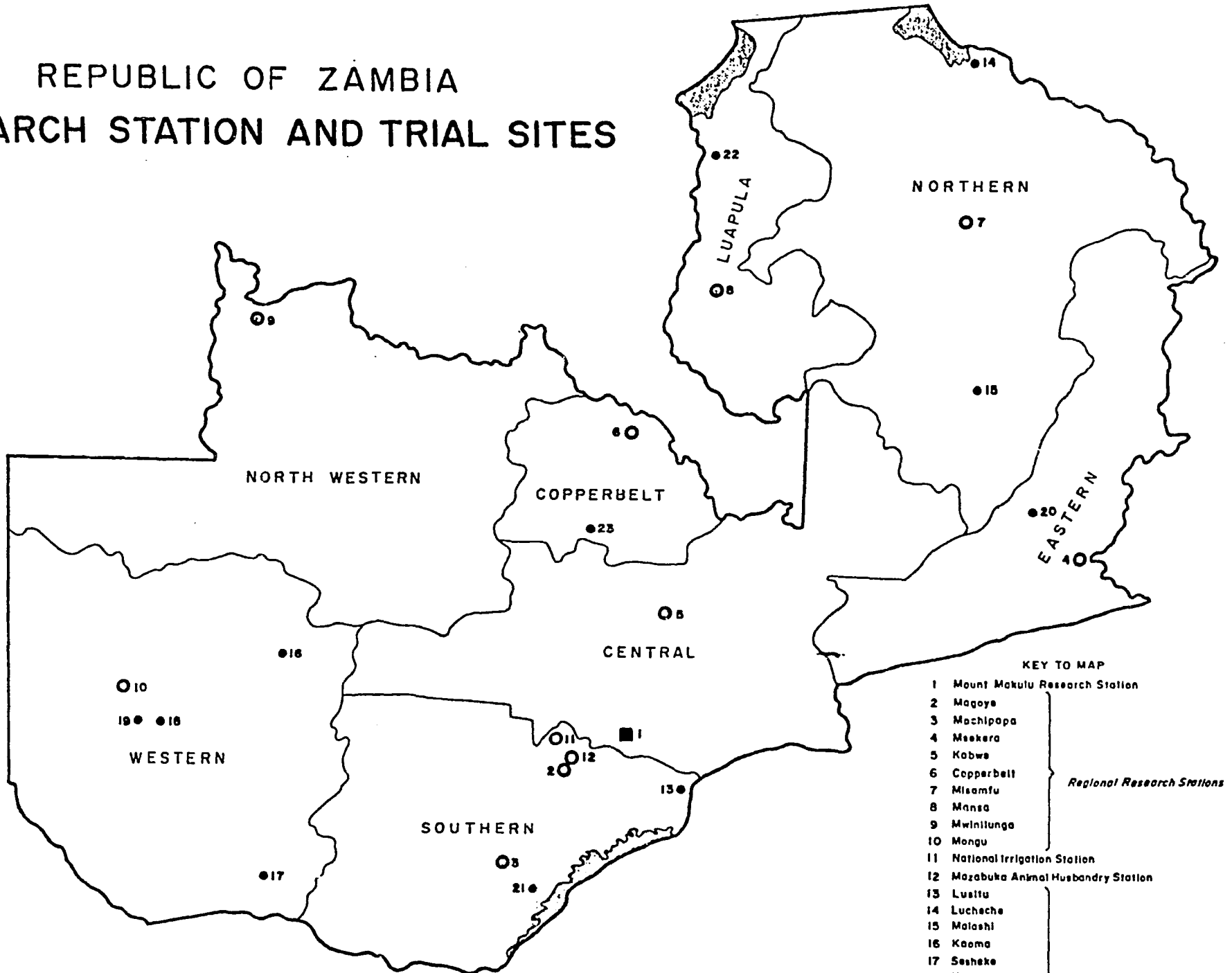
LIST OF PEOPLE CONSULTED

Mr. Patterson	-	USAID
Mr. Hamamba	-	Permanent Secretary, MAWD
Mr. Namakando	-	Deputy Director General, National Commission for Development Planning
Mr. Chibasa	-	Deputy Director of Agriculture (Research), MAWD
Mr. Mukutu	-	Deputy Director of Agriculture (Extension), MAWD
Ms. Chungu	-	Director of Research, Mt. Makulu
Mr. Mumba	-	Department of Agriculture, Director, MAWD
Mr. Remba	-	Coordinator Foreign Assistance Project, MAWD
Mr. Prior	-	Ag. Research Officer, Mt. Makulu
Mr. Kean	-	Agricultural Economist, MAWD
Mr. Javaheri	-	Soybean Coordinator, Mt. Makulu
Mr. Mutanga	-	Director, Department for Economics & Technical Cooperation, National Commission for Development Planning
Mr. Musonda	-	Principal, National Commission for Development Planning (NCDP)
Mr. McPhillips	-	Soil Scientist
Dr. Ravagnan	-	Director, National Oilseeds Development Project
Mr. Nyemba	-	Microbiologist, Mt. Makulu Research Station
Dr. Sandrhu	-	Mount Makulu
Mr. Sakufiwa	-	Director, Food Conservation Unit, Mt. Makulu
Mr. Vernon	-	Weed Control & Tillage Unit, Mt. Makulu
Mr. Parker	-	Weed Control & Tillage Unit, Mr. Makulu
Mr. Javanovich	-	Maize Breeder, Mt. Makulu
Mr. Patel	-	Maize Breeder, Mt. Makulu
Mr. Mulele	-	Chief Crop Husbandry Officer, MAWD
Mr. Rettie	-	Acting Chief Economist, Economic Planning Unit, MAWD
Mr. Baxter	-	FAO, Program Coordinator, Kabwe
Mr. Winderix	-	FAO
Mr. Obiama	-	Project Officer, FAO
Dr. Nissly	-	Head, Crop Science Dept. School of Agriculture, University of Zambia.
Mr. Holland	-	Director, Family Farms
Mr. Ter Horst	-	Liaison Officer, Research/Extension, IBRD Rural Extension-In-Service Team
Prof. Mwanza	-	Vice Chancellor, University of Zambia
Dr. Ncube	-	Head, Department of Economists, University of Zambia

ABBREVIATIONS

AA	Agricultural Assistant (Extension Division)
AID	Agency for International Development
AID/DSB/AGR	AID/Development Support Bureau/Office of Agriculture
AID/W	AID/Washington
AID/Zambia	Agency for International Development, Zambia
ARPT	Adaptive Research Planning Team
BNF	Biological Nitrogen Fixation
CD	Commodity Demonstrator (Extension Division)
CDSS	Country Development Strategy Statement
CRT	Commodity Research Team (MAWD)
CIMMYT	International Maize and Wheat Research Center
FAO	Food and Agriculture Organization
FI	Farmer Institute
FTC	FarmerTraining Center
GRZ	Government of Zambia
ICRISAT	International Crop Research Institute for Semi Arid Tropics
IITA	International Institute for Tropical Agriculture
LIMA	Small-scale Farmer Recommendations, MAWD
MAWD	Ministry of Agriculture and Water Development
MS	Master of Science Degree
NAMBOARD	National Agricultural Marketing Board
NRDC	Natural Resources Development College
OPEX	Operational Expert
PAO	Provincial Agricultural Officer
PES	Project Evaluation Summary
PhD	Doctor of Philosophy Degree
PID	Project Identification Document
PIO/P	Project Implementation Order/Participant
RDSB	Rural Development Studies Bureau at UNZA
REDSO/EA	Regional Economic Development Service Organization/East Africa
RIS	Rural Information Service, MAWD
RLEO	Research Liaison Extension Officer, ARPT
R&R	Rest and Relaxation Leave
SMS	Subject Matter Specialist/Extension
SOTA	State of the Art Study
TA Contractor	Technical Assistance Contractor
TDY	Temporary Duty
T&V	Training and Visit System in the Extension Division
UNIP	United National Independence Party
UNZA	University of Zambia

REPUBLIC OF ZAMBIA
RESEARCH STATION AND TRIAL SITES



I. PROJECT ABSTRACT

This project is a five-year activity which will provide $12,515,000 in grant aid to the Government of Zambia (GRZ) for technical assistance, commodities and supporting costs to assist the Ministry of Agriculture and Water Development (MAWD) in strengthening its agricultural research capacity and to increase the effectiveness of the extension service in transferring relevant new agricultural technology to the farmers of Zambia, with special emphasis on small producers.

AID inputs will consist of seven long-term technical advisers for five years; one OPEX operational replacement for a Zambian technician for two and one-half years; 50 person/months of short-term consultants; 34 Zambians to receive long-term academic training, plus short-term courses, local in-service training; a small special studies program; research equipment, vehicles; operational costs and construction of housing for the US team.

The GRZ will contribute the equivalent of $4,256,000 (25.38% of total project costs) in the form of professional staff, training support expenses, land, offices, and operating costs, bringing the total cost of the project to $16,771,000.

The project will further develop a recent GRZ initiative to reorganize its agricultural research organization and to establish direct linkages with the extension service in order to better serve Zambia's small farmers.

II. BACKGROUND

A. AGRICULTURE IN THE ZAMBIAN ECONOMY

1. Factors Affecting Agricultural Performance

Although of obvious importance, agriculture has been a particularly troublesome sector of the Zambian economy. Since Zambia has the highest percentage of its total population living in urban centers of any African country south of the Sahara (40%), it is not surprising that its share of agriculture as a percentage of GDP is the lowest in Africa (18% in 1978 - up from 13% at independence in 1964). Government of Zambia (GRZ) policy has been directed at satisfying the food requirements of the urban sector at subsidized prices, which has had the effect of discouraging economic growth of the rural areas. The dominance of copper production in the Zambianeconomy (90% of export earnings) overshadows agriculture and is responsible for Zambia's dualistic economy. This dualism also extends into the agricultural sector itself with a small and diminishing number of large-scale commercial farmers (now no more than 400) accounting for a high percentage of marketed produce, as compared to the estimated 600,000 small farmers and 75,000 somewhat larger and better equipped "emergent farmers".

The generally disappointing performance of Zambian agriculture has been of major concern both to the GRZ and to donor agencies. Negative factors at work include Zambia's landlocked position; the GRZ's agricultural pricing policy; lack of trained manpower; operational problems of GRZ institutions and parastatal organizations; rural depopulation, combined with an exodus of European commercial farmers; the effects of the Rhodesian guerrilla war; and, most significantly for this project, inadequate attention to the development of agricultural technology especially with respect to the smaller producer.

Some of these negative factors have recently been alleviated with the emergence of an independent Zimbabwe and new GRZ policy assertions in the Third National Development Plan (TNDP) published in 1979. The very recent restructuring of the Zambian agricultural research organization discussed in the following section, is a positive and welcome step. Also a major advantage enjoyed by Zambia in comparison to many developing countries is an abundance of agricultural land and a corresponding absence of land pressure.

2. Zambia's Major Crops

Maize is, by far, Zambia's most important crop with just over one million acres under cultivation. As a food crop, maize is consumed as the daily staple of Zambian families and, as a cash crop, accounts for three-fourths of the total value of marketed crop production. It is grown by all categories of farmers in Zambia: about 60% of marketed production and 85% of total production originates from medium-sized and small farms. Marketed maize production rose with some fluctuations, between 1964 and 1976, on average about 8 to 10 per cent per year. Poor harvests in subsequent years saw a drop in output and necessitated substantial maize imports in 1979 and 1980. There is also concern by the GRZ that reliance on maize as a single staple should be tempered by attention to other cereal crops. A diversification into alternate staples could provide small farmers with greater security of household food requirements.

Other principal food and cash crops include the oilseeds group: groundnuts, sunflower and cotton. Oilseeds are valuable for the manufacture of oil for human consumption and meal for protein concentrate stockfeeds. Groundnut production has varied widely and current output stands at about two-thirds of the 1964 total. Sunflower and cotton have tended to displace groundnuts and have proven particularly popular among the middle category of farmer whose production is not exclusively oriented to the market or subsistence. Oilseed crops can substitute for commodities presently imported and are generally complementary products which can fill niches in existing farming operations.

Other crops include sorghum, millet and beans which are favored for subsistence, and tobacco, soybeans and sugarcane which are grown almost exclusively for sale. There is little doubt, however, that maize and oilseeds are likely to be central to any strategy for agricultural development in Zambia. One recent study specifically identified these crops as having "the greatest need and potential for increased production". 1.

1. Dean F. Tuthill et.al., "Agricultural Sector Assessment: Zambia" (Washington, USAID, Southern Africa Development Assistance Project, 1978) p.17.

B. PRESENT AGRICULTURAL RESEARCH AND EXTENSION

1. The Evolution of Policy

In the past, Government policies for agricultural research and extension have accorded low priority to the needs of small farmers. Research has usually consisted of efforts to develop crop varieties that fit the requirements and resources of large-scale commercial producers. Breeding work on maize at the National Research Station at Mount Makulu, for example, has been confined to improving the qualities of long season hybrids under conditions of heavy fertilizer application. Small farmer preferences - e.g. for a short growing season, drought resistance, or minimum inputs - have received little attention. The unbalanced orientation of the Zambian research establishment is not unusual among countries in the Southern Africa region. It can be attributed to the large and strategic contribution made by commercial farmers to national food production, and to the well-organized way in which they articulate their interests into the policy-making process.

As for agricultural extension policy, the Zambian government has endeavoured to reach out and serve a broad spectrum of producers. A nationwide network of extension agents, with over 1,500 positions and 450 village level agricultural camps, has been created with a presence in every administrative district. However, because the small rural population (3.5m) is scattered over a large land area, and distances between farm units are great, the contact between farmers and extension workers in Zambia is often selective. and sporadic. The most effective extension services are available where clusters of successful farmers are to be found. The tendency for extension to stop short of the smaller and poorer cultivators in the outlying areas is reinforced by training limitations and transport shortages within the extension service itself. The fact that field officers are called upon to deliver advice and technology that may be inappropriate to small farmers does not make the extension task any easier.

2. Recent Reorganization of Research and Extension

The Zambian Government has recognized the need to stimulate small farmer agriculture and to propagate a more fruitful linkage between research and extension. The most important recent GRZ policy initiative involves a restructuring of the national research program. The Ministry of

Agriculture and Water Development (MAWD) includes the Department of Agriculture, within which Research, Extension, Land Use and Training divisions can be found (Figure 1). A recent reorganization relevant to the AID project has taken place within the Research division. Two new types of research teams have been created (1) Commodity Research Teams (CRT's) and (2) Adaptive Research Planning Teams (ARPT's) (Figure 1). A brief outline of the nature and functions of each is as follows:

a) CRT

One of the several priority areas spelled out in the Third National Development Plan (1979-1983) is "improving and expanding existing research facilities". The creation of Commodity Research Teams is part of a GRZ plan to upgrade the efficiency of research and extension activities throughout the country. More precisely, the GRZ proposes to establish twelve multi-disciplinary CRT's (Figure 2) which will be located at regional research stations. The CRT's will conduct research programs on constraints to increased production of the various commodities grown in Zambia. The work of the CRT's will focus on such matters as varietal improvements, costs of production, cropping patterns, tillage practices, use and timing of agricultural inputs, and harvesting and storage methods. The CRT research program will pertain to the improvement of the body of knowledge on the biology and management of the major food and cash crops in Zambia. The goals addressed by CRT activities relate to national goals for food production and agricultural exports, as well as to the improvement of the welfare of small farm families.

b) ARPT

To improve the generation of agricultural technology the research establishment is now creating an Adaptive Research Planning Team to provide feedback on small farmer production constraints to the CRT scientists and to provide for the testing of new technologies at the farm level. The development of relevant improved technologies geared to specific target groups requires two-way communication among research workers, extension workers and farmers. To date in Zambia commercial farmers have tended to have greatest access to the communications process and GRZ researchers have responded effectively to their needs. To overcome this problem, the ARPT system has been introduced to determine the technological requirements and capacities of small farmers. Unlike the CRT's, the focus of which is national, the ARPT's will restrict

FIGURE 2. NEW STRUCTURE OF AGRICULTURAL RESEARCH

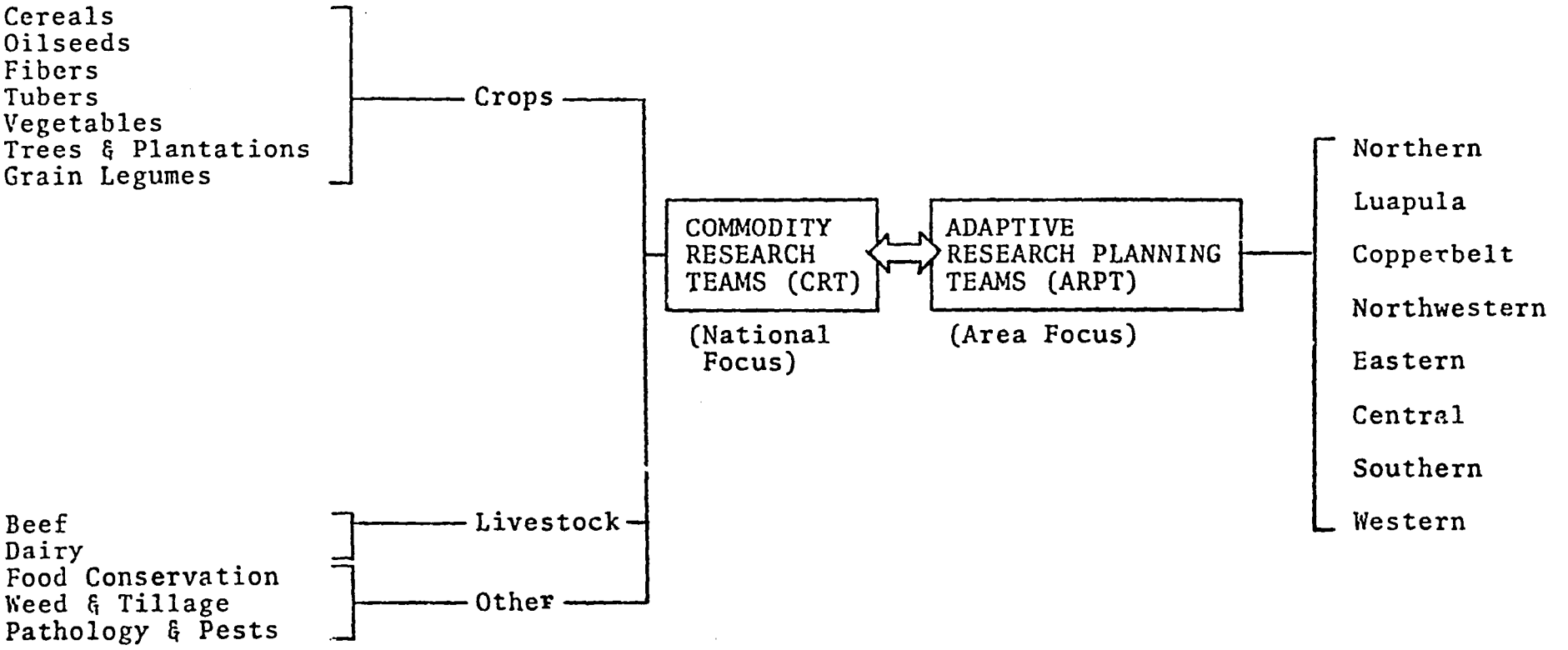
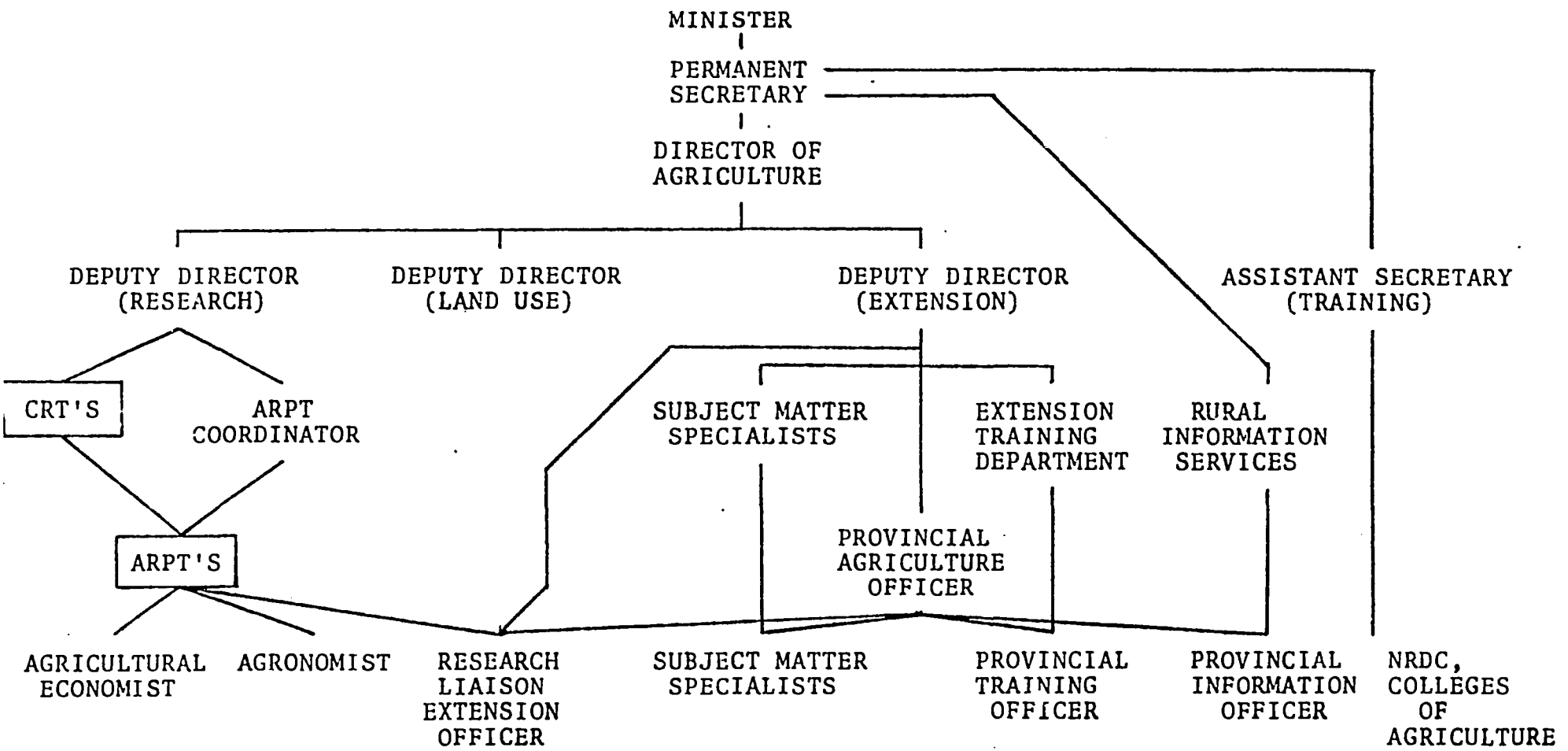


FIGURE 1. STRUCTURE OF MAWD, SHOWING CRT'S AND ARPT'S



important projects stressing institution building, technical assistance and training with emphasis on agriculture: the agricultural research and extension project presented in this paper and an agricultural studies and manpower training activity. Both projects relate directly to two basic GRZ objectives which are highlighted in the Third National Development Plan and AID's recently prepared CDSS on Zambia: 1) to increase the incomes of small farmers and 2) to increase total food production. Both projects are also designed to alleviate the four major constraints to achieving the above goals as identified in the CDSS: (1) insufficient investment and allocation of scarce resources in the agricultural sector; (2) the lack of a coherent and effective agricultural sector strategy; (3) defects and deficiencies in statistical information needed for making agricultural policies and decisions; (4) difficulty in reaching small farmers through existing development projects.

The Zambian agricultural scene is attracting the attention of a number of foreign donors who have a wide variety of planned and current activities. Among the most relevant for this project, given the GRZ decision to concentrate the initial ARPT work in Central Province, are:

a) A rural extension in-service training project funded by the World Bank and with technical assistance provided by the Netherlands. The first stages of this project have been started in Central Province, with a view to upgrading the skills of extension workers and raising the quality of farmer training. The Training and Visit system mentioned above is an integral part of this project.

b) The Food and Agriculture Organization of the United Nations (FAO) has an activity on in-service planning and training for agriculture and rural development, also in Central Province. The FAO aims to train MAWD personnel in the identification, implementation, and evaluation of viable agricultural projects of all types.

c) The Pan-African Institute for Development (PAID) plans to conduct studies on the social acceptability and economic feasibility of GRZ rural development policies at the village level in Central Province. The regional headquarters of PAID are located in Kabwe and PAID programs for 14 Eastern and Southern African countries are administered from there.

d) Donors have initiated integrated area development schemes in several parts of Zambia. The World Bank supports an approach to agricultural development that focuses on extension, marketing and the provision of credit for farm inputs in Eastern and Southern Provinces. Other donors are financing projects that concern both infrastructure and agriculture in Northwestern Province (Federal Republic of Germany), Western Province (ADB) and Eastern, Northern, Luapula and Western Provinces (SIDA).

The PP team made contact with the donors operating in Central Province and in each case assurances of mutual cooperation and the avoidance of duplication were exchanged. Whereas there is a fairly heavy concentration of donors in the Central Province, such a concentration is by no means atypical of Zambia as a whole. It seems highly desirable for the success of the AID project described below that opportunities for coordination with complementary donor activities be realized to the fullest.

FIGURE 3. SCHEMATIC REPRESENTATION OF SOME DETERMINANTS OF THE FARMING SYSTEM

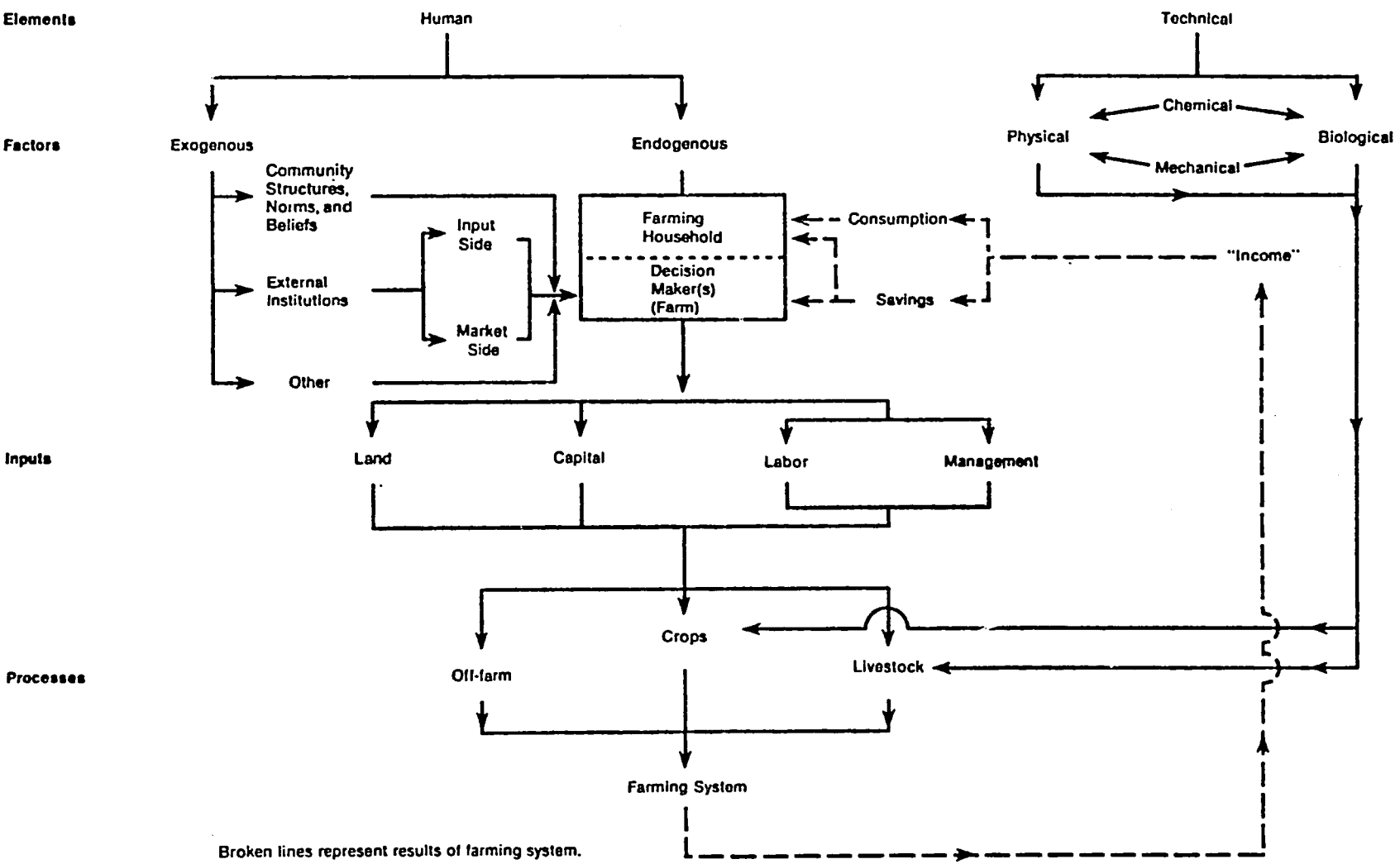


FIGURE 4. SCHEMATIC FRAMEWORK FOR ARPT WORK

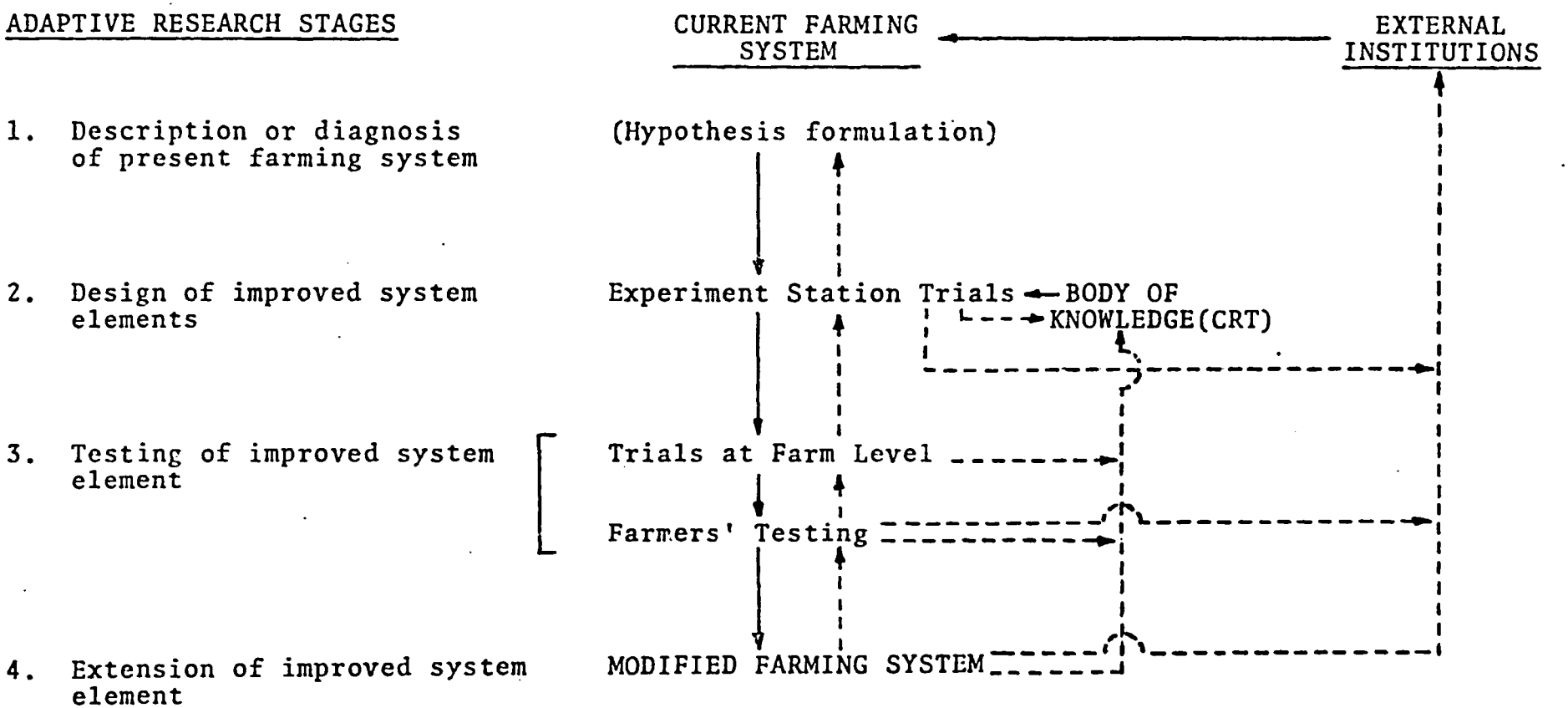
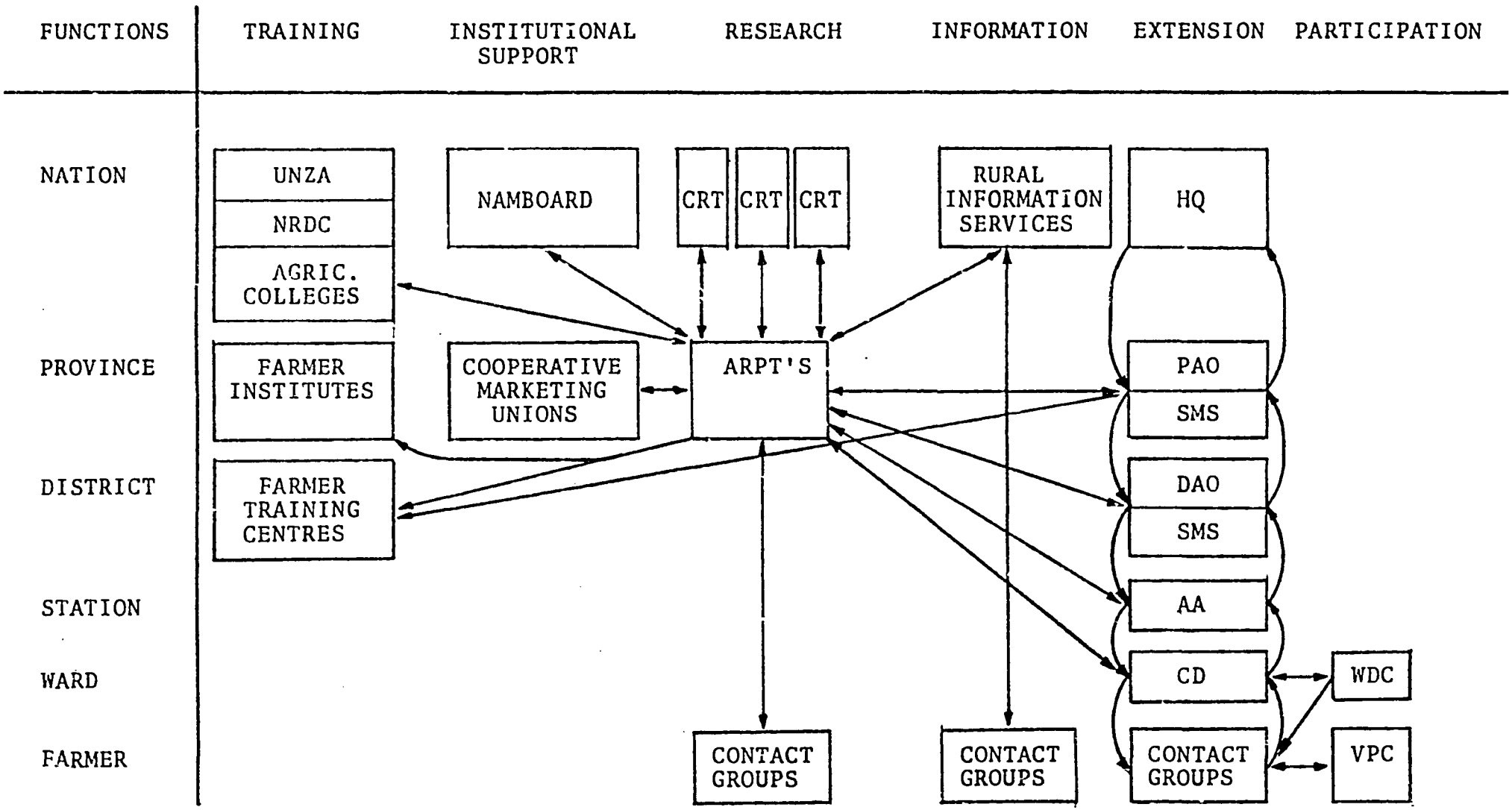


FIGURE 5. FUNCTIONS OF ARPT'S



III. PROJECT DESCRIPTION

In the six months which have elapsed since the submission of the PID for this project in January, 1980, the GRZ has made considerable progress in planning the framework aimed at redirecting research priorities towards the needs of small farmers. The multi-disciplinary research teams referred to in the PID have evolved into the Commodity Research Teams (CRT's), described briefly in the preceding section, around which an important part of this project will be based. The recent establishment of the Adaptive Research Planning Team (ARPT) as a GRZ initiative provides a potential link to the small farmer and sets the stage for this project. AID will provide major technical support to both the CRT's and the ARPT.

Small farmers presently grow 60% of marketed maize in Zambia and have the potential to dramatically increase production in terms of additional hectares and yield per hectare. Longstanding institutional arrangements for agricultural research, however, have not permitted the small farmer to share in the benefits of new technologies. Other incentives for the small farmer such as price and access to inputs and markets are also judged inadequate to meet GRZ objectives. The advantages of other cash and food crops such as sunflower and soybean are just becoming known to small farmers and further efforts in research and extension will be necessary to develop potential.

This project will help build institutions which will direct research toward the needs of small farmers. The commodity teams and adaptive research teams being organized in the MAWD will approach research from a problem-solving point of view. The results of research by CRT's and the ARPT will be incorporated into extension programs for small farmers.

Given the long-term nature of agricultural research and institution building, the time-phase necessary for major impact is probably 10-15 years. Therefore, the present GRZ initiative is the beginning of a long-range effort and it would be realistic to think of this project as the first phase of a potential longer-term AID assistance program which could, if initial results are promising, be extended to a second, and even third 5-year phase.

A. SUMMARY OF PROPOSED GOAL, PURPOSE AND OUTPUTS

a) The long-term goal of the project is to assist the GRZ in improving the welfare of small farmers and increasing national food production through the development and adaptation of relevant technology. This goal is fully

consistent with the major objectives of the Zambian Third National Development Plan and the main focus of AID's FY 82 Country Development Strategy Statement (CDSS).

b) The purpose of the project is: to help the GRZ strengthen the agricultural research capacity of the Ministry of Agriculture and Water Development (MAWD) and to increase the effectiveness of the extension service in transferring relevant agricultural technology with special emphasis on small farmers.

c) The outputs of the project are:

1) The strengthening of the MAWD Commodity Research Teams on Oilseeds and on Cereal Grains. A major concern of the Oilseeds Team is the need for high protein food, as well as food oils and stockfeeds, in Zambia. Soybeans and sunflowers have the dual potential of serving small farmers as food crops and as cash income earners. Research programs are needed to develop varieties tailored to Zambian small farmer conditions. A major concern of the Cereals Team is the necessity to breed and introduce varieties of maize tailored to small farmer conditions which in many respects are different from those of commercial farmers.

2) The effective operation of an Adaptive Research Planning Team (ARPT). In contrast to the CRT's, this team of researchers will not work on a specific range of commodities on a nationwide basis (i.e. days to maturity of maize; harvest time shattering problems of soybeans). Rather it will work in specific geographical regions to identify, with the help of farmers, problems peculiar to local farming systems. Some of these problems will be directed to CRT's for research and some will be handled internally by the ARPT. In either case the findings will be fed back through the extension service to the small farmer.

3) The enhancement of the capacity of the extension service to diffuse usable agricultural technology to small farmers through improved research-extension linkages and communication.

4) The upgrading of professional and technical skills in agricultural research and extension within MAWD through selected academic and practical training in Zambia, in the US, in other African countries, and at international institutions.

B. PROJECT ACTIVITIES

The project will provide technical assistance to MAWD in the form of seven long-term (5 year) AID-financed advisers,

one medium-term (2.5 year) scientist (microbiologist) under an OPEX arrangement to fill in for a Zambian in training, and 62 person/months of short-term consultants. These staff resources, with the possible exception of the OPEX scientist, will be recruited by the US university which is awarded the contract for the implementation of the project. The GRZ has requested that these advisers be assigned to the Oilseeds CRT, the Cereal Grain CRT, and the ARPT in Central Province. In part the assignments reflect the need of GRZ to fill gaps in the existing research establishment. The main reason behind the provision of technical assistance, however, is to promote the development of technologies for selected basic food crops. Through the interaction of the social scientists on the ARPT and agricultural scientists on the CRT's the project will contribute to the reorientation of research priorities towards the requirements of small farmers. The technical assistance team will comprise the following long-term advisers:

a) 1 Team Leader/Agricultural Economist

b) Oilseed CRT:

    1 Soybean Breeder
    1 Sunflower Agronomist

c) Cereal Grain CRT:

    1 Maize Breeder

d) ARPT in Central Province:

    1 Farming Systems Economist (Agricultural Production/ Farm Management Economist)
    1 Agronomist
    1 Research Liaison Extension Officer (Extension Agronomist) (RLEO)

Major facts concerning the functions of these advisers and the MAWD organizations to which they will be assigned are as follows (see Section IV, A, Technical Analysis, for additional discussion):

1. Team Leader/Agricultural Economist

The Team Leader will provide administrative and professional leadership for the project. The administrative task will be substantial owing to the general complexity of the project, the major training and consultancy elements, and the placement of project staff in three different locations. In

his capacity as an Agricultural Economist, the Team Leader will also work with the CRT's in two ways. He will (a) provide help in the economic interpretation of experiments undertaken by the various CRT's and (b) encourage the adoption of ARPT recommendations by the CRT researchers. The Team Leader will report to and work closely with the Director of Agriculture, MAWD (see Section IV, D, Administrative Analysis for further details).

2. Oilseeds CRT

The OilseedsCRT will have its headquarters at Magoye Regional Research Station in Southern Province, with a sub-group at the Mount Makulu Research Station near Lusaka. Commodities will be provided under this project in the form of laboratory and field equipment at these stations to facilitate the operation of major oilseeds breeding programs.

The Soybean Breeder will be located at Magoye and his work will be assisted by a strong complement of existing staff. These include an FAO Soybean Agronomist at Mount Makulu and four Zambian Officers attached to the Magoye soybean program. The Sunflower Agronomist, located at Mount Makulu, will be able to call upon the support of an FAO Sunflower Breeder who already has work underway at the same experiment station. Farm laborers and clerical assistants will be allocated by GRZ to assignments in connection with the oilseeds breeding program. Full details of the functions of the US advisers who will be working with the Oilseeds CRT are provided below (Section IV, A, Technical Analysis).

3. Cereal Grain CRT

The Cereal Grain CRT will eventually have its headquarters at Golden Valley Research Station in Central Province. However, pending the full scale development of this facility, which will require several years, the Maize Breeder will be located at Mount Makulu. As with the OilseedsCRT, the US adviser on the Cereal Grain CRT will be able to interact with others in his field. The Government of Yugoslavia supports one Maize Breeder at Mount Makulu and negotiations are in progress with SIDA (Sweden) for a second. In addition, two Zambian Maize Breeders are expected to return from overseas training at the M.Sc. level during the life of this project. However, given the dominance of maize as Zambia's most important food crop, at least one more maize breeder is clearly needed. As with the Oilseeds CRT the GRZ will provide farm laborers and clerical assistance for the Cereal

Grain CRT. The upgraded research facilities provided under this project at Mount Makulu are expected to contribute to the work of all maize breeding personnel. A key component of the project is to strengthen the capacity of the Zambian research establishment to develop genetic breeding lines and refine and adapt varieties of the nation's principal staple food crop.

4. The ARPT

The ARPT will be responsible for introducing a "bottom up" approach into the process of setting research priorities in Zambia. Sometimes called "adaptive research", this approach begins by identifying the needs of farmers and the opportunities that exist for the improvement of existing farming systems. The adaptive research approach can be summarized in four stages:

1) diagnostic stage: analysis of farmer needs and farming system potential and constraints

2) design stage: identification of possible improved technologies

3) testing stage: evaluation of promising technologies under farmers' conditions

4) extension stage: dissemination and general application.

Initially, the main functions of the ARPT will be limited to research and extension. Once ARPT's become firmly established throughout Zambia, however, it is anticipated that they will engage in a broader set of functions. These include influencing the content of agricultural training and extension information programs and influencing the operation of agricultural support services in favor of small farmers. Further details on the adaptive research process and the functions of the ARPT are given below (Section IV, A, Technical Analysis). Finally, it should be stressed that adaptive research by the ARPT will complement and interact with commodity research by the CRT's. The ARPT will influence the choice of CRT research priorities and the CRT's will generate improved technologies for testing by the ARPT.

The ARPT advisers provided by this project with their full-time Zambian counterparts will be located at Kabwe Regional Research Station in Central Province. Much of their work will be at the farm level and the research station will constitute primarily a location for the analysis of the substantial amounts of data that the ARPT will collect from farmer surveys and trials. The bulk of the full-time junior staff will be funded

and provided by the GRZ. Staffing is tentative at present but may include the following:

	Provided by MAWD	
	Research	Extension
Technical Officers	3	1
Supervisors (Agricultural Assistants)	4	2
Permanent Laborers	2	-
Drivers	2	-

Additional backup funding is to be provided to allow for clerical assistance and other extra staff if the above proves insufficient.

5. Extension

The project seeks to develop greater capacity within the MAWD extension service for transferring improved technologies and interpreting CRT research findings to small farmers. Moreover, upward communication is envisaged in which extension will play a critical role in conveying information on the production problems of small farmers to the attention of researchers. Funding will be provided under the project to conduct the following activities:

a) In-service training for agricultural extension workers. Five-day courses will be held at Farm Institutes (provincial level) and Farmer Training Centres (district level) to convey information on improved agricultural recommendations. Extension workers will also be trained to participate in on-farm trials and organize demonstrations for small farmers.

b) Transportation. Twenty-six extension supervisors in Central Province will be provided with motorcycles to help alleviate chronic transport shortages and to increase the number and range of farm visits.

c) The ARPT will engage the services of extension workers not only in the dissemination stage of the adaptive research process, but in the diagnostic, design and testing stages as well. The extension division will provide background data on farmer practices, facilitate contact between researchers and farmers, and assist in the administration of trials and tests.

d) Farmer Training. One to two-day short courses will be held at FTC's and agricultural stations and camps.

Agricultural Assistants and Commodity Demonstrators will be be responsible for organizing these courses around demonstration plots on farmers fields using new approaches geared to the requirements of traditional mixed farming patterns. It is anticipated that 3-4,000 farmers in Central Province will be directly trained during the life of the project.

e) Indirect benefits to even larger numbers of farmers are anticipated once information on new and relevant technologies is incorporated into the training and visit extension program throughout Zambia.

The project is designed to bring about closer linkage between the research and extension divisions of MAWD. The Research Liaison Extension Officer (RLEO) on the ARPT will be charged with special responsibility for this task (for a full account of the work of the RLEO, see Section IV, A, Technical Analysis, and the job description in Annex B). Moreover, researchers and extension workers are expected to cooperate in all phases of farmer contact, particularly during on-farm trials, tests and demonstrations. The RLEO and the extension staff will be the key actors in promoting two-way communication between researchers and farmers.

6. Short-Term Consultants

Short-term consultants will be provided where gaps need to be filled to ensure the effectiveness of the CRT's and ARPT supported by AID. A total of 62 person months (50 to be paid for under the project) is planned. In addition to short-termers, one medium-term technician will be required under an OPEX arrangement.

Type	Person/Months
a) Soil Scientist	8
b) Sorghum/Millet Agronomist (to be requested and funded from AID Sorghum/Millet CRSP)	12
c) Entomologist	6
d) Plant Pathologist	7
e) Farm Systems Analyst	4
f) Senior Rural Development Specialist	5
g) Librarian	2
h) Microbiologist	2
i) US university Contract Manager	3
j) Evaluation (Two in-depth evaluations are planned by an external mission, during years 3 and 5)	6
k) Other Specialists (to be specified)	7
	62
OPEX Resource: Microbiologist	30

The OPEX scientist will fill in for 30 months while the Zambian microbiologist is receiving masters degree training in the US. He will also be available as a short-term consultant for one month each in years 4 and 5. He will be individually recruited, probably outside of the university contract, and will report to the Chief Research Officer at Mount Makulu.

7. Training

Extensive academic and practical training of Zambians is needed to carry out and sustain the improved research and extension programs envisaged under the project and to reduce Zambia's long-term reliance on expatriates. The following training is planned:

a) Long-term academic training in the US

4 Ph.D	-	research
15 M.S.	-	10 research, 5 extension
15 B.S.	-	5 research, 10 extension

b) Short-term (6 months) training and study tours at USDA, CIMMYT, IITA, ICRISAT. 27 persons for a total of 162 person/months.

c) In-service training for a) extension workers - 150 per year for 5-day sessions at Farm Institutes (FI) and Farmer Training Centers (FTC); and for b) farmers - 1040 person/days per year at 1-2-day sessions at FTC's, agricultural stations and camps.

8. Special Studies

The special studies program (referred to as research grants in the PID) will supplement core CRT and ARPT activities. In the course of research the need may arise for data or analyses that lie beyond the immediate terms of reference of the CRT or ARPT but which contribute to the intended outputs of the project. In such cases special studies will be commissioned.

There will be two types of arrangement:

a) Studies involving faculty, graduate and undergraduate students from the agricultural and social science schools of the University of Zambia (UNZA).

b) Studies involving Research Associates who will be Ph.D

candidates probably from the contracting US university.

Conditions, topics and personnel will be jointly determined by MAWD and the Contractor and, where Zambian university personnel are involved, by UNZA as well.

9. Commodities

The project will provide relevant research equipment, vehicles and supplies for use by the project-assisted CRT's and ARPT, totaling US$834,000. The equipment list is itemized in Annex E. Eight vehicles and one tractor are to be procured under the project for use by the CRT's and ARPT, and 26 small motorcycles for extension supervisors in Central Province. Four vehicles and all 26 motorcycles will be replaced in the fourth year. It will be necessary to construct six houses for US project advisers (3 at Kabwe, 2 at Mount Makulu and 1 at Magoye). The Team Leader and Microbiologist will occupy rented houses in Lusaka.

10. Summary Statement

The objectives of the project as well as the main lines of execution remain very close to those proposed in the PID prepared six months earlier. Implementation refinements, the strengthening of the US team and the support for the CRT's and ARPT, and realistic inflation and contingency factors, are largely responsible for the increased AID budget from an estimated $8,156,000 in the PID to a new AID life-of-project total of $12,515,000. All major elements of the project are examined further in the Technical Analysis in the following section.

IV. PROJECT ANALYSES

A. TECHNICAL ANALYSIS

1. Background

a) Technology Generation for Small Farmers

Research in low-income countries aimed at developing improved technology for small farmers has often been based on a number of simplistic and erroneous assumptions. As a result, very little has been produced that is relevant for large sections of the farming community. The assumptions, which unfortunately are often not explicitly questioned, include those pertaining to homogeneity of the environment in which farmers operate, optimism concerning characteristics of that environment (e.g. good soil, availability of improved inputs, access to market), and inaccurate notions concerning the goals and characteristics of farm production units.

In reality the environment in which farmers operate is complex. A farming system is the result of interactions among several interdependent components. At the center of the interactions are the farmers themselves and their families whose means of livelihood form an inseparably integrated whole. In achieving a specific farming system, farm families allocate certain quantities and qualities of inputs (land, labor, capital and management) to three processes (crop, livestock and off-farm enterprises), in a manner which, within the knowledge they possess, will maximize attainment of household goods. Figure 3 illustrates some of the underlying determinants of the farming system. The total environment can be divided into two elements: technical and human. The technical element determines the types and physical potential of livestock and crop enterprises, and includes physical and biological factors that have been modified to some extent by man, often through technology development. The farming system that actually evolves, however, depends greatly upon what is possible as defined by the technical element.

The human element is characterized by two types of factors: exogenous and endogenous. Exogenous factors (i.e. the social environment), which are largely outside the control of the individual farming family, will influence what it will be able to do. They can be divided into three broad groups: 1) Community structures, norms and beliefs. 2) External institutions. These can be subdivided into two main groups: inputs and outputs. On the input side, extension, credit

and farm requisite distribution systems are often financed and managed by government agencies. On the output side, the government may directly (e.g. marketing boards) or indirectly (e.g. improved evacuation routes, transportation systems) influence the prices farmers receive. 3) Miscellaneous influences, such as population density and location.

Unlike the exogenous factors, the endogenous factors are controlled by the farming family, which ultimately determines the farming system that will emerge, given the constraints imposed by the technical element and exogenous factors.

b) Agricultural Technology Generation in Zambia: Historical Perspective.

In a country such as Zambia acceptance of the assumptions discussed earlier will result in technology being developed that is unsuitable for large sections of the farming community. The discussion of the determinants of the farming systems helps to explain the heterogenity that exists in current Zambian agriculture. Some of the most important factors contributing to this heterogenity are as follows:
1) The technical element. For example, rainfall, which varies from less than 600mm to more than 1500mm in different parts of the country, is superimposed on different ecological units which are partially differentiated on the basis of altitude. As a result the potential exists for a wide range of crops to be grown.
2) The human element. White settlers, plus some Zambians, have set up large commercial farms which are sharply differentiated from the farms of small and emergent cultivators. Commercial and emergent farmers make extensive use of external institutional support systems and cheap labor and tend to be concentrated around the "line-of-rail". Small farmers, who are numerically dominant in isolated areas, of necessity have more subsistence-orientated farming systems, due mainly to poor access to external institutions and labor constraints at critical times during the growing season. A complicating feature of the Zambian case is the migration of men to urban areas in search of employment, particularly in mining. Most of these come from small farm families. It has been reported that as a result, nationally, women outnumber men 2:1 in the rural areas, and head 20% of the rural households. Such characteristics are likely to have a very profound effect on the types of farming systems found (e.g. severe shortages of labor) and relevant strategies for their improvement (e.g. women enjoy legal equality of access to agricultural credit and information, but in practice the

recipients of such services are overwhelmingly male). Addressing the needs of the whole farming community involves initial acceptance of the heterogeneity existing within it. This has led GRZ to the formulation of the adaptive research approach at field level which is to be closely linked to the reorganization of experiment station work around the interdisciplinary commodity teams.

2. CRT

Reorganization of the MAWD Research Branch involves the creation of Commodity Research Teams (CRT's) and Adaptive Research Planning Teams (ARPT's) (Figures 1 and 2). The CRT's will undertake the research necessary to find solutions to constraints identified principally, but not exclusively, by the ARPT's. The GRZ plans to develop 12 CRT teams covering every major commodity and agricultural research discipline important in Zambian agriculture. This project will assist the Oilseeds CRT and the Cereal Grains CRT. These CRT's will be responsible for all basic research on their assigned commodities and for providing on-the-job training of Zambian scientists appointed as CRT counterparts. CRT's will collaborate closely with the ARPT and will eventually devote up to 60% of their time and resources to priorities identified by the ARPT through its linkages with the small farmers. Each CRT will coordinate closely with other CRT's as appropriate in solving the varietal, pest, and agronomic constraints to increased production by small farmers.

Because Zambia remains heavily dependent on imports of vegetable oil and because maize production has been erratic in recent years, it is most appropriate that this project address these two commodity areas. The small farmer sector of Zambia's agricultural industry must be brought along to where it becomes a net food producer and can contribute to the overall economy of the country. There appear to be some obvious needs by the small farmer for improved technology to which the CRT can contribute. These include early maturing maize varieties, higher yielding maize varieties grown under conservative input levels, better planting methods, improved shelling techniques and alternative crop production choices for risk avoidance during poor growing years.

With respect to oilseeds, the project will work on soybeans and sunflower. Sunflower sales have been declining since 1976 and soybeans are a relatively new crop to the Zambian scene. It is GRZ policy to expand and diversify the production of oilseeds as inputs for local oil extraction plants with the short-term objective of attaining self sufficiency in vegetable oils and oil cake (high protein supplement for livestock and poultry feed). Imports, which are estimated at $ 11 million for vegetable oils and $ 10 million for protein

feed concentrate, could be thereby reduced. The greatest potential for solving these production shortages in oilseed crops lies with sunflower and soybeans. Soybeans introduced in recent years have been found to be very well adapted to the Zambian agroclimatic environment. There is also great potential for developing soybeans as a food and cash crop for small farmers. The aim is to develop technical packages which will address production constraints such as harvest-time shattering in soybeans, high yielding pest resistance in soybean varieties adapted to local growing conditions and improved innoculum availability for soybean and other bean production which will enable the farmer to take advantage of biological nitrogen fixation in the cropping system. Pest resistant, high-yielding, high oil content sunflower varieties also need to be developed, as do cultural techniques for growing sunflowers under more marginal moisture conditions.

In the process of working on these problems the CRT's will look to the International Agricultural Research Centers such as CIMMYT, INTSOY, IITA, ICRISAT, ICIPE and successful regional crop improvement programs in Kenya and Zimbabwe as sources for breeding lines of improved varieties. Local testing will then be undertaken and cultural innovations introduced that are applicable to small farmer growing conditions. Based on existing knowledge of these three crops grown around the world, there is sufficient variability in the genetic germplasm to solve the problems discussed above. Given the resources provided in this project, new varieties should be made available after 6-7 years, the normal period needed to develop new crop varieties in a subtropical environment such as Zambia, where two generations per year can be grown.

3. ARPT

a) The Role of the ARPT in Zambia

The ARPT was proposed in recognition of the heterogeneous character of the Zambian farming community. It stresses a "bottom up" approach through a strategy of starting the research process at the farmers' level by first ascertaining their needs and then addressing these needs through the determination of appropriate research priorities. The work of the ARPT consists of four stages. (Figure 4):
1) The descriptive or diagnostic stage. The actual farming system is examined in the context of the total environment, to identify constraints which farmers face and to ascertain the potential flexibility in the farming system in terms of timing, availability of resources, labor shortages in female-headed households, etc. An effort is also made to understand

goals and motivation of farmers that may affect efforts to improve the farming system.
2) Design stage. A range of improved technologies is identified that is thought to be relevant in dealing with the constraints delineated in the descriptive or diagnostic stage. Strategies for dealing with the constraints can involve either developing technology to break them, or to avoid them through exploiting the flexibility, often incremental, that exists in the farming system. The design stage is primarily confined to work on the experiment station.
3) The testing stage. A few promising improved technologies arising from the design stage are examined and evaluated under farm conditions, to ascertain their suitability for producing desirable and acceptable changes in the existing farm system. Criteria for evaluating the changes are based on those that are important to farmers. The testing stage consists of two parts: first, trials at the farm level with joint researcher and farmer participation, and later, farmers testing with full control by farmers themselves.
4) The extension stage. Implementation of the strategies that were identified and screened during the design and testing stages.

In practice there are no clear boundaries between the various stages. Design activities for example, may begin before the descriptive or diagnostic stages end and may continue into the testing stage as promising alternatives emerge during the trials at the farm level where farmers and researchers interact directly. Similarly, there is an extension component from the earliest stages of adaptive research and by the time of farmer's testing extension activities become central to ARPT work.

At present the GRZ has made the following decisions about the operation of the ARPT's:
1) There will eventually be one ARPT for each province with an overall ARPT coordinator.
2) Because the area focus of each provincial team can encompass a range of crop, livestock and off-farm activities, the ARPT will necessarily develop working relationships with a number of CRT's. These will be of a recursive nature; for example, findings of the ARPT will help determine the research priorities of the CRT's, and the CRT's in turn will provide technologies for adaptive testing by the ARPT.
3) Another important linkage in disseminating the results to farmers is that between research and extension. The GRZ has endorsed the inclusion of a Research Liaison Extension Officer (RLEO) in the ARPT. This officer will be responsible to the MAWD Deputy Director of Agriculture (Extension) and is initially

to be an Extension Agronomist. The other two members of the ARPT will be under the jurisdiction of the Deputy Director of Agriculture (Research), as will the ARPT budget. The RLEO must have close relationships with the Provincial Agriculture Officer (PAO) and Subject Matter Specialists (SMS's) in the province. (See Section below on Research-Extension Linkages.)

b) Functions and Staffing of the ARPT

As ARPT's become institutionalized in the Zambian government structure, it is anticipated that their influence will be widely felt. Broadly speaking, the functions of an effective ARPT will eventually encompass the following fields (see Figure 5):
i) Research: interaction with farmers and CRT's in determining research priorities;
ii) Extension: delivery and evaluation of technologies through effective liaison with, and feedback from, the extension service.
iii) Information: provision of relevant agricultural advice for incorporation into extension education programs.
iv) Training: contribution to curricula material to agricultural training institutions.
v) Institutional support: exertion of influence support services to provide farm requisites and marketing opportunities in a form useful to small farmers.
vi) Participation: stimulation of local community organizations through interaction with farmer contact groups.

Realistically, MAWD and AID must acknowledge that the ARPT is unlikely to prove fully effective in all these functions during the 5-year life of the project. The above list is provided to indicate the potential scope of the MAWD's prospective adaptive research program. The ARPT's main functions are with research and extension and other functions are likely to follow only as the ARPT concept is generalized throughout Zambia.

The GRZ has proposed that the ARPT supported under the AID project should have its headquarters at Kabwe, at the Regional Research Station in Central Province. The PP team considers this a good choice. For example, it is an important province agriculturally and has an operational Training and Visit extension program. Long-term staff support by US advisers is to be the same as that proposed for all ARPT's, (i.e. an Agronomist, an Agricultural Economist, and an RLEO). In the performance of its work the ARPT will pay special attention to on-the-job training of Zambian counterparts in adaptive research work. At present such training programs are not

incorporated into formal degree courses although some of the international agricultural institutes such as CIMMYT do provide short courses. In this connection it will be important to complement CIMMYT plans for training Farming Systems Analysts (Agricultural Economists) in Zambia. Training functions, especially of the RLEO, (aided on occasion by the other long-term members of the ARPT) should include instruction to extension staff in the techniques and requirements of adaptive research. As far as research methodology is concerned, the ARPT will seek to develop cost effective approaches to adaptive research. The GRZ proposes to base ARPT work on the CIMMYT methodology. Further details of this, as well as a proposed ARPT workplan, are given in Annex C.

4. Extension

a) Integration of Extension and Research Services

The reorganization of the MAWD Research Division is distinctly innovative, as it brings together extension and research officers to implement the ARPT activities described above. MAWD has recognized the need to inform extension officers more fully on agricultural technology and to devise better mechanisms to feed back the constraints of small farmers to research scientists for appropriate research. This recognition has been the basis of the collaborating approach between research and extension taken by the Department of Agriculture.

At present, the research division directs its research according to farmer needs determined through a series of meetings attended by the Commercial Farmers Bureau, government parastatal officers, research scientists, Zambia Seed Producer Association, and provincial level MAWD agricultural officers. The research results produced at the research stations under this method of determining research priorities are written up in crop memo pamphlets and given to the extension service to guide officers in training sessions and setting out demonstrations with small farmers. The extension service has difficulty in reaching small farmers, however, because of transportation shortages, lack of support from parastatal institutions, lack of appropriate technology, lack of extension and direct involvement in research activities. This project is designed to facilitate the new approach to bring closer collaboration between research and extension officers through the ARPT concept. As already discussed this project will establish the new position of RLEO in the ARPT in Central Province and will finance a technical assistance adviser to fill the position. The work of the RLEO is expected to enhance the utilization of research by:

i) compressing the time span between discovery of technology and its dissemination to small farmers,
ii) increasing the volume of relevant research output through the system; and
iii) raising the quality and quantity of research products through on-farm trials and farmer tests.
The RLEO will be stationed at Kabwe with the other ARPT members. He will be responsible for collaboration on project activities with provincial level extension officers and will receive overall project guidance at the national level from the Deputy Director of Agriculture (Extension).

At the Provincial level the RLEO and Zambian counterparts will participate in the adaptive research program carried out by the ARPT and undertake the responsibility to train extension officers at the camp, station, district and provincial levels. Extension officer training will be conducted at the Farm Institute and the four Farmer Training Centers in Central Province. Training conducted at these institutions will be through workshop sessions, seminars, demonstrations and general meetings. The RLEO will also be responsible to participate in the organization and conduct of farmer training workshops held at the agricultural stations and camps. These farmer training workshops will be of one or two-day duration. It is expected that six to eight hundred farmers will participate each year in these training and demonstration workshops. To facilitate these workshops a small amount of budget support is being provided through the project. At the national level the duties of the RLEO will be to ensure close collaboration with the Deputy Director of Agriculture (Research) and the Dutch Research Extension Liaison Officer stationed at Mount Makulu. The Deputy Director of Agriculture (Extension) will also assist in the coordination of the work of the Dutch Rural Extension In-Service Training team headquarters at Kabwe and financed under the World Bank Fourth Education Project. The technqiues and methodologies gained through the ARPT work in Central Province will provide guidance to MAWD in replicating the ARPT in other provinces.

One of the major advantages of this project is the close linkage planned between research and extension work in the conduct of field trials and on-farm tests. This approach will provide training to extension officers on how to carry out and monitor on-farm tests and demonstrations at the small farmer level. District and camp level staff will be trained at ARPT farm trial sites on the techniques used to set up farmer demonstrations and observe the results of applying new technology. The knowledge gained by extension officers through this association will be directly applied by encouraging small

farmers to modify their current farming practices. At present, by contrast, demonstrations are conducted without the benefit of extension workers observing research trials at either the research stations or on farmer fields.

b) Other Functions of Extension

The present extension program has several components which will be strengthened by the research-extension linkage of this project. In particular the strengthening will accelerate the development of the Farmer Field Day Activity, the Training and Visit System and the Rural Information Service. While these program activities are already part of the extension program it is the intent of the project to provide additional support through an intensification of the training effort for extension workers and farmers, motorcycles for transportation of agents, printed material on improved technology, and professional assistance in the conduct of field demonstrations and farmer field days.

i) Field Days and Tours:

It is planned that the project will have an immediate impact on small farmers by assisting extension officers in conducting field days and tours at ARPT farm trial sites. The adaptive field trials and farmer testing plots conducted by the ARPT will provide an excellent opportunity for extension officers to bring small groups of farmers together to observe the newly developed technology. These field days will have the greatest impact on the farmers adjacent to ARPT sites. In addition the ARPT trial and testing sites will provide the opportunity to inform other extension agents in the province of the newly developed technology and on the methodology for organizing and conducting proper field days and tours. This spread effect will give the ARPT work a wider audience throughout Central Province and make for possible replication in other provinces. Another benefit expected through the project will be the training of instructors from the other Farmer Training Centers (26) in the country. If possible the training of FTC instructors will be scheduled in Central Province, thus offering an opportunity for the instructors to observe and study the ongoing work out of the ARPT.

ii) Training and Visit System (T and V System):

The Training and Visit System has been recently introduced into the national extension service. The system is presently being tested out in the Central, Southern and Eastern provinces. The World Bank is providing financial and professional support to the MAWD for the T and V system. It is

planned that as the new agricultural technology is developed, it will be fed by the RLEO(s) of the ARPT into the T and V system. The method to transfer the new technology for T and V system extension officers will be through workshops and seminars held at the Central Province Farm Institute and Farming Training Centers. It is anticipated that the workshops and seminars will reach approximately 250 to 280 of the extension officers in the Central Province. By taking advantage of the instituted T and V system, it is hoped that the new agricultural technology adapted through the ARPT will be given a much wider distribution than is now possible.

iii) Rural Information Service (RIS):

The RIS is the primary office responsible for publishing printed material, programming radio farm forums and preparing audio visual materials. The World Bank Fourth Education Project is providing financial and professional assistance to the RIS. While the RIS is currently being assisted by another donor, it should be closely monitored by the contractor of this project. If it is determined during the first or second year project evaluation that additional commodity or financial assistance is required, the project contractor should consider using part of the allotted contingency fund to provide specific additional support. The RIS will support the research-extension component of the project by providing brochures, leaflets, bulletins and audio visual materials based on the new agricultural technology recommended by the ARPT. Information on the new technology will also become part of the farm forum program which is disseminated by radio to the farm audiences. Thus the published material and the radio program will be an integral medium to transmit knowledge of improved technology to extension officers and small farmers.

c) Female Extension Workers

Since 20% of households are headed by females and since women are responsible for major agricultural tasks in all households (for further description see below, Section IV, C, Social Analysis), considerable attention must be paid to this category of farmer. The project will reinforce MAWD policies to increase the number and improve the quality of female extension workers. At present in Zambia, women comprise fewer than 5% of the staff of the extension service (e.g. 13 female extension workers out of a total of 284 in Central Province). Their work is hampered in a number of ways: (i) most are stationed at provincial and district headquarters rather than at agricultural camps in the field (ii) in many rural areas social pressures are exerted against women travelling and working alone, and (iii) the training of female extension workers emphasizes home economics, kitchen crops and poultry keeping; while training

in improved crop production practices, for example in maize and sunflower that some women farmers grow, has been largely limited to male extension workers. The project seeks to improve this situation by (i) investigating the problems of women farmers, for example through the adaptive research by the ARPT and through special studies ii) actively seeking qualified female candidates, not only for in-service training but for undergraduate and advanced degrees iii) encouraging MAWD initiatives to extend information and technology to women farmers, perhaps using a contact group approach or women farmer field days.

5. Training

The participant training component of the project is aimed at improving the professional qualifications of Zambian scientists on the MAWD staff. At present, there are about 25 expatriates in the research branch under GRZ contract and about 24 expatriates in the extension service. Current reliance on expatriates for professional services is very heavy, and the GRZ will seek to redress the balance between Zambian and expatriate scientists and other professionals over the next decade. The School of Agriculture at the University of Zambia (UNZA) has been unable to keep pace with national requirements for graduates in the agricultural sciences. In 1979 it produced only 12 graduates (4 women) with bachelors degrees in agriculture. Several steps have recently been taken to alleviate this situation. The planned intake of first-year students in agriculture at UNZA has been boosted to 60 for 1981; freshmen students are now able to designate agriculture as a major field; and discussions are underway concerning the admission of NRDC diploma holders to the University. Nonetheless, the School of Agriculture will have limited capacity for growth given existing teaching and laboratory space at the Lusaka campus. Even disregarding this physical constraint, several years will be needed before the effects of new admissions policies are felt in the form of an expanded pool of trained agriculturalists.

For this reasons, the project proposes to train 34 Zambians in various crop research and extension specialities to the B.S., M.S., and Ph.D levels at US and other institutions in third countries. The aim of the training program is to provide the Zambian staff of the MAWD with the essential scientific, technical and administrative skills needed to carry out desired research and extension work. The training will also assist the GRZ with its goal of Zambianization of the senior level positions of the research and extension services. The numbers and educational levels of the existing MAWD Zambian research and extension staffs are indicated in

Annex D . Academic and in-service training provided by the project will improve both the scientific and administrative skills of Zambian professionals. The academic training is designed to perfect a highly qualified core of professionals who can deal effectively with agricultural research and extension problems. The unusually large number of participants to receive training for undergraduate and advanced degrees under this project (4 Ph.D's in research, 15 M.S.'s and 15 B.S.'s in research and extension) is considered justified as the most effective way, and probably the only way, to provide graduate level Zambian scientists with the highly specialized skills needed to carry out independent research in plant breeding, soil fertility, microbiology, etc. B.S. level training is required to strengthen research station management capability, research support staff, and extension work. Students receiving university training will be bonded to work for the GRZ (MAWD) in appropriate positions for specified periods of time commensurate with the length of time of training. The project agreement will contain a covenant requiring measures to ensure proper subsequent use of personnel trained under the project. The cementing of the linkages between Zambian researchers and researchers in other institutions in the world is necessary for the development of a first-class research development program. The exchange of knowledge, genetic materials and research techniques and methodologies is urgently needed to perfect the present MAWD research and extension endeavours.

Short-term training will be an important element of the training program. This will consist of third country study assignments at courses sponsored by CIMMYT, IITA, ICIPE, ICRISAT and INTSOY, as well as USDA and special US university sponsored short courses. These courses, normally of a 6-month duration, would include practical aspects of farming systems research; maize/sorghum/millet breeding and production, research administration, etc. Study tours of relevant development projects in nearby countries (e.g. Zimbabwe and Kenya) are also envisaged under this component of the project.

Within Zambia, in-service training sessions of 2 to 5 days duration will be supported. In-service training will be targetted at such GRZ personnel as field extension workers, extension and research supervisors, research assistants, field interviewers, and data analysts. Workshops, seminars and lectures will be planned, managed and taught by MAWD and AID project staff personnel, including short-term consultants. Training sites will include NRDC, field research stations, Farm Institutes and Farmer Training Centers. Also, the farmer training component of the project will consist of short workshops of one or two-day duration for small farmers.

These workshops will be conducted at the Farmer Training Centers and camp or station centers which will make it as convenient as possible for the farmer to attend.

6. Special Studies

Funding under this part of the project will provide opportunity to undertake supplementary studies that fall beyond the purview of the CRT and ARPT. In order to support project objectives, data and analyses may be required for example, on the following topics: a) the relationships among farming systems in Zambia with special attention to the disequalizing effects of labor flows; b) the role of women in farm-level decision-making and production; c) rural consumer preferences and the acceptability of soybeans and other grain legumes as food crops at village level; d) the reduction of shattering problems in soybeans; e) institutional constraint to the adoption of improved technology, mechanization and storage.

Funding for such studies will be channelled in two ways:

a) University of Zambia Special Studies

Over the five-year period these will amount to a total of $300,000, the disbursement of which will be jointly determined among MAWD, the University of Zambia, and the US university/ contractor. These studies would be for project-related work involving faculty, graduate and undergraduate students in both the technical and social science areas. For example, UNZA will be asked to provide a Rural Sociologist to develop, in conjunction with MAWD, a program of work over the five-year life of the project. A sociologist from the US was originally proposed but, at GRZ request, $50,000 was transferred from short-term consultancy to special studies to cover the costs of recruiting and supporting a qualified Zambian in this position. The sociologist will assist the ARPT in all phases of its work including questionnaire design, farmer contact, and interpretation of results from social structural and cultural points of view. Other UNZA personnal will be engaged on a more flexible basis. One of the objectives of this funding is to encourage the development of a "demonstration effect" on Zambian students of the advantages of a career in agriculture.

b) Research Associate Special Studies

Over the five-year period these will amount to $250,000 to meet fieldwork and report preparation requirements. Five Ph.D candidates based at US universities (including Zambians and other Africans) will be involved. The Research Associates will provide full-time assistance to the project and serve

the dual role of conducting research i) that contributes to the achievement of the objectives of the project and ii) in partial fulfilment of the requirements of a Ph.D degree. The Research Associates will be both social and technical scientists and will work with the ARPT's and CRT's respectively. The intention is, with five Research Associates in Zambia over the life of the project, each for a period of 18 to 24 months, that there would be an average of two individuals of this type in Zambia at any one time. The Deputy Director of Agriculture (Research) indicated that study tours of 18 to 24 months would be welcome but that shorter tours would be of questionable value. The inclusion of Research Associates in the project has the full agreement of MAWD; indeed their inclusion was felt by both sides not only to be mutually beneficial but important to the success of the project as a whole.

Topics for the studies and choice of personnel will be a joint decision between MAWD and the US university contractor. Such studies will tend to be relatively low cost, as Research Associates will receive nominal salaries and an allowance of $200 per month in lieu of housing.

7. Summary Conclusions

After in-depth discussions with the MAWD research and extension staff at all levels, the PP team is satisfied that the innovative approach proposed for the CRT's and ARPT's and the resulting strengthening of linkages at national and provincial levels, is technically sound and feasible. In the six months since the PID was prepared, MAWD has devoted a great deal of thought and attention to the development of this concept and to the redirection of agricultural research to benefit the smaller farmer. The PP team found itself in a dynamic situation, with momentum already provided by this GRZ initiative, into which the proposed AID project should fit smoothly, in a stroke of unusually fortuitous timing.

B. ECONOMIC ANALYSIS

The main thrust of the project is in helping GRZ to create some of the preconditions necessary for bringing about improvement in the welfare of small farmers in the long run. It is not, therefore, a revenue producing project, making it difficult to analyse from an economic viewpoint. For example, it is not possible at this stage to employ conventional cost-benefit analysis.

1. Types of Economic Benefits

While costs of the project can be estimated it is much more difficult to estimate the benefits. Reasons for this include the following:

a) The benefits that will arise during the project will result in intermediate products (e.g. such as trained Zambians, redirected research priorities, etc.) which only in the long run will bring about improvements in the welfare of small farmers. Such benefits will include increases in real income and improved nutrition levels among the rural population. Benefits will also accrue to the national economy in the form of reduced food imports resulting from increases in domestic food production.

b) The benefits that will arise in the long run will directly accrue to the different types of small farmers. However, in addition it is likely that indirect benefits are likely to accrue to emergent and perhaps even commercial farmers. It is possible to design an improved technology that can only be adopted by large farmers but it is not possible to design a type which is only applicable for small farmers and cannot also be captured by other types of farmers.

c) For the ultimate goal of improvement in the welfare of small farmers to be attained preconditions other than those under the purview of the project need to be fulfilled. Other factors would include a satisfactory degree of development of external institutions such as an efficient extension service, credit facilities, input availability, market development, etc. It would be virtually impossible to separate the effects of different factors in and outside the project on projected benefits. Therefore, it is impossible to estimate "a priori" the benefits that eventually will arise from the implementation of this project. However, numerous documented studies in both high-and-low-income countries have demonstrated the high potential pay-off in terms of return to public expenditure in agricultural research (e.g. internal rates of return in the USA 34-51%, India 63%, Columbia 71%, etc.) A unique feature of this project which could have a favorable impact on the internal rate of return is the explicit strategy of strengthening the research-extension linkages.

2. Areas of Cost-Effectiveness

Because of the difficulty of measuring benefits with any

degree of accuracy, the only alternative is to pursue the least cost method of achieving project objectives, i.e. helping improve the welfare of small farmers through a decentralized research system and through the integration of applied research, commodity research and extension services. The following activities of the project have been designed in the least cost manner:

a) Training of Zambians is a major component of the project. In the long-run there is no doubt this is the least cost way of providing the necessary skills. Continuing to hire expatriates to undertake such functions is simply not a viable alternative. Moreover, other universities in the Southern and Eastern African region do not at present have openings for the numbers of Zambian students that would be required to significantly expand the pool of agricultural skills.

b) The "top-down" approach to developing improved technology, that until recently characterized agricultural research in Zambia has certainly not proved a cost effective way of addressing the problems of small farmers. The restructuring of research around multi-disciplinary CRT's and their strong linkages to interdisciplinary provincial ARPT's provides promise of a more cost effective way of addressing the problems of different types of small farmers. This point is developed further in the Technical Analysis (IV, 2 - ARPT). This can be achieved through the ARPT's helping to articulate the research priorities of CRT's and undertaking adaptive testing, based on an identification of those needs or problems. This "bottom-up" approach to technology development is now being implemented in many countries because it is thought to be the only cost effective method of developing improved technologies relevant to the needs of more disadvantaged farmers who traditionally have not had a "voice" in determining research priorities. Just how cost effective this approach will be is an empirical question but the fact remains that the "top-down" approach has been completely ineffective.

c) The institutionalization of the research-extension link as proposed in the project has important implications in terms of cost effectiveness. A common problem in many countries has been the dichotomy between research and extension. As a result technology has often been developed that has not been delivered to and disseminated by the extension service in a timely manner. This project will support the establishment of a new position - the RLEO - in order to perform the bridging function between small farmers, applied research, commodity research and the extension system.

C. SOCIAL ANALYSIS

1. Social Feasibility: Institution-Building

The project is designed to build institutions with two levels of impact in mind; the national and the regional. At the national level the project will strengthen the MAWD by contributing advisers and training to the Commodity Research Teams (CRT's). The project will also contribute to institution building at the regional level by assisting in the establishment of an Adaptive Research Planning Team (ARPT) in Central Province. In the long-term the training component of the project is compatible with the GRZ goal of Zambianization of public service personnel.

The institution building approach of the project appears feasible within the present social environment of MAWD. The senior administrators and professionals in the research division have expressed support for technical assistance and training opportunities, as have the younger professional officers who stand to be selected for training. The proposals for strengthening the linkages between research and extension have been firmly endorsed. Indeed, the chances for project success are enhanced by the strong working relationship that already exists between the research and extension branches at Ministry Headquarters. Nevertheless, a current problem is the poor communication and coordination between research and extension at the lower levels of the MAWD organization. This project is innovative in that it seeks to integrate an extension component into the adaptive research process. Special care will have to be taken to involve all levels of extension officers in all phases of the interaction between small farmers and the research establishment. A more detailed assessment of participating GRZ institutions and GRZ support capabilities is given below (Section IV, D, Administrative Analysis).

2. Beneficiaries

Beyond institution-building, a beneficial impact is envisioned among the rural poor majority. In the broadest sense, the concern of GRZ and AID strategy in agriculture is with the 600,000 small farmers in Zambia. This is the group that is often referred to by GRZ as "traditional" farmers. The project will help to reorient research priorities in such a way as to contribute in the long run to improvements in the welfare of this group. Moreover, the adaptive research process will facilitate the participation of small farmers in the identification and solution of agricultural problems.

In order to clarify the meaning of "small farmer" and to pinpoint target groups for the project, a brief discussion of criteria for the classification of farmers is in order. Crudely speaking, one of the main characteristics that distinguishes types of farmer in Zambia is the area of land under cultivation:

Type	Cultivated Area	Estimated Numbers
Commercial Farmers	Over 40 ha.	400
Semi-commercial Farmers	20 - 40 ha.	5,000
Emergent Farmers	5 - 20 ha.	70,000
Small Farmers	0 - 5 ha.	600,000

Other characteristics, for example, the source of power for cultivation, can be assumed to roughly coincide with and reinforce this classification. Most small farmers till only with a hoe, emergent and semi-commercial farmers with oxen, and commercial farmers with tractors. Similarly, the smaller farmers are distinguishable according to the proportion of produce marketed and cash income from agriculture (low), access to farm inputs (low), source of labor (family rather than hired) and settlement pattern (village rather than individual homestead).

The emphasis on the small farmer does not imply a single or rigidly defined target group. The advantage of adaptive research is that it permits the development of recommendations for a wide range of farming systems and the delivery of differentiated packages of technology tailored to the needs of distinct producer groups. The task of defining precise domains for agricultural recommendations will fall to the ARPT. The work of the ARPT will take note of the heterogeneity of farming systems within the small farmer category. The ARPT may not be able to influence the development of technologies relevant to all potential target groups during the life of the project. But, in choosing where to place emphasis in initial research activities, the ARPT will have to balance at least two considerations. On the one hand, certain improved small farmers, especially those cultivators up to 5 hectares with oxen, are in a position to take advantage of market opportunities providing they can break one or more constraints of present farming systems. This is the group most likely to immediately respond to relevant technologies and to contribute to national food production. On the other hand, other categories of small farmer clearly constitute the poor majority. Those farm families cultivating under two hectares (with hand-held hoes, perhaps 400,000 in Zambia) are most likely to face seasonal food deficits and to have female heads of households. In order to meet GRZ

goals and the AID mandate, the project must maintain a focus on multiple target groups within the small farm sector.

3. Choice of Location

The dualism that marks Zambian society and economy is manifest in regional disparities. A clear distinction exists between two types of rural province: those on the "line-of-rail" (i.e. Southern, Central, Lusaka and Copperbelt) and the outlying provinces (Northern, Luapula, Northwestern, Western and Eastern). The line-of-rail provinces are best served by the infrastructure of agricultural services - NAMBOARD depots, cooperative marketing unions, agricultural extension camps - as well as enjoying proximity to urban markets. Agricultural production in the outlying provinces has been inhibited in large part by problems with the timely delivery of inputs, collection of produce, and payment of farmers. Government agencies responsible for these services have simply been stretched too thin.

The choice of location for ARPT activities was governed by two considerations. First, the ARPT must have easy access to the project target groups among the rural poor majority. In this regard, almost any province in Zambia would have qualified; according to the Census of Agriculture 1970-71, in no province do small farmers constitute fewer than three-fourths of the total. Second, the chances for farmers to respond to relevant and improved technology must be maximized. Since the project does not make provision for the upgrading of agricultural support services, the choice of location was restricted to areas where the infrastructure was already relatively reliable.

The GRZ requested that the ARPT be set up at Kabwe Regional Research Station and that its work begin in the Central Province. This choice of location fulfills the necessary conditions: 80% of the farmers in Central Province cultivate less than 5 ha. and 60% less than 2 ha., yet they are served by a road, rail, marketing and extension infrastructure that is better developed than the norm. The Central Province lies on the Zambian plateau at a consistent altitude of 1000 metres above sea level and receives a uniform annual rainfall of 800-1000 mm. The population of 345,000 comprises some 75,000 farm households and is spread over a large area in a low density of about 3 persons per sq. km. The main starch staples grown by small farmers are maize and sorghum with millet and cassava also important in some areas. Maize serves as both a food crop and as a cash

crop, whereas the others are always consumed locally as porridge (or beer) supplemented with a side-dish of fish, groundnuts, beans or leafy vegetables. For the most part, emergent and commercial farmers are restricted to pockets in Mumbwa District, parts of Kabwe Rural District, and the Mkushi block. Small farmers predominate in all other parts of the province. The ARPT may wish to pay particular attention to Serenje District which is populated almost exclusively by unimproved or subsistence village farmers. The ARPT may also wish to build upon the preliminary analysis of the eight distinct farming system domains in Central Province (six of them traditional) prepared for MAWD by the International Maize and Wheat Improvement Centre/East Africa (CIMMYT/EA).

4. Spread Effects

The work of the ARPT will increase resources devoted to farm level research as a complement to the work conducted on experiment stations. Trials of new agricultural technologies will first be conducted on farmers fields under the supervision of researchers and extension workers with the assistance and labour of farmers. Later, the farmers themselves will assume all management functions and fully test recommendations within the context of their own annual agricultural cycles. In this process, those farmers who participate in farm trials and tests will benefit most quickly and directly from the spread of relevant technologies. Indirect benefit will accrue to farmers with similar crop mixes and conditions of operation, especially the 3-4000 who attend in-service training sessions organized under the project. Since Central Province enjoys fairly homogenous ecological conditions, it is likely that technologies developed on the basis of farm trials and tests will have potential for broad diffusion. Spread effects might also be reasonably expected to other provinces where comparable farming systems prevail or where Zambian researchers trained under the project are able to initiate further adaptive research investigations.

5. Social Feasibility : Small Farmers

It seems feasible that the project will benefit target groups among small farmers and have a measure of spread effect, providing three caveats are considered.
a) Agricultural support services must operate efficiently and effectively. It is no good recommending the adoption of hybrid seeds or fertilizers, for example, if these inputs are unavailable at local depots at planting time or if payment for the previous season's crop has not been made. Moreover, technology development must be realistically matched to the

capacity of the existing support system to deliver.
b) The success of this project also depends on the effective transfer and evaluation of recommendations by the agricultural extension service. Since the Training and Visit System has been more fully operationalized in the Central Province than elsewhere in Zambia, it is hoped that a reasonable degree of diffusion of innovations will occur. Training for agricultural assistants provided under the project cannot alone reinvigorate the entire extension service. Special effort will also have to be made to direct the attention of extension workers beyond the existing clientele of emergent farmers. In Central Province many of the most successful producers are settlers from outside the area. In addition to servicing the concentration of Tonga, Lozi and Zimbabwean emergent farmers in Mumbwa District, for example, extension should address the needs of the Lenje, Lala and Shwaka groups (among others) indigenous to the Central Province.
b) There is some question regarding the acceptability of certain oilseed commodities by small farm families. Sunflower and cotton have caught on as cash crops, especially among emergent farmers (90% of marketed sunflower production comes from noncommercial farms); soybeans, however, are produced almost exclusively (95%) by commercial farmers. The latter commodity is used primarily as a stockfeed and does not presently play a part in human diets in villages. The work of the soybean breeder designated under the project is unlikely to be relevant to the rural poor majority unless accompanied by a widespread change in food preferences. Given its richness in protein, however, soybean has high potential for improving nutrition in Zambia. It can also double as an alternative cash crop and, when planted in rotation, serve as a partial substitute for nitrogenous fertilizer. On balance, the soybean component of the project can be endorsed with two provisos: first, that a special study is made of rural consumer preferences and the acceptability of soybeans as a village food crop; and second, that nutrition education programs are undertaken to promote acceptability of this new commodity.

5. The Role of Women

Women are central to agricultural production in Zambia. Not only do they provide a significant proportion of the labor force on commercial and emergent farms but produce 80% of the domestic food in the traditional sector. Women cultivate field and kitchen crops and are responsible for processing starch staples into meals.

Part of the reason for this pivotal role of women lies in the political and economic history of Zambia. During the colonial era most rural areas were incorporated into a

Southern African mining complex which stretches from Capetown, South Africa to Lubumbashi, Zaire. Able-bodied males were drawn out of the rural areas into urban mine employment. Men were usually responsible for shifting slash-and-burn axe-cultivation or cattle-keeping, but male outmigration and woodland depletion have led to greater emphasis being placed on hoe-cultivation by women on permanent plots. Income-generating activities such as beer brewing and the sale of groundnuts have traditionally been the preserve of women and continue to be important to small farm households today. Indeed, many female-headed households rely on these activities as a sole source of income. The proportion of female-headed households varies from province to province, the highest up to 60%; Central Province averages about 20%.

Women are over-represented among the poorest stratum of traditional farmers. Seasonal labor is one of the scarcest factors of production in rural Zambia and a major constraint on increased production by households headed by widows or divorcees. Research by the Rural Development Studies Bureau (RDSB), University of Zambia, shows that women farming alone are susceptible to the reclamation of tools and equipment by the families of men who are dead or departed. The cultivation of permanent fields is demanding in terms of the intensive labor required for hoeing, ridging and weeding. As a result female-headed households have often reduced the area of staples under cultivation or changed crop choices in favor of low-husbandry but low-nutrition crops such as cassava. The RDSB study shows that one-third of the female-headed households have insufficient grains to engage in brewing beer for sale. Moreover, women and children whose household production is stalled below the subsistence level are increasingly being driven into piecework as hired laborers for more successful farmers.

The ARPT, in its focus on multiple target groups with different farming systems, should take care not to exclude female-headed households. Indeed it should seek to move beyond the existing CIMMYT methodology by including sex of head of household as one criterion in discerning recommendation domains. (Other possible criteria include ethnic group, and whether or not farmers are registered with the extension service. See also Annex C.) Moreover, as part of the project, special studies are recommended on women in agricultural production in Zambia which would address the following topics, among others: the accessibility of female-headed households to resources such as labor, tools and credit; the generation and retention of farm and off-farm income by women; the labor requirements of the farming systems

of female-headed households and the flexibility (or lack thereof) available for the introduction of innovations; role of female extension workers in fostering contact with women as agricultural producers (see also Section IV, A, Technical Analysis).

7. Summary of Social Impact

The project aims primarily at institution-building within MAWD and evaluation of the project should reflect this. The extent to which MAWD is better able to address the technological constraints of small farmers is the most appropriate criterion for assessing social impact. Some small farmers, including households headed by women, will directly benefit from farm trials, test, and demonstrations, and from the adoption of improved technology. Wide and sustained spread effects, however, depend in part on the commitment and capacity of agricultural support agencies other than MAWD and beyond the scope of this project.

D. ADMINISTRATIVE ANALYSIS

1. Administrative Arrangements for US Technical Assistance

a) Coordination among Three Locations by Team Leader

The biggest administrative problem arising from the implementation of this project is the fact that the US long-term technical assistance team will be located in three different locations in Zambia: four members will be in the Lusaka area (the Team Leader in town near MAWD and three at the main research station at Mount Makulu); three in Kabwe (Central Province), 100km north of Lusaka; and one at Magoye (Southern Province) 120km south of Lusaka. This distribution is required by the nature of the GRZ agricultural research network, with actual locations dictated by the selection of crops covered. Although in all cases access to Lusaka and to the other stations concerned is good (first class paved roads), US advisers will be housed at their respective stations, which will present a number of administrative problems. For this reason, and the general complexity of the project involving 7 long-term advisers and 62 p/m of consultants, an overall team leader is deemed necessary, an experienced agricultural professional who can coordinate the work done by the US team at the various locations and serve as the team's spokesman with MAWD in Lusaka. The Team Leader will report directly to the MAWD Director of Agriculture and would work very closely with the Deputy Directors for Research and Extension. He will also play an important substantive role as a farm systems economist supporting the CRT structure, with progressively more time devoted to the substance of research in the latter years of the project.

The Team Leader will be based in Lusaka, where he can work closely with MAWD and yet would be only 15 minutes away from the Mount Makulu Research Station. A house and a separate office would be rented in Lusaka for the Team Leader, as there is inadequate office space at MAWD Headquarters. The Team Leader will be the first team member to arrive in Zambia, as soon as possible after the US university contractor is selected and probably several months ahead of the other team members. His early tasks will include planning the arrival schedules for the long-term advisers and the first short-term consultants, working closely with MAWD to select the first groups of Zambians to go to the US for academic training and laying the professional groundwork and workplan for the balance of the US team. The Team Leader will hire an Administrative Assistant locally whose job it would be to handle numerous time-consuming, yet important logistical details, involving housing,

furnishings, vehicles, arrival and delivery of project commodities, etc. The Team Leader would also hire locally a secretary and driver who would support the AID team as a whole.

b) Housing of the US Team

Housing for the US team in the three locations mentioned is not now available and would have to be built and financed under the project. Timing of construction is clearly of paramount importance as team members will not be able to work effectively unless they are resident at their respective stations. With the exception of the Team Leader who can occupy rented quarters in Lusaka, long-term team members should not be sent to Zambia until their housing is completed. Short-term consultants can, of course, be sent at any time, as they require far less logistical support.

The GRZ has prescribed standards for staff housing, and architectural plans for senior staff (suitable for expatriate professionals) have been reviewed by REDSO/EA engineers and found satisfactory. These three-bedroom houses, several of which were inspected by the PP team, are adequate for families with no more than two children at post. Appropriate furnishings will be provided under the project.

The main problem with respect to housing is the time required for construction if local private contractors are employed. Estimates of about one year were quoted after the construction contract is signed before the houses are ready for occupancy, due mainly to financing, labor and supply problems. The GRZ has proposed to build the houses using MAWD's own construction teams, which have in the past proved to be more reliable and faster than local private contractors. Using these procedures a construction period of six months is considered sufficient. The GRZ has also agreed to furnish suitable building sites, provide electrical and water connections and assign Department of Public Works engineers to supervise construction. Construction delays are frequently the result of financing uncertainties, which should not be a problem in this case, since AID will fund construction costs.

To reduce construction time, some consideration was given to exploring pre-fabricated housing, perhaps from Zimbabwe, but local examples seen by the team did not appear to be as solidly constructed as conventional houses built by Zambian contractors. Since the houses will be used by the Zambian research staff long after the end of the AID project (at least a 40-year life expectancy is desired), both MAWD and the project design team preferred to remain with normal GRZ house construction practices.

c) Schooling Problems

An important recruitment constraint for the US team will be the lack of adequate schooling in the rural locations (Kabwe and Magoye; Mount Makulu's proximity to Lusaka is an exception) In Kabwe the convent primary schools are generally considered adequate for boys until age 8 and girls until age 13 although classes are large (40-50). Selection of advisers for the two rural areas would, therefore, probably have to exclude candidates with children in fourth grade through high school, unless they are willing to consider boarding school.

d) Implementation under US University Contract

Implementation of this project will be contracted by AID to a US university or consortium of universities. Selection will be based on competitive bidding, judged jointly by AID and the GRZ (MAWD).

For procedures on selection of the university contractor, see Section VI below (Implementation Plan). The length of the project covered by this PP will be five years. However, because of the long-term nature of the research to be undertaken, it is likely that the present project, if successful, may be followed by another second and perhaps even a third five-year phase. As for the first phase, it would be desirable for as many as possible of the US team members to remain for the full five years for maximum continuity. A basic tour of three years is recommended with an authorized "R & R" holiday trip annually for each US family.* Staff members desiring a second tour would take home leave in the US at the end of the third year, while for the others replacements would arrive at that time.

The microbiologist to be supplied under the project will not strictly be a member of the technical assistance team. He will play a direct operational role at Mount Makulu, filling in for MAWD's sole Zambian microbiologist while the latter is in the US pursuing a Master's degree. The US microbiologist will be sought under an OPEX arrangement for a two-and-a-half year period to provide appropriate before-and-after overlap with his Zambian counterpart in training.

2. Role of AID/Zambia

The present two-member AID office in Lusaka will be expanded before the end of 1980 to include an agricultural officer and a management officer, both of whom are expected to play an active supporting role in this project, especially during the first two years. The agricultural officer, will act as liaison between the US Agricultural Research and Extension team and AID/Zambia on matters of program and

*R & R travel funds can be applied for an annual trip to the east coast of the United States for R & R and/or to attend professional meetings.

substance. He will be largely responsible for conducting an annual Project Evaluation Summary (PES) with the team's help (see Section VII, Evaluation Plan). On the logistical side, the AID management officer will assist the Team Leader in facilitating the smooth start-up of the project in the first months following the team's arrival. Another useful function of the AID/Zambia office will be in the area of participant training. A well-qualified Zambian training assistant is already employed at the AID/Zambia office and will be able to prepare and process much of the required training documentation such as PIO/P's and bio-data forms. The training assistant will also work on the Ag. Studies, Training and Institutional Development Project (611-0075) which has an equally large training component. Despite excellent anticipated project support from AID/Zambia, it should be borne in mind that all of the AID staff will have numerous other responsibilities and will be able to devote only a limited portion of their time to this project. For day-to-day management, the project will have to rely on the Team Leader and his administrative assistant.

3. Assessment of Participating GRZ Institutions

The institution-building objectives of this project have been emphasized throughout this paper. The GRZ entities most directly involved are, of course, the Research and Extension divisions of MAWD. Both are well-established and have developed an infrastructure over the years which place them well ahead of similar institutions in most African nations. Although thinly staffed at the professional level, both have capable, progressive leadership. Both directors are foreign-trained (Research-US and Extension-New Zealand) and appear to have an excellent relationship both with each other and with the various expatriate experts who assist them. Both the Directors of Research and Extension and members of their senior staff were extraordinarily cooperative and helpful to the PP team in the development of this project. Senior MAWD staff collectively devoted over 150 person/hours of time with the PP team, including meetings and field trips. This represents several times the average host government participation in the design of an AID project and reflects the degree of GRZ interest.

Although it has an infrastructure which has been described as potentially one of the most effective in Africa,*the MAWD

*The Agricultural Education Sector in Zambia: Constraints and Opportunities, by William T. Levine, South-East Consortium for International Development, 1978.

Extension Service's performance suffers from a number of shortcomings, including inadequate teaching for its large staff (over 1500 extension workers), lack of transport for field staff, and a low level of incentive for extension agents in terms of housing, per diem allowances and working conditions. The Research Organization, although possessing a network of 23 field stations around the country is critically short of trained Zambian staff and is constrained in the operations by recent Government-wide budget cuts.

Despite these limitations, MAWD has made significant recent progress in improving its research organization, with the creation of the new Commodity Research Team and Adaptive Research Planning Team structure. Much has already been written in this paper about the CRT and ARPT, but the point to be made here is that this initiative was taken by MAWD immediately prior to the design of this project and was thus not imposed by AID or the contract design team as the basis for the project. Nevertheless, it will indeed serve as the framework around which the US technical assistance will be based and is expected to receive full GRZ backing as a concept of MAWD's own creation.

4. GRZ Support Capabilities

a) Counterpart staff - MAWD will be expected to assign a Zambian professional counterpart to each of the seven US technical advisers supplied under the project. Considering the limitations of the size of the Zambian professional research and extension staffs and the several other foreign donor projects which they must support, it is evident that a full-time senior person cannot be furnished in most cases. The choice may then be between sharing a senior Zambian with one or more other projects on a part-time basis or accepting a full-time junior person (Diploma level) who may have very little experience or operating authority. Although the training value of the latter option may be high, regular access to a senior Zambian professional will be important for every US adviser. Therefore, the GRZ will be asked to identify a Zambian counterpart of appropriate rank for each US adviser, even one already working with another relevant project. In cases where counterparts are sent to the US for long-term training, substitute counterparts will be designated by MAWD, normally the official replacements for the officers in training.

b) Selection of trainees - although all of the long-term training proposed in the project is badly needed, the GRZ may have difficulty in identifying suitable candidates, freeing them for 2-3 years of study abroad and finding replacements to do their work in the meantime. For this reason, there may have to be some trade-offs between the four

proposed Ph.D training positions and those at the Master's degree level, if sufficient Ph.D candidates cannot be found. The GRZ is being strongly urged to identify participants for training at the outset of the project. To enforce this principle, AID will plan the arrival in Zambia of the advisers (other than the Team Leader) to coincide with the final selection of the first group of Zambian participants.

E. ENVIRONMENTAL CONCERNS

An Initial Environmental Examination recommending a negative determination was submitted with the PID in January 1980 and approved in AID/W as part of the PID review process. Since this Project Paper proposes no significant design changes from the PID, no further environment analysis is necessary. The IEE is attached to this paper as Annex J.

V. FINANCIAL PLAN

A. SUMMARY OF AID PROJECT BUDGET

Total AID life of project contributions total $12,515,000, of which $2,779,000 represent allowances for inflation and contingencies. These allowances constitute an increase of 28.5% over the 1981 "base price" of the US contribution of $9,536,000.

Major components of the project budget are as follows:

Technical Assistance	$	5,223,000
Training		2,662,000
Commodities		834,000
Construction		405,000
Operational Recurrent Costs		612,000
TOTAL		9,736,000
Inflation at 10% compounded annually		1,852,000
Contingency 8%		927,000
GRAND TOTAL AID BUDGET	$	12,515,000

It will be noted that this budget represents a 54% increase from the PID estimate of $8,156,000 for AID's life of project contribution. Although the final design of the project remains unusually faithful to the initial proposal in the PID, several factors explain the cost increases from the earlier provisional budget.

1. Direct technical assistance costs have increased by just over $1 million, although they now represent a lower percent of the total US budget (about 40%) than in the PID (about 50%). This increase is the result of a) the addition of one and a half more staff members: a Team Leader/agricultural economist for 5 years and an OPEX microbiologist for two and one half years, and b) a higher level of cost estimates for technical assistance (now budgeted at an average cost of $125,000 per year). The PID cost estimate failed to take account of institutional overhead assigned to technical assistance.

2. The training budget has increased by about $850,000 as a result of refinements in the training plan, which now include the Special Research Grants ($300,000) and the Research Associate Program ($250,000).

3. Commodities, only a rough estimate at the time of the PID, have grown by about $350,000 with the compilation of a definitive list of required equipment and supplies. The commodity budget includes a 7% fee for the US Procurement Agent and a $20,000 supplement for air freight of critical or fragile items.

4. The PID budget gave insufficient attention to operational costs arising from the activities of the US team, apart from those contributed by the GRZ. A budget of just over $600,000 has been added for this purpose, details of which can be found in the Financial Annex.

5. Finally, the PP budget includes a more liberal provision for inflation and contingency than was thought necessary when the PID was prepared. A contingency of almost $1 million is now allowed. While this is only 8% of the inflated cost of the project, it is considered adequate because the main elements and activities of the project are clearly defined and major deviations are considered unlikely. With respect to inflation, a 10% rate, compounded annually,is considered sufficient since all of the construction and 90% of the commodities will be financed during the first year. Subsequent year expenditures relate primarily to US technicians' costs and training, which are considered unlikely to increase by more than 10% annually.

B. GRZ CONTRIBUTION

The GRZ budget for this project totals $4,256,000 or 25.38% of overall costs. The host government will mainly be in-kind, through the provision of personnel, facilities and services. Since most of the Zambian staff involved as well as facilities to be used already exist and are in the GRZ budget, the additive recurrent cost burden on the GRZ will not be great. Nevertheless the GRZ has committed itself to devote considerable human and institutional research towards the objectives of this project. Although the high priority attached by MAWD to the support of this project has been amply demonstrated by the active participation of senior ministry officials in the design of the project, MAWD's ability to meet its recurrent cost obligations should be examined in the light of austerity measures imposed from time to time by the GRZ on its operating ministries because of the effect on the Zambian economy of fluctuating copper prices. As reported in the PID (p.20), severe cuts were imposed in 1979 on the MAWD research and extension budgets. However, in the case of research, half of this cut (about $450,000) was later restored by a budget supplement. Following are revised figures for the MAWD

research and extension budget for the past two years.

MAWD Research/Extension Budget ($000)

	1979	1980	% Increase
Research			
Recurrent	2036	2513	23.4%
Capital	1273	2363	85.6%
Total	3309	4876	47.3%
Extension			
Recurrent	7910	8674	9.6%
Capital	2469	3810	54.3%
Total	10,379	12,484	20.2%

An examination of the GRZ budget on a year-by-year basis reveals that most current costs relate to staff salaries of Zambian personnel working on project activity directly or those in the US for long-term training. The effects of this on MAWD will be of an opportunity cost nature, rather than a heavy burden of additive financing. The AIDREP/Zambia and the design team believe that the GRZ budget is within reasonable limits and that MAWD will have both the resources and the motivation to fulfill its commitment under the project.

A multi-year comparison of the MAWD budget and its research and extension components is given below. In addition to steady increases in absolute terms, research and extension have also received some increase in percentage terms except for 1979 when MAWD received a sizeable increase in its headquarters capital budget.

Multi-year Budget Comparisons ($000)

Unit	1976	1977	1978	1979	1980
Research	2181	2756	3510	3309	4876
Extension	7364	8665	10,071	10,379	12,484
MAWD	106,602	117,775	96,869	177,350	169,405
GRZ	773,600	1,046,708	971,555	1,231,255	1,286,964

Multi-year Budget Comparisons ($000)

Percentages	1976	1977	1978	1979	1980
MAWD as % of GRZ	13.7	11.2	9.9	14.4	13.1
Research as % of MAWD	2.0	2.3	3.6	1.8*	2.8*
Extension as % of MAWD	6.9	7.3	10.3	5.8*	7.3*
Dept.of Agriculture (Rsh + Ext) as % of MAWD	8.9	9.6	13.9	7.6*	10.1*

* Declines in % due to larger than normal capital allocations to MAWD Headquarters.

The GRZ project budget is summarized in the following table showing major headings by fiscal year. For a breakdown of the GRZ budget, see the Financial Annex, where the full budget submitted by the MAWD is included. In the Annex table, support costs, which parallel the presentation of the AID budget, are indicated in Zambian kwacha (K1.00 = $1.25).

C. SUMMARY FINANCIAL TABLES

Pages 51-55 contain financial tables summarizing the AID and GRZ contributions to this project by category and fiscal year.

SUMMARY OF GRZ PROJECT EXPENDITURES BY FY ($000)

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
Support to US Technical Assistance	104.8	112.8	113.9	108.8	111.0	551.3
Support to Training	106.3	261.7	328.1	288.8	288.8	1273.7
Operational Recurrent Costs	191.2	209.9	177.6	234.1	259.8	1067.6
Basic Totals	402.3	584.4	619.6	631.7	654.6	7892.6
Totals with inflation 15% (compounded annually)	402.3	672.1	884.8	869.5	1040.1	3868.9
Contingency 10%	40.2	67.2	88.5	86.9	104.0	386.8
GRAND TOTAL GRZ BUDGET	442.6	739.3	973.3	956.4	1144.1	4255.7

ESTIMATED AID PROJECT EXPENDITURES BY FISCAL YEAR (US$000)

LONG-TERM ASSISTANCE	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
Soybean Breeder	125	125	125	125	125	625
Maize Breeder	125	125	125	125	125	625
Sunflower Agronomist	125	125	125	125	125	625
Farming Systems Economist	125	125	125	125	125	625
Agronomist	125	125	125	125	125	625
Extension Agronomist	125	125	125	125	125	625
Agricultural Economist	125	125	125	125	125	625
SUB-TOTALS	875	875	875	875	875	4375
SHORT-TERM TECHNICAL ASSISTANCE						
Soil Scientist (8 P/m)		21	21	21	21	84
Entomologist (6 P/m)		21	11	11	21	64
Plant Pathologist (7 P/m)		21	11	21	21	74
Farm Systems Analyst (4 P/m)		11	11	11	11	44
Sr. Rural Dev. Specialist (5 P/m)		11	21	11	11	54
University Coordinator (3 P/m)	32					32
Librarian (2 P/m)	11		11			22
Evaluation (6 P/m)			32		32	64
Microbiologist (OPEX-30 P/m)	63	125	125			313
Microbiologist (2 P/m)				11	11	22
Other Specialities (7 P/m)	11	11	21	21	11	75
SUB-TOTALS	117	221	264	107	139	848
TECHNICAL ASSISTANCE TOTALS	992	1096	1139	982	1014	5223

ESTIMATED AID PROJECT EXPENDITURES BY FISCAL YEAR (US$000) (Continued)

TRAINING	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
Ph.D Candidates (4 x 3 Yrs.)		80	80	80		240
M.S. Candidates (15 x 2 Yrs.)	40	140	260	160		600
B.S. Candidates (15 x 2 Yrs.)	160	300	300	140		900
Short Courses (27)	10	50	70	70	70	270
Incountry Training		25	25	25	25	100
Special Study Grants (6)	50	50	100	50	50	300
Research Associate Program		63	63	63	63	252
TRAINING TOTALS	260	708	898	588	208	2662
CONSTRUCTION						
Long-Term Advisor Houses (6)	375					375
Screenhouses (3)	30					30
CONSTRUCTION TOTALS	405					405
COMMODITIES						
Vehicles (12)	120			60		180
Tractor (1)	18					18
Motorcycles (52)	31			31		62
Research Equipment *	438					438
Household Furniture(7 sets)	126					126
Office Furniture (Team Leader)	10					10
COMMODITY TOTALS	743			91		834

ESTIMATED AID PROJECT EXPENDITURES BY FISCAL YEAR (US$000) (Continued)

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
OPERATIONAL RECURRENT COSTS						
Project Expendables	66	66	66	66	66	330
Administrative Recurrent Costs	24	30	30	30	30	144
Vehicle Fuel & Maintenance	46	37	28	18	9	138
RECURRENT COST TOTALS	136	133	124	114	105	612
TOTAL PROJECT COSTS	2536	1937	2161	1775	1327	9736
TOTAL COSTS WITH 10% INFLATION (compounded annually)	2536	2131	2615	2363	1943	11588
CONTINGENCY 8%	203	171	209	189	155	927
GRAND TOTAL AID BUDGET	2739	2302	2824	2552	2098	12515

SUMMARY OF PROJECT INPUTS ($000)

	AID		GRZ		TOTAL	
	FX	LC	FX	LC	FX	LC
Technical Assistance	5223	-		551	5223	551
Training	2136	526	-	1274	2136	1800
Commodities	834	-	-	-	834	-
Construction	-	405	-	-	-	405
Operational Recurrent Costs	-	612	-	1068	-	1680
TOTAL	8193	1543		2893	8193	4436
Inflation	1482	370		976	1482	1346
Contingency	742	185		387	742	572
GRAND TOTAL	10,417	2098	-	4256	10,417	6354

VI. IMPLEMENTATION PLAN

A. ROLE OF THE UNIVERSITY CONTRACTOR

1. Selection Procedures

AID-financed inputs for this project will be implemented by a professional team supplied by a US university selected under a competitive bidding procedure. The US university team will work for and with the GRZ implementing agency, the MAWD Department of Agriculture's Research and Extension Divisions.

At the PID stage it was intended that this project be designed in final form and implemented under the Title XII Collaborative Assistance Mode. However, there proved to be insufficient time for the Title XII selection procedures to be completed early enough to permit project authorization and initial obligation in FY 1980. Instead AID used an existing Cooperative Agreement with a US university to undertake preparation of the Project Paper in July 1980. To implement the project, a direct AID-university contract is proposed, with a short list of eligible universities to be drawn up by the AID Project Committee based, inter alia, on recommendations from the GRZ, AID/Zambia and REDSO/EA. Requests for proposals will be prepared and issued by the AID/W Contract Office as soon as possible after execution of the Project Agreement with the GRZ to permit arrival of the long-term technical assistance team in the Spring of 1981.

2. Administration of Training Program

The project's training program will be administered by the contracting university, as will the Research Associate Program. Roughly 20-30 per cent of the Zambian participants in long-term academic training in the US would attend the contracting university, which would have the responsibility of placing the remaining students at other appropriate US universities.

B. CONSTRUCTION PROCEDURES

The only construction financed under the project will be six houses for the long-term US advisers and three plant-breeding screenhouses for experimental purposes. The screenhouses will be very simple wood-frame structures which will be built using labor at the research stations and locally available materials.

The six houses to be built will be located at the MAWD

Research Stations where US adviserswill be assigned: Kabwe (3), Mount Makulu (2), Magoye (1). It has been proposed to the GRZ that construction be financed by the host government using the Fixed Amount Reimbursement (FAR) method of payment. This procedure is acceptable to the GRZ, since standard GRZ plans and specifications for senior staff housing (Model 3-2-2) will be used and building will be under MAWD's direct control. MAWD will use its own house construction units and work crews, which have been formed in each of Zambia's nine provinces, with supervision supplied by the Public Works Department. The PP team was told that the MAWD unit has a better record of adherence to construction schedules than private contractors because of better control and supervision. In the Administrative Analysis, the problem of construction delays was raised, and a principle stressed with the GRZ by the PP team was the US advisers will not be sent to Zambia until their housing is ready, except for the Team Leader who will be in a rented house in Lusaka, and short-term consultants. The GRZ has indicated its intention to begin construction of the six houses as soon as possible after the Project Agreement is signed. This will allow approximately six months for the house to be completed, which MAWD judges to be sufficient. The AID/Zambia office will monitor the situation closely and a REDSO/EA engineer will be available as needed to assist the GRZ with the planning of construction.

C. PROCUREMENT

Equipment and scientific instruments in the amount of $438,000 will be procured virtually all of it from the US except for small articles available locally as shelf items. A full list of equipment is included in the Financial Annex to this paper (Annex E). Seven sets of residential furniture for the US team will be ordered from the US. Office furniture for the Team Leader will be procured locally.

Eight vehicles, one tractor and 26 motorcycles will be purchased in the first year, and four vehicles and another 26 motorcycles in the fourth year as replacements.

The first year's purchase of vehicles includes:

Vehicle	Use
3-1/2 ton pick-up trucks	CRT, Mount Makulu
2-4 wheel drive multipurpose vehicles	ARPT, Kabwe
2-station wagons	Team Leader/ARPT
1-mini-bus	Extension, Kabwe
1-90 hp tractor	CRT, Magoye
26-small motorcycles for field use	Extension/ARPT, Kabwe

To reduce the cost of fuel it is recommended that all of these vehicles be diesel-powered (diesel fuel presently costs half as much as gasoline in Zambia). For such reasons as right-hand steering, maintenance and spare parts, it will be necessary to purchase all of these vehicles in a non-US source/origin basis. The justification for a Code 935 waiver is attached as Annex H.

Since a considerable amount of equipment will be purchased from the US, the services of a procurement agent will be necessary. Technical specifications will be prepared by AID/DSB/AGR (which was represented on the design team) and sent to REDSO/EA for preparation of PIO/Cs. Upon completion PIO/Cs would be sent to the US procurement agent selected by AID/W for procurement arrangements. Itmay be necessary initially to rent warehouse space for the project to accommodate the early shipments of furniture equipment and materials if they arrive in Zambia before the US team is in place to receive them.

D. PROPOSED CALENDAR OF EVENTS

Date	Major Action	Primary Responsibility
August, 1, 1980	Submission of PP to AID/W.	AID/Zambia AID/REDSO/EA
August, 20, 1980	AID/W Review and Project Authorization.	AID/W
August, 30, 1980	Signature of Grant Agreement	AID/Zambia-GRZ
August, 1980	Short list of US universities agreed to.	AID/Zambia REDSO/EA,GRZ, AID/W
October, 1980	Zambian Soybean Breeder processed for short-term training.	AID/Zambia
October, 1980	Bids solicited from US universities on short list.	AID/W Contracts Office
October, 1980	PIO/C for research equipment completed & approved.	AID/DSB/AGR REDSO/EA
November, 1980	Request for Proposals (RFP) issued by Contracts Office.	AID/W
December, 1980	Procurement Contracts awarded/orders placed for research equipment.Vehicle orders placed.	REDSO/EA AID/W
January, 1981	University proposals reviewed (60 days after RFP).	AID/W, GRZ REDSO/EA
January, 1981	Construction started on 6 houses.	AID/Zambia and GRZ
January, 1981	GRZ and REDSO reps visit 3 final university candidates for interviews.	GRZ/REDSO
January, 1981	University contractor selected.	AID/W, AID/ Zambia, GRZ

Date	Major Action	Primary Responsibility
January, 1981	1 short-term trainee departs for INTSOY Soybean Conference in Srilanka.	AID/Zambia
February, 1981	University Contract signed	AID/Zambia
February, 1981	Team Leader and Univ.Admin. Officer to Lusaka on 30-day TDY to arrange office, secretary, admin.asst; interview participants; check on housing.	AID/Zambia TA Contractor
March, 1981	Soybean Breeder arrives on 45-day TDY.	TA Contractor
May, 1981	Arrival of Team Leader.	TA Contractor
May, 1981	Processing completed for 8 B.S. and 2 M.S. participant trainees.	TA Contractor
June, 1981	Vehicles arrive.	TA Contractor
June, 1981	Initial research equipment shipped by surface arrives Zambia.	TA Contractor
July, 1981	Construction of houses completed.	GRZ
July, 1981	OPEX Microbiologist arrives.	AID/W
August, 1981	Contract Adm. Officer TDY.	TA Contractor
August, 1981	First 10 trainees depart for US.	
September, 1981	Librarian Consultant TDY - one month.	AID/W
September, 1981	6 long-term TA team members arrive.	TA Contractor
September, 1981	3-screenhouses construction contracted for (1-Mount Makulu, 2-Magoye).	TA Contractor
October, 1981	Final surface shipment of research equipment arrives.	TA Contractor
December, 1981	Data Processing/Farming Systems Analyst TDY - short-term Consultant.	TA Contractor
February, 1982	3-screenhouses construction completed.	TA Contractor
May, 1982	Selection - processing of PIO/P's completed for 4 Ph.D, 5 M.S., 7 B.S., and 5-6 month participants.	TA Contractor
June, 1982	Five short-term trainees depart for training.	TA Contractor
July, 1982	First AID annual internal evaluation completed (PES).	AID/Zambia
August, 1982	2nd group of 16 trainees depart for the US.	TA Contractor
March, 1983	Selection and processing completed for 8 M.S., participants and 7 short-term participants.	TA Contractor

Date	Major Action	Primary Responsibility
July, 1983	1st External Evaluation.	Evaluation Team
August, 1983	8 M.S. participants and 7 short-term trainees depart for US.	TA Contractor
September, 1983	External Evaluation Report submitted.	Evaluation Sub-Contractor
March, 1984	Selection and processing completed for 7 short-term training programs.	TA Contractor
July, 1984	2nd internal AID Evaluation (PES).	
August, 1984	7 short-term trainees depart for training.	TA Contractor
November, 1984	PID completed for possible second phase.	AID/Zambia REDSO/EA
January, 1985	Selection and processing of PIO/P's completed for 7 short-term training programs.	TA Contractor
February, 1985 to June, 1985	PP design, authorization and obligation Second Phase, if approved.	AID/Zambia REDSO/EA
March, 1985	7 short-term trainees depart for training.	TA Contractor
March, 1985	Final outside Evaluation of project.	Evaluation Team
December, 31, 1985	Project Assistance Completion Date (PACD).	

VII. EVALUATION PLAN

The evaluation of the project will occur in three phases:

A. ANNUAL PROJECT EVALUATION SUMMARY (PES)

Internal AID evaluation studies are planned at the end of operational years, 1, 3 and 4 of the project. This monitoring activity will be conducted principally by the AID/Zambia Agricultural Officer and the REDSO Agricultural Officer. It is also anticipated that as well-informed outsiders, the short-term consultants will make a contribution to annual evaluations through their written report to MAWD, the AID/Zambia Representative, and the project Team Leader at the end of each consultancy.

B. MID-TERM FORMATIVE EVALUATION

At the end of operational year 2 an external evaluation team of 2-3 members will be contracted using short-term consulting funds provided under the project for a total of 3 person/months. The task of the team will be to assess and identify any problem areas and make recommendations for possible design adjustments. The team will also appraise the capacity of GRZ to bear cost-sharing, particularly where sliding scales are concerned, and recommend any adjustments that may be necessary. In particular, the evaluation should assess the implementation rate of the participant training program and the recruitment of professionals employed by the US contractor. The evaluation should also assess MAWD counterpart situation and make recommendations to address any noteworthy situations. The team should also give a preliminary indication of whether a second phase of the project appears justified and, if so, propose directions for a longer term AID role in Zambian agriculture. As such, the mid-term formative evaluation will probably be the most important and substantive evaluation phase during the five-year life of the project.

C. END-TERM SUMMATIVE EVALUATION

Under normal circumstances another external evaluation (3 p/m) would be undertaken at the end of year 5 for a thorough final assessment of the project and its results. If a decision has been taken to proceed with a second phase, however, the timing of this evaluation might be moved forward to the early part of year five. This evaluation might be timed to immediately precede, and serve as a basis for, the Project Paper for the second five-year phase of the project.

VIII. CONDITIONS, COVENANTS AND NEGOTIATING STATUS

A. CONDITIONS PRECEDENT

As conditions precedent to the disbursement of funds for the construction of houses, the GRZ will be required to furnish evidence that suitable sites have been selected and land provided. The GRZ must also provide in advance of the disbursement of funds for construction, appropriate plans and specifications, cost estimates and time schedules for construction.

B. COVENANTS

The Grant Agreement will contain the following covenants:

1. The GRZ agrees to provide appropriate counterpart personnel on a timely basis.

2. The GRZ agrees that US technicians for whom housing is being built under the project, will not arrive in Zambia until such housing is completed and available.

3. The GRZ agrees that housing constructed under the project will be used exclusively by AID-financed advisers in this or subsequent projects until or unless AID otherwise agrees in writing.

4. The GRZ agrees to make available qualified candidates for long-term academic training in the US and agrees to ensure by bonding or other means that these persons are assigned to the same or other suitable positions as mutually agreed upon, within MAWD for a period equal to at least twice the period of training financed under the project.

5. The GRZ agrees that all equipment, including motorcycles, procured under the project will be used exclusively for project activities and that the use of all vehicles, excluding motorcycles, will be under the direction and supervision of the US Team Leader and the MAWD Director of Agriculture or their respective designee.

6. The GRZ agrees to provide the services of a Zambian sociologist to the ARPT for a regular program of work for which AID funds have been budgeted under the Special Studies activity of the project.

7. The GRZ agrees to share with AID vehicle fuel and maintenance costs under the project according to the sliding-

scale formula set forth in the Project Paper.

C. NEGOTIATING STATUS

As already noted, the degree of participation and co-operation by the GRZ in the design of this project has been unusually high. All major elements of the project, its methodology and even operational details have been thoroughly discussed with senior officials of the GRZ implementing agency (MAWD). The National Commission for Development Planning (NCDP) was also briefed on the project, and an official letter of request for AID to undertake the project (Annex K), was received from the Permanent Secretary of the NCDP while the PP design team was in Lusaka.

Since this will be the first AID Project Grant Agreement with the GRZ in the current AID program, the draft Grant Agreement is being circulated in advance to appropriate GRZ Ministry of Finance and Ministry of Legal Affairs staff for review. As there will be very little time between project authorization and the deadline for FY 80 project obligation, the need for urgent action has been stressed with the GRZ to permit rapid review and signature of the Project Grant Agreement.

ANNEXES

PROJECT DESIGN SUMMARY

ANNEX A

LOGICAL FRAMEWORK

Project Title & Number: AGRICULTURAL DEVELOPMENT (RESEARCH & EXTENSION) - NUMBER 611-0201

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal:	Measures of Goal Achievements:		Assumptions for achieving goal targets:
To assist the GRZ in improving the welfare of small farmers and increasing national food production through the development and adaptation of relevant technology.	Increased production of oilseeds (Sunflower, Soybean) and maize by small farmers in Central Province. Improving the understanding and knowledge base of small farmer production constraints by focusing research/extension activities on small farmer welfare.	National agricultural production statistics. MAWD records and reports on research and extension activities.	That agricultural research and extension will continue to be high priorities of the GRZ. That GRZ recurrent and capital budgetary allocations to MAWD during the project and beyond will be increased to support institutions and activities developed under the project.
PURPOSE: To help the GRZ strengthen the agricultural research capacity of the Ministry of Agriculture and Water Development (MAWD) and to increase the effectiveness of the extension service	Functioning Commodity Research Teams in Oilseeds and Cereal Grains working on the needs of small farmers. Functioning adaptive research planning team capable of referring small farmer production constraints to the CRT's. Functioning extension staff in Central Province that is working collaboratively with the ARPT and disseminating relevant	Reports and records of MAWD research stations. Reports on activities of MAWD extension service. Reports of CRT and ARPT teams Project evaluations	Coordination and cooperation will continue between the Research and Extension Services of the MAWD Department of Agriculture. Effectiveness of the extension service will be improved by more frequent in-

NARRARIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
PURPOSE: (Contn'd)			
in transferring relevant agricultural technology with special emphasis on small farmers	technology to small farmers.		service training sessions for agents, and the increased mobility provided by the vehicles, motor bikes and petrol supplied under the project. Small farmer research will be improved at both the basic and adaptive levels through the academic and practical training of Zambians under the project.
OUTPUTS: The strengthening of the MAWD Commodity Research Teams on Oilseeds and Cereal Grains. The effective operation of MAWD's first Adaptive Research Planning Team (ARPT) in Central Province. The enhancement of the capacity of the extension service to diffuse useable agricultural technology to small farmers	Establishment of two functional multidisciplinary research teams e.g. Oilseeds CRT and Cereal Grains CRT. ARPT Teams conducting diagnostic, design, and testing research in established recommendation domains. Teams of research liaison extension officers (RLEO's) working with Recommendation Domains of ARPT to disseminate improved technologies to small farmers. Identification of small farmer production constraints by research/extension links.	Reports by CRT and ARPT teams. Training records of US and 3rd country participants. Project evaluation.	The MAWD will be able to assign appropriate counterparts and will make needed equipment available to CRT, ARPT, and extension activities on a timely basis. The external institutional support systems for farm inputs and markets will be reasonably accessible by small farmers in Central Province.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OUTPUTS: (Contn'd.) through improved research/extension linkages and communication. The upgrading of the professional and technical skills in agricultural research and extension within MAWD through selected academic and practical training in Zambia, in the US, in other African countries and at international institutions.	Small farmer production constraints referred to proper CRT's. Approximately 19 research/extension professionals trained to Ph.D and M.S. levels and approximately 15 participants trained to the B.S. level in agricultural sciences. Approximately 162 person months of in-service training. In-country research and extension training at provincial and national level amounting to 3750 person days. In-country training for small farmers amounting to 4160 person days.		The ARPT research results will, over time, prove relevant in influencing basic research conducted under the CRT's. Farmers will accept and put into practice improved technology introduced by extension officers.
INPUTS: USAID Technical Assistance 1 Team Leader/Agricultural Economist 1 Soybean Breeder 1 Sunflower Agronomist 1 Maize Breeder 1 Farm System Economist (Agricultural Production/Farm Management Economist) 1 Agronomist 1 Research Liaison Extension Officer (Extension Agronomist) Specialized Short-term Consultants (50 p/m)	USAID $5,223,000 for technical assistance.	Records of TA Contractor	Zambian degree candidates can be identified and released for long-term training in the US. Participants returning after training will be effectively utilized in positions relevant to their training. Specialized technical assistance proposed can be supplied by a US university under competitive contract.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
INPUTS: (Contn'd.) 1 Microbiologist-OPEX Training Long-term academic training in agricultural sciences in the US, short-term practical training in third countries and local in-service training.	$2,662,000 all training.		Housing built by MAWD construction unit will be completed on schedule.
Commodities Laboratory and farm equipment. 3 screenhouses, library books and journals. Vehicles and motorcycles.	$834,000 for commodities.		
6 houses for US technicians	$405,000 housing US technicians.		
Operational Recurrent Costs	$612,000 operational recurrent costs.		
Special Studies A. studies conducted by students of the University of Zambia. B. Research Associates	($550,000 Special Studies- included in Total under Training).		
GRZ Staff salaries, training support, offices, operations, maintenance, housing, etc.	GRZ budget contribution total $4,256,000 in local currency or 25.38% of total project costs.		

JOB DESCRIPTIONS FOR TECHNICAL ASSISTANCE TEAM

General qualifications and duties are described for each of the seven members of the Project Team, as well as for the OPEX Microbiologist who will be filling in when the Zambian Microbiologist at Mount Makulu is in the US pursuing an M.S. Degree.

The use of the male pronoun throughout these descriptions is for convenience only and should not be interpreted as implying that qualified female candidates would not be considered on an equal basis.

Team Leader

Maize Breeder

Soybean Breeder

Sunflower Agronomist

Farming Systems Economist

ARPT Agronomist

Research Liaison Extension Officer (RLEO)

Microbiologist

JOB DESCRIPTION - TEAM LEADER

DURATION: 5 YEARS

A. QUALIFICATIONS

1. Ph.D in Agricultural Economics with experience in organizing and carrying out multi-disciplinary research/ extension programs in the Third World.

2. Five to ten years professional experience in the Third World preferably involving micro-level research.

B. DUTIES

1. Serve as administrative leader of the team of technical and social scientists (long-term, short-term and Research Associates), including liaison with GRZ and USAID/Zambia. The incumbent will report to the Department of Agriculture as specified below.

2. Assist in the recruitment of the Technical Assistance Team and short-term consultants.

3. Assist in identifying and placing Zambians in short and long-term training courses, study tours and participation in scientific symposia outside Zambia.

4. Participate with MAWD and UNZA in reviewing Special Studies carried out by UNZA faculty and graduate students.

5. Assist in recruiting US/African Research Associates for undertaking relevant special studies as mutually agreed upon with MAWD.

6. Assist the Commodity Research Teams (CRT's) in the design and economic interpretation of experiments.

7. Assist in the communication of ARPT recommendations to researchers on the CRT's.

8. Undertake professional activities which are mutually agreed upon with the Deputy Director of Agriculture (Extension) in support of the extension program.

Duty Station: Lusaka

Responsible to: Department of Agriculture, Director, on policy matters and to the Deputy Director of Agriculture, (Research) and the Deputy Director of Agriculture, (Extension) on technical matters.

JOB DESCRIPTION - MAIZE BREEDER

DURATION: 5 YEARS

A. QUALIFICATIONS

A Ph.D in plant breeding, preferably in maize, with a minimum of 5 years experience in a tropical or subtropical region, or at an International Agricultural Research Center or 5 years experience as a maize breeder.* Field experience should include demonstrated ability to plan and execute a significant maize breeding program. Research project planning, management, and implementation experience are essential. Demonstrated ability and willingness to develop and implement interdisciplinary research within the framework of a multi-disciplinary Maize Commodity Research Team (CRT) is essential.

B. DUTIES

The maize breeder as a member of the National Cereal Grain CRT will devote a majority of his resources and time to research on maize breeding problems of small farmers. In the course of his work he will:

1. Continue to implement current research during the absences from Zambia of GRZ maize breeding professional research officers who are away for graduate training.

2. Evaluate germplasm, conduct variety evaluation trials, develop new varieties and hybrids and recommend varieties and/or hybrids for release to small farmers in Zambia.

3. Prepare research publications on plant breeding research.

4. Ensure proper maintenance and use of equipment provided under the project.

5. Respond to ARPT recommendations on research priorities with a view to developing a breeding program relevant to the needs of the small farmers.

6. Maintain close linkages with the ARPT agronomist and assist him as appropriate in designing and implementing adaptive research and demonstration trials on farmers fields.

7. Provide liaison between the special short-term consultants and the professional and administrative officers of both the Cereal Grain CRT and the ARPT.

8. Assist in the identification and selection of Zambian agricultural scientists for long-term training, in-country, or short-term training as appropriate.

* Maize breeding experience can be in the US.

JOB DESCRIPTION - SOYBEAN BREEDER

DURATION: 5 YEARS

A. QUALIFICATIONS

A Ph.D with a concentration in plant breeding and a minimum of 5 years of prior breeding experience on grain legumes, including soybeans. Prior experience in tropical/ sub-tropical areas is desirable. Field experience should include demonstrated ability to plan and execute a plant-breeding program including research planning, project management, and implementation. The candidate must also have demonstrated ability to conduct interdisciplinary research on team activities and to work effectively with public officials, donor agencies and farmers.

B. DUTIES

The soybean breeder will devote up to 60% of his resources and time for 5 years to soybean research priorities identified by the ARPT.

In the course of his work, he will:

1. Continue research in progress and implement new research during the absences of Zambian Research Officers who are in the US in graduate training.

2. Evaluate germplasm, conduct variety yield trials and develop soybean varieties in response to small farmers needs in liaison with the ARPT.

3. Prepare research publications relating to soybean breeding research.

4. Assure proper maintenance and use of program field and laboratory equipment.

5. Encourage the development of GRZ capability to produce breeders' seed to be released to the National Seed Outlet for increase and distribution to farmers.

6. Provide assistance to GRZ Officers and the ARPT in the allocation of resources, the establishment of small-farmer priorities, and the evaluation of applied research programs.

7. Provide liaison between appropriate short-term consultants, GRZ Officials, and the ARPT.

8. Assist in the selection and processing of Zambian plant breeders for participant training and for in-country or other short-term training and assist in selection of training institutions.

9. Assist with short courses or other types of in-service training for counterparts, ARPT and extension workers and other GRZ personnel in plant breeding, including development of curricula, course materials and presentation.

JOB DESCRIPTION - SUNFLOWER AGRONOMIST

DURATION: 5 YEARS

A. QUALIFICATIONS

A Ph.D in Agronomy with emphasis on field crop production or field-oriented soil science, with a minimum of 5 years experience; or an M.S. degree in Agronomy with an emphasis on field crop production or field-oriented soil science with a minimum of 7 years experience. Research project planning, management and implementation experience are essential. Experience as an extension agronomist with a joint research appointment would be highly desirable. Demonstrated ability and willingness to develop and implement interdisciplinary research within the framework of a multi-disciplinary oilseed team is essential. The incumbent will be posted at Central Research Station, Mount Makulu, Lusaka, Zambia.

B. DUTIES

The Sunflower Agronomist as a member of the National Oilseeds Commodity Research Team will devote a majority of his resources and time to research on sunflower production problems of small farmers. In the course of work he will:

1. Continue research in progress and implement new research activities designed to attack problems identified by the Adaptive Research Planning Team (ARPT) as being constraints to increased small farmer sunflower production.

2. Prepare the agronomic portion of research publications.

3. Assure proper use and maintenance of equipment in the program.

4. Provide liaison between the special short-term consultants and the professional and administrative officers of both the CRT and the ARPT.

5. Assist in the identification and selection of Zambian agronomists for long-term training, in-country, or short-term training as appropriate.

6. Maintain close linkages with the ARPT Agronomist and assist as appropriate in designing and implementing adaptive research and demonstration trials on farmers' fields.

JOB DESCRIPTION - FARMING SYSTEMS ECONOMIST

DURATION: 5 YEARS

A. QUALIFICATIONS

1. Ph.D in Agricultural Economics with specialization in farm management/production economics.

2. Three to five years experience in farming systems research or as a member of a multi-disciplinary team carrying out farm level surveys in the Third World.

B. DUTIES

1. Participate in the Adaptive Research Planning Team (ARPT), consisting of the Farming Systems Economist, an Agronomist and as Research Liaison Extension Officer. The team will carry out its program of work at the farm level in the Central Province of Zambia with duty stations at Kabwe.

2. Participate in the planning, supervision and implementation of farm level surveys, trials and evaluation of improved technologies for small farmers compatible with the CIMMYT methodology presently implemented by the GRZ.

3. Assist in the timely processing and analysis of the results of farm level surveys, trials and tests conducted by the ARPT.

4. Assist in the interpretation of results for CRT's and policy makers through seminars, workshops and publications.

5. Assist in training Zambian counterparts, other Zambian staff members of the ARPT, and university students engaged in Special Studies.

6. Assist the Research Liaison Extension Officer in short training courses for extension staff.

JOB DESCRIPTION - ARPT AGRONOMIST

DURATION: 5 YEARS

A. QUALIFICATIONS

M.S. or Ph.D in a field crops speciality or soil science with emphasis on production and problem solving research at the farm level. Must have an established record of providing leadership in and conducting successful extension programs. The candidate must be committed to working in the developing world, with 5 years of field experience in Africa. Demonstrated ability and willingness to develop and work with scientists from other countries and with a multi-disciplinary team is essential. As a member of the Adaptive Research Planning Team (ARPT) the agronomist's responsibilities will be under the leadership of the Deputy Director of Agriculture (Research) and the work of the team will be coordinated by the National ARPT leader. The incumbent will be posted at Kabwe, Central Province, Zambia.

B. DUTIES

The responsibilities of the ARPT Agronomist will include:

1. Participation in ARPT research by cooperating with other team members in problem identification and research priorities.

2. Providing leadership for/and the conducting of field trials and tests.

3. Maintaining close linkages with the Commodity Research Teams (CRT) Agronomists.

4. Advising the ARPT Research Liaison Extension Office (RLEO) on matters relating to the extension of research findings and feedback.

5. Assisting in the timely processing and analysis of the results of farm level surveys, trials, and tests conducted by the ARPT.

6. Assisting in the interpretation of results for CRT's and policy makers through seminars, workshops and publications.

7. Assisting in the identification and selection of Zambian Agricultural scientists for long-term training, in-country or short-term training as appropriate.

JOB DESCRIPTION - RESEARCH LIAISON EXTENSION OFFICER (RLEO)

DURATION: 5 YEARS

A. QUALIFICATIONS

An M.S. or Ph.D in an agricultural science with a minimum of five years field experience in Third World countries, preferably Africa or 10 years experience in the US. Field experience should include a demonstrated ability to plan, implement and evaluate extension field testing, demonstration activities, and extension officer and farmer training programs. An experienced extension agronomy specialist with a background of working cooperatively with researchers and county level extension agents is essential. The incumbent should have a demonstrated capability to manage and administer extension activities. A willingness and motivation to develop and implement and interdisciplinary research/extension activity within the framework of the Adaptive Research Planning Team concept is necessary.

B. DUTIES

The RLEO as a member of the ARPT will devote the majority of working time to diagnostic, design and testing stages and in cooperating in the farming system research work and developing extension officer and farmer training programs. Specific duties will be:

1. Assist in the implementation of ongoing extension training activities and participate in the development of new training activities plan to be initiated at the camp, station, district and provincial level training institutes/centers.

2. Assist in the evaluation of ongoing extension training activities in Central Province and help plan new methodology for conducting training program.

3. Participate in the planning, supervision and implementation of farm level surveys, trials, tests and evaluation of improved technologies for small farmers compatible with CIMMYT methodology presently implemented by the GRZ.

4. Assist in the timely processing and analysis of the results of farm level surveys, trials, tests conducted by the ARPT.

5. Assist the ARPT researchers in short training courses for other ARPT members.

6. Assist in the coordination of the extension activities of ARPT and the relevant extension activities of other donors e.g. the Training and Visit System, FAO In-Service Training project and World Bank projects.

7. Assist in the identification and selection of Zambian extension candidates for long-term, short-term and in-country training.

JOB DESCRIPTION - MICROBIOLOGIST

DURATION: 2 1/2 YEARS

A. QUALIFICATIONS

A senior microbiologist with either an M.S. or Ph.D degree in soil microbiology and a minimum of 5 years of experience working with biological nitrogen fixation (BNF) in grain legumes. This experience should include capability in the management and operation of a pilot facility engaged in the production of Rhizobium japonicum innoculum for soybeans and other beans. The candidate should also have demonstrated ability in planning and execution of a BNF experimental program for testing Rhizobium japonicum strain efficiency, survivability, population efficiency, etc.

B. DUTIES

While the host country microbiologist is away for graduate training the microbiologist will devote 100% of his time and project resources to:

1. Continuing operation of the Mount Makulu Experiment Station innoculum plant and upgrading its capacity through installation and operation of new equipment made available by the project.

2. Continue BNF research in the program and expand it to the extent possible.

3. Assure proper maintenance of the laboratory and production equipment.

4. Evaluate Rhizobium japonicum strains for soybean or grain legumes for varietal x environment x strain interaction for determination of most efficient innoculum for Zambia.

5. Assist soybean and grain legume breeders in selection of new varieties for improved BNF ability.

6. The microbiologist will be stationed at the Mount Makulu Central Research Station, Lusaka.

ANNEX C

PROPOSED ARPT METHODOLOGY AND WORK PLAN

1. Methodology

The GRZ proposes to use the International Maize and Wheat Improvement Center (CIMMYT) methodology for ARPT work. The AID project should be supportive of this and utilize CIMMYT methods wherever possible. Experimentation with a few slightly different approaches is justified, however, for the following reasons:

a) The Central Province ARPT team is likely to be the first fully operational ARPT in Zambia.

b) CIMMYT as yet have had little experience with the testing stage of the adaptive research program.

c) Unlike earlier CIMMYT methodology which concentrated on looking at one crop in the farming system (i.e. farming systems research in the small) the ARPT's in Zambia have a broader perspective, which involves looking at all major enterprises, thereby complicating the methodological issues.

d) The need for some methodological and data processing innovations, particularly at the testing stage, helps justify the short-term consultancy for a Farming Systems Analyst. Such individual(s) who must be expert(s) in the area would, however, need to accept the basic CIMMYT approach and not seek to change it drastically. To help ensure this the consultant selected should be mutually agreed upon by the GRZ and US university contractor.

2. Work Plan

At the request of the GRZ CIMMYT have undertaken some work in Central Province. This has involved demarcating the Province into eight recommendation domains (6 traditional, 1 emergent and 1 commercial). In addition at an earlier date they undertook a survey, analogous to a verification survey, in Serenje District.

The information collected and analysed by CIMMYT will provide a good base for the development of a work plan

by the ARPT. In the light of the current evolution of thinking in the GRZ concerning the methodologies to be employed by the ARPT it is perhaps premature to draw up a definitive work plan. Therefore, at this stage the following suggestions should be considered tentative:

a) The team members should work in an interdisciplinary mode at all stages of the research process, although the input of the RLEO will become critical in the later stages.

b) Since it will not be possible to work simultaneously in all the traditional domains and the emergent farmer domain, criteria for selection will need to be drawn up. Possible criteria could include numbers of farmers in the recommendation domain (e.g. in CIMMYT's analysis the two traditional domains with the largest numbers of farmers are 2 and 5), the probability of having relevant improved technologies to offer farmers (e.g. it is likely that the ARPT will mainly emphasize cereals (especially maize) and oilseeds, and will also examine weed control, storage, etc.). A further possibility for working in different domains is to phase in work at different times (e.g. start work in a third domain in year 2).

c) In the descriptive and diagnostic stage it is anticipated that, apart from incorporating questions about a number of different crops, the exploratory survey and the one-shot verification survey methodology advocated by CIMMYT can and should be employed.

d) The criteria for the design of appropriate technologies can also closely follow that suggested by CIMMYT.

e) The possible value of experimenting with different approaches comes at the testing stage. Differing approaches could be used in different domains. While the general approach to on-farm trials and farmer-testing would remain the same, differences are possible in terms of the frequency and the scope of the data collected. Accurate and relevant data are required for evaluating the potential value to farmers of the results of the on-farm trials and

farmer testing. Two criteria for determining the scope of and frequency with which data are collected are (a) the lowest possible cost commensurate with the degree of understanding necessary, and (b) compatability with the fairly limited resources that the GRZ is likely to have available in the future. This will require considerable skill. Possible approaches to look at are:

i) Two levels of sample: a large one in which single point registered types of data are collected at infrequent intervals, and a small one in which continuous non-registered types of data are collected at frequent intervals.

ii) For the small sample there might also be two possibilities: first, data collection by activity on the major enterprises and, second, a few case studies in which data would be collected on the whole farming system. Michigan State University should be able to give valuable advice on such approaches arising out of the work they are currently undertaking in northern Cameroon. Clustering samples and close links to the farmers involved in the on-farm trials and farmers' testing are also important in reducing costs. In conjunction with CIMMYT ideas on the testing stage, experience gained by the International Rice Research Institute (IRRI) and in Zambia the Weed Control program undertaken by the GRZ could be useful in designing cost effective approaches for on-farm trials and farmers' testing.

f) Part of the work plan should include monitoring the adoption process once the technology thought to be relevant is passed on to the extension service for dissemination to farmers.

g) The training functions discussed in the preceding section will obviously be an important part of the work plan. One avenue of training lower level extension workers (e.g. AA's) that might be seriously considered if the GRZ agrees is seconding some of

them to the ARPT for some time in order to learn through doing.

3. References

CIMMYT publications that refer specifically to Zambia are:

CIMMYT and MAWD, Zambia 1978. Demonstrations of an Interdisciplinary Approach to Planning Adaptive Agricultural Research Programmes. Report No. 3. Part of Serenje District, Central Province, Zambia. Nairobi, CIMMYT.

CIMMYT and MAWD, Zambia 1979. Demonstration of an Interdisciplinary Approach to Planning Adaptive Agricultural Research Pro-rammes. Report No. 4. Deriving Recommendation Domains for Central Province, Zambia. Nairobi, CIMMYT.

Other papers of more general methodological interest include:

Perrin, R.K., Winkelmann, D.L., Moscardi, E.R. and J.R. Anderson, 1976. From Agronomic Data to Farmer Recommendations. Information Bulletin No.27. Londres, CIMMYT.

CIMMYT Economics Program, 1980. Planning Technologies Appropriate to Farmers: Concepts and Procedures. Londres, CIMMYT.

MAWD STAFFING

ANNEX D

PROFESSIONAL RESEARCH STAFF

(Minimum Qualification B.Sc.)

A. Funded Locally (in part)

Position	Nos. in Budget	Expat-riate	Zambian Balance		
				Vacant	Over-filled
Principal Research Officers	6	1	3	2	-
Agricultural Research Officers	3	-	-	3	-
Agricultural Chemistry	3	1	3	-	1
Agricultural Engineer	1	-	-	1	-
Agronomist (General)	7	6	5	-	4
Agronomist (Indigenous crops)	1	1	-	-	-
Agronomist (Oilseeds)	1	-	-	1	-
Agronomist (Tobacco)	1	1	-	-	-
Agronomist (Wheat)	1	1	-	-	-
Agronomist (Tea)	1	-	-	1	-
Animal Husbandry	4	2	2	-	-
Biometrician	1	1	-	-	-
Ecologist	1	-	-	1	-
Entomologist	3	2	2	-	1
Microbiologist	1	-	1	-	-
Fibre Officer	1	-	-	1	-
Horticulture Res. Officer	2	2	-	-	-
Farm Management Research Officer	2	1	-	1	-
Horticultural Research Officer (Vegetables)	1	1	-	-	-
Irrigation Officer	1	-	-	1	-
Pasture Research Officer	4	3	-	1	-
Plant Breeder (General)	5	2	4	-	1
Plant Breeder (Legumes)	1	-	1	-	-
Plant Breeder (Wheat)	1	-	1	-	-
Rice Officer	1	-	-	1	-
Plant Pathology	4	-	5	-	1
Seeds Officer	1	-	1	-	-
Soil Specialist	2	1	1	-	-
Stored Products Specialist	1	-	1	-	-
Stored Products Chemistry	1	-	1	-	-
Stored Products Entomology	1	-	1	-	-
Tree Crop Officer	1	-	-	1	-
Librarian	1	-	1	-	-
	66	25	33	15	7

PROFESSIONAL RESEARCH STAFF

B. Donor Agency Supported Positions (in addition to the above)

Position	Nos.	Donor Agency
Sunflower Breeder	1	FAO
Sunflower Pathologist	1	Belgian Aid
Soybean Agronomist	1	FAO
Cotton Breeder	(1	FAO
	(1	IRCT
Cotton Entomologist	1	IRCT
Wheat Breeder	1	FAO/NORAD
Wheat Pathologist	1	Belgian Aid
Potato Virologist	1	Belgian Aid
Maize Pathologist (breeder)	1	FAO

PROFESSIONAL RESEARCH STAFF

C. Highest Degrees of Zambian Professional Staff

(Note: the total is not quite consistent with the one worked out under A.)

Area	Number B.Sc.	M.Sc.	Ph.D
Assistant Director (Research)		1	
Chief Agricultural Officer	1		
Agricultural Chemist	2	1	
Agronomist (Potato)	1		
Agronomist (Wheat)	1	1	
Agronomists	3		
Entomologist	1		1*
Microbiologist	1		
Plant Breeder (Sunflower)	1	1*	
Plant Breeder (Maize)	(1)[a]	1*	
Plant Breeder (Wheat)		2*	
Plant Breeder (Cotton)	1		
Plant Pathologist	2	2	1+1*
Seeds Officer	1+Diploma		
Soil Specialist		1	
Stored Products Entomologist		1	
Stored Products Chemist	1		
Soybean Agronomist		1*	
Librarian	1		
	17+(1)[a]	7+5*	1+2*

TOTAL 32

* People in training at level indicated

( )[a] Individual with B.Sc. on Maize Course at CIMMYT.

PROFESSIONAL EXTENSION STAFF

POSITION	APPROVED POSITIONS	ZAMBIAN (OFFICERS)	EXPATRIATE	VACANCIES
SUPER SCALE STAFF	15	12	2	1
1 Director of Agriculture				
1 Assistant Director (Extension)				
1 Chief Animal Husbandry Officer				
1 Chief Crop Husbandry Officer				
1 Chief Horticultural Officer				
9 Provincial Agricultural Officers				
1 Principal				
MAIN SCALE STAFF	831			
1 Home Economics Officer				
8 Senior Executive Officers				
13 Executive Officers				
1 Milk Recorder				
1 Junior Executive Officer				
62 Clerical Officers				
63 Junior Clerical Officers				
519 Agricultural Assistants				
9 Telephone Operators - Grade II				
17 Senior Orderlys				
1 Driver				
119 Agricultural Demonstrators				
PROFESSIONAL STAFF	56	17	26	13
1 Farm Management Officer				
1 Sen. Extension Training Officer				
1 Senior Citrus Officer				
1 Senior Cotton Officer				
1 Senior Dairy Officer				
1 Senior Poultry Officer				
1 Senior Oil Seeds Officer				
1 Senior Pig Husbandry Officer				
1 Extension Liaison Officer				
1 Senior Tree Crop Officer				
12 Animal Husbandry Officers				
9 Crop Husbandry Officers				

PROFESSIONAL EXTENSION STAFF (Contn'd)

POSITION	APPROVED POSITIONS	ZAMBIAN (OFFICERS)	EXPATRIATE	VACANCIES
3 Dairy Officers				
7 Horticulturalists				
1 Pig Officer				
1 Poultry Officer				
1 Rice Officer				
9 Extension Training Officers				
1 Horticultural Officer				
TECHNICAL STAFF	628			
3 Chief Agricultural Supervisors				
21 Principal Agricultural Supervisors				
1 Principal Meat Grader				
258 Agricultural Supervisors				
9 Meat Graders				
336 Senior Agricultural Assistants				
SECRETARIAL STAFF	17			
2 Stenographers				
15 Typists				
SECONDED FROM: Personnel Div. to Ext.	1			
1 Assistant Personnel Officer				
SECONDED TO: Conservation Mechanical Unit from Ext.	1			
1 Assistant Stores Officer				

SUPPLEMENTARY FINANCIAL TABLES

SUMMARY OF AID PROJECT INPUTS

Estimated Costs ($)

I.	Technical Assistance	$ 5,223,000
II.	Training	2,662,000
III.	Construction	405,000
IV.	Commodities	834,000
V.	Operational Recurrent Costs	612,000
	TOTAL Project Costs	$ 9,736,000
VI.	Inflation at 10% Compounded Annually	1,852,000
VII.	Contingency (8%)	927,000
GRAND TOTAL AID BUDGET		$ 12,515,000

EXPLANATORY NOTES FOR T.A. ESTIMATES (Continued)

A. Kabwe ARPT and Magoye Soybean Breeder

1) Field activities	-$40/day x 75 days =	$ 3,000
2) Lusaka	-$80/day x 40 days =	$ 3,200
		$ 6,200

B. Mount Makulu and Team Leader

1) Field - $ 40 x 45 =	$ 1,800

(4 x $6,200) + (3 x $1,800) 7 = Avg of $4,300

EXPLANATORY NOTES FOR T.A. ESTIMATES

1. The estimate of the average cost of one person year of long-term technical assistance assumes an average assignment of 3 years and an average family size of 2 adults and 1 child with the total children being equally divided between primary and secondary school ages.

AVERAGE ANNUAL COST FY 81

Salary	$37,500
Transportation of personnel, 1 RT/year for PCS, HL or RCR	
$ 2,000 x 3.0	7,000
HHE transportation (surface and air)	7,000
Automobile transportation (3,000 lbs.)	1,135
U.S. Storage	600
Post Differential (25%)	9,375
Post cost-of-living allowance	2,400
Educational travel and educational allowance	5,000
Defense Base Insurance (9%)	3,375
Utilities	6,000
Incountry Travel*	4,300
Temporary Lodging	1,000
Retirement, FICA (16%)	6,000
R & R	9,000
	$ 99,685
Overhead @ (25%)	24,921
	$ 124,606

* Incountry travel - Per diem for long-term staff while travelling incountry in line with project work and objectives.

AVERAGE COST PER PERSON MONTH OF SHORT-TERM CONSULTANTS - FY 81

The estimate of the average cost of one person months of short-term technical assistance is based on one month consulting periods at an annual salary scale of $42,500.

Honorarium		$ 4,890
Per Diem	28 x $72	$ 2,028
	2 x $ 6	
Transportation 1 RT		$ 2,100
In-Country Transportation		200
Overhead		$ 1,222
Miscellaneous		100
		$ 10,540

LONG/SHORT TERM TRAINING (US$000)

FIELD OF TRAINING	PERSONS	FY 81	FY 82	FY 83	FY 84	FY 85	Sub-Total
A. RESEARCH							
Long-Term (Ph.D) 3 Yrs.							
Maize Breeder	1		20	20	20		60
Sunflower Agronomist	1		20	20	20		60
Soybean Breeder	1		20	20	20		60
Production/Farm Mgt. Economist	1		20	20	20		60
Long-Term (M.S.) 2 Yrs.							
Agronomists	2	20	40	20			80
Soil Fertility	2		20	40	20		80
Microbiologist	1	20	20				40
Farming Systems Analysts (farm mgt./prod. economists)	3			60	60		120
Agricultural Engineers	2			40	40		80
Long-Term (B.S.) 3 Yrs. (beyond NRDC* Diploma)	5	40	100	100	60		300
Short-Term (6 mo.)	15	10	20	30	50	40	150
Incountry (5 days/session)	150		2	3	3	2	10
						TOTAL	1100

* Natural Resources Development College

LONG/SHORT TERM TRAINING (US$000)

FIELD OF TRAINING	PERSONS	FY 81	FY 82	FY 83	FY 84	FY 85	Sub-Total
B. EXTENSION							
Long-Term (M.S.) 2 Yrs.							
Rural Development Adm.	1		20	20			40
Agronomist (maize)	1		20	20			40
Agronomist (oilseeds)	1			20	20		40
Agronomist (fruit & veg)	1		20	20			40
Agr.Mechanization Eng.	1			20	20		40
Long-Term (B.S.) 3 Yrs.							
(beyond NRDC* Diploma)							
Extension Res.Liaison Offs.	5	60	100	100	40		300
Agronomists	2	20	40	40	20		120
Agricultural Economists	2	20	40	40	20		120
Agr.Mechanization/Eng.	1	20	20	20			60
Short-Term	12		30	40	20	30	120
Incountry (5 days/session for extension workers)	600		9	10	10	9	38
(1 day sessions for farmers)	1040/yr		13	13	13	13	52
						TOTAL	1010

* Natural Resources Development College

ESTIMATED TRAINING PLAN

(NO. OF PARTICIPANTS AND DEPARTURE DATE)

LEVEL OF STUDY						
RESEARCH						
Ph.D	-	4	-	-	-	4
M.S.	2	2	6	-	-	10
B.S.	2	3	-	-	-	5
EXTENSION						
M.S.	-	3	2	-	-	5
B.S.	6	4	-	-	-	10
TOTAL	10	16	8	-	-	34

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Blantyre)

CRT & ARPT - ITEMS	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
C. CRT-OILSEED (Magoye)						
1-Tractor, MF185	18,000					18,000
1-3 furrow, Moldboard Plow	5,000					5,000
1-Disk Harrow	2,975					2,975
1-Rotary Cultivator	2,500					2,500
1-Row Cultivator	2,500					2,500
1-Rotary Mower (Bush Hog)	5,000					5,000
1-Tractor Sprayer Outfit	2,500					2,500
1-Chisel Plow, 5 Tine	6,250					6,250
1-Ridger, 3-Row	3,125					3,125
1-Fertilizer Spreader	2,000					2,000
1-Vibratyne Harrow	6,250					6,250
2-Row Harvesters	8,000					8,000
1-2-4 Row Plot Planter	12,000					12,000
2-Swanson Type Plot Threshers	10,000					10,000
2-Planet Jr. Cone Planter	1,000					1,000
1-Minimum Tillage Planter (Massey 130 Type)	17,500					17,500
1-Lifter Inverter	2,500					2,500

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Lusaka)

CRT & ARPT - ITEMS	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
A. CRT-MAIZE (Mount Makulu)						
1-3 furrow, Moldboard Plow	5,000					5,000
1-Disk Harrow	2,975					2,975
1-Rotary Cultivator	2,500					2,500
1-Row Cultivator	2,500					2,500
1-Rotary Mower	5,000					5,000
1-Tractor Sprayer Outfit	2,500					2,500
1-Fertilizer Spreader	2,000					2,000
1-Minimum-Tillage Planter, MF "130"	17,500					17,500
					Sub-Total	39,975
B. CRT-OILSEED (Mount Makulu)						
1-Plot Thresher	10,000					10,000
1-Seed Cleaner	20,000					20,000
1-Experimental Plot Planter	12,000					12,000
1-Tractor Sprayer Outfit	2,000					2,000
1-Dryer	5,500					5,500
1-Moisture Meter for Grain	1,000					1,000
					Sub-Total	50,500

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Lusaka)

CRT & ARPT - ITEMS		FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
D. CRT-OILSEED AND GRAIN LEGUME (Mount Makulu)							
Microbiology							
1-Autoclave	Production	13,000					13,000
2-Shaker (12/5 litre Flasks	Production	8,000					8,000
Glassware & Chemicals	Production	5,000					5,000
Pippetting Machine	Production	2,000					2,000
1-Laminar Flow Hood	Production	4,000					4,000
1-Microscope	Production	3,000					3,000
1-Scaler	Production	1,000					1,000
1-Refrigerator	Production	2,000					2,000
1-Dryer Sterilizer	Processing	15,000					15,000
1-Peat Grinder w/motor	Processing	4,000					4,000
Sieves, Pans, Tables, Fillers, Mixers, etc.	Processing	6,000					6,000
						Sub-Total	63,000

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Lusaka)

CRT & ARPT - ITEMS	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
C. CRT-OILSEED (Magoye contn.)						
1-Irrigation Bore Hole, Pump, Transformer and Pipe plus Sprinkler for 1 hectare w/spares	25,000					25,000
2-Single Plant Threshers	1,000					1,000
2-Platform Scales (100kg. capacity)	500					500
2-Electric Balances (10kg)	3,000					3,000
2-Electric Balances (1kg)	3,000					3,000
1-Drying Oven	5,000					5,000
1-Electronic Seed Counter	3,900					3,900
1-Calculator w/printout attachment (TI-59)	350					350
2-Handheld Calculator (TI-57)	100					100
1-Typewriter, manual, wide-carriage	850					850
					Sub-Total	149,800

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Lusaka)

CRT & ARPT - ITEMS	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
G. SOILS LABORATORY EQUIPMENT (Mount Makulu)						
1-Fan for Fume Removal	2,000					2,000
Glassware	2,500					2,500
1-Printer for Automatic Chemistry	4,000					4,000
10-Dispensers (10)	300					300
Automatic Dispensers	1,500					1,500
Infiltrographs	2,500					2,500
Penetrograph	1,250					1,250
Soil Permeability Kit	1,250					1,250
D.F.Rings & Accessories	2,500					2,500
Bottle Shaker	2,000					2,000
Kjeldecsystem (for digestion)	2,000					2,000
H. ADMINISTRATIVE					Sub-Total	21,800
1-Electric Typewriter (IBM Selectric II) 220 volts, 50 cycle	1,250					1,250
1-Manual Typewriter, wide carriage	850					850
1-Decktop Photocopier (NASHUA 1220 DF)	2,000					2,000
					Sub-Total	4,100
TOTAL - Equipment to be purchased by AID						$ 354,275
Ox-Drawn Equipment (local purchase by contractor)						2,000
Cold storage for seed (US purchase by contractor for Magoye)						20,000
Cold storage for Microbiology (US purchase by contractor for Mt.Makulu)						15,000
TOTAL - Equipment to be purchased under the project						391,275
AID procurement Agent fee of 7% on $354,275						27,389
Supplemental Air Freight fee for certain items to be air-freighted to Lusaka						20,000
GRAND TOTAL for Research Equipment Costs						$ 438,664

COMMODITIES AND EQUIPMENT BY FISCAL YEAR OF ACQUISITION

(Estimated Price, CIF Lusaka)

CRT & ARPT - ITEMS	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
E. ARPT (Kabwe)						
4-Calculators w/printout attachment (TI-59 type)	1,400					1,400
12-Handheld Calculators (TI-59 type)	600					600
1-Minicomputer	12,000					12,000
1-Tabletop Photocopy Machine (NASHUA-1220 DF)	2,000					2,000
1-Mimeograph Machine (UK type to be compatible with stencils in Zambia)	2,000					2,000
1-Electric Typewriter 220 volts, 50 cycles (IBM Selectric II)	1,250					1,250
1-Manual Typewriter Wide carriage	850					850
					Sub-Total	20,100
F. LIBRARY (Mount Makulu)						
1-PA System	5,000					5,000

DETAILED ANALYSIS OF THE OPERATIONAL RECURRENT BUDGET ($000)

CATEGORY	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
ARPT						
Consumable Supplies (Paper, Repro. needs, etc.)	12	12	12	12	12	60
Computer Time (UNZA)	5	10	10	15	10	50
Publishing Costs	5	10	10	15	10	50
Books for Kabwe		1		1		2
CRT's						
1 - Maize Consumable Supplies (Markers, Crossing Bags, Sample bags, etc.)	3	6		6		15
1 - Sunflower Consumable Supplies (Markers, Plot Supplies, etc.)	3	6		6		15
1 - Soybean Consumable Supplies (Plot Markers, Peat Pots, Seed Bags, etc.)	3	6	6	6	6	27
Microbiology (Yeast, Extract Bags, Chemicals, etc.)	3	3	4	4	4	18
ADMINISTRATIVE						
Salaries (Team Leader, Sec., Admn. Asst., Driver), Office Rent, Supplies, Temporary Storage	24	30	30	30	30	144
VEHICLE FUEL AND MAINTENANCE	46	37	28	18	9	138
LIBRARY - Mount Makulu						
Journal Subscriptions	14	14	14	14	14	70
New Resource Reference Books	3	5	5	5	5	23
OPERATIONAL RECURRENT BUDGET TOTALS:	121	140	119	132	100	612

TABLE PREPARED BY MAWD IN ZAMBIAN KWACHA (K1.00=$1.25)

ESTIMATED GRZ. PROJECT EXPENDITURES BY FISCAL YEAR (ZK)

LONG-TERM ASSISTANCE	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
1. Support personnel						
T.O.(x6)	18,927	19,920	20,912	21,904	22,896	104,559
A.A.(x14)	13,000	13,534	13,068	14,781	15,493	70,876
General Workers(25)	2,650	2,700	2,750	2,800	2,850	13,750
2. Administrative/Overheads						
Office space						
- Long term Advisors	972	972	972	972	972	4,860
- support personnel	1,025	1,015	1,015	1,015	1,015	5,075
Administration						
- preparatory	1,850	1,850	1,850	1,850	1,850	9,250
-iimplementation						
Local - Officers-in-Charge						
- Executive Officers	9,965	9,965	9,965	9,965	9,965	49,825
H/Q - C.A.R.O.						
ADA (Res, Ext and Land Use)	11,130	11,130	11,130	11,130	11,130	55,650
3. Housing for Zambian support personnel						
High cost, Medium and low cost	19,200	19,200	19,200	19,200	19,200	96,000
SHORT-TERM TECHNICAL ASSISTANCE						
1. Zambian Employed						
Scientist input/consultant						
- 9 x @ 60%	1,717	3,090	3,433	3,433	3,433	15,106
2. GRZ Salary (OPEX - 30P/m)						
Microbiologist	3,428	6,856	6,856	-	-	17,140

/2.....

ESTIMATED GRZ. PROJECT EXPENDITURES BY FISCAL YEAR (ZK)

TRAINING	FY 81	FY 82	FY 83	FY 84	FY 85	TOTALS
1. GRZ Salary						
Ph.D. (4 x 3 yrs)	-	22,438	23,405	24,372	24,372	94,587
M.Sc (15 x 2 yrs)	8,881	31,660	56,173	37,855	37,855	175,424
B.S. (15 x 3 yrs)	25,236	48,641	51,122	24,397	24,397	173,793
2. GRZ Housing						
High cost (4 x 3 yrs) Ph.D	-	16,800	16,800	16,800	16,800	67,200
(15 x 2 yrs) M.S.	8,400	29,400	54,600	33,600	33,600	159,600
Medium cost (15 x 3 yrs)	14,400	27,000	27,000	12,600	12,600	93,600
3. Short-term training(salary)						
162 person/month	12,151	12,151	12,151	12,151	12,151	60,755
4. In-Country(Facilities)						
- 25 P/month (or 1050 person/days).	-	5,248	5,248	5,248	5,248	20,992
5. GRZ Housing (in-Service)	16,000	16,000	16,000	16,000	16,000	80,000
OPERATIONAL RECURRENT						
1. Vehicle Fuel & Maintenance	-	7,000	14,000	21,000	35,000	77,000
2. Trial Requisites	53,000	60,950	63,600	66,250	68,900	312,700
3. Imputed Land Value 100ha @ K1,00/Ha	100,000	100,000	100,000	100,000	100,000	500,000
TOTAL COSTS	321,922	467,520	535,250	457,323	475,727	2,257,742
TOTAL COSTS WITH 15% INFLATION. (Compounded annually)	321,922	537,648	707,868	695,531	832,049	3,095,018
CONTINGENCIES 10%	32,192	53,765	70,787	69,553	83,205	309,502
	354,114	591,413	778,655	765,084	915,254	3,404,520

SUMMARY OF RESEARCH EQUIPMENT PURCHASED FROM US AND LOCAL SERVICES

I. US Source Equipment Purchased Through AID

Category

A.	Maize CRT	$ 39,975
B.	Oilseeds CRT	
	a. Sunflower	50,500
	b. Soybean	149,800
C.	Microbiology	63,000
D.	ARPT	20,100
E.	Library	5,000
F.	Soils Laboratory	21,800
E.	Administrative - Team Leader Office	4,100
	Sub-Total	$ 354,275

US Source Equipment Purchased by Contractor

A.	Seed Cold Storage Unit (Magoye)	$ 20,000
B.	Microbiology Cold Storage Unit (Mt. Makulu)	15,000
	Sub-Total	$ 35,000

II. Local Source Equipment Purchased by Contractor

A.	Ox-drawn Equipment	$ 2,000

TOTAL Equipment Cost	$ 391,275
Procurement Agent Fee of 7% on $354,275	27,389
Supplemental Air Freight Fee	20,000
GRAND TOTAL FOR EQUIPMENT	$ 438,664

COMMODITIES, CONSUMABLE SUPPLIES AND LOCAL SERVICES PURCHASED BY CONTRACTOR

(1981 - 85)

I. Local Costs	
A. CRT's	
Maize - Consumable Supplies	$ 3,000
Sunflower - Consumable Supplies	3,000
Soybeans a. Consumable Supplies	6,000
b. Ox-drawn Equipment	2,000
B. Microbiology - Consumable Supplies	6,000
C. ARPT - Consumable Supplies	6,000
- Computer Time (UNZA)	50,000
- Publishing Costs	50,000
D. Administrative, Operational Recurrent Costs	140,000
E. Vehicle Fuel & Maintenance	138,000
F. Office Furniture (Team)	25,000
TOTAL LOCAL COSTS	$ 429,000
II. US Contractor Commodity Costs	
A. CRT's	
Maize - Consumable Supplies	$ 12,000
Sunflower - Consumable Supplies	12,000
Soybean - Consumable Supplies	21,000
- Seed Cold Storage Unit	20,000
B. ARPT - Consumable Supplies	54,000
- Books for Kabwe	2,000
C. Microbiology - Seed Cold Storage Un	15,000
- Consumable Supplies	12,000
D. Library	93,000
E. Administrative - Consumable Supplie	4,000
TOTAL: US Contractor	$ 245,000
GRAND TOTAL: Contractor	$ 674,000

COST SHARING FORMULA FOR PROJECT VEHICLE FUEL

	AID		GRZ	
	%	$	%	$
1981	100	46,000	0	
1982	80	36,800	20	9,200
1983	60	27,600	40	18,400
1984	40	18,400	60	27,600
1985	20	9,200	80	36,800

ANNUAL ARPT OPERATION BUDGET

I.	STAFF	
	Secretary, Clerk Typist, and 3 Statistical Clerks (provided by GRZ)	$ 22,500
II.	Vehicle operation (3 vehicles + 5 motorcycles)	19,415
III.	Consumable Item (paper, etc.)	12,000
IV.	Computer Time (UNZA)	10,000
V.	Publishing Costs	10,000
VI.	Books	400
TOTAL	Annual Operating Cost	$ 74,315

SUMMARY OF COSTS ESTIMATED - CONSTRUCTION PER SITE

Site Location	Type and Number of Houses	Other Facilities	Total Cost in U.S. $
Mount Makulu Research Station	(2) 3-2-2	2 Screenhouses	$ 130,000
Magoye Research Station	(1) 3-2-2	1 Screenhouse	$ 70,000
Kabwe Research Station	(3) 3-2-2		$ 180,000
			$ 380,000

CHECKLIST OF STATUTORY CRITERIA

CROSS REFERENCE: Country checklist is up to date. See Annex G, Zambia CIP Loan Paper 611-K-005 prepared February 1980.

A. GENERAL CRITERIA FOR PROJECT

1. FY 80 App. Act Unnumbered; FAA Sec. 634A; Sec. 653(b);. (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?

   (a) The Project is included in the FY 1980 and FY 1981 Congressional Presentation.

   (b) Congress will need to be notified since life-of-project costs exceed that reported to Congress.

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

   The GRZ plans have provided up-to-date construction and cost estimates which have been approved by AID engineers.

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

   No legislative action is required to implement the project.

4. FAA Sec. 611(b); FY 80 App. Act Sec. (501). If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

   Not applicable.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

Not applicable.

6. FAA Sec. 209. Is project susceptible of execution part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

This project is being implemented in cooperation with other donors but the expertize provided by AID is unique and not readily included under multilateral auspices.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices, (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

The project is designed to improve the technical efficiency of agriculture(e). All other items are not applicable.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Not applicable.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The GRZ is committing its resources in support of the project through the provision of personnel, facilities, vehicles, equipment, some operating costs, etc.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

Not applicable.

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes.

12. FY 80 App. Act Sec. (521). If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

Not applicable.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

a. Not applicable, as this project is ESF. However, the project supports the GRZ Third National Development Plan (TNDP) especially its emphasis on agriculture and rural development.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)
(1) (103) for agriculture, rural development or nutrition; if so (a) extent to which activity is specificall designed to increase productivity and income of rural poor; (103A) if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition,particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening nationa food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

Not applicable.

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

Not applicable.

(4) (105) for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and b. extent to which assistance provides advanced education and

training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.

Not applicable.

(5) (106) for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: (i) (a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves.(ii) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations; (iii) research into, and evaluation of, economic development processes and techniques; (iv) reconstruction after natural or manmade disaster; (v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance; (vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

Not applicable.

c. (107) is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor.)

Not applicable.

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country)?

The GRZ is committing budgetary resources, personnel, facilities and equipment valued at over 25% of the project. Assurances will be included in the ProAg.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country

"relatively least developed"?

Not applicable.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

The project is in direct response to the GRZ TNDP. A key feature is the emphasis on institutional development and training as they relate to enhanced performance in the agriculture sector, the key to the economic well being of the country.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

Yes, the institutional development and training proposed are essential to Zambia's economic growth possibilities.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

Not applicable.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Not applicable.

3. Project Criteria Solely for Economic Support Fund

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

Yes, Zambia's continued economic health is crucial to it's political stability especially in the volatile Southern Africa region.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

No.

STANDARD ITEM CHECKLIST

A. PROCUREMENT

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?

Yes.

2. FAA Sec. 604(a). Will all commodity procurement financed be from the United States except as otherwise determined by the President or under delegation from him?

Yes.

3. FAA Sec. 604(b). Will all commodities in bulk be purchased at prices no higher than the market price prevailing in the United States at time of purchase?

Yes.

4. FAA Sec. 604(c). Will all agricultural commodities available for disposition under the Agricultural Trade Development & Assistance Act of 1954, as amended, be procured in the United States unless they are not available in the United States in sufficient quantities to supply emergency requirements of recipients?

No agricultural commodities are anticipated under this project.

5. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed?

Yes.

6. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

No agricultural commodities are anticipated under this project.

7. FAA Sec.604(f). Are there arrangements whereby a supplier will not receive payment under the commodity import program unless he/she has certified to such information as the Agency by regulation has prescribed?

Not applicable.

8. FAA Sec. 603(a). Will U.S. Government excess property be utilized wherever practicable in lieu of the procurement of new items? — Yes

9. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on provately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. — Yes

10. International Air Transport. Fair Competitive Practices Act, 1974

If air transporation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available? — Yes

B. OTHER RESTRICTIONS

1. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the United States? — Yes

2. FAA Sec. 636(i). Is financing prohibited from use, without waiver, for purchase, long-term lease, exchange, or guaranty of sale of motor vehicle manufactured outside the United States? — Yes

3. Will arrangement preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or involuntary sterilizations of to motivate or coerce persons to practice abortions? to pay for performance of involuntary sterilizations as method of family planning or to coerce or provide any financial incentive to any person to practice sterilizations? — Yes

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized — Yes

	c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs?	Yes
	d. FAA Sec. 662. for CIA activities?	Yes
	e. App. Sec. 103. to pay pensions, etc., for military personnel?	Yes
	f. App. Sec. 106. to pay U.N. assessments?	Yes
	g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending).	Yes
4.	FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? Can the country borrower service the loan on harder than standard development loan terms?	Not applicable

ANNEX G

TELEGRAM

AMEMBASSY LUSAKA

7 MAR 80
0550Z

UNCLASSIFIED
Classification

ACTION: AID

INFO:

P R 061134Z MAR 80
FM SECSTATE WASHDC
TO RUTAOH/AMEMBASSY LUSAKA PRIORITY 0799
INFO RUQMNI/AMEMBASSY NAIROBI 3321
ET
UNCLAS STATE 063345

ACTION
ACTION TAKEN
N/A
DATE: 3/27
INITIALS

AIDAC, NAIROBI FOR REDSO/EA

E.O. 12065:N/A

AGS:

SUBJECT:PID - ZAMBIA AGRICULTURE RESEARCH AND EXTENSION, 611-0201

1. SUBJECT PID WAS REVIEWED ON FEBRUARY 15. THE PID IS APPROVED, SUBJECT TO RECEIPT AND REVIEW BY AID/W OF PROPER IEE DOCUMENTATION WHICH HAS NOT BEEN SUBMITTED WITH PID. REQUEST SUBMISSION FOR AID/W APPROVAL OF DATE BY WHICH IEE WILL BE SUBMITTED IN ACCORDANCE WITH AID REGULATION 16, SECTION 216.3(A). QUESTIONS AND ISSUES RAISED DURING PID REVIEW ARE SUMMARIZED BELOW FOR YOUR CONSIDERATION. COPIES OF ISSUES PAPER POUCHED TO ADDRESSEES 27 FEBRUARY.

2. GRZ POLICY/COMMITMENT: CONCERN WAS EXPRESSED REGARDING GRZ'S LONG TERM COMMITMENT TO IMPROVED SMALL FARMER AGRICULTURAL PRODUCTION AND ITS RELATED SUPPORT FOR THE RESEARCH AND EXTENSION PROGRAMS. ALTHOUGH THERE ARE POSITIVE INDICATIONS IN THE RECENTLY-RELEASED THIRD NATIONAL DEVELOPMENT PLAN STRESSING AGRICULTURAL PRODUCTION AS AN AREA OF PRIORITY CONCENTRATION, SUCH PLANS ARE NOT ALWAYS A RELIABLE INDICATOR. THE RECURRENT COST IMPLICATIONS OF THE PROPOSED PROJECT ARE OF SPECIAL CONCERN. THE PP SHOULD PROVIDE CONCRETE EVIDENCE OF GRZ'S COMMITMENT TO NEW STRATEGY AND POLICY, ESPECIALLY IN RELATION TO RESEARCH AND EXTENSION

OBJECTIVES TO BENEFIT SMALL FARMERS. CONSIDERATION SHOULD BE GIVEN TO GRZ SUPPORT IN TERMS OF BUDGET AND PERSONNEL AS WELL AS NEW INCENTIVES TO ENCOURAGE GREATER PRODUCTION BY SMALL FARMERS THROUGH IMPROVED PRODUCER PRICES, CREDIT AND MARKETING. ARRANGEMENTS (PERHAPS A PROJECT AGREEMENT COVENANT) SHOULD BE CONSIDERED TO ASSURE (1) GRZ FINANCIAL CONTRIBUTION TO PROJECT; AND (2) EMPLOYMENT OF RETURNED PARTICIPANTS.

3. PROJECT DESIGN: THE PROJECT, AS STATED IN THE PID, WILL IMPROVE THE CAPACITY WITHIN THE MAWD TO PROVIDE SMALL FARMERS WITH APPROPRIATE TECHNOLOGIES TO IMPROVE THEIR PRODUCTIVITY. HOWEVER, PID DOES NOT PROVIDE SUFFICIENTLY

CLEAR DEFINITION OF TARGET GROUPS. WHAT ARE WEALTH AND INCOME PARAMETERS OF A QUOTE MIDDLE-SIZED EMERGENT FARMER UNQUOTE. HOW WILL THE TRANSFER OF NEW FARMING TECHNIQUES BE ACCOMPLISHED AMONG THE VARIOUS TARGET SUB-GROUPS? WILL DIFFERENCES BETWEEN SUB-GROUPS WITHIN THE TARGETED POPULATION NECESSITATE DIFFERENT PACKAGES FOR THE SAME CROPS? WILL FARMERS REQUIRE CREDIT TO BE ABLE TO APPLY PRODUCTION PACKAGE RECOMMENDATIONS?

A) RESEARCH: ALTHOUGH PID INDICATES EXISTENCE OF A COUNTRY-WIDE RESEARCH PROGRAM, PP SHOULD CLARIFY AMOUNT OF PRESENT RESEARCH ACTIVITY FOCUSING ON SMALL FARMERS; EXTENT TO WHICH EXISTING INFRASTRUCTURE REQUIRES UPGRADING FOR SUCCESSFUL PROJECT IMPLEMENTATION; EXPECTED COORDINATION BETWEEN AID AND OTHER DONORS PRESENTLY ASSISTING THE MAWD'S RESEARCH EFFORTS. WHAT IS THE ROLE OF THE SCHOOL OF AGRICULTURE AT THE UNIVERSITY OF ZAMBIA IN TRAINING PEOPLE FOR AGRICULTURAL RESEARCH? PP SHOULD DISCUSS LINK BETWEEN THE SCHOOL AND RESEARCH SERVICE IN TERMS OF A) SCHOOL'S PROVIDING SUFFICIENT OUTPUT FOR RESEARCH SERVICE MANPOWER NEEDS OVER LONGER TERM AND B) COORDINATION OF THE SCHOOL'S RESEARCH ACTIVITIES WITH THOSE OF THE RESEARCH SERVICE.

B) EXTENSION: THE PID IDENTIFIES NUMBER OF PROBLEMS WHICH HAVE HAMPERED THE EXTENSION PROGRAM. CAN THE PROPOSED PROJECT HELP WHERE OTHERS HAVE EVIDENTLY NOT BEEN SUCCESSFUL IN MAKING THE EXTENSION SERVICE SUFFICIENTLY EFFECTIVE TO TRANSFER THE BENEFITS OF RESEARCH TO THE SMALL FARMERS? IT AMOUNT OF RESOURCES FOR THE EXTENSION SERVICE, INCLUDING GREATER CONCENTRATION ON TRAINING FOR LOWER-LEVEL EXTENSION WORKERS. THERE REMAINS CONCERN THAT EVEN WELL TRAINED EXTENSION WORKERS WITH PROJECT-FUNDED MOTOR BIKES WILL NOT GUARANTEE COMMITMENT TO THEIR WORK UNLESS THE GOVERNMENT CAN REMEDY THE OTHER PROBLEMS LISTED IN THE PID WHICH THE PROJECT ITSELF CANNOT RESOLVE.

C) STATUS OF EXISTING PROGRAMS AND INSTITUTIONS. THE LIMA PROGRAM IS MENTIONED IN THE PID AS AN EXPERIENCE WITH A D POSSIBLE MODEL FOR SMALL FARMER RESEARCH PACKAGES. PP SHOULD INCLUDE AN ASSESSMENT OF THIS PROGRAM INCLUDING EXTENT TO WHICH FARMERS HAVE ADOPTED RESEARCH PACKAGES AND DESCRIPTION OF THE EFFECTIVENESS AND CAPACITY OF THE FARMER TRAINING CENTERS AND THE FARMERS INSTITUTES. PP SHOULD ALSO PROVIDE EVALUATION OF OTHER DONOR EXPERIENCES. IN VIEW OF THE PRESENT SITUATION AT THE RESEARCH CENTERS REGARDING OPERATION, MAINTENANCE AND REPLACEMENT OF VEHICLES AND EQUIPMENT, PLEASE CONSIDER WHETHER THE PROJECT SHOULD MAKE PROVISION FOR SHOP EQUIPMENT AND A FULL-TIME REPAIR/MAINTENANCE ADVISOR.

D) ROLE OF WOMEN: ACCORDING TO THE PID, 60 PERCENT OF FOOD GROWN IN ZAMBIA FOR DOMESTIC CONSUMPTION IS FARMED BY WOMEN. ON THIS BASIS, THE PP SHOULD REFLECT THIS SITUATION IN ALL ASPECTS OF PROJECT IMPLEMENTATION, INCLUDING THE MIX

WAIVER JUSTIFICATION

The Project Paper proposes to finance the purchase of 12 vehicles, one tractor and 52 motorcycles from the AID contribution of the project, of which eight vehicles, the tractor and 26 motorcycles will be purchased during the first year of the project and the balance will be purchased as replacement in the fourth year.

The first year's vehicle purchase will be as follows, with the choice of the four replacement vehicles to be determined based on requirements at the time:

Vehicle	Use
3-½ ton pick-up trucks	CRT, Mount Makula
2-4 wheel drive multipurpose vehicles	ARPT, Kabwe
2-station wagons	Team Leader/ARPT
1-mini-bus	Extension, Kabwe
1-90 hp tractor	CRT, Magoye
26-small motorcycles for field use	Extension/ARPT, Kabwe

Since gasoline is extremely expensive in Zambia (currently $3.80 per U.S. gallon and likely to increase before the project begins and several times during the life of the project), the Project Paper proposed that all vehicles be diesel-powered. Diesel fuel is readily available in Zambia and is currently priced at about half the cost of gasoline. Diesel vehicles are increasingly popular in Zambia, and servicing appears to be satisfactory.

Since right-hand steering is virtually a necessity in Zambia for safety reasons and since right-hand drive diesel vehicles are not manufactured in the U.S., a waiver of Section 636(i) of the Foreign Assistance Act will be necessary to satisfy the needs of the project.

Another major consideration is that the vehicles will be used extensively in the provincial locations of the project, Kabwe in Central Province, and Magoye in Southern Province, where servicing and maintenance facilities for U.S. vehicles do not exist. Even in the capital city of Lusaka, there are no representatives for U.S. vehicles, and consequently service facilities and spare parts are not available.

The Project Paper calls for the procurement of motorcycles for use by extension agents. The motorcycle is a common method of transportation in Zambia due to it's relatively low purchase price and low operating costs. There are service facilities for these motorcycles throughout Zambia, thereby facilating vehicle maintenance and the availability of spare parts. These light weight field motorcycles, which are essential for extension work under this project, are not manufactured in the U.S. Without such motorcycles, the agricultural extension agents will not be available to perform their functions adequately—disseminating new techniques from research stations to the small farmers.

The tractor will be used on the Research Experiment Station in Southern Province. There are no servicing and maintenance facilities for comparable U.S. farm equipment in Zambia, and thus service facilities and spare parts are not available.

Probable origin of the vehicles to be purchased under the project is the United Kingdom, Japan and/or France. Probable sources of procurement are Zambia, Malawi and Zimbabwe.

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT LOCATION: Zambia

PROJECT TITLE: Agricultural Research and Extension

PROJECT NUMBER: (611-0201)

LIFE OF PROJECT: Five Years

IEE PREPARED BY: John A. Patterson
AID Representative
AID/Zambia
(January 18, 1980)

ENVIRONMENTAL ACTION RECOMMENDED: Negative Determination

CONCURRENCE/APPROVAL

AID Representative
AID/Zambia
January 18, 1980

ASSISTANT ADMINISTRATOR'S DECISION:

APPROVED AID

DISAPPROVED

DATE: 6/6/80

SIGNATURE

INITIAL ENVIRONMENTAL EXAMINATION

Summary Project Description

The purpose of this project is to develop the necessary agricultural human resources and administrative capacity in agricultural research and extension which are required to accelerate the growth of Zambia's rural sector, especially with respect to small holders. Efforts will center around strengthening and reinforcing the agricultural research capacity of the MAWD and increasing the effectiveness of the extension service in transferring agricultural technology to traditional and emergent farmers.

To accomplish this AID will finance 6 U.S. agricultural specialists for 5 years plus a number of short-term consultants in a major technical assistance effort. Coupled with this will be an extensive training program in the U.S., third countries and Zambia which will provide long-term degree training and shorter practical training for at least 50 Zambian agricultural scientists and technicians. The project will also proide a moderate amount of commodities and equipment to support this work.

Environmental Impact

Most elements of this project including all of the technical assistance and training will be environmentally neutral. Agricultural research activities will take place at established research station and uner strictly controlled conditions. No environmentally adverse effects of the research are foreseen, and the project's extension activities will tend to produce a beneficial environmental effect by introducing improved farming practices, soil conservation techniques, etc. Some pesticides and fertilizers will be used under controlled conditions in conncection with research activities, but will not be financed under the project. Proper handling and use of pesticides and fertilizers will be a concern of research station managers and the U.S. technical assistance staff. The only construction under the project will be erection of 3 greenhouses for controlled plant breeding and 6 houses for the U.S. technicians in Lusaka and at one or more of the MAWD research stations. Land for these houses will be provided by the GRZ at appropriate sites, and architectural style and construction specs will be in accordance with approved GRZ standards for personnel at this level.

Recommendation

In the absence of any foreseeable unfavorable environmental effects, it is the view of the PID design team and the AID Representative that no further environmental analysis is necessary. Accordingly, a negative determination is recommended.

PROJECT AUTHORIZATION

NAME OF COUNTRY: ZAMBIA

NAME OF PROJECT: AGRICULTURAL DEVELOPMENT (RESEARCH & EXTENSION)

NUMBER OF PROJECT: 611-0201

1. Pursuant to Part II, Chapter 4, Sections 531 and 533 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorise the Agricultural Development (Research & Extension) Project for Zambia (the "Cooperating Country") involving planned obligations of not to exceed $12,515,000 in grant funds over a five-year period from date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

2. The project consists of the provision of technical assistance, training and commodities to assist the Cooperating Country in its efforts to redirect agricultural research and extension towards the small farmer by supporting the national Commodity Research Teams in Oilseeds and Cereals/Grains, an Adaptive Research Planning Team in one region, and the extension service.

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

a) Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by AID under the project shall have their source and origin in the Cooperating Country or in the United States, except as provided in paragraph (d) below and except as AID may otherwise agree in writing. Ocean shipping financed by AID under the project shall, except as AID may otherwise agree in writing, be financed only on flag vessels of the United States.

b) Conditions Precedent

Prior to disbursement under the Grant, or to the issuance by AID of documentation pursuant to which disbursement will be made, for each construction activity the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

(1) Plans and specifications, cost estimates, and time schedules for carrying out such construction activity.

(2) Evidence that a suitable site has been set aside for such construction activity.

c) Covenants

The Grant Agreement shall contain covenants substantially as follows:

1) The Cooperating Country agrees to provide counterparts for the project on a timely basis.

2) The Cooperating Country agrees that no technicians will arrive in Zambia until suitable housing has been provided.

3) The Cooperating Country agrees to make available qualified candidates for long-term academic training in the US and agrees to ensure by bonding or other means that such trainees are assigned upon their return to suitable positions within the Ministry of Agriculture and Water Development and to work assignments related to activities under this project, unless AID otherwise agrees in writing. The period of required service will be equal to twice the duration of the training financed under the project.

4) The Cooperating Country agrees that the equipment and motorcycles procured under the project will be exclusively used for project activities, unless AID otherwise agrees in writing.

5) The Cooperating Country agrees that use of all vehicles, other than motorcycles procured under the project will be under the supervision and direction of the US technical assistance team leader and the MAWD Director of Agriculture or their respective designee.

6) The Cooperating Country agrees that housing constructed under this project shall be used solely for AID-financed technicians under the project or upon completion of this project by AID-financed technical assistance personnel assigned to other projects in Zambia until and unless AID otherwise agrees in writing.

7) The Cooperating Country agrees that it will provide the project with a rural sociologist on a regular consulting basis to work with the ARPT in the execution of its programs.

8) The Cooperating Country agrees to share with AID, vehicle fuel and maintenance costs under the project, according to the sliding scale formula set forth in the project paper (Annex E-8).

d) Waivers

Based upon the justification in Annex H of the Project Paper, I hereby:

1) Authorize procurement of 12 project vehicles, one tractor and 52 motorcycles at an approximate cost of $260,000 from countries included in AID Geographic Code 935.

2) Certify that exclusion of procurement from Free World countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of US foreign policy objectives and objectives of the foreign assistance program; and

3) Certify that special circumstances exist to waive, and do hereby waive, the requirements of S636(i) of the Act.

DATE: _____

_____

Douglas J. Bennet, Jr.
Administrator.

ANNEX K

Communications should be addressed to the Permanent Secretary

Telephone: LUSAKA 50431, 50612, 50559, 50458

Telegrams:

In reply please quote
NCDP/ETC/101/36/1

REPUBLIC OF ZAMBIA

NATIONAL COMMISSION FOR DEVELOPMENT PLANNING

OFFICE OF THE PRESIDENT
NATIONALIST/MBITA RD
P.O. BOX 50268
LUSAKA

25th July, 1980.

Mr. J. A. Patterson,
AID Representative,
P. O. Box 32481,
LUSAKA
Zambia

Dear Mr. Patterson,

Thank you for your letter of June 9, 1980 informing us of the arrival of the AID team to complete the preparation of the proposed Agricultural Research and Extension Project. Since that time, as you know, this team has been working closely with the Research and Extension staff of the Ministry of Agriculture and Water Development and we appear to be in substantial agreement on the planning of this project.

Based on the proposals contained in your Project Identification Document of January, 1980 which are subject for further discussions and on the discussions currently under way between the AID team and the Government officials, it is the Government's wish that the AID team should complete all the necessary documentation so that the project can be approved in Washington at an early date and the Grant Agreement signed between AID and the Government of the Republic of Zambia prior to the end of the US Fiscal Year in September, 1980.

Yours sincerely,

L. S. Chivuno
ACTING PERMANENT SECRETARY
NATIONAL COMMISSION FOR DEVELOPMENT PLANNING