D-AAR-03

JORDAN:

HIGHLAND AGRICULTURAL DEVELOPMENT

PROJECT PAPER

278-0264

BEST AVAILABLE

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: [X] A = Add, C = Change, D = Delete — Amendment Number: _____

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: JORDAN

3. PROJECT NUMBER: 278-0264

4. BUREAU/OFFICE: ASIA NEAR EAST — 03

5. PROJECT TITLE (maximum 40 characters): HIGHLAND AGRICULTURAL DEVELOPMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 92

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 86 B. Quarter 1 C. Final FY 88

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 86 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(4525)	(702)	(5227)	(13,722)	(6778)	(20,500)
(Loan)	(107)	(35)	(142)	(2080)	(4910)	(7,000)
Other U.S. 1.						
Other U.S. 2.						
Host Country GOJ		2224	2224		34,811	34811
Other Donor(s) UNEP		400	400		400	400
TOTALS	4632	3361	7993	15812	46,899	62,711

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ESF	123	011	031			12,000	5,000	20,500	7,000
(2)									
(3)									
(4)									
TOTALS						12,000	5,000	20,500	7,000

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 023 | 021 | 029

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BF						
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

Stimulate greater agricultural production through applied research, improved extension methodolgies and various activities to enhance institutional capabilities

14. SCHEDULED EVALUATIONS
Interim MM 06 YY 88 | MM 06 YY 91 | Final MM 12 YY 92

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

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

17. APPROVED BY
Signature: Richard A. Johnson
Title: Acting Director, USAID/JORDAN
Date Signed: MM 03 DD 25 YY 86

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

AID 1330-4 (8-79)

JORDAN HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT
ACRONYMS AND ABBREVIATIONS

AAP	Approved Action Plan
ACC	Agricultural Credit Corporation
ACSAD	Arab Center for Studies of Arid Zones and Drylands
ADAS	Assistant Director for Agricultural Services
ADC	Agricultural Development Council
ADD	Assistant Director for Development
ADF	Agricultural Development Fund
AOAD	Arab Organization for Agricultural Development
APM	Agricultural Program Manager
ASCS	Agricultural Service Center Supervisor
ASO	Agricultural Service Officer
B/C	Benefit-Cost Ratio
CAC	Commodity Analysis Coordinator
CMT	Commodity Multidisciplinary Team
CMTL	Commodity Multidisciplinary Team Leader
CP	Chief of Party
DRE	Department of Research and Extension, MOA
DOA	Directorate of Agriculture
DU	Dunum, one-tenth of a hectare (about one-fourth of an acre)
EIRR	Economic Internal Rate of Return
FAO	Food and Agriculture Organization, U.N.
FY	U.S. Fiscal Year (October 1 - September 30)
GDP	Gross Domestic Product
GOJ	Government of Jordan
HA	Hectares
ICARDA	International Center for Agricultural Research in the Dry Areas
IDRC	International Development Research Center
IPM	Integrated Pest Management
JCO	Jordan Cooperative Organization
JD	Jordanian Dinar (approximately US DOL2.60, August 1984)
JVA	Jordan Valley Authority
JVASP	Jordan Valley Agricultural Services Project
JVFA	Jordan Valley Farmers Association
MOA	Ministry of Agriculture
MOP	Ministry of Planning
NCARTT	National Center for Agricultural Research and Technology Transfer
PID	Project Identification Document
RAIN	Rainfed Agriculture Information Network
RASC	Regional Agriculture Service Center
SCRAD	Systematic Commodity/Resource Analysis & Development Process
SG	Secretary General
SMS	Subject Matter Specialists
TA	Technical Assistance
TDY	Temporary Duty (used for Technical Assistance personnel on TDY)
UJFA	University of Jordan, Faculty of Agriculture
USAID/J	United States Agency for International Development - Jordan
USAID/W	United States Agency for International Development - Washington
WFP	World Food Program, United Nations
WID	Women in Development

PROJECT PAPER
Jordan 278-0264

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

Table of Contents

		Page
I.	PROJECT SUMMARY AND RECOMMENDATIONS	1
	A. Borrower/Grantee	1
	B. Implementing Agency	1
	C. Amount	1
	D. Total Project Cost	1
	E. Goal and Purpose	1
	F. Summary Description	1
	G. Recommendations	2
	H. Draft Authorization	2
II.	PROJECT RATIONALE AND DETAILED DESCRIPTION	5
	A. Jordan Agriculture	5
	B. Rationale and Problem Statement	6
	C. Detailed Project Description	8
III.	PROJECT ANALYSIS	18
	A. Cost Estimate and Financial Analysis	18
	B. GOJ Inputs	24
	C. Audit and Internal Control Requirements	36
IV.	IMPLEMENTATION PLAN	48
	A. Administrative Arrangements	48
	B. Implementation Plan	49
	C. Contracting Plan	52
V.	MONITORING PLAN	54
VI.	SUMMARIES OF ANALYSES	55
	A. Technical	55
	B. Financial	57
	C. Economic	57
	D. Social	68
	E. Administrative	69
	F. Environmental	76
VII.	CONDITIONS AND COVENANTS	77
VIII.	EVALUATION ARRANGEMENTS	79

IX. ATTACHMENTS

(A) Pid Approval Message
(B) Log Frame Matrix
(C) Statutory Checklist
(D) B/G request for assistance
(E) FAA, Section 611 (e) certification.

X. PROJECT ANALYSES: (volume 2)

(A) Technical
(B) Financial
(C) Economic
(D) Social Soundness
(E) Administrative
(F) Environmental
(G) Commodities and Facilities
(H) Training

XI. PROJECT CONSULTANT REPORTS (volume 3)

(A) Boyd Post Report "Jordan Highlands Agricultural Development"
(B) Mark Kraczkiewicz "Report of Private Sector Credit Team"

* These reports are incorporated by reference and are available at NE/TECH and USAID/Jordan.

PROJECT PAPER
JORDAN 278-0264

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

I. THE PROJECT SUMMARY AND RECOMMENDATIONS

A. Borrower/Grantee: The Government of the Hashemite Kingdom of Jordan (GOJ).

B. Implementing Agency: The Ministry of Agriculture (MOA) in consultation with the Agricultural Development Council. The MOA will also serve as coordinating agency.

C. Amount: Not to exceed US Dollar 27,500,000 to be authorized as a grant of US Dollar 20,500,000, plus a loan component of US Dollar 7,000,000.

D. Total Project Cost: The total project cost is estimated at US Dollar 63,000,000 of which the GOJ will contribute the equivalent US Dollar 35,500,000 over the life of project.

E. Project Goal and Purpose:

Goal: To increase overall food production and rural income in the highlands of Jordan.

Purpose:

Stimulate greater agricultural production through applied research, improved extension methodologies and various activities to enhance institutional capabilities.

F. Summary Project Description: The project is designed to enable the GOJ to effectively address its priority goal of increased food security and more equitable income distribution through the development of highlands agriculture. This goal will be emphasized in the next five year development plan (1986-1990). The Highland Agricultural Development Project will be primarily a production program, supported by applied research designed to increase agricultural productivity in the Jordan highlands.

The project will stimulate greater agricultural production through applied research, improved extension methodologies and various activities designed to enhance institutional capabilities. Accordingly, the main project components will focus on (a) the identification of high potential agro-technologies and (b) effective extension of those technologies to highland farmers, including required support services and other inputs. The project represents a priority GOJ initiative to promote agricultural development in the highlands, involving significant re-deployment of institutional resources within the agricultural sector. Indicative of the commitment of GOJ to accelerate the agricultural development of the highlands is the establishment of a high level Agricultural Development Council and Development Fund.

A National Center for Agricultural Research and Technology Transfer together with four Regional Agricultural Service Centers will be established to promote the development of rainfed agriculture in the Jordan highlands. This effort will be coordinated at both the national and regional levels and involve private sector and cooperative groups. The Agricultural Development Council will review policies, set priorities and coordinate this effort. A Systematic Commodity/Resource Analysis and Development approach will be implemented to identify constraints to developing agricultural commodities in the highlands. Priorities will be established and Action Plans developed to address the constraints identified. These constraints will be eliminated through applied research and improved technology delivery systems using both public and private sector channels. Project activities will include organized on-farm demonstration programs; a pilot effort in land aggregation, and mechanisms to help mobilize required capital formation and inputs related to new technologies promoted under the project. A pilot project in range land development, co-financed with UNEP, will be implemented by the Jordan Cooperative Organization under the auspices of Ministry of Agriculture. AID will contribute on a matching basis to provide technical support for this important effort. AID will continue its dialogue with the Government on issues involving highland agriculture including credit, marketing, subsidies, etc.

Major outputs of the project include substantial increases in highland food production particularly in cereals, pulses and livestock. This will be achieved through improved institutional coordination, systematic analysis of the constraints leading to development and implementation of Action Plans. These plans will define institutional roles and responsibilities in implementing the various project supported agricultural production campaigns.

The primary AID inputs include 126 person months of long-term technical assistance, 90 person months of short-term advisors and other support staff; training for Jordanian personnel conducted both in-country and in the U.S.; and appropriate facilities and equipment required to carry out project activities including laboratory equipment, farm machinery and vehicles. Loan financed construction of facilities will include the National Center for Agricultural Research and Technology Transfer and four Regional Agricultural Service Centers.

G. Recommendations: USAID/Jordan has reviewed the Highland Agricultural Development Project finding the project to be technically, administratively, financially, economically and socially sound. Therefore, the project is recommended for FY 85 approval and obligation of funds.

H. Draft Project Authorization:

Name of Country: Hashemite Kingdom of Jordan

Name of Project: Highland Agricultural Development

Number of Project: 278-0264

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Highland Agricultural Development Project for Jordan involving planned obligations of not to exceed $7,000,000 in Loan funds and $20,500,000 in grant funds over a seven year period, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project. The planned life of the project is seven (7) years from the date of initial obligation.

2. The project consists of the planning, establishment, development and institutionalization of a program to increase the agricultural productivity of the Jordan Highlands.

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

   (a) Interest Rate and Terms of Repayment

   The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within (20) years from the date of first disbursement of the Loan, including a grace period of not to exceed five (5) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of five percent (5%) per annum, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

   (b) Source and Origin of Commodities, Nationality of Services

   Commodities financed under the AID Loan shall have this source and origin in Jordan or in countries included in AID Geographic Code 941 except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services financed under the AID Loan shall have Jordan or countries included in AID Georgraphic Code 941 as their place of nationality, except as AID may otherwise agree in writing. Ocean shipping financed by the AID loan shall, except as AID may otherwise agree in writing, be financed on flag vessel of the Unites States, other countries in Code 941 and Jordan.

   Commodities financed under the AID grant shall have their source and origin in Jordan or in the United States except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services financed under the AID grant shall have Jordan or the United States as their place of nationality, except as AID may otherwise agree in writing. Ocean shipping financed under the AID grant shall, except as AID may otherwise agree in writing, be financed on flag vessel only of the United States.

c. Conditions Precedent

Prior to the first disbursement under the Loan or Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Borrower/Grantee will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D evidence that: (1) an Agricultural Development Council or equivalent has been duly established as a high-level body having representation from the Ministry of Agriculture and various autonomous agencies and the private sector, and (2) a secretariat has been formed and (3) a Secretary General has been appointed to implement decisions made by the Council.

d. Covenant

The Government of Jordan covenants to reassign returning long term trainees in positions and at salary levels commensurate with their experience and training and to require their term of employment for a period at least twice the period of their training.

II. PROJECT RATIONALE AND DESCRIPTION

Background:

A. JORDAN AGRICULTURE

Agriculture in Jordan represents approximately 7.5 percent of Gross Domestic Product (GDP) and employs 20 percent of the national labor force. The more rapid economic growth in non-agricultural sectors, particularly since 1973, has resulted in a relative decline in agriculture's share of GDP. This tendency for agriculture to lag behind other sectors of the economy has contributed to the large balance-of-trade food deficit estimated at $411.0 million in 1983. Currently, Jordan relies on imports to meet as much as 75 percent of its food requirements. The major areas of domestic production deficiencies are in cereals, pulses and livestock.

Jordan can be divided into three general agro-climatic zones, which include the Jordan Valley, the desert, and the highlands.

The Jordan Valley runs the length of the great rift from Lake Tiberias down along the Jordan River to the Dead Sea and further south to Aqaba on the Red Sea. At present, agriculture is concentrated in the northern valley where approximately 26,000 hectares are under irrigation and intensively cultivated. This area depends on water from the Yarmouk and Zarqa Rivers, augmented by seasonal streams or wadi flows. Average annual rainfall ranges from about 250 mm in the north to less than 100 mm in the south. The northern valley has some 6,000 farms which produce mainly fruits and vegetables. Given its moderate winter climate, the valley supplies primarily a winter market. Over the last decade, the northern valley has received by far the bulk of new agricultural investment. As a result, valley agricultural production accounts for 35 percent of total agricultural output. Further expansion is likely to focus on the southern "Ghor", that is, the valley south of the Dead Sea.

The desert areas of east Jordan represent 87 percent of Jordan's total land area. However, in terms of cultivable land, it is of minimal importance being considered very marginal for agricultural use. Average rainfall is below 200mm per year and in many areas approaches zero. Apart from rangelands and some areas where groundwater exists, agriculture is not considered to be viable. Population density is extremely low due to the very limited agricultural resource base.

The highlands refers to a narrow strip of elevated land, running from the Syrian border to the Shobak/Petra area about 300 km south. The width of the highlands range from 50 km in the north to 25 km in the south. The highlands contain about 342,000 hectares of cultivable land of which 225,000 are currently under cultivation. Terrain varies from mountainous to rolling fields. The highlands have the greatest rainfall in Jordan, ranging from an annual average of 200 mm to over 600 mm. Despite significant annual variations in rainfall and rocky soils, there exists considerable production potential for rainfed agriculture. This potential is related to basic fertility of soils in combination with a relatively long growing season which permits multiple cropping and diversified farming operations.

There are about 44,500 farms in the highlands with some 300,000 people. Most of the highland farmers belong to Jordan's lower income strata. Typically, these farmers are engaged in diverse agricultural endeavors involving field crops, livestock, vegetables, olives, etc. It is quite common for a farm family to raise a number of crops/livestock on a single farm depending on terrain, water availability and economic factors. A major characteristic of highland farms is fragmentation of land and relatively small farm size. The average farm is less than 8 hectares which, given the extensive cultivation methods presently used, represents a sub-optimal size farm in terms of economic viability. However, the short-term potential for productivity increases is substantial, as demonstrated by a few progressive farmers who have adopted improved agro-technologies.

Finally, in terms of this sub-sector's contribution to the rest of the economy, highland agriculture generates roughly $197.0 million a year, equivalent to 4.9 percent of Gross Domestic Product. Given the domestic market for products produced in the highlands, this contribution could be greatly expanded. That is, since Jordan is a net importer of cereal grains and meat products, both of which are currently produced in the highlands but in insufficient scale, there exists an opportunity for expanded production for the domestic market.

B. Rationale and Problem Statement

In recent years, the preponderance of agriculture and rural development investment has been in the Jordan Valley even though the highlands account for the majority of agricultural production (65 percent) and the bulk of arable land in the country. Furthermore, Jordan has seriously lagged behind other countries in the region in modernizing the traditional agricultural sector that predominates in the highlands. Recognizing the potential for significant increases in highland agricultural production, Jordan is planning a major program emphasis on the highlands as evidenced by recent Government planning documents.

Despite the relative neglect of the highlands, there have been some important highland oriented research and development programs relevant to this project such as the following:

- The World Food Program support for increased planting of tree and vine crops;
- An AID supported project to develop and introduce improved cereal technologies, primarily wheat;
- Ford Foundation assistance in updating and testing improved cereal production technology introduced under an earlier USAID project;
- Australian support to a project utilizing on-farm trials of improved cereal and forage production;
- Arab Center for Studies of Arid Zones and Drylands (ACSAD) on-going research collaboration in rainfed crops and fertilizer requirements;

- International Development Research Center (IDRC) of Canada support for research in grain legumes;
- German technical assistance on a major watershed (Zarqa);
- Australian assistance in analyzing the economic potential for highland agricultural development by major commodity;
- Food and Agriculture Organization (FAO) contributions of improved technologies including ways of overcoming problems caused by land fragmentation;
- Independent efforts by Jordanian universities and public agricultural sector agencies.

This research and development activity has generated improved rainfed technologies which have the potential for substantially increasing production and income in the Jordan highlands. Nevertheless, research on certain other highland commodities important to the farm system has received relatively little attention such as livestock, vegetables, and tree crops. Hence, as a result of earlier research efforts, there are a number of tested technologies especially for cereals and forage crops that could be applied now, while other crop technologies are being further developed.

If there are improved technologies for some crops available in Jordan that could be adopted by farmers, what have been some of the constraints inhibiting their adoption?

The answer to this question is complex. Basically, the unavailability of information and technical support at the farm level has been the major constraint. This reflects a weakness in the technology transfer process in Jordan. The problem can be viewed in terms of the supply and demand for technology. That is, the interaction between agricultural research workers who generate technology and farmers/entrepreneurs who ultimately utilize technology. This interaction is indirect and depends on the intermediary role of the agricultural extensionist or private sector equivalent. Their role in the technology transfer process is crucial. The extensionist in his informational/technical support role must be sensitive to farmer needs and local conditions so as to articulate these demands for technology to researchers and agro-input suppliers. Factors which impact on this process and explain the slow rate of technological change in the highlands could be summarized as follows:

Farmer demand for technology is conditioned by:
- Lack of awareness and knowledge concerning available technologies;
- Inaccurate perceptions of risk associated with new technologies;
- Lack of confidence in public and private agricultural support systems;
- Uncertainty of how to obtain necessary equipment and other inputs.

The supply of technology is constrained by:
- Lack of understanding concerning farmers' needs or farm enterprise objectives;
- Inadequate investment in research and/or mis-specified research priorities;
- Inadequate extension methodology and/or motivation;
- Lack of timely availability of farm inputs and support services;

Ultimately, farmer adoption of modern technologies will depend on information concerning technical feasibility and profitability as well as access to required inputs. This will require greater institutional efforts to reduce the constraints on both sides of the technology adoption equation. To do this, Jordan must develop its institutional capacity to better address highland agricultural problems. Naturally, this effort, to be successful, must involve both the public and private sectors. Hence this project will promote institutional development, along with supporting infrastructure, using a pragmatic and systematic approach to technological change necessary for increasing agricultural production in the Jordan highlands.

C. Detailed Project Description

The project will encourage and support the accelerated agricultural development of the Jordan highlands. The project will stimulate greater agricultural production through applied research, improved extension methodologies and various activities designed to enhance institutional capabilities. Accordingly, the main project components will focus on (a) the identification of high potential agro-technologies and (b) effective extension of those technologies to highland farmers, including required support services and other inputs. The project represents a priority GOJ initiative to promote agricultural development in the highlands, involving significant re-deployment of institutional resources within the agricultural sector. Indicative of the commitment of GOJ to accelerate the agricultural development of the highlands is the establishment of a high level Agricultural Development Council and Development Fund to facilitate improved coordination and permit flexible funding for a wide range of council approved activities, including credit guarantee mechanisms, research contracts and demonstration programs in cereals, livestock and tree crops.

The Agricultural Development Council (ADC) to be established under the project will act as the coordinating body for setting priorities and assigning responsibilities, including the allocation of resources, to various institutions for implementation of approved Action Plans. The Council will also act as an advisory board to the Ministry of Agriculture in recruiting and appointing staff for the project, either on a permanent or temporary basis. This Council will be comprised of senior Ministry and other GOJ staff, plus representatives from the private sector, including the cooperative organizations. It will have a Secretary General and support staff to handle day-to-day administrative requirements. Support staff for the ADC secretariat

will be headquartered at the National Center for Agriculture Research and Technology Transfer. The Secretariat will also administer the Development Fund to ensure rapid deployment of resources to carry out Council approved Action Plans.

These Action Plans will be used to organize production campaigns drawing on the existing inventory of "known" technologies in Jordan. These technologies, requiring little or no further research, can be promoted early in the project resulting in rapid increases in farm productivity. In order to replenish the initial inventory of technologies on an on-going basis, adaptive research activities will also involve a search for new technologies. Thus, the project will be production oriented with selected research aimed at overcoming specific adoption problems encountered in the field. At the same time, high potential technologies will be identified that can be readily adapted and promoted in the highlands during later stages of the project.

Finally, the project views agricultural research and extension as functionally constituting a continuum of knowledge development, transmission, application and feedback. Accordingly, the integration of research and extension activities will be emphasized under the project as well as a multi-disciplinary approach in properly identifying farm-level problems and specifying their solution.

1. Project Components

a. Applied Research in Agro-Technology: Under this component of the project, a systematic search for high potential technologies appropriate to conditions in the highlands will be undertaken. Given the small agricultural land base, Jordan can not afford or justify a large investment in primary (basic) agricultural research. Therefore, it will need to rely heavily on basic technologies developed elsewhere. At the same time, Jordan will need to develop adequate research capability to identify, evaluate and adapt agro-technologies and solve specific application problems in addition to carrying out selective research activities. The project will utilize a Systematic Commodity/Resource Analysis and Development (SCRAD) framework to identify suitable agricultural commodities for active promotion including related technologies. This analytical framework will help identify any bottlenecks or constraints to successful cultivation in the highlands. Based on experience in other countries, this approach can be expected to yield a more optimal set of priorities by identifying critical areas for research and estimating the benefits of successful innovation. Under the SCRAD framework, an analysis of commodity market structure is carried out identifying current production sources, market volumes and location of consumers. The price stability and market absorptive capacity is determined and compared with potential production using available resources and known technologies. The potential commodity production can be achieved through successfully overcoming various constraints. These are then prioritized in terms of the foregone production or opportunity costs of not addressing that particular constraint. Project resources are then concentrated on those constraints which, if overcome, would contribute most to realization of commodity production potential.

Based on these priorities, Action Plans will be developed to address natural resource, technology and institutional constraints. The plans will assign responsibility for implementation and provide a monitoring mechanism for measuring progress. Given the initial backlog of known and available technologies, it is anticipated that there will be a programmed series of integrated program campaigns. The programs will be integrated on the basis of crop complementarities and/or related technology currently available. For example, (a)cereal/pulse/forage, (b)range/livestock and (c)forestry/tree crops represent appropriate groupings for field promotion. Since improved technologies are currently available in-country for cereals, pulses, and some forages, the first set of production campaigns will be directed toward these crops. This might be followed by range/livestock campaigns and somewhat later, temperate horticultural crops such as stone fruits, vegetables and certain tree crops. Applied research activities will include analysis of farm economics and improved marketing practices.

A National Center for Agricultural Research and Technology Transfer (NCARTT) will be established which will have overall responsibility for the identification and testing of high potential technologies for the highlands. The actual extension of production technologies to farmers will be implemented through a network of Regional Agricultural Service Centers (RASC). The NCARTT will form the administrative headquarters for institutional coordination of public agriculture sector resources for this project. Also, it will house the administrative and planning staff, central research laboratories and the subject-matter specialists who supervise on-farm research, demonstrations and training activities carried out at the various Regional Agricultural Service Centers. The NCARTT will also form part of an international network of agricultural research institutions to better assess appropriate technologies, information and technical support for specific agricultural problems. Construction of this new central facility will be mainly loan financed under the project. Equipment and materials for the center will be provided from grant funds.

b. Information Dissemination, Demonstration and Farm Input Mobilization: Under this component, new technologies will be promoted among highland farmers and various agro input suppliers. A variety of market-oriented mechanisms will be used to effectively demonstrate and explain new technologies and encourage adequate and timely supply of farm inputs and services. In promoting the adoption of new technologies, the Regional Agricultural Service Centers (RASCs) will provide information, training and technical support to highland farmers. The objective will be to provide practical demonstration to farmers of the "validity" of selected technologies promoted under the Action Plans. An interactive operational mode will be used to ensure proper feedback between researcher and extensionist. In general, the RASCs will be the site for initial farmer and private sector introduction and orientation to new technologies as well as training and other extension activities designed to more rapidly spread tested technologies. Subject-matter Specialists and qualified extensionists will demonstrate the technology to potential users, thereby promoting its adoption as well as providing any needed training in its use. They may also provide facilities for Agriculture Credit Corporation (ACC), Jordan Cooperative Organization

(JCO) and other rural credit institutions to finance needed livestock and crop production inputs and equipment. Four of these Centers are projected for the highlands and will be financed mainly with loan funds. The NCARTT will also serve as a fifth center for outreach purposes. Production campaigns directed from these centers will utilize a variety of extension methods and draw on both public and private sector support mechanisms such as seed producer, equipment dealers, universities etc.. Project activities include:

(i) Organized On-Farm Demonstration Programs - A major means of encouraging farmers to adopt new crop and livestock technologies, along with the required technical support, e.g. custom services and inputs, will be through organized on-farm demonstration programs. In order to encourage farmers to participate and to reduce the perceived risks associated with new technology, these demonstrations could take several forms. One method is simply to underwrite the cost of inputs on demonstration farms. Another is to provide guaranteed income to the farmer through a base lease arrangement for the land used. That is, each participating farmer receives a land rent based on land productivity classifications. This lease amount could be supplemented according to the amount of farmer supplied labor and other inputs, e.g. machinery. A marketing arrangement will also be developed to sell the products from these on-farm demonstrations. Any marketing surplus over total production costs i.e. land rent, rental of machinery and/or custom services and other inputs will be used either to partially replenish the Development Fund or alternatively pay an incentive dividend to participating farmers. Such dividends would provide a direct incentive to the farmer to participate in demonstration programs by sharing in the returns of profitable innovation. The project will fund contracts with suppliers of custom machinery services and input suppliers to provide the inputs and services needed to conduct this type of on-farm demonstration. In this manner, various extension approaches will be field tested and the approach(es) which brings about higher adoption rates will be transferred to the extension service and private organizations through training programs conducted at the RASCs.

(ii) Farm Input Mobilization - Private sector and cooperative organizations will be encouraged to expand their operations in support of highland farmers wishing to adopt new technologies. If necessary, loans for equipment purchased by machinery service contractors will be arranged through the project with various credit institutions. These loans may be secured through a special guarantee mechanism financed from the Agricultural Development Fund. The guarantee would supplement equipment resale value as collateral for loans. These equipment loan guarantees would be in favor of JCO, ACC or other lending agencies on behalf of participating farmers and/or agro-enterprises. Such an arrangement will provide a guaranteed credit operation and encourage both the machinery service contractors and input suppliers to provide the proper machinery and inputs.

Private sector input suppliers and contractors will be encouraged to become more active in the highlands. Promotional campaigns will be launched, including trade fairs (by the Agricultural Engineer's Association) publicity and dialogue with private sector leaders.

In addition, the Jordan Cooperative Organization, the Agricultural Credit Corporation, and various private sector agro-enterprises that provide machinery and other services including inputs will be supported by project technical assistance in order to expand and improve their farmer services. Emphasis will be placed on development of adequate machinery services and input supplies through market-oriented systems. There will also be technical assistance provided to assist participating agricultural credit agencies to improve rural loan portfolio management and repayment performance. Furthermore, such institutions will be encouraged and assisted in establishing small saver and institutional savings programs to mobilize capital needed to expand loan programs to highland farmers. Project technical assistance will be directed towards developing specific programs to stimulate farmer demand for input supplies and custom machinery services through the on-farm demonstration program, pilot land aggregation program and other project implementation activities.

(iii) Pilot Land Aggregation Program - In some cases, excessive land fragmentation may be identified in the Action Plan as a constraint to technology adoption. Frequently, this situation results over time due to traditional inheritance practices affecting farm ownership. Land fragmentation is gradually being overcome through a variety of informal or commercial arrangements. A slightly modified form of the on-farm demonstration program will be tested on a pilot basis to explore ways of accelerating this aggregation process. One solution to the land fragmentation problem is to reaggregate land on a sound farming basis without changing legal ownership. In other cases, there is a need for land reclamation, conservation farming and watershed projects to be implemented across ownership boundaries. Some of these may need to be on a cost share basis between landowners and the Government. This could be done through long-term lease arrangements, giving both the landowner and the contractual farmer a share in profits over total operating and improvement costs. The development of adequate contract farming practices and marketing arrangements would also make it possible for abandoned farm land to be put back into productive use as part of the farm aggregation process. There are a number of options that will be considered for the purpose of land aggregation. Actual farming can be done by sharecropping, long term management contracts, or by forming companies or partnership arrangements. Various means are presently being used to share costs and benefits. The need is for longer term arrangements that are not currently practiced. The purpose of this experimental program will be to develop the mechanisms that meet the requirements and provide incentives for participation by both landowners and progressive farmers. For instance, a contractual agreement could be patterned after those in the demonstration program outlined above, except on a longer term basis, so both the landowner and the farm operator benefit from investment in land improvement. Furthermore, lease arrangements might be useful for the promotion of tree crops at

higher elevations in order to help prevent soil erosion. Moreover, since certain technologies may require a minimum cultivation area to be efficient, land consolidation in conjunction with custom service contracts may permit significant economies of scale. Therefore, land aggregation and reclamation could be commercially feasible, if appropriate contracting mechanisms are found.

(iv) Pilot Range Improvement Demonstration (co-financed by UNEP) - Much of the highland area is not suitable for cultivation or forestry and is currently used for communal grazing. Over the years, these areas have become almost barren due to overgrazing. This practice has destroyed most of the desirable vegetation that provides feed for sheep and goats. Moreover, it has contributed to the aggravation of an already serious erosion problem. Recent demonstration work in Tunisia and Morocco, under similar soil and climatic conditions, has shown that when these range areas are revegetated and properly managed, i.e., under the control of grazing cooperatives or associations, they can be productive and provide a high rate of return on investment. A pilot range improvement project co-financed with UNEP will be implemented by the Ministry of Agriculture in cooperation with the JCO which will organize the grazing cooperative. This will involve the revegetation and proper management of a rangeland block of GOJ lands adjacent to the Lajun range experiment station. The block will be grazed under controlled grazing conditions and improved livestock management techniques practiced by members of a JCO cooperative. This will provide a demonstration of viable size to field test and adapt the technology developed in Tunisia and elsewhere. The matching AID funds will be utilized primarily for technical support services while UNEP funds will cover commodity and construction (fencing) costs. The Lajun range and livestock improvement demonstration will lay the basis for follow-up campaigns for improved livestock management and rangeland renewal.

(v) Agricultural Development Fund (ADF) - In order to accelerate implementation of policies approved by the Agricultural Development Council and provide a flexible financing mechanism for mobilization of resources outlined in the various Action Plans, the project will establish an Agricultural Development Fund co-financed by AID and GOJ and administered by the ADC secretariat. The Fund will provide supplemental financing for a number of project related activities. These include on-farm demonstrations, land aggregation, credit guarantee and research contracts. Accordingly, the Fund will be established with a number of accounts separately maintained to ensure financial accountability and fulfillment of project objectives. The actual operation of each account or "fund window" will vary somewhat depending on the nature of the financed activities. Some activities will require direct expenditures or drawdowns which supplement normal GOJ budgetary allocations. Other activities generate reflows that can be recycled within the same account or reallocated within the overall Fund. The general operation of Fund accounts is described below:

(a) On-Farm Demonstration - This important extension activity will require lease payments to farmers and financing of inputs and services provided by private custom operators, cooperative associations or other non-government entities. The disbursements from this account will be independent of the normal GOJ budgetary process and ensure expeditious participation by private groups and interested farmers. Since the demonstrations involve the physical application of new technology on farmers' fields, there will be a marketable output from this activity. Therefore, within one year of disbursement from this account, a reflow will be generated which will partially replenish the Fund. A projection of drawdowns and reflows is provided in Annex B.

(b) Land Aggregation - The project will provide short-term lease financing to encourage consolidation of farms. The objective will be to consolidate enough land to achieve a more optimally-sized farm suitable for full application of new technologies. As with the on-farm demonstration program described above, the financing of this activity will result in certain reflows, depending on production yields from leased farms and the contractual arrangements with the participating farmer and farm machinery operators. An illustrative projection of drawdowns and reflows is presented in Annex B.

(c) Equipment Loan Guarantee - In order to improve financial intermediation through removal of debt risk, the project will establish a loan guaranty program for capital investment or equipment purchased by farmers and/or custom operators. The guarantee program with participating Jordan credit institutions such as ACC and JCO will help ensure adequate credit availability for investment in new technology, e.g. seed drills, chisel plows, tractors, combines etc. An analysis of loan default exposure and corresponding account reserves is presented in Annex B. Unutilized guarantee reserves may be reprogrammed to other Fund accounts towards the end of project life.

(d) Research Contracts - This account will be drawn upon to finance the foreign exchange costs of contracts with international or regional research organizations. The financing of such contracts, buy-ins or specialized technical assistance are direct cost disbursements with no reflows anticipated. AID disbursements to this account will help develop longer term institutional relationships to support NCARTT activities through international research networks.

(e) The GOJ contribution to the fund will cover the local cost expenses of university and contractor participation in research contracts and provide variable input financing in support of the equipment guarantee program. The GOJ contribution will also fund such cost items as local travel of participating agency personnel and expendible property both office and agricultural.

AID will contribute to the Agricultural Development Fund accounts on the basis of approved project activities. Actual disbursements will be made on the basis of approved Action Plans and in accordance with liquidity requirements, advance payments will be made. Reflows to a fund account may be subsequently reallocated within the Fund as well as any unused initial allocation during the life of project. Such reprogramming of funds may be done on a case by case basis or on the basis of interim evaluation recommendations.

2. Project Outputs

Under the project, a wide variety of activities will be supported aimed at increasing institutional capacity to develop and transfer improved technologies to farmers. Accordingly, the major outputs include improved policy formulation and coordination, institutionalized techniques for identifying research and extension priorities; time phased plans defining objectives and mobilizing institutional resources; trained research and extension staff in new methodologies, increased credit availability for new equipment (embodied technology), diagnostic laboratory support, demonstration and testing facilities and improved knowledge of rangeland management/organization. Ultimately, these institutional outputs will result in higher technology adoption rates among farmers and increased agricultural production in the highlands.

- Improved policy formulation and coordination will be brought about through the formation of the Agricultural Development Council chaired by the Minister of Agriculture. The Council will include the heads of semi-autonomous agencies such as the Agricultural Credit Corporation (ACC). Moreover, there will be representatives from the private sector and cooperative groups such as the Jordan Cooperative Organization (JCO). This high-level Council will be supported by a secretariat. Policies will be reviewed periodically, both in terms of internal consistency and the overall objective of accelerated agricultural development of the highlands. The Council will oversee the SCRAD process, formally review and approve Action Plans and allocate institutional resources, some of which will be provided through the project-supported Agriculture Development Fund.

- The project will help institutionalize the Systematic Commodity/Resource Analysis and Development (SCRAD) approach to better identify production constraints and establish research and development priorities. The SCRAD methodological approach will provide the information and analysis necessary to formulate Action Plans and launch successful production campaigns.

- The Action Plans represent time-phased efforts to mobilize resources to achieve specific objectives. These objectives may be institutional in character, such as legislative reform or a marketing strategy for new agricultural commodities. Alternatively, they can be targetted to key constraints at the farm level, identified through the SCRAD process. For example, promotion of seed drills in wheat growing areas or technologies involving contour farming to help prevent moisture and soil loss. The Action Plans will identify responsible institutions and detail implementation activities.

- Agricultural research and extension personnel will be trained in new methodologies, including multi-disciplinary approaches to problem solving. These technical skills, upgraded through training and technical assistance under the project, will enhance institutional capacity to serve farmers and various agro-enterprises.

- Increased credit availability to farmers and/or custom operators interested in adopting new technologies will be supported under the project through technical assistance to Jordan rural credit institutions and establishment of a credit guarantee mechanism for equipment purchase.

- A diagnostic laboratory facility will be established at NCARTT to provide technical support to farmers and researchers. The facility will be useful in helping to adapt technologies to specific conditions in Jordan.

- Demonstration and testing facilities will be established at various Regional Agriculture Service Centers. They will provide extension personnel with facilities to effectively demonstrate new technologies to farmers and entrepreneurs as well as test/calibrate new agricultural equipment. The regional service centers will also provide logistical support to its extensionists in the field.

- The pilot rangeland project will provide experience and knowledge in both organizational and technical aspects of rangeland management. It will provide an opportunity for JCO to organize cooperative grazing methods in environmentally fragile areas. If successful, the approaches to revegetation of highland ranges could be replicated on a much wider scale.

Finally, the project will make possible increases in agricultural output in the highlands as a result of successful technology transfer. Crop yields are expected to increase from 20 to 100 percent depending on the commodity and technology used. Major gains in cereals and forage production are anticipated early in project life, while livestock, vegetable and tree crop production increases are projected for later stages. For projections of physical outputs at the farm level see Annex C.

3. Project Inputs

AID inputs for the project include grant-financed technical assistance and staff training directed towards establishment of NCARTT and four highland regional service centers. In addition, grant financing will be provided for laboratory equipment and other commodity procurement. Loan funds will finance construction of the five centers.

(a) Technical Assistance

Long Term: A multi-disciplinary team consisting of Chief-of-Party and various subject matter specialists.

Short Term:	Consultants to advise on specific research/extension methodologies and operational aspects of program implementation.

(b) Training

Pre-service and In-service:	Candidates selected will participate in short-term courses and workshops within Jordan.
University-level (Non-Degree) Training:	Candidates selected will study at a U.S. institution and will work with U.S. counterparts in research/ extension programs.
Graduate Training:	A trained cadre of experts in disciplines relevant to design and implementation of project activities.
Specialized Training:	Participants for USDA and other short courses.

(c) Construction

National Center for Agricultural Research and Technology Transfer (NCARTT):	This center, to be located near Amman, will consist of offices, laboratories and other support facilities.
Regional Agricultural Service Centers (RASC)	These four centers will be located in the highlands and consist of offices, training areas and logistical support facilities

(d) Commodities

Office Equipment:	Required for five centers
Laboratory Equipment:	Central Laboratory for NCARTT and veterinary and other services for RASCs
Tractors and Farm Equipment:	Demonstration programs conducted at centers and on-farm demonstrations.

GOJ inputs include in-kind contributions of land for center sites, office support and assigned counterparts for the five centers. In addition, a cash contribution (US$7.25 million) to the Agriculture Development Fund and construction of facilities (US$.5 million) will be provided by the GOJ.

III. PROJECT ANALYSIS

A. Cost Estimate and Financial Analysis

1. Introduction:

The Highland Agriculture Development Project is directed towards the dual objectives of: (1) realizing significant economic and financial returns through the application of improved technology to farms in the highlands; and, (2) developing an institutional structure/technical capacity for agricultural technology.

This analysis examines from a financial perspective the resource requirements of the Project as an activity, and addresses the financial concerns implicit in the objectives. Section 2, the Budgetary Analysis, describes the AID and GOJ project inputs, details the budget, and specifies budgeting assumptions. Section 3 addresses the financial implementation of the activity including planned contracting methods and audit/internal control requirements. Institutional implications for the GOJ/MOA are described in Section 4.

2. Budgetary Analysis

This section examines and quantifies the inputs which are described in more detail in other sections of the paper. The budget has been prepared in accordance with guidance contained in STATE 234165 (83) and STATE 052165 (83). The total project cost is estimated at $ 62,311,000 with AID financing of $ 27,500,000 and a GOJ contribution of $34,811,000, as indicated in the summary budget, (Table 1). The GOJ contribution is 55.9% of the total cost.

a. AID Inputs

AID inputs to the Project include grant funding of $20,500,000 and $ 7,000,000 in loan funds. The summary and detailed budgets, (Tables 1 and 2), indicate the AID funded project components. Identified base year (FY 85) costs total $19,741,000 of which foreign exchange costs amount to $11,715,000 or 59% of the total. Estimates for physical contingencies and inflation are $ 3,146,000 and $4,613,000 respectively. AID inputs are generally categorized in traditional cost components rather than project specific, (or output related), inputs. Section (d) relates project inputs to outputs.

(1) Technical Assistance-Grant Funded

A substantial portion of the AID contribution pertains to the technical assistance component with a base year cost of $4,445,000. A total of 312 person/months (p/m) of effort is required. There are three areas of emphasis for the technical assistance component. The bulk of the effort will be directed towards the NCARTT. A total of 3 long term advisors (Chief of Party, an extension advisor, and an administrative advisor) are budgeted for 108 months of long term effort, plus 18 months of long term effort yet to be specified. There will be 90 months of short-term assistance. The Project will also support the UNEP pilot Range Improvement Demonstration by providing a Range Specialist for 24 months. In addition, there will be 72 p/m of backstopping effort

(TABLE 1)
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT
SUMMARY BUDGET
$ (000)

	USAID				
INPUTS	TOTAL AID	AID GRANT	AID LOAN	TOTAL GOJ	TOTAL OF ALL
TECHNICAL ASSISTANCE	4,445	4,445			4,445
COMMODITIES	6,201	6,201		500	6,701
TRAINING	753	753		59	812
EVALUATION	125	125			125
AGRICULTURE DEVELOPMENT FUND	3,405	3,405		6,750	10,155
LAND AND FACILITY CONSTRUCTION	4,812		4,812	1,000	5,812
GOJ PERSONNEL AND OPERATIONAL COSTS				14,148	14,148
TOTAL BASE YEAR PROJECT COSTS	19,741	14,929	4,812	22,457	42,198
CONTINGENCY	3,147	2,004	1,143	2,321	5,468
INFLATION	4,612	3,567	1,045	10,033	14,645
TOTAL PROJECT COST	27,500	20,500	7,000	34,811	62,311

(TABLE 2)
HADP
DETAILED BUDGET U.S. CONTRIBUTION
$ (000)

	UNITS	BASE YEAR COSTS	FX	LC	CONTINGENCY	INFLATION	TOTAL COST
GRANT FUNDS							
TECHNICAL ASSISTANCE							
LONG-TERM	150 P/M	1,469	1,114	355			
SHORT-TERM	90 P/M	1,080	864	216			
HOME OFFICE SUPPORT		259	259				
OVERHEAD/INDIRECT COST		589	589				
SUB TOTAL TECHNICAL ASSISTANCE (INSTITUTIONAL)		3,397	2,826	571			
OTHER T.A.	72 P/M	1,048	734	314			
TOTAL T.A.	312 P/M	4,445	3,560	885	445	1,030	5,920
COMMODITIES/EQUIPMENT							
TECH. CENTER (NCARTT)		940	846	94			
AGRI. SERVICES CENTERS		5,261	4,621	640			
SUB TOTAL COMMODITIES		6,201	5,467	734	620	1,044	7,865
TRAINING							
SHORT-TERM TRAINING		216	171	45			
LONG-TERM ACADEMIC		312	204	108			
ENGLISH LANG. TRAINING		35		35			
SPECIAL PROGRAMS		140	140				
OVERHEAD ON U.S. TRAINING		50	50				
SUB TOTAL-TRAINING		753	565	188	75	88	916
AGRICULTURE DEVELOPMENT FUND							
ON-FARM DEMONSTRATIONS		650		650			
LAND AGGREGATION PROGRAM		1,000		1,000			
EQUIPMENT LOAN GUARANTEE		350		350			
INTERNATIONAL TECHNICAL SUPPORT		1,405	831	574			
SUB TOTAL AG. DEVL. FUND		3,405	831	2,574	851	1,367	5,623
EVALUATION		125	125		13	38	176
TOTAL GRANT FUNDS		14,929	10,348	4,381	2,004	3,567	20,500
LOAN FUNDS							
FACILITY CONSTRUCTION							
N C A R T T		987	303	684			
AGR. SERVICE CENTERS		3,227	1,000	2,227			
SUB TOTAL CONSTRUCTION		4,214	1,303	2,911			
DESIGN		254	64	190			
CONSTRUCTION SUPERVISION		344	-	344			
TOTAL LOAN FUNDS		4,812	1,367	3,445	1,142	1,046	7,000
TOTAL AID PROJECT INPUTS		19,741	11,715	8,026	3,146	4,613	27,500

primarily in logistic support to the project team, at a cost of $408,000 which is included under home office support and indirect costs. The HADP is a logistically and administratively complex activity. The Project involves a major reorganization of the MOA and the careful coordination of project inputs and relationships with other organizations and institutions. In view of the potential difficulties in initial implementation, the project budget includes a provision for administrative services. An administrative advisor will provide 24 months of service as a part of the expedited implementation phase.
Personnel and support are costed in accordance with salary ranges for senior personnel found in similar activities, and with benefits normally provided in a direct contract with an educational institution. The average total cost per person month of effort (including overhead, and applied contingency and inflation) is $ 14,231 over-all. Overhead rates, (based on direct labor cost) are 50% for home office, and 35% for overseas staff.

(2) Training-Grant Funded

The technical directions and methodologies planned for the HADP require, in effect, a technical and administrative reorientation of the professional counterpart staff assigned to the activity. During the initial years of the Project, almost all such personnel will receive at least some training. Training under the project is multidirectional and some personnel will be trained through a variety of courses. Training can be viewed as administrative (project methodologies/procedures) or, technical (advanced training in areas of specialization). Training activities in both areas will be carried out within Jordan, or regionally, where feasible, and in the U.S. Training is a continuous process, and the Project will establish a relationship with regional entities, such as ICARDA, for on-going training or updating in technical specialties. The training component is budgeted at $753,000 in base year costs.

(a) In-Country Training Activities

(i) Basic Training

A significant training effort will be mounted within Jordan including courses in: (1) management, for project personnel with management responsibility; (2) introduction to the SCRAD method; and (3) basic ASO preparation. All of the above courses will be presented through the NCARTT, most probably under contractual arrangements. A total of $215,500 is provided for 225 p/m of training as described in the Post report. These training courses represent basic training activities for which the responsibility will gradually be assumed as an internal function of the NCARTT, thus providing for the eventual training of additional personnel.

(ii) English Language Training

An adequate level of English language competence is indispensable for professional staff both for the necessary technical training to be undertaken outside of Jordan, and, to be current with the technical literature available in specialized fields. Depending on competence, all GOJ project professional personnel may be required to attend English language programs. Language training is budgeted at $ 35,000.

(b) Training Outside of Jordan

(i) Academic Training

As described in section II 3b (4), the NCARTT will require an expansion in the technical expertise in specific agricultural disciplines to direct the longer term research efforts. This requirement will be met through long-term academic training for 32 employees. A total of $ 312,000 is budgeted for 336 person months of training, most of which will be in the U.S. Consideration will also be given to academic training at the University of Jordan in certai areas.

(ii) Specialized Training

A total of 47 p/m of external short-term training at a cost of $ 140,000 is envisioned for the Subject Matter Specialists at U.S. Universities or technical training at the USDA planned for ADC'S as detailed in the Boyd Post report.

Costs for training outside of Jordan are based on person month estimates included in HB 10. The GOJ finances required international travel and the employee's salary. In-country training costs consist of: (1) cost of contract trainers; (2) some tuition/academic costs where training is performed at the UOJ or other institutions; and (3) a reduced maintenance allowance or per diem as appropriate.

(3) Commodities/Equipment-Grant Funded

The identified commodity costs are $ 6,201,000 in FY 85 base year terms and are detailed in the Post report. The bulk of the commodity component is aimed at the furnishing and equipping of the NCARTT and the Service Centers, including the laboratories, which will be completed early in the project. The other aspect of the component is the procurement of commodities for the actual demonstration and extension activities at the Service Centers. Given the length of the Project, some of the items (particularly vehicles/farm equipment) employed at the Service Centers will require replacement. There will be a continuing requirement for some minor commodity/equipment procurement on an annual basis which is included within the GOJ contribution to the project.

AID commodities will be largely of U.S. source and origin (90%). Some supplies/equipment may be procured locally and $620,000 or 10% of the component is provided for this purpose.

(4) Evaluation-Grant Funded

The budget contains a provision for the financing of outside evaluations. As specified in section III, two interim evaluations have been scheduled, one in FY 1988, and the other in FY 1990. The cost estimates are based on acquiring services through a contract with a private firm, or, through a PASA and $ 125,000 is provided. The final evaluation is presumed to be after the PACD and funded from outside of the Project.

(5) Agricultural Development Fund-Grant Funded

Both USAID and the GOJ will contribute to an Agricultural Development Fund which will provide resources for the undertaking of specific research programs and demonstration/extension activities within the context of the Project. The operation of this fund is further described in other section of the Project Paper. USAID will contribute a total of $3,405,000, in base year costs. The fund is viewed as a vehicle which will permit the flexible application of financial resources to targets of opportunity. USAID's contribution to the fund will, however, be directed towards certain specific areas of interest.

The On-Farm Demonstration Program, budgeted at $650,000, is intended to encourage farmers to participate in the application of new technology. The Pilot Land Aggregation Program will support innovative methods of reaggregating land to viable agricultural units, on a longer term commercial basis. A total of $1,000,000 is included for land aggregation. The Equipment Loan Guarantee Fund will provide revolving debt coverage program of $350,000 to reduce risk in the purchase of farm machinery. Lastly, AID funds will be utilized to fund the acquisition of international technical assistance or research through regional or international organizations. Funding of $1,405,000 is estimated for this purpose.

Implementation arrangements for the fund, and the methods which will be needed to achieve the required adaptation, are not firm at this time and the above mentioned procedures are illustrative of the approaches under consideration.

(6) Construction of Facilities-Loan Funded

This component, budgeted at $4,812,000 in base year costs, consists of a contribution towards the construction of the NCARTT, and, a contribution to the construction/expansion of the service centers. Sites on GOJ owned land have been selected for the NCARTT and two of the service centers. Tentative sites have been identified for the remaining two service centers. The NCARTT will be constructed from the ground up, in accordance with the requirements specified in the Post report. MOA facilities currently exist on the four service center sites and efforts will include renovation and expansion. Estimates are based on the square footage developed in the Post report and the current construction costs for similar structures.

The construction component also includes a provision for the services of design and construction supervision. The current cost estimates specified in the Post report include a provision for partial local currency financing by the GOJ.

B. GOJ Inputs (Table 3)

(1) Personnel related costs and operational support.

From the perspective of the GOJ, the Project is aimed at the institutional element of the MOA which is responsible for the Highlands. The GOJ contribution consists largely of the in-kind contribution of personnel, and the related operational support costs for the MOA entities under the project i.e. the Highland Agricultural Development Council; the NCARTT; and the Agricultural Service Centers. Detailed assumptions in respect to the GOJ personnel contribution are found in the Post report. A total of $10,621,000 is budgeted in base year costs for 194 counterpart personnel, to be assigned for 1,128 person years of effort. Total personnel include professional staff of 84, a total of 50 secretarial/clerical employees, and 60 farm technicians as indicated in Table 4.

All operational aspects of project activities are financed entirely by the GOJ. Except for the limited administrative support for the contract team detailed in A.2 a(1), all clerical/support staff and related office costs are part of the GOJ contribution. All support costs related to vehicles/commodities, and facility operation/ maintenance are similarly included. The MOA will also provide funding for all costs related to the day-to-day work operations of the centers, which will entail a significant annual level of supplies and equipment. Operational support costs have been budgeted at $3,527,000 in base year costs.

GOJ personnel and operating expense are linked to the establishment of the various institutional elements. Given the need for mobilization time, and in some cases recruitment, costs are phased in accordance with the following schedule.

Office of the Director - Staffed and functioning as a coordinating unit as of 10/1/85 continues through FY 1992. Base year costs p/a are $156,000 for the support of 15 employees.

NCARTT - Staffed and functioning on 4/86 to correspond with arrival of technical team. Base year costs p/a are $536,000 for the support of 39 employees.

Service Centers - All four service centers are considered staffed and functioning on an interim basis (without permanent facilities) by 12/86. The base year cost p/a is $1,739,000 for the four service centers which support 140 employees, (excluding laborers and guards).

(2) Support to Training

In accordance with USAID Jordan policy, the GOJ will provide international transportation for training outside of Jordan budgeted at $ 59,200 in base

TABLE 3

HADP
DETAILED BUDGET-GOJ CONTRIBUTION
($ 000)

	BASE YEAR	CONTIN-GENCY	INFLA-TION	TOTAL COST
Personnel and Operating Exp.	1,093	109	446	1,648
Director's Office				
Staff	950			
Operating Expenses/Equip.	143			
National Agricultural Tech. Center	3,488	349	1,532	5,369
Staff	2,584			
Operating Expenses/Equip.	904			
Agri. Service Centers	9,567	957	4,637	15,161
Staff	7,087			
Operating Expenses/Equip.	2,480			
Total Personnel and Operating Expense.	14,148	1,415	6,615	22,178
Support to Training	59	6	5	70
Commodities	500	50	47	597
Agriculture & Development Fund	6,750	675	3,280	10,705
Construction Contribution	500	125	46	671
Land	500	50	40	590
Total GOJ Contribution	22,457	2,321	10,033	34,811

TABLE 4

H A D P
GOJ CONTRIBUTION - PERSONNEL
(PERSON YEARS)

INPUTS	TOTAL	1986	1987	1988	1989	1990	1991	1992
Office of the Director	105	15	15	15	15	15	15	15
Professional Staff	35	5	5	5	5	5	5	5
Clerical Staff	70	10	10	10	10	10	10	10
NATC	253	19	39	39	39	39	39	39
Professional Staff	149	11	23	23	23	23	23	23
Clerical Staff	104	8	16	16	16	16	16	16
ASC'S	770		70	140	140	140	140	140
Professional Staff	308		28	56	56	56	56	56
Clerical Staff	132		12	24	24	24	24	24
Farm Technicians	330		30	60	60	60	60	60
	1,128	34	124	194	194	194	194	194

year costs. As the trainees are presumed to be counterparts assigned to the project, salary/benefit costs for trainee time are included under personnel costs.

(3) Agricultural Development Fund

Over the life of the Project, the GOJ will finance research and development activities to supplement that performed in the NCARTT. It is obvious that envisioned programs will require funding beyond the specific resources within the project, (the operations of the NCARTT and the Service Centers), and the anticipated institution building inputs supplied by AID, (technical assistance, training, construction, and commodities). A funding pool is therefore required to enable the NCARTT and Agricultural Development Council to mobilize research and extension activities beyond the strict institutional capacity of the project entities. The research and development fund provides this capacity. As discussed previously, the fund will be jointly financed by AID and the GOJ. AID funds will be tied to specific interventions, and foreign exchange requirements. The GOJ contribution to the fund will largely be directed towards local costs.

A total GOJ contribution of $ 6,750,000 in base year costs is estimated for this purpose. It should be noted, that while this element is crucial, it is not well defined. The funding could represent any of the following:

-- Contracts or other institutional implementation arrangements with public and semipublic entities within or outside of Jordan (such the UOJ/FA in Jordan).

-- In-kind contributions of personnel/other resources from other elements of the MOA or GOJ outside of the institutional framework of the project, should the required expertise be available.

-- Matching contributions to fund programs identified for AID financing in section 2A5.

(4) Land and Facility Construction.

The GOJ will contribute to the construction component of the project by donating the required land for the NCARTT and Service Centers. The land contribution is valued at approximately $500,000 and considered donated. The construction contribution is estimated at $500,000 based on the facilities described in the Post report and the anticipated AID inputs. The contribution towards construction is subjected to a 25% physical contingency factor and appropriate escalation.

c. Contingencies and Inflation

The HADP is a long and technically complex activity, and provisions for physical contingency and inflation are extremely important. These factors have been included in the manner required in ANE Bureau guidance. Physical contingencies are added to base year costs, and the appropriate cumulative inflation factors are applied to the costs spread over the life of the project, subdivided into foreign exchange and local costs.

The project budget includes a total of physical contingency of $5,468,006. Base year costs for grant funded components (technical assistance, commodities, training, and evaluation) and related GOJ inputs, are subjected to a 10% physical contingency, which should be adequate in that these elements are reasonably well defined. The provision for the Agricultural Development Fund is not well defined at this point. Given this uncertainty an increased physical contingency is appropriate. Similarly, the construction elements have not been finalized and costs are not sufficiently quantified for a firm budget provision, and, in accordance with Bureau guidance, the contingency should be increased. A total physical contingency of 25% has been included under each of these components, and, the related GOJ inputs.

Price escalation or inflation follows the current guidance. The budgets are stated in U.S. dollars with a base year of January 1985. Costs are inflated cummulatively beginning in FY 86 at the following rates: Inflation of Foreign Currency is calculated at the rate of 6% per year from FY 86 through FY 92, Local costs are inflated at the rate of 8% per year for the same period. No project costs are presumed to be incurred in FY 85, or after FY 92.

The rate of exchange utilized in the budget is .400 JD = $1. or rather $2.50 = JD 1. The rate of exchange has moved consistently in favor of the dollar over the past several years. In FY 1980, for example, the average rate was JD 1 = $ 3.35. Thus the value of the J.D. has declined approximately 34% over this period. The current exchange rate reflects the relative strength of the dollar worldwide, and the JD could gain in value, particularly given the length of the Project. However, based on past experience, any such change could most probably be absorbed within the physical contingency and inflation factors.

2d. Relationship of Project Inputs to Outputs

The Project is aimed at the dual objectives of: increased agricultural production in the Highlands, and the development of an institutional capacity for the application of research. Table 5 subdivides project inputs between these two objectives as a measure of the project focus. The two categories indicated are a simplification of the project outputs indicated elsewhere in the PP.

The category "Research and Institution Building" combines those outputs related directly to the Agricultural Development Council, the NCARTT, and other research/administrative elements which the Project will support. It includes, for example, the services of the Administrative Specialist who will assist in the envisioned reorganization. Research/Institution Building activities receive approximately $7,078,000 of AID financing and $7,140,000 from the GOJ which represents 34% of the total cost. AID technical assistance and training inputs are largely directed towards this output.

TABLE 5
HADP
RELATIONSHIP OF INPUTS TO OUTPUTS
BASE YEAR COSTS (000)

	TOTAL PROJECT COSTS	APPLIED RESEARCH 1/	EXTENSION PROJECT II
AID CONTRIBUTION - GRANT			
Technical Assistance	4,445	3,287	1,158
Equipment/Commodities	6,201	940	5,261
Training	753	537	216
Evaluation	125	62	63
Agricultural Develop Fund	3,405	1,125	2,280
SUB-TOTAL-AID GRANT	14,929	5,951	8,978
AID CONTRIBUTION - LOAN			
Construction	4,812	1,127	3,685
SUB-TOTAL - AID LOAN	4,812	1,127	3,685
TOTAL AID CONTRIBUTION	19,741	7,078	12,663
GOJ CONTRIBUTION			
Personnel and Operating Expense	14,148	4,581	9,567
Support to Training	59	59	
Agricultural Develop Fund	6,750	2,000	4,750
Construction/Land	1,000	500	500
Commodities	500		500
TOTAL GOJ CONTRIBUTION	22,457	7,140	15,317
TOTAL PROJECT COST	42,198	14,218	27,980
	100%	33.7%	66.3%

1/ APPLIED RESEARCH COMBINES PROJECT ELEMENTS WHICH RELATE TO THE ADC AND TO THE NCARTT

2/ EXTENSION COSTS INCLUDE ALL PROJECT ELEMENTS RELATED TO THE SERVICE CENTERS AND DIRECT INTERVENTIONS.

The category "Extension and Project Interventions" summarizes outputs which are aimed at directly increasing agricultural production, including extension efforts, pilot demonstrations, and private sector initiatives. As this is the primary project objective, 66% of total resources or $ 27,980,000 is utilized. There is an institutional element as cost related to direct extension activities, including personnel, have been included. This category nonetheless represents that portion of the project resources which is action rather than research oriented. Major AID financed efforts include the construction and equipping of the service centers, and the contribution to the Agricultural Development Fund.

The separation of costs in Table 5 between the two summary outputs is an indicator of the PP assessment as to the relative priorities to be addressed. A preponderance of resources, financial and personnel are applied to extension activities without which the research will be unutilized.

3. Project Financial Implementation

This section describes the planned implementation methods and the input timing to achieve the project objectives. The Project has a long life and some of the implementation methods will require a significant lead time for negotiation/contracting. To achieve the proper coordination, an expedited implementation phase will be undertaken prior to the main contracting phase.

a. Project Implementation Methods

(1) Expedited Implementation Phase-AID

The bulk of the technical assistance and training components will be provided through a major institutional contract. Certain implementation activities should be undertaken, however, in advance, given the lead time required for contracting and mobilization, including (a) procurement of certain project commodities ; (b) limited pre-project training for key GOJ counterparts; (c) technical assistance in administration; and, (d) architectural/engineering services for facility construction. The expedited implementation phase will begin shortly after the signing of the agreement/satisfaction of initial CP's. The total expedited implementation phase will involve approximately $1,415,000 in AID financing, and should be completed in accordance with the schedule detailed in section III B.

(a) Procurement of Commodities

Some of the project commodities must be on site prior to the arrival of the technical assistance team, and available to the MOA as rapidly as possible. USAID will procure these items through direct AID contracting. Because of the size of the commodities component and in view of the number of separate transactions, a separate procurement contract will be used. This contract will most probably be with a Procurement Agent with payment through a Bank Letter of Commitment.

(b) Training

Pre-project training activities for key project personnel specified in section IIB 4b will be undertaken through S/IT. The objective of this training is to ensure that specified personnel receive the initial exposure to required project methodologies. In-country English language training for counterpart personnel will also be financed through a host country contract.

(c) Technical Assistance In Administration and Technical Liaison/Support

The Project is administratively and logistically complex. Shortly after the project begins the services of an administrative advisor will be obtained to assist the GOJ in the follow-through for detailed planning/coordination of the AID and GOJ project inputs. The Administrative Advisor will initially be obtained under either a HC PSC or through a PASA with USDA for a period of 1-2 years.

(d) Architectural/Engineering Services

The services of a local firm will be obtained to design and plan and monitor construction of the facilities which will be built. The GOJ plans to move ahead rapidly with the required construction, and these initial services will be required quickly. A host country contract and direct reimbursement mechanism is envisioned.

(2) Main Project Implementation Phase-AID

(a) Institutional Contract

Most technical assistance and participant training activities under the AID Grant financed project components will be incorporated into a major institutional contract with an American organization. Given the research and extension foci of the Project, a contract with a major university (or consortium including appropriate universities) is the only realistic alternative for a contracting entity. Participant training will be included in the contract. Commodity procurement will be contracted separately.

The method of project implementation will be that normally used for AID financed University contracts, the FRLC, in accordance with AID policy. The portion of the project assigned to the institutional university contract is approximately $4,100,000 in base year costs, and represents approximately 21% of AID base year project funding.

(b) Commodity Procurement

Commodity procurement in the main implementation phase will be undertaken at two points. The principal procurement exercise will be finalized after the arrival in Jordan of the technical assistance team. The team and GOJ counterparts will develop the technical specifications and the

procurement package with contracting by July 1986. In accordance with AID policy the contracting method will be a host country contract with a procurement agent in the U.S., with financing through a Bank Letter of Commitment. This method of financing is necessitated by the magnitude of the effort and the proliferation of procurement actions and payment invoices which would otherwise result. The total envisioned procurement contract is budgeted at $3,710,000 in base year costs.

A second project procurement phase will be undertaken in FY 90 for the modernization of farm machinery. As this procurement will be significantly less complex a host country contract with an AID direct letter of commitment may be utilized. Commodity costs in this phase are budgeted at $1,596,000.

While separate commodity procurement contracts are planned, consideration will be given to enfolding the commodity component within the institutional contract for the technical assistance and training depending on the capacity of the institution selected. The cost of the two approaches would be similar in that the contract with the educational institution would be funded under a FRLC, and there would be an advantage in a reduction in the number of contracts and implementing documents.

(c) Evaluation

Interim evaluations, will be funded through direct AID contracts with appropriate U.S. Institutions, (PASA contracts with the USDA or IQC type contracts).

(d) Agricultural Development Fund

The AID contribution to the Fund will be implemented directly by the MOA. Actual disbursement mechanisms for the separate accounts under the fund have not been determined. Specific AID funding allocations will be based on action plans submitted by the Agricultural Development Council. It is envisioned that, for the most part, AID allocations will be matched by contributions from the GOJ Agricultural Development Fund component. Given the areas earmarked for AID involvement, however, disbursement should be straightforward. Fund requirements will be determined by the Agricultural Development Council in coordination with the NCARTT and USAID Jordan. AID would then provide a direct funding allocation for the MOA to undertake the agreed action. The pilot demonstration activities and the land aggregation programs would be financed through the payment of fixed predetermined land rental or lease amounts which can be easily verified and controlled. The equipment guarantee program would involve the establishment of a revolving fund incumbrance system, as payments would only be made in the case of default. AID financing of international technical support would be on the basis of case-by-case approval of individual contracts or implementation arrangements. To facilitate progress, AID direct contracting may be used in the case of international organizations. The envisioned financing methods would most probably not require significant advance financing from AID funds. As this aspect of the Project is not well defined at this time, implementation should be subject to a CP, which requires further definition.

(c) Facility Construction/Expansion

The loan funded construction component will be implemented through host country contract(s) with a local construction firm(s). AID will probably provide an agreed upon level of financing through a FAR method. The FAR method has been used successfully in similar activities in Jordan and the construction will be straightforward with no requirement for advanced technology.

(3) The GOJ project inputs will be provided through the routine budget process. The GOJ operates on a calendar year basis with budget requests prepared/submitted as of July for the following year. The MOA has submitted a tentative funding request for 85/86 based on the budget figures noted in the Post report. The MOA will provide a separate budget allocation for agreed costs under the Project.

One element of the GOJ contribution requires special definition in respect to financial implementation. The GOJ contribution to the Agricultural Development Fund is included as part of the MOA regular budget. With the GOJ's current financial position, a dedicated source of revenue should facilitate the timely availability of a significant cash (as opposed to in-kind) contribution. This method of financing is proposed for the new "Fund for Encouraging Agriculture". The Agricultural Development Fund proposed here might be considered for administration under the Fund for Encouraging Agriculture with an allocated portion of these funds.

(4) Financial Implementation Plan and Assumptions

The financial implementation plan detailed in Table 6 spreads expenditures over the life of the project. This table combines physical contingency and inflation provisions into the individual inputs. Projected fund commitments are detailed in Table 7. The financial plan is based on the contracting/resources provision assumptions detailed below.

(a) Expedited Implementation Phase - AID Inputs

Grant Agreement signed	6/85
Initial CP's met	7/85
PIO/C for expedited commodities issued	10/85
Commodities in place in Jordan (target date)	6/86
Pre project Training Activities	
Documentation issued	10/85
Training Completed, participants returned	5/86
Interim Chief of Party/Technical Liaison	
Documentation issued	7/85
Contract signed/advisor arrives	9/85
Engineering/Architect Contract	
Contract Signed	12/85
Work completed	12/86

(b) Main Implementation phase - AID Inputs

Institutional contract signed Jan 86.

— Technical assistance begins 04/1/86 and continues in the manner scheduled in the Post report.
— Training activities proceed in the manner described in Post report.

Commodity Procurement

Commodity contract issued in 7/86
Second phase/replacement takes place in FY 90

Facility construction

Completed by year 2 of implementation, 1988

Agricultural Development Fund

Starts in year 2 of project implementation and continue through FY 91.

b. Relationship of Financing Methods to AID Policy

The implementation/financing methods described above are generally in conformance with the AID Payment Verification Policy Guidelines as modified in the USAID Jordan Mission Assessment of FY 1984. The institutional and research orientation of the project, and the need for extensive U.S. home office technical support and coordination virtually mandates the use of an educational institution, although a mixed private sector/university consortium is an alternative. The amalgamation of costs under the contract is necessitated by the interrelated nature of the inputs. The use of the FRLC for university contracts is required by AID policy in respect to educational institutions. The loan funded construction phase emphasizes a host country contract and a use of the FAR method. The precise funding methods for the Agricultural Development Fund are not finalized but should consist of a direct reimbursement payment arrangements with the MOA. The use of contracts with procurement agents/bank letter of commitment financing is needed because of the complexity of the commodity component and the proliferation of invoices and procurement documentation which would otherwise result.

Other than the institutional contract, the main use of direct contracting is found in the expedited implementation phase. Direct contracting is required to ensure that the initial technical assistance in administration and commodities are in place prior to the arrival of the contract team. AID Financing and Implementation Methods are summarized below.

Implementation Methods in Base Year Costs	AMOUNT $ (000)
Technical Assistance	
Direct Contract/PASA - Direct Reimb.	1,048
Institutional Contract with University Consortium - FRLC	3,397
Training	
Pre Project Training - S/IT participant fund transfer.	50
Institutional Contract - FRLC	703
Commodity Procurement	
AID direct Contract with Procurement Agent Bank Letter of Commitment	895
HCC with Procurement Agent - Bank Letter of Commitment	3,710
HCC for commodities - AID Letter of Commitment	1,596
Evaluation	
AID Direct Contract/PASA or IQC Direct Payment	125
Agricultural Development Fund	
Implementation Arrangement with MOA Reimbursement or direct payment	3,405
Facility Construction	
Reimbursement or direct payment FAR method construction arrangement FAR payment procedures.	4,812
TOTAL Base Year Costs	$19,741

C. Audit and Control Requirements

Audit

The HADP will have a very significant audit potential given the nature of the project, the magnitude of the resources employed, and the financing methods. Approximately 50% of project resources are utilized in the cost reimbursement institutional contract and commodity procurement contracts, and these costs, including overhead, must be audited during the course of the project. The AID inspector General Audit function is responsible for the audit of direct contracts. However, in view of the current movement towards the use of non federal auditors, should AID policy permit private audit of direct contracts, consideration should be given to finance from the contingency element of the project, periodic independent audit of contract costs. Depending on the nature of the HCC commodity contracts, there may be a potential for financial audit i.e. if the component is included within the institutional contract or on a reimbursement basis.

Most of the other project costs do not have a significant financial audit potential. The limited direct contracts for commodities, services (administrative specialist and evaluation) and training through S/IT are straightforward. Similarly, FAR financed construction does not generally require audit, since the initial determination of reasonability of cost (and construction monitoring) places this burden on the GOJ. For the most part, AID resources are employed in the provision of specific services, commodities, and training . The bulk of AID resources are foreign exchange costs, expended in the U.S. Financial procedures for the Agricultural Development Fund, will be designed in such a way as to minimize the need for audit.

Internal Control

Internal control concerns in the HADP are minimized in that AID resources consist primarily of the provision of specific services, commodities training, and FAR construction. Funds are provided for operational activities solely by the GOJ. The exception in respect to the methods of implementation with internal control is the fund. While this is a relatively small part of the Project, internal control requirements will be considered carefully prior to specific agreement on procedures.

Utilization and control of project commodities represents an internal control concern. Project monitoring must ensure that proper controls are maintained over the receipt and appropriate use of commodities, and that commodities are safeguarded from pilferage. There is similarly a requirement for maintenance and servicing arrangement to ensure that full benefit is obtained from the investment. The GOJ is aware of these concerns and will take the necessary arrangement to ensure proper physical control and maintenance of commodities including vehicles and farm equipment.

3.d AID

AID will provide total project funding of $27,500,000. Given the magnitude and length of the Project, there is some flexibility in the annual funding levels. USAID has determined that the initial FY 85 obligation will consist of a grant of $6,000,000. This amount will cover costs through FY 86, and a few months in FY 87. The Financial Implementation Plan (Table 6) demonstrates a presumption that $5.4 million of AID will be expended in FY 86 (construction and commodity costs). Cumulative expenditures through FY 87 are estimated at $11.3 Million or 41% of AID funds. By the end of FY 88, total disbursements are expected to total $17.8 Million or 65% of the funding. With minimal forward funding this amount should be available, at the latest, in FY 87. The remaining funding of $9.7 Million could be provided in FY 89 or beyond, if necessary. The projected fund commitments by fiscal year are shown in Tables 7 and 8.

TABLE 6

H A D P
FINANCIAL IMPLEMENTATION PLAN
($ 000)

INPUTS	TOTAL	1986	1987	1988	1989	1990	1991	1992
AID Contribution-Grant								
Technical Assistance	5,920	1,069	1,544	1,250	707	432	428	490
Training	916	501	337	38	40			
Equipment/Commodities	8,650	3,656	1,835			2,372	-	
Evaluation	176			66		110		
Agricultural Development Fund	4,838		716	1,947	1,048	1,127	787	
Total AID Grant	20,500	5,226	4,432	3,301	1,795	4,041	1,215	490
AID Contribution-Loan								
Construction	7,000	142	1,533	3,248	2,077			
Total AID Loan	7,000	142	1,533	3,248	2,077			
TOTAL AID CONTRIBUTION	27,500	5,368	5,965	6,549	3,872	4,041	1,215	490
GOJ Contribution								
Support to Training	65	65	-	-	-	-	-	-
Land & Facility Construction	1,175	1,175	-	-	-	-	-	-
Agricultural Development Fund	10,726	275	642	1,386	1,496	2,424	2,618	1,885
Commodities	601	242	359					
Personnel & Operational Cost	22,244	467	2,005	3,370	3,640	3,931	4,246	4,585
TOTAL GOJ CONTRIBUTION	34,811	2,224	3,006	4,756	5,136	6,355	6,864	6,470
TOTAL PROJECT COST	62,311	7,592	8,971	11,305	9,008	10,396	8,079	6,960

TABLE 7
H A D P
PROJECTED FUND COMMITMENTS
$ (000)

	TOTAL	1985	1986	1987	1988	1989	1990
GRANT							
TECHNICAL ASSISTANCE/	5,920						
Institutional Contract	4,570		3,754		816		
Other/Expedited Impl.	1,350	700		650			
TRAINING	916						
Institutional Contract	861		501	360			
Other/Expedited Impl.	55	55					
COMMODITIES	8,864						
Expedited Impl.	864	864					
Main Phase Contracts	7,000		4,090			2,910	
AG. DEVELOPMENT FUND	5,624			831	2,265	1,218	1,310
EVALUATION	176				66		110
Total Grant Financing	20,500	1,619	8,345	1,841	3,147	4,128	1,420
LOAN							
Construction	7,000						
NCARTT							
Service Centers				465	954	-	
Design				843	2,100	1,900	
Construction supervision	-	78	194	177			
Total Loan Financing	7,000		142	1,533	3,248	2,077	
TOTAL AID FINANCING	27,500	1,619	8,487	3,374	6,395	6,205	1,420

TABLE 8
HADP
FUND COMMITMENTS BY FISCAL YEAR FUNDING
$ (000)

	TOTAL	FY 85	DATE OF COMMIT.	FY 86	DATE OF COMMIT.	FY 87	DATE OF COMMIT.	FY 88	DATE OF COMMIT.
		FISCAL YEAR FUNDING							
GRANT FINANCING									
Technical Assistance	5,920								
Institutional Contract	4,570	3,754	1/86			316	1/88	500	1,89
Other/Expedited. Impl	1,350	700	9/85		9/87	650	9/87		
Training	916								
Institutional Contract	861	501	1/86			360	1/88		
Other/Expedited Impl.	55	55	9/85						
Commodities	7,864								
Expedited Impl.	864	864							
Main Phase Contract	7,000			4,090	5/86-12/87			2,910	FY 89-90
Ag. Develop. Fund									
	5,624			500	12/86	2,108	215 6/87 1,893 12/87	3,016	FY 89-90
Evaluation	176					66	5/88	110	5/90
TOTAL GRANT FINANCING	20,500	5,874		4,590		3,500		6,536	
LOAN FINANCING									
Construction	7,000								
NCARTT	2,180								
Service Centers	4,775			2,000	5/86	4,000	5/87	1,000	9/88
A & E Contract									
TOTAL LOAN FINANCING	7,000			3,000					
TOTAL AID FINANCING	27,500	5,874		6,590		7,500		7,536	

4. Institutional Implications For the GOJ

a. Recurrent Costs

The detailed GOJ budget (Table 3) demonstrates the institution building emphasis of the project. As the research and extension capacity within the MOA represents a project objective, recurrent costs can be considered an appropriate contribution. GOJ Project financing consists of recurrent costs of $14,148,000 in base year terms, in-kind contributions of land of $ 500,000, trainee transportation cost of $59,000, actual cash costs of $6,750.000 for the Agricultural Development Fund, $500,000 for facility construction, and $500,000 for commodities.

Recurrent costs under the Project represent personnel and operational support (operating expense) of the project entities. A total of 194 personnel will be required at a cost of $10,621,000. As these personnel continue throughout the life of the project, the provision for inflation becomes increasingly important.

The HADP requires a reorganization in one form or another of the MOA and a good portion of the personnel envisioned will be transferred from other duties. Others will have to be hired. While it is difficult to ascertain exact numbers of personnel, it seems clear that the shortfall in personnel will occur in the areas requiring specialized technical expertise. The following estimates are utilized for purposes of illustration: 10-12 subject matter specialists; 30-40 farm technicians; and 25-30 Agricultural Services Officers. There will also be a secondary hiring effect from the transfer of other personnel to the HADP. While some current functions will be subsumed by the project, at least some additional personnel will eventually be hired to replace employees assigned. For budget purposes we can assume that approximately one third of all other employees will be replaced eventually. In respect to operating expenses, other than personnel costs, it should be noted that the project establishes 5 new installations (the NCARTT and the four service centers) the costs of which represent an augmentation to recurrent cost expenditures.

The MOA budgets for 1982-1985 are presented in Table 9. Costs are divided into current and capital components. Personnel levels upon which salary cost estimates are based are also indicated. Table 10 compares the GOJ contribution for FY 86, FY 87 and FY 88 (base year plus contingency), with the FY 85 MOA budget. (The 85 budget should be roughly comparable with the FY 1986 base year project costs). The significance of the project cost assumptions is demonstrated by the fact that at full staff, project entities will required an amount equal to 23% of the current cost budget.

The main issue however is the extent to which the GOJ project contribution represents an increase in the current and capital cost budget rather than a redeployment of available resources. Table 10 quantifies these net augmentations to MOA financing and spreads base year costs, plus contingencies over the life of the project. By 1988, the first year of full operations, additional recurrent costs will be approximately $1,753,000 or 15% of the MOA 85 base year budget.

TABLE 9

HADP
MOA BUDGET 1982 - 1985
JD (000)

	(ACTUAL) 1982	(FINAL) EST 1983	(EST) 1984	(EST) 1985
Current Budget				
Personnel Costs	3,341	3,565	3,630	3,731
Graded Employees	(756)	(765)	(779)	(810)
Ungraded Employees	(648)	(615)	(661)	(700)
Contracted Employees	(11)	(10)	(11)	(11)
Laborers	(600)	(649)	(627)	(600)
Benefits & Other pers. costs	(1,326)	(1,527)	(1,552)	(1,610)
Operational costs	959	920	876	810
Other costs	12	85	100	129
Total Current Budget	4,312	4,570	4,606	4,670
Capital Budget				
MOA Facilities	155	137	213	347
Projects				
Grazing/Rangeland	530	485	587	670
Forestry Develop.	15			
Greenhouse Develop.	498	485	658	619
Highland Agricult.	326	202	245	275
Soil/Water Treat.	324	586	409	375
Dairy Farms	189	4		
Wheat Develop.	30	61	79	38
Research Center (JV)	34	76	152	76
Potato Production	23	33		
Total Capital Budget	2,124	2,069	2,343	2,400
Total MOA Budget	6,436	6,639	6,949	7,040

TABLE 10
NET COST INCREASE TO THE MOA
HADP
($ 000)

	MOA CY 85 BUDGET	FY 86 PROJECT COST	FY 86 INCREASED COST	FY 87 PROJECT COST	FY 87 INCREASED COST	FY 88 - FY 89 PROJECT COST	FY 88 - FY 89 INCREASED COST	FY 90,91 AND 92 PROJECT COST	FY 90,91 AND 92 INCREASED COST
Current Costs									
Personnel	9,328	334	241	1,178	433	1,822	899	1,822	899
Employees/Benefits	7,828	334	241	1,095	350	1,656	733	1,656	733
Laborers	1,500			83	83	166	166	166	166
Operational costs	2,025	90	90	385	385	611	611	611	611
Other costs	322	59	59						
Contingency		48	48	156	156	243	243	243	243
Total Current Costs	11,675	531	438	1,719	974	2,676	1,753	2,676	1,753
Capital Costs									
MOA Facilities	868	500	500						
Projects	5,132	250	250	500	500	1,000	1,000	1,500	1,500
Contingency		200	200	50	50	100	100	150	150
Total Capital Cost	6,000	950	950	550	550	1,100	1,100	1,650	1,650
Total	17,675	1,481	1,388	2,269	1,524	3,776	2,853	4,326	3,403

1/ Project cost is defined as base year cost plus contingency
2/ Increased cost is calculated per section 4 a.

H A D P

INCREASED COST ESCALATED BY INFLATION

INPUTS	1986	1987	1988	1989	1990	1991	1992
BASE YEAR COSTS	1,388	1,524	2,857	2,857	3,403	3,403	3,403
INFLATION	111	254	742	1,030	1,597	1,997	2,429
TOTAL COST	1,499	1,778	3,599	3,887	5,000	5,400	5,832

The contribution to the Fund is shown as an augmentation to the capital budget. There is as well a long-range recurrent cost burden in the project as equipment/facilities require replacement.

Table 9 represents a relatively static view of recurrent costs. If resources for the MOA were to increase, for example, at a rate greater than inflation, the project effect on recurrent costs would be reduced. Table 8 indicates, however, that the MOA budget over the years has increased at a rate considerably under that of inflation.

The recurrent cost burden of the Project is significant to the MOA. Even if some of the administrative or auxiliary staffing is eventually reduced, there is a continuing requirement for hiring and retaining technical qualified staff, without which the Project will fail. The most important aspect of recurrent costs probably does not pertain to the levels of personnel required, but rather to the operational expense funding of project entities and the Fund for Agricultural Development, both of which represent significant annual cash outlays. The Project will not work unless the NCARTT and the service centers have sufficient operating funds to permit the envisioned day-to-day operations. Similarly, the fund is indispensible for NCARTT to carry out activities beyond the finite capacity of the in-house staff.

Given overall GOJ resources, the project cost burden is not serious. But, the issue is that of relative priorities, and willingness to incorporate in long-range planning a significant increase in the resource level devoted to the MOA in general and Highland agriculture in particular. Project planning and the Project Agreement should incorporate specific conditions or convenants to address these concerns including, if possible, separate budget allocations for the project activities.

b. Financial Management Implications of the Project

The HADP will be implemented by the project entities described elsewhere within this paper. The Project as a whole will represent an operational subsection of the MOA and is subject to the general MOA/GOJ financial procedures, except to the extent to which special authorities are granted.

The GOJ uses a centralized though somewhat cumbersome accounting and fund control/disbursement system. GOJ financing is planned around a calendar year budget cycle. Budget submissions are prepared and forwarded to the Office of the Budget in July for the following year. Operating budgets are broken down by department, and by cost category. A separate budget section indicates approved positions (in a civil service context). The budget is divided into two major sections; Current Costs, and Capital Expenditures.

The current costs represent the normal costs associated with the direct operations of various sections of the Ministry. The capital budget specifies projects and activities usually of a capital intensive nature. However, contract personnel, including laborers, and others specifically associated with an approved project, are funded from this budget, rather than the current account. The overall budget is finalized through negotiation and an authorized budget level is provided in time for the new year. The Ministry, and by extension the subsections thereof, are then entitled to draw funds from their budget allocations.

There is an accounting/fund control process at the Directorate level, but responsibility is, in effect, exercised at the national level in Amman. Payroll-related costs and other operating expenses are parceled out from Amman. There is a fund encumbrance process for purchase of major items. A request for a purchase contract is forwarded to Amman by the Directorate and, if approved, the order is placed. To the extent practicable, orders for major recurring items are combined, ordered early in the year, warehoused, and issued as required. Special orders outside of the recurring purchases are approved in Amman (depending on the value and nature of the purchase) by the Finance Director, Undersecretary, and/or the Minister. In accordance with GOJ procedures, the MOA must seek separate approvals for procurement of certain items (computers for example) and go through the Ministry of Finance/Department of Supply for purchases over a certain value. Authorities at a lesser level are limited to the utilization and control of commodity resources provided to them, and to the use of a petty cash fund through which purchases up to 200 JD's can be made. Control for disbursements are similarly centralized in Amman. Vouchers are forwarded from the Directorate to Amman for payment, except for petty cash payments which are processed at a lower level.

The budget/fund control/disbursement processes are important to the implementation of the HADP. Operating expenses are part of the GOJ contribution and the system in place requires great emphasis to ensure that fund requirements are specified within the budget cycle, and defended, if need be, from budget reductions later in the process. The project entities will hopefully be organized as a separate unit within the Ministry with a separate and defined entity budget. This will help in planning and monitoring.

The budget process relies on accurate estimates of non-personnel type costs, particularly equipment and supplies, and on early ordering. Assuming that adequate operating expense levels are approved, the Project can work within the MOA procedures. It would be very helpful, however, if greater authorities for procurement of services and supplies could be delegated. This is particularly true on expenditures related to the Agricultural Service Centers which will have a considerable amount of minor expenditures.

There is some potential for difficulty in the administration of the Agriculture Development Fund. This element of the project will be used to finance research and demonstration efforts within and outside of the GOJ. The funding source for this is not firmly decided but it will either come through the Fund for Advancement of Agriculture, which will operate as a separate institution, or through the MOA capital expenditure budget. In either case, the project entity will have to prepare a financing package for each undertaking which specifies the funding sources/methods and arrange for fund transfers or for the issuance of contracts if necessary. The current system could seriously retard this process. It is not possible at this time to resolve this matter, but negotiation should seek to establish some delegated authority within the project entity to utilize the research and development portion of the GOJ contribution outside of normal procedures.

To ensure proper planning, monitoring, and control of project resources, (AID and GOJ financed), the project entity should have a financial function or section preferably within the Office of the Director. Current plans include a provision for an accountant/budget specialist and clerical support. Assuming that there will be a direct authority link between the Office of the Director (action element of the Agricultural Council), the NCARTT, and the Agriculture Service Centers, the office could provide overall budgeting and maintain the necessary financial records. This would enable the Project Director to ascertain the resources available, plan financially, coordinate fund encumbrances under project financing and review disbursements (with or without the responsibility for actual disbursement). This financial function is also necessary to monitor and control costs and revenues under the demonstration pilot/land aggregation program, and guarantees given for the farmer equipment procurement. Lastly, there will be a need for accounting and control for funds utilized from the Development Fund, and for commodities supplied by AID.

IV. IMPLEMENTATION PLAN

A. Administrative Arrangements

Following is a brief discussion of the major project participants and their responsibilities, including the Government of Jordan, AID and the principal foreign donor, the United Nations Environmental Program. Functions and responsibilities are detailed in the administrative and technical analyses and annexes.

The Borrower/Grantee will be the Government of Jordan, represented by the Ministry of Planning. The MOP is the representative of the government on all AID bilateral projects. The MOP is responsible for overall donor and program coordination. It has a solid history of effective and efficient management of these project resources. Delegations to implementing agencies on this project will flow from the MOP.

The Ministry of Agriculture will have overall implementing responsibility for the project.

An Agricultural Development Council will be formed (see conditions precedent) under the chairmanship of the Minister of Agriculture, with membership from other concerned public and private sector entities, e.g. the Agriculture Credit Corporation, the Faculty of Agriculture at the U of J, the Jordan Cooperative Organization, Association of Agricultural Engineers etc. The Council will be responsible for securing and coordinating the planned participation of these organization. The Council will also be responsible for project execution including policy review, overseeing the SCRAD process, approving Action Plans and budgetary allotments under the Agricultural Development Fund, among other major decision-making responsibilities.

The Secretariate to the Council, under the leadership of the Secretary General, will manage and have responsibility for the implementation of Action Plans, be the authorized representative of the Government for AID-funded activities, coordinate the activities of the Council (agendas, budgets, policy papers etc.) and be AID's principal counterpart for the project. The Secretariate will also administer the Agricultural Development Fund.

The NCARTT and the RASC and their facilities and staffs will be under the responsibility of the Ministry of Agriculture. . In collaboration with the MOA district directorates, they will coordinate and develop applied research and extension programs to be carried out by RASC's and participating autonomous agencies (e.g. the U of J) and private sector groups, including the Jordan Cooperative Organization. These will include demonstrations and activities to undertake range and livestock management, such as the UNEP/AID funded rangeland pilot project.

AID, as the principal donor, will monitor this project in accordance with its responsibilities and regulations. The following sections discuss these responsibilities and how AID will execute them.

While a number of donors are involved in one way or another in highlands agriculture, the UNEP is the major co-financing foreign donor in this project (contributing $400,000). It will provide at least half the resources for the range land pilot project in Lajjun. UNEP is acting only as a financer and will not play an active implementation role. AID will coordinate its input to this activity with the UNDP Resident Representative on this activity. UNEP resources are directed at capital needs of the pilot project and AID's at technical assistance.

Finally, to expedite implementation, AID and the GOJ have agreed to contract for limited technical assistance, training and commodities early in the project. These procurements will be subject to only the most critical of conditions before implementation (see Section VII). The Secretariate will be responsible for the execution of these early implementation activities.

B. Implementation Plan

The implementation schedule reflects the major actions that need to be taken to ensure project inputs are available on a timely basis under the project. This includes launching the applied research program, training of Jordanian staff, and creation of an effective extension staff to bring relevant technologies to highland farmers.

The major actions to be undertaken during project life are anticipated as follows:

Implementation Schedule

YEAR/QUARTER	ACTION/EVENT	RESPONSIBLE ORGANIZATION
FY 85		
3rd	Project Paper Completed and submitted to AID/W	USAID
3rd	Project Paper approved/Funds Authorized	AID/W
4th	Project Agreement signed	AID/MOA/MOP
4th	Administrative Specialist initiates pre-implementation activities	USAID/MOA
4th	Initial Conditions Precedent Met	MOA
FY 86		
1st	Secondary Conditions Precedent Met	MOA
1st	Preparation of RFP for major Institutional Contract(s)	
1st	A&E Firm selected and contract signed	MOA
1st	Short Term Training Program Initiated	AID/MOA
2nd	Short-Term Technical Advisors Arrive in-country	UNIV
2nd	FAR Method Approved	AID
2nd	Institutional Contract Signed, Home Office Support Begins	AID/W
3rd	Order vehicles, trailers, office equipment and other priority commodities	PSA/USAID
3rd	Contracting for construction initiated	
3rd	Construction of NCARTT initiated	MOA
3rd	Construction of RASCs begin	MOA
3rd	Chief of Party and subject-matter specialists arrive in country	USAID/MOA
4th	Long Term Training Program Initiated	UNIV
4th	UNEP Range Demonstration Initiated	USAID/UNEP
4th	Center equipment list approved and ordered	USAID/MOA
FY 87		
1st	Short-Term Training in U.S. completed	AID/MOS
1st	NCARTT Facility Completed	MOA
1st	Preliminary On-Farm Demonstrations	UNIV/MOA
2nd	Completion of RASCs	MOA
2nd	On-Farm Demonstrations: Phase I	MOA/JCO
3rd	NCARTT and RASCs fully staffed	MOA
FY 88		
1st	Land Aggregation Pilot Program	MOA
1st	On-Farm Demonstrations: Phase II started	MOA
2nd	Scopes of work for first INTERIM EVALUATION	USAID/MOA
3rd	Evaluation of credit availability and institutional performance	ACC/USAID

	3rd	Evaluation of On-Farm demonstration	MOA/USAID
	4th	Subject-Matter Specialists complete assignments	UNIV/MOA
Fy 89			
	3rd	Evaluation of Land Aggregation Pilot Program	AID
	4th	Long Term Training in Jordan Completed	UNIV
FY 90			
	3rd	Field Survey of Land Use and Cropping Paterns	MOA/AID
	3rd	Long Term training in U.S. completed	UNIV
FY 91			
	3rd	Scopes of work for second evaluation	USAID
	4th	Second Interim Evaluation: Training Program and Research/Extension	
FY 92			
	4th	Chief-of-Party completes assignment	
FY 93			
	3rd	Final data collected for comparison with baseline/census data	MOA/AID
FY 94			
	4th	End of Project Evaluation	MOA/AID

C. Contracting Plan

Given the magnitude and variety of inputs required for this project, it will be necessary to utilize several A.I.D. approved contracting modes. This approach will help ensure that project inputs are available on a timely and cost-effective basis. Accordingly, the following major contract arrangements are anticipated for project implementation.

1. Technical Assistance and Training

An AID direct institutional contract is proposed for contracting of technical advisory services and training.

Given the number of highly qualified U.S. academic institutions, consortia, and non-university organizations that can provide technical expertise and the services needed to conduct the research, extension and training requirements, it is essential that the contractor selection be fully competitive. USAID and the GOJ will also take an active role in contractor selection through formation of a joint selection committee which will rank order proposals for AID/W contract negotiation.

2. Design and Facility Construction

A host country contract with an A&E firm is required for design of center facilities and supervision of construction. A fixed amount reimbursable (FAR) method is proposed for construction and renovation of the existing facilities, related to National Center for Agricultural Research and Technology Transfer and the four Regional Agricultural Development Centers. An appropriate FAR arrangement will be set-up with MOA and a local engineering and construction firm will be competitively selected for facility design and supervision. USAID engineers will monitor construction progress and certify completed infrastructure.

3. Commodity Procurement

A direct A.I.D. procurement service agent (PSA) contract is proposed for the procurement of the various commodities outlined in this paper. This activity would be appropriate for a Section 8(a) or other minority or small business firms. The PSA should be selected through competitive procedures and have experience and capability to procure relatively long lists of scientific and laboratory equipment within a short timeframe. The PSA service is being proposed because of the limited size of the USAID/Mission in handling such items and the historical problems U.S. universities have in acquiring commodities and exporting them.

4. Project Evaluation

The USAID proposes using a separate, direct AID contract for the evaluation element of this project. It is felt that Section 8(a) or other minority firms might be appropriate for these activities as well

as many other U.S. consulting firms or universities. The preferable method of contract selection would be open competitive selection amongst selected 8(a) and/or other minority firms or open, competitive bidding for other U.S. firms or institutions.

In summary, three separate direct AID contracts are sought for the various activities of this project. It is unlikely that a single contractor or firm would be capable of performing the wide diversity of activities and services sought by this project. In accordance with AID contracting guidance, the preferred contracting method is open competitive bidding.

A PIO/T for contractual services should be prepared shortly after the signing of the project agreement and fulfillment of conditions precedent to disbursement. The preparation of the RFP and RFTP is programmed for first quarter FY 86.

It is important that GOJ staff and USAID officers be closely involved in contractor selection and that prospective contractors be thoroughly informed about project requirements.

V. MONITORING PLAN

a. USAID/Jordan. The mission will monitor, on a continuous basis, project implementation. A project officer will be assigned within the Projects Office for this purpose. In addition, a project Liaison and Technical Coordination Advisor will be recruited and among other assignments will report on project progress and input/output status. He will advise and work closely with the NCARTT Director and USAID project officer to ensure provisions of the project agreement, contracts, implementation letters and/or memorandums of understanding are in accordance with established AID guidelines and procedures. He will participate, as appropriate, in reviews and evaluations to be undertaken of the project and seek backstop assistance from AID Mission and/or AID/W as required, to expedite project implementation. The resident LTC advisor will actively perform the following duties:

- Monitor use of AID-financed commodities;
- Coordinate with USAID Training Office in the monitoring of all training programs administered under the project;
- Assist in the resolution of major problems that may arise that threaten the success of the project.

It is not anticipated that additional USAID/staff will be required to monitor this project.

b. Contractor Chief-of-Party Responsibilities and Reporting Requirements U.S. assistance will be provided through a contract with a land-grant university, university consortium, and/or private consulting firm with experience in the conduct of applied dryland research and extension or combination of these. Since English is widely spoken in Jordan, the resident contract staff will not be required to have proficiency in Arabic. The contractor will be self-supporting and will perform called-for services in accordance with annual work plans which will be approved by both USAID and MOA. The contractor will report annually, and in writing, to MOA and USAID on project activities. The role of the U.S. contract team will be that of senior but temporary associates assisting in the establishment and development of the program.

The contractor will: a) submit progress reports regularly every three months; (b) submit all required financial reports to USAID project officers as provided for in the terms of the technical assistance contract; c) fulfill all reporting obligations to NCARTT as called for in the negotiated contract; d) arrange and deliver to USAID and NCARTT all evaluation inputs required. The MOA/NCARTT will provide AID with a) an annual report concerning programs and problems of implementing the project and b) financial reports, as required, e.g., an annual financial report of MOA/NCARTT contribution, a bi-annual report on contract research, etc.

c. Additional Reporting: Short-term consultants assigned to various organizations, including credit institutions, will be responsible for assignment reports and follow-up recommendations.

VI. SUMMARIES OF ANALYSES

A. Technical Analysis: The state of agricultural technology and land potential in Jordan was intensively reviewed during project development. The technical analysis indicated that, despite natural constraints related to rainfall patterns and terrain/soil features of the highlands, considerable technology exists both within Jordan and elsewhere which if applied successfully, could very substantially increase agricultural productivity in the highlands.

The technical analysis in Annex A reviews the natural constraints to increased production and the technology inventory available. The physical constraints, while in some cases formidable, can be alleviated provided technology is suitably adapted to local conditions and properly extended to the farmer. For purposes of analysis, the technologies identified during project development review were divided into those requiring little or no further research and those that could be fully developed and ready for on-farm application within a relatively short period of time.

The major physical constraint on agricultural production in the highlands is rainfall. A secondary constraint is the steep and rocky terrain found in many parts of the highlands. In general, Jordanian farmers tend to push the various crops beyond their environmental limits. For example, the higher rainfall and elevation areas with steeper terrain that are presently in wheat should be converted to tree crops. Lower rainfall areas currently in wheat should be converted to barley and/or pulses, and marginal rainfall areas should be converted into improved rangelands (perennial range grasses and edible shrubs). The growing of forage crops will be a critical aspect of improving livestock production throughout the highlands in the long run.

Pilot efforts carried out during the past five years in the highlands of Jordan and regionally by ICARDA have demonstrated that there is sufficient technology available, or that could be readily adapted, to significantly improve agricultural productivity of rainfed crops and livestock in the highlands. There are also strong indications that where appropriate technology transfer methods are used, highland farmers can be persuaded to adopt these proven technologies. The technology most advanced and available for immediate transfer to farmers is related to cereal production. Research that can be used at the farm level has also been done for pulses and some forages. Technology on improved management of olives is available from the FAO Network of Mediterranean Olive Producing Countries. Proven technology used under similar conditions in the Near East Region on water catchment methods, improved livestock management and nutrition, range revegetation and management, and forest management is either available for immediate use or requires minimal adaptation to Jordanian conditions.

Varying degrees of additional experimentation and testing will be needed in the areas of pest management, livestock feeding and management practices, forage crops, fruit and nut crops, marketing (all products), farming systems (integration of improved crop and livestock systems into economically sound farming practices) and appropriate technology transfer methods. Since dryland vegetables are labor-intensive and have low yields without irrigation, some vegetable crop production in rainfed areas should

be substituted by more suitable crops. In addition, improvement in testing and diagnostic services will be necessary for soil and leaf analysis, identification of disease, insect and other pest; and for pesticide residues. Most of these technical support services already exist in various stages of development.

a. The following cereal crop technologies have been found to be adequately researched and ready for farm adoption:
   - contour plowing with chisel plow
   - seeding and phosphate fertilizer application with grain drill
   - improved wheat and barley varieties
   - use of herbicides for weed control at proper time
   - top dressing with nitrogen fertilizer
   - early seeding

b. Small ruminant/livestock:
   - vaccination
   - internal parasite control
   - improved nutrition/supplemental feeding prior to breeding, during latter part of gestation and for lactation
   - lamb fattening after weaning
   - systematic culling
   - control of breeding season

c. Range and pasture:
   - use of vetch and medics in cereal rotation
   - range revegetation with atroplex and other shrubs
   - use of wheatgrasses in higher potential sites
   - controlled grazing and time of use

High potential technologies developed elsewhere, but requiring additional research in the Jordan context include the following:
- improved olive varieties and production practices
- integrated control of olive pests
- improved low chilling varieties of temperate fruits
- new vegetable varieties
- improved herbicides
- new pest management practices
- paired row planting of cereals
- improved varieties of pulse crops
- new range and pasture species and varieties
- improved breeds of sheep and goats
- straw treatment to improve nutritional quality
- new species of fruits, vegetables and oil seed crops.

A detailed analysis of technology inventory and application potential in the highlands is provided in Annex A and volume III.

The relative profitability of technologies ready for dissemenation and application in Jordan are detailed in the farm budgets to the Economic Analysis contained in Annex C.

B. Financial Analysis

The analysis presented in Annex B examines, from a financial perspective, the resource requirements of the Highland Agriculture Development Project as an activity, and addresses the financial concerns implicit in the project objectives.

Financial arrangements, detailed in Annex B, demonstrate that the Highland Agricultural Development Project is sound from a financial perspective, and that financial planning and review is adequate and in accordance with AID policies and procedures.

The budgets and financial plan have been prepared in accordance with Bureau guidance and inputs are sufficiently quantified given the magnitude and length of the effort. Provisions for contingencies and price escalation should ensure that specified inputs are within the budgeted financing. Higher contingency levels have been applied for the AID contributions to the Agricultural Development Fund and to construction, in that plans are not finalized for these inputs.

Financing methods and implementation procedures are throughly discussed and in general accordance with AID policy preferences. Direct procurement, primarily in the context of expedited implementation, will be required in some cases. Input timing and the financial implementation plan are specified. AID internal control and audit needs are discussed in section 3 c.

The financial effects of the Project on the GOJ are reviewed. The analysis concludes that the recurrent cost burden, though significant, does not represent a major project concern given the overall level of GOJ resources.

C. Economic Analysis:

This section will summarize the economic rationale for the project. First, the macro-economic portion considers the agricultural sector in relation to the overall economy, in particular agriculture's role in Jordan's balance-of-payments; and secondly, the role and relative importance of highland agriculture. Finally, the micro-economic portion summarizes the results of farm level analysis and the calculation of project economic rate of return, with a brief review of methodology and underlying assumptions concerning the estimation of project benefits and costs.

A. Macro-economic Analysis

1. The Agricultural Sector

Between 1975-1983, the agricultural sector grew at a rate of about 4.75 percent. While a creditable performance, this rate was only half the rate of growth registered by the economy as a whole. Thus, while agriculture accounts for some 20 percent of overall employment in Jordan, the sector's share of GDP has generally declined, to about 7.5 percent 1/ in 1983. Throughout the past decade, which has encompassed the First Five Year Plan for

1976-1980 and most of the Second Five Year Plan (1981-1985), agricultural development has focussed heavily on the irrigated Jordan Valley. Output growth in horticultural crops from the Jordan Valley has accordingly far outstripped the relatively stagnant cereal and stone fruit crops of the highlands, and has led to rapid growth in agricultural exports. Agricultural exports of fruits and vegetables to neighboring Arab countries increased at an annual rate of 16 percent - in dollar terms - during 1975-1983.

Notwithstanding the rapid growth in agricultural exports, Jordan's dependence on food imports, reflected in its deficit in agricultural trade, has steadily grown. Structurally this situation can be analyzed within the context of Jordan's overall balance of payments situation.

2. Balance of Payments
Jordan's balance of payments is characterized by a very large trade deficit - imports about four times exports - financed by remittances from Jordanians working abroad (mostly in the Gulf States), grant aid by friendly Arab States, development assistance, and in recent years, bank borrowing on European capital markets. Following is a condensed summary of the balance of payments for 1983, and estimated for 1984. The agricultural portion of foreign trade is shown in parentheses below the line items for overall trade.

1/ Includes a small share attributable to forestry and fisheries.

BALANCE OF PAYMENTS, 1983-84
(U.S.$ Millions)

	1983	1984 (est.)
Current Account	- 389	- 270
Exports, f.o.b.	580	756
(of which: agricultural) a/	(109)	N.A.
Imports, f.o.b.	- 2,709	- 2,488
(of which: agricultural) b/	(- 520)	N.A.
Balance of Trade	- 2,129	- 1,732
(of which: agricultural)	(- 411)	N.A.
Wage earner remittances, net	909	975
Unrequited transfers	812	650
(of which: Arab support)	(711)	(500)
Other services, net	19	- 113
Capital Account	432	70 c/
Direct investment, net	24	30
Long-term capital, net	402	113
Short-term capital, net	6	- 213 c/
Errors & Omissions	- 13	(d)
Valuation Adjustment	25	(d)
Change in Reserves (minus = inc.)	- 30	340
Central Bank (- inc.)	- 23	337
Commercial Banks (- inc.)	- 7	3
Reserves, end-year	1,860	1,503
Central Bank	1,041	687
Commercial Banks	819	816

Notes: (a) Domestic exports only
(b) net of reexports
(c) Includes errors and omissions and Valuation adjustment.
(d) Included in short-term capital

Notwithstanding impressive increases in exports and wage earner remittances, which contributed to a $119 million reduction in the current account deficit, and some $200 million of GOJ borrowings from foreign banks (included in the long-term capital category), Jordan registered an overall balance of payments deficit of some $340 million in 1984. Also, exports are expected to do well in the next few years as a result of major investments (in fertilizer, phosphates and potash) of the past few years now coming on stream. Nevertheless, the situation is worrisome, especially since, in these circumstances, there is no scope for an increase in imports. Understandably, therefore, the government is anxious to curtail its trade deficit, and has focussed its attention on that portion of the trade deficit (24.2 percent in 1983) accounted for by agricultural products.

Important as it is, the deficit in agricultural trade does not fully demonstrate the importance of agricultural imports in meeting Jordan's food needs. The following table relates agricultural imports to total availability of agricultural products in 1983, showing also the increase in agricultural production and imports since 1975.

AGRICULTURAL IMPORTS RELATED TO TOTAL
AVAILABILITY OF AGRICULTURAL PRODUCTS
(U.S. $ Millions) a/

		1975	1983
1.	Agricultural Output b/	74.8	259.4
2.	Less: Domestic ag. exports c/	-33.5	-108.9
3.	Equals: Ag. output available for domestic consumption	41.3	150.5
4.	Agricultural imports c/ d/	142.3	434.6
5.	Total Availability of agricultural products (3+4)	183.6	585.1
6.	Imports as % of availability (4 as % of 5)	77.5	74.3

Note: (a) Converted from Jordan dinars at JD 1.00 = U.S.$.330 in 1975 and U.S. $.363 in 1983.

(b) Industrial origin of GDP at factor cost

(c) Food and live animals; tobacco; and animal and vegetable oils and fats. Data in f.o.b. values.

(d) Adjusted to exclude imports for later reexport.

Total availability of agricultural products, which can serve as an approximation of consumption, increased at an annual rate of 15.5 percent, in dollar terms, during 1975-1983 1/. Rising consumption far outpaced the increase in agricultural output, leading to a three-fold rise in the dollar value of agricultural imports during the same period. Agricultural imports accordingly accounted for some 74 percent of domestic consumption of agricultural products in 1983.

The above measurement reflects Jordan's (proper) decision to pursue its comparative advantage and maximize agricultural exports. Such exports have reduced the amount of production that would otherwise have been available for home consumption. A truer measure of "import dependence" would be expressed by the following relationship, which treats both imports and availability net of agricultural exports:

$$\text{Degree of Dependence} = \frac{M - X}{P + (M - X)}$$

Where:

M = Agricultural imports
X = Agricultural exports
P = Agricultural production

Substituting the values from the table, the degree of import dependence was .592 in 1975 and .557 in 1983.

However measured, the GOJ considers the degree of import dependence unacceptably high. Included in the agricultural import bill for 1983 were U.S. $ 90 million of wheat imports and $131 million in imports of all cereals. The desire to reduce Jordan's dependence on outside suppliers of basic commodities and provide a measure of food security has much to do with the high priority accorded agricultural development in the GOJ Five Year Plan for 1986-90.

3. Highland Agriculture in Perspective: Highland agriculture accounts for some 92 percent of the cultivable area in Jordan. Of the cropped (i.e. other than fallow) Highlands area, some 79 percent is planted to field crops (wheat, barley, vetch, pulses and lentils), the remainder to fruit and vegetables. Annex C Table 1 compares the basic cropping patterns of the Highlands and Jordan Valley, and Annex Table 2 provide a detailed breakdown of area and production within the Highlands itself.

1/ The increase reflected rising import and market costs, as well as population growth and increasing levels of consumption by individuals. Adjusted for inflation and population growth, per capita consumption has risen at about 7 percent per annum.

As noted, the Highlands have experienced little agricultural growth compared to the Jordan Valley. Furthermore, given the higher value fruit and vegetable crops comprising the bulk of Valley output, the value of Highlands production is considerably lower than that of the Valley on a per hectare basis. Whereas the Highlands accounts for 89 percent of the cropped area in Jordan, it accounted, during 1980-82, for 63 percent of agricultural output by value, or 57 percent excluding poultry (with which the project will not be involved). Table VII.1 contains estimates of the value of agricultural output, comparing the Highlands and the Jordan Valley on a commodity-by-commodity basis.

The GOJ's past concentration on the Jordan Valley was undoubtedly correct. The Valley's moderate climate and irrigation potential promised large returns to investment which were, in fact, realized. The major investments having been made, however, further output gains will be more difficult to achieve. Agricultural exports, too, show signs of levelling off. Their continued growth may, in any event, depend more on the resolution of marketing problems than the future growth of output per se.

Development of the Highlands at this time appears to offer significant benefits from a balance of payments perspective, while raising the income levels of the relatively less prosperous portion of the farming population. An important part of the rationale for investing in highland agriculture from a macro economic perspective is the desire to effect import savings, by substituting domestic production for imports of basic food commodities. For example, the projected adoption rates and yield increases due to the project would result in a savings in wheat alone amounting to $12 to 15 million per year within a few years time. Additional annual savings can be effected in barley, oilseeds, and meat products imports worth $3.1, million, $4.2 million and $67.8 million, respectively, in 1983.

Table VII.1
AGRICULTURAL INCOME, 1980-1982 a/
By Commodity and Main Farming Area
(U.S. $ Millions) b/

COMMODITY	HIGHLANDS	JORDAN VALLEY	HIGHLANDS AS % OF TOTAL
Fruits, grapes, olives	31.5	16.7	65
Livestock	33.2	1.8	95
(Products)	(19.0)	(0.9)	(95)
(Live animals)	(14.2)	(0.9)	(95)
Vegetables	26.2	74.5	26
Field Crops	26.2	1.4	95
Tobacco	6.7	-	100
Forest Products	1.4	-	100
Honey	0.6	0.1	86
Total, Excluding Poultry	125.8	94.5	57
Poultry and Game	53.9	2.8	95
TOTAL	179.7	107.3	63

Notes: (a) Based on 3-year averages for farm income by commodity group, distributed according to the average cropping pattern for the years 1980-1982. Averages used in order to minimize the impact of extreme fluctuations due to weather (as in the case of wheat, severely affected by drought in 1982).
(b) Dinar values converted at JD 1 = $U.S. 2.50

Sources: Dept. of Statistics, Statistical Yearbook, 1982
Dept. of Statistics, Agricultural Statistical Yearbooks, 1980-1982.

2. Micro-economic Analysis

Annex C contains a detailed economic rate of return analysis, including farm level budget projections for the various crops with which the project will deal, as well as a discussion of considerations and underlying assumptions. This section contains a summary of the findings, with a brief explanation of methodology and principal assumptions.

(a) Methodology

The rate of return analysis was developed in two segments: returns to production and to research, respectively.

(1) Returns to production: Returns to production are based on existing technology only, without taking account of future returns to research investments arising under the project itself. Production costs comprise materials, inputs and hired labor used in the farming process, plus those project costs not attributed to research. Costs of land, capital and family labor are not included. Returns are based on farm enterprise budgets for the six major product groups (wheat, barley, vetch, chickpeas, lentils and fruit).

(2) Returns to Research:

Research costs, comprising approximately 35 percent of total project funding, comprise construction of research-type facilities (laboratories, etc.), long-term training and a portion of the project technical assistance. Projected returns to research, necessarily of a conjectural nature, are based upon experience from other AID projects of a similar character, and are believed to be conservative. Returns to research are assumed to accrue beginning in project year 7.

(b) Assumptions

Following are the basic assumptions underlying the return to production calculation:

- Costs and prices: Assumptions with regard to input cost and output prices are based upon GOJ and international sources, as detailed in Annex C. While farm level financial analyses are based on financial costs throughout, the project EIRR calculation is based upon economic prices. Economic prices differ from financial prices only in the cases of wheat and barley.

- Cropping pattern: The cropping pattern, including the fallow portion, is assumed to remain unchanged throughout the 20-year project period. Since, in fact, farmers are likely to shift to the more profitable crops as the project proceeds - and, in particular, could be expected to reduce the proportion of fallow land - this imparts a conservative bias to the findings.

- Yield Increases: In line with farmers' known tendency to adopt technology and changes in cultural practices gradually, and in components, the yield increases assumed in the farm level analyses reflect only 60 percent of what the technology would provide if fully adopted. Given the very low present yields, especially in field crops, this still allows for substantial yield increases over the project period.

- Adoption Rates: Separate schedules of adoption rates have been assumed for the various product groups. The assumptions reflect, for each product group, the existing state of cultural practices and technology use, the relative availability of shelf technology, and priorities within the project itself. The adoption schedule for wheat is expected to be relatively rapid, given the existing primitive state of cultural practices, the ready availability of technology, and the project schedule calling for early attention to the wheat area. Project penetration (the share of total acreage to be impacted by the project) is assumed as 85 percent in the case of wheat, 82 percent for pulses, and 37 percent for fruit crops. The complete adoption schedules appear in Annex C.

(6) Findings

1. Farm Level: Prospective increases in net benefits arising from adoption of existing technology range from 14 percent, in the case of fruit, to 590 percent, in the case of barley

The full range of findings is summarized in Table VI.2 below.

Table VI.2
Net Farm Income, By Commodity Group
($ U.S. per hectare)

Commodity	Without Project	With Project	% Inc.
Wheat	147.45	394.25	167.4
Barley	10.25	70.75	590.2
Vetch	147.75	180.62	22.2
Lentils	166.75	357.75	114.5
Chickpeas	138.50	367.50	165.3
Fruit	615.37	699.20	13.6

2. Project rate of return

The project Economic Internal Rate of Return (EIRR) is calculated as 24 percent: 28 percent for the production component, and 19 percent for the research component. The benefit: cost ratios, assuming a 15 percent cost of capital, are 1.9 and 1.45 for the production and research components, respectively. The composite benefit: cost ratio, covering both project components, is 1.75:1. Sensitivity analysis related to these findings appears in Annex C.

D. Social Analysis:

In the Jordan highlands the social structure is changing rapidly, due to high population growth rates, the lowering of illiteracy, and a large number of young people entering workforce ages each year. Unemployment in Jordan has not been a serious problem because of the availability of jobs in Saudi Arabia and the Gulf States and employment opportunities within urban areas. However, there is a potential for a major unemployment problem which could have several influences on agriculture. One is that the urban workforce may not be able to absorb a large influx of workers from rural areas; another is that the contraction of employment opportunities may result in absentee landlords returning to cultivate their own land, displacing sharecroppers and bringing under cultivation lands which are now idle.

The target population of this project is all persons engaged in rainfed agriculture in the Jordanian highlands. This population is diverse, including land owners, renters, landless laborers, herders, those with a long cultural history in agricultural and those without. All agricultural producers will be targets for technology development and transfer through the SCRAD process. Effects should be felt by both large and small producers as some technologies could be transferred to both without adaptation. Indeed, given the extensiveness of small and medium size operations in Jordan, highland agricultural production will increase more if the needs of the small (less than 30 dunums) and medium size farmers are addressed. Offering a wider choice of technologies will lead to benefits being accrued to agricultural producers. Although the public sector will benefit from intensified support in research and extension and training provided under the project, instituting the SCRAD process will also provide the private sector with systematic information on market potentials.

Women form an important target group for the project, given their active role in agricultural production. Women are involved in a variety of agricultural tasks, from planting to the processing of agricultural products and weaving wool from livestock. Yard agriculture almost exclusively falls to women, and home gardens and yard animals are important to the agricultural family, especially for very small land holders. Women do not operate machines or plow but they do constitute an important source of day labor. In the absence of male family members gone to jobs in the cities or elsewhere, the women may be the only farmers or herders available to make decisions about agricultural activities. Research shows that not only do women participate in agricultural production, they also have a say in family decisions about agriculture and agricultural investments. Their involvement in the project can contribute to project success.

In order to maximize the benefits of the project, implementation will include ways to consider the needs of small farmers, herders, rural poor and women. Implementation will be based on systematic methods of gathering information, such as reconnaissance surveys of areas served by the Agricultural Service Centers. Expatriate staff should be

experienced in working with small farming units, and at least one advisor should have farming system and agricultural communications skills in order to institute means of reaching those in the target population less likely to participate in the SCRAD process and work with Jordanian counterparts in developing ways to involve small farmers, herders, women and the rural poor in technology development and transfer.

Training will play an important part in introducing GOJ agricultural service officers to applications of technology appropriate to the various groups of agricultural producers. Women will be hired as agricultural service officers, a minimum of two for each RASC, especially to advise on the development of technology suited to women's farming activities and the transfer of technology to them. The project, particularly the SCRAD process, offers the opportunity for benefiting a wide spectrum of producers in the Jordan highlands.

E. Administrative Analysis:

The Ministry of Agriculture (MOA) will have primary responsibility for project implementation. The Minister of Agriculture will coordinate the project with other public and private sector entities. This will be accomplished in his capacity as Chairman of the Agricultural Development Council which will include the public agency heads and representatives of the private sector.

Presently, the MOA is comprised of various central Directorates located in Amman and six regional Directorates, one in each Governorate. The delivery of agricultural services to farmers is coordinated by the Director of Agriculture in each of these Governorates, with support provided by the Amman-based Directors. Each Governorate is further divided into Districts, with a District Director of Agriculture who reports to the Director of Agriculture.

Moreover, there are agencies which provide agricultural services/support that are autonomous and include private sector entities. These include the Jordan Cooperative Organization, Jordan Valley Farmers Association, Agricultural Credit Corporation, Faculty of Agriculture of the University of Jordan, Yarmouk University (which performs some agricultural research), Jordan Valley Authority, and the Royal Scientific Society. Currently, coordination among these organizations is largely informal. Overall policy guidance and coordination is provided by the Prime Minister through the Agricultural Council, made up for the most part of the various agency heads.

At the apex of the present institutional hierarchy is the Agricultural Council chaired by the Prime Minister. However, since meetings tend to be infrequent and its role is purely advisory, it is not effective for coordination purposes. For example, it does not have a secretariat staff to prepare for meetings or follow up on recommendations. Therefore, the project will create an Agricultural Development Council, chaired by the Minister of Agriculture, to oversee the operation of the

Systematic Commodity/Resource Analysis and Development process (SCRAD) and to coordinate various project activities, such as the assignment of responsibilities to various institutions and allocation of required resources.

This new Council will be comprised of the agency heads of organizations involved in agriculture plus representatives of the private sector and the cooperatives. It will have a secretariat staff, under a Secretary-General, to oversee its work and ensure follow-up and monitoring. The SCRAD process will be used to analyse the constraints preventing full development of potential for individual commodities and resources. It will also analyse and recommend policy changes, enabling legislation, modifications to regulations and review land use patterns.

The SCRAD analytical process will result in a new set of priorities to be recommended for formal Council approval. When these priorities are established, appropriate actions to overcome the constraints identified in each sub-sector or commodity will be assigned to the most appropriate public and/or private sector organization. These in turn will develop an Action Plan to overcome the major constraints. Action Plans may deal with matters such as policy changes, legislation, changes in regulations, pricing, import/export incentives, organizational changes, cropping patterns, research, extension, education or comprehensive action programs for agencies and the private sector. Once these plans are approved by the Council and responsibilities are assigned, along with supplemental financial support implementation will be monitored by the Council secretariat staff. The analytical process will be a continuous activity to monitor progress and make appropriate program adjustments. Although considerable time and effort is required initially to analyse each commodity and resource, once completed, the updating process requires little additional effort.

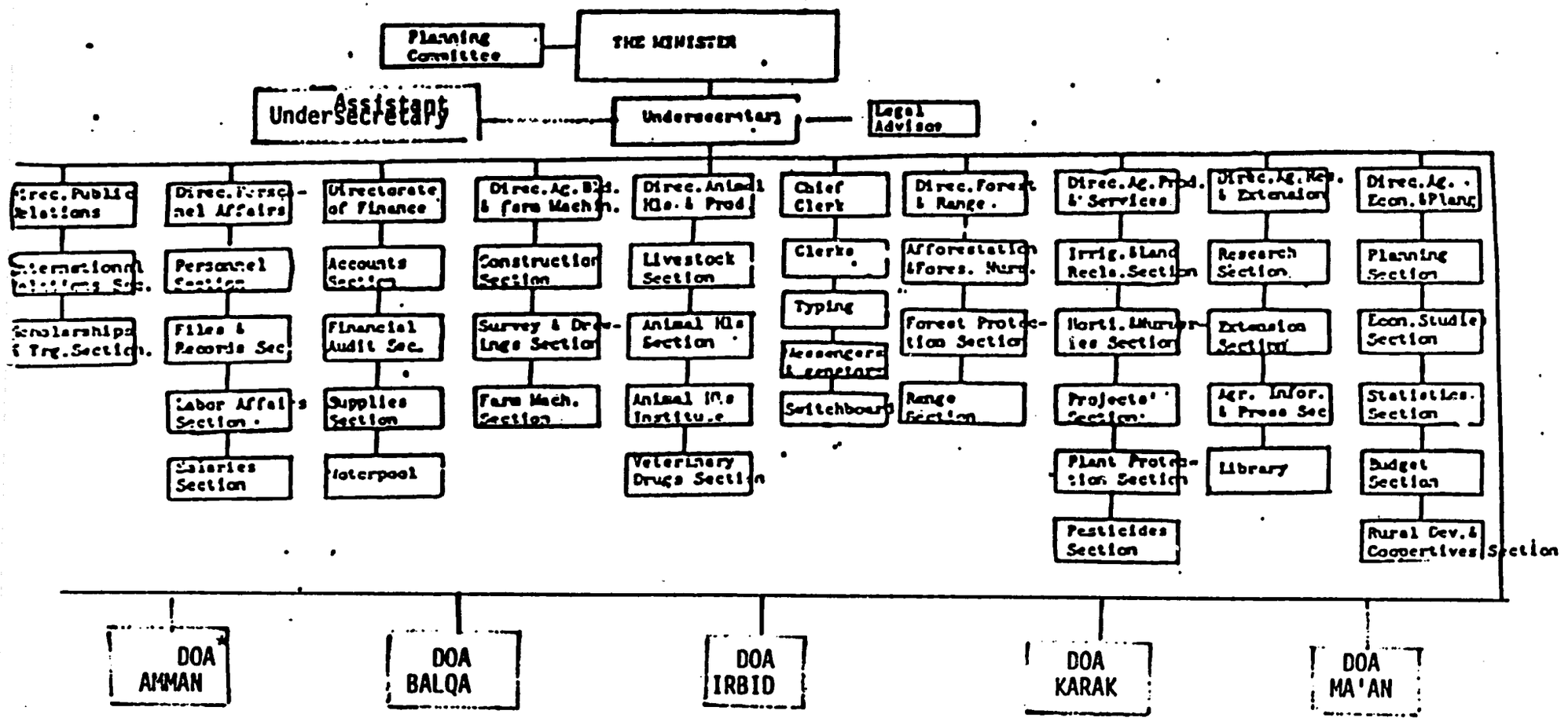
Under the project, an Agricultural Development Fund will be established and managed by the Secretary General and the Secretariat. The Fund will provide a source of supplemental funding for the Action Plans approved by the Council to accelerate the development of the highlands.

Operational coordination of research activities and direct responsibility for a comprehensive farm level research and extension programs will be the responsibility of the National Center for Agricultural Research and Technology Transfer (NCARTT). This new organization will replace the current Directorate of Research and Extension in the MOA. The NCARTT will have broader functions and jurisdiction than the Directorate it replaces. The Director of NCARTT will be responsible operationally and budgetarily to the Minister of Agriculture and will be coordinated with other agencies through the Secretary General (SG) of the ADC. Under the supervision and control of the SG, the NCARTT will be the lead organization responsible for implementation of the SCRAD process. It will arrange Governorate level input into the SCRAD process through five Regional Agricultural Service Centers. NCARTT will also serve as the RASC for the fifth Governorate. These RASCs will provide the core staff and act as headquarters for all

the MOA research and extension staff, facilities and functions in each Governorate. Each RASC will be under a supervisor who will be a Governorate level administrator and will be responsible to the Director of the NCARTT. These Supervisors will work directly with the Directors of Agriculture in each of their respective Governorate to coordinate SCRAD planning and implementation of the Action Plans. They will be directly supervised for all program and technical matters by the Director of NCARTT. Project-provided Subject-Matter Specialists will coordinate a series of Multidisciplinary Teams to develop, implement and evaluate national programs dealing with highland agricultural development. These SMS will work closely with a counterpart staff of Agricultural Service Officers assigned to each RASC. The ASOs are the coordinating and supervising arm of each multi-disciplinary program at the Governorate level. A detailed description for these programs and each of the staff of NCARTT responsible for the SCRAD process and implementation of programs is provided in Annex A. The NCARTT and RASCs will form a new system for priority analysis, planning, and coordination, as well as a mechanism for assigning implementation responsibilities.

The administrative structures related to the project are summarized in the following charts.

Figure 1.



DOA= DIRECTORATE OF AGRICULTURE

Figure 2
Proposed Reorganization Structure

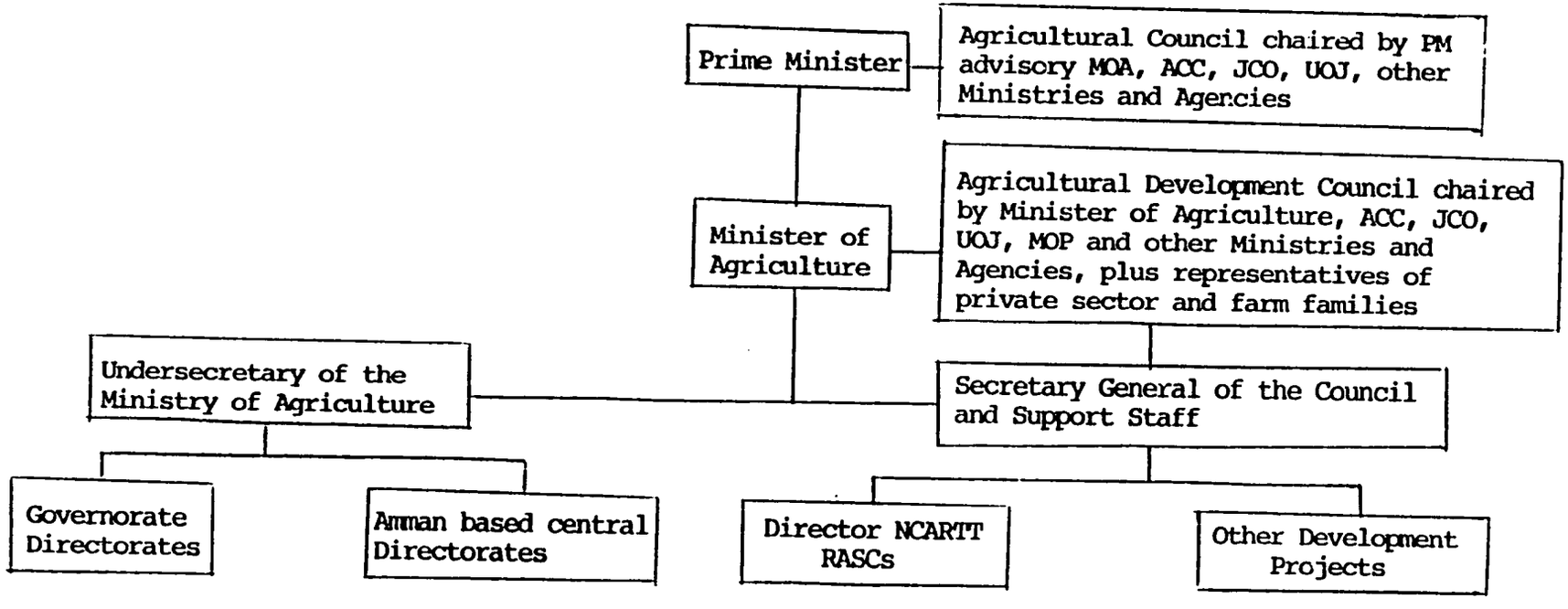


Figure 3
Highland Agricultural Development Project Organizational Chart

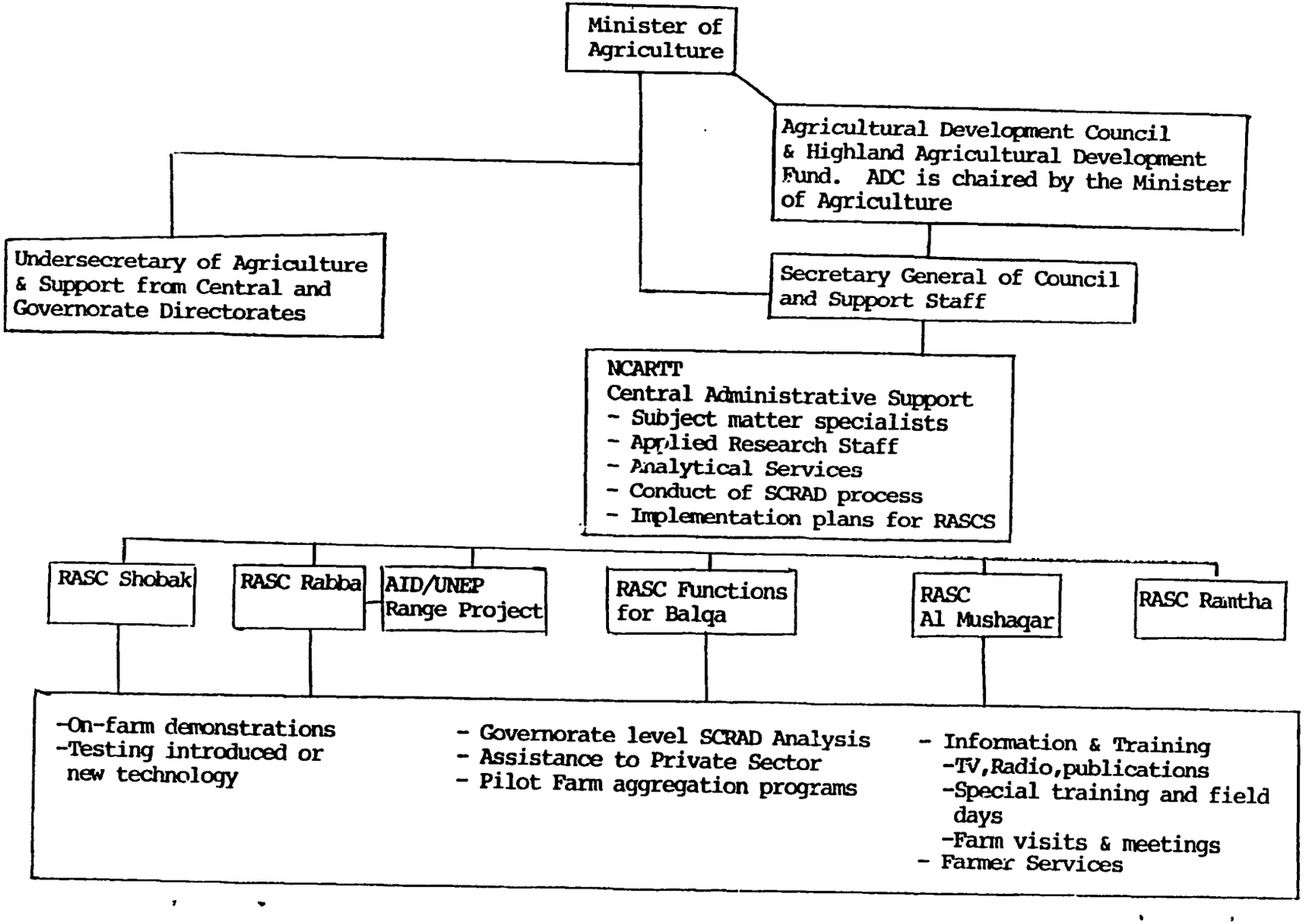
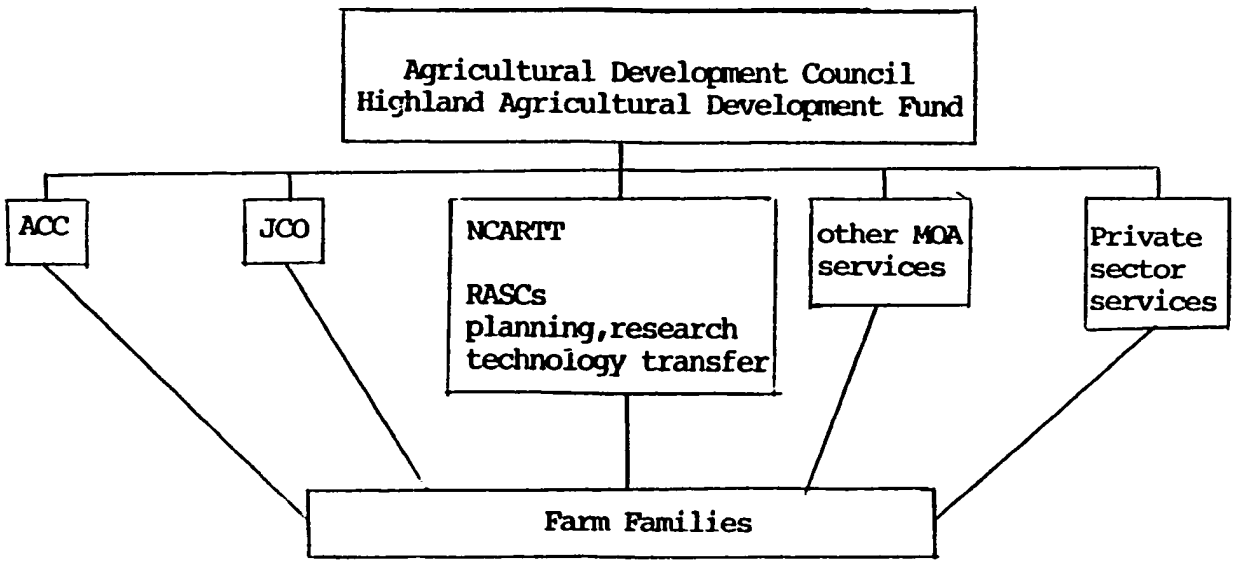


Figure 4

How Farmers will Receive
Services under HADP



F. Environmental Analysis

An environmental examination for the project was prepared and has an emphasis on pesticide use. It was concluded that the project should have an overall beneficial effect on the environment because of more efficient use of water, more appropriate crop selection and adoption of cultivation practices that minimize soil erosion. Pesticide use will be kept to a minimum, with only USEPA-approved pesticides recommended and used in the project. The project will incorporate certain mitigating measures to include:

- encouragement of pest management research
- training of pesticide users
- provisions for safe use of pesticides
- monitoring of pesticide use

These actions will be the responsibility of the National Center for Agricultural Research and Technology Transfer and will be implemented through the regional agricultural service centers. The analysis and recommendations of the environmental examination are contained in Annex F. Interim project evaluations will assess the impact of project activities on the environment.

VII. CONDITIONS PRECEDENT AND COVENANTS

Prior to the first disbursement under the Grant and Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee/Borrower will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.

(a) An opinion of counsel acceptable to A.I.D. that this Agreement has been duly authorized and/or ratified by, and executed on behalf of the Grantee/Borrower, and that it constitutes a valid and legally binding obligation of the Grantee/Borrower in accordance with all of its terms;

(b) A statement of the name of the person holding or acting in the office of the Grantee/Borrower specified in Section 8.2, and of any additional representative together with a specimen signature of each person specified in such statement;

(c) Evidence that (1) an Agricultural Development Council or equivalent has been duly established as a high-level body having representation from the Ministry of Agriculture and various autonomous agencies and the private sector, (2) a secretariat has been formed and (3) a Secretary General has been appointed to implement decisions made by the Council.

Disbursement for Technical Assistance, Training and Equipment

Prior to disbursement under the Grant for technical assistance, training and equipment, other than for facilities design and pre-implementation, the Grantee will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. evidence that the Ministry of Agriculture has identified staffing and budgetary resources for the first year of the Project.

Disbursement under the Agricultural Development Fund (ADF)

Prior to disbursement under the Grant for ADF the Grantee will except, as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.

(a) Evidence that the Agricultural Development Fund (ADF) has been duly established and that adequate mechanisms and operating procedures have been developed to utilize and administer the Fund.

(b) Evidence that steps have been taken by GOJ to provide its base year contribution of the $7.25 million equivalent in Jordan Dinars to the ADF.

Disbursement for Facility Construction

Prior to disbursement under the Loan for facility construction the Borrower will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.

(a) Evidence of proper title for land proposed for the center sites.
(b) Evidence of final facilities engineering design and construction supervision arrangements.

B. Covenants

The Grantee/Borrower covenants as follows:

1. That the Ministry of Agriculture (MOA), having established NCARTT as a separate entity within the MOA organization, will appoint a technically qualified, full-time Director to effectively interact with Project and donor agency expatriate staff and keep abreast of technological development in the field of agriculture. The Director shall be granted full authority to manage and administer the NCARTT, reporting directly to the Secretary General/Minister of Agriculture.

2. That the Ministry of Agriculture agrees to place all project-financed farm machinery, vehicles and equipment under the supervision and control of the Director or his/her designee which may only be used in carrying out Project operations. These may not be transferred or used elsewhere on non-Project related activities without USAID's prior written consent. The GOJ agrees that Project vehicles will be made available to Project personnel on a timely basis through the issuance of suitable license plates, by permitting "self drive" by technicians, or by other appropriate arrangements. Operating expenses and maintenance for all project vehicles and farm equipment will be provided by GOJ.

3. That the MOA will reassign returning long-term trainees in positions and at salary levels commensurate with their experience and training and will require terms of employment for a period at least twice the period of their training.

4. That adequate budgetary and manpower resources will be provided in a timely manner for the period of the Project.

VIII EVALUATION ARRANGEMENTS

The project will have two interim evaluations during project life and a final end-of-project status evaluation following the PACD. The interim evaluations are scheduled for FY 88 and FY 91 and a final evaluation in FY 94. The project budget provides $125,000 in base year costs for the interim evaluations to be carried out by an independent contractor or consulting firm. The final evaluation will be funded separately and performed by an organization mutually agreed upon by GOJ and USAID.

Evaluation design is developed on the understanding that the forthcoming Agriculture Census and the SARSA survey efforts will provide most of the baseline information required. This was the opinion of BUCEN consultants. Any significant information gaps could be met during early stages of implementation.

The interim evaluations will focus on implementation problems and make recommendations for mid-course corrections. The following project input/output relationship will be evaluated as indicated below:

(1) FY 88 Interim Evaluation:

- Functioning of the Agricultural Development Council and Secretariat in terms its policy review and program/action plan approval role.
- Coordination of implementing agencies in carrying out the Action Plans with emphasis on On-Farm Demonstrations and a preliminary review of the Land Aggregation Pilot Program.
- Status of constructed facilities and appropriateness of equipment procured.
- Evaluation of JCO efforts to organize a cooperative grazing association and protect/revegetate pilot project area.
- Assessment of SCRAD procedures and recommended priorities for the applied research and extension programs.
- Assess technical and administrative effectiveness of AID and GOJ provided inputs, e.g., timeliness quality etc.

(2) FY 91 Interim Evaluation:

- Review of impact of various section plans in addressing constraints identified and adoption rates among participating farmers.
- Role of women in project research/extension programs and benefits from new technology adoption in rural areas.
- Evaluation of Loan Aggregation Program and field survey of land use patterns, using baseline and other data for comparative analysis.
- Evaluation of training program and extension methodologies.
- Assess technical and administrative effectiveness of AID and GOJ provided inputs, e.g., timeliness and quality.

In addition, a major review of the rural credit situation has been scheduled for FY 88 to evaluate institutional performance, liquidity and farmer access to credit, particularly in the highlands. Evaluations will also give attention to environmental and social aspects of project implementation.

Based on the interim evaluation recommendations and supporting analysis of project implementation, the Mission will consider reprogramming of funds in the Agricultural Development Fund to better meet the project purpose in consultation with GOJ.

Final

The final evaluation in FY 94 will attempt to determine project impact on highland productivity and income using existing surveys and agricultural statistics as a base. This will include micro, as well as macro sector level impacts.

IX Attachments

(A) Pid Approval Message

GLE UNCLASSIFIED STATE 083613/01

ACTION AID2 INFO CHG A/DCM CHRON

VZCZCAJC696
PP RUEHAM
DE RUEHC #3613/01 082051Z
ZNR UUUUU ZZH
P 220231Z MAR 84
FM SECSTATE WASHDC
TO AMEMBASSY AMMAN PRIORITY 9780
PT
UNCLAS STATE 083613

LOC: DISK 20
22 MAR 84 05
CN: 13736
CHRG: AID
DIST: AID

AIDAC

E.O. 12356: N/A
TAGS:
SUBJECT: NEAC MEETING ON PID 278-0264, HIGHLAND AGRICULTURAL DEVELOPMENT

1. SUMMARY:
THE NEAC MET 13 MARCH 1984 AND APPROVED THE REVISED HIGHLANDS AGRICULTURAL PID AND AUTHORIZED DEVELOPMENT OF A PROJECT PAPER. HOWEVER SEVERAL CONCERNS STILL REMAIN, PARTICULARLY REGARDING THE PROPOSED CREDIT AND PRIVATE SECTOR COMPONENTS. SINCE A STUDY OF THESE COMPONENTS IS SCHEDULED EARLY IN THE OVERALL PROJECT DESIGN, IT WAS AGREED AT THE NEAC THAT USAID/AMMAN WOULD PREPARE THE TERMS OF REFERENCE FOR THE STUDY FOR AID/W'S REVIEW AND CONCURRENCE. A COPY OF THE NEAC ISSUES PAPER HAS BEEN POUCHED TO USAID ALONG WITH VARIOUS OTHER CONCERNS RAISED. THE CONCERNS EXPRESSED AT THE NEAC AND RECOMMENDATIONS FOLLOW. END SUMMARY.

2. NEAC ISSUES:

A. ISSUE: TENANCY ARRANGEMENT AND INVESTMENT INCENTIVES: THERE REMAIN CONCERNS THAT THE POSSIBLE HIGH DEGREE OF ABSENTEE LAND OWNERSHIP AND THE NATURE OF TENANCY AGREEMENTS MAY PROVE TO BE MAJOR OBSTACLES TO ACHIEVEMENT OF PRODUCTION OBJECTIVES, PARTICULARLY IF TREE CROPS ARE ULTIMATELY TO BE PART OF THE EXTENSION/PRODUCTION EFFORT.
RECOMMENDATION: THAT THE SOCIAL/ECONOMIC BENEFICIARY STUDIES ALSO ADDRESS THE ARRAY OF INCENTIVE/DISINCENTIVE FACTORS WHICH WOULD AFFECT CHOICE OF PROJECT ACTIVITIES.

B. POLICY DIALOGUE ISSUES: (1) DISCUSSION OF THE LOCAL WHEAT PRICE PROTECTION SYSTEM CONCLUDED THAT THE SYSTEM, AS CURRENTLY PRACTICED, DOES NOT APPEAR TO MISALLOCATE SIGNIFICANT FINANCIAL RESOURCES NOR UNDULY ENCOURAGE IMPROPER LAND USE. ALTHOUGH THE POLICY ON BREAD SUBSIDIES NEEDS TO BE EXAMINED FURTHER IT WAS RECOGNIZED THAT THE PROJECT, PER SE, MAY NOT BE THE MOST APPROPRIATE VEHICLE TO PROMOTE A DIALOGUE ON THAT ISSUE. (2) THE FOLLOWING OTHER POLICY ISSUES WERE IDENTIFIED AS CRITICAL TO PP APPROVAL:

BEST AVAILABLE

RESEARCH/EXTENSION MANAGEMENT, INTEREST RATE SUBSIDIES AND SUPPORT FOR PRIVATE SECTOR DEVELOPMENT.

C. ISSUE: MANAGEMENT FEASIBILITY:
THE DISCUSSION ON THIS POINT CONCLUDED THAT THE PROJECT IS COMPLEX BUT BASED UPON JORDAN'S MANAGEMENT SUCCESSES AND ASSUMING THE GOJ FOLLOWS THROUGH ON THEIR EXISTING COMMITMENT WITH STAFF AND OTHER RESOURCE INVESTMENTS, THE PROJECT HAS A REASONABLY GOOD CHANCE OF BEING PROPERLY MANAGED. A MANAGEMENT ASSESSMENT IS A NORMAL PART OF PROJECT DESIGN AND GIVEN THE RATHER POOR HISTORY OF RESEARCH COORDINATION THE PP MUST DEMONSTRATE THAT A WORKABLE SYSTEM IS IN PLACE FOR RESEARCH AND EXTENSION ACTIVITIES PRIOR TO PROJECT IMPLEMENTATION. IF MEASURES TO IMPROVE MANAGEMENT IN THE RESEARCH AND EXTENSION SYSTEMS ARE IDENTIFIED THOSE IMPROVEMENTS SHOULD BE HIGHLIGHTED IN THE PROJECT OUTPUTS SECTION.

D. AGRICULTURAL CREDIT:
AS GENERALLY PLANNED FOR IN THE DESIGN REQUIREMENTS SECTION OF THE PID (PAGE 22) IT IS RECOMMENDED THAT THE PRIVATE SECTOR AND CREDIT STUDIES RECEIVE EARLY ATTENTION AS THESE COMPONENTS OF THE PROJECT NEED FURTHER JUSTIFICATION AND REVIEW. IT WAS AGREED THAT EARLY AGREEMENT SHOULD BE REACHED BETWEEN AID/W, THE GOJ AND USAID ON THE CONTENT OF THE CREDIT AND PRIVATE SECTOR COMPONENTS. THE GOJ, USAID AND AID/W WOULD ALL CONCUR IN THE SCOPE OF WORK TO ASSURE AGREEMENT ON THE CRITICAL ITEMS TO BE ADDRESSED. USAID ANTICIPATES PARTICIPATION BY AN ECONOMIST FROM NE/DP IN THE STUDY ALONG WITH JORDANIAN AND OTHER U.S. EXPERTS. IT IS ANTICIPATED THAT THE STUDY WOULD, AMONG OTHER ITEMS, ADDRESS (1) WHETHER

THERE IS A FINANCIAL RESOURCE CONSTRAINT WHICH AT THIS TIME CANNOT BE MET BY RESOURCES OTHER THAN AID'S AND THE APPROPRIATE SIZE AND TIMING OF ANY AID CONTRIBUTION IN RELATION TO THE GOJ AND OTHER INVESTORS' INPUTS. (2) HOW THE CREDIT COMPONENT WILL BE DESIGNED TO REFLECT AID POLICY ON CREDIT PROGRAMS (STATE 252939, 9/82), PARTICULARLY ON ISSUES OF INTEREST RATE REFORMS WITH RESPECT TO NEW TARGET LEVELS AND ANTICIPATED TIMING OF CHANGES AND THE SUSTAINABILITY OF CREDIT DELIVERY PROGRAMS AFTER AID ASSISTANCE IS COMPLETED. (3) IF THE CREDIT PROGRAM HAS INNOVATIVE ASPECTS OF A PILOT NATURE AND (4) THE DIVISION OF LABOR BETWEEN THE AGRICULTURAL CREDIT AGENCIES AND THE PRIVATE COMMERCIAL AGENCIES IS CLEARLY DEFINED WITH THE PURPOSE OF MAXIMIZING PRIVATE SECTOR INVOLVEMENT IN PROVISION OF AGRO-BUSINESS SERVICES. THERE WILL ALSO NEED TO BE FINANCIAL AND ECONOMIC ANALYSIS OF THE MAJOR TYPES OF FARMER'S AND FARM SERVICE ENTERPRISES WHICH THE CREDIT PROGRAM MIGHT FINANCE. FINALLY, THE PROPOSED PARAMETERS OF THE CREDIT

BEST AVAILABLE

COMPONENT RELATIVE TO THE EXTENSION EFFORT OR OTHER DEVELOPMENT EFFORTS THE GOJ MAY HAVE PLANNED FOR THE HIGHLANDS ALSO MUST BE DEFINED. NEAC NOTED THAT THE RESULTS OF THE CREDIT AND PRIVATE SECTOR STUDIES WILL BE REPORTED TO AID/W AND THE APPROVAL OF THE CREDIT AND PRIVATE SECTOR COMPONENT WILL BE AUTHORIZED FOR INCLUSION IN THE PROJECT SUBJECT TO REVIEW OF THE STUDIES AND A PRELIMINARY PROPOSAL OF THESE COMPONENTS.

3. SEVERAL OTHER CONCERNS WERE ALSO EXPRESSED AT THE NEAC AND PRC MEETINGS BY VARIOUS DIVISIONS. THEY HAVE BEEN POUCHED IN FULL FOR MISSION'S CONSIDERATION IN DEVELOPING THE PP. IN SUMMARY FORM THE CONCERNS AND RECOMMENDATIONS ARE:

A. SERVICE CENTERS: AID/W UNDERSTANDS THESE TO BE PRIMARILY A BASE FOR RESEARCH AND EXTENSION PERSONNEL. THERE IS SOME EMERGING CONCERNS THAT THE GOJ MAY LIKE TO DO THINGS QUOTE FOR UNQUOTE FARMERS RATHER THAN RELYING ON FARMERS' OWN INITIATIVES. THE CENTERS SHOULD NOT REPLACE THINGS WHICH COULD POSSIBLY BE DONE BY THE PRIVATE SECTOR.

B. THE IFAD PROJECT EXPERIENCE MAY PROVE USEFUL FOR EVALUATING AGRICULTURAL CREDIT AND FARM OPERATIONS IN THE HIGHLANDS. THIS MIGHT PROVE USEFUL IN IDENTIFICATION OF ENTERPRISES REQUIRING CREDIT, DISBURSEMENT MECHANISMS, NEED FOR LOCAL CURRENCY FINANCING, AND PROVIDE INFORMATION REGARDING SOURCE AND ORIGIN OF ITEMS TO BE FINANCED, ALL OF WHICH WILL NEED TO BE ADDRESSED IN THE

PP. IF CODE 935 PROCUREMENT IS CONTEMPLATED IT SHOULD BE ADDRESSED AND JUSTIFIED IN THE PP.

C. A PLANT PROTECTION SPECIALIST SHOULD JOIN THE DESIGN TEAM TO HELP SET UP A MONITORING AND CONTROL SYSTEM FOR USE OF PLANT PROTECTION MATERIALS.

D. IN PROJECT DESIGN MUCH GREATER ATTENTION NEEDS TO BE GIVEN TO SOCIAL ANALYSIS GENERALLY AND TO THE ROLE OF WOMEN IN PARTICULAR. THOSE CONCERNS ARE FULLY EXPRESSED IN MEMOS POUCHED TO USAID. NEAC SUPPORTS THE GENERAL RECOMMENDATIONS THEREIN.

E. CONCERNS HAVE BEEN RAISED THAT THE METHOD USED IN THE PID ECONOMIC ANALYSIS MAY NOT FULLY REFLECT CAPITAL COSTS OF FARM EQUIPMENT WHEN THE CAPITAL COSTS ARE QUOTE PASSED UNQUOTE TO FARMERS IN THE FORM OF MACHINERY RENTALS SUFFICIENTLY HIGH TO COVER ENTREPRENEUR'S INVESTMENT COSTS, DEPRICATION, OPERATIONS AND MAINTENANCE AS CONTRASTED TO TREATING THE CAPITAL COSTS OF MACHINERY AS A QUOTE PROJECT COST UNQUOTE AT THE TIME PURCHASE TAKES PLACE AND CHARGING FARMERS FOR OPERATION AND MAINTENANCE COSTS ONLY. MEMO FOLLOWS ON THIS CONCERN AND OTHER SUGGESTIONS FOR PROJECT DESIGN AND ECONOMIC ANALYSES.

F. THE PID DID NOT CONTAIN A FULL DISCUSSION ON THE RECOMMENDED CONTRACTING MODE. THE ISSUES PAPER SUGGESTS

BEST AVAILABLE

84

UNCLAS SECTION 02 OF 02 STATE 083613

POSSIBLE LANGUAGE FOR CONTRACTING WHICH WOULD ENCOURAGE TITLE XII UNIVERSITY AND PRIVATE SECTOR JOINT INVOLVEMENT IF THAT SECULD BE WHAT THE GOJ AND USAID HAVE IN MIND.

G. IN ORDER TO IDENTIFY THE PROJECTS INSTITUTIONAL OBJECTIVES AS WELL AS FUNCTIONAL PURPOSES, THE FOLLOWING REVISED PURPOSE STATEMENT IS SUBMITTED FOR YOUR CONSIDERATION: QUOTE TO CREATE AN INTEGRATED AGRICULTURE RESEARCH EXTENSION-CREDIT SYSTEM WHICH REACHES FARMERS THROUGH BOTH PUBLIC AND PRIVATE INSTITUTIONS FOR THE PROVISION OF INFORMATION AND INPUTS UNQUOTE. SEULTZ
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PP RUEHC RUFHRA
DE RUEHAM #0455 015 **
ZNR UUUUU ZZE
P 151531Z JAN 84
FM AMEMBASSY AMMAN
TO RUEHC / SECSTATE WASHDC PRIORITY 7955
INFO RUFHRA / AMEMBASSY RABAT PRIORITY 1633
BT
UNCLAS AMMAN 00455

CLASS: UNCLASSIFIED
CHRGE: AID 01/15/84
APPRV: DIR:WGROLLINGER
DRFTD: PO:ALAURENT:MV
CLEAR: 1.PO:TRISEOI
2.PRM:DLEATY
DISTR: AID-2 AMB DCM
CERON

AIDAC

FOR NE/TECH/AD, GEORGE MILLER

E.O. 12356: N/A
SUBJECT: JORDAN HIGHLAND AGRICULTURAL DEVELOPMENT
PID 278-0264

REF: (A) 83 STATE 368021, (B) 83 STATE 387534

1. MISSION APPRECIATES RECEIPT OF THE NEAC COMMENTS ON THE HIGHLAND AGRICULTURAL DEVELOPMENT PID (REF. B). THE STATEMENT OF NEAC CONCERNS AND THE HIERARCHY OF QUESTIONS IS CONSTRUCTED IN A CLEAR AND HELPFUL MANNER.

2. AT THE INITIATIVE OF THE GOJ, MISSION DIRECTOR AND SEVERAL OTHER MISSION PERSONNEL,MET JANUARY 10, WITH HIGH LEVEL OFFICIALS OF THE NATIONAL PLANNING COUNCIL, MINISTRY OF AGRICULTURE, UNIVERSITY OF JORDAN, AGRICULTURAL CREDIT CORPORATION AND JORDAN COOPERATIVE ORGANIZATION. CONCERNS OF AID/W AS WELL AS THOSE OF THE GOJ WERE DISCUSSED. THE GOJ REMAINS STRONGLY SUPPORTIVE OF THE HIGHLAND AGRICULTURAL DEVELOPMENT ACTIVITY AND BELIEVES THESE CONCERNS CAN BE THOROUGHLY ADDRESSED. A SIX PERSON COMMITTEE HAS BEEN FORMED TO WORK WITH USAID/J IN DEVELOPING A REVISED PID. THE COMMITTEE HELD ITS FIRST MEETING ON SATURDAY, JANUARY 14 AND WILL WORK CLOSELY WITH BOB MORROW AFTER HE ARRIVES ON JANUARY 15.

3. MISSION PROPOSES TO RESPOND TO AID/W CONCERNS SEQUENTIALLY ON THE TWO LEVELS OF CONCERN EXPRESSED IN THE NEAC CABLE, THE FIRST BEING THE CDSS-LIKE CONCERN OVER THE ROLE OF AGRICULTURE IN JORDAN'S ECONOMY AND THE SECOND THE MICRO PROJECT ISSUES. IF THE FIRST LEVEL CONCERN CANNOT BE RESOLVED TO MISSION'S AND AID/W'S SATISFACTION - AND WE BELIEVE IT CAN - THEN WORK ON THE PROJECT ISSUES WILL BE SUSPENDED. SIMILARLY, SHOULD THE CDSS CONCERN BE SATISFIED BUT SUBSEQUENT ANALYSIS AT THE PROJECT LEVEL NOT SUBSTANTIATE PROJECT VIABILITY, THEN FURTHER WORK ON THE PROPOSAL WILL BE TERMINATED.

4. MISSION RESPONSE TO THE CDSS LEVEL CONCERN WILL BE SUMMARIZED IN THE FY 86 CDSS BUT WILL ALSO BE TRANSMITTED TO AID/W BY CABLE IN MORE DETAIL. WE WOULD APPRECIATE AN AID/W REACTION ON THE CDSS LEVEL JUSTIFICATION FOR AID SUPPORT TO HIGHLAND AGRICULTURE UPON RECEIPT OF THE CABLE SO THAT APPROPRIATE ACTION CAN BE PROMPTLY TAKEN WITH REGARD TO FURTHER WORK ON THE PROJECT LEVEL ISSUES.

ASSUMING MISSION'S RESPONSE WILL RESOLVE THE CDSS LEVEL CONCERN, MISSION SUGGESTS CDSS REVIEW BE POSTPONED TO END OF CDSS REVIEW CYCLE, I.E., TO THE END OF FEBRUARY OR EARLY MARCH AT WHICH TIME MISSION DIRECTOR BOLLINGER COULD ATTEND BOTH THE CDSS REVIEW AND THE NEAC REVIEW OF THE REVISED PID WHICH WE WOULD STRIVE TO SUBMIT BY THEN. HOWEVER, WE CANNOT GUARANTEE AT THIS TIME THAT THE PID CAN BE READY FOR A NEAC REVIEW BY EARLY MARCH. THE CHANGE IN GOVERNMENT LAST WEEK MAY RESULT, FOR EXAMPLE, IN SOME TEMPORARY SLOWING OF MOMENTUM ON THE JORDANIAN SIDE.

6. MISSION SUGGESTS FURTICK, WHO IS PRESENTLY ON TDY IN MOROCCO, PLAN TDY TO JORDAN FOR THE PERIOD FEBRUARY 6-15 INSTEAD OF AFTER THE CYPRUS MEETING SO HE CAN PARTICIPATE IN DISCUSSION WITH MISSION AND GOJ ON THE ISSUES RAISED BY AID/W AND ASSIST IN THEIR RESOLUTION.

7. FURTICK SHOULD BOOK SEAT ON CYPRUS AIRWAY FLIGHT 403, LEAVING AMMAN ON FEBRUARY 16 AT 1125 HOURS. VISTS
BT
#0455

NNNN

EW UNCLASSIFIED AMMAN 455

87

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVE VARIFIABLE INDICATORS	MEANS VERIFICATION	ASSUMPTIONS
GOAL:			
Increase food production and rural incomes in the highlands of Jordan	Increase highland production of cereals, pulses, tree crops, and livestock.	Agriculture Census Baseline Data Agricultural production Import / export reports Special Reports	Continuing GOJ commitment to the development of the highlands. Normal weather conditions
PURPOSE:			
Stimulate greater agricultural production through applied research, improved extension methodologies and various activities to enhance institutional capabilities.	Strengthen the capabilities of the National Center of Agriculture Research and Technology Transfer to develop and diffuse agricultural technologies for cereals, pulses tree crops and livestock so as to rearch 75 percent of highland farmers	Project evaluation of NCARTT and RASC operations to include number of technologies promoted, on-farm demonstrations farmer adoption rates and records of increased sales of agro-inputs and equipment	Productive technologies will continue to be developed in Jordan and elsewhere; Farmers and agro-enterprises will respond to profit opportunities associated with new technologies
OUTPUTS:			
- Improved institutional coordination and priority analysis - Establishment of a National Center for Agricultural Research and Technology Transfer (NCARTT) - Development of appropriate demonstration methodologies - Establishment of 4 Regional Agricultural Service Centers - Improved knowledge of rangeland management and co-op organization - Increased agricultural production	- Formation of Agricultural Development Council and a secretariat; - Fully staffed and equipped (NCARTT); - On-Farm technology demonstrations; - Fully staffed and equipped Regional Agricultural Service centers; - Rangeland set aside and managed by a co-op; - Higher yields in project area.	- Min. of Agriculture reports - Approved action plans and budget allocations - USAID research center visits - USAID agriculture service center visits - Studies approved - Contract reports - Progress reports and evaluations	- Ministry of Agriculture retains qualified staff. - Budgetary allocations remain stable - Institutional re-organization of MoA occurs - Investment environment for private sector remains favorable - Timing and quality of inputs provided according to specification
INPUTS:			
AID - Technical assistance - Training - Commodities and equipment - Evaluation - Agricultural Development Fund - Construction - Contingency and Inflation	(U.S.$ 000) - 312 p.m.of Tech. Asst. $ 4,445 - Training $ 753 - Equipment $ 6,704 - Evaluations completed $ 125 - Fund eatablished $ 3,000 - Buildings completed $ 6,292 - $ 8,181	- AID records - GOJ budget data - Progress and Financial reports - Project Audits	- Project authorized and Project agreement signed - Conditions precedent met - Participants are named, qualified and processed on schedule - Budgets forthcoming as planned - Contractor selection, procurement and staffing proceeds an schedule
GOJ - GOJ personnel and staff support - GOJ contributed land - Contribution to Agricultural Development Fund	- Personnel $ 14,148 - Land titles transferred $ 1,000 - Development Fund $ 7,250		

ANNEX C.

(C) Statutory Checklist

GENERAL CRITERIA FOR PROJECT

1. FY 1985 Continuing Resolution Sec. 523; 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;	a) The committees will be notified in accordance with normal agency procedures.
(b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that amount)?	b) Yes

2. FAA Sec. 611 (a)(1). Prior to obligation in excess of $100,00 will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

	a) Yes
	b) Yes

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?

None required

4.	FAA Sec. 611(b); FY 1985 Continuing Resolution Sec 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973, or the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See AID Handbook 3 for new guidelines.)	This is not a water or water-related land resource construction project.
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?	Yes
6.	FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	This project is not susceptible to execution as a regional project
7.	FAA Sec 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and 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 will provide technical assistance to help increase overall food production and overall income in the highlands area of Jordan. Will affect the technical efficiency of agriculture, and may encourage development of cooperatives. There is no relationship to labor unions.

8.	FAA Sec. 601(b). Information and conclusions 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).	Will have little or no impact. Project will encourage, private U.S. participation in foreign assistance programs thru U.S. private enterprise and universities who will be used to bid for provision of needed services.
9.	FAA Sec. 612(b), 636(h); FY 1985 Continuing Resolution Sec. 507. 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 in lieu of dollars.	The Borrower/Grantee will contribute about $35,000,000 in local currency and the Project Agreement will so provide.
10.	FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No
11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes
12.	FY 1985 Continuing Resolution Sec. 522. 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 likely
13.	FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does the project or program take into consideration the problem of the destruction of tropical forests?	Yes

14.	FAA 121(d). If a Sahel Project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N.A.
15.	FY 1985 Continuing Resolution Sec. 536. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution?	No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 111, 113, 281(a). 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, (e) utilize and encourage regional cooperation by developing countries?

(a) The purpose of the Project is to assist the highland farmers most of whom are small farmers

(b) The project will help cooperatives

(c) The project will stimulate self-help efforts by inducing farmers, thru incentives to participate in project activities

(d) Women are a significant part of the agriculture force in Jordan and will play an important role in carrying out many project activities. The project has elements directed specifically at improving the role of women. Their need will be considered in the analysis of constraints, action plans to overcome constraints, and special female technicians are to be included in each district to oversee specific actions identified.

(e) A segment of the Project will involve collaborative research work with regional and international agricultural institutions and organizations, such as ICARDA.

b. FAA Sec, 103, 103A, 104, 015, 106. Does the project fit the criteria for the type of funds (functional account) being used?	Yes
c. FAA Sec. 107. Is emphasis 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)?	Yes
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 is the latter cost-sharing requirement being waived for a "relatively least developed country)?	Yes
e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project for 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"?	No

f. 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?	Activity gives reasonable promise of increasing food production and thereby providing for a more equitable distribution of income
g. 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 institution building, and will use and enhance Jordanian intellectual resources. It will provide a commodity resource and analysis and development as well as a policy dialogue aimed at more productive and efficient agriculture.
2. Development Assistance Project Criteria (Loans Only)	
a. FAA Sec. 122(b). Information an conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.	Jordan has the capacity to repay the loan portion of this project.
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?	NA
3. Economic Support Fund Project Criteria	
a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	Yes
b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	No

45

c. FAA Sec. 534. Will ESP funds be used to finance the construction of, the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to non-proliferation objectives?	No
d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	No commodities are to be granted

96

5C(3). STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1.	FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?	Yes
2.	FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes
3.	FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?	Do not discriminate
4.	FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). 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? (Exception where commodity financed could not reasonably be procured in U.S.).	NA

5.	FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries which are direct aid recipients and which are otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one or these areas? Do these countries permit Unites States firms to compete for construction or engineering services financed from assistance programs of these countries?	No
6.	FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo linears, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates?	No
7.	FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	Yes

8.	International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available?	Yes
9.	FY - 1985 Continuing Resolution Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States.	If used it will contain such a section
B.	Construction	
1.	FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services to be used?	Yes
2.	FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	Yes
3.	FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP)?	NA
C.	Other Restrictions	
1.	FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?	Interest is at a straight 50%
2.	FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?	NA

3.	FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-block countries?	Yes
4.	Will arrangements preclude use of financing:	
a.	FAA Sec. 104(f); FY 1985 Continuing Resolution Sec. 525: (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons coerce persons to practice	NA
	abortions; (2) to pay for performance of involuntary sterilizations as a method of family planning, or to coerce or provide financing incentive to any person to undergo	NA
	sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of	NA
	family planning; (4) to lobby for abortion?	NA
b.	FAA Sec. 620(g). To compensate owners for expropriated nationalized property?	Yes
c.	FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?	Yes
d.	FAA Sec. 662. For CIA activities?	Yes

100

e.	FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained?	Yes
f.	FY 1985 Continuing Resolution, Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel?	Yes
g.	FY 1985 Continuing Resolution, Sec. 505. To pay U.N. assessments, arrearages or dues?	Yes
h.	FY 1985 Continuing Resolution, Sec. 506. To carry out provisions of FAA Section 209(d) (Transfer of FAA funds to multilateral organizations for lending)?	Yes
i.	FY 1985 Continuing Resolution, Sec. 510. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?	Yes
j.	FY 1985 Continuing Resolution, Sec. 511. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?	Yes
k.	FY 1985 Continuing Resolution, Sec. 515. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?	Yes

101

ATTACHMENT D

B/G Request for Assistance
will be cabled to AID/Washington

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
AMERICAN EMBASSY
AMMAN — JORDAN

وكالة الولايات المتحدة للانماء الدولي
السفارة الاميركية
عمان - الاردن

OFFICE OF THE DIRECTOR

مكتب المدير

ANNEX E

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

I, Gerald F. Gower, the principal officer of the Agency for International Development in Jordan, having taken into acount, among other things, the maintenance and utilization of projects in Jordan previously financed or assisted by the United States, do hereby certify that in my judgement Jordan has both the financial capability and the human resources capability to effectively maintain and utilize the Highland Agricultural Development Project.

Gerald F. Gower
Mission Director

Date: May 3, 1985

JORDAN
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT
(HADP)
278-0264

IX ENGINEERING ANNEX

A. Description:

Physical facilities are required to house the administrative, research, and extension elements of the project which will include office spaces, laboratories, meeting spaces and other supporting structures to protect the project's equipment and materials. A minimum of staff housing is proposed to facilitate project implementation and to help retain qualified staff in the more remote (for Jordan) locations.

The National Center for Agricultural Research and Technology Transfer (NCARTT) will form the administrative headquarters for the project. It will also house the administrative and planning staff, central research laboratories and subject matter specialists.

The four Regional Agricultural Centers (RASCs) are where highland farmers and private sector firms may obtain specialized information on improved cropping and livestock practices as well as technical training. The RASC will comprise offices for administrative, research, extension and credit personnel, library, computer room, two general service and repository laboratories, and conference rooms located in the main building. They will also provide the locale for the interface between researcher-extensionist-farmer- and the setting for the initial farmer contact.

In addition office space will be available for the Agricultural Credit Corporation (ACC) and/or the Jordan Cooperative Organization (JCO).

B. Site Selection:

The locations for the NCARTT and the RASC were limited to the project area. It was desirable to have the NCARTT within short commuting distance to the University of Jordan and the Ministry of Agriculture. Therefore Baqa' (15 miles from Amman) was the site selected for the NCARTT, which has sufficient area to also house the Baqa' district RASC.

The RASCs were located in proximity to the regional agricultural research stations at Al Ramtha, Al-Mushaqar, Al Raba, and Al Shubak. Following a field inspection and inventory check of all these stations and their facilities, it was determined that adequate space and utilities were available. All four RASCs, as well as the NCARTT sites have adequate area for planned construction facilities and land to carry out applied research.

C. Design:

1. Site:

Due consideration will be given to optimum use of site area, e.g. the areas containing the best agricultural soils will be assigned for demonstration and development areas while the areas with high visability and easy access will be reserved for project buildings. Site grading will be provided as required for access and site drainage. Fencing, where none exists will be provided for site security. Also see Attachment E2, Outline Specifications.

2. Architectural and Structural:

The design of the buildings will be austere and similar to the esthetics of existing Jordanian buildings. It is planned to use local available materials, to the extent practical to reduce costs and construction time. Standard Jordanian structural criteria will be used. Also see Attachment E2, Outline Specifications.

3. Utilities:

Utilities will be provided by connection to existing services. Where such services do not exist they will be included in the construction contract. Also see Attachment E2, Outline Specifications.

D. Construction:

1. General:

Due to the limited size and complexity of the proposed construction it is planned to utilize Jordanian contractors for the construction phase of the project. Recent experience indicates that although there are variations in contractor performance, there is sufficient capability among Jordanian contractors to assure completion of the proposed project in a timely manner and in accordance with contact plans and specifications.

105

2. Construction Contractors:

Present situation indicates there is excess construction capacity in Jordan. The planned facilities do not require new or innovative construction techniques and therefore are within the capabilities of local contractors.

3. Construction Materials:

The majority of materials planned for use in the proposed project are available in Jordan, however some speciality items such as wood trim, glass, builders hardware, electrical items, plumbing supplies, heating and air handling units probably will have to be purchased off-shore. It is anticipated that where possible the contractors will use "off-the-shelf" purchases to reduce procurement time.

4. Construction Labor:

Sufficient numbers of various classes of skilled and unskilled labor (Jordanian and Foreign) can be found in the local labor market to perform this project. In addition, the anticipated type of construction will not require highly specialized construction labors. As noted above, current signs now point to a depressed construction market, and unless a unforeeseable change occurs the market will continue to be a "buyers market".

E. Maintenance and Operating Costs:

Special care will be exercised in final design to provide materials to hold maintenance and operational costs to a minimum. Heating and air conditioning will only be provided to those areas that have an operational requirement.

F. Project Implementation:

1. Ministry of Agriculture:

The Ministry of Agriculture has overall implementing responsibility for the project. When construction is complete, the Ministry of Agriculture will assume responsibility for the facilities.

2. Ministry of Public Works:

The Ministry of Public Works (MPW) has overall responsibility for the design and construction of all government buildings (except military) in Jordan. Coordination will be maintained with MPW during the design phase and the construction will be executed through the MPW. Actual design and construction will be executed by private sector firms under the general supervision of MPW.

G. Procurement Plan:

1. Design:

The A/E selection and contracting procedures will be in accordance with applicable AID regulations. A private sector A/E firm will be selected for this work.

2. Construction:

It is anticipated the Ministry of Public Works, will be responsible for construction contractor selection, bid evaluation and contract award. Construction supervision will be provided by exercising the option in the design contract to provide the normal engineering services during the construction phase. Standard payment provisions will be used.

3. Commodities:

Installed equipment items, not provided through the commodity supply contract, are to be included in the construction contract.

H. Implementation Schedule:

The following table outlines in general terms an optomistic implementation schedule. The schedule is based upon recent experience and further assumes that no changes will be made in project philosophy or location.

Fiscal Year & Quarter	Approx. Date	Elapsed Days	Event
FY85 4th Qtr.	1 July 85		PROAG Signed
		30	
4th Qtr.	1 Aug. 85		Initial C.P.s met
		60	
FY86 1st Qtr.	1 Oct. 85		A/E Selected
		30	
1st Qtr.	1 Nov. 85		Design Started
		180	
3rd Qtr.	1 May 86		Design Complete (IFB Issued)
		(Included in above)	
	1 May 86		Constr.Contractor Prequalified
		45	
	15 June 86		IFB Opened
		30	
4th Qtr.	1 July 86		Award Const. Contracts
		30	
	1 Aug. 86		Start Construction
		455	
FY88 1st Qtr.	1 Oct. 87		NCARTT Complete
		365	
FY89 1st Qtr.	1 Oct. 88		RASCs Complete

I. Cost Estimate

The base cost estimates are derived from the schematic plans and outline specification detailed in Attachments E1 and E2. Unit prices were estimated as of June 1985. Contingencies and inflation have been calculated in accordance with N.E. Bureau guidance. Contingencies are added to base costs, and a compounded inflation factor is applied over the life of the project. The budget includes a physical contingency of 25% for construction and 10% for engineering costs. Price escalation follows current guidance i.e. local costs are inflated at a compounded annual rate of 8% and foreign exchange (dollar) costs at a compounded annual rate of 6% during the construction phase.

The exchange rate utilized is JD 0.400 = $ 1.00 or $ 2.50 = JD 1.000.

The estimate of total construction costs for the HADP is $ 6,971,458. See attached tables - and - details on cost estimates.

108

J. Environmental Considerations:

INITIAL ENVIRONMENTAL EXAMINATION

OF BUILDING FACILITIES ONLY

Project Location: Jordan

Project Title: Highland Agricultural Development

Project No.: 278-0264

IEE Prepared By: Abdullah A. Ahmad

Environmental Action Recommended: Negative Determination

It is considered that the proposed project's physical facilities will not have a significant effect on the environment and no further assessment is required.

Concurrence:

Bernard E. Donnelly
Chief Engineer
USAID/Jordan

10 June 1985

Attachment E4 contains a detialed Initial Environmental Examination of the Building Facilities.

K. Section 611(a)(1) Certification

An analysis of the present plans for the physical facilities to support the Highland Agricultural Development Project indicate they are of sufficient detail to provide a reasonable cost estimate. Further, prior to obligating funds for construction, detailed plans, specifications and cost estimates will be prepared for the construction contract.

ATTACHMENT E1

INDEX OF SCHEMATIC FACILITY PLANS

LOCATION: BAQQA

DRAWING NO.	TITLE
-	General Title and Map of Jordan
BL/1	Baqqa General layout
M/2	Main Building - Ground Floor Plan
M/3	Main Building - First Floor Plan
M/4	Main Building - Section and Elevation
L/5	Laboratories - Plan
L/6	Laboratories - Section and Elevation
HF/7	Staff Houses - Family - Plan
HF/8	Staff Houses - Family - Section and Elevation
S/9	Store - Plan, Section and Elevation
SU/10	Shop and Utility Store - Plan
SU/11	Shop and Utility Store - Section and Elevation
E/12	Farm Equipment Cover - Plan and Section
SP/13	Service Vehicle Cover Pickups - Plan, Section and Elevation
SWD/14	Service Vehicle Cover - 4 WD
G/15	Security Guard Quarters - Plan, Section and Elevation

LOCATION: AL-RAMTHA, AL-MUSHAGAR, AL-RABBA, AND AL-SHUBAK

RL/1	Al-Ramtha General Layout
ML/2	Al-Mushagar General Layout
RAL/3	Al-Rabba General Layout
SL/4	Al-Shubak General Layout
M/5	Main Building - Ground Floor Plan.
M/6	Main Building - First Floor Plan
M/7	Main Building - Section and Elevation
SB/8	Staff House - Bachelor's - Plan, Section and Elevation
HF/9	Staff Houses - Family - Plan
HF/10	Staff Houses - Family - Section and Elevation
SU/11	Shop and Utility Storage Area - Plan
SU/12	Shop and Utility Storage Area - Section and Elevation
S/13	Store- Plan, Section and Elevation
E/14	Farm Equipment Cover - Plan and Section
SP/15	Service Vehicle Cover - Pickups - Plan Section and Elevation
SWD/16	Service Vehicle Cover - 4 W.D. - Plan, Section and Elevation
G/17	Security Guard Quarter - Plan, Section and Elevation
U/18	Baqqa - Utilities
U/19	Al-Shubak - Utilities (Typical)

OUTLINE SPECIFICATIONS

A) ARCHITECTURAL

1. All blockwalls to be of hollow concrete blocks.
2. All plaster to be 15mm thick with one base and one final smooth course.
3. All interior walls shall be given two coats of emulsion paint.
4. Floor finish shall be terrazzo tile or screeded cement.
5. Hot water shall be provided in all bathrooms, kitchens and laboratories.
6. Closets in rooms shall be fitted with double leaf wooden doors and wooden shelves.
7. Glazed wall tile in toilets, kitchens, laboratories and workshop shall be installed to a height of 220cm from finished floor level.
8. An adequate water supply shall be provided including all necessary external and internal distribution systems.
9. Adequate air conditioning and heating shall be provided as required.
10. Security Fence will be provided as required.
11. All materials must meet American standards.
12. Main Buildings shall have special architectural treatment to emphasize external appearance. External walls may be stone faced.
13. All dimensions are shown in centimeters.

B) STRUCTURAL

1. Design and Construction Specifications: Latest ACI Code.
2. Concrete: Reinforced concrete to be:

   Class (A)

   f'c = 225 Kg/cm 2 ultimate stress in 28 days

   fc = 90 Kg/cm 2

   n = 10
3. Reinforcement: All reinforcement steel to be high tensile steel with = 4200 Kg/cm 2 , Grade 60.
4. Forms: Form work shall not be removed from any span until the concrete in that span has attained a compressive strength not less than 70% of ultimate.
5. Cement: All cement in reinforced concrete or in mortar work to be ordinary Portland cement conforming to A.S.T.M. No. 85.
6. All reinforced concrete work shall conform to ACI 318, Building Code Requirements for Reinforced Concrete.
7. A minimum 0.8 cm cover shall be used for all exposed reinforced concrete exterior surfaces.
8. Laps: Lapped splices shall be 24 bar diameters min.
9. Water: Mixing water for concrete shall be clean potable water free from any harmful element or compound.
10. Openings: Openings for all utilities, drainage and other services shall be provided in foundations, beams, or slabs.

114

C) WATER/WASTEWATER

1. All exterior sewer lines shall be concrete pipe.
2. Trenches shall be to grade, properly dressed and contain a layer of clean sand bedding.
3. All manhole covers shall be heavy or medium duty cast iron and water tight.
4. Bedding shall be provided as specified and placed in accordance with manufacturer's recommendations.
5. All drainage pipes to be concrete pipe.
6. All interior wastewater pipes shall be cast iron or P.V.C.
7. All covered water supply pipes shall be ductile iron pressure or galvanized steel pipe, laid with a minimum cover of 60cms.
8. All above ground water supply pipes shall be provided with expansion facilities in accordance with manufacturer's recommendations.

D) ELECTRICAL

1. Electrical power is 220 Volts - 3 phase, 4 wire, 50 cycles, and shall incorporate a solidly grounded neutral for lighting and all services.
2. All electrical work shall conform to Ministry of Public Works (Jordan) standard specifications.
3. All conduits shall be 1/2" minimum size.
4. All main feeders to panel board shall be copper cables, multi core, P.V.C. insulated and P.V.C. sheathed overall.

E) TELEPHONE

Main buildings, Houses, Security Guard Quarters and Laboratories shall be equipped with telephones at locations to be determined. Telephone outlets shall be located 30cms from top of finished floor level of each building.

F) STEEL STRUCTURES

Steel structures shall be post and truss system with an inclination of 11 degrees and formed from corrugated sheets on wooden purlins cleated to prefabricated steel trusses.

G) SECURITY LIGHTING

Security lighting shall be 250w high pressure sodium vapor lamps, bracket mounted on 10m high poles along all interior roads and spaced at 30-35m. Such lighting shall ensure an average illumination level of 10 to 15 lux. Lighting level at road intersections shall be 30 lux minimum.

H) SEPTIC TANKS

If sewer laterals cannot be connected to existing public sewers, septic tanks with tile field absorption systems shall be provided. Septic tanks shall be designed in accordance with the criteria contained in the U.S. Public Health Service Manual of Septic-Tank Practice..

I) ROADS AND STORM WATER DRAINAGE

Access roads shall be of minimum 7.5m width. All roads shall consist of a 30 cm sub base course with a minimum C.B.R. of 30%, a 20cm base course with a minimum C.B.R. of 80%, a top asphaltic concrete wearing surface course of 5cm and a seal coat.

Drainage facilities shall be adequate to control surface runoff and shall generally consist of road side ditches.

117

TABLE E1

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (HADP)

SUMMARY BUDGET (FACILITIES)

IN U.S. DOLLARS /1

INPUTS	GRANT	LOAN	GOJ	TOTAL
Facility Construction	-	4,147,750	-	4,147,750
Land	-	-	1,000,000	1,000,000
Engineering	-	580,685	-	580,685
Total Base Year Costs	-	4,728,435	1,000,000	5,728,435
Contingency	-	1,095,007	-	1,095,007
Inflation	-	1,148,016	-	1,148,016
Total Facility Cost	-	6,971,458	-	7,971,458

/1 : Exchange Rate = JD 0.400= $1.00 or $2.50= JD 1.000

TABLE E2

HADP

DETAILED BUDGET U.S. CONTRIBUTION

(FACILITIES)

IN U.S. DOLLARS /1

	BASE YEAR COST	FX	LC	CONT.	INFLATION
LOAN FUNDS					
Construction					
NCARTT	953,250	285,975	667,275	238,313	199,325
RASC	3,194,500	958,350	2,236,150	798,625	849,378
Design	248,865	62,216	186,649	24,887	-
Inspection & Supervision	331,820	-	331,820	33,182	83,914
SUBTOTAL	4,728,435	1,306,541	3,421,894	1,095,007	1,148,016
Total Loan Funds	6,971,458				

/1 = Exchange Rate: JD 0.400=$1.00 or $2.50=JD 1.000

TABLE E3

HADP

FINANCIAL IMPLEMENTATION PLAN

(WITH INFLATION)

$ (000)

	TOTAL	1985	1986	1987	1988
DESIGN	289,150	142,008	147,142	-	-
INSPECTION	448,914	-	77,672	194,326	176,916
NCARTT CONSTR.	1,390,891	-	436,866	954,025	-
RASCs CONSTR.	4,842,503	-	842,909	2,099,585	1,900,009
TOTAL	6,971,458	142,008	1,504,589	3,247,936	2,076,925

TABLE E4

NCARIT CONSTRUCTION COST ESTIMATE

IN JORDANIAN DINARS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
1	Main Building	M 2	1650	110	181,500
2	Housing	M 2	200	115	23,000
3	Shops	M 2	130	75	13,500
4	Guard Quarters	M 2	18	75	2,700
5	Farm Equip. Cover	M 2	780	40	31,200
6	Service Vehicle Cover	M 2	480	20	9,600
7	Store	M 2	135	80	10,800
8	Site Work	M 2	16500	1.5	25,000
9	Laboratories	M 2	200	120	24,000
10	Utilities, Roads, Water, Sewerage & Elect. Tel.....	L.S.			60,000
	SUBTOTAL.....				381,300
	Contingency @25%.....				95,325
	SUBTOTAL.....				476,625
	Inflation.....				79,731
	GRAND TOTAL.....				556,356

TABLE E5

RASCs CONSTRUCTION COST ESTIMATE

IN JORDANIAN DINARS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
1	Main Building	M 2	1140	110	125,400
2	Housing	M 2	390	115	44,850
3	Shops	M 2	182	75	13,650
4	Guard Quarters	M 2	18	75	1,350
5	Farm Equip. Cover	M 2	780	40	31,200
6	Service Vehicle Cover	M 2	360	20	7,200
7	Store	M 2	135	80	10,800
8	Site Work	M 2	16500	1.5	25,000
9	Utilities, Roads, Water, Sewerage & Elect. Tel.	L.S.			60,000
	SUBTOTAL				319,450
	4 units				1,277,800
	Contingency @25%				319,450
	SUBTOTAL				1,597,250
	Inflation				339,751
	GRAND TOTAL				1,937,001

INITIAL ENVIRONMENTAL EXAMINATION
BUILDING FACILITIES ONLY

The Environmental Threshold Decision included in the Project PID and the Initial Environmental Analysis submitted with the Project Paper did not discuss the environmental effect of the construction of buildings at the five agricultural stations at Shobak, Rabba, Mushaqar, Ramtha and Baqaa. There are three environmental concerns generally associated with building construction in Jordan - the short-term adverse impacts of air and noise pollution, wastewater disposal and antiquities.

The buildings at all five sites will be built on fairly large plots of land ranging from 50 to 600 acres and will be isolated from other buildings. Therefore, the short-term adverse effects of noise and dust will be minimal.

Wastewater from the buildings at the five stations will be discharged through Septic Tanks to tile field absorption systems. Although the building at Baqaa will initially be connected to a field absorption system, it is expected that in about two years it will be connected to a public sewer and wastewater treatment plant.

It is not known now whether any wells will be drilled on station property. In any event, wells will be deep and will be located at a safe distance from cesspits or other sources of pollution.

There has been some archaeological activity by the Department of Antiquities and international teams in the vicinity of most of the stations, but since there has not been any archeological interest in the actual sites selected for the stations, it may be assumed that there is a good chance that there will be no significant discoveries at the sites. Since there is not always a valid archaeological assumption anywhere in Jordan, Antiquities Provisional Law 12 (1976) will be strictly applied. Application for building permits must be cleared by the Department of Antiquities. Articles 6, 13, 14, 15, 16 and 29 of the law protect any artifacts that are found. Similarly, the General Conditions of Contract of the various ministries and municipalities require construction contractors to notify the ministry or authority concerned when artifacts are encountered.
In addition, during project implementation, the Mission's monitoring staff will give special consideration to the protection of archaeological findings.

Conclusion:

The Initial Environmental Examination (IEE) conducted by the Mission's Environmental Officer concludes that the project buildings part will not have a significant impact on the environment.

Essentially, the IEE determined that construction of buildings will have short-term adverse impacts caused by pollution, such as that from noise and dust. The project will have no uncontrolled adverse long-term impacts. Therefore, a negative determination is concluded and no further environmental consideration is required.

IMPACT IDENTIFICATION AND EVALUATION FORM

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

1/ See Explanatory Match for this form.

2/ Use the following symbols: N - No environmental impact

L - Little environmental impact

M - Moderate environmental impact

H - High environmental impact

U - Unknown environmental impact

125

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

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

_____ _____

_____ _____

D. NATURAL RESOURCES

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

_____ _____

_____ _____

E. CULTURAL

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

_____ _____

_____ _____

F. SOCIOECONONIC

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

_____ _____

_____ _____

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

1. Changing a natural environment ---------- N
2. Eliminating an ecosystem element ---------- N
3. Other factors

_____ _____

_____ _____

H. GENERAL

1. International impacts ---------- N
2. Controversial impacts ---------- N
3. Larger program impacts _____ N
4. Other factors

_____ _____

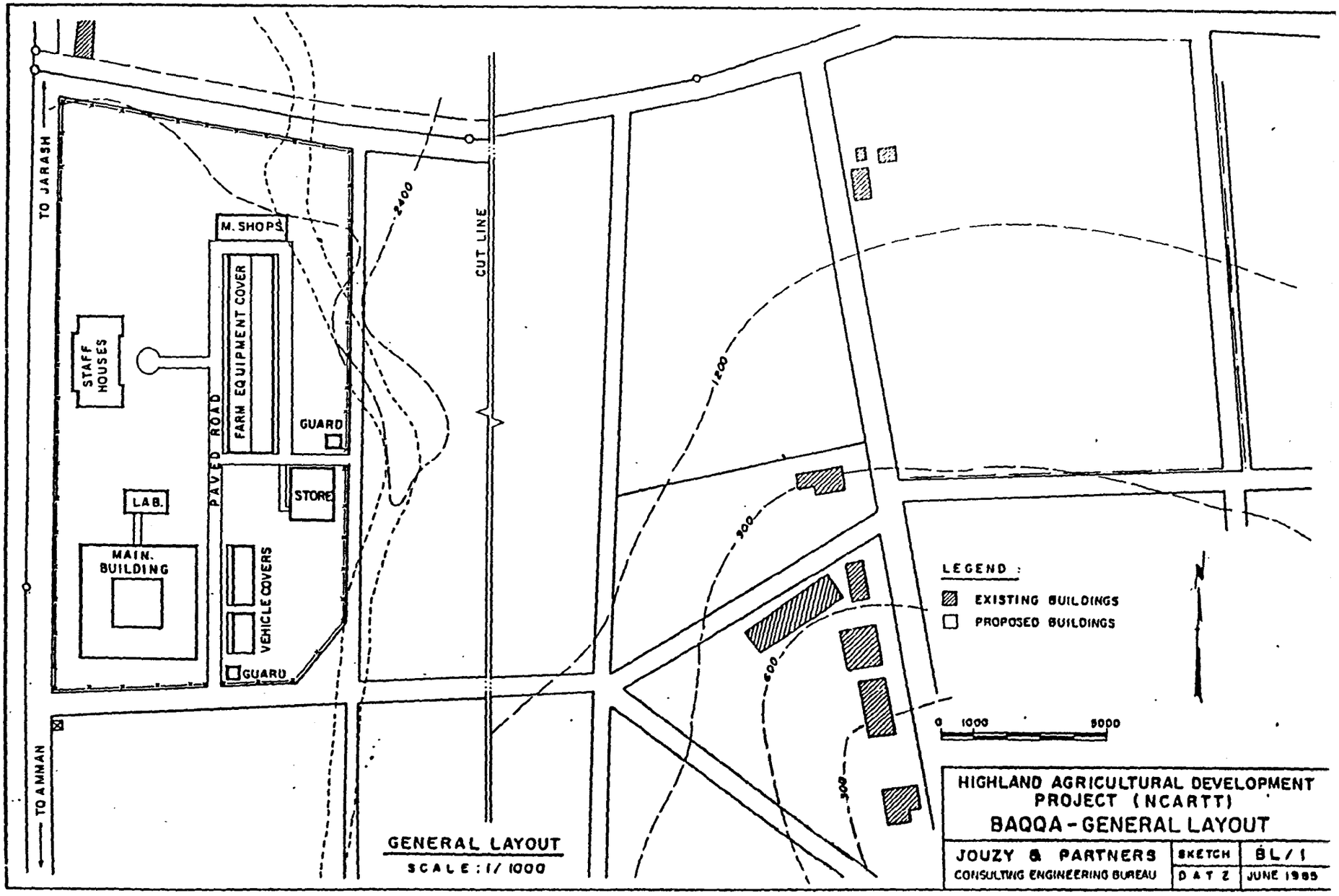
_____ _____

I. ARCHAEOLOGICAL ARTIFACTS

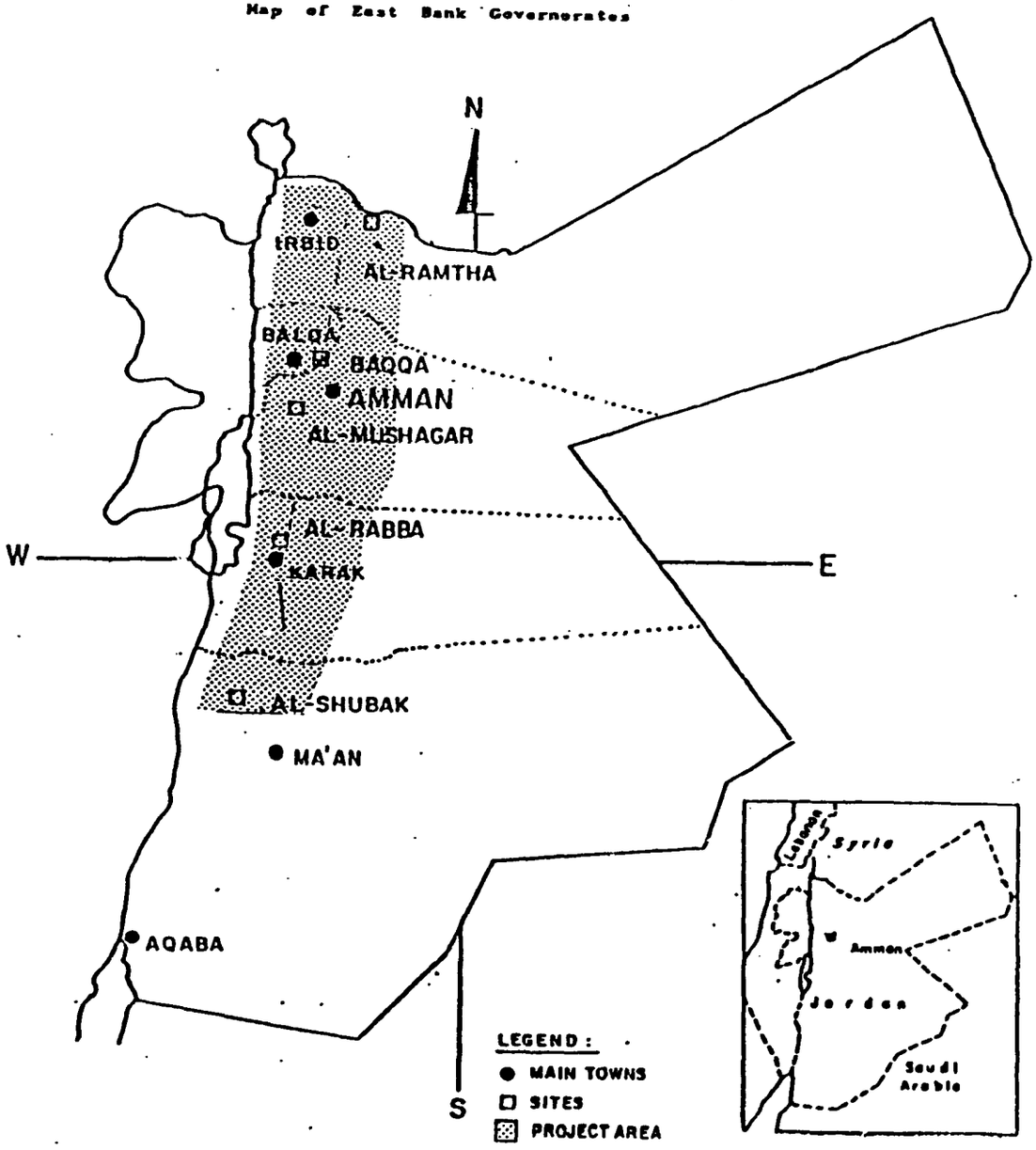
Protected by the Antiquities Law No. 12.

_____ _____

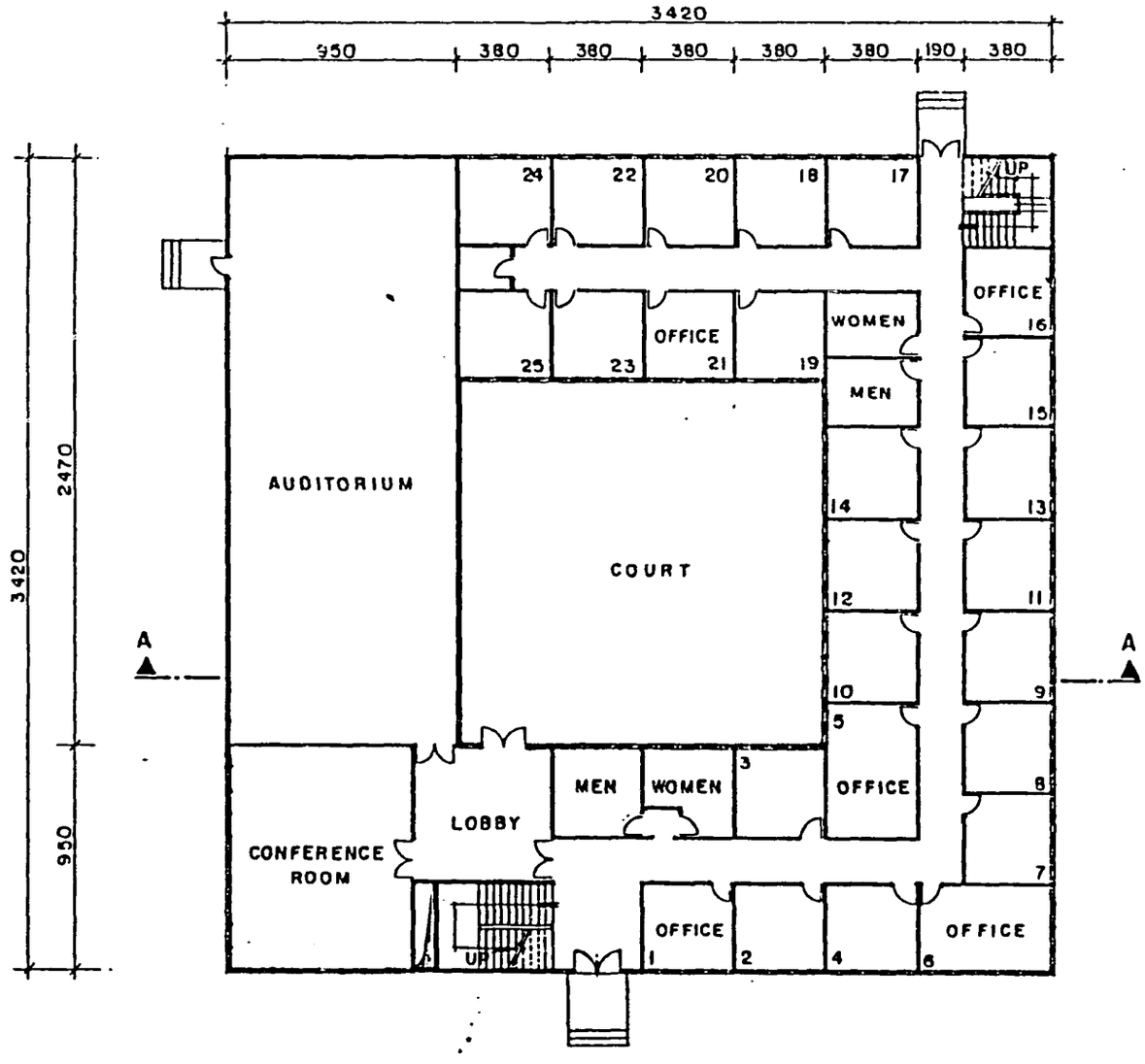
_____ _____


TO JARASH
TO AMMAN
M. SHOPS
FARM EQUIPMENT COVER
STAFF HOUSES
GUARD
PAVED ROAD
STORE
LAB.
MAIN. BUILDING
VEHICLE COVERS
GUARD
CUT LINE
2400
1200
900
600
300
LEGEND :
EXISTING BUILDINGS
PROPOSED BUILDINGS
0 1000 5000
GENERAL LAYOUT
SCALE : 1/ 1000
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)
BAQQA - GENERAL LAYOUT
JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU
SKETCH
BL/1
DATE
JUNE 1985

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT



JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU



NOTES:

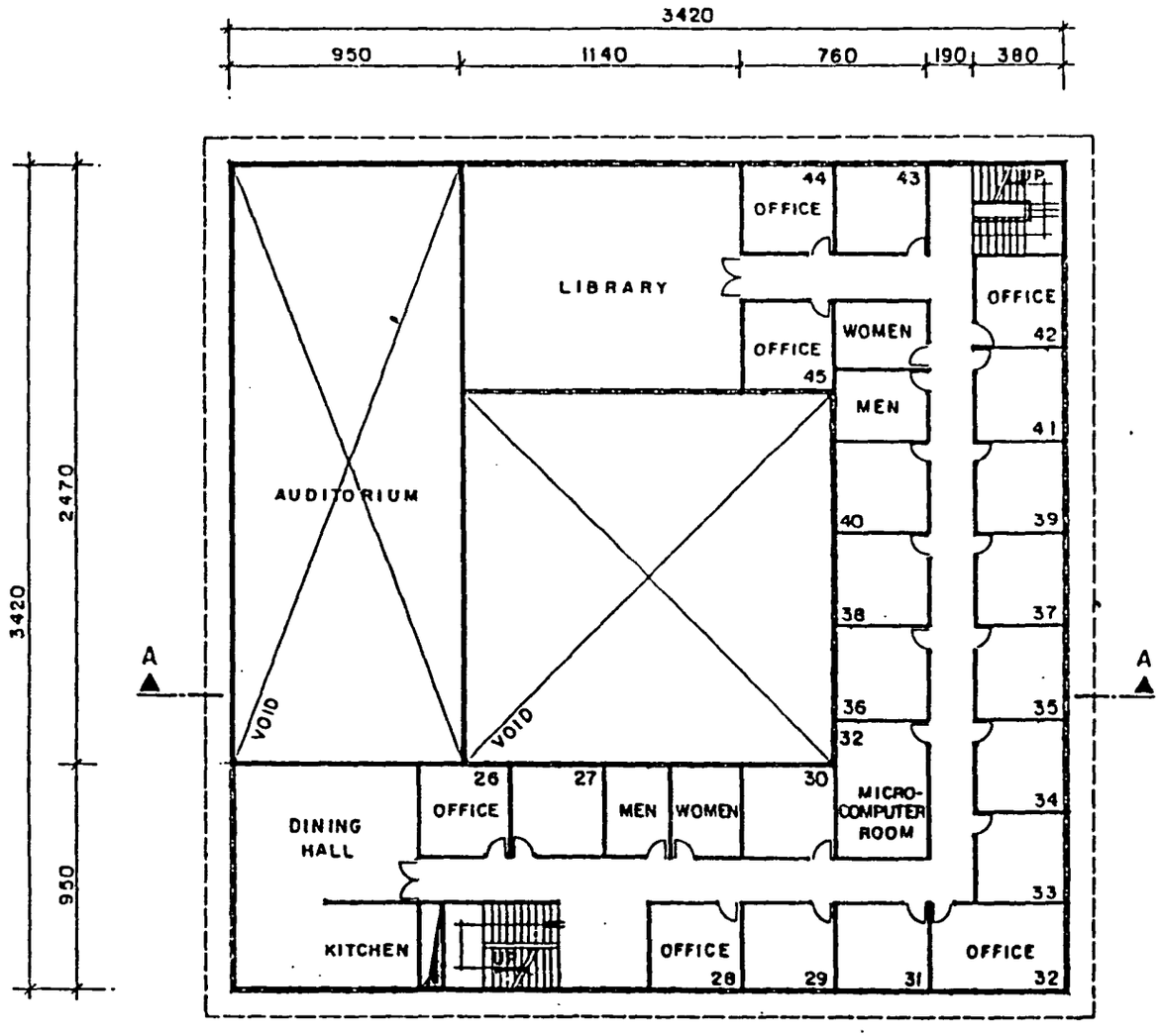
1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE M/4.

0 100 500 1000

GROUND FLOOR PLAN

SCALE: 1/200

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) MAIN BUILDING		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	M/2
	DATE	JUNE 1985



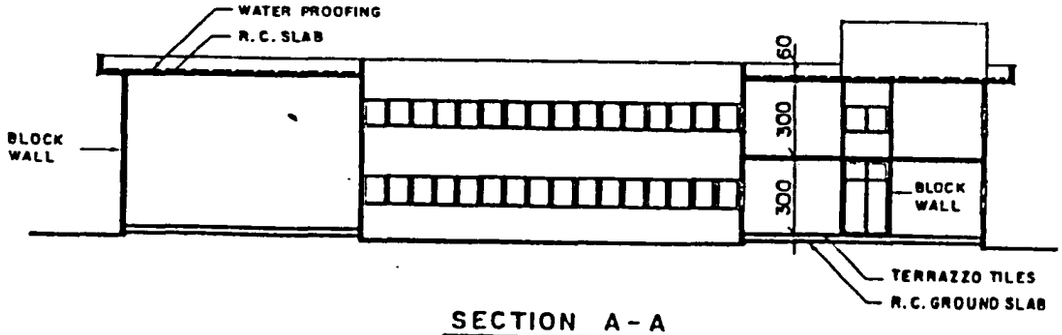
NOTES:

1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE M/4.

FIRST FLOOR PLAN

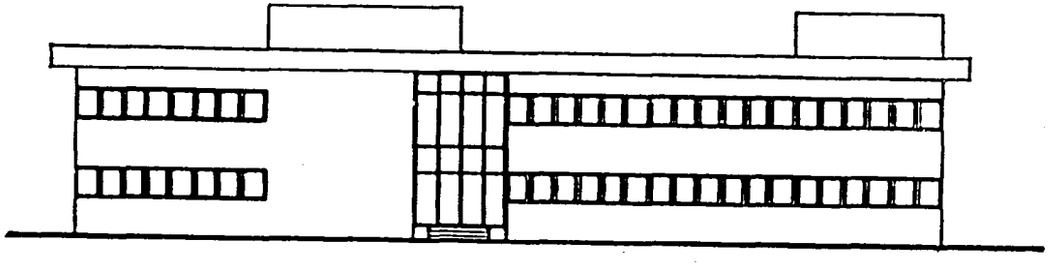
SCALE : 1/200

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) MAIN BUILDING		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	M/3
	DATE	JUNE 1995



SECTION A-A

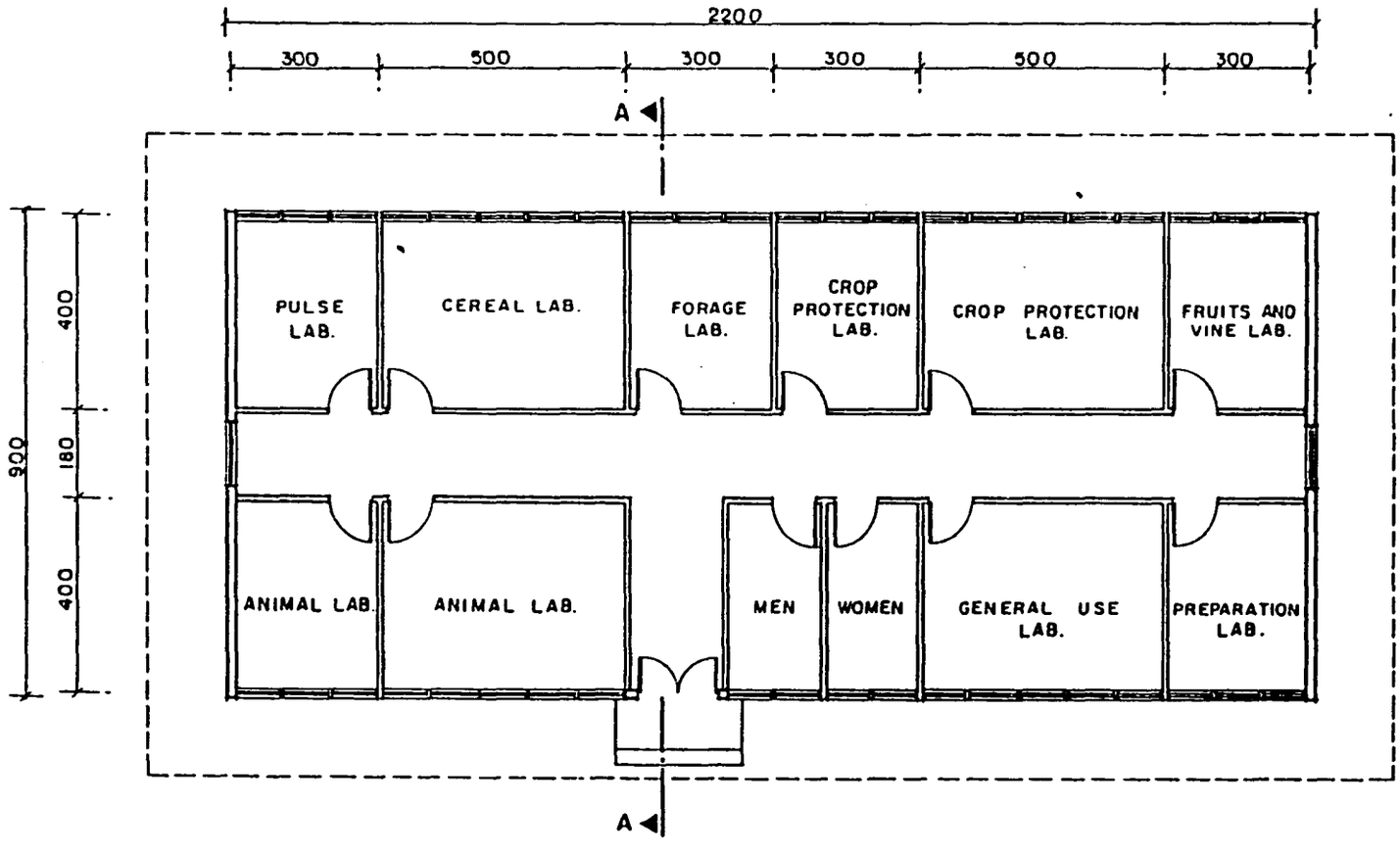
SCALE : 1/100



FRONT ELEVATION

SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) MAIN BUILDING		
JOUZY & PARTNERS	SKETCH	M/4
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985



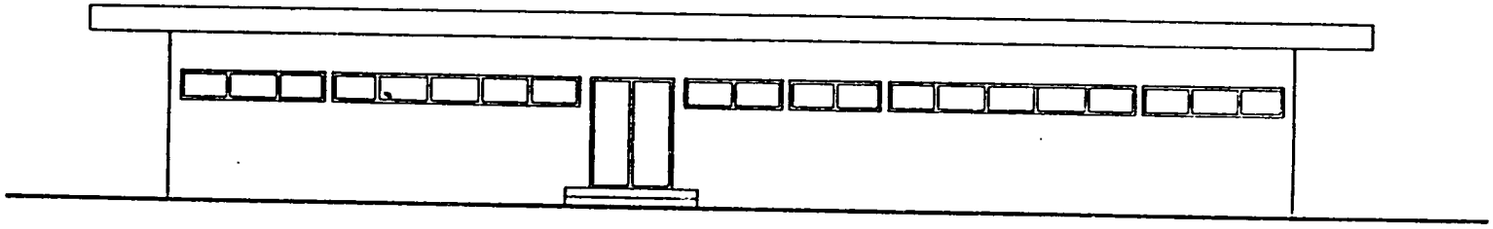
PLAN

SCALE : 1/100

NOTES :

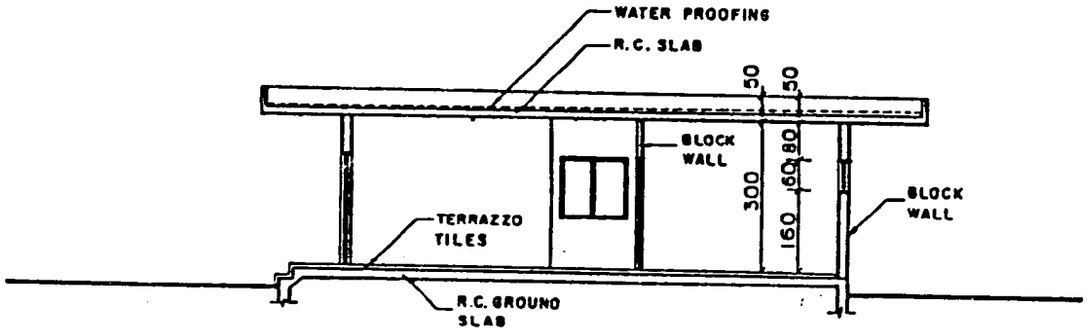
1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE L/6.

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) LABORATORIES		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	L/5
	DATE	JUNE 1985



FRONT ELEVATION

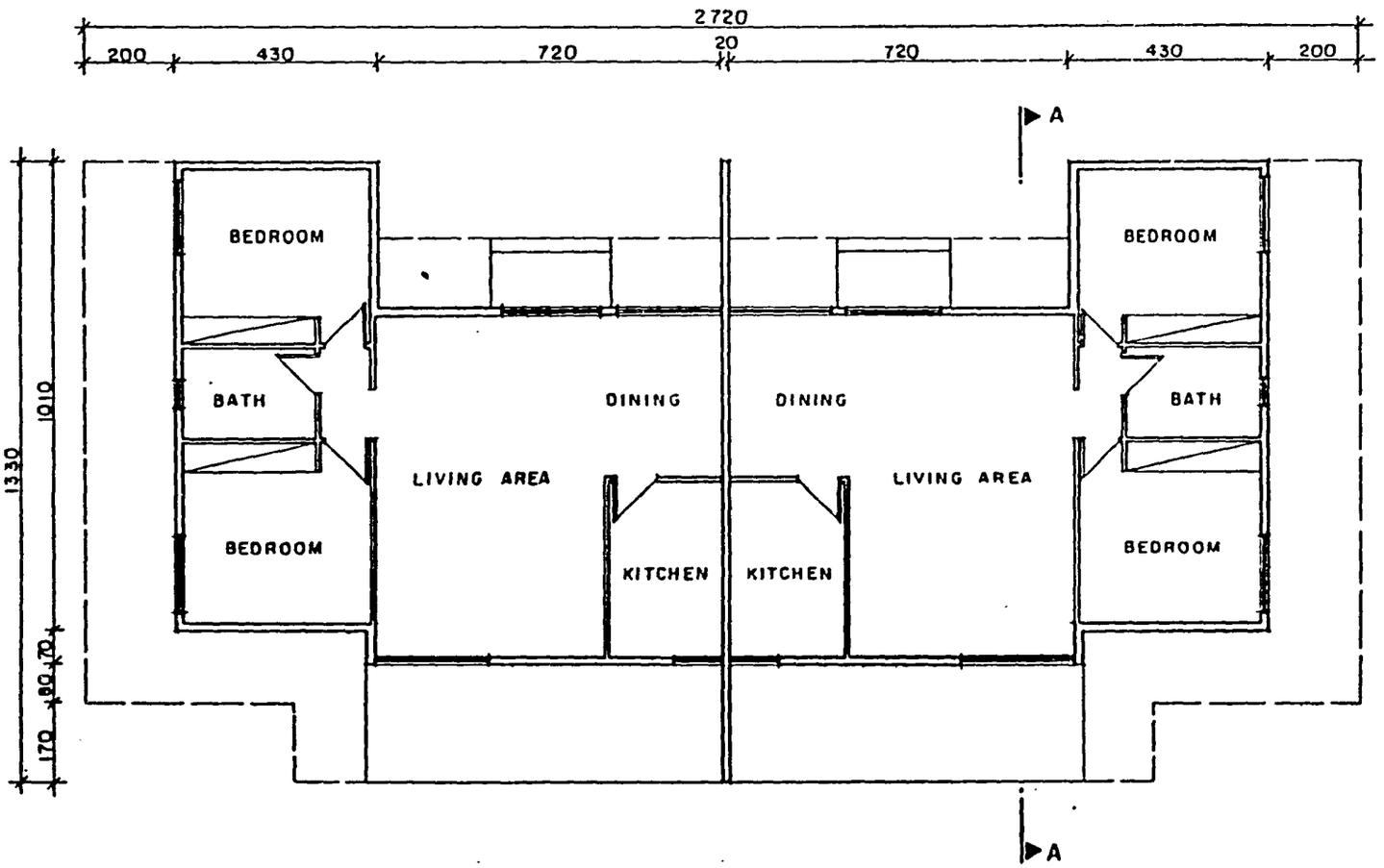
SCALE :1/100



SECTION A-A

SCALE :1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) LABORATORIES		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	L/6
	DATE	JUNE 1985



NOTES:

1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE HF/8.

PLAN

SCALE: 1/100

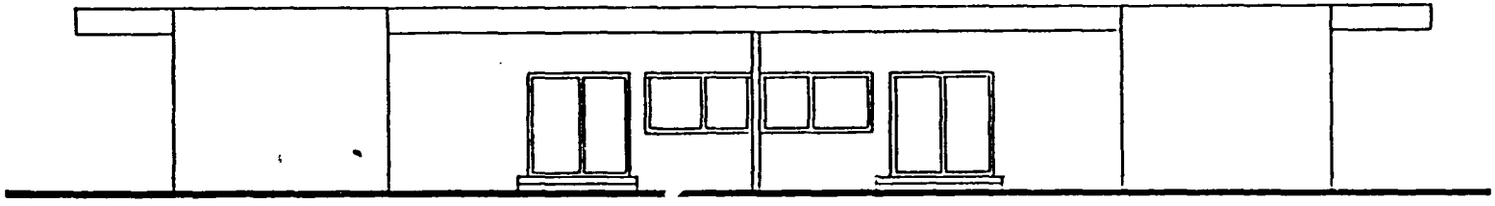
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)

STAFF HOUSES - FAMILY

JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU

SKETCH

DATE



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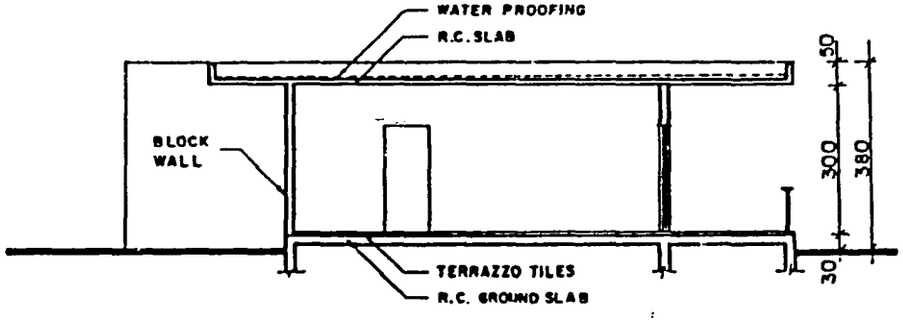
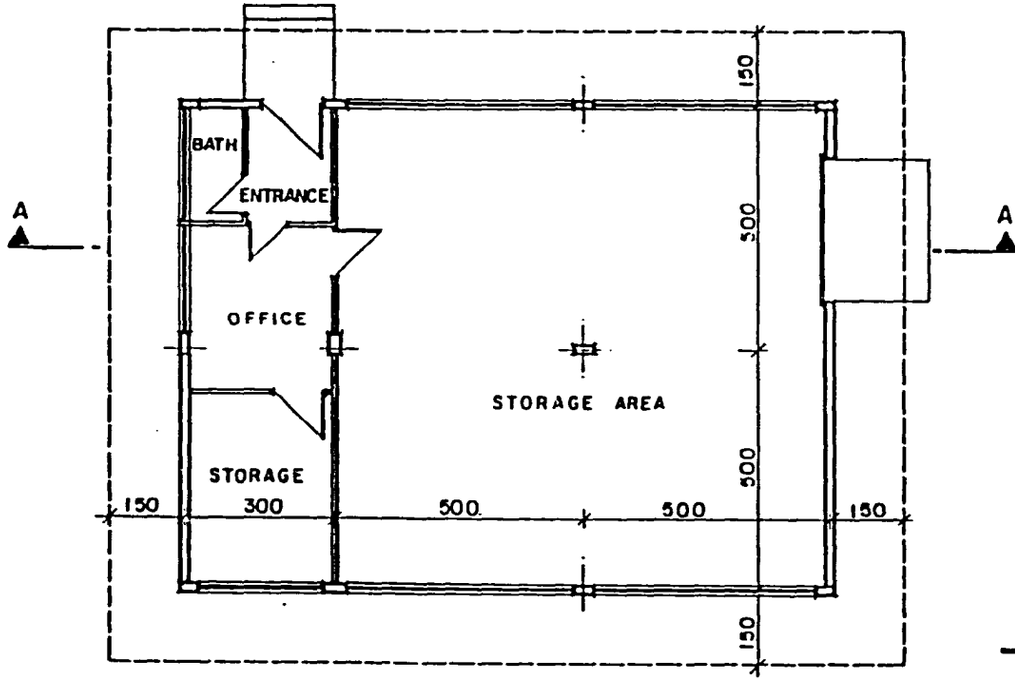


SECTION A - A

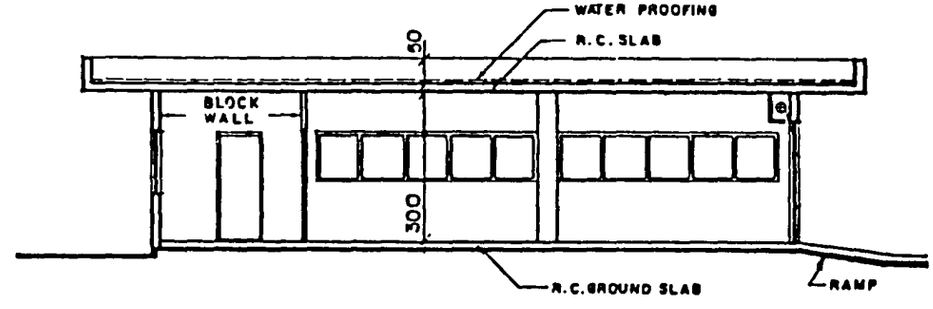
SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) STAFF HOUSES - FAMILY		
JOUZY & PARTNERS	SKETCH	HF/8
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985



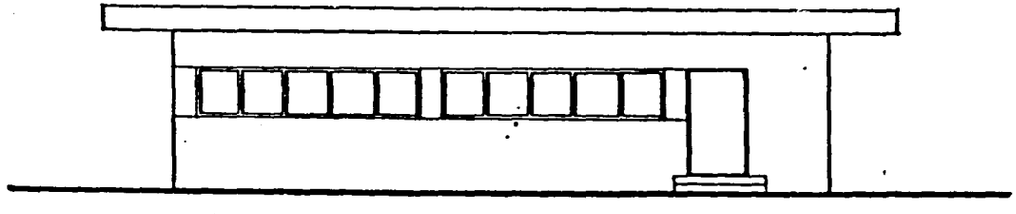
PLAN

SCALE : 1/100



SECTION A-A

SCALE : 1/100



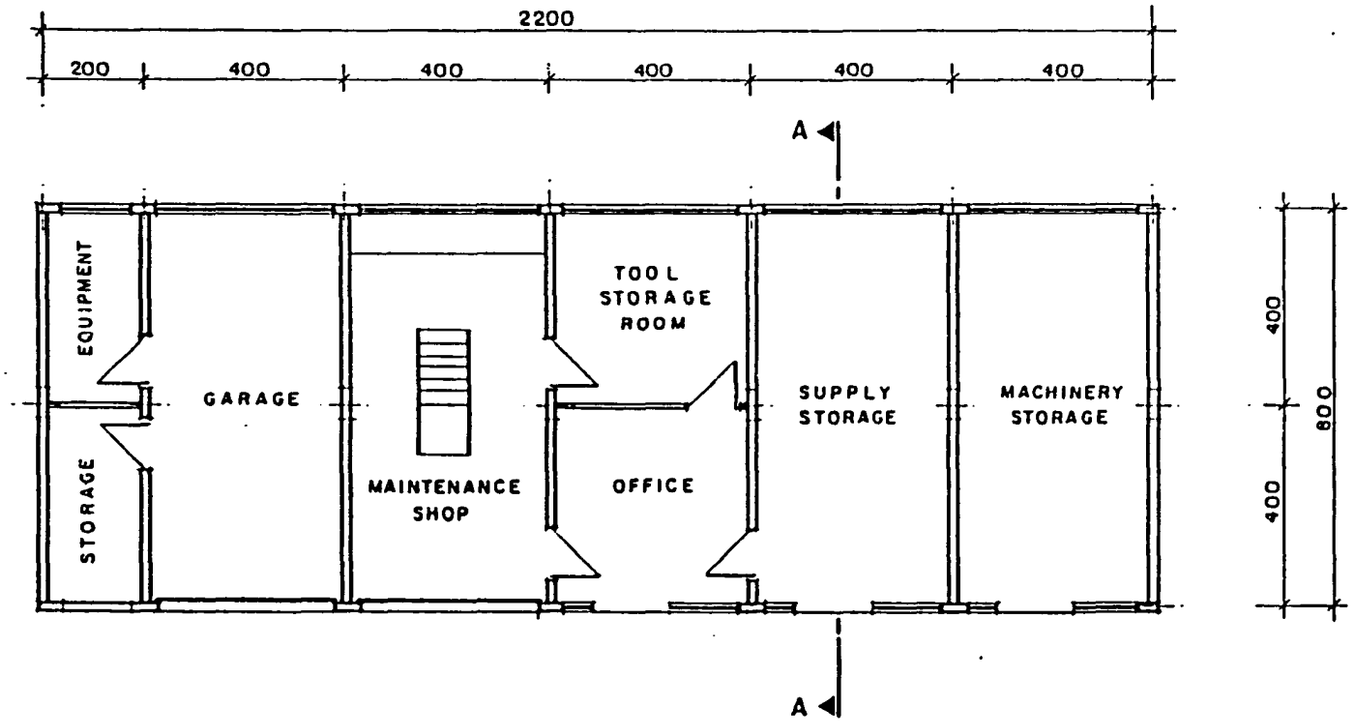
FRONT ELEVATION

SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) STORE		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	S/9
	DATE	JUNE 1985

NOTES :

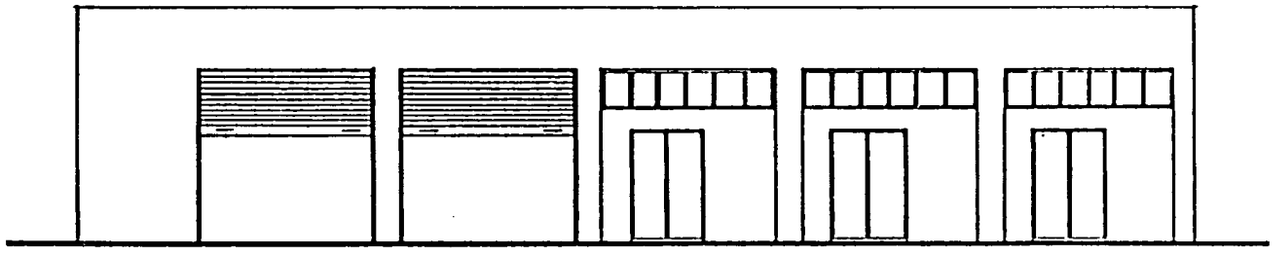
1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTIONS A-A SEE SU/11.



PLAN

SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)		
SHOP & UTILITY STORAGE AREA		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SU/10
	DATE	JUNE 1985



FRONT ELEVATION

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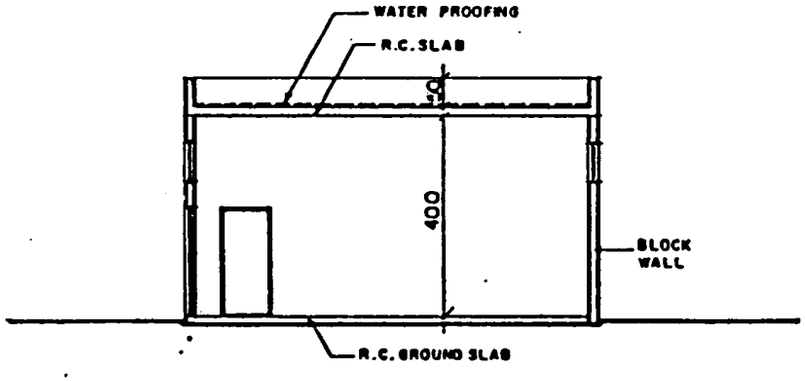


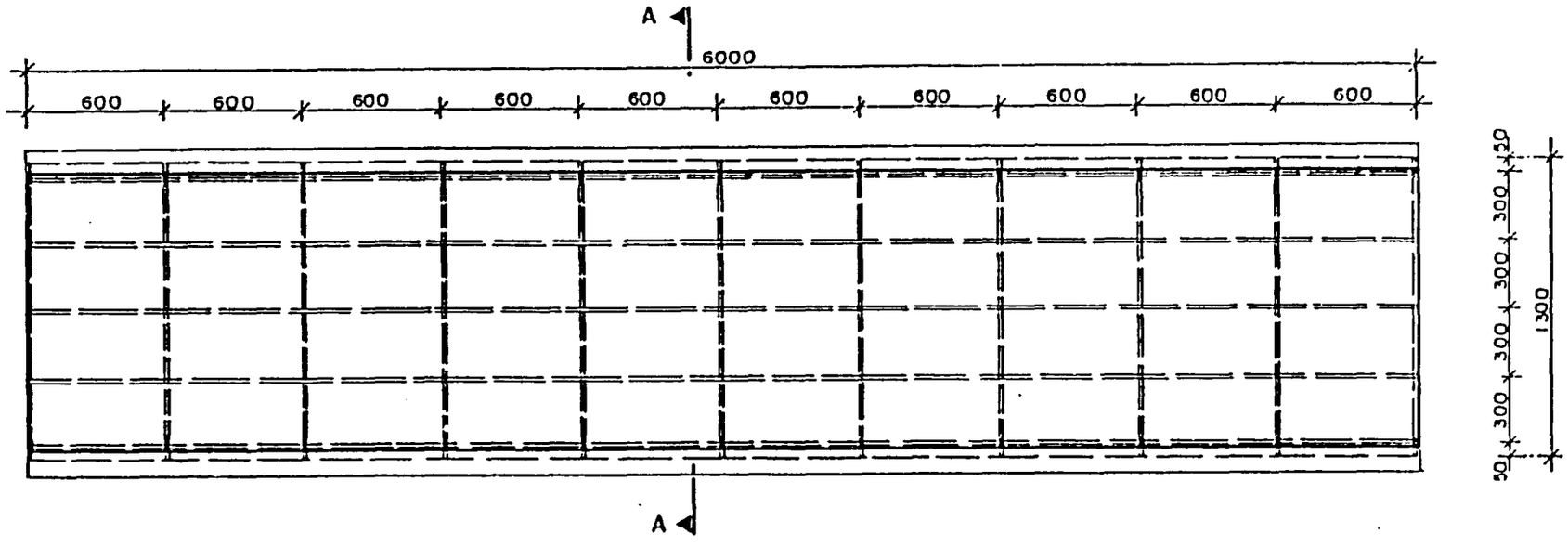
SECTION A-A

SCALE: 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)

SHOP & UTILITY STORAGE AREA

JOUZY & PARTNERS	SKETCH	SU/11
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985



PLAN

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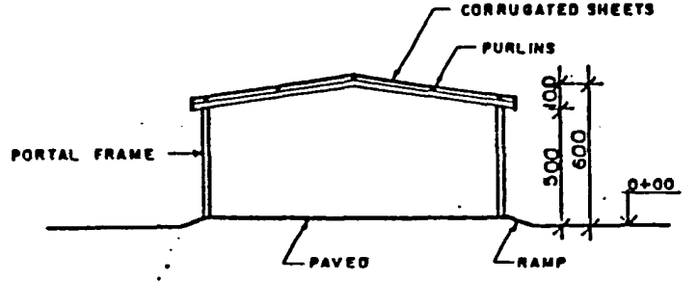
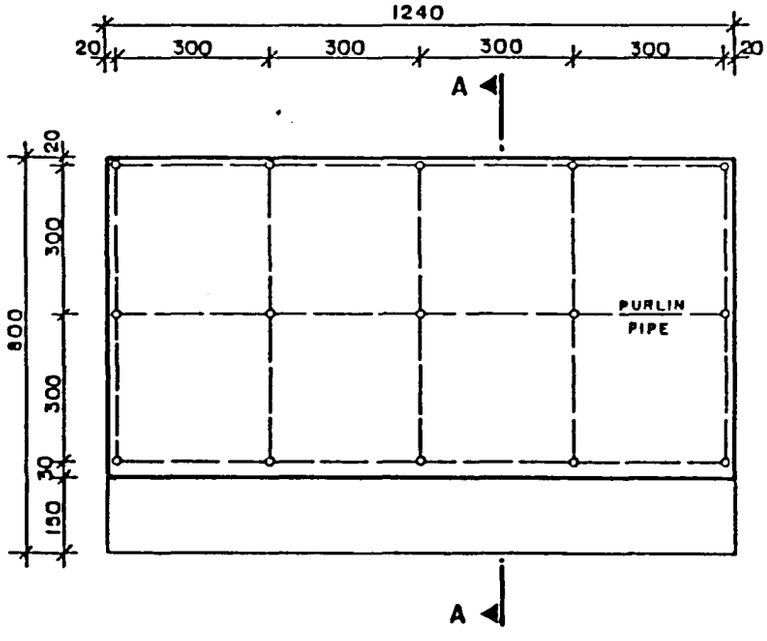


SECTION A - A

SCALE : 1/200

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT) FARM EQUIPMENT COVER		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	E /12
	DATE	JUNE 1985



PLAN

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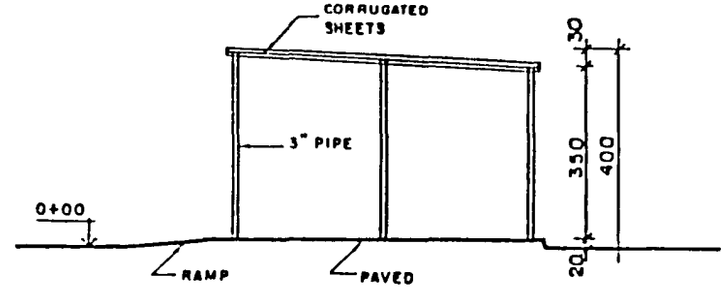
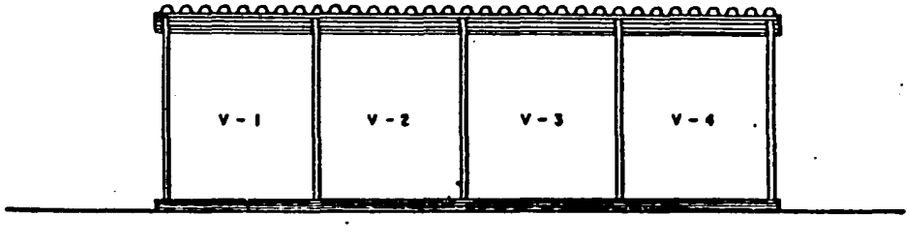


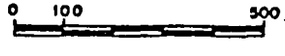
SECTION A - A

SCALE : 1/100

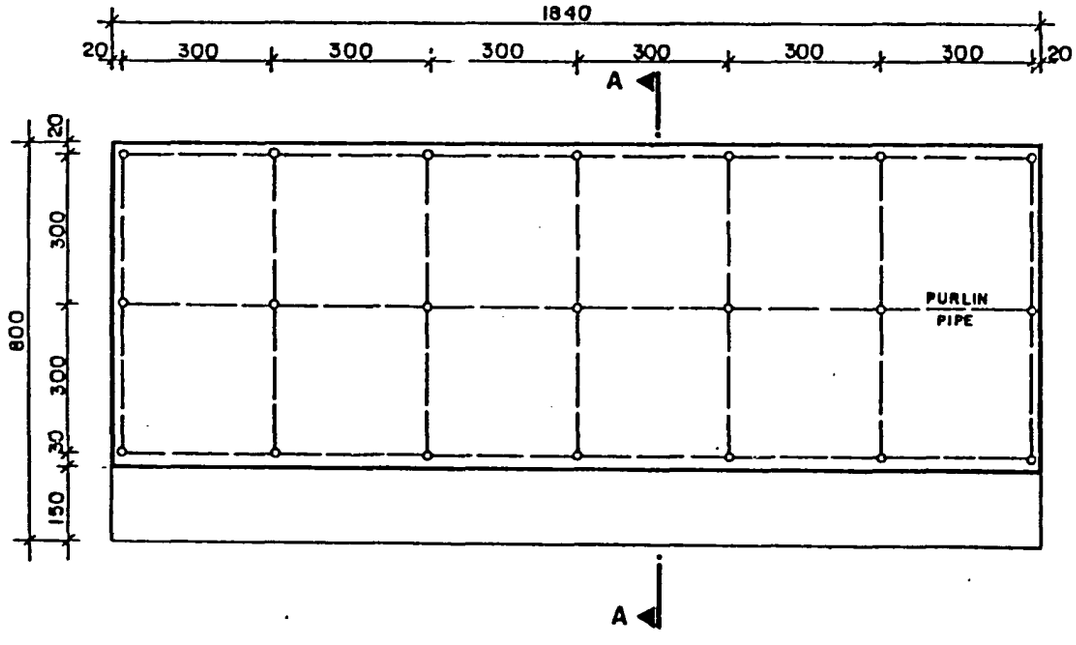


FRONT ELEVATION

SCALE : 1/100

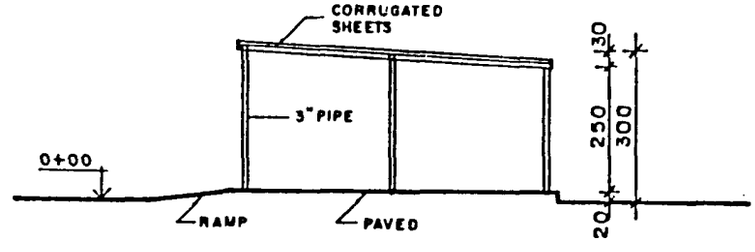


HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)		
SERVICE VEHICLE COVER - PICKUPS		
JOUZY & PARTNERS	SKETCH	SP/13
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985



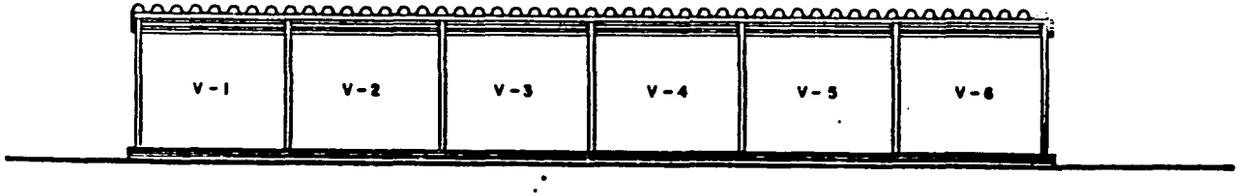
PLAN

SCALE : 1/100



SECTION A - A

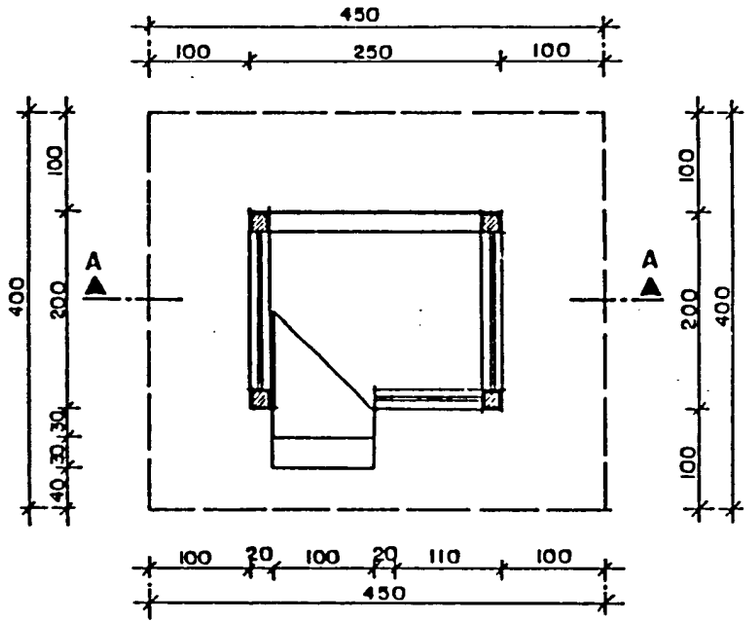
SCALE : 1/100



FRONT ELEVATION

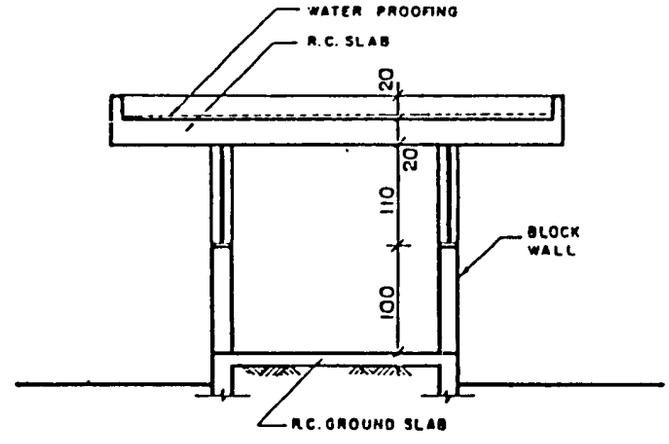
SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)		
SERVICE VEHICLE COVER - 4 W D		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SWD / 14
	DATE	JUNE 1985



PLAN

SCALE : 1/50

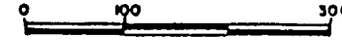


SECTION A-A

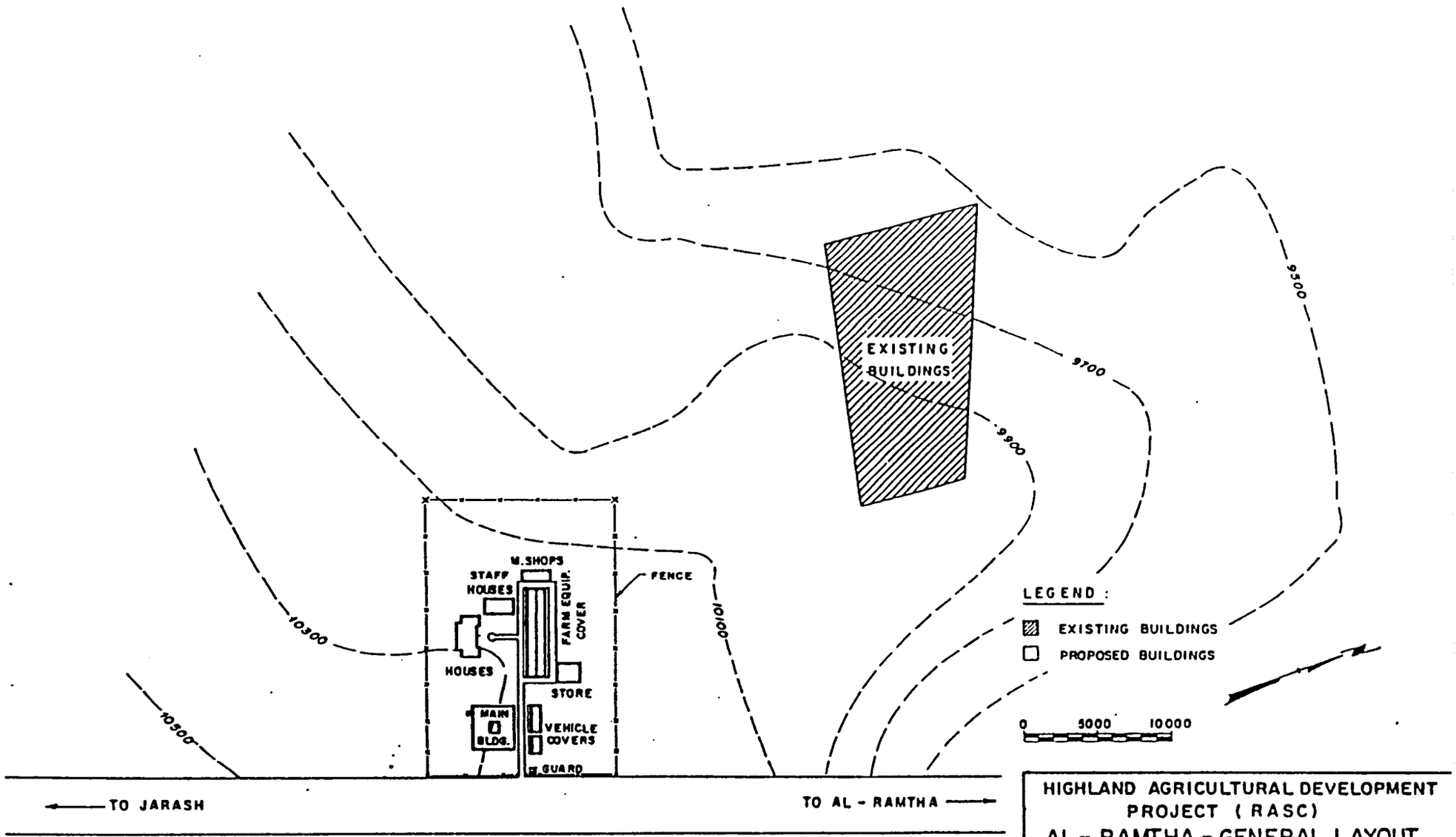
SCALE : 1/50

FRONT ELEVATION

SCALE : 1/50



HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)		
SECURITY GUARD QUARTERS No.182		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	G/15
	DATE	JUNE 1985



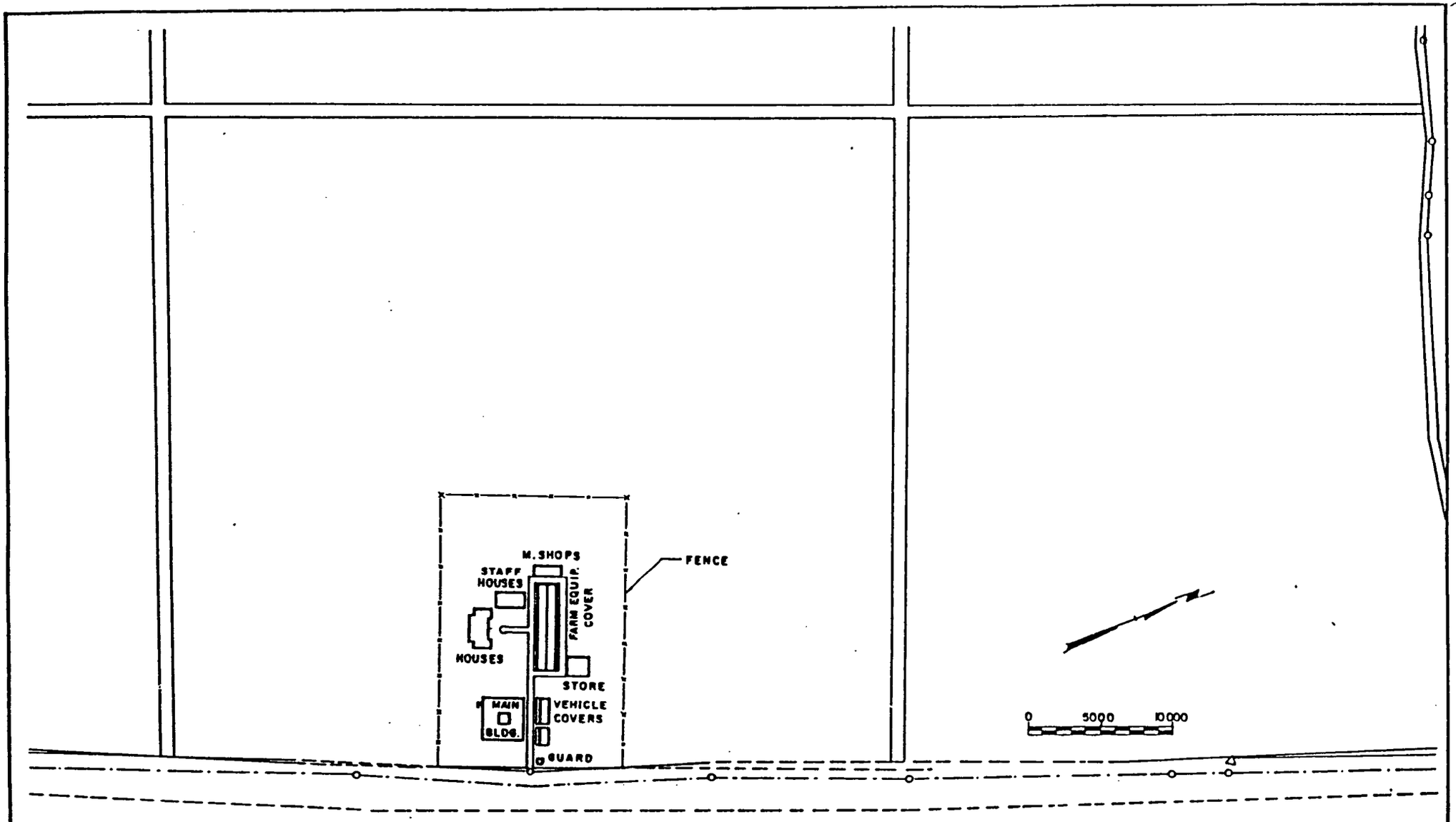
GENERAL LAYOUT

SCALE : 1/2500

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)

AL - RAMTHA - GENERAL LAYOUT

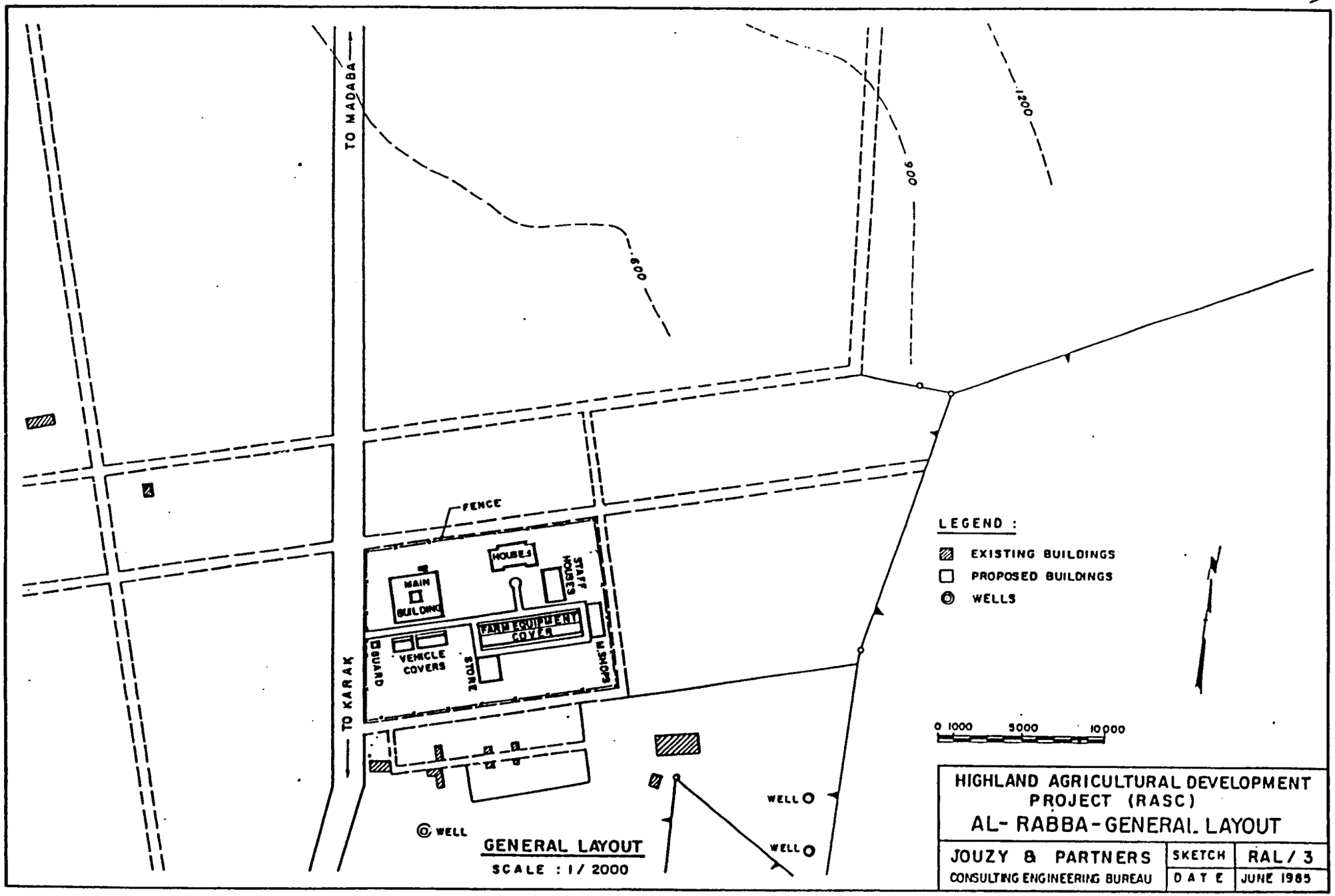
JOUZY & PARTNERS	SKETCH	RL/1
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985

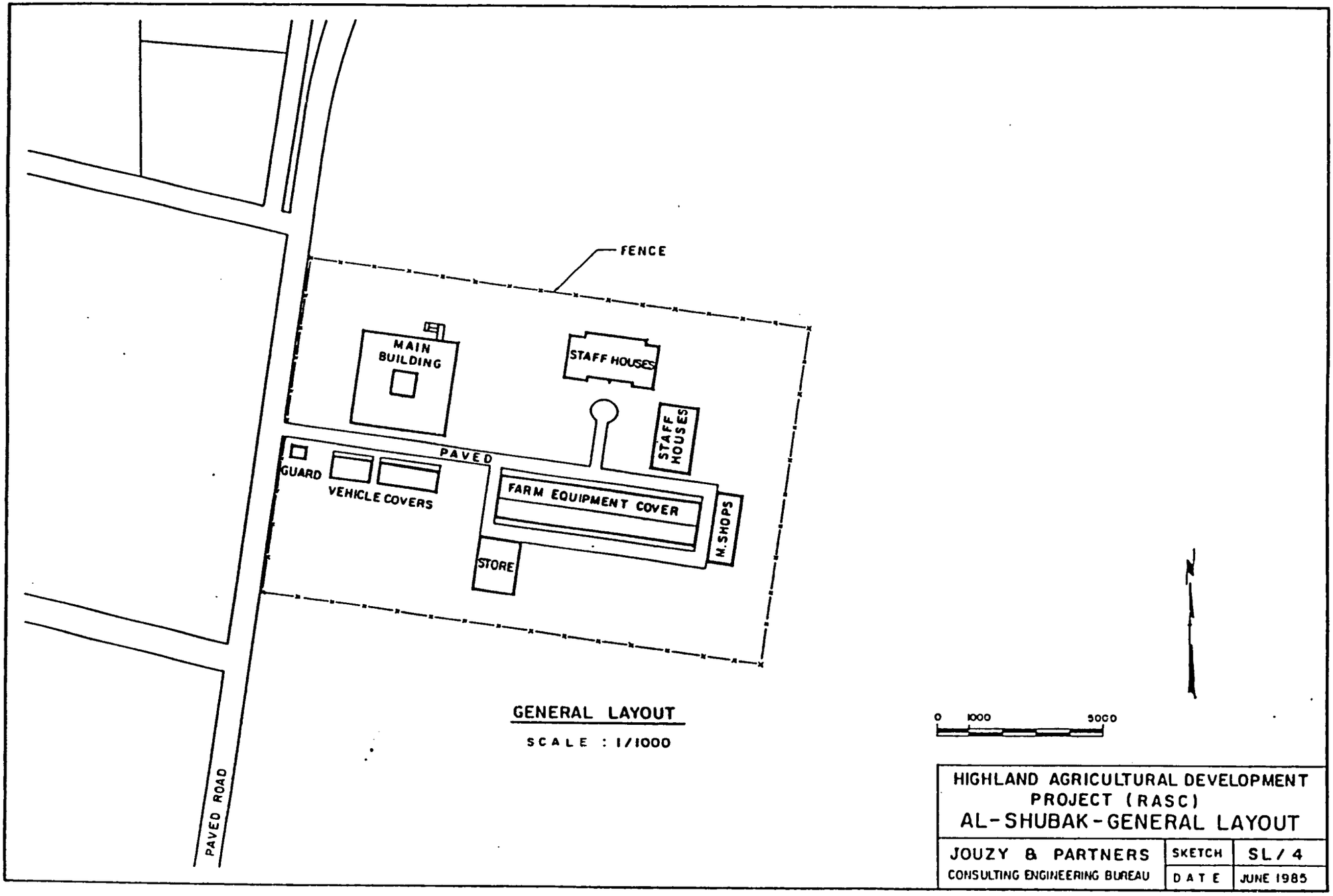


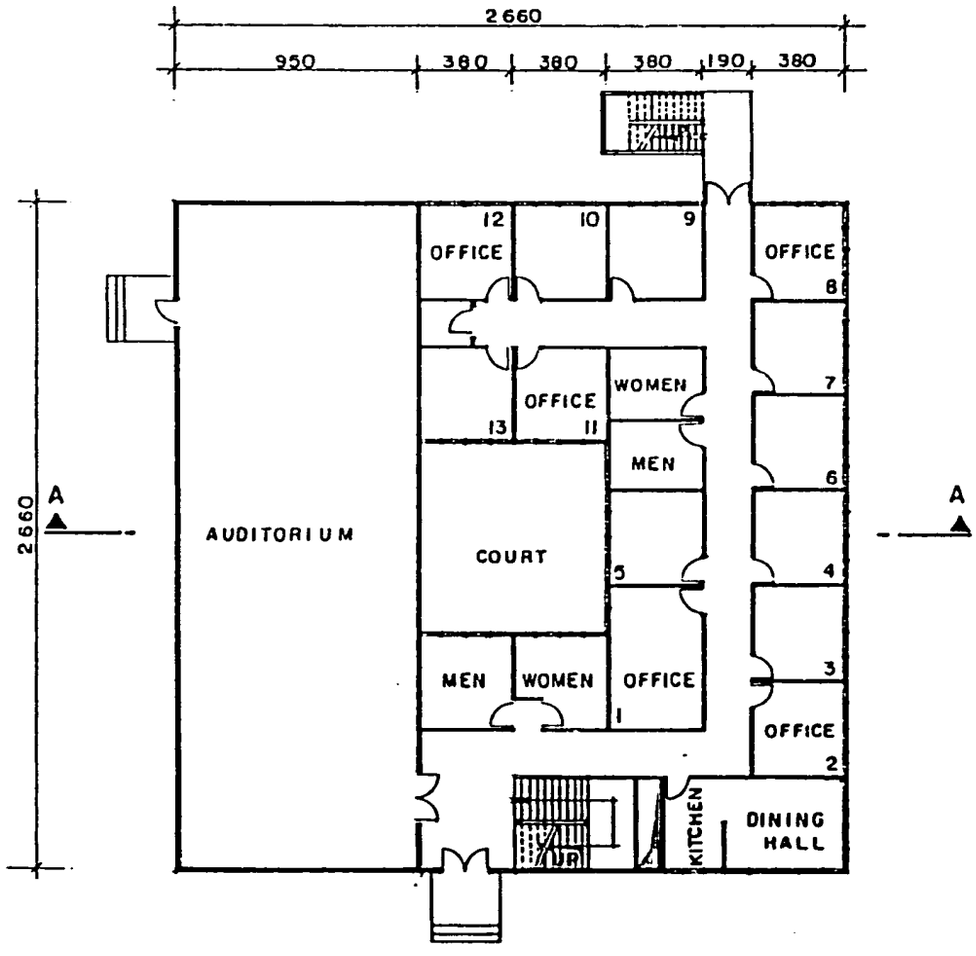
GENERAL LAYOUT

SCALE: 1/2500

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)		
AL-MUSHAGAR - GENERAL LAYOUT		
JOUZY & PARTNERS	SKETCH	ML/2
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985


TO MADABA
TO KARAK
1200
900
600
FENCE
HOUSES
STAFF HOUSES
MAIN BUILDING
FARM EQUIPMENT COVER
VEHICLE COVERS
QUARD
STORE
WORKS
WELL
WELL
WELL
LEGEND :
EXISTING BUILDINGS
PROPOSED BUILDINGS
WELLS
0 1000 5000 10000
GENERAL LAYOUT
SCALE : 1/ 2000
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)
AL- RABBA - GENERAL LAYOUT
JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU
SKETCH
RAL / 3
DATE
JUNE 1985


FENCE
MAIN BUILDING
STAFF HOUSES
STAFF HOUSES
PAVED
GUARD
VEHICLE COVERS
FARM EQUIPMENT COVER
M. SHOPS
STORE
PAVED ROAD
GENERAL LAYOUT
SCALE : 1/1000
0 1000 5000
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)
AL-SHUBAK-GENERAL LAYOUT
JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU
SKETCH
SL/4
DATE
JUNE 1985



NOTES:

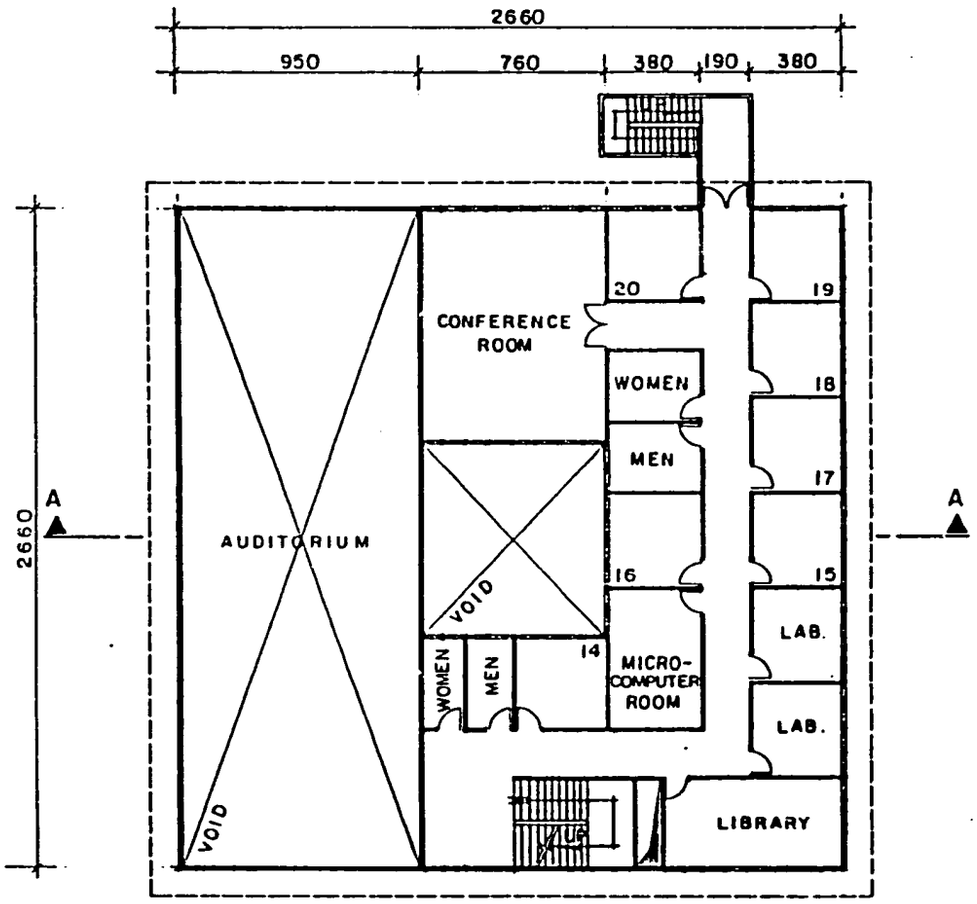
1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE M/7.

GROUND FLOOR PLAN

SCALE: 1/200

0 100 500 1000

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) MAIN BUILDING		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	M/5
	DATE	JUNE 1985



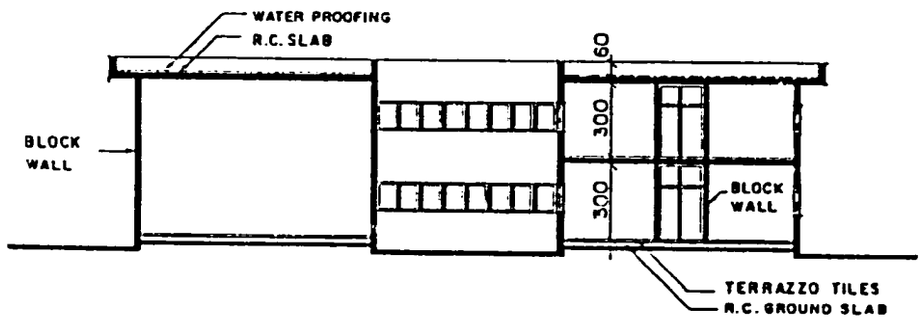
FIRST FLOOR PLAN

SCALE : 1/200

NOTES:

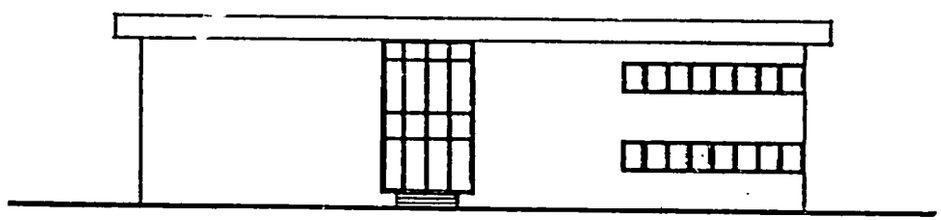
1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE M/7.

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (R A S C) MAIN BUILDING		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	M/6
	DATE	JUNE 1985



SECTION A-A

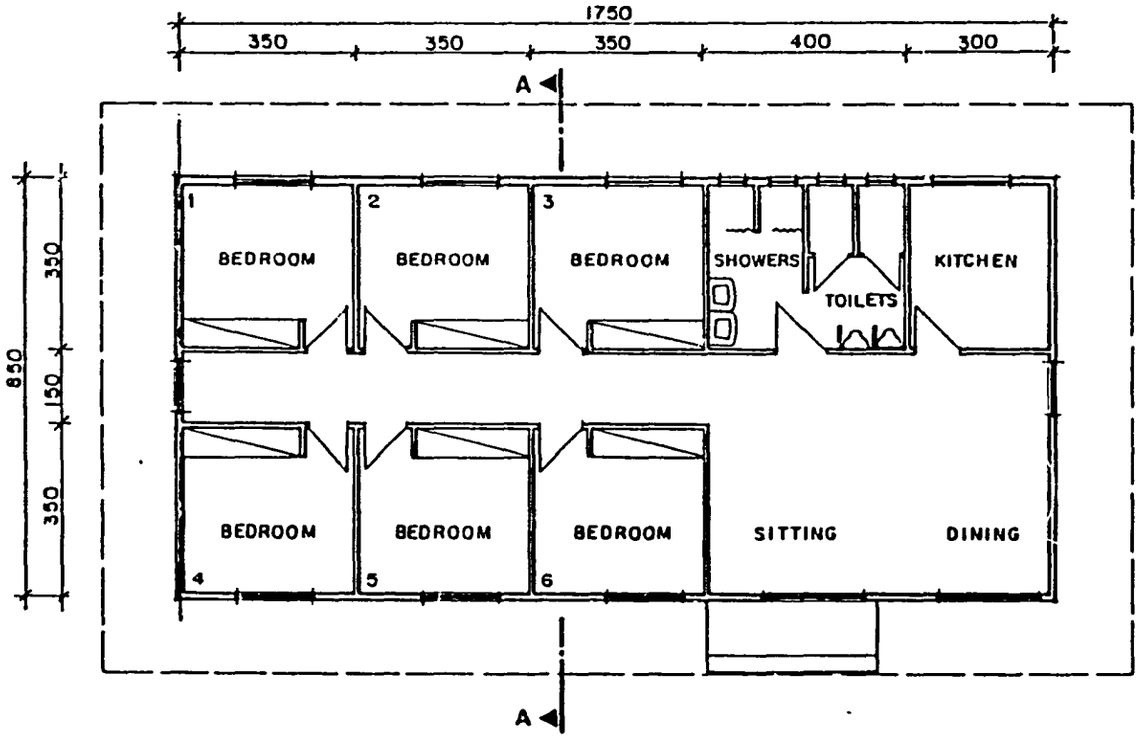
SCALE : 1/100



FRONT ELEVATION

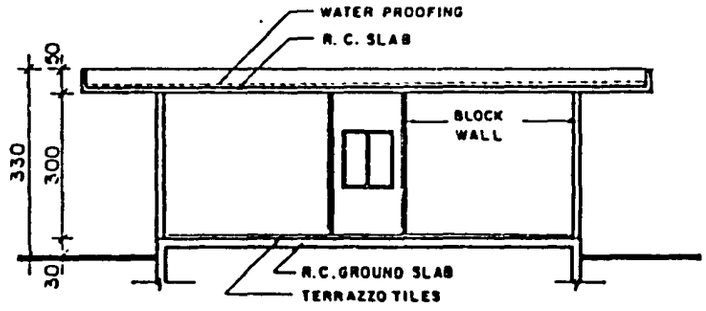
SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) MAIN BUILDING		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	M/7
	DATE	JUNE 1985



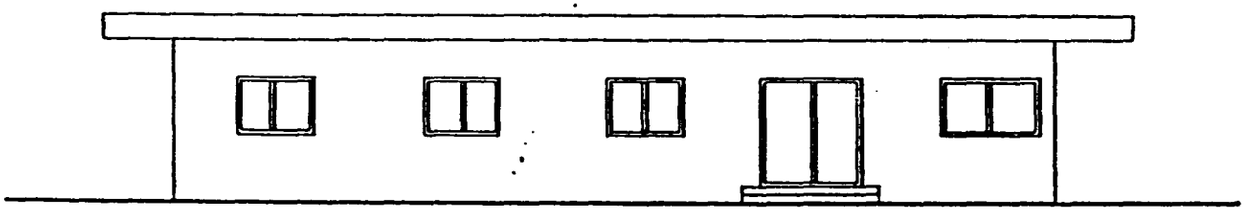
PLAN

SCALE : 1/100



SECTION A - A

SCALE : 1/100



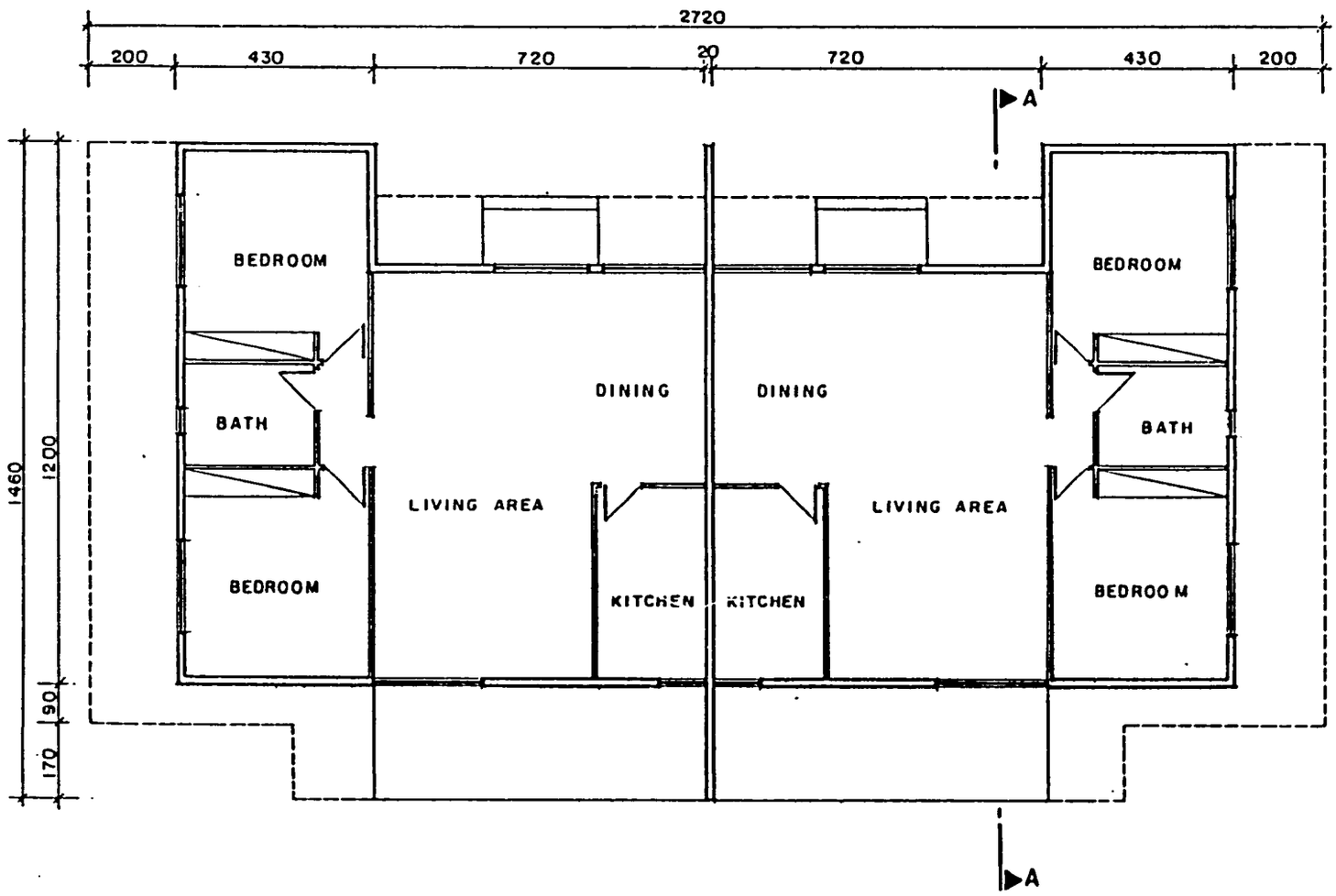
FRONT ELEVATION

SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)

STAFF HOUSE - BACHELOR'S

JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SB/8
	DATE	JUNE 1985



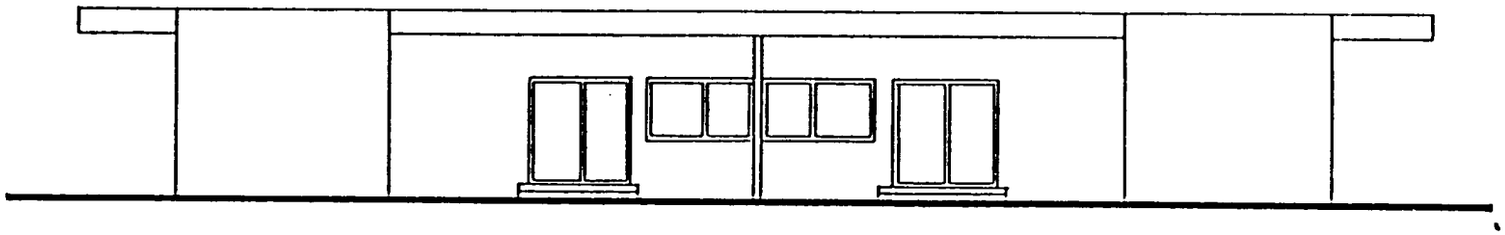
NOTES :

1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE HF/10.

PLAN.

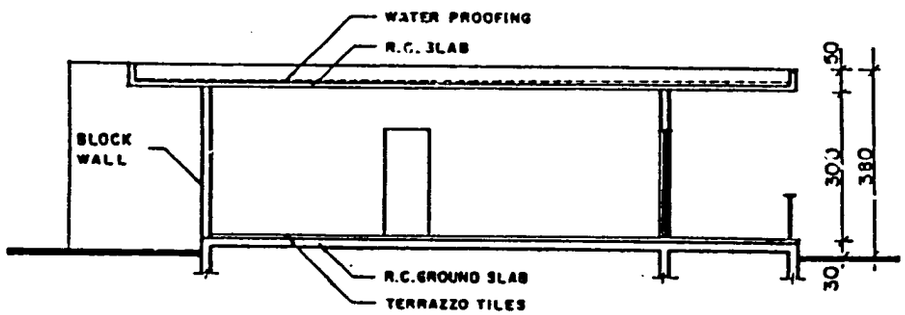
SCALE: 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) STAFF HOUSES - FAMILY		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	HF/9
	DATE	JUNE 1985



FRONT ELEVATION

SCALE : 1/100



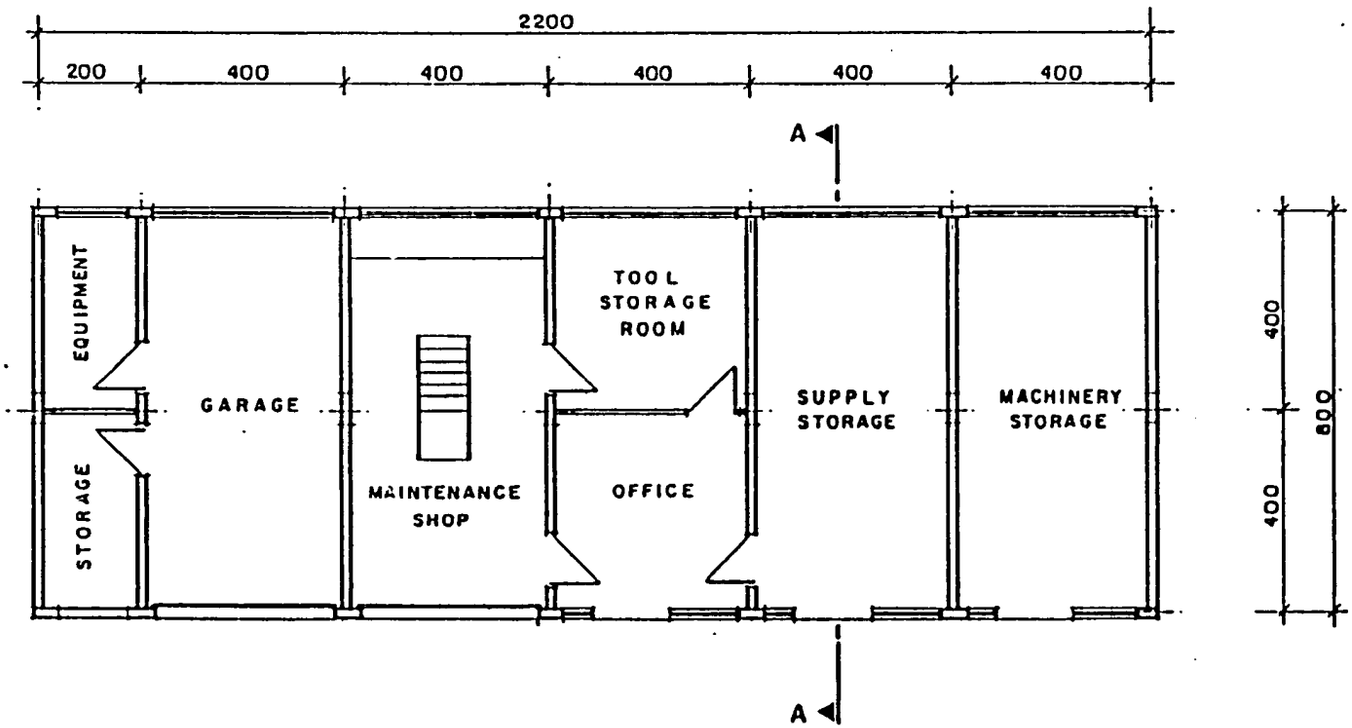
SECTION A - A

SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)		
STAFF HOUSES - FAMILY		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	HF/10
	DATE	JUNE 1985

NOTES:

1. ALL DIMENSIONS ARE IN CMS.
2. FOR SECTION A-A SEE SU/12.



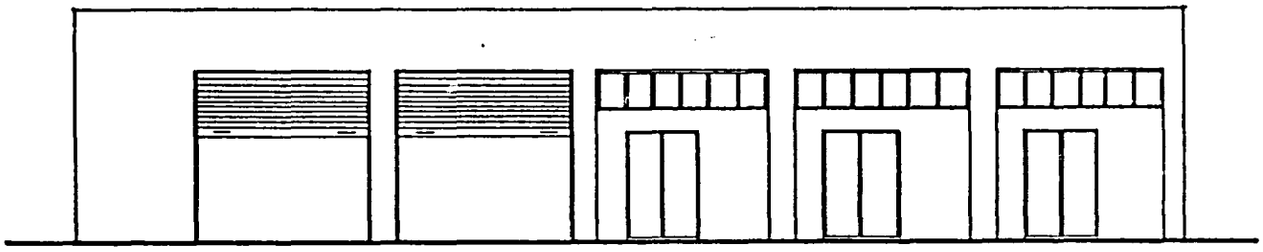
PLAN

SCALE: 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)

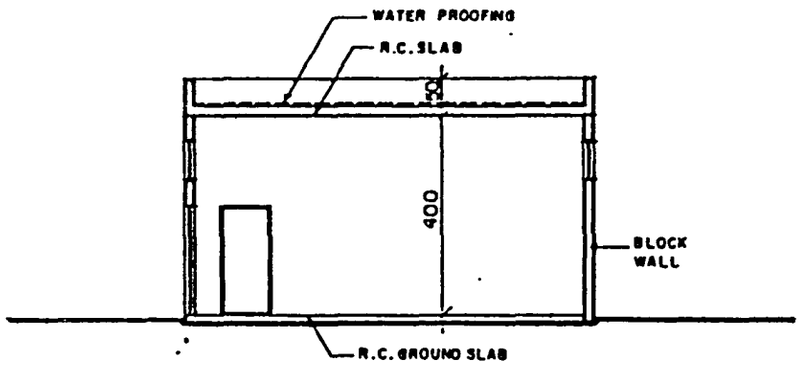
SHOP & UTILITY STORAGE AREA

JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SU/11
	DATE	JUNE 1985



FRONT ELEVATION

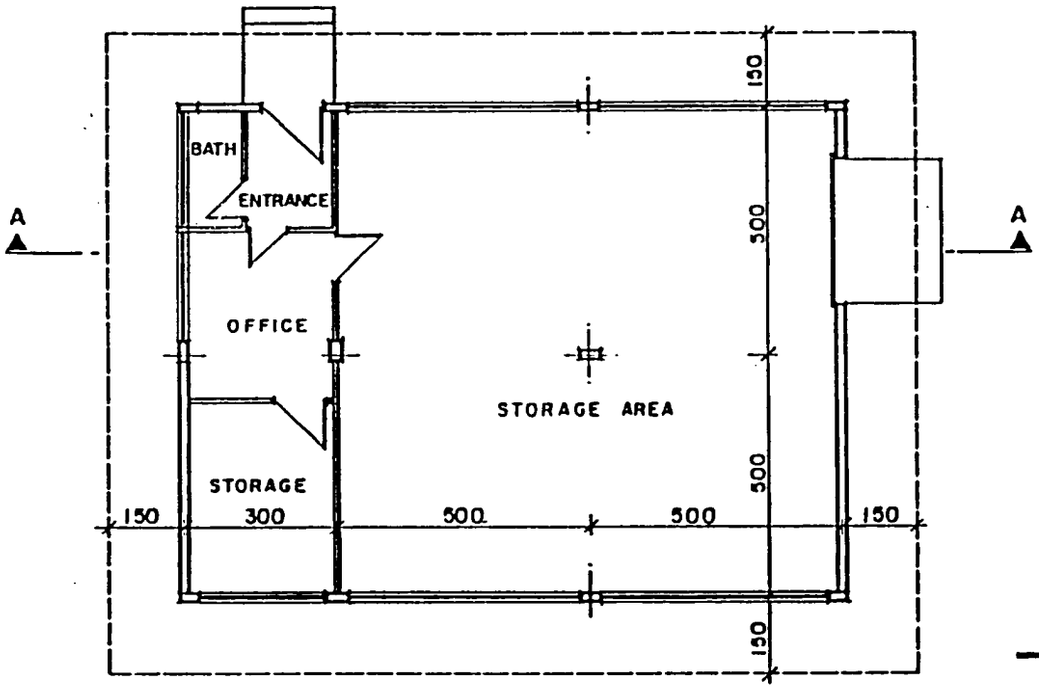
SCALE: 1/100



SECTION A-A

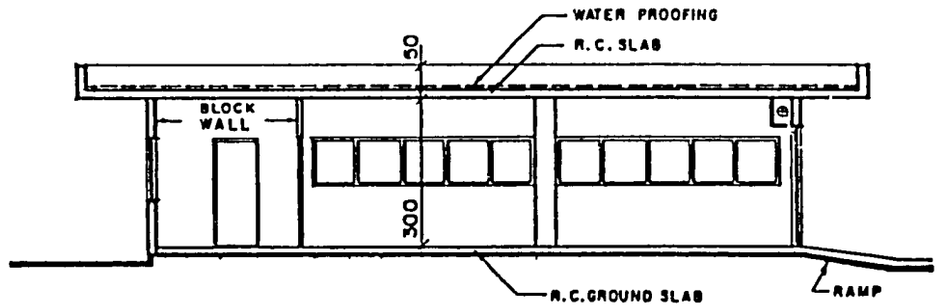
SCALE: 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)		
SHOP & UTILITY STORAGE AREA		
JOUZY & PARTNERS	SKETCH	SU/12
CONSULTING ENGINEERING BUREAU	DATE	JUNE 1985



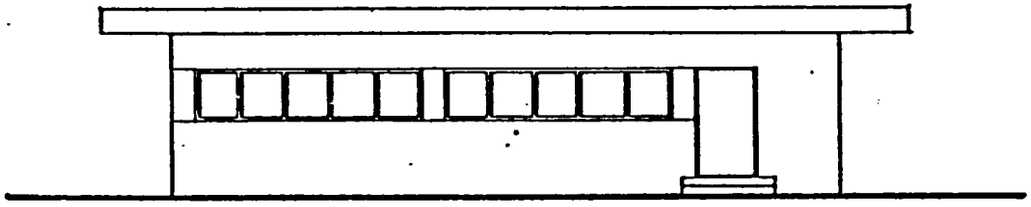
PLAN

SCALE : 1/100



SECTION A-A

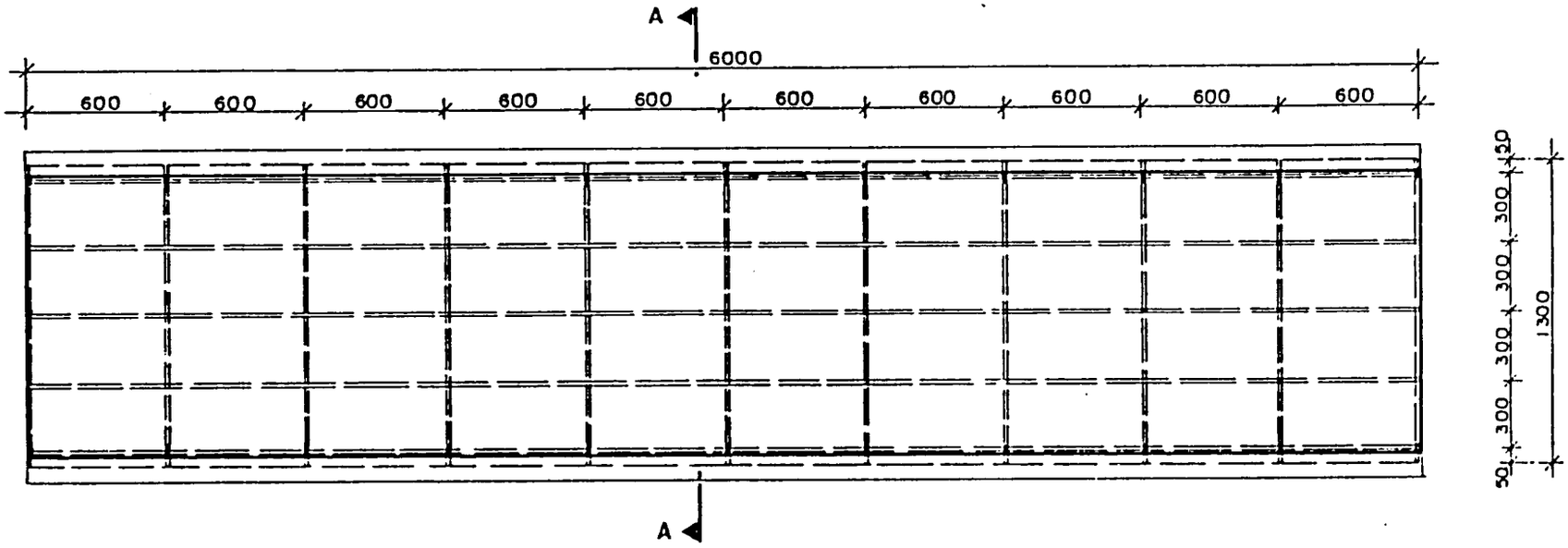
SCALE : 1/100



FRONT ELEVATION

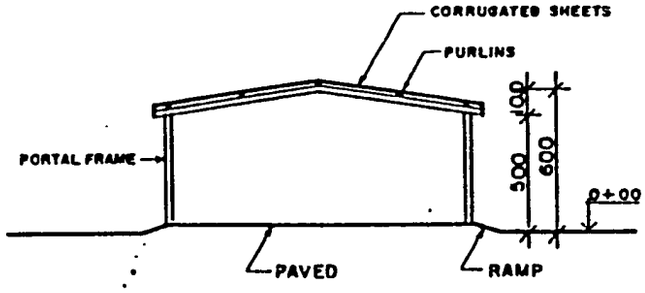
SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) STORE		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	S/13
	DATE	JUNE 1985



PLAN

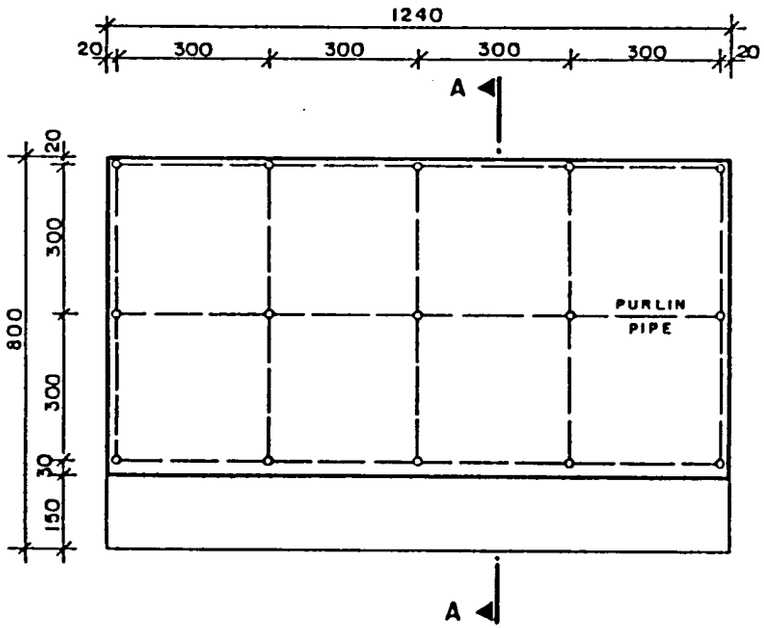
SCALE : 1/200



SECTION A - A

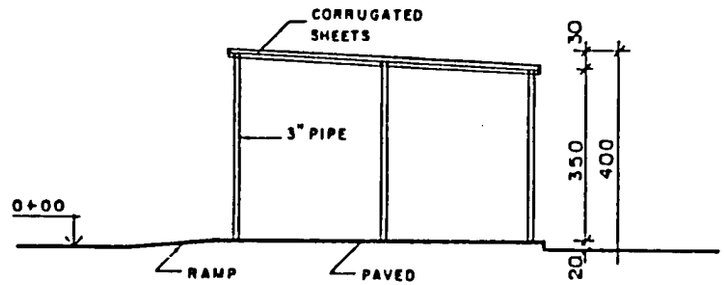
SCALE : 1/200

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) FARM EQUIPMENT COVER		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	E / 14
	DATE	JUNE 1985



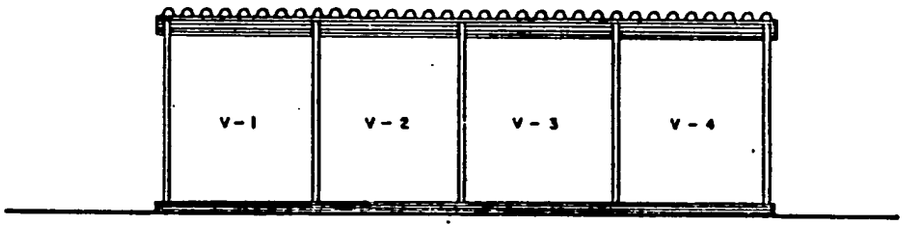
PLAN

SCALE : 1/100



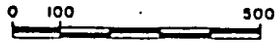
SECTION A - A

SCALE : 1 / 100



FRONT ELEVATION

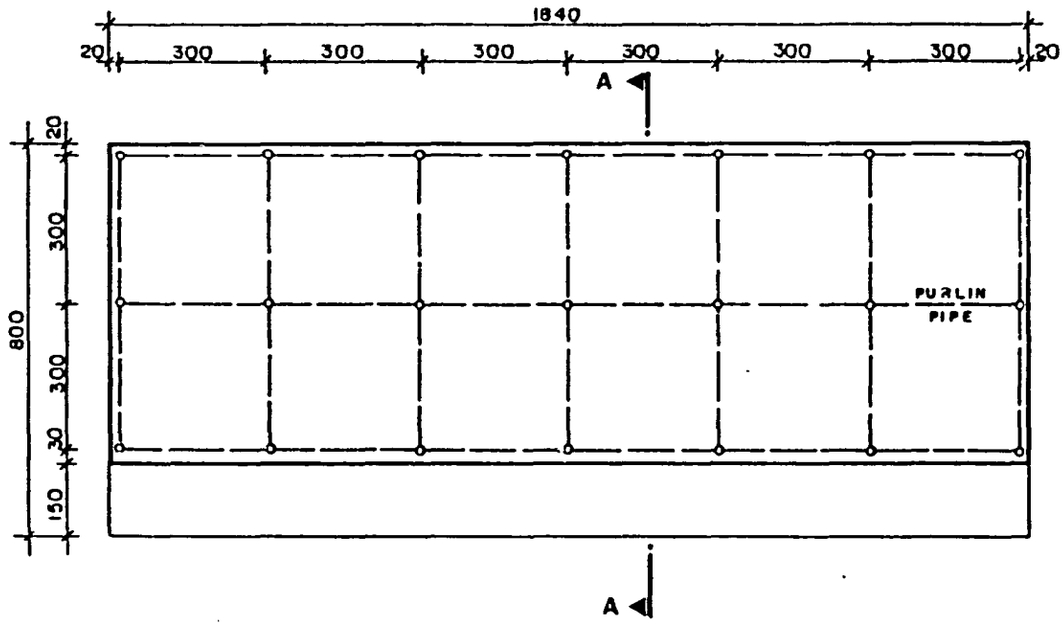
SCALE : 1/100



HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)

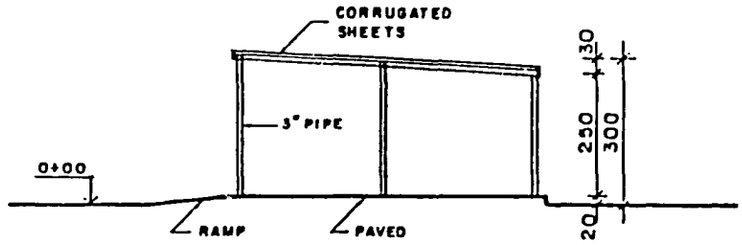
SERVICE VEHICLE COVER - PICKUPS

JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SP / 15
	DATE	JUNE 1985



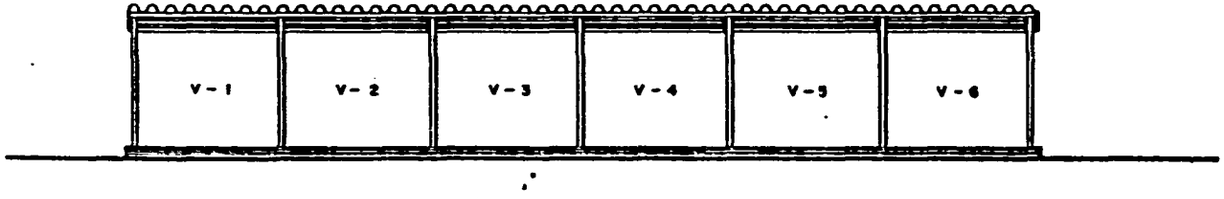
PLAN

SCALE : 1/100



SECTION A - A

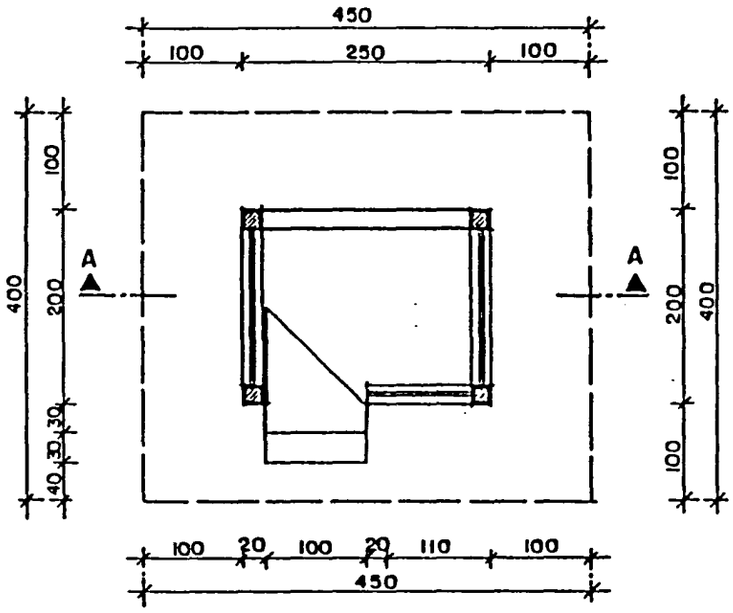
SCALE : 1/100



FRONT ELEVATION

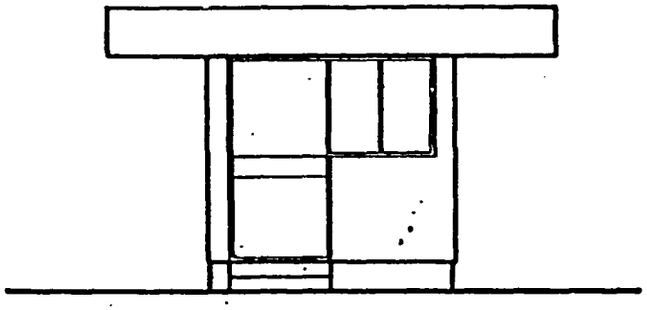
SCALE : 1/100

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC)		
SERVICE VEHICLE COVER - 4 W. D.		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	SWD / 16
	DATE	JUNE 1985



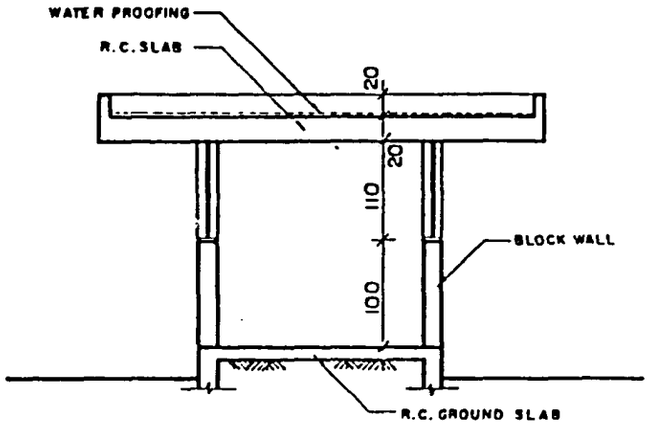
PLAN

SCALE : 1/50



FRONT ELEVATION

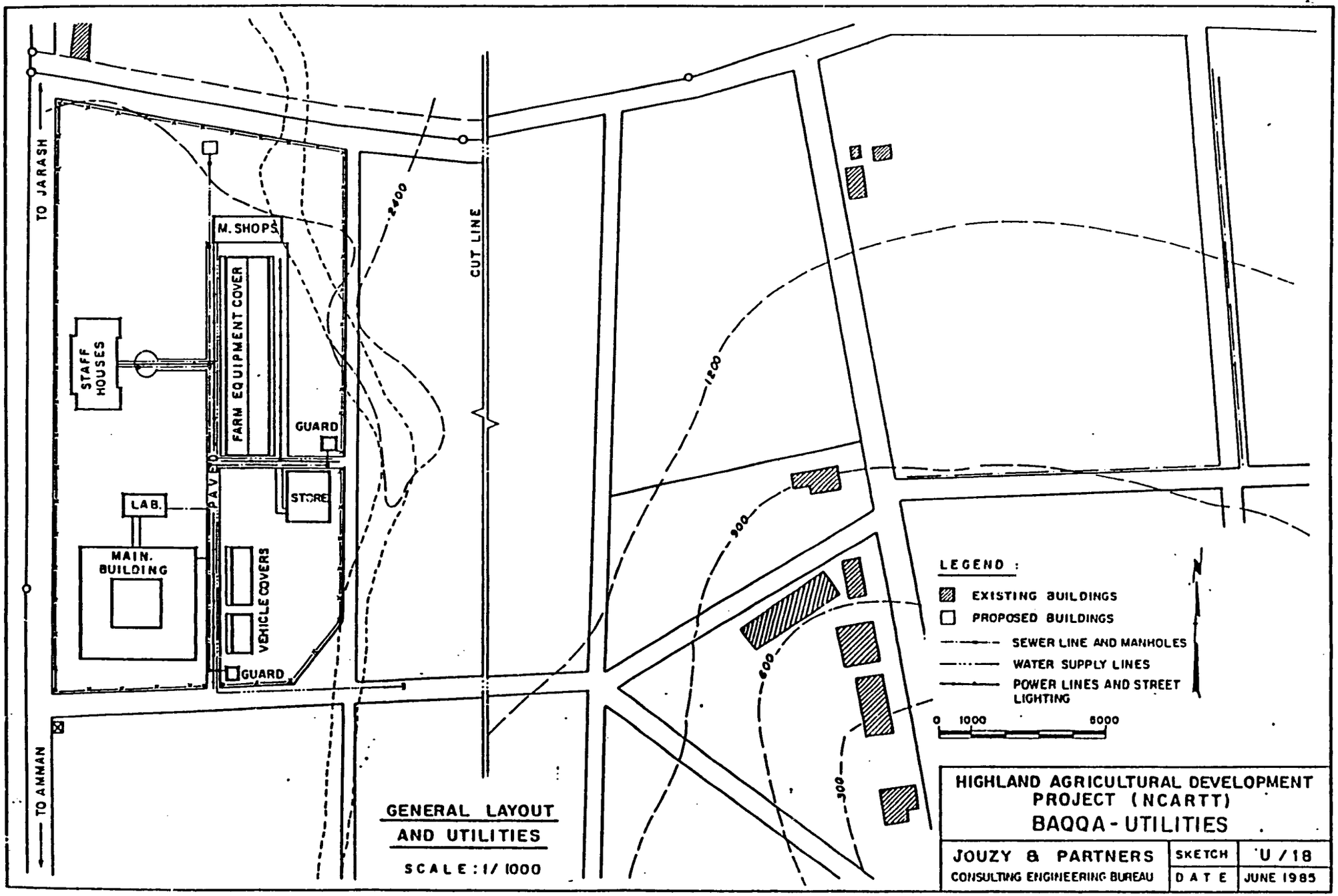
SCALE : 1/50

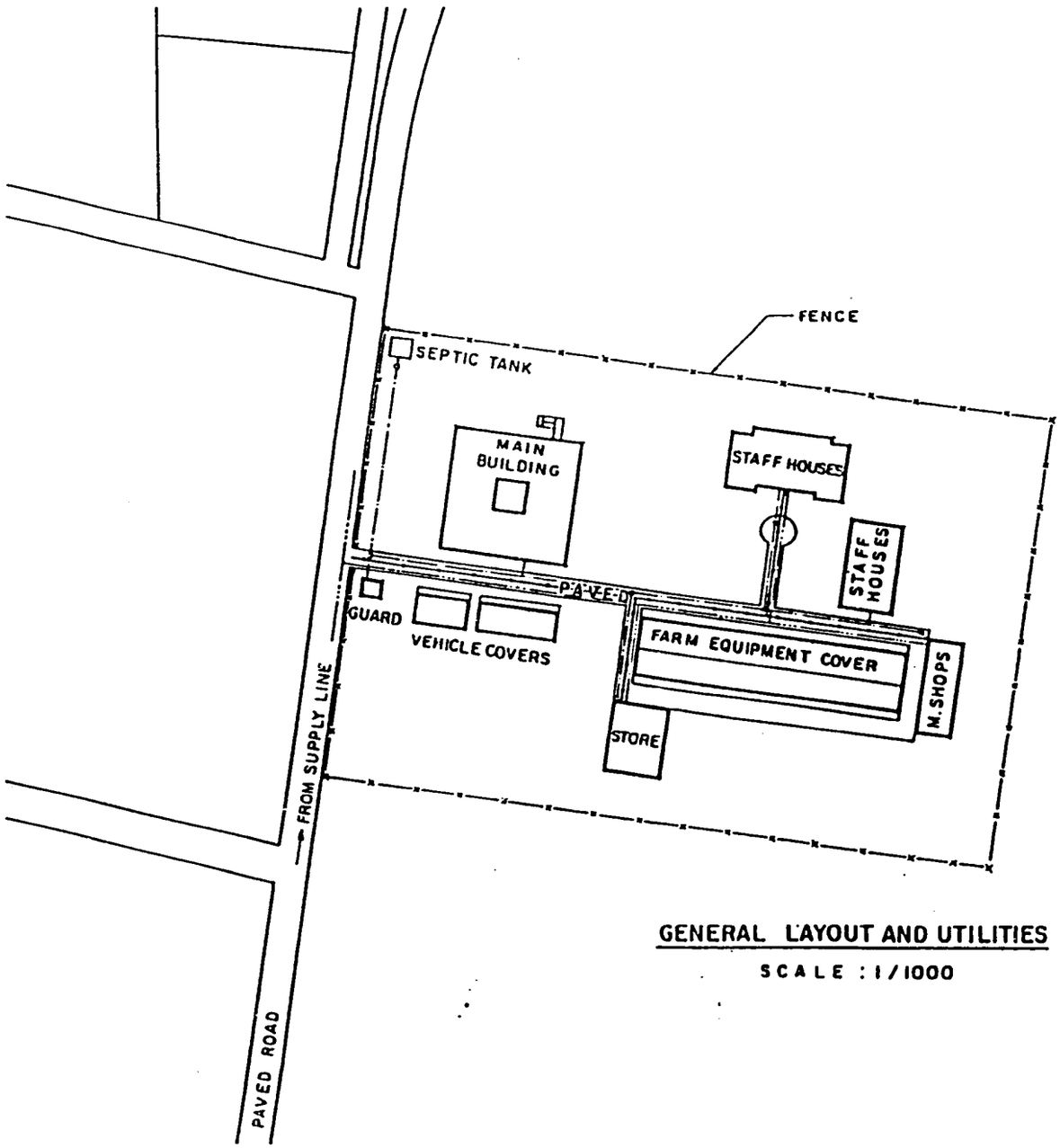


SECTION A - A

SCALE : 1/50

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC). SECURITY GUARD QUARTERS		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	G/17
	DATE	JUNE 1985


TO JARASH
TO AMMAN
M. SHOPS
FARM EQUIPMENT COVER
STAFF HOUSES
GUARD
STORE
LAB.
MAIN. BUILDING
VEHICLE COVERS
GUARD
PAVED
CUT LINE
2400
1800
900
600
300
LEGEND :
EXISTING BUILDINGS
PROPOSED BUILDINGS
SEWER LINE AND MANHOLES
WATER SUPPLY LINES
POWER LINES AND STREET LIGHTING
0 1000 6000
N
GENERAL LAYOUT AND UTILITIES
SCALE : 1/ 1000
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (NCARTT)
BAQQA - UTILITIES
JOUZY & PARTNERS
CONSULTING ENGINEERING BUREAU
SKETCH
U / 18
DATE
JUNE 1985



NOTE :

1. AL-SHUBAK UTILITIES LAYOUT SHOWN ON THIS DRAWING APPLIES TO ALL AL-RAMTHA, AL-MUSHAGAR AND AL-RABBA SITES.

LEGEND :

- SEWER LINE AND MANHOLES
- WATER SUPPLY LINES
- POWER LINES AND STREET LIGHTING

N

0 1000 5000

GENERAL LAYOUT AND UTILITIES

SCALE : 1/1000

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT (RASC) AL-SHUBAK - UTILITIES		
JOUZY & PARTNERS CONSULTING ENGINEERING BUREAU	SKETCH	U/19
	DATE	JUNE 1985

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JORDAN:

HIGHLAND AGRICULTURAL DEVELOPMENT

JORDAN 278-0264

PROJECT PAPER VOLUME II

ATTACHMENTS

13

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

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TABLE OF CONTENTS

		Page
VI	SUMMARY OF ANALYSIS	
	A. Technical	1
	B. Cost Estimate and Financial Analysis	52
	C. Social	77
	D. Environmental	127
	E. Commodity and Facilities	130
	F. Training	139

A. Technical Analysis

As the project is fully implemented priorities for technical activities, assignment of responsibility for needed actions and monitoring will be based on a system approach know as the SCRAD process.

1. The Systematic Commodity and Resource Analysis and Development (SCRAD) Process

The SCRAD process is based on a systems analysis process originally developed in Hawaii that has increasingly become the basis of planning and resource allocation systems for agricultural development. The system is very flexible and can be easily adapted to localized needs. It is a process that systematically examines with initial input from a small task force of experts, the macro and micro constraints on a particular segment of the agricultural sector i.e. a commodity or a resource such as water. For example, in the case of a commodity, there will be an initial assessment to determine whether or not there appear to be any constraints on developing the full potential of the commodity. This potential is related to the amount of product the market could absorb without putting serious downward pressure on prices. These constraints usually fall within the categories of land, water, capital, labor, breeding and genetics, reproduction, insect control, disease control, weed control, culture and management, mechanization, structures and facilities, post harvest handling, processing, waste management, transportation and storage, marketing, cost of production, and public policies including those related to import/export. This analysis is based on a work sheet that has a check list under each category. When this work sheet is completed it is provided as a progress report to all interested parties i.e. Government agency personnel, private sector interests and representatives of commodity producers.

Where constraints at the macro level of any of these categories are identified, those most familiar with the particular constraints give a micro level analysis of each particular constraint and try to identify the actions that are necessary to relieve the constraint, who is in the best position to take the actions necessary, how long it will probably take, what it will cost and the probability of success. The cost of not taking the actions identified through foregone production are also calculated. Each of these analyses result in an action plan on how to overcome the particular constraint involved. When this is completed, the action plans are provided to the same people that received the original work plan. They are asked to participate in an open meeting which brings together those best able to represent the farm family/producers, the private sector interests that deal with the producer and with the commodity after it leaves the farm and the public sector agencies involved with the commodity. In this meeting, the accuracy of the constraint analysis at the macro level is first examined to be sure there is general agreement. The next step is to agree on the micro analysis of the individual constraints and modify them as necessary. Once general agreement is reached on these aspects, then priorities are set on the action plans components and recommendations made on assigning responsibility for needed actions and for allocation of the funds required. Where new funds or reallocation of current funds and staff involve the public sector, then in the case of this project, these recommendations would go to the Agricultural Development Council for approval. Very often these result in a package in which the

165

private sector agrees to take certain actions if the public sector takes the necessary supporting actions. These may deal with such things as research, extension campaigns, policy changes, water allocation, investment in infrastructures, etc.

The SCRAD process requires a small central staff to coordinate the process. The support staff will come from an allocation of staff time as needed for specific tasks i.e. examining a particular constraint and developing action plans. In general, the Subject Mater Specialists are usually the best resource to coordinate the examination of specific constraints, but in some cases, due to the nature of the constraint, this leadership might come from the private sector, an outside consultant or another part of government. For the process to function most effectively, the Agricultural Development Council needs to have a special fund it can use to provide supplemental funding where required to overcome the constraints. In most cases, the existing staff and budget can be directed to carry out the action plans, but often special equipment or other requirements such as additional temporary staff need supplemental funding. In cases where research may be needed, funds can be allocated to the University, or an international agency to conduct the needed research. Under this project, the funds for the HADC are through the Highland Agricultural Development Fund detailed in the budget section and project description.

This process can be carried out at the national level, regional level or at the local level as the need dictates. Once the analysis is completed, it is updated as needed and this process can be used as a monitoring devise by focussing periodic attention on the constraint being addressed by a particular action plan with specific assignment of responsibility.

2. Implementation with Emphasis on Multidisciplinary Efforts

Improved agricultural technology will be passed on to the farmers and private sector by several means. Demonstrations will be held at field stations and on cooperating farms. Radio, television, publications, and other effective methods of delivery will be used as appropriate.

The Subject Matter Specialists will have a very important role in serving as the points of contact between the private sector, research and extension. Through their contacts with all segments dealing with a resource or commodity they will function as primary information channels. Therefore the selection and training of these specialists is of critical importance. They should be regularly evaluated to prevent performance deficiencies.

The Subject Matter Specialists most familiar with a commodity will usually serve as a Multidisciplinary Team Leader (MTL). The team will be comprised of other Subject Matter Specialists, Agricultural Service Officers, researchers and private sector specialists as most appropriate. Aggregations of related Multidisciplinary Teams will be designated programs with one of the MTLs serving as Chairman for purposes of coordination. Programs, in turn, will be further aggregated into Integrated Programs. Integrated Programs will have a designated overall coordinator chosen from among the Program Chairmen. The sketch that follows illustrates the relationship in such an aggregation for Integrated Program One (IP1).

MT (1) (MTL)	Cereals		
MT (2) (MTL)	Pulses	PROGRAM (CHAIRMAN)	
MT (3) (MTL)	Forages		
MT (4) (MTL)	Range		
		PROGRAM (CHAIRMAN)	INTEGRATED PROGRAM (COORDINATOR SELECTED FROM AMONG PROGRAM CHAIRMEN)
MT (5) (MTL)	Livestock		
MT (6) (MTL)	Watershed	PROGRAM (CHAIRMAN)	
MT (7) (MTL)	Forestry		

Integrated Program One (IP1) will consist of the three Programs (Cereals/Pulses/Forages, Livestock and Range, and Watershed/Forestry). It is proposed as the initial thrust of the HADP. When IP1 is established, IP2 will be started which will center on horticulture, both tree crops and vegetables. The livestock/range program will include a UNEP cofinanced range revegetation pilot demonstration.

Particular attention will be focused on small farm workers and effects on rural women. The intent is to try to improve the quality of life for everyone, and not cause any segment of the population to suffer unnecessary problems. Overcoming land utilization problems caused by land ownership fragmentation will be given special study and emphasis through pilot programs and any other means identified during implementation.

There is a very significant amount of improved agricultural technology available and deliverable to the Highlands. This is particularly true in cereal grain production. It is roughly estimated that only 20 percent of previous research results on wheat production in Jordan have thus far been adopted. There is general agreement from local tests and ICARDA results in the region that the technology is available to increase wheat and barley production by 200-300 percent. Livestock production could be substantially increased by improving the nutritional regimes and management of the animals. Range improvements could significantly increase grazing capacities. Forest watershed technology could result in fewer fires, reduced erosion, more grazing area, and forest products from existing and reforested areas. There is also extensive research in similar areas for fruit, particularly olives and grapes, dryland vegetables and forestry that

should be introduced and could greatly expand production and efficiency. Therefore, the project will be able to focus initial production activities from the start on those farm ready technologies available. Initial effort will be to prioritize the specific practices for concentrated production campaigns, determine the primary methods to be used in these campaigns and assign responsibilities for the specific actions needed. Concurrently priorities will be established for applied research and testing for those technologies with high potential for future production campaigns that are not yet farmer ready. The various sub sectors to be addressed by the project are discussed in more detail in the following sections.

3. Cereals and Pulse Crops

Various donor sponsored GOJ research projects have identified the desirable combinations of tillage practices, rotations, fallow, varieties, planting techniques, and plant protection practices in each of the major wheat and barley growing regions. The adoption rates for these individual practices have varied from 1 or 2 percent for planting with the grain drill to 20 to 30 percent for chemical weed control and fertilizer. The major constraints to higher adoption rates include lack of knowledge about benefit of the technology by farmers and those who should be transferring it, lack of availability of commercial farming services at the time of need, reluctance of some suppliers to provide relatively low cost inputs, and erratic rainfall. The variable rainfall patterns increase the investment risk and a more long term outlook must be taken to justify expected returns. Except for the seed stations and farmers in the Rabba area, little adoption of the clean fallow concept has occurred. During this last dry season, where clean follow was utilized, yields of wheat and barley in excess of 1.5 tons per hectare were obtained with rainfall levels below 200 mm. This technology in combination with proper placement of seed and fertilizer first demonstrated by the AID/Oregon State University contract has been ignored by subsequent projects. Its success, especially in dry years, needs to be reinvestigated. Updated results are needed to shed light on the question of lower rainfall limits for commercial barley and wheat production. The results of improved technology trials in Jordan closely parallel those summarized in a regional survey by ICARDA. The most important imporved technologies are banding phosphorous fertilizer with seed or beside it using a drill, early seeding, chisel plowing, chemical weed control, treated seed of improved varieties and proper use of nitrogen fertilizer.

Most of these technologies can be transferred without additional research. However, the adoption rates will be limited by the rate at which the technology can be disseminated and the rate at which the inputs can be made available. Additional adaptive research is needed in crops other than wheat. These are: rotations of cereals with pulses and forage legumes, improved varieties' responses to best cultural practices, and control of weedy grasses in both cereals and pulses. This research should be done on a continuing basis and the results incorporated into the extension program as they are verified in demonstration sites.

4. Availability of Improved Seed

An adequate supply of seed for improved varieties with sufficient purity and quality is an important element in input availability. Improved seeds of barley and wheat are produced by the Ministry of Agriculture. They are processed by the Ministry of Agriculture or the Jordanian Cooperative Organization and are distributed primarily by the Jordanian Cooperative Organization. Some contract farmer production also occurs. A formal seed certification system does not exist although variety verification is implied. Major emphasis is given to purity and seed size. Some checking of germination is done at a Ministry of Agriculture laboratory at Jubihea, but not all lots are labelled. Assuming that new varieties will be developed by international agencies or by Jordanian researchers, then stock seed needs to be produced in association with research agencies. A more clearly defined system to scale up production of successive generations is needed to insure proper availability of new varieties to farmers. Public agencies cannot be expected to continue to own land solely for seed production. JCO can probably contract for the seed production by reliable commercial producers. This would benefit the growers by providing another cropping alternative and benefit the public sector by freeing up some land for research and demonstrations purposes. The entire procedure needs considerable improvement. The JCO and/or private firms could have responsibility for seed production contracting, processing, and distribution. The MOA should have sole responsibility for stock seed production, development, and maintenance of a certification system, and operation of an improved seed testing laboratory. This project could provide TDY technical assistance in cereal seed certification and in improving the seed testing laboratory facilities. TDY technical assistance and short term participant training probably would be required if these suggestions are part of the Action Plan produced by the Cereals/Pulses/Forages Commodity Multidisciplinary Team.

5. Vegetables

The vegetable industry of the highlands is very well developed. Historically the MOA has taken a very active role in research and extension activities to service the industry. Cultural practices, plant protection programs, and variety testing activities have created a well developed industry by Jordanian standards. Domestic and potential foreign market development activities, however, are in need of improvement. Grades and standards are either non-existent or are poorly applied in the market place. The idea of forward contracting for a specific quality and price applied to a quantity of product delivered at a specific time is used only in the tobacco industry. Jordan's unique climatic zones could contribute to orderly marketing of products competitively against other regions. Likewise, greater attention given to market quality and periodicity of delivery potential could minimize the wide price fluctuations and provide a consistent return to farmers and a more reliable supply of high quality produce to the consumers. An early research program followed by market development activities should be the major thrust of the project for the vegetable industry. Involvement of the private sector marketing organizations as advisory bodies and as partners in the planning of these activities will be necessary for success. Therefore, when a vegetable Commodity Multidisciplinary Team is organized it is important that these parts of the vegetable industry participate fully.

Three thousand tons of potatoes are imported annually from Europe. A good tuber disease and virus testing program has been initiated. Capabilities of commercial seed potato production as a summer crop in higher elevations and a winter crop in the Jordan Valley have been amply demonstrated. As potatoes become more important in Jordan's vegetable industry, local sources of disease and virus free tubers would have a competitive advantage over increased import tonnages. As in the case of vegetable seeds, the wisdom of creating a public monopoly of potato seed production is questioned. A more proper role of the MOA would be to encourage both vegetable and potato seed production by the private sector. The MOA's major contribution should be in research and extension to help seed growers adopt seed growing technologies and in improving the testing services to monitor quality of the seed stocks. Assistance in developing this function should be considered for the project through an appropriate Commodity Multidisciplinary Team. The current vegetable industry is based largely on a limited number of crops. There is opportunity of expanding the diversity of vegetables available. Because of the rapid changes in varieties available, a continuing testing system for new varieties of the current crops grown is important.

6. Vegetable Seeds

The MOA currently has the authority to license which varieties of vegetable seeds are imported. It tests samples of lots for purity and germination, phytosanitary contamination, and trueness to type by growout tests. The magnitude of these testing programs is questioned since the laboratory facilities are crude at best. Currently 397 tons of vegetable seeds are imported annually, having a retail sales value of 2,647,250 JD. Assuming a 300 percent markup for processing, packaging, and retailing, the gross value to the farmer for this level of proposed domestic production would be only 882,417 JD. The imports originate primarily from California, United Kingdom, Holland, France, and Cyprus.

Some onion seed has been produced by MOA at the Deir Alla station. It will produce all onion seed in the future and will issue no licenses for future onion seed imports. Similar plans are being contemplated for cauliflower, cabbage and lettuce seed production at Shouback and Wadi Dhleil. Several years will be required for this to materialize.

The MOA desires to eventually produce all vegetable seeds and to cease licensing imports of foreign produced seeds. The wisdom of this objective has some serious constraints. First, is the creation of a public monopoly and not allowing the private sector to enter the business whereas current sources are produced by the private sector. Second, the agency does not possess the necessary skills. Third, the consistent high quality and competitively low prices of foreign seeds are a strong factor against which the local unskilled seed producers would probably not be able to compete. Therefore, it is suggested that only the improvement of the laboratory and seed testing programs be included in the HADP.

7. Fruit and Forest Seedings

A major thrust of the MOA in the agricultural improvement of the highlands has been to produce fruit tree seedlings and distribute them at little or no cost to farmers. This has been a successful method of encouraging planting of fruit trees. In response to a strong demand for planting stock a vigorous private sector industry has begun to appear. Now the public sector nursery program needs to be examined in depth vis a vis this recent development. The efficiency of production in MOA nurseries and the quality of the nursery stock they produce needs to be compared with the efficiency and planting stock available from the private sector. Agricultural and conservation improvement through planting of fruit and nut trees in the highlands will continue to be dependent upon a continuing supply of high quality planting stock. Improvements in the industry supplying these inputs will have a direct bearing on the total project. Private sector experience and industry capabilities need to be thoroughly investigated with the prospect of it becoming the major source of materials. Advantages of such a conversion would be the strenghening of a relatively new industry, probably greater efficiencies of production, and the freeing of MOA budgets for more important research and development functions.

The expansion of the olive and grape production in the highlands has been truly phenomenal. This expansion needs to serve as an indicator of what else can be done in the future. Certainly the role of trees and vines on terraces on the slopes of the Highlands is a vital part of watershed protection, and soil and water conservation. In most cases it is probably the highest use of the land resource from an economic viewpoint. With the exception of olives the total expansion of a variety of fruit and nut species in the highlands can serve the local market by reducing imports and by providing a greater return to Highland farmers. Again, the variability of climatic zones within the highland area allows the complete spectrum of crops ranging from citrus in the Jerash area to apples and stone fruits in the Shouback and Ajloun areas. The Jordanian appetite accepts almost any types of fruit or nut. It is only the imagination and developmental activities of this project which will limit what crops can be tested for use in the highlands. With thorough analysis and a thoughtful Action Plan created by the Fruit and Nut CMT, rapid development of this industry toward achieving it's potential should be possible.

8. Forests

Forests in Jordan are quite limited at present. However, this was not always the case. During the last ice age glaciers extended fairly far down the globe, perhaps as far south as present-day Turkey or Syria. During that period the climate in what is now Jordan was much colder and wetter. These conditions were favorable to trees, vegetations, and wildlife adapted to such an environment. As the world's climate warmed the ice receded and the life forms changed.

The small remnants of pine and oak forests are being used to meet the needs of Jordanians today. Dibbin National Forest and Zai National Forest are under control of the Ministry of Tourism and are heavily used for family picnics. City dwellers delight in going to a pine stand to spend the day picnicking. In fact, many of the pine stands appear to be in danger from the physical impact of cars driving over the root systems and from people tramping through the area compacting the soil. There is probably a significant need for additional recreational areas near the cities, particularly near Amman. There also is a need for more park areas within the city, as well as in the countryside.

In the effort to reduce sedimentation in the King Talal Dam the only goal considered important was getting trees planted as soon as possible on the lands the GOJ owned. Private landowners could also have trees planted on their lands by the GOJ at no cost, but the agreement they would be required to enter into with the GOJ was apparently too restrictive to get many cooperators. As a result there are reforested areas interspersed with bare private land.

Management plans have not yet been prepared for these reforested areas. At this time grazing is not allowed and the law also prohibits any timber harvesting. Very soon some planned management of these new stands must begin because many stands appear to be overstocked and because of the high fire danger. There already have been a number of fires which have destroyed pine stands.

b. Deliverable Forestry Technology

(1) Reduction of fire incidence and lowering the hazard potential is seen as the most pressing forestry issue. At present forest fire control is the responsibility of the Department of Forests & Ranges. There is now a radio communication network among forestry offices so that prompt action can be directed to existing forest fires. It would be desirable to better equip the forest fire brigades with tanker trucks. These could be located in high danger areas.

It would be very desirable to consider the possibility of prescribed burning to reduce the fire fuel levels in reforested areas and keep them low by applying a properly scheduled series of prescribed burns. Once the trees have reached sufficient height to be beyond damage by goats a program of controlled grazing may be useful to keep herbaceous vegetation browsed down to the point that it is not as dangerous a fire fuel as it might be if left ungrazed. However, since the primary purpose of the plantations is to protect the watersheds and reduce soil erosion some adaptive research will be required. Recommendations from the Zarqa Project (1) that reforestation plantings include adapted forage trees, especially Acacia cyanophylla and that reforested areas be used as "drought forage reserves" appear to have considerable merit.

172

(2) Species trials for future reforestation could add new aspects to the reforestation program which have not as yet been addressed. There are several tree species in the world which may be adapted to the climate and soils of the Highlands that have not yet been tried. One forage tree family which is adapted to drought conditions and fixes nitrogen in the soil are the leucaena. A very active program of collecting varieties and breeding these highly useful trees at the University of Hawaii has resulted in rapid growing trees of considerable size for use in fuel wood production.

(3) Products from the forest are apparently not a concern at this time. However, it is suggested that there is much to recommend planning to obtain products from the forests at some time in the future. Potential forest products include lumber, fuelwood, charcoal, naval stores (resin, terpentine), poles and numerous other economically valuable materials. However, careful planning is essential to obtain the desired results. Special consultants will probably be required to coordinate the products - species relationships.

The species being planted now have only limited potential for products, except for the stone pine which will produce very valuable nut crops. Aleppo pine can be used to produce naval stores, but it will take a large area and significant investments to get into these products.

(4) Genetic improvement of currently used species is possible. The science of forest genetics is well advanced and could be used with any desired species. Since this is a long-term, high cost area of research it is doubtful that it would be applicable to the HADP. Rather emphasis should be placed on bringing in already improved lines of species which have potential for the future forests of Jordan. It may even be that genetic improvement of Aleppo pine is being done somewhere in the world and that Jordan could obtain the improved varieties without going through the whole process.

(5) Forestry in the HADP will be integrated closely with the grazing and livestock programs. Forest-grazing technology is well advanced in the United States and its application to Jordanian conditions should be straight-forward.

9. Range and Livestock

Livestock account for approximately 30 percent of Jordan's agricultural production. The keeping of sheep and goats is widespread and appears to be a fundamental activity in the agricultural production systems of both landholders and landless farmers/herders. Livestock numbers appear to have remained relatively stable since 1972. Care should be exercised in interpreting livestock census data as their accuracy is unknown. Census problems can be inferred from the observation that the official census issued by the Department of Statistics in 1983 lists total sheep and goat numbers in Jordan at approximately 1.3 million head, while sources in the Ministry of Agriculture place the population at somewhere between 2 and 2.5 million head. Nevertheless, the data are adequate to demonstrate that sheep and goats are by far the most common ruminant animals kept in Jordan. Cattle and camels are a relatively small component of total livestock production.

173

Small ruminants are an important economic activity for farmers, contributing both through cash sales of livestock products and through provision of meat, milk, and, to a lesser extent, hair/wool for direct household consumption. Cash income from sheep is approximately distributed as follows: wool 3-4 percent, manure 1-2 percent, meat 50 percent, and milk 45 percent of total sales income. It seems reasonable to assume that income from goats is similarly distributed. Livestock management patterns are both varied and complex, ranging from nomadic herds, which move seasonally, to village farm flocks and yard animals which are retained near the owner's residence year-round. Livestock production is heavily forage-based. A commonly employed management system is to graze desert steppe rangelands during the winter-spring, then return to the highlands for grazing of highland ranges and croplands during the summer-fall period. Standing forage present on rangelands and cropland weeds are, presumably, higher quality and/or less expensive than baled hay, grain straw, or concentrates. Management emphasizes the maximum exploitation of standing forage resources. A 1972 estimate of livestock feed resources in Jordan placed 23 percent, 31 percent, and 46 percent of the total livestock feed units coming from desert rangelands, crop stubble and fallow lands, and harvested fodders (straw, barley, vetch) respectively. In addition to rangeland vegetation and cropland weeds, a large proportion of the barley grain, and virtually all of the wheat and barley straw, is marketed through livestock. Barley grain, wheat bran, and straw are commonly provided to sheep and goats during the summer when other feed is scarce. Straw prices vary with the availability of other livestock forage and may be quite high (60 JD/ton) during drought years. Sales of straw contribute substantially to total farm income and may exceed the value of grain harvested in some years.

Jordanian farmers have frequently been described as "risk avoiders". The value of the livestock-cropland connection in reducing the economic risks inherent in grain production under conditions of erratic rainfall must not be undervalued. During years of average or above average rainfall, grain farmers have good yields of both grain and straw. Straw prices are typically low (say JD 30) in such years but this is to some extent compensated for by the high volume of straw produced. Grain and straw yields are low in drought years. However, the value of straw for livestock feed is very high in such years. Furthermore, if the drought is so severe that harvesting of the crop for grain is not economically feasible some income may be produced by selling the crop for grazing by livestock.

The interdependence of cropland and livestock enterprises in Jordan is obvious from the previous discussion. Moreover, livestock management systems commonly utilize all land types (desert, cropland, etc) in an integrated fashion which links up seasonally-available forage sources to provide a year-round forage base for livestock production. In addition to the cropland forage source, there are approximately 25,000 hectares of rangeland in the highlands. Agricultural development efforts in the highlands should recognize the interdependence of crop and livestock production and the seasonal contribution of different land types to animal production. Failure to recognize these relationships may lead to either non-acceptance of technology by farmers or to the enhancement of some peoples' income at the expense of others.

a. Present Situation

(1) Grazing Land

The sudden increase of population in 1948 and 1967 together with a high rate of natural population increase (3.1 percent) has dramatically increased the demand for agricultural products in Jordan over the last three decades. Increased demand is particularly apparent for wheat and animal products, which are staples in the Jordanian diet. High demand for cereal crops has encouraged the plowing of much semi-arid rangeland for grain production. At the same time, the expansion of cities to accomodate an enlarging urban population removed considerable amounts of land from the agricultural base. An aggressive afforestation effort has converted approximately 27,000 hectares of former grazing land in the highlands to forest preserves. Forty five thousand hectares of land has been planted to fruit trees. The net effect of all these events has been increased demand for animal products which must be produced from a declining amount of grazing land. Impacts on grazing lands of high levels of grazing use over many years are easily seen. Highland and desert lands which once supported perennial grasses and palatable shrubs now support predominately annual plants and unpalatable shrubs. In many areas, raindrop inpact on unprotected soil has produced a "cap" which effectively seals the soil surface, thus reducing the effectiveness of what rainfall is received.

Comparison of exclosed areas which have not been grazed for several years to nearby grazed areas suggest that overuse of the present vegetation has reduced its annual forage production by over 50 percent. The relationship of current forage production on a site to its biological potential (reflecting primarily climatic, edaphic, and topographic constraints) is unknown.

It is reasonable to assume, however, that the livestock carrying capacity could be increased several-fold by reestablishment of perennial forage plants and improved grazing management practices. Other benefits from establishment of perennial forage plants would be a reduction of variability in forage production from year to year, and increased protection of the soil surface from wind and water erosion.

It is important to recognize in considering a highlands project that many livestock move seasonally from grazing areas in the desert to the highlands. Livestock movement to the highlands tends to occur when the desert forage supply is exhausted. For example, arrival of livestock herds in the highlands occurs earlier in the summer, and greater numbers of animals arrive during drought years than during years of above average precipitation. Both degree and timing of demand for grazing in the highlands is, therefore, closely related to forage production in the desert.

The current state of technology is adequate to support introduction of improved forage species and better grazing management techniques in the highlands. Knowledge of grazing management applicable to local conditions exists for immediate extension to farmers. Many potentially valuable forage plants are available for introduction into highland grazing areas. Several years are needed, however, to evaluate specific plants and to refine methods used to establish plants under highland conditions before an extendable technolcgy will be ready for farm use. A potential constraint to both research and extension efforts within Jordan is the lack of any appreciable number of Jordanians with range management training.

(b) Desert Rangeland

The desert rangelands (defined as non-irrigated lands receiving less than 200 mm of precipitation) are outside of the area proposed for inclusion in the Highlands Development Project. Nevertheless, several observations pertinent to Rangeland Development in Jordan are offered. Several projects carried out by the Ministry of Agriculture, JCO, and World Food Program have demonstrated that palatable shrubs (Atriplex) may be successfully established on semi-arid rangelands receiving 150-200 mm of annual precipitation. Livestock carrying capacity of these improved areas has been estimated to be ten times that of similar unimproved areas (10). Participants in these projects are to be congratulated for their initiative and technical expertise in providing examples of what is biologically attainable from desert rangelands. Care needs to be exercised, however, in using these projects as models for broad scale rangeland improvement in Jordan. The costly, labor-intensive techniques used are not likely to be those ultimately employed to rehabilitate large areas of rangeland. Quicker, more cost-effective techniques (example, rangeland drill, range imprinter) are available for testing and adaptation to Jordanian conditions. Site-specific recommendations of shrubs, perennial grasses, and annual plants for establishment will ultimately need to be prepared. It is likely that current economic analysis of range improvement based upon the existing Atriplex establishment trials greatly overestimate the cost of improvement. Both the cost/benefit ratio and potential production achievable from rangeland improvement are more favorable than is generally recognized by planners within Jordan.Fencing costs have been included in some economic analysis of rangeland improvement

systems. Comments made in the Zarqa report that fencing is not necessary for large scale projects appears sound. Control of livestock by herders is very good. If herders respect project boundaries, there is no need for fences. If herders do not respect the boundaries, a fence is not likely to hold them out. It is too easy to cut or let down a fence. The key to animal control is agreement between herders and project personnel.

For a more detailed discussion of rangeland improvement in Jordan the reader is referred to Child et al's 1984 report "A National Rangeland and Rainfed Watershed Program".

Table 1

Rainfall Zones of Jordan
(From Regional Study on Rainfed Agriculture and Agro-Climatic Inventory of Eleven Countries in the Near East Region. FAO.1982)

Rainfall (mm)	Area (ha)	Percent of Total Area
50	5,932,700	64.1
50-100	1,385,100	15.0
100-200	1,139,500	12.4
200-300	394,800	4.3
300-400	178,800	1.9
400-500	125,300	1.3
500	98,900	1.0

Table 2

NUMBER OF LIVESTOCK (THOUSANDS) IN JORDAN

YEAR	SHEEP	GOATS	CATTLE	CAMELS
1972	854	527	50	13
1977	857	379	25	18
1978	857	382	40	10
1979	924	564	37	11
1980	937	450	37	12
1981	1073	515	37	13
1982				
1983	912	383	19	

c. Small Ruminants

Small ruminants in Jordan predominately serve as dual purpose animals for the production of meat and milk. The most common sheep breed is the Awassi (fat-tailed sheep). Most goats are black milk-type goats. The Awassi is a very hardy, heat tolerant animal but is often characterized by low productivity. A typical Awassi ewe produces only 40-50 kilograms of milk per lactation and weans only a 60 percent lamb crop (60 lambs weaned per 100 ewes). Lambs often weigh only 18 to 20 kilograms at weaning. The current level of production is well below the genetic potential of the Awassi breed. Awassi raised under good nutrition and health management practices may produce 90-100 kilograms of milk per lactation, wean over a 90 percent lamb crop, and produce over a 30 kilogram lamb at weaning. Since the current low level of productivity is likely the result of nutritional and management constraints rather than the genetic potential of the Awassi breed, little progress would be made by "improving" the breed under current management practices. A similar situation is believed to exist for goats. It is recommended, therefore, that relatively low research and extension priority be given to breeding work with sheep and goats and to the introduction of new breeds from outside of Jordan until management practices and feed resources have evolved sufficiently to meet the higher nutritional needs of high producing animals. Highest priority should be given to extension efforts which show producers how to successfully manage their current stock while research efforts should concentrate on strategies to provide high quality feed for small ruminants. The urgent need for extension help for small ruminant owners is evident in the fact that the production of red meat actually fell by 22 percent during 1976-1980 in spite of an increase in sheep and goat numbers during the same period. Evidently production per animal fell significantly during this period. The nutritional requirements of small ruminants are well known to animal and range scientists. Transfer of nutritional knowledge to Jordanian livestock producers could potentially double red meat production without increasing the size of the breeding herd. Relatively simple changes such as provision of a low cost nitrogen supplement (urea) to livestock being fed crop stubble or straw would greatly enhance animal nutrition and health. Control of time of breeding is another area where immediate extension contributions could occur. Little effort is now being made by livestock managers to schedule when lambs or kids are born. Control of time of breeding is a basic element in fitting seasonal feed demand to the seasonal patterns of forage supply. Changing management of breeding may be difficult, however, as it involves basic changes in flock management and the timing of milk production/marketing.

Health services for livestock are currently being delivered by the Veterinary Department within the Ministry of Agriculture. Provision of services to farmers is good, considering the budget and transportation constraints within the Ministry of Agriculture. Care should be taken to coordinate animal production research and extension efforts of the Highlands Agricultural Development Project with the Veterinary Department so that the programs may complement each other.

Considerable interest has been expressed in the last several years in promoting a concentrate (barley-wheat bran) - based lamb fattening industry in Jordan. The current low price of barley (55 JD/ton) and high price of domestic lamb (1 JD/kilogram of liveweight) makes fattening lambs a very economically attractive enterprise. Fattening of lambs to heavier market weights than are now prevalent would increase farmer income while reducing the amount of red meat which must be imported. Although a grain-based livestock production enterprise may be financially attractive for farmers, it may not be a good national policy for Jordan. Jordan is a grain deficient nation.

Domestic production of livestock feed has not kept pace with demand. Production of feed products increased from 86 to 229 thousand tons during 1975 to 1980. Feed imports increased from 128 to 168 thousand tons over the same period. Even allowing for dramatic increases in future barley production, there is little reason to believe that production will be adequate to supply the requirements of a large lamb fattening industry. It is more likely that development of grain-based lamb fattening enterprises would result in a proportionate increase in grain importation. Such a development would not represent a true move towards food independence. Emphasis on development of forage crops and their use in on-farm lamb fattening enterprises, together with enhancement of livestock production within the traditional livestock systems represents a more likely strategy to increase food independence than does the encouragement of grain-based livestock fattening in Jordan.

d. Yard and Draft Animals

In addition to the keeping of small flock of sheep and goats for milk and meat in the immediate vicinity of the home, often fed by weeds and crop residues hawled to them, pigeons, rabbits and small range poultry flocks are found on most farms. The MOA has a milk goat and a rabbit improvement program at Wadi Walla in support of improving these yard animals. Oregon State University has an International Center for Rabbit Improvement that has not been linked with the MOA program. Although large scale poultry production will not be part of the activities of the project, there may be future potential for incorporating successful AID project experiences from Egypt and elsewhere for small scale poultry improvement. The poultry kept in Jordan, beside chickens include turkeys, ducks, geese and guineas.

Although the use of animal traction is decreasing rapidly in Jordan, there is still significant use of donkeys, horses and camels for draft and transport purposes. There is significant expereince from AID and other organizations on the care and use of these animals for improved performance.

e. Crop-Livestock Interface

A large proportion of the feed consumed by livestock during each year comes from cropland. As described earlier, livestock traditionally spend the summer through fall period on or near cropland areas in the highlands where they eat weeds, graze what rangeland areas are still available, graze crop stubble, and are fed concentrates (grain and wheat bran). Crop straw (wheat straw, barley straw, pulse straw) is often a major component in livestock diets during the summer period.

Cereal grain and straw are especially important as summer feed, because they are one of the few feeds which are harvested and stored for later use by livestock. Straw is typically high in fiber, low in protein and minerals, and very low in digestibility. Its biological value as a feedstuff is relatively low. The market price of straw is suprisingly high considering its low nutritional value. Straw prices typically vary from 30 JD/ton in above average forage years to 60 JD/ton during droughts. This price compared to a highly nutritional feed such as barley, which sells for only 55 JD/ton is difficult to explain on an animal production basis. It is reasonable to assume that such price analysis reflects lack of nutritional knowledge by the purchasers. The provision of extension programs, including an aggressive effort to inform livestock producers about animal nutrition and the nutritive value of various feedstuffs, should be given high priority in the Highlands Project.

The net result of proposed research and extension programs under the Highlands Development Project should result in more straw on the market. Straw will have to compete with an increased quantity of higher quality forages such as vetch and medic hays and with increased availability of forage from grazing lands. Combined with purchaser knowledge about the nutritive value of various feed stuffs, increased feed availability may drive the price of straw down to its true biological value as a feed (say 20-30 JD/ton). Lower straw prices would significantly impact the economics of grain as a crop, but may have the desirable effect of reducing the economic incentive for converting marginal areas from rangeland to small grain production.

Some interesting work with forage crops has been conducted in Jordan under the Australian Dryland Production Project and in Syria by ICARDA. Yields of vetch and medics exceeding 2000 kg/ha have been obtained from areas with more than 250 mm of annual precipitation. Work with grazing lambs has demonstrated that good weight gains (over 200 g/hd/day) may be obtained from forage legume pastures. Economic analysis of forage crops as a farm enterprise looks promising, especially when a portion of the crop is used for on-farm fattening of lambs. The subject of forage crops should be given high priority within the Highlands Agricultural Development Project. The technology of growing, harvesting, and marketing forage crops under Jordanian conditions is not yet sufficiently developed to be deliverable to farmers. Research on forage crops has a high potential for producing a usable technology within 6 to 10 years. Development of such a technology would be highly desirable as it could increase farmer income, reduce imports of red meat and help to reduce soil erosion. Although this research effort should be coordinated with ICARDA, the Highlands Agricultural Development Project personnel should directly undertake forage crop research in Jordan. This is deemed desirable because the environmental conditions in ICARDA's research area differs from those of areas proposed for this project. Furthermore, keeping the total livestock-crop-pulse-forage research and extension efforts within HADP will aid in coordination of program efforts and will promote a holistic "systems approach" to problem solving.

B. Cost Estimate and Financial Analysis

1. Introduction:
The Highland Agriculture Development Project is directed towards the dual objectives of: (1) realizing significant economic and financial returns through the application of improved technology to farms in the highlands and; (2) developing an institutional structure/technical capacity for agricultural technology.

This analysis examines from a financial perspective the resource requirements of the Project as an activity, and addresses the financial concerns implicit in the objectives. Section 2, the Budgetary Analysis, describes the AID and GOJ project inputs, details the budget, and specifies budgeting assumptions. Section 3 addresses the financial implementation of the activity including planned contracting methods and audit/internal control requirements. Institutional implications for the GOJ/MOA are described in Section 4.

2. Budgetary Analysis

This section examines and quantifies the inputs which are described in more detail in other sections of the paper. The budget has been prepared in accordance with guidance contained in STATE 234165 (83) and STATE 052165 (83). The total project cost is estimated at $ 64,811,000 with AID financing of $ 29,500,000 and a GOJ contribution of $35,311,000, as indicated in the summary budget, (Table 1). The GOJ contribution is 54.5% of the total cost.

a. AID Inputs

AID inputs to the Project include grant funding of $20,500,000 and $ 9,000,000 in loan funds. The summary and detailed budgets, (tables 1 and 2), indicate the AID funded project components. Identified base year (FY 85) costs total $21,478,000 of which foreign exchange costs amount to $12,699,000 or 59% of the total. Estimates for physical contingencies and inflation are $ 3,526,000 and $4,655,000 respectively. AID inputs are generally categorized in traditional cost components rather than project specific, (or output related), inputs. Section (d) relates project inputs to outputs.

(1) Technical Assistance-Grant Funded

A substantial portion of the AID contribution pertains to the technical assistance component with a base year cost of $4,445,000. A total of 312 person/months (p/m) of effort is required. There are three areas of emphasis for the technical assistance component. The bulk of the effort will be directed towards the NCARTT. A total of 4 long term advisors (Chief of Party, two technical advisors, and an administrative advisor) are budgeted for 174 months of effort, supported by 90 months of short-term assistance. The Project will also support the UNEP pilot Range improvement Demonstration by providing a Range Specialist for 24 months at a cost of $220,500. There are 104 p/m of backstopping effort primarily in logistic support to the project team, at a cost of $408,000 which is included under home office support and indirect costs.

183

The HADP is a logistically and administratively complex activity. The Project involves a major reorganization of the MOA and the careful coordination of project inputs and relationships with other organizations and institutions. In view of the potential difficulties as for implementation, the project budget includes a provision for administrative services. An administrative advisor will provide 24 months of service as a part of the expedited implementation phase. The Project will also finance the services of an agricultural specialist charged with technical oversight of the activity for the USAID Mission, and for technical liaison with regional and international organizations with interests in dry-land agriculture. The technical assistance component also includes a provision for the establishment of a liaison office for the contract team.

Personnel and support are costed in accordance with salary ranges for senior personnel found in similar activities, and with benefits normally provided in a direct contract with an educational institution. The average total cost per person month of effort (including overhead, and applied contingency and inflation) is $ 14,231 over-all. Overhead rates, (based on direct labor cost) are 50% for home office, and 35% for overseas staff.

(2) Training-Grant Funded

The technical directions and methodologies planned for the HADP require, in effect, a technical and administrative reorientation of the professional counterpart staff assigned to the activity. During the initial years of the Project, almost all such personnel will receive at least some training. Training under the project is multidirectional and some personnel will be trained through a variety of courses. Training can be viewed as administrative (project methodologies/procedures) or, technical (advanced training in areas of specialization). Training activities in both areas will be carried out within Jordan, or regionally, where feasible, and in the U.S. Training is a continuous process, and the Project will establish a relationship with regional entities, such as ICARDA, for on-going training or updating in technical specialties. The training component is budgeted at $753,000 in base year costs.

(a) In-Country Training Activities

(i) Basic Training

A significant training effort will be mounted within Jordan including courses in: (1) management, for project personnel with management responsibility; (2) introduction to the SCRAD method; and (3) basic ASO preparation. All of the above courses will be presented through the NCARTT, most probably under contractual arrangements. A total of $215,500 is provided for 225 p/m of training as described in the Post Report. These training courses represent basic training activities for which the responsibility will gradually be assumed as an internal function of the NCARTT, thus providing for the eventual training of additional personnel.

(ii) English Language Training

An adequate level of English language competence is indispensable for professional staff both for the necessary technical training to be undertaken outside of Jordan, and, to be current with the technical literature available in specialized fields. Depending on competence, all GOJ project professional personnel may be required to attend English language programs. Language training is budgeted at $ 35,000.

(b) Training Outside of Jordan

(i) Academic Training

As described in section II 3b (4), the NCARTT will require an expansion in the technical expertise in specific agricultural disciplines to direct the longer term research efforts. This requirement will be met through long-term academic training for 32 employees. A total of $ 312,000 is budgeted for 336 person months of training, most of which will be in the U.S. Consideration will also be given to academic training at the University of Jordan in certain areas.

(ii) Specialized Training

A total of 47 p/m of external short-term training at a cost of $ 140,000 is envisioned for the Subject Matter specialists at U.S. Universities or technical training at the USDA planned for ADC'S as detailed in the Post report.

Costs for training outside of Jordan are based on person month estimates included in HB 10. The GOJ finances required international travel and the employees salary. In-country training costs consist of: (1) cost of contract trainers, (2) some tuition/academic costs where training is performed at the UOJ or other institutions; and (3) a reduced maintenance allowance or per diem as appropriate.

(3) Commodities/Equipment-Grant Funded

The identified commodity costs are $ 6,704,000 in FY 85 base year terms and are detailed in the Post Report. The bulk of the commodity component is aimed at the furnishing and equipping of the NCARTT and the Service Centers, including the laboratories, which will be completed early in the project. The other aspect of the component is the procurement of commodities for the actual demonstration and extension activities at the Service Centers. Given the length of the Project, some of the items (particularly vehicles/farm equipment) employed at the Service Centers will require replacement. The budget includes a provision for replacement of all operational vehicles and 50% of the farm machinery after 5 years of services. There will also be a continuing requirement for some minor commodity/equipment procurement on an annual basis which is included within the GOJ contribution to the project.

AID commodities will be largely of U.S. source and origin (90 %) Some supplies/equipment may be procured locally and $670,000 or 10% of the component is provided for this purpose.

(4) Evaluation-Grant Funded

The budget contains a provision for the financing of outside evaluations. As specified in section III, two interim evaluations have been scheduled, one in FY 1988, and the other in FY 1990. The cost estimates are based on acquiring services through a contract with a private firm, or, through a PASA and $ 125,000 is provided. The final evaluation is presumed to be after the PACD and funded from outside of the Project.

(5) Agricultural Development Fund-Grant Funded

Both USAID and the GOJ will contribute to an Agricultural Development Fund which will provide resources for the undertaking of specific research programs and demonstration/extension activities within the context of the Project. The operation of this fund is further described in other section of the Project Paper. USAID will contribute a total of $3,000,000, in base year costs. The fund is viewed as a vehicle which will permit the flexible application of financial resources to targets of opportunity. USAID's contribution to the fund will, however, be directed towards certain specific areas of interest.

The On-Farm Demonstration Program, budgetd at $650,000, is intended to encourage farmers to participate in the application new technology. The Pilot Land Agregation Program will support innovative methods of reagregating land to viable agricultural units, on a longer term commerical basis. A total of $1,000,000 is included for land agregation. The Equipment Loan Guarantee Fund will provide revolving debt coverage program of $350,000 to reduce risk in the purchase of farm machinery. Lastly, AID funds will be utilized to fund the acquisition of international technical assistance or research through regional or international organizations. Funding of $1,000,000 is estimated for this purpose.

Implementation arrangements for the fund, and the methods which will be needed to achieve the required adaptation, are not firm at this time and the above mentioned procedures are illustrative of the approaches under consideration.

(6) Construction of Facilities-Loan Funded

This component, budgeted at $6,451,000 in base year costs, consists of a contribution towards the construction of the NCARTT, and, a contribution to the construction/expansion of the service centers. Sites on GOJ owned land have been selected for the NCARTT and two of the service centers. Tentative sites have been identified for the remaining two service centers. The NCARTT will be constructed from the ground up, in accordance with the requirements specified in the Post Report. MOA facilities currently exist on the four service center sites and efforts will include renovation and expansion. Estimates are based on the square footage developed in the Post Report and the current construction costs for similar structures.

The construction component also includes a provision for the services of an architect/engineering firm to assist in the designs for the facility construction/expansion. The current cost estimates specified in the Post report include a provision for partial local currency financing by the GOJ.

b. GOJ Inputs (Table 3)

(1) Personnel related costs and operational support.

From the perspective of the GOJ, the Project is aimed at the institutional element of the MOA which is responsible for the Highlands. The GOJ contribution consists largely of the in-kind contribution of personnel, and the related operational support costs for the MOA entities under the project i.e. the Highland Agricultural Development Council; the NCARTT; and the Agricultural Service Centers. Detailed assumptions in respect to the GOJ personnel contribution are found in the Post report. A total of $10,621,000 is budgeted in base year costs for 194 counterpart personnel, to be assigned for 1,128 person years of effort. Total personnel include professional staff of 84, a total of 50 secretarial/clerical employees, and 60 farm technicians as indicated in table 4.

All operational aspects of project activities are financed entirely by the GOJ. Except for the limited administrative support for the contract team detailed in A.2 a(1), all clerical/support staff and related office costs are part of the GOJ contribution. All support costs related to vehicles/commodities, and facility operation/ maintenance are similarly included. The MOA will also provide funding for all costs related to the day-to-day work operations of the centers, which will entail a significant annual level of supplies and equipment. Operational support costs have been budgeted at $3,527,000 in base year costs.

GOJ personnel and operating expense are linked to the establishment of the various institutional elements. Given the need for mobilization time, and in some cases recruitment, costs are phased in accordance with the following schedule.

Office of the Director - Staffed and functioning as a coordinating unit as of 10/1/85 continues through FY 1992. Base year costs p/a are $156,000 for the support of 15 employees.

NCARTT - Staffed and functioning on 4/86 to correspond with arrival of technical team. Base year costs p/a are $536,000 for the support of 39 employees.

Service Centers - All four service centers are considered staffed and functioning on an interim basis (without permanent facilities) by 12/86. The base year cost p/a is $1,739,000 for the four service centers which support 140 employees, (excluding laborers and guards).

(2) Support to Training

In accordance with USAID Jordan policy, the GOJ will provide international transportation for training outside of Jordan budgeted at $ 59,200 in base year costs. As the trainees are presumed to be counterparts assigned to the project, salary/benefit costs for trainee time are included under personnel costs.

(3) Agricultural Development Fund

Over the life of the Project, the GOJ will finance research and development activities to supplement that performed in the NCARTT. It is obvious that envisioned programs will require funding beyond the specific resources within the project, (the operations of the NCARTT and the Service Centers), and the anticipated institution building inputs supplied by AID, (technical assistance, training, construction, and commodities). A funding pool is therefore required to enable the NCARTT and Agricultural Development Council to mobilize research and extension activities beyond the strict institutional capacity of the project entities. The research and development fund provides this capacity. As discussed previously, the fund will be jointly financed by AID and the GOJ. AID funds will be tied to specific interventions, and foreign exchange requirements. The GOJ contribution to the fund will largely be directed towards local costs.

A total GOJ contribution of $ 7,250,000 in base year costs is estimated for this purpose. It should be noted, that while this element is crucial, it is not well defined. The funding could represent any of the following:

-- Contracts or other institutional implementation arrangements with public and semipublic entities within or outside of Jordan (such the UOJ/FA in Jordan).

-- In-kind contributions of personnel/other resources from other elements of the MOA or GOJ outside of the institutional framework of the project, should the required expertise be available.

-- Matching contributions to fund programs identified for AID financing.

(4) Land and Facility Construction.

The GOJ will contribute to the construction component of the project by donating the required land for the NCARTT AND Service Centers. The land contribution is valued at approximately $500,000 and considered donated. The construction contribution is estimated at $500,000 based on the facilities described in the Post report and the anticipated AID inputs. The contribution towards construction is subjected to a 25% physical contingency factor and appropriate escalation.

c. Contingencies and Inflation

The HADP is a long and technically complex activity, and provisions for physical contingency and inflation are extremely important. These factors have been included in the manner required in NE Bureau guidance. Physical contingencies are added to base year costs, and the appropriate cumulative inflation factors are applied to the costs spread over the life of the project, subdivided into foreign exchange and local costs.

The project budget includes a total of physical contingency of $5,887,000. Base year costs for grant funded components (technical assistance, commodities, training, and evaluation) and related GOJ inputs, are subjected to a 10% physical contingency, which should be adequate in that these elements are reasonably well defined. The provision for the Agricultural Development Fund is not well defined at this point. Given this uncertainty an increased physical contingency is appropriate. Similarly, the construction elements have not been finalized and costs are not sufficiently quantified for a firm budget provision, and, in accordance with Bureau guidance, the contingency should be increased. A total physical contingency of 25% has been included under each of these components, and, the related GOJ inputs.

Price escalation or inflation follows the current guidance. The budgets are stated in U.S. dollars with a base year of January 1985. Costs are inflated cummulatively beginning in FY 86 at the following rates: Inflation of Foreign Currency is calculated at the rate of 6% per year from FY 86 through FY 92, Local costs are inflated at the rate of 8% per year for the same period. No project costs are presumed to be incurred in FY 85, or after FY 92.

The rate of exchange utilized in the budget is .400 JD = $1. or rather $2.50 = JD 1. The rate of exchange has moved consistently in favor of the dollar over the past several years. In FY 1980, for example, the average rate was JD 1 = $ 3.35. Thus the value of the J.D. has declined approximately 34% over this period. The current exchange rate reflects the relative strength of the dollar worldwide, and the JD could gain in value, particularly given the length of the Project. However, based on past experience, any such change could most probably be absorbed within the physical contingency and inflation factors.

2d. Relationship of Project Inputs to Outputs

The Project is aimed at the dual objectives of: increased agricultural production in the Highlands, and the development of an institutional capacity for the application of research. Table 8 subdivides project inputs between these two objectives as a measure of the project focus. The two categories indicated are a simplification of the project outputs indicated elsewhere in the PP.

The category "Research and institution building" combines those outputs related directly to the Agricultural Development Council, the NCARTT, and other research/administrative elements which the Project will support. It includes, for example, the services of the Administrative Specialist who will assist in the envisioned reorganization, Research/Institution Building activities receive approximately $8,067,000 of AID financing and $7,140,000 from the GOJ which represents 35% of the total cost. AID technical assistance and training inputs are largely directed towards this output.

The category "Extension and Project Interventions" summarizes outputs which are aimed at directly increasing agricultural production including extension efforts, pilot demonstrations, and private sector initiatives. As this is the primary project objective, 65% of total resources or $ 28,728,000 is utilized. There is an institutional element as cost related to direct extension activities, including personnel, have been included. This category nonetheless represents that portion of the project resources which is action rather than research oriented. Major AID financed efforts include the construction and equipping of the service centers, and the contribution to the Agricultural Development Fund.

The separation of costs in Table 8 between the two summary outputs is an indicator of the PP assessment as to the relative priorities to be addressed. A preponderance of resources, financial and personnel are applied to extension activities without which the research will be unutilized.

3. Project Financial Implementation

This section describes the planned implementation methods and the input timing to achieve the project objectives. The Project has a long life and some of the implementation methods will require a significant lead time for negotiation/contracting. To achieve the proper coordination, an expedited implementation phase will be undertaken prior to the main contracting phase.

a. Project Implementation Methods

(1) Expedited Implementation Phase-AID

The bulk of the technical assistance and training components will be provided through a major institutional contract. Certain implementation activities should be undertaken, however, in advance, given the lead time required for contracting and mobilization, including (a) procurement of certain project commodities ; (b) limited pre-project training for key GOJ counterparts; (c) technical assistance in administration and; (d) architectural/engineering services for facility construction. The expedited implementation phase will begin shortly after the signing of the agreement/satisfaction of initial CP's. The total expedited implementation phase will involve approximately $1,415,000 in AID financing, and should be completed in accordance with the schedule detailed in section III B.

(a) Procurement of Commodities

Some of the project commodities must be on site prior to the arrival of the technical assistance team, and available to the MOA as rapidly as possible. USAID will procure these items through direct AID contracting. Because of the size of the commodities component and in view of the number of separate transactions, a separate procurement contract will be used. This contract will most probably be with a Procurement Agent with payment through a Bank Letter of Committment.

140

(b) Training

Pre-project training activities for key project personnel specified in section IIB 4b will be undertaken through S/IT. The objective of this training is to ensure that specified personnel receive the initial exposure to required project methodologies. In-country English language training for counterpart personnel will also be financed through a host country contract.

(c) Technical Assistance In Administration and Technical Liaison/Support

The Project is administratively and logistically complex. Shortly after the project begins the services of an administrative advisor will be obtained to assist the GOJ in the follow-through for detailed planning/coordination of the AID and GOJ project inputs. The Administrative Advisor will initially be obtained under either a HC PSC or through a PASA with USDA for a period of 1-2 years. Similarly, USAID will utilize the services of a senior agricultural advisor, through a PASA with the USDA. The Liaison/Support Advisor will monitor the technical aspects of the Project and provide necessary coordination with regional entities.

(d) Architectual/Engineering Services

The services of a local firm will be obtained to design and plan and monitor construction of the facilities which will be built. The GOJ plans to move ahead rapidly with the required construction, and these initial services will be required quickly. A host country contract and direct reimbursement mechanism is envisioned.

(2) Main Project Implementation Phase-AID

(a) Institutional Contract

Most technical assistance and participant training activities under the AID Grant financed project components will be incorporated into a major institutional contract with an American organization. Given the research and extension foci of the Project, a contract with a major university (or consortium including appropriate universities) is the only realistic alternative for a contracting entity. Participant training will be included in the contract. Commodity procurement will be contracted separately.

The method of project implementation will be that normally used for AID financed University contracts, the FRLC, in accordance with AID policy. The portion of the project assigned to the institutional university contract is approximately $4,100,000 in base year costs, and represents approximately 19% of AID base year project funding.

(b) Commodity Procurement

Commodity procurement in the main implementation phase will be undertaken at two points. The principal procurement exercise will be finalized after the arrival in Jordan of the technical assistance team. The team and GOJ counterparts will develop the technical specifications and the

procurement package with contracting by July 1986. In accordance with AID policy the contracting method will be a host country contract with a procurement agent in the U.S. with financing through a Bank Letter of Commitment. This method of financing is necessitated by the magnitude of the effort and the proliferation of procurement actions and payment invoices which would otherwise result. The total envisioned procurement contract is budgeted at $3,710,000 in base year costs.

A second project procurement phase will be undertaken in FY 90 and FY 91 for the replacement of vehicles and farm machinery. As this procurement will be significantly less complex a host country contract with an AID direct letter of committment may be utilized. Commodity costs in this phase are budgeted at $2,094,000.

While separate commodity procurement contracts are planned, consideration will be given to enfolding the commodity component within the institutional contract for the technical assistance and training depending on the capacity of the institution selected. The cost of the two approaches would be similar in that the contr ct with the educational institution would be funded under a FRLC, and there would be an advantage in a reduction in the number of contracts and implementing documents.

(c) Evaluation

Interim evaluations, will be funded through direct AID contracts with appropriate U.S. Institutions, (PASA contracts with the USDA or IQC type contracts).

(d) Agricultural Development Fund

The AID contribution to the Fund will be implemented directly by the MOA. Actual disbursement mechanisms for the seperate accounts under the fund have not been determined. Specific AID funding allocations will be based on action plans submitted by the Agricultural Development Council. It is envisioned that, for the most part, AID allocations will be matched by contributions from the GOJ Agricultural Development Fund Component. Given the areas earmarked for AID involvement, however, disbursement should be straightforward. Fund requirements will be determined by the Agricultural Development Council in coordination with the NCARTT and USAID Jordan. AID would then provide a direct funding allocation for the MOA to undertake the agreed action. The pilot demonstration activities and the land agregation programs would be financed through the payment of fixed predetermined land rental or lease amounts which can be easily verified and controlled. The equipment guarantee program would involve the establishment of a revolving fund incumberance system, as payments would only be made in the case of default. AID financing of international technical support would be on the basis of case-by-case approval of individual contracts or implementation arrangements. To facilitate progress AID direct contracting may be used in the case of international organizations. The envisioned financing methods would most probably not require significant advance financing from AID funds. As this aspect of the Project is not well defined at this time, implementation should be subject to a CP, which requires further definition.

(c) Facility Construction/Expansion

The loan funded construction component will be implemented through host country contract(s) with a local construction firm(s). AID will probably provide an agreed upon level of financing through a FAR method. The FAR method has been used successfully in similar activities in Jordan and the construction will be straightforward with no requirement for advanced technology.

(3) The GOJ project inputs will be provided through the routine budget process. The GOJ operates on a calendar year basis with budget requests prepared/submitted as of July for the following year. The MOA has submitted a tentative funding request for 85/86 based on the budget figures noted in the Post report. The MOA will provide a separate budget allocation for agreed costs under the Project.

One element of the GOJ contribution requires special definition in respect to financial implementation. The GOJ contribution to the Agricultural Development fund is included as part of the MOA regular budget. With the GOJ's current financial position, a dedicated source of revenue should facilitate the timely availability of a significant cash (as opposed to in-kind) contribution. This method of financing is proposed for the new "Fund for Encouraging Agriculture". The Agricultural Development Fund proposed here might be considered for administration under the Fund for Encouraging Agriculture with an allocated portion of these funds.

(4) Financial Implementation Plan and Assumptions

The financial implementation plan detailed in table 5 spreads expenditures over the life of the project. This table combines physical contingency and inflation provisions into the individual inputs. Projected fund committments are detailed in Table 9. The financial plan is based on the contracting/resources provision assumptions detailed below.

(a) Expedited Implementation Phase - AID Inputs

Grant Agreement signed 6/85		
Initial CP's met 7/85		
PIO/C for expedited commodities issued 10/85		
Commodities in place in Jordan (target date)		6/86
Pre project Training Activities		
Documentation issued	10/85	
Training Completed, participants returned		5/86
Interim Chief of Party/Technical Liaison		
Documentation issued	7/85	
Contract signed/advisor arrives		9/85
Engineering/Architect Contract		
Contract Signed	12/85	
Work completed		12/86

(b) Main Implementation phase - AID Inputs

Institutional contract signed Jan 86.

--- Technical assistance begins 04/1/86 and continues in the manner scheduled in the Post report.
--- Training activities proceed in the manner described in Post report.

Commodity Procurement

Commodity contract issued in 7/86
Second phase/replacement takes place in FY 90 and FY 91

Facility construction

Completed by year 2 of implementation, 1988

Agricultural Development Fund

Starts in year 2 of project implementation and continue through FY 91.

b. Relationship of Financing Methods to AID Policy

The implementation/financing methods described above are generally in conformance with the AID Payment Verification Policy Guidelines as modified in the USAID Jordan Mission Assessment of FY 1984. The institutional and research orientation of the project, and the need for extensive U.S. home office technical support and coordination virtually mandates the use of an educational institution, although a mixed private sector/university consortium is an alternative. The amalgamation of costs under the contract is necessitated by the interrelated nature of the inputs. The Use of the FRLC for university contracts is required by AID policy in respect to educational institutions. The loan funded construction phase emphasizes a host country contracts and a use of the FAR method. The precise funding methods for the Agricultural Development Fund are not finalized but should consist of a direct reimbursement payment arrangements with the MOA. The use of contracts with procurement agents/bank letter of commitment financing is needed because of the complexity of the commodity component and the proliferation of invoices and procurement documentation which would otherwise result.

194

Other than the institutional contract, the main use of direct contracting is found in the expedited implementation phase. Direct contracting is required to ensure that the initial technical assistance in administration and commodities are in place prior to the arrival of the contract team. AID Financing and implementation Methods are summarized below.

Implementation Methods in Base Year Costs	AMOUNT $ (000)
Technical Assistance	
Direct Contract/PASA - Direct Reimb.	1,048
Institutional Contract with University Consortium - FRLC	3,397
Training	
Pre Project Training - S/IT participant fund transfer.	50
Institutional Contract - FRLC	703
Commodity Procurement	
AID direct Contract with Pre-Current Agent Bank Letter of Committment	900
HCC with Procurement Agent - Bank Letter of Committment	3,710
HCC for commodities - AID Letter of Committment	2,094
Evaluation	
AID Direct Contract/PASA or IQC Direct Payment	125
Agricultural Development Fund	
Implementation Arrangement with MOA Reimbursement or direct payment	3,000
Facility Construction	
HCC with A/E company Reimbursement or direct payment	45
FAR method construction arrangement FAR payment procedures.	6,406
TOTAL Base Year Costs	$21,478

195

c. AUDIT AND INTERNAL CONTROL REQUIREMENTS

Audit

The HADP will have a very significant audit potential given the nature of the project, the magnitude of the resources employed, and the financing methods. Approximately 50% of project resources are utilized in the cost reimbursement institutional contract and commodity procurement contracts, and these costs, including overhead, must be audited during the course of the project. The AID inspector General Audit function is responsible for the audit of direct contracts. However, in view of the current movement towards the use of non federal auditors, should AID policy permit private audit of direct contracts, consideration should be given to finance from the contingency element of the project, periodic independent audit of contract costs. Depending on the nature of the HCC commodity contracts, there may be a potential for financial audit i.e. if the component is included within the institutional contract or on a reimbursement basis.

Most of the other project costs do not have a significant financial audit potential. The limited direct contracts for commodities, services (administrative specialist and evaluation) and training through S/IT are straightforward. Similarly, FAR financed construction does not generally require audit, since the initial determination of reasonability of cost (and construction monitoring) places this burden on the GOJ. For the most part, AID resources are employed in the provision of specific services, commodities, and training . The bulk of AID resources are foreign exchange costs, expended in the U.S. Financial procedures for the Agricultural Development Fund, will be designed in such a way as to minimize the need for audit.

Internal Control

Internal control concerns in the HAPD are minimized in that AID resources consist primarily of the provision of specific services, commodities training, and FAR construction. Funds are provided for operational activities solely by the GOJ. The exception in respect to the methods of implementation with internal control is the fund. While this is a relatively small part of the Project, internal control requirements will be considered carefully prior to specific agreement on procedures.

Utilization and control of project commodities represents an internal control concern. Project monitoring must ensure that proper controls are maintained over the receipt and appropriate use of commodities, and that commodities are safeguarded from pilferage. There is similarly a requirement for maintenance and servicing arrangement to ensure that full benefit is obtained from the investment. The GOJ is aware of these concerns and will take the necessary arrangement to ensure proper physical control and maintenance of commodities including vehicles and farm equipment.

3.d AID

AID will provide total project funding of $29,500,000. Given the magnitude and length of the Project, there is some flexibility in the annual funding levels. USAID has determined that the initial FY 85 obligation will consult of $11,000,000 (G- $6,000,000 and L-$5,000,000). This amount will cover costs through FY 86, and a few months in FY 87. The financial implementation plan (Table 5) demonstrates a presumption that 9.4 million of AID will be expended in FY 86 (construction and commodity costs). Cumulative expenditures through FY 87 are estimated at $15.4 Million or 52% of AID funds. By then end of FY 88 total disbursements are expected to total $22 Million or 75% of the funding. With minimal forward funding this amount should be available, at the latest, in FY 87. The remaining funding of $7.5 Million could be provided in FY 88 or beyond, if necessary.

The following table presents a proposed funding plan which provides approximately 18 months of forward funding (after FY 85 which is fixed.)

	FY 85	FY 86	FY 87	FY 88	TOTAL
GRANT	6.0	5.0	3.5	6.0	20.5
LOAN	5.0	4.0			9.0
TOTAL	11.0	9.0	3.5	6.0	29.5

While the above financing plan is adequate, and funds would be available as needed for committment, it may be preferable to increase forward funding to 24 months and consolidate financing into 3 fiscal years.

	FY 85	FY 86	FY 87	TOTAL
GRANT	6.0	7.5	7.0	20.5
LOAN	5.0	4.0		9.0
TOTAL	11.0	11.5	7.0	29.5

Projected fund commitments and contracting are quantified in Table 9, and related to proposed fiscal year funding levels in Table 10. The firm FY 85 funding level of $11,000,000 will be used to finance activities under the expedited implementation phase, section 3a (1), initial funding for the institutional TA/Training contract, and construction. It is expected that construction of the NCARTT will move ahead as soon as the designs are finalized. Similarly, work will go forward on the two service centers which require only expansion and renovation of exisiting facilities. FY 86 source year funds will be used for: the main phase of commodity procurement; the remaining two service centers; and initial Agricultural Development Fund activities.

197

4. Institutional Implications For the GOJ

a. Recurrent Costs

The detailed GOJ budget (Table 3) demonstrates the institution building emphasis of the project. As the research and extension capacity within the MOA represents a project objective, recurrent costs can be considered an appropriate contribution. GOJ Project financing consists of recurrent costs of $14,148,000 in base year terms, in-kind contributions of land of $ 500,000, trainee transportation cost of $59,000, and actual cash costs of $7,750.000 which pertain to the Agricultural Development Fund and, to facility construction.

Recurrent costs under the Project represent personnel and operational support (operating expense) of the project entities. A total of 194 personnel will be required at a cost of $10,621,000. As these personnel continue throughout the life of the project, the provision for inflation becomes increasingly important.

The HADP requires a reorganization in one form or another of the MOA and a good portion of the personnel envisioned will be transfered from other duties. Others will have to be hired. While it is difficult to ascertain exact numbers of personnel it seems clear that the shortfall in personnel will occur in the areas requiring specialized technical expertise. The following estimates are utilized for purposes of illustration: 10-12 subject matter specialists 30-40 farm technicians; and 25-30 Agricultural Services Officers. There will also be a secondary hiring effect from the transfer of other personnel to the HADP. While some current functions will be subsumed by the project, at least some additional personnel will eventually be hired to replace employees assigned. For budget purposes we can assume that approximately one third of all other employees will be replaced eventually. In respect to operating expenses other than personnel costs, it should be noted that the project establishes 5 new installations (the NCARTT and the service centers) the costs of which represent an augmentation to recurrent cost expenditures.

The MOA budgets for 1982-1985 are presented in Table 6. Costs are divided into current and capital components. Personnel levels upon which salary cost estimates are based are also indicated. Table 7 compares the GOJ contribution for FY 86, FY 87 and FY 88 (base year plus contingency), with the FY 85 MOA budget. (The 85 budget should be roughly comparable with the FY 1986 base year project costs). The significance of the project cost assumptions is demonstrated by the fact that at full staff, project entities will required an amount equal to 23% of the current cost budget. The main issue however is the extent to which the GOJ project contribution represents an increase in the current and capital cost budget rather than a redemployment of available resources. Table 7 quantifies these net augmentations to MOA financing and spreads base year costs, plus contingencies over the life of the project. By

1988, the first year of full operations, additional recurrent costs will be approximately $1,753,000 or 15% of the MOA 85 base year budget. The contribution to the Fund is shown as an augmentation to the capital budget. There is as well a long-range recurrent cost burden in the project out-years as equipment/facilities require replacement.

Table 7 represents a relatively static view of recurrent costs. If resources for the MOA were to increase, for example, at a rate greater than inflation, the project effect on recurrent costs would be reudced. Table 6 indicates, however, that the MOA budget over the budget has increased at a rate considerably under that of inflation.

The recurrent cost burden of the Project is significant to the MOA. Even if some of the administrative or auxilliary staffing is eventually reduced, there is a continuing requirement for hiring and retaining technical qualified staff, without which the Project will fail. The most important aspect of recurrent costs probably does not pertain to the levels of personnel required, but rather to the operational expense funding of project entities and the Fund for Agricultural Development, both of which represent significant annual cash outlays. The Project will not work unless the NCARII and the service centers have sufficient operating funds to permit the envisioned day-to-day operations. Similarly, the fund is indispensible for NCARTI to carry out activities beyond the finite capacity of the in-house staff.

Given overall GOJ resources, the project cost burden is not serious. But, the issue is that of relative priorities, and willingness to incorporate in long-range planning a significant increase in the resource level devoted to the MOA in general and Highland Agriculture in particular. Project planning and the Project Agreement should incorporate specific conditions or convenants to address these concerns including, if possible, separate budget allocations for the project activities.

b. Financial Management Implications of the Project

The HADP will be implemented by the project entities described elsewhere within this paper. The Project as a whole will, represent an operational subsection of the MOA and is subject to the general MOA/GOJ financial procedures, except to the extent to which special authorities are granted.

The GOJ uses a centralized though somewhat cumbersome accounting and fund control/disbursement system. GOJ financing is planned around a calander year budget cycle. Budget submissions are prepared and forwarded to the Office of the Budget in July for the following year. Operating budgets are broken down by department, and by cost category. A separate budget section indicates approved positions (in a civil service context). The budget is divided into two major sections; Current Costs, and Capital Expenditures.

The current costs represent the normal costs associated with the direct operations of various sections of the ministry. The capital budget specifies projects and activities usually of a capital intensive nature. However, contract personnel, including laborers, and other specifically associated with an approved project are funded from this budget, rather than the current account. The overall budget is finalized through negotiation and an authorized budget level is provided in time for the new year. The Ministry, and by extension the subsections thereof, are then entitled to draw funds from their budget allocations.

There is an accounting/fund control process at the Directorate level, but, responsibility is, in effect, exercised at the national level in Amman. Payroll related costs and other operating expenses are parcelled out from Amman. There is a fund encumberance process for purchase of major items. A request for a purchase contract is forwarded to Amman by the Directorate and if approved, the order is placed. To the extent practicable, orders for major recurring items are combined, ordered early in the year, warehoused, and issued as required. Special orders outside of the recurring purchases are approved in Amman (depending on the value and nature of the purchase) by the Finance Director, Undersecretary, and/or the Minister. In accordance with GOJ procedures, the MOA must seek separate approvals for procurement of certain items (computers for example) and go through the Ministry of Finance/Department of Supply for puchases over a certain value. Authorities at a lesser level are limited to the utilization and control of commodities resources provided to them, and to the use of a petty cash fund through which purchases up to 200 JD's can be made. Control for disbursements are similarly centralized in Amman. Vouchers are forwarded from the Directorate to Amman for payment, except for petty cash payments which are processed at a lesser level.

The budget/fund control/disbursement processes are important to the implementation of the HADP. Operating expenses are part of the GOJ contribution and the system in place requires great emphasis to ensure that fund requirements are specified within the budget cycle, and defended, if need be, from budget reductions later in the process. The project entities will hopefully be organized as a separate unit within the Ministry with a separate and defined entity budget. This will help in planning and monitoring.

The budget process relies on accurate estimates of non-personnel type costs particularly equipment and supplies, and on early ordering. Assuming that adequate operating expense levels are approved, the Project can work within the MOA procedures. It would be very helpful, however, if greater authorities for procurement of services and supplies could be delegated. This is particularly true on expenditures related to the Agricultural Service Centers which will have a considerable level of minor expenditure.

There is some potential for difficulty in the administration of the Agriculture Development Fund. This element of the project will be used to finance research and demonstration efforts within and outside of the GOJ. The funding source for this is not firmly decided but it will either come through the fund for Advancement of Agriculture, which will operate as a separate institution, or through the MOA capital expenditure budget. In either case, the project entity will have to prepare a financing package for each undertaking which specifies the funding sources/methods and arrange for fund transfers or for the issuance of contracts if necessary. The current system could seriously retard this process. It is not possible at this time to resolve this matter, but, negotiation should seek to establish some delegated authority within the project entity to utilize research and development portion of the GOJ contribution outside of normal procedures.

To ensure proper planning, monitoring, and control of project resources, (AID and GOJ financed), the project entity should have a financial function or section preferably within the Office of the Director. Current plans include a provision for an accountant/budget specialist and clerical support. Assuming that there will be a direct authority link between the Office of the Director (action element of the Agricultural Council), the NCARIT, and the Agriculture Service Centers, the office could provide overall budgeting and maintain the necessary financial records. This would enable the Project Director to ascertain the resources available, plan financially, coordinate fund encumberances under project financing and review disbursements (with or without the responsibility for actual disbursement). This financial function is also necessary to monitor and control costs and revenues under the demonstration pilot/land agregation program, and guarantees given for the farmer equipment procurement. Lastly, there will be a need for accounting and control for funds utilized from the Development fund, and for commodities supplied by AID.

(TABLE 1)
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT
SUMMARY BUDGET
$ (000)

AID INPUTS	GRANT	LOAN	GOJ	TOTAL	
TECHNICAL ASSISTANCE	4,445	4,445			4,445
COMMODITIES	6,704	6,704			6,704
TRAINING	753	753		59	812
EVALUATION	125	125			125
AGRICULTURE DEVELOPMENT FUND	3,000	3,000		7,250	10,250
LAND AND FACILITY CONSTRUCTION	6,451		6,451	1,000	7,451
GOJ PERSONNEL AND OPERATIONAL COSTS				14,148	14,148
TOTAL BASE YEAR PROJECT COSTS	21,478	15,027	6,451	22,457	43,935
CONTINGENCY	3,566	1,953	1,613	2,321	5,887
INFLATION	4,456	3,520	936	10,533	14,989
TOTAL PROJECT COST	29,500	20,500	9,000	35,311	64,811

(TABLE 2)
HADP
DETAILED BUDGET U.S. CONTRIBUTION
$ (000)

	UNITS	BASE YEAR COSTS	FX	LC	CONTINGENCY	INFLA
GRANT FUNDS						
TECHNICAL ASSISTANCE						
LONG-TERM	150 P/M	1,469	1,114	355		
SHORT-TERM	90 P/M	1,080	864	216		
HOME OFFICE SUPPORT AND OVERHEAD/INDIRECT COST		848	848			
SUB TOTAL TECHNICAL ASSISTANCE (INSTITUTIONAL)		3,397	2,826	571		
OTHER T.A.	72 P/M	1,048	734	314		
TOTAL T.A.	312 P/M	4,445	3,560	885	445	1,0
COMMODITIES/EQUIPMENT						
TECH. CENTER (NCARTT)		970	873	97		
AGRI. SERVICES CENTERS		5,734	5,043	691		
SUB TOTAL COMMODITIES		6,704	5,916	788	670	1
TRAINING						
SHORT-TERM TRAINING		216	171	45		
LONG-TERM ACADEMIC		312	204	108		
ENGLISH LANG.TRAINING		35		35		
SPECIAL PROGRAMS		140	140			
OVERHEAD ON U.S. TRAINING		50	50			
SUB TOTAL-TRAINING		753	565	188	75	
AGRICULTURE DEVELOPMENT FUND						
ON-FARM DEMONSTRATIONS		650		650		
LAND AGGREGATION PROGRAM		1,000		1,000		
EQUIPMENT LOAN GUARANTEE		350		350		
INTERNATIONAL TECHNICAL. SUPPORT		1,000	750	250		
SUB TOTAL AG. DEVL.FUND		3,000	750	2,250	750	1

(Table 2) cont'd

EVALUATION	125	125		13	
TOTAL GRANT FUNDS	15,027	10,916	4,111	1,953	3,
LOAN FUNDS					
FACILITY CONSTRUCTION					
N C A R T T	2,211	511	1,700		
AGR. SERVICE CENTERS	4,240	1,272	2,968		
SUB TOTAL CONSTRUCTION	6,451	1,783	4,668	1,613	
TOTAL LOAN FUNDS	6,451	1,783	4,668	1,613	
TOTAL AID PROJECT INPUTS	21,478	12,699	8,779	3,566	4,

TABLE 3

HADP
DETAILED BUDGET-GOJ CONTRIBUTION
($ 000)

	BASE YEAR	CONTIN-GENCY	INFLA-TION	TOTAL COST
Personnel and Operating Exp.	1,093	109	458	1,660
Director's Office				
Staff	950			
Operating Expenses/Equip.	143			
National Agricultural Tech. Center	3,488	349	1,553	5,390
Staff	2,584			
Operating Expenses/Equip.	904			
Agri. Service Centers	9,567	957	4,707	15,231
Staff	7,087			
Operating Expenses/Equip.	2,480			
Total Personnel and Operating Expense.	14,148	1,415	6,718	22,281
Support to Training	59	6	6	71
Agriculture & Development Fund	7,250	725	3,715	11,690
Construction Contribution	500	125	50	675
Land	500	50	44	594
Total GOJ Contribution	22,457	2,321	10,533	35,311

TABLE 4

H A D P
GOJ CONTRIBUTION - PERSONNEL
(PERSON YEARS)

INPUTS	TOTAL	1986	1987	1988	1989	1990	1991
Office of the Director	105	15	15	15	15	15	15
Professional Staff	35	5	5	5	5	5	5
Clerical Staff	70	10	10	10	10	10	10
NATC	253	19	39	39	39	39	39
Professional Staff	149	11	23	23	23	23	23
Clerical Staff	104	8	16	16	16	16	16
ASC'S	770		70	140	140	140	140
Professional Staff	308		28	56	56	56	56
Clerical Staff	132		12	24	24	24	24
Farm Technicians	330		30	60	60	60	60
	1,128	34	124	194	194	194	194

TABLE 5

H A D P
FINANCIAL IMPLEMENTATION PLAN
($ 000)

INPUTS	TOTAL	1986	1987	1988	1989	1990	1991
AID Contribution-Grant							
Technical Assistance	5,920	1,069	1,544	1,250	707	432	428
Training	916	501	337	38	40		
Equipment/Commodities	8,650	3,656	1,835			2,372	787
Evaluation	176			66		110	
Agricultural Development Fund	4,838		716	1,947	1,048	1,127	
Total AID Grant	20,500	5,226	4,432	3,301	1,795	4,041	1,215
AID Contribution-Loan							
Construction	9,000	4,189	4,811				
Total AID Loan	9,000	4,189	1,527				
TOTAL AID CONTRIBUTION	29,500	9,415	9,243	3,301	1,795	4,041	1,215
GOJ Contribution							
Support to Training	71	71	-	-	-	-	-
Land & Facility Construction	1,269	1,269	-	-	-	-	-
Agricultural Development Fund	11,690	297	642	1,386	1,496	2,424	2,618
Personnel & Operational Cost	22,281	504	2,005	3,370	3,640	3,931	4,246
TOTAL GOJ CONTRIBUTION	35,311	2,141	2,647	4,756	5,136	6,355	6,864
TOTAL PROJECT COST	64,811	11,556	11,890	8,057	6,931	10,396	8,079

TABLE 6

HADP
MOA BUDGET 1982 - 1985
JD (000)

	(ACTUAL) 1982	(FINAL) EST 1983	(EST) 1984	(EST) 1985
Current Budget				
Personnel Costs	3,341	3,565	3,630	3,731
Graded Employees	(756)	(765)	(779)	(810)
Ungraded Employees	(648)	(615)	(661)	(700)
Contracted Employees	(11)	(10)	(11)	(11)
Laborers	(600)	(649)	(627)	(600)
Benefits & Other pers. costs	(1,326)	(1,527)	(1,552)	(1,610)
Operational costs	959	920	876	810
Other costs 1/	12	85	100	129
Total Current Budget	4,312	4,570	4,606	4,670
Capital Budget				
MOA Facilities	155	137	213	347
Projects				
Grazing/Rangeland	530	485	587	670
Forestry Develop.	15			
Greenhouse Develop.	498	485	658	619
Highland Agricult.	326	202	245	275
Soil/Water Treat.	324	586	409	375
Dairy Farms	189	4		
Wheat Develop.	30	61	79	38
Research Center (JV)	34	76	152	76
Potato Production	23	33		
Total Capital Budget	2,124	2,069	2,343	2,400
Tota MOA Budget	6,436	6,639	6,949	7,040

1/ Includes shares investments of 74,90 and 119 respectively

TABLE 7
NET COST INCREASE TO THE MOA
HADP
($ 000)

	MOA CY 85 BUDGET	FY 86 PROJECT COST	FY 86 INCREASED COST	FY 87 PROJECT COST	FY 87 INCREASED COST	FY 88 - FY 89 PROJECT COST	FY 88 - FY 89 INCREASED COST	FY PRO COS
Current Costs								
Personnell	9,328	334	241	1,178	433	1,822	899	1
Employees/Benefits	7,828	334	241	1,095	350	1,656	733	1
Laborers	1,500			83	83	166	166	
Operational costs	2,025	90	[illegible]	385	385	611	611	
Other costs	322	59	59					
Contingency		48	48	156	156	243	243	
Total Current Costs	11,675	531	438	1,719	974	2,676	1,753	2
Capital Costs								
MOA Facilities	868	500	500					
Projects	5,132	250	250	500	500	1,000	1,000	1
Contingency		200	200	50	50	100	100	
Total Capital Cost	6,000	950	950	550	550	1,100	1,100	1
Total	17,675	1,481	1,388	2,269	1,524	3,776	2,853	4

1/ Project cost is defined as base year cost plus contingency
2/ Increased cost is calculated per section 4 a.

HADP
INCREASED COST ESCALATED BY INFLATION

INPUTS	1986	1987	1988	1989	1990	1991
BASE YEAR COSTS	1,388	1,524	2,857	2,857	3,403	3,403
INFLATION	111	254	742	1,030	1,597	1,997
TOTAL COST	1,499	1,778	3,599	3,887	5,000	5,400

209

TABLE 8
HADP
RELATIONSHIP OF INPUTS TO OUTPUTS
BASE YEAR COSTS (000)

	TOTAL PROJECT COSTS	APPLIED RESEARCH 1/	EXTENSION AND DIRE PROJECT INTERVENTI
AID CONTRIBUTION - GRANT			
Technical Assistance	4,445	3,287	1,158
Equipment/Commodities	6,704	970	5,734
Training	753	537	216
Evaluation	125	62	63
Agricultural Develop Fund	3,000	1,000	2,000
SUB-TOTAL-AID GRANT	15,027	5,856	9,171
AID CONTRIBUTION - LOAN			
Construction	6,451	2,211	4,240
SUB-TOTAL - AID LOAN	6,451	2,211	4,240
TOTAL AID CONTRIBUTION	21,478	8,062	13,411
GOJ CONTRIBUTION			
Personnel and Operating Expense	14,148	4,581	9,567
Support to Training	59	59	
Agricultural Develop Fund	7,250	2,000	5,250
Construction/Land	1,000	500	500
TOTAL GOJ CONTRIBUTION	22,457	7,140	15,317
TOTAL PROJECT COST	43,935	15,207	28,728
	100%	34.6%	65.4%

1/ APPLIED RESEARCH COMBINES PROJECT ELEMENTS WHICH RELATE TO THE ADC AND TO THE NCARTT

2/ EXTENSION COSTS INCLUDE ALL PROJECT ELEMENTS RELATED TO THE SERVICE CENTERS AND DIRECT INTERVENTIONS.

TABLE 9
H A D P
PROJECTED FUND COMMITMENTS
$ (000)

	TOTAL	1985	1986	1987	1988	1989	1990
GRANT							
TECHNICAL ASSISTANCE/	5,920						
Institutional Contract	4,570		3,754		816		
Other/Expedited Impl.	1,350	700		650			
TRAINING	916						
Institutional Contract	861		501	360			
Other/Expedited Impl.	55	55					
COMMODITIES	8,650						
Expedited Impl.	990	990					
Main Phase Contracts	7,660		4,500			3,160	
AG. DEVELOPMENT FUND	4,838			715	1,948	1,048	1,127
EVALUATION	176				66		110
Total Grant Financing	20,500	1,745	8,755	1,725	2,830	4,208	1,237
LOAN							
Construction	9,000						
NCARTT			2,800				
Service Centers			2,200	3,940			
A & E Contract		60					
Total Loan Financing	9,000	60	5,000	3,940			
TOTAL AID FINANCING	29,500	1,805	13,755	5,665	2,830	4,208	1,237

211

TABLE 10
HADP
FUND COMMITMENTS BY FISCAL YEAR FUNDING
$ (000)

	TOTAL	FISCAL YEAR FUNDING FY 85	DATE OF COMMIT.	FY 85	DATE OF COMMIT.	FY 87	DATE OF COMMIT.
GRANT FINANCING							
Technical Assistance	5,920						
Institutional Contract	4,570	3,754	1/86			316	1/88
Other/Expedited. Impl	1,350	700	9/85		9/87	650	9/87
Training	916						
Institutional Contract	861	501	1/86			350	1/88
Other/Expedited Impl.	55	55	9/85				
Commodities	8,650						
Expedited Impl.	990	990	9/85				
Main Phase Contract	7,660			4,500	5/86-12/87		
Ag. Develop. Fund							215
	4,838			500	12/86	2,108	1,893 1
Evaluation	176					66	
TOTAL GRANT FINANCING	20,500	6,000		5,000		3,500	
LOAN FINANCING							
Construction	9,000						
NCARTT	2,800	2,800	2/86				
Service Centers	6,140	2,140	2/86	4,000	5/86		
A & E Contract	60	60					
TOTAL LOAN FINANCING	9,000	5,000		4,000			
TOTAL AID FINANCING	29,500	11,000		9,000		3,500	

212

Table 11
Projection of Drawdowns and Reflows
Under the On-Farm Demonstration

ITEM	YEAR 1	2	3	4
A. Ramtha				
AID	166032	5811.2	58111.2	58111.2
Farm Units	0	107920.8	107920.8	107920.8
Sub-Total	166032	166032	166032	166032
B. Balqa				
AID	16650/	582//.45	582//.45	582//.45
Farm Units	0	108229.5	108229.5	108229.5
Sub-Total	16650/	166507	16650/	166507
C. Rabba				
AID	135612	4/454.4	4/464.2	4/464.2
Farm Unit	0	88147.8	88147.8	88147.8
Sub-Total	135612	135612	135612	135612
D. Shaubak				
AID	17/418	62096.4	62096.2	62096.2
Farm Unit	0	115321./	115321./	115321.7
Sub-Total	17/418	17/418	17/418	177418
E. Total Costs				
AID	645569	225949.1	225949.1	225949.1
Farm Unit	0	419619.8	419619.8	419619.8
Sub-Total	645569	645569	645569	545569

Table 12
Projection of Drawdowns and Reflows
Under the Land Aggregation Account, HADP

ITEM	YEAR 1	2	3	4	5
A. Ramtha					
AID	56817	19885.95	19885.95	19885.95	19885.95
Demonstration	0	36931.05	36931.05	36931.05	36931.05
Sub-Total	56817	56817	56817	56817	56817
B. Balqa					
AID	48645	17025.75	17025.75	17025.75	17025.75
Demonstration	0	31619.25	31619.25	31619.25	31619.25
Sub-Total	48645	48645	48645	48645	48645
C. Rabba					
AID	56175	19661.25	19661.25	19661.25	19661.25
Demonstration	0	36513.75	36513.75	36513.75	36513.75
Sub-Total	56175	55175	56175	56175	56175
D. Shaubak					
AID	67250	23537.5	23537.5	23537.5	23537.5
Demonstration	0	43712.5	43712.5	43712.5	43712.5
Sub-Total	67250	67250	67250	67250	67250
E. Al-Mushaqqar					
AID	52002	18200.7	18200.7	18200.7	18200.7
Demonstration	0	33801.3	33801.3	33801.3	33801.3
Sub-Total	52002	52002	52002	52002	52002
F. Total Costs					
AID	280889	98311.15	98311.15	98311.15	98311.15
Demonstration	0	182577.8	182577.8	182577.8	182577.8
Grant Total	280889	280889	280889	280889	280889

Table 13
Estimated Costs for Machinery Loan Guaranty Fund

ITEM	NO. MACHINES	COSTS(1)	TOTAL COSTS ($)	FARMER DOWN PAYMENT	AID MAXIMUM EXPOSURER
Chisel Plow	25	2000	50000		
Sprayer	40	2200	88000		
Seed Drill	25	4000	100000		
Combines	5	65000	325000		
Tractors	15	20000	300000		
Grand Total Costs			863000	215750	323625

(1) Farmer Down payment equals 25% of Total Costs
(2) AID Exposure equals 50% of the difference between total costs and farmer down payment costs.

Financial Analysis

1. Introduction
2. Budgetary Analysis

   a. AID Inputs

      (1) Technical Assistance-Grant Funded
      (2) Training-Grant Funded

         (a) In-country Training Activities

            (i) Basic Training
            (ii) English Language Training

         (b) Training Outside of Jordan

            (i) Academic Training
            (ii) Specialized Training

      (3) Commodities/Equipment-Grant Funded
      (4) Evaluation-Grant Funded
      (5) Agriculture Development Fund - Grant Funded
      (6) Construction of Facilities-Loan Funded

   b. GOJ Inputs

      (1) Personnel Costs and Operational Support to Project Activities
      (2) Support to Training
      (3) Agriculture Development Fund
      (4) Land and Facility Construction

   c. Contingencies and Inflation
   d. Relationship of Project Inputs to Outputs

3. Project Financial Implementation

   a. Project Implementation Methods

      (1) Expedited Implementation Phase

         (a) Procurement of Commodities
         (b) Training
         (c) Technical Assistance/Administration
         (d) Architectural/Engineering Services

(2) Main Project Implementation Phase

(a) Institutional Contract for Technical Assistance and Training
(b) Commodity Procurement Contract
(c) Evaluation
(d) Agriculture Development Fund
(e) Facility Construction

(3) GOJ Project Implementation
(4) Financial Implementation Plan and Assumptions

b. Relationship of AID Input Financing Methods to AID Policy
c. Audit and Internal Control Considerations for AID Funds
d. Alternative AID Financing plans

4. Institutional Implications for the GOJ

a. Recurrent Costs
b. Project Financial Management Implications

Tables:

(1) HADP Summary Budget
(2) HADP Detailed Budget - U.S. Contribution
(3) HADP Detailed Budget - GOJ Contribution
(4) HADP Budget - Estimate of GOJ Personnel Required
(5) Financial Implementation Plan
(6) MOA Capital and Current Expenditure Budget 1982-1985
(7) Net increase to MOA Budget under HADP
(8) Relationship of Project Inputs to Outputs
(9) Projected Fund Commitments
(10) Fund Commitments by Fiscal Year Funding
(11) Projection of Drawdowns and Reflows under the On-Farm Demonstration Account.
(12) Projection of Drawdowns and Reflows under the Land Aggregation Account.
(13) Estimated Cost for Machinery Loan Guaranty Fund.

C. Economic Analysis

In evaluating the project in economic terms, the ex ante analysis will focus on production and those institutional activities particularly extention and research which affect productive relationships. Since the main project objective is to disseminate appropriate technologies to the highland farmer, the analysis assumes that the timing of project activities and related costs follow closely those anticipated in the project financial and implementation plans. Since the economic life of the project extends beyond the (PACD), project benefits and costs are projected over a twenty year period and discounted to the present.

For exposition purposes the analysis will treat the extension/production component first and later evaluate the likely costs and returns associated with the research component of the project. A separate benefit/cost ratio and internal rate of return will be calculated for each of the major components of the project to determine economic feasability of this project. The analysis will conclude with an overall rate of return for the project as a whole in keeping with the integrated approach between research and extension called for under the project. Sequentially, we begin with an overview of the agricultural sector and the characteristics of highland agriculture improved technology package. Next, we discuss the methodology for estimating project benefits and costs. This will be followed by an analysis of major crop enterprises. Next, we estimate the benefit-cost ratio (B/C) and the economic internal rate of return (EIRR) for the extention and research components seperatly. Finally, we measure the impact of changes in benefit and costs streams on the estimated extension and research B/C ratios.

Overview

According to a recent agricultural sample survey, Jordan's total cultivable land area is approximately 373,394 hectares of which the currently cropped area is roughly 243,239 hectares. The highlands represents some 225,000 hectares of cropped arable land or 89 percent of the total,See Table I.

Table I
Jordan: Basic Cropping Pattern, 1980-1982a/
(Crop data in hectares)

ITEM	Jordan Valley	Highlands	Highlands as % of Total
Field Crops b/	4,037	177,464	98
Fruits, grapes, olives	4,046	32,389	89
Vegetables	18,533	14,853	44
TOTAL CROPPED AREA	26.616	224,706	89
Fallow, cultivable	4,777	117,295	96
TOTAL CULTIVABLE	31,393	342,001	92
No of holdings	6328	44,406	88
Ave. holding	5.0	7.7	

Notes: (a) Averages for the three years, 1980-1982 (b) Wheat, barley, vetch, lentils and chickpeas
Source: Agricultural Sample Survey, Yearbooks, 1980-1982, Dept. of Statistics

Highland agricultural production can be further disaggregated into individual crops as reported in Table II. Wheat and barley are the principal field crops accounting for 49 and 22 percent of total cultivatable area respectively, with olive production being the most important perennial crop.

Table II
MAJOR LAND USES AND PRODUCTION
OF SELECTED CULTIVATED CROPS IN THE HIGHLANDS[1/]

TTPE OF CROP	AREA (HA)	%	PRODUCTION (M.T.TON)	%
1. Field Crops				
Wheat	108,888	.49	74093	.25
Barley	48,268	.22	24385	.08
Lentils	9,984	.04	7408	.02
Chickpeas	2,274	.01	1,524	.01
Vetch	3,000	.01	2,275	.01
Other Field Crops	5,086	.02	7,389	.02
TOTAL	177,464	.79	117074	.39
2. Vegetables				
Tomatoes	4,148	.02	36,897	.12
Melons	4,475	.02	42,029	.14
Other	6,230	.03	39m981	.13
TOTAL	14,853	.07	118,907	.39
3. Olives, Grapes, Other Fruits				
Olives	28,859	.13	34,468	.11
Grapes	2,215	.01	22,982	.08
Other	1,215		8,499	.03
TOTAL	32,389	.14	65,949	.22
GRANT TOTAL	224,706	1.00	301,930	1.0

(1) Averages for the period 1980-1982
Source: Agricultural Sample Survey, Dept. of Statistics 1980, 1981, 1982

The highlands is characterized by arid climate with extreme rainfall variability within and among years. Annual rainfall varies from an average of 200 mm in the Karak area, south of Amman, to 500 mm or more in the Irbid area, north of Amman. Highland agriculture is essentially rainfed, with vegetable and fruit crops being supplemented by some groundwater sources. Average traditional yields of field and fruit crops in the highlands are low at about 680 Kg/Ha for wheat, 510 Kg/Ha for Barley, 740 Kg/Ha for Chickpeas, 760 Kg/Ha for Hay and 2 M.T./Ha for Fruits. The most important factors responsible for these low cereal and pulse yields include sesaonal variability and low predictability of rainfall, inadequate weed control, low fertilizer use, poor soil moisture retention, and seedbed preparation.

There are approximately 25,000 farm families in the highlands with an additional 35,000 agricultural and animal husbandry related workers. The average family size is approximately seven people. The average farm size varies greatly according to the climatic and topographic conditions. In the northern part of the Highlands, Irbid area, with the terrain being gently very steep, average farm size is approximately 75 dunums with wheat accountaing for 60 percent of farm acreage and the rest diversified between lentils and fruit crops. In the Southern Highlands, Karak area, average farm size is approximately 150 dunums with the terrain being rollie and the farm being cropped heavily with wheat and barley. Land holdings in the highlands are fragmented, sharecropping and other tenancy arrangements are common. Soils are calcareous, rocky, shallow and defficient in basic crop nutrients, such as nitrogen and phosphates.

Most cereal cultivation in the highlands is still undertaken in a farming system using traditional practices except for land preparation where mechcanization," plowing," has been extensively adopted. About 90 percent of the land is plowed using tractors and a molboard or disc plow. Animal power is used to prepare stony land. Farm implements, such as the plow, disk plow and harrow are used on non-stony lands. However, chisel plows, and seed drills for planting, are not widely used due to lack of availability and/or knowledge on the part of the farmers. Seeding is normally done by hand broadcasting of untreated seeds on untilled soil, after which the surface is disked or plowed to cover the seeds. The result is uneven crop stands and low yields.

Weeding is generally done by hand although the use of basic spraying equipment to control weeds is spreading. Small scale farmers use hand back-sprayers and large-scale farmers use tractor-sprayers. Nevertheless, only some 8 percent of all highland farmers use herbicides. Fertilizer use remains limited, with only 8 percent of farmers found using nitrogen and less than 1 percent using phosphate according to one recent study of wheat farmers.(1) Unpredictability of rainfall, high cost and limited availability and lack of knowledge are the main factors inhibiting use of fertilizer. Few farmers have access to improved seed varieties. In a 1980 survey more than 50 percent of seed came from their own stock, while 14 percent purchased seed materials from cooperatives, and 28 percent from the market.(2)

221

Finally, harvesting and threshing are done mainly by hand, though the use of combines to harvest wheat and barley is increasingly common in areas of large-scale land holdings. Land preparation, weeding, and harvesting are the major family labor consuming activities in the traditional farming system.

Improved Technology Package

The project is intended to offer a package of improved technologies and cultural practices. These improved technologies and cultural practices would differ according to (a) rainfall zones, (b) level of mechanization, and (c) those using draught power. The technology package includes the following components for field crops: (a) early planting, (b) land preparatipn by chisel plow, (c) planting with a seed drill, (d) use of improved varieties, (e) use of fertilizer and appropriate rates,.and (f) chemical weed control.

Many of the improved technologies have already been tested under controlled experimental conditions and under farmer field conditions with great success.(3) Average yields for the Wheat and Barley variety test plots for the north area, Zone A, reported by University of Jordan gave approximately 150-200 percent higher yields than the Irbid district average. Almost certaintly a number of farmers will be reluctant to accept the full package of technologies. Therefore priorities have to be set for an alternative farm improvement package where the main emphasis should be put on early planting, land preparation techniques and seed drilling. Next would be the application of both fertilizer use and chemical weed control with improved varieties. Otherwise the use of fertilization without appropriate weed control would be a waste of soil nutrients.

The technology package for tree crops is not as well developed and tested as that for the field crops. however there are some improved cultural practices available and some that can be borrowed from other countries with similiar climatic and soil conditions quite readily. The technology package for the fruit and tree crops is as follows: (a) introduction of improved species, (b) revised planting densities, (c) contour planting, (d) improved fertility measures, (e) appropriate spraying, (f) early plant protection, and (g) appropriate pruning of plant material. Current research results from experiments and field trials from the work on citrus production in the valley can be easily modified to help increase fruit production in the highlands.

In short it is assumed that the availability of improved land preparation techniques, seed planting, and appropriate production inputs are not well known to the majority of the highland farmers or readily available through cooperative societies or by private custom operators.

B. Methodology

For the purpose of analysis, the project has been divided into extention /production, and research components. The production component considers economic returns to known technology, based on enterprise budget analysis and assumed adoption rates. The research component considers future economic returns to research arising under the project; that is, prospective returns beyond those that can be expected from the application

of existing technology. The extension/production component is evaluated seperately from the research component because they represent different activities and use different resources. In addition they enter into the process of technological innovation at different points in time, but they are interrelated and complementary. To estimate the seperate contribution of extension and research we rely on partial analysis, i.e., holding research expenditures at a certain level while estimating the contribution of extension. Likewise, in estimating the contribution of research, the level of extension is held constant.

On the cost side, some 35 percent of all project costs, i.e. those for buildings, research facilities and a portion of the technical assistance, have been identified as research costs; the remaining 65 percent of all costs are considered production, or extension, costs. While the methodology for calculating net benefits is essentially the same for the two project components, the further comments in this section pertain specifically to the extention/production component.

In calculating the net benefits and returns to extention and research a Bencost subroutine of the Benefit-Cost Analysis Package, developed by Development Designs was used to derive the Benefit-Cost Ratio (B/C), Economic Internal Rate of Return (EIRR) and Sensitivity Analysis on the six streams of benefits and two stream of costs. Sensitivity analysis is used to deterimine the economic impact of changes in the benefit or costs streams due to unforeseen events.

In order to compare project benefits and costs on an equal basis, both are converted into monetized streams over time and discounted back to the present. Typically, expenditures are greater early in project life, while the benefits usually occur later reflecting the time needed for project implementation and the gradual adoption of new technologies by farmers and/or custom operators. The identifiable costs include public costs which are explicitly shown in the project budget and private costs incurred by the farmer for the purchase of inputs related to the new technology. The benefits of the project are directly related to the increase in agricultural yields brought about by the adoption of the new technology. Technological improvements influences the production possibilities of agricultural commodities in two ways: (a) an output increasing effect and/or (b) a cost reducing effect. An example of an output increasing technology is the use of an improved crop variety. A cost-reducing effect is the use of a seed drill for improved seeding and uniform stand. Both types of technological improvements will influence the cost of production and therefore the production possibilities of the six major crops in this project.

The project benefits are estimated from enterprise budgets showing variable costs and revenues per hectare. The expected increase in yields along with expected farmer adoption rates and cropping pattern represent important factors in determining the level of benefits in a given year. The following conservative assumptions were made concerning the benefit stream. First, the current crop mix and corresponding areas under cultivation would remain constant over the period of analysis. That is,

there would be no crop substitution effect with respect to changes in relative prices and/or costs of production. Second, the farmer adoption rate would be cumulative and gradual reflecting the demonstration and on-farm trails effects of profitable technologies promoted under the project. Third the yield increases used in the analysis reflect approximately 60 percent of what the total technology package would provide if fully adopted. Other assumptions include constant real prices for outputs and inputs based on recent average year prices and the existance of marketing channels adequate to handle and process the additional market surplus produced by the highland farmers.

After estimating the relevant benefit and cost streams, the opportunity cost of investment resources in the project was taken into consideration. In calculating the net present value of benefits and costs, a discount rate of 15 percent was used. This rate is considered competitive in most capital markets at this time. However, the internal rate of return was found to exceed this rate by almost one-fold.

C. Farm Crop Budgets

The approach taken to estimate farm revenues, costs of production and net income is essentially an accounting approach. The enterprise budget for six major crops to be impacted by the project were constructed from data provided by the Agricultural Credit Corporation (ACC), Jordan Cooperative Organization (JCO) and Ministry of Agriculture (MOA) sources. An average farm gate price, for several recent years, was used in the enterprise budget analysis to reflect potential financial returns, see Table III. The enterprise budgets are planning budgets and do not represent any particular farming system, specific project site and/ or year. The financial budgets provide the basis for evaluating and comparing the relative profitability of alternative investments between cropping enterprises in which a package of technological inputs and customs services are used.

The relationship between inputs and outputs (yield) per hectare are represented for current technology "without the project" and new technology "with the project". Since the respective prices are held constant under both situations, the differences in net benefits are due to yield increases of Wheat, Barley, Lentils, Chickpeas, Hay, and Fruit crops by 114, 86, 50, 69, and 62 percent, respectively, see Table IV. The incremental net benefit reflects the opportunity cost of not shifting to the new technology. Conversely, it is a measure of the economic incentive to adopt the technology promoted under the project.

The six major enterprises of the project show positive returns to land, capital, family labor, and management under both the traditional and improved system, Tables V-X. Income over variable cash cost increased 166, 590, 114, 165, 23, and 14 percent for Wheat, Barley, Lentil, Chickpeas, Hay, and Fruit, respectively. The fruit enterprise provided the highest profit potential with chickpeas second and lentils being third. Family labor requirements were reduced for the cereal crops by 50 percent and 68 percent for the pulses. Labor requirements for fruit trees

increased approximately 58 percent. Given the scarcity of farm manual labor in the highlands the increase of mechanization and improved custom services will help reduce the need for foreign laborers and release family labor for other farm or non-farm activities.

D. Returns to Extension/Production

The project will concentrate in part on strengthening the extension component by providing technological assistance, training of individuals, resources for on-farm trails and demonstration, and improved facilities at the four regional agricultural service centers. The level of extention funds are reported in Table XI which show total estimated extension expenditures for project duration and recurrent costs for GOJ. An increase in extention expenditures, assuming approriate technology, availablilty of inputs and holding research expenditures constant, will have the effect of increasing the maximum percent of farmers adopting the new technology and reduce the adoption lag period from the time that would be required under current extention expenditures and institutional structure.

This process is characterized in Figure 1 which shows that Wheat acreage receiving the new technology is expected to reach a maximum adoption rate of 85 percent by year 11 versus 15 percent by year 15 under the current institutional structure. The marginal contribution of improved extention activities on Wheat at a given time period t, is estimated by the incremental benefit of producing wheat times the vertical distance between the two adoption profiles. The ratio of the discounted costs and benefits reported in Tables XI and XII, respectively provides a B/C ratio of 1.9:1. The point where benefits first exceed costs occurs in year ten. The calculated EIRR is 28 percent which seems to be a reasonable estimate when compared to the EIRR reported in Table XIII.

E. Returns to Research

The justification for public financing of activities which generate large positive externalities, such as education and research are well documented in public finance theory and supported by AID.(4) A survey of recent literature, of ex post analysis, on the returns to investment in agricultural research is shown in Table XIII.(5) The variation in annual internal rates of return range from 11 to 130 percent depending on the crop, the time period and, perhaps, the methodology of estimation. The World Bank in its review of projects performance noted that returns realized from agricultural research were general two or three times greater than most alternative investment opportunities. It is also noted that the economic internal rate of returns are generally higher in developing countries than in developed countries. In addition the majority of research efforts evaluated point to significant gains fully justifying the corresponding utilization of resources.

This part of the analysis therefore estimates a stream of benefits to the project from strengthening the national research capacity to undertake and successfully carry out multidisciplinary research appropriate to be

transfered to farmers. Increased benefits from yield increases, additional to those expected under the production/extension component, will result from expected variety improvement, improved seeding densities, optimal fertilizer application rates, and improved weed control for specific climatic zones. Benefits are calculated as the value of increased crop production. Crop areas are assumed constant as well as prices. Costs for the project are taken from the project budget and exclude inflation, since farm level benefits and costs are not inflated.

The value of increased production for each crop is made dependent on the assumed change in yield possible from technology transfer and the adoption of the technology by farmers. It is assumed that further variety improvements and improved cultural practices will increase yields by at least 20 percent over and above those already estimated. The adoption rates used under the production/extension activities are assumed here. Beyond that, a six year lagged period was assumed before improved research results would be generated and made available.

Table XIV summarizes the total estimated costs of research for the project and GOJ contribution. USAID contribution is made up of loan and grant funds for the construction of the National Agricultural Technology Center building, training of research persons, technical assistance, and laboratory equipment represent the main cost items.

The calculated EIRR to the research component of the project is 19 percent. This estimate seems reasonable when compared to similiar results from other countries with similiar climatic conditions and crops such as Mexico and India, Table XIII. The point where benefits first exeed costs occurs in year ten. The benefit:cost ratio, assuming a 15 percent discount rate, is estimated at 1.45:1.

F. Summary; Internal Rate of Return to Production and Research

The respective public cost streams for the project were shown in Tables XV and XVI. AID funding will end in project year 8. The GOJ will assume the institutional incremental recurrent costs associated with maintaining the institutional capacity built up during project years 1-8. Following is a benefit summary for the production and research components, respectively:

	Extension Component	Research Component
B/C ratio	1.9	1.45
Net present value	$20,807,459	$ 5,493,025
Cross-over period	10th year	19th year
Economic Internal Rate of Return	28 %	19 %

The weighted EIRR for the two components suggest a combined rate of return for the project as a whole of about 24 percent. The next step is to test the sensitivity of the IRRs to unexpected variations in the project benefit and cost streams.

G. Sensitivity Analysis

The benefit and cost streams for both sets of analysis were varied by 10 and 20 percent. Table XV summarizes the partial effect of these changes on the initial benefit/cost ratio (estimated at 1.9) for the Production/Extension Component. For example a 20 percent decrease in wheat benefits, caused by either a lower farm gate price and/or lower yield, with all other benefits and costs held constant, would decrease the benefit/cost ratio from 1.9 to 1.63, or by 14 percent. Similarly, an unanticipated GOJ increase in extension expenses (i.e, salaries) by 20 percent, holding all other benefit and costs streams constant, would lower the benefit cost ratio by 7 percent.

Table XVI, which summarizes the impact of changes in benefit and costs streams for the research component, shows similiar results. The results of the analysis indicate that the extension and research components of this project are sufficiently "robust" to merit the investment intended.

Therefore, the project development committee finds this project to be economically viable and recommends project approval at this time.

Footnotes:

1. Arabiat, S.,D. Nygaurd and K. Somal. 1982. "Issues of Improving Wheat Production in Jordan; Results from a Survey". University of Jordan and the International Center for Agricultural Research in the Dry Areas.

2. Arabiat, et al.

3. International Center for Agricultural Research in the Dry Areas. 1984. " A Report on the Jordan Cooperative Cereals Improvement Project". University of Jordan and Internation Center for Agricultural Research in the Dry Areas.

4. Agricultural Research activities were formerly confined to components of agricultural or rural development projects. But because of their significant impact they have had, and are now commanding more resources as individual projects in the regional bureaus. In 1984 over half a dozen AID missions in Africa had or were developing agricultural research projects.

   Central funding for agricultural research has also increased significantly. Presently over 20% of AID's funds for agriculture, rural development and nutrition are devoted to research. The World Bank has experienced a similiar growth of funding for this type of activity: about 30% of its lending activities to agricultural and rural development are for research.

   Most of AID agricultural research activities over the last two decades have been very successful. Each of the eight impact evaluations undertaken of AID agricultural research projects noted the significant economic impact of the research programs. Because of these successes, project activities have moved from a sole concentration in Asia to being included in each of the regional programs. The importance of agricultural research is widely accepted and was noted to be of particular importance by 24 AID missions in their CDSSs in 1983.

5. Ruttan, V.W., 1984. Toward a Global Agricultural Research Program. Monograph for "Workshop on Agricultural Research Policy and Organization in Small Countries." Wageningen, Netherlands, September 12-14, 1984. An earlier draft of this paper was presented at a meeting of the federal-state Joint Council on Agricultural Research, U.S. Department of Agriculture, Washington, D.C., August 1, 1984.

Table III

OUTPUT PRICES

FOR FIELD, AND FRUIT CROPS

ITEM	FINANCIAL PRICES(1) JD/MT	ECONOMIC PRICES (2) JD/MT
A. Cereals and Mixtures		
1. Wheat	110.00	78.00
2. Barley	70.00	64.00
B. Fodder		
1. Wheat Straw	50.00	35.00
2. Barley Straw	50.00	35.00
3. Lentil Straw	65.00	65.00
4. Chickpea Straw	50.00	50.00
C. Pulses		
1. Lentil	180.00	180.00
2. Chickpea	170.00	170.00
D. Tree Crops and Vines		
1. Olives	260.00	260.00
2. Grapes	110.00	110.00
3. Peach	185.00	185.00
4. Apples	185.00	185.00
5. Apricots	185.00	185.00
6. Figs	120.00	120.00

Sources:
(1) Financial prices and all economic prices except wheat and barley: Agricultural Credit Corporation and Jordan Cooperative Organization estimates based on average farmgate prices during the past few years.
(2) Wheat and barley economic prices: Actual C.I.F. prices on most recent international purchases.

Exchange rate: 1JD=US$2.50

TABLE IV
SELECTED FIELD CROP YIELDS
WITH AND WITHOUT PROJECT EFFECTS
M.T./HECTARE

ITEM	WITHOUT PROJECT	WITH PROJECT	%
A. Cereals and Mixtures			
1. Wheat	0.70	1.50	114
2. Barley	0.67	1.25	86
B. Fodder			
1. Wheat Straw	1.30	2.30	77
2. Barley Straw	1.20	1.87	56
3. Lentil Straw	1.40	1.60	14
4. Chickpea Straw	1.30	1.65	23
C. Pulses			
1. Lentils	0.60	0.90	50
2. Chickpeas	0.65	1.10	69
D. Fruit			
1. Apples	2.00	3.25	62

Source: Estimates by ICARDA Staff and Credit/Private Sector Study Team and Agriculture Sample Surveys, 1980, 1981, 1982.

Table V
WHEAT, FARM FINANCIAL BUDGET/HECTARES

ITEM	WITHOUT PROJECT		WITH PROJECT	
	JD	$	JD	$
Income(1/)				
Grain	77		165	
Straw	65		113	
A. Total	142	355	278	695
Production Expenses				
Land Preparation	20		15	
Seed	13		15	
Seeding	0		15	
Fertilizer	0		20.5	
Weed Control	0		5.3	
Harvesting	7		15	
Hired Labor	37.5		28	
Other	5.4		6.5	
B. Total Cash Costs	82.9	207.25	120.3	300.75
C. Net Benefit	59.1	147.75	157.7	394.25
D. Net Benefit w/o project	59.1		59.1	147.75
E. Incremental Net Benefit			98.6	246.5

Output Prices:(1/)	Financial	$	Economic	$
Grain (M.T.)	110	275	78	195
Straw (M.T.)	50	125	35	87.5

Yields(M.T./Ha)	w/o Project	W/ Project
Grain	0.7	1.5
Straw	1.3	2.3

Note: 1/ Exchange Rate 1JD=$US2.5

Table VI
Barley, Farm Financial Budget/Hectare

ITEM	WITHOUT PROJECT		WITH PROJECT YEARS	
	JD	$	JD	$
Income (1/)				
Grain	38.5		70	
Straw	50		75	
A. Total	88.5	221.25	145	362.5
Production Expenses				
Land Preparation	20		15	
Seed	14.4		15	
Seeding	3		15	
Fertilizer	0		17	
Weed Control	0		5.3	
Harvesting	7		25	
Hired Labor	34.3		18	
Other	5.7		6.4	
B. Total	84.4	211	116.7	291.75
C. Net Benefit	4.1	10.25	28.3	70.75
D. Net Benefit w/o	4.1		4.1	10.25
E. Incremental Net Benefit	0		24.2	60.5

Output Prices (1/)	Financial	$	Economic	$
Grain (M.T.)	70	175	64	160
Straw (M.T.)	50	125	35	87.5

Yields (M.T./HA)	w/o Project	w/ Project
Grain	0.67	1.25
Straw	1.20	1.87

Note: 1/ Exchange Rate 1JD=$2.5

Table VII
Lentil, Farm Financial Budget/Hectare

ITEM	WITHOUT PROJECT		WITH PROJECT	
	JD	$	JD	$
Income(1/)				
Grain	108		162	
Straw	91		104	
A. Total	199	497.5	266	665
Production Expenses				
Land Preparation	20		20	
Seed	21.6		18	
Seeding	0		15	
Fertilizer	0		17	
Weed Control	0		5.3	
Harvesting	15		25	
Hired Labor	67.3		16	
Other	8.4		6.6	
B. Total	132.3	330.75	122.9	307.25
C. Net Benefit	66.7	166.75	143.1	357.75
D. Net Benefit w/o Project	66.7		66.7	166.75
E. Incremental Net Benefit			76.4	191

Output Prices (1)	Financial	$	Economic	$
Pulse (M.T.)	180	450	180	450
Straw (M.T.)	65	162.5	65	162.5

Yields (M.T./ha)	w/o Project	W/ Project
Pulse	0.6	0.9
Straw	1.4	1.6

Note: 1/ Exchange Rate 1JD= $US2.5

Table VIII
Chickpea, Farm Financial Budget/Hectares

ITEM	WITHOUT PROJECT		WITH PROJECT YEARS	
	JD	$	JD	$
Income(1)				
Pulse	110.51		187	
Straw	65		80	
A. Total	175.5	438.75	267	667.5
Production Expenses				
Land Preparation	20		20	
Seed	20.4		15	
Seeding	3		15	
Fertilizer	0		17	
Weed Control	0		5.3	
Harvesting	15		10	
Hired Labor	54.3		31.1	
Other	7.4		6.6	
B. Total	120.1	300.25	122.9	300
C. Net Benefit	55.4	138.5	147	367.5
D. Net Benefit w/o Project			55.4	138.5
E. Incremental Net Benefit			91.6	229

Output Prices (1)	Financial	$	Economic	$
Pulse (M.T.)	170	425	170	425
Straw (M.T.)	50	125	50	125

Yields (M.T./Ha)	w/o Project	With Project
Pulse	0.65	1.1
Sraw	1.3	1.6

Note:1/ Exchange Rate 1JD=$2.5

Table IX
Hay, Farm Financial Budget/Hectare

ITEM	WITHOUT PROJECT		WITH PROJECT YEARS	
	JD	$	JD	$
Income(1/)				
Grain	77			
Straw	65			
Hay			172	
A. Total	142	355	172	430
Production Expenses				
Land Preparation	20		10	
Seed	13		10	
Seeding	3		10	
Fertilizer	0		11	
Weed Control	0		0	
Harvesting	7		24	
Hired Labor	34.5		30	
Other	5.4		4.75	
B. Total	82.9	207.25	99.75	249.375
C. Net Benefit	59.1	147.75	72.25	180.625
D. Net Benfit w/o Project	59.1		59.1	147.75
E. Incremental Net Benefit			13.15	32.875

Output Prices(1/)	Financial	$	Economic	$
Hay (M.T.)			75	187.5
Grain (M.T.)	110	275		
Straw (M.T.)	50	125		

Yields (M.T./Ha)	w/o Project	W/ Project
Hay		2.3
Grain	0.7	
Straw	1.3	

Note: 1/ Exchange Rate 1JD=$US2.5
1 Hectare = 10 dunums or 2.47 acres

235

TABLE X
Fruit Farm Financial Budget/Hectares

ITEM	WITHOUT PROJECT		WITH PROJECT YEARS	
	JD	$	JD	$
Income(1/)				
Fruit	370	925	601.25	1503.125
Production Expenses				
Land Preparation	22.5		15	
Replacement Stock	0		60	
Fertilizer	3		49.5	
Pesticides	0		15.4	
Pruning	9		16	
Harvesting	50		70	
Hired Labor	24		68.2/	
Other	15.35		27.4	
B. Total	123.85	309.625	321.57	803.925
C. Net Benefit	246.15	615.375	279.68	699.2
D. Net Benefit w/o Project			246.15	615.375
E. Incremental Net Benefit			33.53	83.825

Output Prices(1/)	Financial	$	Economic	$
Fruit (M.T.)	185	462.5	185	462.5
Yields (M.T./Ha)	w/o Project		W/ Project	
Fruit	2		3.25	

Note: 1/ Exchange Rate 1JD = $US2.5

236

TABLE XI Summary of Expected Adoption Rates and Estimated Benefits for Selected Crops,

Year	Wheat		Barley		Lentil		Chickpea	
	Adopt-1/ tion	Total Net2/ Benefit	Adop- tion	Total Net Benefit	Adop- tion	Total Net Benefit	Adop- tion	Total Benef
1	0	0	0	0	0	0	0	
2	5	817	5	87	1	19	1	
3	10	1633	10	174	2	38	2	1
4	20	3267	20	348	4	76	4	2
5	30	4900	30	521	7	133	7	3
6	40	6533	40	695	11	210	11	5
7	50	8166	50	869	16	305	16	8
8	60	9799	60	1043	22	419	22	11
9	70	11433	70	1216	30	572	30	15
10	75	12250	75	1303	40	763	40	20
11	80	13066	80	1390	54	1030	54	29
12	85	13883	85	1477	69	1316	69	35
13	85	13883	85	1477	74	1411	74	38
14	85	13883	35	1477	78	1487	78	40
15	85	13883	85	1477	82	1564	82	42
16	85	13883	85	1477	82	1564	82	42
17	85	13883	85	1477	82	1564	82	42
18	85	13883	85	1477	82	1564	82	42
19	85	13883	85	1477	82	1564	82	42
20	85	13883	85	1477	82	1564	82	42

(1 The adoption rate is cummulative and represents the percent of basic area receiving improved agricultural practices. Wheat base area is 108,883 hectares, Barley 48,268 he lentils 9984 hectares, chicpeas 2274 hectares, Hay 3000 hectares, and fruit 32,735 hect

2) The total Net Benefit is derived by multiplying the area receiving improved agricultura for each respective crop times the incremental net benefit from the economic farm budge $147/Ha, Barley $70/Ha, Lentil $191/Ha, Chickpea $229/Ha, Hay $33/Ha, and Fruit $84/Ha.

Check hay Ec.returns

Table XII
Estimated Extension Costs for
USAID and GOJ HADP
($US 000)

YEAR	USAID	GOJ	TOTAL
1	6,399	963	7,362
2	3,938	1,494	5,432
3	3,068	2,454	5,522
4	511	2,454	2,965
5	1,631	2,815	4,446
6	777	2,811	3,588
7	411	2,811	3,222
8	92	279	371
9	0	1105	1105
10	0	1105	1105
11	0	1105	1105
12	0	1105	1105
13	0	1105	1105
14	0	1105	1105
15	0	1105	1105
16	0	1105	1105
17	0	1105	1105
18	0	1105	1105
19	0	1105	1105
20	0	1105	1105

Note: Estimates include allowance for contingencies but not for inflation.

Table XIV
Estimated Research Costs for
USAID and GOJ,
HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT
(US$ 000)

YEAR	USAID	GOJ	TOTAL
1	3,447	519	3,966
2	2,121	794	2,915
3	1,652	1,321	2,973
4	275	1,321	1,596
5	878	1,516	2,394
6	419	1,514	1,933
7	221	1,514	1,735
8	49	151	200
9	0	595	595
10	0	595	595
11	0	595	595
12	0	595	595
13	0	595	595
14	0	595	595
15	0	595	595
16	0	595	595
17	0	595	595
18	0	595	595
19	0	595	595
20	0	595	595

Note: Includes estimates for contingencies but not inflation.

Table XV
Estimated Impact of a 10 and 20 Percent
Change in Individual Benefit and Cost
Streams on Production/Extension Benefit/Cost Ratio

Item	-20	-10	- 0 -	+10	+20
A. Benefits					
1. Wheat	1.63	1.77	1.9	2.05	2.19
2. Barley	1.85	1.88	1.9	1.94	1.97
3. Lentil	1.89	1.90	1.9	1.92	1.93
4. Chickpea	1.90	1.91	1.9	1.91	1.91
5. Hay	1.91	1.91	1.9	1.91	1.91
6. Fruit	1.89	1.91	1.9	1.92	1.93
B. Costs					
1. USAID	2.14	2.02	1.9	1.81	1.73
2. GOJ	2.11	2.00	1.9	1.82	1.75

Table XVI
Estimated Impact of a 10 and 20 Percent Change
In Selected Benefit and Costs Streams on
Research Benefit/Cost Ratio

ITEM	BENEFIT - COST RATIO				
	-20	-10	- 0 -	+10	+20
A. Benefits:					
1. Wheat	1.33	1.39	1.45	1.50	1.56
2. Barley	1.39	1.42	1.45	1.47	1.50
3. Lentil	1.42	1.43	1.45	1.46	1.48
4. Chickpea	1.44	1.44	1.45	1.45	1.45
5. Hay	1.45	1.45	1.45	1.45	1.45
6. Fruit	1.36	1.40	1.45	1.49	1.53
B. Costs:					
1. USAID	1.62	1.53	1.45	1.37	1.31
2. GOJ	1.60	1.52	1.45	1.38	1.32

I. Social Soundness

1. Social Constraints and Opportunities

a. Demographic Setting

Perhaps the most significant social factor which has some impact on agricultural production in the Jordanian highlands is the speed of social change and the potential for even faster change. With 48 percent of the population under the age of 15 (only two nations have a higher percentage) and continuing high fertility (total fertility rate of 7.2 births per woman is surpassed by only 4 nations) (14), Jordan has built into the structure of its population the potential for very rapid change. Such change may provide the potential for rapid solution of some problems, such as rapid lowering of illiteracy rates among adults as the young, educated population becomes adult. Alternately, the age structure contains the potential for serious problems, such as unemployment.

b. Unemployment

Unemployment has not been a serious problem for Jordan because of the availability of jobs in the Arab Gulf States and the boom in construction in Jordan which has been partially based on remittances from persons working in the Gulf States. Both of these opportunities are slowing down. With many of the returning workers needing jobs and an estimated minimum of 50,000 young adults entering working ages each year (14), there is a potential for a major unemployment problem in the next few years.

Unemployment can have several influences on agriculture. First, the urban workforce will not be able to continue to absorb a large influx of persons from rural areas, whether they are displaced by agricultural or social change. Second, remittances from abroad and from urban to rural areas will not be growing rapidly as in the recent past. Remittances from abroad will have less direct effect on agriculture, since those are usually spent on housing. However, as stablees in remittances lead to less increase in construction, there will be fewer new construction jobs available. There is also the possibility that lack of employment opportunities may result in some absentee landlords returning to cultivate their own land (13), thus displacing some who are now renting or sharecropping and placing in cultivation some lands which are now idle.

c. Patterns of Land Use

(1) Fragmentation and Consolidation

Under the current legal system, land is divided among all children, although daughters may refuse their share. The result has been extreme fragmentation of land ownership. For example, 24 percent of all agricultural land ownership in Jordan involves less than 10 dunums (less than one hectare) (8).

It is reported that in the last two or three years there has been a great change in the patterns of organization of land for agricultural use. Consolidation of farming occurs in a variety of ways ranging from sharecropping and renting to cooperation of landowners or renters in the actual cultivation of adjoining parcels. In the Zarqa watershed project, it is estimated that consolidation since the early 1970's has occurred at about the same rate as fragmentation, keeping the situation relatively stable (13). However, there is some discussion that, in the last two or three years, consolidation has been occurring faster than fragmentation.

One kind of consolidation appears to be occurring when one family member farms the combined family holdings. In such cases the role of other members in decision-making needs to be understood and considered in the process of technology transfer. Family ties are strong, as seen in the sending of remittances, and this kind of family consolidation may also provide the farmer with cash resources for agricultural investment beyond what could be expected from the land itself. A pattern similar to what Caldwell calls the "share family" in India may also be occurring in Jordan. This family arrangement finds the farming member of the family supplying non-farming members with food (13), while the non-farming members contribute to the cash needs such as schooling costs and agricultural investment of the farmer.

There are several aspects of farming patterns which need to be studied before the targeted population of the project can be completely identified and before technology can be modified and transfered.

Effort now is needed to identify certain aspects of land use in order to have some minimal understanding of potential target populations.

(2) Small Farmers

For this project, a small farmer is defined as one who uses for agricultural purposes less than 30 dunums (3 hectares) of land. The person defined as a farmer is the person responsible for cultivating the land, is not necessarily the owner. The land area counted for the above definition includes land considered by the farmer to be fallow land, and grazing land which is specifically owned or rented. Also included in the definition of small farmer is the person (man or woman, but usually the latter) who cultivates a home garden next to the house or keeps a few animals, mostly in the yard area.

There are two exceptions to the above definition of the small farmer. First, in areas of rainfall of 500 mm or higher the small farmer is one who uses less than 20 dunums for agriculture. Second, for those whose agricultural activity is almost exclusively herding, the definition is based on the size of the herd. A single herding family is defined as a small "farming" operation if the number of animals owned (primarily sheep and goats) is less than 30. The number of herding operations is very roughly estimated to be about 9 percent of all agricultural operations (7).

242

Because the definition of the small farmer is based on usage and not on ownership of land, it is not possible with available data to get an accurate picture of the extent of small farming operations. However, to give some idea of the setting, land ownership in 1980 in all Jordan including the Ghors will be described. Agricultural land holdings (owned land) of less than 20 dunums constitute about 38 percent of agricultural land holdings. Holdings of less than 30 dunums include 48 percent of land holdings (8). The average number of pieces in 51 percent of the holding is 3.5 (1), which shows that the size of the holding does not fully reveal the extent of fragmentation.

It is possible to get some idea of the patterns of land use in Irbid District by looking at information from the 1975 Census of Agriculture in combination with the Agricultural Sample Survey for 1980 (8). Using these data for a very rough estimate of non-owner agricultural use of land, we can guess that from 20 to 40 percent of farming operations involve less than 20 dunums and from 30 to 50 percent of operations involve less than 30 dunums in Irbid District. It is expected that even with consolidation of land for farming, there will still be many small farmers, since 78 percent of the land (1975 census) and 80 percent of the holdings are owner operated .

(3) Part Time Farming

Another economic response to land fragmentation is part-time farming. The 1975 Census reveals that 30-40 percent of "farmers" had another main occupation (13). Part-time farming is not an extremely recent phenomenon, and it is thought by some that a combination of farming with other jobs may be a good thing. It helps keeps the population in rural areas since the wife and children of a family often stay in the rural area as the husband or son commutes daily, weekly, or monthly to an urban job (6). This pattern has implications for who makes the agricultural decisions. In addition, the other income provides a backup for the family involved in the uncertainties of rainfed agriculture. Indeed, other jobs held by the farmer or by relatives in the share family system may provide a kind of insurance which makes it possible for many farmers to stay in the business of farming in the extremely uncertain setting of rainfed agriculture in Jordan (10).

(4) Legal System

A final issue influencing land use which needs to be understood for effective implementation of the project is the complex system of legalities surrounding agricultural land use. "Ownership" does not imply what is does in the legal system of the United States. Understanding ownership is particularly important in relation to improvement of rangeland, since persons other than the "owner" have rights to non-crops. "It [is] unethical to refuse permission to graze on stubble, fallow and unused land, unless it is required for one's own animals" (13, p.33). However, there are certain parts of the legal code which do provide some protection for those growing fodder crops (13). There are also different kinds of renting and sharecropping, some of which provide protection for the user's ultimate right to the land.

5. Removal of Agricultural Land From Production

(1) Land Speculation

Several social factors have resulted in removal of agricultural land from production. One of these factors is the use of excess capital, often earned in Gulf States, to buy land as investment. When land speculation is the motivation for purchasing the land, the land is not usually used for agriculture (15).

(2) Urbanization

Another factor, rural to urban migration, has contributed to a loss of agricultural land in two ways. First, rural to urban migration has contributed to urban sprawl (15). The growth of such cities as Amman, Irbid, and Jarash extends into agricultural land and appears to be totally uncontrolled. For example, the area of agricultural land in Irbid Sub-district in 1983 was only 82 percent of the area of land in agriculture in 1975 (7). The goal of increasing agricultural production in the highlands may not be reached if good land continues to be lost to agriculture at such a rapid rate.

Second, there is a shortage of the younger generation to take over farming. Less than half of the farmers in the Zarqa study believed their sons would like to farm. The young, especially those with education, are leaving rural areas, leaving a shortage of labor (except near the Palestinian Refugee Camps) and a lack of the next generation to farm (13). Part of the reason for leaving is lack of basic services, such as roads, transportation, health care, and schools (6).

The ineffectiveness of the extension service is partially related to the problem of rural livability. It is difficult to persuade educated persons to live in areas where good schools and other facilities are not easily available. It is even more difficult to persuade people to do this on low pay. Add to this lack of support services, the resultant ineffectiveness of extension has meant this tool for increasing agricultural production has not been used. Low agricultural productivity, in turn, contributes to the migration from rural areas.

e. GOJ Policy

There are several aspects of GOJ policy related to social factors which act as constraints on the implementation of the project or in reaching the goal of increased highland agricultural production. The following are seen as particular problems.

(1) Low pay and small increments for civil servants leads to loss of highly qualified and motivated persons from agricultural research and extension in the MOA.

(2) Subsidy of cereals may be responsible for farmers cultivating wheat and barley in areas which are, at best, marginal for those crops.

(3) The problem of urban sprawl into agricultural lands has been mentioned. Lack of government policy to control this loss adds to the problems of increasing agricultural production in the highlands.

(4) Currently, the apparently widespread practice of sharecropping and renting sometimes does not contribute to long term care and investment in the productivity of the land. There is no government policy to deal with this problem.

It is recommended that the GOJ be encouraged to seriously consider modification of creation or policies to deal with these problems. In some cases the problem could be solved by commitment of GOJ to enforce current laws.

2. Target Population

The following analysis will systematically consider categories of people involved in highland agriculture. Characteristics of some categories are discussed in detail since they influence effective project implementation. Then the potential for benefit or harm to those persons from the project is discussed. Specific ethnic groups will not be discussed in detail.

a. General Definition of Target Population

The target population for this project is to be all persons engaged in rainfed agricultural production in the Jordanian highlands. Agricultural producers who will be targets for technology development and transfer through the SCRAD process are all farmers, herders and their families, including those with home gardens and yard animals, and agricultural laborers. In addition, custom operators, agricultural suppliers and other private and public agencies in highland agriculture will be targets for inclusion in the SCRAD process and education about the developed technologies when it is appropriate.

It is not possible to identify a simple, unified target population for this project because those involved in highland agriculture are land owners, renters, and landless laborers, persons working large land areas and persons working less than 5 dunums, persons with a long cultural history in agriculture (settled Palestinians and Camp Palestinians), nomadic Bedu, recently settled Bedu, who, while experienced for uncounted generations in herding, have less experience in cultivating crops, and finally, other settled East Bank Jordanians with varying cultural backgrounds in cultivation and herding. Women's roles in agricultural activities and decisions also vary in the groups mentioned, and vary from north to south within the highlands. There are also variations in whether the "farmer" is a full-time farmer or if another job is held.

Sensitivity to these variations will increase the probability that the project will produce technologies which are compatible with the various groups and that it will transfer the technology effectively. If these occur, adoption is likely to be higher, and highland agricultural production likely to increase. To give one example of the need for consideration of social factors, in groups in which women have a strong voice in agricultural decisions, failure to inform women about new technologies could be one reason for low adoption rates.

(1) Farmers

Inclusion of the small farmer will increase the likelihood of project success in increasing highland agricultural production. Most technology available in Jordan has been designed for the large farmer. Even though, for example, mechanization is available to small farmers through custom operators or rentals from neighbors, the charges are still too high for many to mechanize.

If only large farmers (operations involving 500 or more dunums of land) have ready access to technology, and that technology has been adapted primarily for them, they have several advantages in making their land more profitable. Small and medium sized operations cover 70 percent of agricultural land area (8) and can contribute significantly to increased agricultural production. However, they need technology which is adapted to their needs and resources. Many technologies have been developed with the big farmer in the United States in mind. It is important that the research being done in this project consider not only the climatic and soil adaptation, but also the social adaptation of the technologies.

If such adaptations are made, the farmer of a medium or small sized operation will have a wider range of choice of technologies to suit his or her needs. Thus, the development of technologies for small operations will benefit more than the small farmer. If a larger number of small and medium sized farmers are able to modernize, highland agricultural production will increase more than if their needs are ignored.

However, if the needs of the small farmers are not included in technology development and transfer, a low rate of adoption of modern agricultural techniques may result. Research shows that "most farmers, in spite of their desire to do so, are unable to pay the cost of farm modernization" (6,p.49).

The assumption that small farmers are traditional, and thus resistant to change has been repeatedly shown to be incorrect. Small farmers have been shown, in some situations, to be better adopters of new technologies for larger portions of their land than larger farmers in the same setting. This has occurred even when extension efforts and credit have been directed at large farmers and small farmers have had to seek out the new technology themselves. Failure to develop technology and failure to contact small farmers places them at an unnecessary disadvantage beyond the constraints they face in limited resources.

(2) Home Gardens and Yard Animals

In addition to persons conventionally recognized as small farmers, there are those engaging in small scale agricultural production primarily intended for family consumption. Many families do this kind of agricultural production, and its value in contributing to the food security of the Kingdom should not be underestimated. Home production of food, especially of fruits and vegetables, can contribute to the health of the family beyond the apparent monetary value. First, variety in the diet is very important to nutrition and is enhanced by home production. Second, because much home produce is consumed when it is very fresh, vitamin content is higher than in food which has been

shipped and stored in poor conditions. Yard animals provide similar contributions to the health of families. Their productivity, as that of home gardens, is reported to be well below potential production levels. Technologies are available for quick adaptation and transfer.

Extension of more productive technologies, adapted for small-scale home production, could increase national agricultural production and contribute to the health of many families. Also, agricultural production for home use, whether it uses the "leisure" time of men and children after jobs and school, or the productivity of women, contributes to the overall productivity of the Kingdom in terms of use of available human labor, and in terms of maximum use of agricultural land.

(3) Herders

Herders are important in the agricultural system of the highlands. During dry times herders will graze their animals in highland areas. At other times highland-owned animals are taken by herders into the desert. Involvement of these people is essential for improvement of rangelands as well as protection of other lands. Without involvement of herders, it will simply not be possible to implement effectively any rangeland improvement program. However, they will not be an easy target population. Persons who are involved in herding as a major activity may be part of stable communities in the highlands or they may be nomadic or semi-nomadic. Efforts to involve them in planning research and to transfer technology to them will require commitment and creativity. The UNEP cofinanced program will examine the best means of organizing settled herders into grazing cooperatives.

Herders will benefit in the long run from improvement of rangeland and growing of high quality forage crops. However, there may be some initial harm and thus resistance to any technology package which includes a clean fallow since this will remove what is now an important source of food for animals.

(4) Women

Women are agricultural producers in the highlands. Their role should not be overlooked. Project success will be more likely if successful methods are developed for technology development and transfer to this group.

(a) AID Policy

At this point it may be useful to review selected portions of the AID Policy Paper: Women in Development.

The following quotations are taken from that paper.

> Women's increased productivity depends on their improved access to resources, e.g. land, improved farming techniques, information, employment... Where inefficient technologies reduce women's overall productivity, AID will support the development of labor-saving and time-saving technologies which are acceptable and accessible to women . . . AID will support the

347

development of institutions and transfer of technology which ensure: the appropriateness and access of improved technology of women (as well as men); and (b) the existence of institutions which include women and effectively reash women (as well as men) and which permit the dissemination of benefits and information to both sexes (5,p.1). Steps must be taken to ensure that the new technologies and resources which are part of development assistance give evidence of "trickle-across," in fact resources allocated to "the farm household" typically reach men rather than women . . . Furthermore, steps must be taken to ensure that control which women may have over resources is not threatened or eliminated by reallocation of such resources to other. (5,p.4).

With these portions and the rest of AID policy on women in mind the following analysis and recommendations concerning the inclusion of women in this project are made.

(b) General Setting of Women in Jordan

Educational levels vary by gender in Jordan. Illiteracy is a condition of many more females than males. Only 19 percent of males were illiterate in 1979 compared to 48 percent of females (9). The illiteracy rate varies by age and residence. In 1976 young women were less likely to be illiterate (13 percent at age 15-19 and 23 percent at age 20-24) than older women (89 percent illiterate at age 50 and older). Women in rural areas were twice as likely to be illiterate (76 percent) as were women in urban areas (38 percent) (9a). Rural women are not only less educated than urban women, but opportunities for girls to continue their education beyond primary school are often limited in villages without preparatory or secondary schools (6 and 10).

The primary occupation open to women with limited education is agriculture. In 1975 women were 36 percent of agricultural workers.

(c) Agricultural Involvement of Women

Women in Jordan are active in agriculture as part of agricultural families. The view of their role varies depending on the gender of the informant and the gender of the listener. Jordan is a society with varying degrees of seclusion of women. Outsiders often meet men first when visiting a village or family. Male visitors, more often than not, fail to interact with women of the village or family. Female visitors, however, are free to visit the women and they get a quite different view of what is happening than is received from male interaction. Male interaction provides the view that men are the primary agricultural producers and that they make all decisions about agriculture and other important matters themselves. However, when women interact with women, even with men present, the view is presented that women are very active in agriculture. Women describe in great detail their involvement in agricultural decisions and wonder how their husbands could possibly make such decisions alone. Men will also acknowledge to women that women are very influential in family decision making.

248

Research supports the view that women who are active in agricultural tasks are also involved in decisions of the family (13). Their skills and activities include planting, weeding, cultivating, pruning, spraying, harvesting, care of animals, work in home gardens, and processing and storage of various kinds of agricultural produce (3).

In most crop production tasks in which women are more involved than men, women have about twice as much involvement as men in cultivating, weeding, planting, and spraying. The tasks from which women are excuded are plowing and (non-human) transportation. Women do not operate machines (3). Women are also involved in milking and the care of animals (13).

Yard agriculture is an important part of women's role in agricultural production. "The Jordanian village women's agricultural baliwick is her yard (3,p.75)." The majority of low income families own no more land than their house site. Home gardens are an important part of the agricultural activities of the family, especially for very small land holders. Basson found in 1979 that 43 percent of families with only one dunum had home gardens (3). Thus the access to agricultural production for many small holders is the home garden and yard animals. In addition, as mentioned before, in many societies, and probably in Jordan, variety in the diet is provided in large part through the gardens of women. Often a very small amount of production can have a disproportionate influence on the nutrition of low income families.

Despite the relatively low productivity at present of home gardens and yard animals, women's activities make a significant contribution to family income. Basson found, in a non-probability sample, that the senior women in agricultural households contributed an average of 18.4 percent of total family income, in terms of the value of her productive activities (3).

Women agricultural wage laborers have another kind of involvement in agriculture. Many of these laborers are Palestinian, and many of these are not "rural" by conventional definitions. Many live in Palestinian refugee camps in cities or in camps which are larger than several of the towns of Jordan (9). Women laborers are usually an important or sole support of their families (3). Women agricultural laborers reported to the do different jobs than men. There is also some sharing of certain tasks. Women agricultural wage laborers do planting, weeding, and cultivating of vegetables, harvesting of vegetables, lentils, and wheat, and olive picking (3). Plowing, for example, is done by men only.

In addition to participation in agricultural activities, women participate in decisions of the family about agriculture and agricultural investments (13). Since women often have hidden cash savings, and savings in the form of gold which only they can use, they could provide some capital for agricultural investment. But such investment is provided only if the woman so decides. It is considered to be totally unacceptable for a man to use his wife's, mother's, or sister's gold without her permission (3).

In the absence of male family members who have gone to jobs in cities, or in other countries, the woman may be the only farmer or herder available to make decisions about certain agricultural activities (6 and 10). Without her decision the needed activity will not get done. This pattern has important implications for transfer of technology to farming families.

(d) Advantages to the Project of Involvement of Women

There are a variety of advantages of inclusion of women in project implementation. Inclusion of women will increase the probability of project success.

Women can contribute to development of technology. They know their own needs. They know the problems involved in certain tasks. Therefore, input from women from farming and herding families and from agricultural wage laborers will be useful in the SCRAD process as research and technology development priorities are developed.

Women are in control of much of the consumption of agricultural products whether those products are used in the family which produced them or whether the products are purchased. Therefore, women have important information on the acceptability of new varieties of food products needed in terms of processing and storage procedures in the home. Input from women will assist in estimating the extent of a market for various agricultural products, and the availability of agricultural produce for the market (or how much will be consumed in the family). For example, there is not much point in gearing up for a major effort to process an increased amount of a certain agricultural product for the market, if 90 percent of that agricultural increase will be consumed without entering the market.

In addition to the practical need to involve women in technology development, there are similar practical reasons for involving them in transfering technology. Women are involved in certain agricultural tasks more than men (3). Women need the expertise in order to use the new technologies.

Expecting men to teach their female family members is not realistic. It has not happened in the past. There are no signs that it would happen in the future. In practical terms, considering only effective project implementation, women need to be targets for technology transfer.

> If technical improvements in crop or animal husbandry are introduced, it is not sufficient that the male head of the holding is aware of the changes. The hands dealing with different manual operations have to be trained as well. This is merely a technical aspect (10, p. 66).

Women are involved in decisions about agriculture. The increasing practice of men holding another job, in addition to farming, places the women in a crucial position. "Modern agricultural production often requires quick decisions while husband and/or brother are away at work (e.g. phytosanitary measures)" (10, p.66).

Women also need to understand new technologies whether or not they, themselves use them. It is possible that the low adoption of some modern technologies can be traced to the lack of information about them by one of the key decision makers-the woman. This has happened in other developing countries.

Another reason for making efforts to transfer technology to women is that they are asking for help. Much concern has been heard about the lack of interest of the farmer in new technologies. By contrast, Basson found that women want help and technical assistance in their agricultural tasks (3). While a lot of energy may be spent trying to find and convince male farmers to adopt new technologies, it may be that the women are simply waiting to be contacted.

(e) Methods for Involvement of Women in the Project

Specific efforts will be made to include women in project implementation. It cannot be assumed either that women will automatically be included in technology development and transfer or that they will benefit when not included.

There is also a danger of overreaction to the cultural limitations on rural women's interaction with men in public. Many cannot or will not, but others will. It is suspected that older women especially will have more freedom and self-confidence concerning activity outside the home. There are also cultural differences among various groups. Assuming that it is impossible for women to represent themselves and others is but another way to exclude them. Assuming that they have all the skills necessary to interact in a public setting is also a way to exclude them.

Inclusion of women in the development process through this project will be done in the two following interrelated ways.

(1) First, by hiring qualified women staff for the NCARTT and ASCs. In addition, two women qualified in some agriculturally related field will be each hired for ASC. These women ASOs would have the express duty to involve women in the technology development and transfer process. They will be among those representing women in the SCRAD process and will provide input to guide the research for technology development and adaptation. When it is not acceptable for men to transfer the technology to women, the women ASOs will do so. As it may not be acceptable for women agriculturalists to approach the private sector for advice, the role of women ASOs in transfering technology to them is crucial. Special training of women ASOs will be necessary to provide them with the wide variety of skills needed to carry out their jobs.

(2) Second, women will be involved in the SCRAD process. Some women will be found to participate in public meetings. Getting input from women will require some effort, but will not be impossible. It will not be possible for all women to come to public meetings and, additionally, express their viewpoints adequately. However, there will be some women, probably some in each village, who may be willing to participate. These will probably be the women most likely to adopt innovations. In addition, women ASOs who have been assigned the task of representing women's concerns in the ASCs can seek input from women who are not able to participate in the more public process. Care must be taken by the women ASOs to represent,

as objectively as possible, the concerns of all women agriculturalists, and that they do not rely entirely on the more assertive village women, since these are the women most likely to represent themselves at the public meetings.

In the early stages of the project, the animal production and range management technologies being developed and transferred are those most likely to be used by women. Care should be taken that women are especially included in the development and transfer of technology in these as well as other areas early in the project, and in vegetable and tree crops later in the project.

(f) Women as Beneficiaries

Women's involvement in the project implementation is important because their involvement can contribute to project success. AID policy also requires that attention be given to women's issues so women can benefit from development (15). Women as beneficiaries will now be discussed.

If the project had focused narrowly on cereal grain production as mentioned in the PID, the effect on women would be negative. Indeed, it would provide another textbook example of the exclusion of women in the development process, especially if it is assumed that all technology can be transfered to men only. Women's productive, economic roles in the current production of grain are likely to be eliminated. This can have negative effect on her family role as will be discussed below.

The elimination of women's roles in grain production will be especially difficult for women agricultural wage laborers whose wages are important for the survival of their families. Palestinian women who live in the camps would be especially negatively affected.

Women whose agricultural production occurs in the family may find their productive activity reduced, and as a result, their influence and status within the family also reduced. Exclusion of women from access to the information needed to participate in family decisions has, in other societies, been related to a decrease in power and influence within the family and thus to lower status. Decreasing the productive activity of women in agriculture has the same effect. This may be happening in Jordan. Twice as many women work in rural as in urban areas of Jordan. Traditionally, it was a source of low status to a man to have his wife work outside the family (13). A male social scientist who has studied the urban family reported that urban women, despite appearance of modernity often have less power in the family and less freedom of action than rural women (Barhoum, personal communication). This is consistent with the results of the Zarqa Project study (13).

Since women do contribute to cash income and in-kind substitution for cash, pushing them out of agriculture without providing ways for them to increase their productivity increases the cost of an innovation to their families and to society. Making it possible for women to continue or strengthen their economically productive roles in the rural setting, rather than losing those roles, may make the small difference necessary for a family to

stay in the rural area. That is desired by a significant portion of the rural population. In addition, strengthening the productivity of women through the already existing activity of the home gardens and yard animals will provide income-generating activity for women with a minimum of resource mobilization in comparison to creating and training for a new industry. It will also strengthen a productive activity which is socially acceptable. Such a contribution to increased agricultural production can serve as import substitution and contribute to the food security of Jordan, whether the products are sold or consumed by the family.

Displacement of women agricultural laborers due to mechanization could be a major problem for women who are already on the bare edge of survival. Because they lack construction skills women cannot find the jobs which some displaced male agricultural laborers can find. The few opportunities these women have, such as needlework and sewing, provide, at best, only about two-third as much annual income as agricultural labor by women. This estimate is based on Basson's report (3) and this writer's interviews with women earning money through sewing and embroidery. Furthermore, the women have to work much longer hours than they do in agriculture to earn less. The woman agricultural laborer works 5 1/2 to 7 1/2 hours (3 and personal interviews). She may have most of the afternoon free for other activity. Some use this time to do embroidery and sewing to supplement their agricultural income. Thus, eliminating agricultural labor opportunities makes the loss even greater than one-third.

In areas where greenhouse agriculture is increasing, women displaced from one kind of agricultural activity can shift their employment. However, in some of the major cereal grain growing areas, there is no greenhouse agriculture.

It is important that this project link with other projects which attempt to provide ways to generate income for both men and women. This suggestions is discussed in more detail later.

Such links provided through the SCRAD process, can provide other projects and agencies with information to help locate small, viable, modern industry in small towns or rural areas. Income generating projects are often not much better than the independent handicrafts work a woman does. Sometimes pay is not as high as for agriculture or independent work, and the work is often designed for an uncertain tourist market.

However, there is a potential for establishing a women's supply and marketing cooperative for embroidered work. There is a domestic market as well as a tourist market. The prices on the tourist goods seem too high to attract a large tourist market, yet the mark-up on these items may be a least give times what the woman making the item receives.

Purchase of materials is often from small, local stores where prices are high. Some preferred materials are not readily available on the East Bank. There is room for a cooperative to supply materials at close to wholesale prices, and to market the finished good, when needed. The prices received for finished work need to be at levels which would permit women to

earn considerably more than they currently do, and yet are low enough to attract a wider market. It is concluded that women's income could be doubled, at a minimum, and prices to tourists cut in half, if such a cooperative operates with the interests of the producers in mind.

While development of a crafts cooperative is probably not in the scope of this project, it is within the scope of coordination with other agencies which can occur through the SCRAD process. Such a cooperative can help mitigate the negative impact of the project on certain women by opening of other at least equally remunerative opportunities.

A negative impact of development on women has occurred when there has been a switch from a self-sufficient economy to a cash economy. If men have greater access to the cash than women, as is often the case, the cash does not necessarily contribute to the needs or improved well-being of the women and children of the family (or sometimes of the man) (12). Increasing food sources which men cannot divert from family consumption as easily as cash would clearly benefit the family.

Women can benefit from this project. If women are able to have their agricultural needs considered in the SCRAD process, their work burdens could be lightened and their productivity increased. In addition to improved productivity in other tasks, improvement of productivity of home gardens and yard animals would contribute to an increase in the family's standard of living. Coordination with other agencies to minimize the negative impact of eliminating agricultural jobs is very desirable. In all, if the project implementation is active in its efforts to consider women's needs, the impact on women could be positive.

d <u>Project Impact-Beneficiaries</u>

(1) Benefits of the project for certain target populations have been discussed in detail and recommendations for implementation made. It should be understood clearly that small farmers and women will not benefit unless they are specific targets for technology development and transfer. Whether the impact of the project on them is positive or negative depends on project implementation and whether it is influenced by active and informed consideration of their needs. Conventional agricultural development as it has been practiced by many U.S. experts will not meet their needs. If this style of development had been effective in meeting the needs of the poor, small farmers, and women, there would have been no impetus for Congressional mandates and AID policy to protect the concerns of these categories of people. In contrast to conventional development the SCRAD process provides the opportunity for benefit to these people if they are adequately represented.

Other beneficiaries who have not been discussed in detail will now be discussed. See the discussion of small farmers and women in the section on target populations.

(2) Farmers

The farmer with the medium sized operation, especially those close to our arbitrary definition of small farmer, will benefit from the availability of a choice of technologies. Those closer to the definition of larger farmer and larger farmers themselves will benefit sooner as they will be able to increase their production and income using technologies and inputs quickly adapted from existing technology.

Large farmers "will be able to own their own machinery and will also provide custom services to their neighbors" (Goetse). Such expansion of mechanization will benefit the owners both in their own operations and as they rent to others.

(3) Rural Poor

It is easy to be misled by the abundance of Mercedes automobiles, the magnificence of private residences being built in and around Amman, the ease of avoiding the really poor areas of Amman and remote villages, the custom of interacting in villages primarily with and through the local leaders or sheikhs (often the more wealthy of the village). One might superficially conclude that Jordan is a developed country with little or no poverty. This is not the case. That poverty exists is recognized by the GOJ. Basic facilities such as safe water, sanitation, and education are missing in more remote villages (6). Poor rural residents often have few skills (10) and fewer resources.

There is some concern that modernization, especially mechanization of agriculture, will have a negative impact on the rural poor, many of whom depend on employment in agricultural labor for their income. The poor are likely to own little or no land (3). As seen in the discussion on women agricultural laborers, there are few opportunities open to these people which would provide as much income. In those areas where greenhouse agriculture is expanding, agricultural labor opportunities will, presumably, also expand. However, in other areas there will be no expansion of jobs for these people without some specific attention to the problem. Men may be able to get jobs by moving out of their home area to take advantage of temporary jobs, possibly in urban construction. With static construction, this outlet is not as available as it has been in the past. Rural to urban migration will thus result in the migrant remaining in poverty as well as having a negative impact on cities (6).

There is need for attention to creating income generation activities for the rural poor who are affected negatively by mechanization. The SCRAD process, if broadened to inclde such concerns, could provide a mechanism for coordination with other government agencies and voluntary agencies which are attemtping to generate employment opportunities. Awareness of the location of future displacement of agricultural laborers will enable other agencies to locate rural industry and training in areas where it is most needed. Such information in advance of displacement will minimize the length of time the rural poor are likely to remain without income.

(4) Private Sector

Increased volumes of inputs will stimulate the volume of sales, services, and maintenance functions. The agricultural economy of Jordan is highly profit-oriented and will expant into new areas of service as soon as opportunities are demonstrated. The infrastructure is in place from Amman, but will need to expand into local areas both for services and supplies. When the public sector subsidizes or donates inputs, unfair competition with the private sector occurs and the rate of adoption by the private sector is impeded. Even small demonstration activities wherein inputs are donated create an expectation of continued donating and a hindrance to the private sector. Historically, the private sector has recruited and kept the best trained and most proficient technical staff. This will probably continue. Up to now most agricultural development has centered around irrigation development and the inputs associated with irrigated production. If this project is to ignore irrigated agriculture then relationships with the private sector will be severely limited because a significantly high proportion of private sector services in the highlands is directed to greenhouse and irrigated crop production." The project, therefore will recognize the interrelationship between the irrigated and rainfed production.

Involvement of the private sector in the SCRAD process will strengthen relationships with them and benefit them as they become informed in a systematic way about the various needs and directions of dryland farming in the highlands. Interaction with representatives of a more varied population (compared to their more limited current interaction with larger farmers) will also provide information about a wider potential market. Such information will make it possible for the private sector to expand or change directions with some confidence that markets will exist. This will be enhanced by the direct involvement of the private sector in the on-farm demonstration program.

(5) Public Sector

The most significant constraint to agricultural development in the highlands is the poorly staffed and improperly supported public research and extension organizations. Major reorganization and intensified support by GOJ will become a direct output of the project. These public agencies will become more mission oriented and will have more highly motivated staff with adequate resources. Assuming that the project objectives are met during the project life, the improved public sector capabilities can be a significant accomplishment in terms of continued function well after the completion of the project.

(6) Participant Trainees

All the short-and long-term trainees of the project will benefit by increased knowledge, skills and higher salaries. Employment opportunities in the private sector will be enhanced by training, and in turn, the private sector may be stimulated by the input of new expertise and perspectives.

(7) Kingdom of Jordan

In a broad sense, the entire Kingdom of Jordan can be considered to be the beneficiary of certain aspects of the proposed project. Control of erosion, improvement of the rangeland, although a slow process, will benefit the Kingdom well beyond the life of the project. These factors will contribute to the long-term improvement of the agricultural productive base, and to the greater ability of Jordan to meet the food needs of an extremely rapidly growing population.

Contribution of this project to greater economic security for the majority of the rural population will not only increase the livability of rural areas, but also that of urban areas by discouraging rural to urban migration.

In addition, since ecnomic insecurity tends to be related to high fertility levels, contributing to the greater economic security of most of the rural population is likely to lead to lower fertility in that population. Lower fertility is more likely to result if economic security exists in rural areas, and if other aspects of rural livability are improved, than it is if a situation is created where many flee for survival to cities where they remain in poverty (6) and continue to respond to that poverty with high fertiliy levels.

3. Base line Study and Sample Survey

The base line study suggested in the section by Barbara Isley in the final report of the team led by Dr. Boyd Post (PP volume 3) has been deemed by the Mission as unnecessary because this data will be available through the latest National Agricultural Census and the Town and Village Survey conducted by the USAID Jordan SARSA project team. Instead, it is anticipated that the project will contract with an organization such as the Farming Systems Department of ICARDA or the AID centrally funded Farming Systems Project through the HADF to develop a representative sample of the primary project beneficiaries in each Governorate served by the project. These will be tracked throughout the project to determine the effect of the project upon each class of beneficiary and where technology is not being adopted, to determine why.

E. Administrative

1. Introduction

Responsibility within the GOJ for agricultural research and extension is currently vested in the Directorate of Research and Extension (DRE). In practice, however, agricultural research and extension have also been carried out by the UJFA, the JCO, private sector companies and by various projects such as the Oregon State University wheat improvement, the World Food Program (WFP) for rainfed tree and vine crops, the ICARDA cereals research, the Australian improved cereals and forage production, the Lower Zarqa Catchment development, the continuing efforts of the Arab Center for Studies of Arid Zones and Dry Lands (ACSAD), and although not related to the Highlands, the Jordan Valley Authority (JVA), the Jordan Valley Farmers Association (JVFA), and the AID sponsored Jordan Valley Agricultural Services Project (JVASP). In the future, through the effort under this project, these activities will be coordinated under priorities set through the SCRAD process and assignment of responsibilities by the ADC. The NCARTT will replace the DRE.

One of the immediate purposes of the HADP is to strengthen and institutionalize Jordanian (both public and private sector) agricultural technology development and transfer capability in support of highland development. This is to be accomplished through the NCARTT by establishing an organization that will amalgamate research and extension in recognition of the fact that functionally they constitute a continuum of knowledge development, transmission, application and feed back; provide for systematic planning and management of programs and projects; and serve as a mechanism for utilizing available public and private sector resources and channeling and coordinating their efforts toward agricultural development of the highlands.

2. Management System

1. The basic principles which will guide the organization and programs of the HADP are as follows:

a. The HADP will have the flexibility to address new and changing needs as they are identified through continuous analysis of the agricultural development requirements of the highlands and to address compatible regional and international needs through a network arrangement for mutual exchange of information and materials. Emphasis will be placed on areas revealed by such analysis to be of high priority to agricultural development of the highlands.

b. To extent feasible, the HADP will take advantage of available research capabilities through network arrangement and focus on the adaptation or improvement of imported and locally available technology instead of conducting primary research.

c. The development or delivery of technology and services to clientele groups in the highlands and in the broader national, regional or international arenas, will be based on multi-disciplinary team approaches comprised of both research and extension components and involve farmers, cooperatives and other private sector interests that are an intemate part of the project.

d. In addition to providing field research support, district Agricultural Service Centers (ASC) strategically located in the key agricultural producing areas of the Kingdom, will serve as a focal point for demonstration, workshops, and information dissemination, as well as for responding to individual requests for assistance or service.

e. The HADP will provide technical, analytical and diagnostic services in support of research projects, farmers and other clientele groups and selected private sector industries serving the highlands. These services eventually may be provided on a largely self-sustaining basis.

f. The HADP will work in close collaboration with the various Directorates and other units of the MOA, UJFA, Yarmouk University, ACC, JCO, regional and international organizations and appropriate private sector companies.

g. The HADP will serve as a depository for information in the areas of highland rainfed agriculture in Jordan and will participate in the AID regional project, Rainfed Agricultural Information Network (RAIN).

3. Agricultural Development Council

The development of the highlands will involve a number of Jordanian institutions in the public and private sectors. Accordingly, a high level Agricultural Development Council (ADC) will be formed to serve as the project's board of directors. Suggested members of the Council are: Minister of Agriculture, Chairman, a representative from the Ministry of Planning (MOP), Dean of the UJFA, Director of the ACC, Director of JCO, two representatives from the private sector, two representatives of farm families.

The ADC will have the authority to (1) adopt and implement highland agricultural development plans; (2) promulgate policies, rules, regulations and procedures for implementation of the plans; (3) set program and project priorities and allocate resources from the HADF; (4) receive donations and funds, award grants and loans and enter into contracts for research, training and agricultural development projects; and (5) coordinate implementing actions by the various public and private sector organizations. The detailed description of the primary organizations involved are found further on in this section.

4. Secretary General of the Council and Director, HADP

The Council will select the. Secretary General of its secretariat who will also be the Project Director. This will be a highly qualified Jordanian with strong administrative experience involving either research and/or extension (preferably both) and with a record of professional accomplishments that will command the respect of peers and staff members alike. The Secretary General will be responsible for coordination of planning, budgeting, policy, the SCRAD process, administration of the HADF and external relations. The Secretary General will be assisted in these duties: by a secretariat staff which will be part of the Secretary General's office.

5. The NCARTT and RASCs

The research and technology transfer functions under the project will be developed and coordinated through a new semi autonomous organization under the Ministry of Agriculture. This will be the National Center for Agricultural Research and Technology Transfer (NCARTT). The NCARTT will be under a Director who reports to the Minister of Agriculture through the Secretary General of the ADC. The delivery of services to the farmers in the Governorates will be through Regional Agricultural Service Centers (RASCs). Each RASC willl be under a Supervisor who reports directly to the Director of the NCARTT. In addition, the staff responsible for conducting the SCRAD process will be part of the NCARTT. The details of responsibilities and staffing pattern for the NCARTT and it's RASCs are provided in the following section. The technical support provided is outlined by similar duty descriptions for both short and long term TA to be provided by the AID institutional contractor in section 7 that follows.

6. Qualifications and Duties of Key Counterpart Positions

A. National Center for Agricultural Research and Technology Transfer (NCARTT).

HADP administrative officers will be located in the NCARTT near Amman.

The administrative officers consist of a Director, an Assistant Director for Development, an Assistant Director for Agricultural Services, an Agricultural Programs Manager, a Coordinator of Diagnostic Service, a Communications Coordinator, a Farming Systems Coordinator, and support Personnel (secretaries, clerks, etc.) sufficient to meet the needs of these administrators.

Descriptions of each of these positions will provide an understanding of functions of headquarters staff.

TITLE	:	Director, NCARTT and HADP
LOCATION	:	NCARTT at Amman.
REPORTS TO	:	Ministry of Agriculture and the Agricultural Development Council

The ADC will approve the selection for the Director of the HADP, a highly qualified Jordanian with strong administrative experience involving research and/or extension, preferably both. The Director must have a record of professional accomplishments which will command the respect of other administrators and the staff. Responsibilities of the Director will include planning, budgeting, policy formulation, personnel, fiscal, and facilities management, program direction and external relations. The other administrators will assist the Director in carrying out these duties.

QUALIFICATIONS:

1. Academic: PhD or equivalent experience in an agricultural science with relevant administrative experience.
2. Experience: Minimum of five years experience in research and/or extension. Prior teaching experience desirable.
3. Personal: The most critical requirement for this position is an administrator of experience and proven ability. Must have leadership, mature judgement and personnel management skills, and be oriented toward problem solving.

DUTIES:

1. Responsibility and authority for planning, budgeting, implementing and managing project activities.
2. Administers the personnel systems and assumes responsibility for recruiting, selecting, hiring and evaluating performance of project staff.
3. Develops and recommends to the Council action plans developed through the commodity/resources analysis systems for approval and implementation.
4. Assumes direct responsibility for supervision of the NCARTT.
5. In collaboration with the Senior Expatriate Advisor, identifies, selects and schedules candidates for short term, graduate and special training opportunities.
6. Recommends contractual arrangements with UJFA, international centers, etc., for research and development projects.
7. Provides for technology transfer to farmers, cooperatives and private sector through Regional Agricultural Service Centers.
8. Coordinates project activities with other GOJ activities.

TITLE : Assistant Director for Development (ADD)
LOCATION : NCARTT, Amman
REPORT TO : Director, NCARTT

Under the general direction of the Project Director assumes responsibility for conducting commodity/resource analyses in order to establish priority action plans for commodity/resource development.

The Assistant Director for Development (ADD) will be responsible for coordination of the Systematic Commodity/Resource Analysis and Development (SCRAD) Process. Close cooperation with the Chief of Party (CP) will be essential to ensure that the Commodity Multidisciplinary Teams (CMTs) are properly staffed and keeping pace with the schedule. The ADD and CP will work closely with the CMT leaders by providing them guidance and appropriate assistance. Leadership at the meeting with a commodity group for priority setting will be handled by the ADD. This person must possess great skill in working interactively in group processes so that the best thoughts and ideas of the group are brought forth.

QUALIFICATIONS:

[illegible]

a relat[illegible]

2 [illegible] ns [illegible]n project planning and management, preferably with background in systems analysis.

3. Personal: Demonstrated inter-personal skills to work with a wide variety of professional staff. Ability to think and function systematically and keep on schedule.

DUTIES:

1. In consultation with the Director, designates the most qualified subject matter specialists as Commodity Analysis Coordinators (CAC) and/or Program leaders.
2. Together with CACs, sets up schedules for conducting commodity/resource analysis, and attends and participates in interdisciplinary team meetings to develop worksheets.
3. Reviews worksheets to assure that all factors: land, water, labor, etc. have been covered.
4. Circulates worksheet to relevant GOJ, and interdisciplinary team members for comments and revisions.
5. Schedules and conducts meeting of all interested parties, including farmers and industry representatives, who will set the priorities for actions to overcome bottlenecks. Revisions to the worksheet are made at this time.
6. After priorities have been decided, finalizes the worksheet into the commodity analysis documents and the action plan.
7. Assists the industry representative and the Director in presenting the analysis and Action Plan to the Council for approval.
8. Upon approval, works with CAC to secure project proposals from subject matter specialists or other designated persons and recommends projects that should be approved for implementation.
9. Meets with CAC to monitor progress of projects.

TITLE : Assistant Director for Agricultural Services
LOCATION : NCARTT, Amman
REPORTS TO : Director, NCARTT

Under the general direction of the Project Director, assumes responsibility for the technology transfer activities.

QUALIFICATIONS:

1. Academic: Master's degree in an agricultural science or a related field.

2. Experience: Extension administration with knowledge of adaptive research.

3. Personnel: Demonstrated supervisory and interpersonal skills.

DUTIES:

1. Assumes responsibility for the training, communication/media, diagnostic services and farming systems activities located centrally in the NCARTT.
2. Assumes responsibility for supervision of the Regional Agricultural Service Centers.
3. Together with the Agricultural Service Center Supervisors, plans, implements and evaluates plan of work for conducting adaptive research trials, demonstrations, workshops and meetings.
4. Participates in commodity/resource analyses and assures that technology transfer needs are not overlooked.

5. Interacts with farmers, cooperatives and private sector representatives to keep abreast of their needs for technology transfer.
6. Recommends staff members for training.
7. Evaluates performance of staff members and recommends personnel actions.

TITLE : Agricultural Project Management Specialist
LOCATION : NCARTT, Amman
REPORTS TO : Assistant Director for Commodity and Program Development.

Under the general supervision of the Assistant Director for Commodity and Program Development, maintains the project management systems for the NCARTT and HADP.

QUALIFICATIONS:

1. Education: Bachelors or higher degree in an agricultural science or related field.

2. Experience: Background as budget or management analyst; experience with computers helpful.

3. Personal: Ability to work with leaders of projects.

DUTIES:

1. Reviews project proposals and budgets and make recommendations for funding levels.
2. Maintains project information system by inputing data and abstracting reports.
3. Assist in commodity/resource analyses.
4. Maintain control over project budgets.
5. Coordinate annual preparation of project descriptions and program reports.
6. Participate in annual project review and budget hearings.
7. Oversee project evaluation system.

TITLE : Subject Matter Specialists (15)
LOCATION : NCARTT, Amman
REPORT TO : Assistant Director for Commodity and Program Development.

Function as coordinator of multidisciplinary commodity/resource teams and/or Program leaders in addition to providing expertise in a subject matter area and serving as an extension specialists.

1. Academic: PhD or MS and work experience in an agricultural science or closely related field.

2. Experience: Extension or research experience, teaching experience desirable.

3. Personal: Demonstrated inter-personal skills and the ability to communicate effectively.

DUTIES:

1. Serves as Multi-disciplinary Team Leader in conducting commodity/resources anaylsis. May also serve as a Program Leader.
2. In consultation with Assistant Director, prepares Commodity Analysis Worksheet.

3. Participates in commodity/resource analysis meetings.
4. Maintains close contact with farmers and industry leaders.
5. Provides expertise in a subject matter and takes research results and puts them into the form that Agricultural Service Officers (ASO) and others involved in extension activities can use.
6. Conducts workshops and training in subject matter area for ASO's and others engaged in extension activities.
7. Conducts adaptive research, field trials and demonstrations.
8. Assists ASO's in solving farmers problems.
9. Develops annual program of work.
10. Participates in program evaluation activities.

SPECIAL CONSIDERATIONS

Subject matter specialists will be located in the NCARTT. They should possess a Master's degree or PhD in a subject matter area and be provided with specialized participant training in extension methods and the role of specialists. A primary function will be to take research results and put them into appropriate form for technology transfer to extension agents and technicians in the private sector. One of their most important responsibilities is to act as Commodity Multidisciplinary Team Leaders (CMTL). Some SMS will serve in addition as program chairmen, and a few will also become the Coordinator of Integrated Programs. Specialists may conduct adaptive research to develop needed informaton and as a way to maintain their technical competence.

Each specialist is expected to adapt and transfer the most pertinent technology in a subject matter area to the Agriculture Service Centers and other agents of change in both the private and public sectors. This is done in ways that are most appropriate to the individual situation. Classical methods of preparing publications, reference materials, newsletters, and mass media releases as well as seminars, workshops, and training activities will be utilized. Demonstration programs will include research workers, private and public sector representatives, extension agents, and farm leaders. Such activities will accelerate the rate of technology transfer, treat research and extension as part of a total developmental activity, and foster a sense of purpose by all participants that will stimulate activities favorable to long term results.

Jordaninan specialists will where possible be recruited from among existing subject matter trained personnel. An important criterion in selection will be the potential for leading CMT activities and the ability to stimulate cooperation among professionals working in various segments of the agricultural economy. Appropriate training by TA or TDY advisors in these skills will be provided to specialists by the AID contract. If some of those selected have no previous formal training or experience as a subject matter specialist, short term participant training not to exceed 12 weeks during the first year of employment may be provided by AID. This training should be received at an institution from which the technical advisors or TDY personnel will be recruited. Ideally, to accomplish the long term goal of the project, the following subject matter specialists with extension skills are needed.

(1) Forestry.
(2) Stone fruits and nuts.
(3) Agricultural marketing.
(4) Vegetables.
(5) Cereals.
(6) Forage legumes/pulses.
(7) Range.
(8) Livestock production.
(9) Farm management (agricultural economist).
(10) Extension communication.
(11) Soil fertility.
(12) Plant pathology.
(13) Entomology
(14) Weed control.
(15) Rural sociologist (with expertise in women's roles in development and research).

These positions should be filled as soon as recruitment procedures identify the best candidates. The intent is to have these specialist positions serve as a continuing link between researchers who are developing technology and ASO's and others who are involved in transferring it to the agricultural economy. In many cases these positions will engage in adaptive research in addition to extension responsibilities.

Evaluation of SMS must be on the basis of the SMS job descriptions and not simply on research publications. It is suggested that all personnel evaluations follow a system similar to that now being used by the U.S. Department of Agriculture which is believed to be as fair and effective as any. This system was devised by the Office of Personnel Management and adapted by USDA.

TITLE : Coordinator, Diognostic Services
LOCATION : NCARTT, Amman
REPORTS TO : Assistant Director for Agricultural Services.

Coordinates soil, leaf, plant disease, insect pest and pesticide analysis activities to obtain timely recommendations for corrective actions.

QUALIFICATIONS:

1. Education: B.Sc or higher in an agricultural science or closely related field; Master's preferred.

2. Experience: Background in diagnostic services or in coordination activities.

3. Personal: Ability to coordinate and expedite requests and to maintain good working relationships with personnel in the testing laboratories.

DUTIES:

1. Sets up policies and procedures for receiving, processing and responding to requests for diagnostic services.
2. Works with testing laboratory personnel to provide timely responses.
3. Conducts or arranges, for training sessions for ASO's on how to collect and send in samples for analysis.
4. Maintains data on incidence of plant diseases and insect outbreaks and works with plant protection specialists to develop plan of action.
5. Maintains data on soil and leaf analysis and works toward computerized recommendations for fertilizer applications.
6. Cooperates with other GOJ agencies in monitoring pesticide residues and recommending corrective actions.

TITLE : Training and Communication Specialist
LOCATION : NCARTT, Amman
REPORTS TO : Assistant Director for Agricultural/Services

evelops and implements an extension communication program (publication, audio visual aids, etc.)

QUALIFICATIONS:

1. Education: Bachelors degree in journalism, communications or mass media.

2. Experience: Background in extension communications

3. Personal: Ability to conduct training in communications and media and supervise a publication program.

DUTIES:

1. Develops and implements a long range plan and annual plans of work for an extension training program to include communications and media aids.
2. Supervises the publications programs.
3. Develops and operates a media facility for both production and training purposes.
4. Develops and conducts training for project personnel in the use of audio visual equipment and materials.
5. Supervises the production of mass media programs such as radio and television programs and press releases.
6. Conducts work shops on extension methods for Subject Matter Specialists and Agricultural Service Officers.
7. Maintains an inventory of audio visual equipment and sets up scheduling and check out procedures.

TITLE : Farming Systems Specialist
LOCATION : NCARTT, Amman
REPORTS TO : Assistant Director for Agricultural services.

Conducts studies of farming systems utilized in the highlands and implements a program of farming systems development for the project.

QUALIFICATIONS:

1.Education: Masters degree in an agricultural science or related field. PhD preferred.

2.Experience: Background in crop production, farm management or production economics with knowledge of family farming practices in the highlands.

3.Personal: Ability to relate well to farmers and elicit information from them about their farming practices and problems,

DUTIES:

1. Conducts studies of farming practices in the highlands with particular attentions to crop-livestock systems and relating them to socioeconomic and family factors.
2. Takes technical information provided by subject matter specialists and by utilizing principles of farming systems research and development, devises farming practices suitable to highland conditions. This inculdes full consideration of socioeconomic and family factors.
3. Conducts field trails to test farming practices which would improve production and family well being.
4. Provides training to supervisors and ASO's on farming systems principles and tests results. Assists ASO's in putting together optional farming practices for adoption by farmers based on each farmer families particular situation.
5. Spends considerable time in the field talking to farmers and keeping abreast of their problems.
6. Coordinates the socioeconomic and women in development programs with the technical programs.
7. Constantly interacts with researchers and specialists and feeds back farm level problems to them as well as learning about the newest developments that can be applied toward improved farming practices.

GENERAL STAFFING CONSIDERATIONS FOR THE NCARTT

The NCARTT will require a core staff of researchers and subject matter specialists. From the organizational standpoint, the NCARTT will be staffed from the most qualified MOA personnel available and they may require considerable technical assistance and training. All of the Center's staffing needs cannot be filled from existing MOA staff.

It is proposed that joint appointments be made with UJFA by having the HADP utilize the two-month summer and one-day per week (UJFA are given Thursday off, which can be engaged under contract to serve on the HADP staff or projects) free time of faculty members who possess the needed qualifications. The faculty members would be expected to spread the time devoted to the project over the whole year, so that they will in effect become 11-month employees with approximately 75 percent time devoted to University instruction and research, and 25 percent time to the HADP as subject matter specialists. Agreement should be reached with the UJFA that these faculty members will receive tenure and promotion credit for the work they perform with the NCARTT. Similar arrangements would be made for appropriate faculty members of Yarmouk University.

Projects also may be carried out by contract (not by direct hire) for research, training or other work with the UJFA, international agencies (ICARDA, etc), the JCO and the private sector.

B.Regional Agricultural Service Centers (RASC)

RASCs will be located strategically to provide agricultural services to the agricultural producers and families in their geographical areas. A supervisor will be in charge of each Center. The Center will house about 12 Agricultural Service Officers who will be involved in both research and extension. These ASOs will receive information and training from the SMS based in the NCARTT at Amman.

Job descriptions follow for supervisors and ASOs.

Support staff inculding secretaries, administrative support, technicians, guards, repairmen, etc. must be provided as appropriate.

TITLE : Supervisor
LOCATION : Each Regional Agricultural Service Centers
REPORTS TO : Assistant Director for Agricultural Services.

Under the general direction of the Assistant Director for Agricultural Service, Supervises the activities of the Regional Agricultural Service Center.

QUALIFICATIONS:

1. Educational: Bachelor's in an agricultural science or related field, preferably Masters degree.
2. Experience: Background as extension agent and/or research preferably with supervisory experience.
3. Personal: Leadership qualities, interpersonal skills, dedication to goals at the ASC.

DUTIES:

1. Plans, supervises and evaluates the activities of the 12 agricultural service officers (ASO) assigned to each Center.
2. Acts as spokeman for the NCARTT in the Governorate.
3. Interacts with MOA Directors of Agriculture and District Directors, JCO, and community leaders to coordinate activities and keep abreast of needs in the Governorate.
4. Develops and implements annual plan of work to meet the needs for adaptive research and technology transfer.
5. Represents the interests of the Governorate in commodity/resource analyses and other planning activities.
6. Assumes responsibility for all experiment station operations in the Governorate.
7. Assumes Responsible for custody, allocation and maintenance of budget, space, equipment and facilities for all Center activities in the Governorate.
8. Administers applicable personnel and fiscal policies and procedures.

TITLE : Agricultural Service Officer (Women) (At least 2 at each Center.)
LOCATION : RASC
REPORT TO : Supervisors of the RASC.

To carry out agricultural technology transfer activities specifically for the women in the Governorate served by the RASC.

QUALIFICATIONS:

1. Education: Master's or Bachelor's degree in a field related to agriculture or community development, or an appropriate social science education.

2. Experience: Background in rural development projects involving women, preferably in Jordan.

3. Personal: Ability to work effectively with a variety of people, men and women, modern and traditional, and Jordanian and American. Must be female due to requirements of the position.

DUTIES:

In addition to the normal duties assigned to ASOs the following responsibilities are assigned to women ASOs

1. Gets acquainted with women in the district served by the RASC and maintains frequent contacts with them.
2. Interacts with women engaged in agricultural activities to learn what their problems and needs are.
3. Identifies the more assertive women and encourages them to participate in the SCRAD process.
4. Provides training in interactive skills to the women who are willing to participate in the SCRAD process.
5. Represents women's activities and needs in the SCRAD process and to other ASOs so technology development and transfer activities of concern to women and women's needs will not be neglected.
6. Conducts technology transfer activities specfically to women, or sees to it that someone else does.

TITLE : Agricultural Services Officers
LOCATION : Regional Agricultural Service Centers
REPORTS TO : Supervisor, RASC

Functions as research associate/extension agent to assist in technology development and to transfer that technology to farmers and others in the public/private sectors.

QUALIFICATIONS:

1. Academic: B.Sc degree in an agricultural or a related field.

2. Experience: A practical agricultural background. Will be required to live in the area and know local farming conditions.

3. Personal: Demonstrated inter-personal skills and ability to work as a team member.

DUTIES:

1. Identifies specific problems of farmers and provides information to solve the problem or refers the problem to subject matter specialists for assistance.
2. Integrates information provided by specialists into useful farming practices for adoption by farmers.
3. Participates in commodity/resource analyses to provide farm level inputs and feed back and to plan and prioritize adaptive research projects and technology transfer requirements.
4. Functions as research associate and assists specialists and researchers in planning and conducting adaptive research projects, trials and demonstrations, both at experiment stations and on farms.
5. Assists farmers to make efficient use of their available resources.
6. Makes farm visits to provide consultation and assistance to farmers.
7. Carries out and/or participates on programs, workshops, meetings and demonstrations.
8. Develops annual plan of work, evaluates programs and prepares annual reports.
9. Keeps abreast of new developments by attending training sessions and other forms of professional improvement activities.

GENERAL STAFFING CONSIDERATIONS OF ASC'S

Agricultural Service Officers will be recruited from among the most qualified MOA personnel. In addition to basic educational qualifications (minimum B.Sc or equivalent experience), the most important consideration for ASO's will be their attitude. ASO's must be willing to give primary effort to the project, undergo training to learn new skills, and be dedicated to serving the farmers and their families. Without proper attitude and dedication, the ASC concept and the HADP will not achieve the desired level of success.

The supervisor of the RASC should be well-versed in farming systems research and development, in addition to being a good administrator and a leader. The most important factor is that individuals selected to be a RASC supervisor must have the proper leadership qualities, attitude, dedication and work ethic. If needed, knowledge and skills in administration and farming systems research and development can be provided through training and technical assistance.

7. Technical Assistance Qualifications and Duties for Short and Long Term Assignments

A. Technical Assistance (Long Term)

1. Administrative Specialist/Interim Senior Advisor (Two Years)

Primary Functions : This individual will report to the Project Director, and will assist in the multitude of administration actions required early in the project (e.g. first 2 years) before the long term team becomes fully operational.

a. Qualifications :

(1) Academic : At least a bachelors degree in an appropriate discipline, masters preferred.

(2) Experience : A minimum of five years dealing with budget and personnel management, commodity procurement and training associated with agricultural programs. Prior experience in dealing with facilities planning and construction oversight desirable.

b. Duties:

(1) Serve during an expedited implementation phase and take all necessary actions to assist the GOJ in accelerating the implementation of the project including the organizational changes called for in the project paper. These include the creation of an Agricultural Development Council, the National for Agricultural Research and Technology Transfer Regional, four Agricultural Service Centers and a Pilot Range Development Demonstration.

(2) Assist with the planning, budgeting and construction oversight of facilities as appropriate.
(3) Assist in the procurement of equipment allocated for the expedited implementation phase.
(4) Assist the GOJ in recruitment of appropriate personnel to staff the positions identified as counterparts in the project.
(5) Initiate English language training for all personnel assigned to the project that are deficient in this language.
(6) Arrange degree and short term training where appropriate to expedite staff development.
(7) Arrange training required for early implementation of the SCRAD planning and management process.
(8) Negotiate a contract for initiating baseline studies. (Consideration should be given for this to be coordinated by ICARDA with input from Jordanian institutions and S&T Bureau Centrally Funded Projects).
(9) After the project has been contracted, assist the contract staff upon arrival and help insure a smooth implementation.
(10) During the early phase of the contract, handle the administrative details of the project so the contract staff can devote maximum time to technical implementation.

2. Chief of Party/Planning and Management Specialist (Five years)

a. Qualifications

(1) Academic : PhD or Masters Degree in an appropriate discipline

(2) Experience : At least five years of experience in a senior planning and management capacity, preferably with experience in dealing with systems analysis of commodity and resource, research; extension administration, development needs; and evaluation procedures. If experience in the system used in Hawaii is lacking, this should be acquired in a brief study tour prior to taking up the assignment in Jordan as this will be the basis for the planning and management system used by the project.

b. Duties:
1. Handle the planning, management, implementation and evaluation requirements of the contract with AID on behalf of the contractor.
2. Act as the contractors' representative in-country and be responsible for dealings with the contractor.
3. In consultation with the Project Director, plan and recommend recruitment of long and short term T.A., order commodities and help select trainees and manage the logistics for participant training outside Jordan.
4. Advise and assist the Project Director in the planning and management of the HADP.

5. Act as Chief of Party for the short and long term T.A. provided by the contractor.
6. File all required reports and documents.

3. Extension Methods Specialist (two years)

a. Qualifications

(a) Academic : PhD or Masters degree in an appropriate related discipline.

(b) Experience : Five or more years experience as an extension methods specialist in a cooperative extension service with a successful record of promoting the adoption of newer and most effective delivery systems. Demonstrated experience or potential for adapting these methods for host country or host country participants is also required.

b. Duties:

(1) Advise project personnel on the relative suitability of various extension methods being used.
(2) Assist host country extension methods specialist in training subject matter extension specialists in use of best adapted extension delivery systems.
(3) Coordinate in-country training sessions for host country extension specialists.
(4) Assist in the planning of short term participant training programs on extension specialist functions for host country extension specialists.
(5) In cooperation with the Assistant Director for Agricultural Services assist host country counterparts in evaluating extension programs of the project and in designing long-term extension programs.
(6) Assist in the design of training sessions on communication methods for host country project staff.
(7) Assist project staff in developing specifications for audio-visual equipment procurement.
(8) Evaluate effectiveness of extension communication delivery systems of the project and help plan improved suitable systems for the project.
(9) Assist in the selection and sheduling of all extension participant trainees associated with the project.
(10) Assist in the recruitment, selection, placement, and evaluation of all extension staff.
(11) Stimulate an on-going extension program by encouraging development of extension professionalism among all project personnel.

4. Range Development and Management Specialists (two years)

a. Qualifications:

(1) Academic : PhD or equivalent experience in range management.

(2) Experience : At least five years of experience in range revegetation and management in a semi arid type climate. Experience with small ruminant ranges desirable, especially if obtained under Near East conditions.

b. Duties:

(1) Act as chief advisor for the cofinanced UNEP/AID Pilot Range Revegetation and Management Demonstration.
(2) Be responsible for coordination of the UNEP and AID provided inputs into this demonstration.
(3) Provide or insure all necessary reporting.
(4) Oversee the short term T.A., commodities and training requirements provided by the two donors.
(5) Coordinate with the Chief of Party to ensure maximum integration of the demonstration with the other project activities.

B. Technical Assistance (Short Term)

1. Sociologist/Anthropologist TDY

a. Qualifications

(1) Academic : PhD or Masters in an appropriate discipline.

(2) Experience : Experience in conducting or supervising research in a developing country, and experience in evaluation research. One year or more experience in development activities in a developing country (preferably in rural areas of Arab countries), knowledge of the social setting of agriculture in developing countries (especially the situation of small farmers and women), and some ability to speak Arabic are highly desired. Experience as a research or extension rural sociologist/anthropologist involved in assessing results of and/or designing agricultural programs associated with socio-economic factors is desired, but not required.

a. Duties

(1) Assist in choosing persons or agencies for any survey work.
(2) Assist in evaluating the social setting for agriculture of the highlands at the beginning of the project.

(3) Help establish the means of incorporating beneficiaries into the SCRAD system for evaluating need and setting priorities to insure equitable and effective representations.
(4) Assist the Jordanian staff in planning for evaluation research.
(5) Participate in follow-up studies to be used to fine-tune implementation and for evaluation, if Jordanian researchers need assistance.
(6) Assist in the design of a final study to be used for evaluation of the project near its completion, if Jordanian researchers need assistance.

2. Cereal Specialist TDY

a. Qualifications

(1) Academic : PhD or Masters degree in agronomy or related field.

(2) Experience : Five or more years experience as an extension agent dealing with cereals, or as an agronomy extension specialist. Significant international development experience is preferred. Experience in cereals research is very desirable.

b. Duties:

(1) Analyze and interpret cereal development work done in Jordan since 1962.
(2) Assist in the determination of best technologies of cereal production applicable to Jordanian conditions.
(3) Provide background information for project staff in determining plan of action for cereal extension program.
(4) Advise research staff on plans for additional research activities in cooperation with other donors and interantional agencies.
(5) Coordinate training programs in cereal production within project staff.

3. Livestock Production Specialist TDY

a. Qualifications

(1) Academic : PhD or Masters in animal science with emphasis in nutrition or production of small ruminants.

(2) Experience : Five or more years as an extension specialist or research scientist dealing with sheep or goats is necessary. International experience is highly desirable.

b. Duties:

(1) Assess the current status of livestock industries of the highlands and those of the desert which use highland resources.
(2) Assist in the planning of extension educational programs on animal production using already known technology adaptable to Jordanian conditions. Special attention should be given for management improvements to be utilized in the AID/UNEP Range Improvement Demonstration.
(3) Assist in the planning of adaptive research activities of the project which relate to livestock management and production of livestock feeds in the highlands.
(4) Participate as a project team member in designing appropriate internal training sessions to improve staff competencies in animal production and related subjects.

4. Forestry TDY

a. Qualifications

(1) Academic : PhD or Masters degree in forest watershed management.

(2) Experience : Five or more years as a forest watershed management specialist in a public agency forest watershed management program. Multiple-use forestry experience involving range, afforestation, watershed management, and recreation, is essential. Experience with use of prescribed burning as a management tool is highly desirable.

b. Duties:

(1) Review current forestry practices of Jordan and assist in the design of modernized practices for afforestation, management, and multiple use of this highland resource.
(2) Cooperate with soil conservation, range, livestock production, and rural extension sociologist staff in developing alternative management systems suitable for the highlands area.
(3) Assist counterpart GOJ staff in analyzing merits of various alternative management techniques, including prescribed burning, for forests in the highlands.
(4) Provide assistance in planning and implementation of forestry extension program for members of various GOJ agencies.

5. Forage Legumes Specialist TDY

a. Qualifications

(1) Academic : PhD or Masters degree in agronomy or related field.

(2) Experience : Five or more years experience as an extension agent, extension agronomist, or research specialist with significant accomplishments in forage legumes. Successful international experience is also highly desirable.

b. Duties:

(1) Assist in the coordination of project research activities with international agencies.
(2) Interpret research results from other countries having conditions similar to Jordan and assist in development of adaptive research programs in appropriate locations in the highlands.
(3) Cooperate with range, livestock, forage legume, and cereal staff members of project in the development of inter-disciplinary research and extension programs for expanding forage legume technology.
(4) Assist in the planning and implementation of training programs on forage legumes for project staff.

c. Technical Assistance (to be determined)

These short term specialists are listed in alphabetical order which implies nothing as to priority or timing. These matters are to be determined by the HADC and its staff.

1. Agricultural Marketing Specialist (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in agricultural economics or agricultural commodity with emphasis on marketing.

(2) Experience : Five or more years experience in extension marketing or private industry market development activities.

b. Duties:

(1) Review the historical developments of agricultural marketing systems in Jordan.
(2) Encourage and assist GOJ counterparts to become more conscious of the market constraints to agricultural development.
(3) Assist project personnel in investigating the feasibility of adopting countrywide grading standards and standardized containers or units of measure for horticultural crops.
(4) Participate as a member of a project team in reviewing the relative export potential for various horticultural crops.

(5) Stimulate the project cooperation with representatives of various private sector organizations in the development of an industry-wide improvement in agricultural marketing systems.

2. Cereal Seed Certification TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in any subject relating to cereal seed certification.

(2) Experience : Five or more years as a certification specialist serving the cereal seed industry and or appropriate experience in developing and improving cereal seed certification procedures.

a. Duties:

(1) Train GOJ counterparts in functions and operation of a seed certification program.
(2) Assist in the formation of a system suitable for Jordan.
(3) Encourage the cooperation of GOJ and international plant breeders in using the certification system for increasing seeds of new superior varieties.
(4) Assist extension personnel in promoting the use of certified wheat and barley seed by highland farmers.

c. Entomology Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in entomology.

(2) Experience : Five or more years as an extension entomologist or research entomologist. Major experience should be with insect pests of one or more of the major crops of the highlands.

b. Duties:

(1) Assess the magnitude of entomological problems of crops of the highlands and strategies for their control.
(2) Advise project staff on research priorities.
(3) Participate in project staff training programs on updated control procedures.
(4) Assist in the development of more uniform insect control recommendations.
(5) Help plan project-wide evaluation of new insect control procedures in cooperation with the private sector.

4. Farm Management Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in farm management or a closely related field.

(2) Experience : Five or more years as an extension specialist or research scientist, with specialization in enterprise cost of production analysis.

b. Duties:

(1) Assess reliability of various sources of data on costs of production and market values of products of the highlands assembled by project staff.
(2) Assist project staff in designing research and demonstration activities so that more useful economic data can be obtained.
(3) Teach project staff most modern computer analysis of least cost data so that more efficient use of new technologies can be encouraged.
(4) Assist in the organization of extension training program for both project staff and other sectors in stimulating optimized financial returns to highland agricultural producers.

5. Plant Pathology Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in plant pathology

(2) Experience : Five or more years as an extension plant pathologist or a research plant pathologist. Major experience should be with one or more of the major crops of the highlands.

b. Duties:

(1) Assess the magnitude of pathological problems of crops of the highlands and strategies for their control.
(2) Advise project staff on research priorities.
(3) Participate in project staff training programs on updated control procedures.
(4) Assist in the development of more uniform disease control recommendations.
(5) Help plan project-wide evaluation of potential new disease control chemicals in cooperation with the private sector.

6. Potato Seed Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in a subject matter area relating to potatoes.

(2) Experience : Five or more years as an extension specialist or private industry member associated with the seed potato industry.

b. Duties:

(1) Assist the GOJ vegetable specialist to assess the current constraints in the seed potato program.
(2) Encourage and assist MOA staff to develop a certification program involving disease free stock, field inspections, and grow out tests for the potato seed industry.
(3) Provide project staff with modern technology in growing seed potatoes and suggest methods of implementing it under Jordan conditions.

7. Pulse Crop Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in agronomy or field closely related to pulse crops.

(2) Experience : Five or more years as an extension specialist or research scientist, with specialization in pulse crops or edible legumes. Successful involvement in international agriculture would be highly desirable.

b. Duties:

(1) Assess the current status of pulse crop technology in the highlands.
(2) Encourage and assist in the coordination of project activities in pulse crops with those of international and other donor agencies.
(3) Assist in the coordination of plant protection, soil fertility, and forage legume specialist activities of the project.
(4) Provide training of project staff in latest applicable pulse crop technologies.

8. Soil Fertility Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in soil fertility or plant nutrition.

(2) Experience : Five or more years as an extension specialist, research scientist, or soil fertility testing laboratory leader. Must be experienced in developing fertilization recommendations from soil analyses.

b. Duties:

(1) Assist in the derivation of specifications for the improvement of the current MOA soils laboratory or in the development of an entirely new one associated with the project.
(2) Evaluate the effectiveness of the current soil sampling, soil testing, and fertilizer recommendations procedures being used by MOA.
(3) Assist in the planning of training sessions to upgrade the proficiency of current MOA staff.
(4) Help design highland-wide soil fertility trials for correlating anticipated crop responses to various fertilizer levels on soils having different soil test values.
(5) Advise on the long term research activities in soil fertility problems of fruits and nuts.
(6) Help plan a more closely integrated development program with the private sector.

9. Soil and Water Conservation Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in soils, conservation, or hydrology.

(2) Experience : Five or more years as an extension soils specialist, member of the soil conservation service, or equivalent. Multi-disciplinary interagency leadership in developing comprehensive soil and water conservation strategies is most preferred.

b. Duties:

(1) Assess success of prior conservation programs in the highlands.
(2) Assist in the planning for long term conservation activities of the project.

(3) Cooperate with other project staff in the development of long term conservation goals.
(4) Evaluate progress of conservation efforts of the project and assist counterparts and other project staff in selecting conservation procedures which are most efficient.

10. Stone Fruits and Nuts Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in horticulture with specialization in appropriate subject matter area.

(2) Experience : Five or more years as a research-extension specialist, with one or more of the crops of the highlands. International experience is highly desirable.

b. Duties:

(1) Assess the current status of the commercial industry, current research, and recent developments in other similar locations.
(2) Train counterparts in the relative effectiveness of various research and extension approaches used in transferring or adapting technology for these perennial crops.
(3) Assist project staff in planning long term demonstration plantings of best potential crops at various project sites.
(4) Cooperate with other project staff in assisting GOJ counterparts in determining most feasible cropping alternatives at representative sites and how to produce and market the crops for optimum returns.
(5) Assist in the planning of extension educational programs for improved technology transfer within the stone fruit and nuts industry.
(6) Advise on the formation of alternate or improved research programs and suitability or acceptability by the Jordan agricultural industry.

11. Vegetable Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in horticulture with training in vegetables.

(2) Experience : Five or more years as an extension specialist in a cooperative extension program.

b. Duties:

(1) Assist the GOJ vegetable specialist in assessing the baseline status of the vegetable industry of the highlands.
(2) Cooperate with project personnel in identifying major opportunities for technology development in vegetable industry.
(3) Serve as the focal point for introducing appropriate new technology for Jordan vegetable industry and assisting project staff in developing programs to utilize it.
(6) Coordinate appropriate training activities for participants and project staff.
(7) Cooperate with potato seed specialist and agricultural marketing project staff in developing a unified vegetable technology program.

12. Weed Control Specialist TDY (to be determined)

a. Qualifications

(1) Academic : PhD or Masters degree in weed science in any appropriate subject matter discipline.

(2) Experience : Five or more years as an extension weed specialist or weed research scientist. Should be experienced in field evaluation of tillage and chemical methods of weed control and their integration into management systems, especially in dryland agriculture.

b. Duties:

(1) Assess the magnitude of weed problems of crops of the highlands and strategies for their control.
(2) Advise project staff on research priorities.
(3) Participate in project staff training programs on updated control procedures.
(4) Assist in the development of more uniform weed control recommendations.
(5) Help plan project-wide evaluation of new weed control procedures in cooperation with the private sector.
(6) Assist in the development of training programs for private applicators.

7. Institutions Involved in the HADC

a. The Agricultural Credit Corporation (ACC)

The Agricultural Credit Corporation (ACC) was established in 1959 as a wholly government-owned statutory corporation with capital of JD 7 million comprising, in part, the assets of the former Ottoman Agricultural Bank. In 1963 a new charter enabled the ACC to take over the assets and business of the former Village Loan Scheme of the Jordan Development Board, the Agricultural Cooperative Societies of the previous department of cooperatives development and residual loan activity originating from past assistance by USAID.

The ACC has grown rapidly over the years with current assets of over JD.1.3 million and equity of JD.11.1 million, up from the 1979 levels of JD.0.8 million and 5.5 million, respectively. Total assets during the past five years have also expanded quickly, growing by a factor of some sixty-seven (67) percent to a present level of JD 23 million . And, the lending institution's loan portfolio has increased on a compounded basis by sixty (60) percent over this time period.

(1) Organizational Structure

The ACC is governed by a nine-member Board of Directors composed of four government held seats, one each from the respective Ministry of Agriculture, Department of Land Registry, National Planning Council and the Director-General of ACC. Four non-official seats are held by district farmer representatives and one ex-officio seat by the Central Bank of Jordan.

Executive Management of the ACC is the function of the Director-General, who is supported by a deputy.

The ACC's work is carried out by six main divisions, covering: loans, supervision and execution, administration, foreign relations, general auditing, and finance". The ACC operates a total of fourteen (14) branch offices on the East Bank and continues to provide maintenance support to four (4) branch offices located on the West Bank. A copy of ACC's organizational chart is attached in the Annex.

(2) Staffing

The ACC is staffed with competent, well-educated personnel at both the central and district level. Many, particularly at the supervisory level, have received training outside Jordan. Most employees hold degrees, particularly in the areas of agronomy and agricultural economics. The ACC currently employees some 200 staff members, of whom 26 are women (hired within the last four years). More than sixty percent of the staff are assigned to district branches.

(3) Primary Clientele

The ACC primarily directs its services to the established, commercial-scale farming sector and to farmers and businessmen who can offer collateral in the establishment of new agricultural enterprises. Although the ACC can waive collateral requirements in the case of small-scale loans (less than JD 2,000) to borrowers who can show ample assets, repayment capacity and can provide two guarantors, most borrowers must offer collateral, usually in the form of land, secured at 75 percent of market value. Many ACC borrowers are partially self-financed, and given their ability to offer land as collateral have access to commercial lines of credit.

The ACC is financing private sector services and recently has been given the authority to take equity stakes in existing or new private sector endeavors up to twenty-five (25) percent of ACC's paid-in capital (currently JD 2.5 million). This added mandate holds promise for stimulating agri-business and agri-industry and improving private sector-led agricultural services in the highlands.

(4) Primary Functions

The ACC serves as an Agricultural Development Bank and, as such, is charged with promoting productive agricultural enterprises. This includes the reclamation, purchase and development of agricultural lands and, in particular, such activities as rock clearing, terracing, irrigation, cultivation, tree planting, and the production of vegetable, cereal, and fodder crops as well as livestock, poultry, bee-keeping and fisheries.

With respect to highland development, the ACC is focussing its support on the expansion of irrigated areas by financing tube wells and drip irrigation systems. In the Mafraq district for example, eighty-five (85) percent of ACC financing has gone toward establishing some 200 tube wells. In Jerash district the ACC is financing water reservoirs, pump irrigation, land terracing and perennial tree-cropping in an attempt to rehabilitate steep slope areas. Additionally, the ACC is providing highland agriculture long-term financing to establish and improve sheep breeding operations and promote the planting of fruit trees and vine plants. With respect to equipment finance, the ACC typically extends credit for some 20-25 tractors yearly. Some seasonal financing is being directed toward cereals.

b. The Jordan Cooperative Organization (JCO)

The first cooperative legislation in Jordan enacted in 1952 established the Cooperative Development Department and gave it basic responsibility for registration, supervision and financing of cooperatives. Early program emphasis was on rural savings and loan societies.

In 1968, Cooperative Law no. 55 was enacted providing for the establishment of the Jordan Cooperative Organization (JCO), an autonomous quasi-government institution, which replaced all previous existing government cooperative organizations. Subsequent cooperative regulations were issued in 1970, and in 1971, a new Cooperative Law was promulgated. In these years, the JCO worked

to overcome financial setbacks resulting from the 1967 war. It promoted supply functions and agricultural machinery ownership through the societies and provided extensive training for cooperative employees and management. The JCO also strove to liquidate the previous savings and loan societies by incorporating them into new multi-purpose agricultural societies. Today, some 181 of these agricultural cooperative exist with the 148 in highland areas representing over 16,000 farmer members and with reserve and share capital amounting to JD 2 million.

(1) Organizational Structure

The JCO is administered by a Board of Directors, composed of eleven members. The Chairman or "President" of the Board serves as JCO's Director-General, the Chief Executive Officer of the organization. The remaining ten Directors are composed of five members from government agricultural institutions and five members representing the farmer group.

The JCO is headquartered in Amman and has eleven district offices throughout the country. Organizationally, JCO is divided into five separate departments, including: The Cooperative and Projects Department, the Cooperative Bank Department, The Supply and Marketing Department, the General Administration and Accounts Department, and the Cooperative Training Center."

(2) Staffing

The JCO currently employs 371 staff members, twenty (20) percent of whom are agricultural graduates. Of this staff, 185 are assigned in the field with the remainder working out of the central office. The cooperative bank currently has 46 staff members with 18 assigned at the field level. Similarly, the supply and marketing department has 50 employees, 28 of whom work in the field. Of JCO's existing staff, 46 positions are currently held by women. Many of the employees, particularly at the supervisory level have had international training and experience.

(3) Primary Clientele

JCO's clientele are primarily small to intermediate scale farmers and the cooperative societies to which they belong. In comparison to the clientele of the ACC, those of the JCO are less likely to be in a position to offer securities for lending purpose. They often lack experience and capability in farming practice. Self-financing plays a smaller role in their farm enterprise than with the larger, more established borrowers of the ACC. Most of these farmers do not have access to commercial credit and, while informal credit plays an important role in meeting their financial requirements, many are dependent upon seasonal credit supplied by the JCO. In highland areas there are an estimated 13,000 cooperative farmers benefiting from JCO's credit, supply, marketing and farm equipment support services. In addition to these, JCO is providing animal feed supply services to both cooperative and non-cooperative livestock raisers throughout Jordan. Non-agricultural cooperative and their members also receive limited financing and other support services from the JCO.

(4) Primary Functions

The JCO provides registration, supervision and auditing services to cooperatives throughout Jordan. The JCO is strongly committed to promoting small and intermediate-scale agricultural development within the country. To this end, it furnishes financing for agricultural cooperatives and their members, supplies this same group basic inputs to production, and establishes farm equipment stations to serve as extension centers to transfer improved agricultural technology to farmers while at the same time providing these farmers access to desired farm equipment on a custom-rental basis.

c. University of Jordan, Faculty of Agriculture

The University of Jordan was established in 1962 and the Faculty of Agriculture within the university established in 1972 to serve agriculture in Jordan. The main objectives of the agricultural faculty are: (1) to attract and build a nucleus of professional staff capable of tackling problems of modern and intensive agriculture, (2) conduct research aimed at increasing yields, (3) to develop optional patterns of land use, (4) to conduct studies in support of proper agricultural policies, (5) to synthesize information into meaningful and easily applied techniques and programs, (6) to upgrade the quality and increase the competence of Jordanian B.Ss. graduates in Agriculture and (7) to create a facility where a selected and limited number of Jordanian can study agriculture under Jordanian conditions. The Faculty of Agriculture is geared toward serving the needs of the country and with the maximum degree of coordination and interaction with all other institutions and in the country concerned with agricultural development. The primary overall objective of the Faculty is to raise the level of agricultural productivity, production and efficiency. Toward that end the agricultural faculty directs its integrated program of teaching, research, and extension. In the field of extension, the Faculty stresses that it wants to avoid duplication with the MOA/DRE. Its extension activities augment and strengthen the extension efforts of extension division of MOA, in the areas of 1) preperation of information materials in the form of extension bulletins and 2) participation with the Extension Division of the Ministry of Agriculture to hold field days.

The Faculty conducts its education, research, and extension programs through four departments: Plant Production and Protection, Animal Production and Health, Soils and Irrigation, and Agricultural Economics and Extension Education.

Personnel

The table below summarize the University of Jordan, Faculty of Agriculture who have earned Doctoral and Masters degrees. Unfortunately, specialists within departments were not listed in the information provided.

DEPARTMENT	DOCTORS	MASTERS
Agricutural Economics & Guidance	5	0
Animal Production	5	1
Nutrition & Food Processing	8	0
Plant Production	12	1
Plant Protection	9	2
Soil & Irrigation	10	2
TOTAL	49	6

Many of the Faculty members have demonstrated ability in research and would be willing to participate in this project. Well over half (57%) of the faculty holding Doctorates earned their degrees in the United States and are well acquainted with the Land-Grant concepts of research and extension.

d. Ministry of Agriculture Functions

The Ministry of Agriculture is responsible for, inter alia, agricultural research and extension activities. The current organizational structure of the Ministry of Agriculture is shown in figure 1. Within the Ministry of Agriculture the Directorate of Agriculture Research and Extension (DR&E) is specifically responsible for such activities as plant protection, field crops, horticulture, vegetables, soils and fertilizers, and irrigation activities to mention only a few.

The extension division of the MOA consist of four sections: (1) Training, (2) Extension programs, (3) Agricultural Information, and (4) Exhibits and Musuems. The general field extension staff is based at the headquarters of each of the six governorates in the country. They report of the Director of Agriculture at the governorate headquarters who is in charge of all extension activities in his area; but not research. The primary task of these field staff is the distribution of improved seeds and fertilizers and other inputs of new technology. They also collect statistical data for the Ministry.

Research and Extension activities have been hampered by insufficient funds, equipment, transportation, technical support staff, low salaries, and very little in-service training of staff.

Each Governorate has an Agricultural Directorate concerned with executing the activities of the six departments in the Ministry of Agriculture and with a Director reporting to the Undersecretary of Agriculture.

The extension agent is a multipurpose worker in his area, responsible for 7 to 16 villages. the extension agent renders various services to farmers in his

area such as providing them with certified seeds, pesticides, insecticides, seedlings, nursery plants, chickens, and other requirements. He is also responsible for collecting statistics and data, collection of fees for chickens, nursery plants, and other requirements sold by him to farmers at cost price.

At present there are six major research stations operated by the MDA. Managers of these stations report to their respective Director of Agriculture Area Director. Primarily basic commodity research is conducted at these facilities

General Appraisal of Agricultural Extension:

The relative small number of extension agents dealing with field crops, vegetables, and fruits coupled with low salaries,, shortage of transportation, facilities and the many activities unrelated to extension have limited the effectiveness of the extension agent in doing his job as a facilitator and educator.

The extension agents have difficulty in keeping contact with the relatively large number of farmers they have to serve. According to the results of a socio-economic survey in the karak area, only 14.3 percent of farmers were able to identify their respective extension agent.

F. Initial Environmental Analysis

1. Affected Environment

Project activities and the agricultural enterprises that it will influence cover much of the western high plateau that lies just to the east of the north-south Jordan Rift Valley. The elevation varies from 500 to 1200 meters. There is a Mediterranean climate with most of the rainfall coming from November to March. The average rainfall varies from 250-400 mm over much of the area, but is somewhat greater in the limited higher areas in the north, and quickly drops below 250 mm as one moves east into the desert. Most of the areas with high rainfall (over 400 mm) are relatively rocky with red Mediterranean soils derived from parent limestone. At lower elevations there is a transition to yellow Mediterreanean soils with far less stone content.

The highland area under consideration for the HADP is the main watershed area for most of the cities and towns in Jordan. Although some of the rivers and streams are used for human consumption, domestic water usually comes from deep wells because of the low stream flows during the summer. Although the Zarqa river with the King Talal Dam represents a large and continuous source of water, it is not used as a human water source because of heavy metal contamination from industries in Zarqa and Amman.

2. Environmental Concerns

The proposed actions represented by the Highland Agricultural Development Project involve a wide variety of support activities that are described in the Project Paper. This environmental evaluation is a broad but somewhat superficial evaluation of the overall environmental consequences, with a more detailed environmental evaluation of those aspects of the project that pertain to pesticides.

a. General Environmental Concerns

Erosion and sedimentation of dams and rivers are serious problems in the highland area with overgrazing and disc and moldboard plowing of submarginal land both contributing to the erosion problem at the present time. The HADP will not be involved in construction of large dams or roads and thus will not have major effects associated with such large land moving projects. Small check dams and terraces will be advocated in the project and both should have a beneficial effect on erosion and water retention.

As mentioned, the project will stress that it is not to the farmers best interest to plant crops that require more rain than can reasonably be expected in most years. Farmers in the lower rainfall areas of the so-called barley zone will be guided toward the planting of permanent forage crops, and farmers in the drier areas of the wheat zone will be guided towards barley. In the steep rocky areas of the higher mountains with considerable rainfall, emphasis will be placed on the planting of perennial crops which require less soil disturbances. This trend towards a more conservative selection of crop enterprises to fit the rainfall will have a beneficial effect on the environment of the highlands.

Tradition and land allocation to heirs has caused farmers to continue to plow up and down the hills. The project will advocate and encourage contour plowing with chisel plows, which are recognized to cause much less disruption of the soil, and thus less erosion. Although moldboard or disc plowing will be needed periodically for disease, insect, and weed control, emphasis on the use of chisel plows will have a positive environmental effect on the area.

Fertilizers have been used to a very limited extent in the Jordan highlands until the present time because low yields and crop failures from low rainfall make farmers very skeptical of increasing crop production inputs. There is good experimental evidence that yields can be increased by the use of fertilizers with a substantial increase in net profits. The project will demonstrate and promote that fertilizers, when applied at the right time and in the correct way, can be beneficial. Research by the University of Jordan, the MOA and ICARDA suggest that for the cereals, nitrogen will be required at 60 Kg/Ha with half being applied at sowing and the other half at tillering. Phosphate will be recommended at 30 Kg/Ha applied as a band at the time of seed drilling. These relatively modest amounts of fertilizer (50#/Ac) should not have adverse environmental effects. Crop rotation with leguminous crops inoculated with the proper strains of Rhizobium should minimize the needs for nitrogen in the future.

b. Effects of Pesticides

(1) Present use of pesticides in the highlands. At the present time few or no pesticides are used on goats and sheep, although there is a very comprehensive program for vaccination and parasite control for all animals. The main pesticide being used in cereals is 2,4-D with 8,400 liters being used in 1983. Although this is a relatively modest amount, an obvious trend is evident when it is recognized that no 2,4-D was being used in 1979. Few or no insecticides are being used on cereals, but some fungicides such as Thiram are being used as seed treatments.

Few, or no, pesticides are being used in the 143,000 Dunums of lentils, but there appears to be a need for both herbicides and insecticides. It is not possible to determine how much pesticide is being applied to olives, but there is evidence that a substantial amount of the 30,000 liters of dimethoate being used in Jordan is being applied to olives for olive fly control. Grapes are sprayed for the grape berry moth, Lobesia botrana, and apples for codling moth, Laspyresia pomonella. Both carbaryl and azinphosmethyl are being used for these pests. How much of the total two tons of carbaryl and 500 liters of azinphosmethyl is being used on tree fruits is open to conjecture, but it is probably a substantial amount. It appears the stone and pome fruits are major users of insecticides, and if their acreage increases from the present 1% of the cultivated land, it could substantially increase the use of insecticides in the highland.

(2) Effects of the project on pesticide use.
The project will be involved in field testing and field demonstrations that will involve the use of pesticides. It also will advocate increased use of certain specific pesticides that clearly are needed for more effective pest control and thus more efficient crop production.

242

In the first phase of the project, which will concentrate on small ruminants, cereals and pulses, the main effect will be an increase in the use of 2,4-D and probably other herbicides. The project will advocate seeding before the first rains to take advantage of all the available moisture, but this will preclude the cultivation of weeds that germinate after the first rains. As a consequence, herbicides will be needed for weed control in most instances.

The project will advocate the use of 2,4-D which is a non-restricted herbicide registered for use on cereals by USEPA and the Plant Protection Division of the Ministry of Agriculture of Jordan. It is of moderate toxicity to humans and should not pose a water pollution problem, since it is sometimes used for aquatic weed control in the U.S. Since dioxin contamination can greatly increase the toxicity of 2,4-D and 2,4,5-T, the project must advocate the use of low dioxin 2,4-D that meets U.S. specifications. Ester formulations of 2,4-D can be safely used in monocultures of grain, but amine formulations should be used when there is danger of vapor drift to broadleaf crops.

Other boardleaf herbicides that might be tried in the project are MCPA and bromoxynil. Both are non-restricted USEPA registered herbicides that should be safe for use in Jordan. Neither is registered by the Jordanian Ministry of Agriculture, so registration would have to be solicited if field trials prove superior efficacy.

As the project progresses, the use of the chisel plow and 2,4-D will very rapidly result in a shift to wild oats and other grassy weeds. Barban (Carbyne), Diclofop-methyl (Hoelon) and trillate (Far Go) are unrestricted USEPA herbicides for grassy weed control in cereals and probably will need to be experimentally evaluated in the project. If they prove useful under Jordanian conditions, registration will have to be obtained from the Ministry of Agriculture.

Summer and alternate year fallow periods are often used to accumulate enough moisture for crops in the drier parts of the highland, and weed control can help to reduce moisture loss during the crop-free periods. However, the project should be very careful about using herbicides during non-cropping periods because of the frequent and unpredictable grazing by sheep and goats. Neither dinoseb nor paraquat should be used in the project, and glyphosate should only be given consideration for use where grazing animals can be excluded.

G. Commodities and Facilities

1. Facilities

The National Agricultural Center for Research and Technology Transfer will include laboratories and offices near Amman. The offices and laboratories in the Center will be supplemented with those of the University where members of the Faculty of Agriculture are hired by the NCARTT through split appointments or by contract with the University. The exact size and content of the NCARTT facilities will be finalized during the expedited phase of the project.

Sites and support for field research by the research staff of the NCARTT or under contract (with UJFA, ICARDA, etc.) will be provided through the Regional Agricultural Service Centers, existing experiment stations, or on-farm sites through a lease or rent agreement with the land owner or tenant.

Facilities proposed for each ASC are as follows:

a. Offices (18)
   a. 1 Supervisor and Secretary
   b. 1 Administrative Services Officer and Clerk
   c. 12 Agricultural Service Officers
   d. 1 For Visiting Researchers/Specialists
   e. 1 For Credit Information Office
   f. 1 For 2 or 3 additional Secretaries to support the 12 ASO's
   g. 1 Microcomputer Room

b. Meeting/Conference Rooms (2)
   a. 1 Seminars/Staff Conferences for 20 people
   b. 1 Public Meeting Room for 120 people with audio-visual equipment and kitchen

c. Laboratories (4)
   a. 1 Preparation Lab (drill, grinders, scales, storage for samples)
   b. 1 General use Laboratories (refrigerated and freezer storage, wet laboratory, benches)
   c. 1 Analytical Lab (microscopes, balances, scales, instrumentation as needed)
   d. 1 Veterinary Facility

d. Shops and Utility Areas (6)
   a. 1 Vehicle and tractor storage and garage
   b. 1 Machinery storage (plows, seed drills, etc.)
   c. 1 Tool storage room.
   d. 1 Maintenance
   e. 1 Hazardous chemical storage (fuels, lubricants, flammable and toxic chemicals)
   f. 1 Supply storage/stock room (fertilizers, seeds, etc)

e. Quarters for security guard

Not all of these facilities need to be provided through new construction since some facilities are already available at both the Ramtha and Rabba Stations.

2. Equipment

The items listed are for Integrated Program one (IP1) only, and may not be complete for all its needs. Sufficient funds should be set aside to acquire other equipment as required.

In addition to office equipment such as desks, chairs, file cabinets, book shelves, etc., the following equipment would be needed at each ASC :

a. 3 Tractors, 70 HP.
b. 3 Sets mounted tillage equipment (chisel plows, duckfoot or sweep plows, spike tooth harrows and cultimulcher).
c. 3 Seed drills with fertilizer attachment capable of delivering fertilizer separately or with seed and/or below seed. Adjustable row width from 15 to 30 cm. One drill with disk opener and other two with shovel openers. All must have packer wheels. Maximum width of 4 meters, with 2 1/2 to 3 meters preferred.
d. 1 Seed drill as described above but also with grass seed attachment.
e. 3 Tractors, 20 to 30 HP, with attachable chisel plows, duckfoot or sweep plows, spike tooth harrows, cultipacker and brush hog.
f. 2 Rotary fertilizer spreaders for dry fertilizer to be attached to the 20 to 30 HP tractors.
g. 1 Three meters dry fertilizer broadcast spreader.
h. 1 Self-propelled one meter plot combine harvester.
i. 2 Self-powered sickle-bar mowers.
j. Miscellaneous hand tools, and containers.
k. Electric welder, acetylene welder air compressor, electric drills and assorted power tools for machine shop.
l. Portable livestock scales suitable for weighing sheep and goats.
m. Portable squeeze chute and corral suitable for working sheep and goats.
n. IBM PCXT or equivalent microcomputer with printer and associated software.

3. Transportation

All vehicles are to be garaged at the ASC. No drivers are required since personnel are expected to drive the vehicles themselves.

a. 1 pickup, 3/4 ton, 4-wheel drive with trailer capable of hauling 20 HP tractor with attached tillage equipment.

b. 3 pickups, 1/2 ton, 4-wheel drive with 2 smaller trailers to haul 20 HP tractors and other equipment. 2 of the pickups should have detachable livestock racks.

c. 6 vehicles capable of travelling poor backroads in all weather conditions.

d. AUDIOVISUAL AND OTHER EQUIPMENT

(All equipment must be 220 volts - no transformers acceptable-50 cycle)

DESCRIPTION	NO.	ESTIMATED COST (US DOL)
(1) 16 mm Sound Projectors, self threading with 2" f/1.2 lens with extension cover	1	1,200.00
a. Replacement lamp	10	150.00
b. Exciter lamp	10	50.00
c. Plastic autoload Takeup Reel	5	20.00
d Dust Cover	1	20.00
e. Plastic Reel Cans 800 ft.	5	10.00
f. Plastic Reel Cans 1200 ft.	5	15.00
(2) 35 mm Sound Filmstrip Projecter	2	700.00
a. Headphone	1	15.00
b. Dual Headphone adapter	1	10.00
c. Replacement lamps	20	80.00
d. Transportation Case	1	80.00
(3) Overhead Projecter	3	1,200.00
a. Rollfeed Attachment Roll 50 ft	10	200.00
b. Organizer shelves	4	80.00
c. Storage cover	3	30.00
d. Carrying Handle	3	30.00
e. Replacement lamps	30	600.00
f. Light Shield	10	180.00
(4) Slide Projecter	3	1,800.00
a. Zoom lens	3	200.00
b. Lamp	20	400.00
c. Slide Trays-80	50	500.00
d. Remote 25' extension cord	3	50.00
e. Filmstrip adapter	3	300.00
f. Carrying case	3	100.00
(5) Cassette Taper Recorder (heavy duty) Syne Capacity with slide projecter	1	300.00
a. Headphones (set)	1	20.00
b. Listening Center	1	25.00
c. Three channel mix	1	80.00
d. Mike stand	1	15.00
e. 35' extension cord	1	20.00
f. Carrying case	1	35.00
g. Tapes	50	200.00
SUBTOTAL		8,715.00

DESCRIPTION	NO.	ESTIMATED COST (US DOLL)
SUBTOTAL Brought forward		8,715.00
(6) Cassette Tape Recorders (Portable)	3	600.00
a. Case	3	60.00
b. Portable Mike	3	60.00
c. Headphone	3	60.00
(7) Video Recorder, Player, and Monitor (Sound) Portable (each)	1	5,120.00
a. Adapter/Charger	1	300.00
b. Battery Cable	1	50.00
c. Tripod	1	175.00
d. Video Cassettes	20	400.00
e. Replacement Bulbs	10	180.00
(8) Programmable Calculators	3	600.00
a. Printer	2	400.00
b. Charger	2	100.00
(9) Projections Screens, including carrying case 60"x60"	3	450.00
(10) Overhead Projecter stand	1	150.00
(11) Portable Loudspeaker (Bullhorn)	2	300.00
a. Replacement Batteries	12	60.00
(12) Portable Easels	4	600.00
a. Carrying case	4	60.00
(13) Rollaround Magnetic Chalboard Easel	1	200.00
(14) Portable Chalkboards	5	335.00
(15) Display rack	1	200.00
(16) Chalk-varied colored (packs)	50	150.00
(17) Magic Markers	100	225.00
(18) Acetate Sheets for overhead Projecter (Packs)	100	300.00
SUBTOTAL		19,850.00

cont'd

SUBTOTAL Brought Forward	4	19,350.00
(19)35 mm Cameras 1.2 mm lens	4	1,600.00
a. Case and strap	4	100.00
b. Closeup lens	2	250.00
c. Film 35 mm rolls	200	1,600.00
(20)Mimeograph	1	750.00
(21)Darkroom Equipment including enlarger		5,000.00
(22)General support equipment (to be determined by assessment of Agricultural Information Specialist)		6,000.00
(23)Analytical equipment		20,000.00
SUBTOTAL		US DOL 55,150.00

e. Commodity Procurement Schedule

(1) Expedited Implementation Phase

An allocation has been made for procurement under this phase (see financial section). Priority will be placed on vehicles used by the NCARTT and farm equipment and vehicles for early implementation of on-farm demonstrations programs of the RASCs. The other equipment ordered under this phase of the project will be the office equipment and related facilities for the NCARTT and RASCs.

(2) Procurred by Commodity Procurement Agent

All other equipment items and commodities will be ordered by the commodities procurement agent after they have been specified by the TA team. Resupply of vehicles and farm machinery later in the project is specified in the financial section.

4. Estimated Cost of Equipment and Vehicles

a. NATCC

Office Furniture/Equipment

Prof Staff 40 @ US DOL 1,500	US DOL 60,000	
Secretaries/Clericals 10@ US DOL 1,000	10,000	
Typewriters 6 @ US DOL 1,800	10,800	
Meeting Rooms	5,000	
IBM PC Printer	12,000	
S/T	US DOL 97,800	
Lab. Equipment		
12 Lab @ US DOL 40,00	480,000	
Audiovisual (per JVASP)	60,500	
US DOL 638,300		
Shipping Cost @ 80 percent	US DOL 270,640	
US DOL 908,940		
Vehicles		
Sedans 3 @ US DOL 10,000	US DOL 30,000	
US DOL 938,940		

b. VEHICLES

Pickup, 3/4 ton, 4-W Drive With Trailer of Hauling 70 HP Tractor with attached tillage eqpt.	15,000
Pickup, 1/2 ton, 4-W Drive , 3@ 12,000	36,000
Trailer to haul 30 HP Tractor and Eqpt. 2 @ 3,000	6,000
Sedans 6@ 10,000	60,000
S/T VE	117,000
TOTAL ASC	735,000

c. RASCs

(1) Office Equipment

Prof Staff 14 @ US DOL 1,500	US DOL 21,000	
Clerical 4 @ US DOL 1,000	4,000	
Typewriters 4 @ 1,800	7,200	
Meeting rooms, Kitchen	US DOL 10,000	
US DOL 50,200		
Lab Equipment		
4 labs @ US DOL 40,000	US DOL 160,000	

Audio Visual (per JVASP)	US DOL	21,850
S/T	US DOL	232,050
Shipping cost 80 percent	US DOL	185,640
	US DOL	417,690

(2) Farm Equipment

70 HP 3 @ US DOL 14,500	US DOL	43,500
Chisel Plows 3 @ 2,000	US DOL	6,000
Duckfoot Plow 3 @ 2,000	US DOL	6,000
Spike Tooth Harrow 3@ 2,000	US DOL	6,000
Cultimulcher 3 @ 2,000	US DOL	6,000
Seed Drills w/fertilizer attachment 3 @ 7,800	US DOL	23,400
Seed Drill w/grass seed attachment 1 @ 7,800	US DOL	7,800
Tractors, 30 HP 3 @ 9,100	US DOL	9,100
Mounted Tillage Eqpt. 3 sets @ 15, 800		47,400
Fertilizer Spreader, Rotary 2 @ 4,000		8,000
Three-meter fertilizer broadcast spreader 1 @ 5,200	US DOL	5,200
Self Propelled 1-meter plot combine harvester 1@ US DOL 12,000x		12,000
Self-powered sickle-bar mower 2 @ 3,000		
Misc. Hand tools & containers Electric Welder, acetylene welder, air compressor electric drills and assorted power tools for machine shop		10,000
Portable livestock scales 3@ 1,300		3,900
Portable squeeze chute-corral @	US DOL	5,200
S/T	US DOL	199,500

x Shipment cost only; combine to be donated

H. Training

Success of the HADP will depend on the performance of Jordanian personnel, along with the adoption and application of many concepts and practices which have only recently been developed. There also is a shortage of persons with qualifications in certain subject matter areas. It will be essential to prepare project personnel through a variety of arrangements including (1) pre-service, (2) in-service, (3) short-term external, (4) graduate study, and (5) special training.

1. Pre-Service: Pre-service training requirements are essential for the Jordanian Assistant Director for Development and the contract Chief of Party. These people should be sent together to the University of Hawaii Institute of Tropical Agriculture and Human Resources to be trained in Systematic Commodity/Resource and Development Process, and research and extension project management. They would learn to work together as well as gaining an understanding of the SCRAD Process.

   Other pre-service training will be language and cultural orientation conducted for contract staff who will provide advisory services for the project.

2. In-Service: Project personnel will participate in a variety of short-term courses designed to provide them information needed to better perform their duties. These courses are as follows:

a. Management. This course is to improve the management skills of all those assigned administrating positions. It is intended for all persons having management responsibilities. A contractor would present this material at the NCARTT.

b. Introduction to Systematic Commodity/Resource and for Development (SCRAD) Process. This would be a two week course explaining the concepts and procedures involved in the SCRAD process. The course could be taught by the ADD and CP as a team after they have returned from their six-month training at the Hawaii Institute of Tropical Agriculture and Human Resources (HITAHR). Alternatively, it could be presented by HITAHR on a contract basis. Candidates for this course would include all project administration, SMS, ASO, and certain support staff (i.e. secretaries working with ADD & CP). Location of the course would be the NCARTT and the rASCs in turn.

c. ASO Preparation. The ASO's will be provided with intensive training in basic field research methodology, pest control to include pesticides safety, concepts of integrated crop/livestock systems and farming systems improvement, extension methodology to include demonstrations and workshops, and techniques of designing, implementing and evaluating integrated research-extension projects. Workshops will be provided on various cropping systems, fertilizers, visual aids, effective communications, etc. ASO's will be expected to participate and provide valuable input into the commodity/resource analysis process, especially to provide farm level inputs and feedback. Most of all they will be expected to integrate information provided by various specialists into useful practices that the farmer can readily adopt. JCO and private sector individuals involved in extension activities should be provided the same training.

d. English Language. Depending upon competency in English at the beginning of service with the HADP all personnel may be required to participate in this training. Emphasis will be placed on reading, writing, speaking, and comprehending English. There would be up to six months of instruction provided to participants. The TOEFL examination must be successfully passed for all personnel being sent to the United States for either long-or short term purposes.

3. Short-Term External

(a) Each Jordanian SMS should receive a 12-week training program at the U.S. institution from which the counterpart TDY in the subject specialty is to come. A two-week training program in Jordan before SMS trainees depart for their U.S. training should provide background in management of research and extension, program planning, communications and similar related research-extension topics. Topics to be covered in the U.S. would emphasize the subject matter specialty and other activities such as: (1) establishing relevant criteria for selecting target areas and research sites, (2) helping to select cooperating farmers, (3) participating in field surveys, (4) assisting in organizing field trials and demonstrations on farmer fields, and (5) organizing and implementing multilocational tests and pilot production programs. Learning how the U.S. TDY functions in his home surroundings will provide a better understanding of what it is that is to be applied in Jordan by the SMS. Such a program will also develop stronger links among the project personnel.

(b) Each Jordanian SMS and ASC Supervisor will be provided an observation and study program focusing on successful integrated technology transfer programs that are oriented towards the needs of small farmers. The purpose of this training is to expose SMS whose education and experience have focused on large-scale farming to become aware of the need for technology development for small farmers.

4. External Graduate Training

Technical education in many of the disciplines required in the HADP will be necessary because there are few or none of the specialists presently available in Jordan. Graduate programs for these areas, and possibly others, will be initiated during the expedited phase of the Project. This will avoid the error of having major SMS counterparts absent during early phases of the contract. Closer linkages will be created between counterparts, trainees, and the contracting university. Whenever possible the major professor of the trainee should be the U.S. TDY. Thus the TDY will be in contact with the graduate student both in the U.S. and Jordan and will be able to supervise thesis field work in Jordan as part of the project. This arrangement should provide a very beneficial synergistic effect on the project.

A total of thirty two participants from the ranks of SMS and ASO will be considered for external education.

Specialists to be developed in this part of the project would include:

Range Management	1 PhD, 2 M.S.
Forest Watershed Management	1 PhD, 1 M.S.
Agricultural Marketing	1 M.S.
Forage-Legumes	1 M.S.
Rural Sociology	1 M.S.

Some recommendations for degree programs are:

a. Competence within an existing or closely related discipline. For example, a person holding a B.S. or equivalent in forestry or botany could be a candidate for the M.S. in range management.
b. Interaction among disciplines is a key feature of the SCRAD process. Therefore, graduate students should be conversant with, and sensitive to, the basic concepts, terminology and methodology of several other core disciplines. Interdisciplinary activities are to be strongly encouraged.

5. Specialized Training
Specialized training will be required for a number of HADP participants. For example, the ADD and CP are slated for six months of training in the SCRAD process in Hawaii.
Participants will also be considered for a number of U.S.D.A. short courses which vary from two to thirteen weeks. Course announcements will be examined, and candidates selected on a basis of course content relevancy to the project.

International and regional centers offer in-depth courses and seminars. It is anticipated that several of the HADP participants may attend short courses at one or more of these centers. As the Near East RAIN network becomes operative, it will sponsor various relevant specialized training programs for staff of participating countries.

JORDAN:
HIGHLAND AGRICULTURAL DEVELOPMENT

PROJECT PAPER VOLUME III

Consultant Reports Used
In Project Preparation

4/30/85

305

PROJECT PAPER VOLUME III

JORDAN 278-0264

HIGHLAND AGRICULTURAL DEVELOPMENT PROJECT

TABLE OF CONTENT

A. Boyd Post Report "Jordan Highlands Agricultural Development"

B. Mark Kraczkeiwicz "Report of Private Sector Credit Team"

306