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UNCLASSIFIED

PROJECT PAPER

JORDAN

Jordan Valley Agricultural Services 278-0241

Agency for International Development

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
 C = Change
 D = Delete

Amendment Number

DOCUMENT CODE

3

2. COUNTRY/ENTITY

JORDAN

3. PROJECT NUMBER

273-0241

4. BUREAU/OFFICE

NEAR EAST

03

5. PROJECT TITLE (maximum 40 characters)

JORDAN VALLEY AGRICULTURAL SERVICES

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
 08 31 86

7. ESTIMATED DATE OF OBLIGATION
 (Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY 81 B. Quarter 4 C. Final FY 81

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

A. FUNDING SOURCE	FIRST FY 81			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	5,620		5,620	5,620		5,620
(Grant)	(5,620)	()	(5,620)	(5,620)	()	(5,620)
(Loan)	()	()	()	()	()	()
Other U.S. 1.						
Other U.S. 2.						
Host Country					4,243	4,243
Other Donor(s)						
TOTALS	5,620		5,620	5,620	4,243	9,863

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ESF	120	070				5,620		5,620	
(2)									
(3)									
(4)									
TOTALS						5,620		5,620	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

075

11. SECONDARY PURPOSE CODE

183

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

A. Code	012	021	123	075	080
B. Amount	25%	16%	17%	17%	25%

13. PROJECT PURPOSE (maximum 480 characters)

Establish and institutionalize a viable mechanism capable of developing and disseminating appropriate agriculture technology for increasing vegetable and fruit production in the Jordan Valley.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY
 05 84 06 86

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

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

17. APPROVED BY

Signature: *Walter G. Bollinger*
 Title: Walter G. Bollinger
 Date Signed: MM DD YY
 09 27 81

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

MM DD YY

**AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT
FACESHEET (PID)**

1. TRANSACTION CODE G A = Add
C = Change
D = Delete

Revision No. 1

DOCUMENT CODE 1

COUNTRY/ENTITY JORDAN 3. PROJECT NUMBER 278-0241

BUREAU/OFFICE A. Symbol B. Code
NEAR EAST 03 5. PROJECT TITLE (maximum 40 characters)
Jordan Valley Agricultural Services

ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION 7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 = 0.3125)

FUNDING SOURCE		LIFE OF PROJECT
A. AID		5,620
B. Other U.S.	1.	
	2.	
C. Host Country		
D. Other Donor(s)		4,598
TOTAL		10,218

A. Initial FY 81
B. Final FY 81
C. PACD 86

8. PROPOSED BUDGET AID FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. 1ST FY		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
1)	120	070		5,620		5,620	
2)							
3)							
4)							
TOTALS				2,120		5,620	

SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each) 075 10. SECONDARY PURPOSE CODE 183

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

A. Code BS

B. Amount

12. PROJECT PURPOSE (maximum 480 characters)

The project purpose is to develop and institutionalize a viable program in applied agricultural research and extension in the Jordan Valley.

13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT

Staff: The Project Paper will be prepared by a team appointed under Title XII collaborative assistance and the Project Officer.

Funds TS&FS Funds

14. ORIGINATING OFFICE CLEARANCE	Signature	Date Signed MM DD YY 09 15 81	15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY
	Title <u>Director, U.S.A.I.D./Jordan</u>		

16. PROJECT DOCUMENT ACTION TAKEN

S = Suspended CA = Conditionally Approved
 A = Approved DD = Decision Deferred
 D = Disapproved

17. COMMENTS

18. ACTION APPROVED BY	Signature	19. ACTION REFERENCE	20. ACTION DATE MM DD YY
	Title		

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT
FACESHEET (PID)

1. TRANSACTION CODE
A = Add
C = Change
D = Delete

DOCUMENT CODE
Revision No.
1

2. COUNTRY/ENTITY
JORDAN

3. PROJECT NUMBER
278-0241

4. BUREAU/OFFICE
NEAR EAST
A. Symbol B. Code
03

5. PROJECT TITLE (maximum 40 characters)
Jordan Valley Agricultural Services

6. ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION
A. Initial FY 81
B. Final FY 82
C. PACD 85

7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 = 0.3125)
FUNDING SOURCE LIFE OF PROJECT
A. AID 4,920
B. Other U.S. 1. 2.
C. Host Country
D. Other Donor(s) 4,430
TOTAL 9,350

8. PROPOSED BUDGET AID FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. 1ST FY		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
	120			2,120		4,920	
TOTALS				2,120		4,920	

9. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)
075

10. SECONDARY PURPOSE CODE
183

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

A. Code B. Amount

BS

12. PROJECT PURPOSE (maximum 480 characters)

The project purpose is to develop and institutionalize a viable program in applied agricultural research and extension in the Jordan Valley.

13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT

Staff: The Project Paper will be prepared by a team appointed under Title XII collaborative assistance and the Project Officer.

Funds Central funds.

14. ORIGINATING OFFICE CLEARANCE
Signature: [Signature]
Title: Director, U.S.A.I.D./Jordan
Date Signed: MM DD YY 03 01 81

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

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17. COMMENTS

18. ACTION APPROVED BY

Signature
Title

19. ACTION REFERENCE

20. ACTION DATE

MM DD YY

TABLE OF CONTENTS - PP 278-0241

	<u>PAGE</u>
I. SUMMARY AND RECOMMENDATIONS	1
II. PROJECT BACKGROUND	6
A. IMPORTANCE OF THE PROJECT TO JORDAN	6
B. EXISTING SITUATION	7
C. CURRENT RESEARCH-EXTENSION SYSTEM	9
III. PROJECT DESCRIPTION	12
A. SUMMARY DESCRIPTION OF PROJECT	12
B. OBJECTIVE	12
C. PROJECT PROGRAM	13
D. RESULTS TO BE EXPECTED	15
E. BENEFICIARIES	16
F. RELATIONSHIP OF PROJECT TO AID AND HOST COUNTRY PRIORITIES	17
G. RELATIONSHIP OF PROJECT TO OTHER DONORS	18
IV. PROJECT ANALYSIS	20
A. TECHNICAL FEASIBILITY	20
B. ECONOMIC FEASIBILITY	27
C. SOCIAL SOUNDNESS ANALYSIS	40
D. ADMINISTRATIVE ANALYSIS	41
E. ENVIRONMENTAL CONCERNS	48
V. PROJECT FINANCIAL PLAN	50
A. BUDGETARY ANALYSIS	50
B. PROJECT FINANCIAL IMPLEMENTATION	54
C. RECURRENT COST IMPLICATIONS	55
VI. PROJECT IMPLEMENTATION AND EVALUATION	56
A. INTRODUCTION	56
B. PROJECT IMPLEMENTATION	56
C. IMPLEMENTATION SCHEDULE	61
D. PROJECT MONITORING AND EVALUATIONS	65
VII. CONDITIONS, COVENANTS AND NEGOTIATING STATUS	67
A. CONDITIONS PRECEDENT	67
B. SPECIAL COVENANTS	68
C. NEGOTIATING STATUS	69

LIST OF ANNEXES - PP 278-0241

- A. LOG FRAME
- B. STATUTORY CHECKLIST
- C. DRAFT PROJECT GRANT AGREEMENT
- D. REQUEST FOR ASSISTANCE
- E. PROJECT AUTHORIZATION
- F. PID APPROVAL MESSAGE AND RELATED CABLES
- G. ADAPTIVE RESEARCH AND EXTENSION PROGRAM
- H. SOCIAL SOUNDNESS ANALYSES
- I. JOB DESCRIPTIONS
- J. OPERATION OF THE APPLIED RESEARCH AND EXTENSION CENTER
- K. SOILS AND WATER PROGRAM
- L. TRAINING PROGRAM
- M. LAND AVAILABILITY SURVEY
- N. AGRICULTURAL INSTITUTIONS SERVING AGRICULTURE IN JORDAN
- O. BUDGET DETAIL

JORDAN VALLEY AGRICULTURAL SERVICES PROJECT
ABBREVIATIONS AND DEFINITIONS

ACC	Agricultural Credit Corporation
AR&E	Agricultural Research and Extension
AR&EC	Agricultural Research and Extension Center
DR&E	Department of Research and Extension, MOA
Dunum	One-tenth of a hectare (about one-fourth of an acre)
FY	U.S. Fiscal Year (October - September)
GOJ	Government of Jordan
IPM	Integrated Pest Management
JCO	Jordan Cooperative Organization
JD	Jordanian Dinar (equals approx. \$ 3 U.S. , July 1981)
JVA	Jordan Valley Authority
JVAS	Jordan Valley Agricultural Services
JVASP	Jordan Valley Agricultural Services Project
JVFA	Jordan Valley Farmers Association
MOA	Ministry of Agriculture
NPC	National Planning Council
PID	Project Identification Document
PP	Project Paper
SMS	Subject Matter Specialists (Extension)
SW	Soil and Water
TDY	Temporary Duty
TWF	Tobacco White Fly
TYLCV	Tomato Yellow Leaf Curl Virus
UOJ/FA	University of Jordan, Faculty of Agriculture
USAID/J	United States Agency for International Development - Jordan
AID/W	Agency for International Development - Washington, D.C.
WID	Women in Development
WSU	Washington State University, Pullman, Wa. 99164, U.S.A.

JORDAN VALLEY AGRICULTURAL SERVICES PROJECT

I. SUMMARY AND RECOMMENDATIONS

A. GRANTEE: The Government of the Hashemite Kingdom of Jordan (GOJ).

B. IMPLEMENTING AGENCY: The Ministry of Agriculture will be responsible for project implementation.

C. THE GRANT: Not to exceed U.S. \$5,620,000 (Five Million Six Hundred Twenty Thousand Dollars) to be authorized as a grant from FY 1981 Economic Support Funds to finance U.S. advisory services; U.S., local and third-country training, and local currency and foreign exchange costs for commodities and equipment. All procurement will be made in the U.S. and Jordan.

D. TOTAL PROJECT COST: The total project cost is estimated at \$9,863,000 of which the GOJ contribution approximates \$4,243,000, or 43 percent of the total.

E. DESCRIPTION OF PROJECT: The project involves the development and institutionalization of an agricultural research and extension center to serve the Jordan Valley and Ghor Safi. The Center will conduct applied research on key problems affecting vegetable and fruit production by those engaged in agriculture in the Valley. Center extension staff will work with Center researchers and Valley agriculturalists in identifying problems on which research work should concentrate, and in extending research results in a fashion which will enable more effective and efficient adoption and use of modern farming technologies. The priority areas for research and extension work during the five-year project duration are integrated pest management, horticultural practices, soil and water management, and economics of production. To facilitate extension of research findings project activities will include 1) research at the Ministry of Agriculture's Deir Alla research station and at three field research sites located throughout the Valley; 2) on-farm demonstrations involving cooperating farmers, and 3) increased frequency of farm visits by extension staff. Technical assistance to be provided by a U.S. university under an AID-financed contract will include long and short-term advisors, training for the Center's Jordanian personnel in Jordan, the U.S. and third countries, such as the American University - Beirut, and commodities and equipment needed to carry out project activities.

F. PURPOSE: To establish and institutionalize a viable center capable of developing and disseminating appropriate agriculture technology for increasing vegetable and fruit productivity in the Jordan Valley.

G. SUMMARY FINDINGS

1. Technical Analysis: Improving research and extension services is considered an effective means for increasing crop production and one which has been proven effective in other countries and situations. The project proposes: a) To develop better services through provision of advisory assistance and considerable training for Jordanian researchers and extension staff; b) to develop improved incentives and allowances in order to retain GOJ employees on the job; c) to foster increased contacts and closer relationships between Jordan Valley agriculturalists and research-extension staff so as to make these services more responsive to actual production problems, and d) to institutionalize a research and extension center which can continue addressing the highest priority problems of Valley agriculture, i.e. pest management, horticultural practices, soil and water management, and production economics. Valley farm owners, tenants and sharecroppers have demonstrated considerable receptiveness to adoption of technological innovations, such as drip irrigation and plasticulture. The proposed activity seeks to facilitate such change by enabling this group to use modern technologies more effectively and efficiently.

2. Economic Analysis: The economic analysis finds that Jordan Valley agriculture output makes a significant contribution to the economy through production both for export and domestic consumption. Fruits and vegetables are the principal crops grown there, the ones which have especially benefitted from adoption of new technologies, the ones where Jordan has a significant comparative advantage in producing for near-by export markets, and the ones offering significant returns to Valley producers. Pests and viruses are, concomitantly, becoming increasingly serious problems, reducing production and the quality of Valley produce. At the same time inappropriate use of the new technologies, as well of initiation of some techniques to alleviate pest

problems, will adversely affect future production and have already curtailed Jordan's access to some of its market outlets. While it is difficult to calculate with much precision future benefits attributable to improved research and extension services, the economic analysis concludes that the project should lead to improved resource utilization and net returns to farmers while decreasing crop losses.

3. Financial Analysis: As an institution-building activity the proposed project does not involve revenue generation per se but does have recurrent budget implications for the GOJ. These implications have been reviewed with Government; the project design period coincided in part with the GOJ's preparation of its CY 1982 budget so that the Ministry of Agriculture has already initiated efforts to include in that budget needed provision for construction and recurrent costs. Project financial implementation with respect to AID funds will be almost entirely through the U.S. university contract, the sole exception being evaluations. Consequently, in a strict sense all project disbursements will be for foreign exchange costs.

4. Social Analysis: The social analysis concludes that the project can positively contribute to Jordan's economy, to increasing agriculture incomes and employment opportunities, and to the general health and well-being of Valley residents. The extent of project success is recognized as being dependent on its being able to alleviate problems judged responsible for hampering existing research and extension efforts. These problems, identified in the analysis, have been specifically included for review in project evaluation.

5. Administrative Feasibility: The collaborative style contracting approach is one with which AID has had much prior experience although this will be the first experience with it for both USAID/Jordan and the GOJ. In large part the choice of this direct-AID contracting mechanism reflects the Mission's desire to minimize the administrative burden which host-country contracting would place on the Ministry of Agriculture, especially given the hiatus (since the mid-1970's) in AID-MOA cooperation and the Ministry's lack of familiarity with AID procedures. The collaborative style approach offers significant benefits vis-a-vis close cooperation between the MOA and the

university contractor. By involving the contractor in project design, this technique has also given it an understanding of, and responsibility for, decisions made during project design on project administrative arrangements, on the content of research and extension activities, and on the institutionalization objective. The MOA has considerable capability within its staff, and the technical assistance proposed reflects that substantive expertise; however, administrative relationships have received much attention in the PID and subsequent project design. The agreements reached between the MOA, USAID and the Washington State University design team are embodied in CP's and the PP itself and give considerable autonomy to the research and extension center's Jordanian Project Director. USAID has sufficient staff to monitor project implementation.

6. Environmental Considerations: The project falls within the categorical exclusion for research activities and education, technical assistance or training programs. However, as the environmental section points out, the project is expected to have some positive environmental impacts through extension efforts to train farmers how to use pesticides in safer, more efficient and effective ways.

H. STATUTORY CHECKLIST: All statutory criteria have been met as indicated in Annex B.

I. ISSUES: Issues raised in the NEAC review (State 93027, Annex F) have been addressed in the PP (see also Amman 3061 and 7009/1 in that Annex). There are certain areas of concern which will necessitate continuing review to verify the effectiveness of the PP's planned solutions during project implementation; accordingly, they have been designated as specific subjects for evaluation during one or more of the periodic project evaluations. These areas are 1) the ability of project research and extension staff effectively to deliver new or improved farming technologies to the project's target group, including the importance of adequate allowances, and incentives, and 2) the organizational relationships between and among the project's agricultural research and extension center and other sections/ departments of the Ministry of Agriculture (MOA). The second has also been included as a Condition Precedent. Finally, that the USAID and MOA accept the Washington State University design team's work and agree to WSU's serving as the contractor for project implementation.

J. SOURCE AND ORIGIN: Goods and services financed under the project shall have their source and origin in the United States and the Cooperating Country except for some participant training to be financed in Code 941 third-countries. Ocean freight financed by AID under the project shall be financed only on U.S. flag vessels.

K. RECOMMENDATION: That the grant of \$5,620,000 be authorized from the FY 1981 ESF appropriation, subject to the terms and conditions in the Grant Authorization included as Annex E.

L. PROJECT COMMITTEE: Amos "Dick" Jones, Project Manager - Agriculture - Chairman.

Larry Brown, Capital Projects Officer
Nancy Carmichael, IDI, Assistant Program Officer
Jeryes Fashho, Chief Accountant
Jarir Dajani, Social Scientist
Fuad Qushair, Project Manager

M. SENIOR REVIEW COMMITTEE:

Walter G. Bollinger, Director
Lois Richards, Deputy Director
Tom Pearson, Capital Development Officer
Scott Edmonds, General Development Officer
Douglas Sheldon, Controller
Dan Leaty, Program Officer
Kevin O'Donnell, Regional Legal Advisor

Note: This project was designed in part, by Washington State University (WSU) under a Collaborative Mode (see I.G5 page 4). The WSU design team members were:

C. Gardner Shaw, Team Leader
Desmond R. O'Rourke
Thomas Trail
Day L. Bassett
Daniel Mayer

II. PROJECT BACKGROUND

A. IMPORTANCE OF THE PROJECT TO JORDAN: To appreciate the importance of this Project to Jordan it is necessary to look at the conditions under which the Jordanian economy now operates. Jordan has a young and rapidly growing population and limited domestic resources for production of either foods or non-foods. It imports all of its petroleum needs, two-thirds of its food needs, and a large share of the other raw materials and finished goods essential to operate a modern economy. Thus, it has consistently run a large deficit in its balance of trade. This has been more than offset on a national accounting basis by a large inflow of budget support grants from other Arab countries, development funds from other governments and foreign exchange remittances from Jordanian workers in the Gulf.

In this situation, irrigated agriculture, present and potential, in the Jordan Valley represents a unique asset. The productivity of much of the rest of Jordanian agriculture is vulnerable to frequent, debilitating droughts. The Valley's unique topography at 200-400 metres below sea level has enabled it to become a major supplier of vegetables to neighboring countries in the off-season. It also supplies most of the domestic requirements of fresh vegetables and citrus and bananas although yields are considerably below its potential. There has been heavy investment by the GOJ and donor nations in improving the infrastructure of the Valley.

A major goal of agricultural development efforts in the Jordan Valley has been to raise the standard of living of the 6,000 farmers and their families working there. Low income and low returns on capital investment at the farm level represents lost opportunity at the national level. The prosperity of individual farmers, and of the Valley economy is dependent on finding appropriate solutions to current problems of Jordan Valley agriculture so that it may realize its potential.

This Project is intended to have an immediate, direct impact on the productivity and profitability of agriculture in the Jordan Valley.

B. EXISTING SITUATION: Producers in the Jordan Valley are faced with an array of interrelated problems for which no widely accepted solutions have yet been found. Low yields are a major problem. Of equal concern are the erratic flow of supplies to market (frequently shortage and glut occur in the same season) and the inability of Valley producers to meet the quality standards of more discriminating export markets. In the case of tomatoes, quality is often inadequate for use even in low-valued items such as tomato paste.

All major vegetables suffer from complexes of pests and diseases. The problems have been intensified in recent years by planting the same crops in the same locations year after year, by limited crop rotation, and by the increased use of plastic houses and tunnels where pests and diseases can have a more concentrated impact.

Crop production in the Valley consists primarily of vegetables grown as cash crops under irrigation for local and export markets. Farmers have focused on growing a few selected cash crops due mainly to the considerable winter market demand. Farmers have tended to plant the same cash crops year after year and this has precluded desirable crop rotations. Additionally, and particularly self-defeating of their market objectives, many Valley farmers are delaying planting dates to reduce insect and disease losses. The major example is tomatoes, where farmers are delaying fall plantings in an effort to avoid the months of high Tobacco White Fly (TWF) concentrations and thus reduce the impact on production of the Tomato Yellow Leaf Curl Virus. However, by doing so, crop maturity is delayed from winter until spring when competing produce from other areas is also being marketed and prices are significantly lower. Thus these farmers miss the peak Gulf market for which the Valley climate provides them with a unique advantage. Research extension, and agricultural service sectors must find technological means of achieving increased productivity when markets demand is greatest.

Many aspects of soil and water management contribute to production problems. Although most production comes from irrigated farms, total production has been noticeably lower in years of general drought, because less water has been available in such years. However, little basic data are available on consumptive needs of Jordan Valley crops. It is possible that yields suffer because of inefficient use of available water in differing soil types, or inappropriate use in conjunction with various fertilization or cultural practices. The growing use of drip irrigation is leading to concern about the build-up of salinity, and there is evidence in some cases of over-irrigation compounded by poor drainage.

Pesticides, such as insecticides and herbicides, and other agricultural chemicals from many sources have been and are available to Jordan Valley farmers. Government agencies have few resources to advise farmers on appropriate rates, uses, safety in application, or proper disposal of pesticides. The only hard evidence on these problems is an increased incidence of reports of pesticide poisoning and the array of types and formulations of pesticides imported into Jordan. There is also widespread concern about the build-up of pest resistance, pollution of water sources, dangerous pesticide dumping, and other side-effects of indiscriminate chemical use.

Investment in new technologies has created problems for Valley farmers. There has been a flood of capital into plastic houses and tunnels, drip irrigation systems, use of plastic mulch, etc. Much of this inflow was due to the plentiful supply of capital in Jordan, the absence of taxes on earnings in agriculture, low returns on fixed-interest Jordanian securities, and exaggerated reports of the profitability of early investments in the new technology. Information is urgently needed on the advisability of further such investments and on the changes in operating practices needed to utilize the new technologies most effectively.

In particular, the new technologies have highlighted the shortage of skilled labor of the kind needed in more complex operating environments. Skilled Jordanian nationals have been attracted to Gulf states by high incomes. Jordan actually imports many of its laborers and some of its skilled personnel from Egypt. The

inadequate knowledge of both farm managers and workers in dealing with an increasingly complex agricultural environment may well be the single biggest constraint on improvement of productivity in Jordan Valley agriculture. This lack of knowledge is a key element of almost all the problems already cited - choice of crops, timing of planting, control of product quality, soil and water management, pest management, improving management decisions on investments and operations and improving the caliber of labor.

Not all the problems of Jordan Valley agriculture are within the control of Jordanian authorities. The Valley has had its greatest comparative advantage in supplying fresh vegetables in the off-season to neighboring countries. However, such seasonal produce markets are notoriously volatile in price which is very sensitive to small changes in volume and timing of supplies. For example, it is not unusual for December wholesale prices to be three times of those in April-May when Jordan competes with local production in other countries. With increased production in winter, Jordan may be able to export considerably more at high prices. Also access to markets in neighboring countries is subject to unpredictable interruptions because of political, trade, or other factors. When these are added to the uncertainties caused by production factors such as drought, frost, disease, pests, etc., it becomes clear that agricultural enterprises in the Jordan Valley face opportunities for large profits but also high risks of large losses. Farmers' decisions must be viewed in that light.

C. CURRENT RESEARCH AND EXTENSION SYSTEM: The Jordan Valley particularly the northern region, was primarily a grain growing area prior to the development of the water distribution system. Now vegetables and fruit, but little grain, are grown in areas receiving irrigation water. The rapid switch to vegetable and fruit production has been accompanied by new technology and the introduction of numerous varieties of horticultural crops being grown without prior evaluation under Valley conditions. Pest problems have developed and pesticides and fertilizers are being applied without research data as to the best type, composition, rates or timing. In short, research has not kept up with the needs of the growers.

Research capabilities have been developed by various governmental agencies, primarily the MOA and the UOJ/FA, but more lucrative opportunities in other countries have resulted in the loss of many competent Jordanian scientists. Also much of the time of the most qualified public researchers is taken up with teaching or administration, or other governmental tasks of a non-research nature.

Research efforts are also plagued by lack of equipment and supplies, manpower, transportation, and communication. These conditions result from a combination of inadequate funding (investment in agriculture has consistently fallen below planned targets) and poor utilization of funds that are available.

Extension activities have suffered even more acutely from the problems listed above. Indeed, the problem of insufficient staff, lack of logistical support and supporting facilities, low salaries and a shortage of information needed to address urgent farmer concerns have persisted so long that the Extension Service's credibility with farmers is low. The private sector has become the major advisor to farmers in introducing and adapting to technological change. While often helpful, bias is in favor of the product being sold and very limited supporting services are provided for the technology promulgated by the private sector.

There is much confusion about what the mission of Extension can or ought to be. One view asserts that as MOA employees, extension agents' duties should include (1) selling government policies or programs to farmers, (2) checking conformance of farmers to laws and regulations e.g. on land, water or pesticide use, (3) cooperating with the programs of other government and non-government agencies, such as JVA or JVFA, as well as (4) actually assisting farmers in planning, producing and marketing their crops.

A second view, endorsed by many authorities including the World Bank,^{1/} argues that unless the extension agent's over-riding goal is to improve the farmer's welfare as the farmer sees it, the agent will not succeed in establishing the mutual trust needed for an effective educational program. This view sees agent involvement in policy promotion or regulation as

^{1/} Benor, David, and James Q. Harrison. Agricultural Extension: The Training and Visit System. World Bank, Washington, D.C. May 1977

a threat to mutual trust. Jordan has followed the first model for extension activities with, in our view, ineffective results.

Administrative problems of the current extension system have also been a major impediment. The extension agents assigned to the Jordan Valley report to the Regional Agricultural Directors and are dependent on the Regional offices for transportation facilities and other logistical support, which is reportedly rarely available. In contrast, the extension support unit in Amman reports to the Director of DAR&E in Amman. Contact between the staff in Amman and those in the Jordan Valley must be made through the offices of the respective Directors. Coordination with researchers in the MOA or the UOJ/FA is equally difficult.

This Project is designed to plan, coordinate and support the Valley's extension and research activities and should eliminate many of the difficulties discussed above.

III. PROJECT DESCRIPTION

A. SUMMARY DESCRIPTION OF PROJECT

The goal of the project, Jordan Valley Agricultural Services, is to increase the Jordan Valley's agricultural productivity, primarily of vegetables and fruits, for local consumption and export, through increasing farmers access to improved technology, inputs, and services. In support of this goal AID will cooperate with the Government of Jordan (GOJ) Ministry of Agriculture (MOA) over a five-year period, in conducting an applied research and extension project for the Jordan Valley. The Jordan Valley Agricultural Services Project (JVASP) will be staffed by Jordanians with the aid of U.S. and possibly other scientists who will assist in program development, staff selection, training, and in applied research and extension activities. The Project purpose, in support of this goal is to establish and institutionalize a viable mechanism capable of effectively developing and disseminating appropriate agricultural technology for fruit and vegetable production in the Jordan Valley.

B. OBJECTIVE

The general objective of the Project is to provide farmers in the Jordan Valley with the knowledge and skills needed to overcome existing problems and to adapt to continually changing production conditions. The achievement of the full potential of Jordan Valley agriculture is critical both to farm producers and to Jordan because of its important role in national economic growth and development.

The specific objectives of the Project are to:

(1) Rapidly create an Agricultural Research and Extension Center (AR&EC) in the Jordan Valley which can provide applied research and extension aid to farmers on their most pressing production problems, and which is so structured that it will continue to function effectively after the project terminates.

(2) Develop innovative systems for (a) identifying both short-term and long-term farm problems, (b) assembling the resources needed to carry out research on these problems, (c) integrating research results with other relevant scientific information, and (d) presenting the results in a format which will extend the knowledge and skills to Valley farmers.

(3) Provide a functioning model of effective problem-solving research and extension which can (with minimum modification) be applied to all the research and extension activities of Jordan's MOA.

C. PROJECT PROGRAM

The AR&EC will be established through this Project in the Jordan Valley. Its director, a Jordanian national, will report to the Ministry of Agriculture headquarters through the Director of Research and Extension (MOA), but jointly with the senior U.S. advisor will have autonomy in decisions on staff selection, remuneration and training, program development and supervision, and budget allocations and expenditures within the provisions of the Project Agreement. It is envisaged that the Project will run for a five-year period during which USAID/J will provide technical and other assistance to ensure the accomplishment of JVASP objectives. At the end of five years, the Center will be sufficiently institutionalized and its staff adequately trained to carry on a relevant and viable program.

When fully operational, the Project will have at its disposal in the Jordan Valley, adequate office facilities, laboratories for soil, water, and plant tissue testing and for plant pest protection and diagnosis, and sufficient land at a number of sites in the Jordan Valley to carry out needed applied research and to demonstrate improved techniques to farmers. Its permanent staff (see Organizational Chart, Fig. 3 Section IV) will include a Project Director, a training specialist, and eight agriculturalists. They will be supported by eight junior agricultural officers, with research and extension duties in entomology, soil and water management, vegetable crop production, and production economics. Ten extension agents will be assigned responsibilities for extension activities in selected locations in the Jordan Valley. Three to four scientists will be assigned per year in the areas of integrated pest management (plant pathology and entomology), production economics, soils and irrigation, vegetable production, and agronomy. These long-term U.S. advisors will assist the Jordanian scientists in program planning and development, organization and training and all facets of program execution. U.S. scientists on short-term assignments will provide timely expertise on extension organization, agricultural information, extension program development, pesticides, soil, water and salinity problems, and citrus horticulture.

The Project will address itself to the major identified constraints on vegetable and fruit production in the Jordan Valley, giving priority to those of greatest economic importance to small farmers, and to those amenable to alleviation by research and extension efforts. Major identified constraints are:

- Plant pests and diseases, especially the tomato yellow leaf curl virus and vegetable nematodes and insects.

- Inefficient production and management practices including inappropriate field preparation techniques, improper use and application of fertilizers and pesticides, and suboptimal cultural practices.

- Soil and water management problems including the lack of information on the quantity, frequency and quality requirements of different plants for fertilizer and water, lack of or improper soil leaching practices, and over-irrigation often compounded by poor drainage.

Project staff will assemble useful information on these problems available from ongoing research in Jordan and other countries. They will conduct additional applied research as needed to test and adapt new technology to Jordan Valley conditions. Extension specialists and agents will interact with Valley farmers in determining current problems under differing environmental conditions, raise the general level of knowledge and skills of Valley farmers through seminars, short-courses, and training at various locations in the Valley and provide recommendations and guidance on specific farm management problems in consultation with the JVASP's research staff.

Equally important will be the feedback from farmers via extension agents as to needed applied research. If there is to be rapid dissemination of knowledge in Jordan Valley agriculture, research and extension cannot operate as separate compartments. Extension specialists and agents must have a role in suggesting priority research, and be intimately involved in experiments, test plots, etc. Researchers must be willing to work alongside extension personnel in farmer meetings, training programs and on-farm demonstrations. Both need to work with other public agencies and the private sector in testing alternative technologies and management systems. In turn, farmers must be encouraged to participate in experiments with research workers and demonstrations with extension agents. These efforts must be supported by adequate printing and audio-visual facilities to bring knowledge on best practices rapidly to the farmers.

D. RESULTS TO BE EXPECTED

1. Provision of laboratories, land, vehicles, equipment, supplies and other commodities required by those employed on the Project to perform the services enumerated herein.

2. The development of a functioning Applied Agricultural Research and Extension Center in the Jordan Valley with three satellite research sites along with demonstration locations capable of continuing a productive program at Project termination.

3. Development of an administrative organization which delegates authority, responsibility, and budgetary control to subordinate units, down to and including professional research and extension staff.

4. The execution of applied research and extension programs directed at the major problems of Jordan Valley agriculture and resulting in the best practical recommendations.

5. The training (to progressively advanced levels) of Jordanian personnel who will be capable of carrying on an effective applied research and extension program in the Jordan Valley.

6. An established program of at least 20 on-farm demonstrations and a minimum of 4 Center-farmer field days annually.

7. A significant improvement in the knowledge and skills of Jordan Valley farmers and in their confidence in MOA's research and extension services.

8. At the end of the five-year Project, leave in place a successful ongoing research and extension program in the Jordan Valley directed and manned by fully-qualified Jordanian scientists and extension specialists.

At the termination of the project a fully staffed AR&EC will have been established in the Jordan Valley. It will have a productive program involving research and extension at its headquarters and at other locations in the Valley. Activities directed to solving farmer's production problems will be coordinated and mutually supportive. The staff, through on-the-job training, short term technical training, and academic training, will be experienced and capable of conducting research on constraints to production, conveying results of that

research to farmers, and providing feed-back from farmers to researchers through extension personnel, so that additional research and testing can be initiated on new or continuing constraints. The Center's demonstrated effectiveness should be such that it will be continued as a permanent unit within DR&E to serve Jordan Valley farmers. This Center can be used as a model for the development of similar Centers in other agricultural areas in Jordan.

E. BENEFICIARIES

Obviously, Project staff receiving training and education will benefit greatly from being involved in this program. Nevertheless, the largest group of direct beneficiaries will be the Jordan Valley farmers who utilize the research and extension programs for increased productivity and improved cost effectiveness. Those operating larger holdings are already utilizing very capital intensive technology and tend to have better access to improved technology and management practices. Tenants, sharecroppers and smaller, owner-operators who comprise a majority of Valley farmers, will be the major audience and primary direct beneficiaries. A minimum of four field days and twenty on-farm demonstrations, mostly in small farmers' fields, are planned annually to extend information to farmers.

Some 5000 farm holdings exist in the Valley, of which 75% are 40 dunums (1dunum = $\frac{1}{4}$ acre) or less and 43% are 20 dunums or less. Approximately two-thirds of all holdings are operated under rental arrangements. While not excluding the interests of any farmer, the emphasis of the Project on developing production guidelines and recommendations for all farmers biases it in favor of the numerous small land owners, tenants and sharecroppers.

Indirect beneficiaries include:

1. Jordan Valley economic community through stimulation of economic growth in the agricultural sector.

2. Consumers of Jordan Valley horticultural crops, through program effects on product quantity and quality.

3. Jordan Valley Authority, Jordan Valley Farmers Association, the Agricultural Credit Corporation, the Jordan Cooperative Organization, and other public agencies concerned with agricultural activities in the valley.

4. The Jordanian economy, through stimulation of agricultural exports and a reduction of the deficit in the balance of trade.

F. RELATIONSHIP OF PROJECT TO A.I.D. AND HOST COUNTRY PRIORITIES

Major goals of the 1981-85 Jordanian 5-year plan include changing the structure of the economy in favor of commodity producing sectors and reducing the trade deficit. The agricultural sector is to support these goals with a projected 7 percent annual growth rate in farm income and controlling the deficit in the agricultural balance of trade by raising productivity. The 1981-85 Plan projects a 60 percent increase in vegetable production and 67 percent increase in citrus production during the five years. This project is designed to assist Jordan in attaining these goals by increasing the productivity of Jordan Valley farmers.

USAID has a lengthy history of development assistance in the Jordan Valley providing educational, housing and medical facilities as well as participating in several agricultural and water development projects. GOJ has emphasized Jordan Valley development and has expressed a preference for USAID to concentrate its agricultural assistance in the Valley.

A.I.D. Program Goals in Jordan are:

1. To help Jordan sustain its social and economic development by meeting equitably the basic human needs of its population.
2. To increase Jordan's capability for self-sustaining growth by strengthening the generation of domestic revenues and export earnings.
3. To develop the technical, managerial and institutional capabilities for coping with Jordan's more complex economic and social structure.

Assistance activities directed toward these objectives are limited to the water, health, agriculture and education sectors with particular attention given to relationships between the various sectors, such as between water and agriculture, so as to maximize the impact of each.

Agriculture assistance is designed to reinforce AID's irrigation and social infrastructure projects in the

Jordan Valley, the country's most productive agricultural area with the greatest potential for growing food and export crops. The sector objective, therefore, is to increase Valley agricultural production primarily of vegetables and citrus fruit. More effective and efficient use of water and modern farm technologies are expected to increase incomes of all valley farmers through productivity gains.

G. RELATION OF PROJECT TO OTHER DONORS

Four international donors in addition to the U.S. are currently involved in Valley agriculture with their emphasis largely on developing marketing infrastructure. The Netherlands financed the Al Arda grading and packing center, and have now added a box factory, and their plans are well advanced to add cold storage facilities to the center. A similar grading and packing center near Wadi Yabis is being built with United Kingdom assistance and construction is nearing completion. The Federal Republic of Germany is supporting the construction of a third grading and packing center near South Shuneh and construction has just begun. These three centers, when complete, are planned to handle adequately the marketing of all Valley fruits and vegetables. JVA will operate the centers, as it now does Al Arda, until such time as JVFA is prepared to take over this responsibility. The Ministry of Agriculture has discussed the need for a grading and packing center in the Ghor Safi area, but a donor has not been identified.

The activities planned under this project have been discussed and closely coordinated with the Valley agricultural marketing advisor from the U.K., provided through the Tropical Products Institute. It has been agreed that activities of this project shall include harvesting methods, field grading and packing, and field losses up to the crops' delivery to the grading and packing centers at which point his program takes over.

The European Economic Community (EEC) is financing a \$ 2 million greenhouse and nursery complex for vegetable seedlings and transplantations (for sale to farmers) in the middle valley. It will be operated by JVA and located adjacent to the middle Valley research site donated to this project by JVA. This arrangement will greatly facilitate program coordination and cooperation and enhance farmer exposure to the project.

The Netherlands is also planning to finance a soil, water, and plant analysis laboratory in the Valley for JVA to assist in the development of lands under their jurisdiction. JVA had indicated that they will make full use of the laboratory so that the JVASP budget should allow for developing and operating its own soil, water, and plant tissue laboratory for the Ministry.

The International Fund for Agricultural Development and the ACC are negotiating a \$ 10 million loan to supplement ACC's lending ability. The funds would be reloaned to farmers throughout Jordan. Production loans for Valley farmers would likely be funded through JVFA which recently received a \$ 1.5 million loan from ACC for this purpose. ACC continues to emphasize intermediate and longer term loans.

IV. PROJECT ANALYSES

A. TECHNICAL FEASIBILITY

1. Appropriateness of Project Approach:

The organization for JVASP is based on proven research and extension models in both developed and developing countries. The essence is the careful identification of major production problems and constraints. Research is then conducted coupled with known and tested information concerning these problems. Then field trials and demonstrations are carried out in farmers' fields under the supervision of committed and knowledgeable research and extension personnel, and proven technologies and recommendations are diffused to the farming public.

Major identified constraints to increased agricultural yields and productivity in the Jordan Valley include plant pest and diseases, inefficient production and management practices, and soil and water management problems. (See Project Background and Annexes G and K).

It is generally believed, and has been demonstrated, that agricultural production can be increased by improvements in agricultural technology achieved through research and extension. Opportunities exist for large increases in agricultural output with the transfer of appropriate technology within the Jordanian socio/cultural/economic framework.

A reasonable base of knowledge has been developed concerning crop production, production relationships, and the relevant socio/economic characteristics present in Jordan Valley agriculture. The potential for high payoff is in the conversion of this information base into a relevant adaptive research and extension system for Jordan Valley farmers.

In the Jordan Valley, the combination of crops and inputs within the individual farmer's management and enterprise system is in general based on experience gained by trial and error. The farmer must allocate the inputs at his disposal for his farming enterprise so as to maximize his income and/or to help him achieve other aspirations important to him. The lack of local, adaptive information is a major constraint on the ability of the farmer to meet his desires and on the government's goal of increased agricultural production. At present farmers

adopt some new technology and reject other new technology with little local, adaptive information regarding the appropriateness of these technologies.

Within this framework, the GOJ has requested U.S. assistance in upgrading its agricultural research and extension capabilities. The Project Paper design team worked closely with the Ministry of Agriculture's Research and Extension Department staff in evaluating the staff's training and experience. Based upon this evaluation, it became clear that considerable technical competence currently exists in the Department. What is needed is less U.S. research advisory help than was originally planned but more training to update and supplement the skills of Jordanian researchers, subject matter extension specialists, and other extension staff assigned to the Project.

Thus, a major component of the Project involves frequent, repeated in-service training combined with short-term and academic training for the entire 28 Jordanian Project research and extension staff. The technical assistance and training provided under the Project is designed to emphasize the parallel development of research and extension competencies in the areas of horticulture, soil and water management, integrated pest management, and farm production economics.

This Project proposes to help Jordan Valley farmers achieve their aspirations and increase agricultural productivity by:

- (a) Problem solving, adaptive research and screening of relevant technology.
- (b) Education and training of personnel in research and extension methods and appropriate new technologies.
- (c) Dissemination and extension of essential information to farmers in a form that is understandable and acceptable.
- (d) Development of locally adapted procedures for implementing new technologies.

Project staff must have a high level of commitment to development of applicable technology and to its adoption by farmers. This activity envisions and requires a considerable

extension orientation among staff and a commitment to the integrated farming approach. The staffing mix and proposed training components are premised upon the applied technology approach.

It is important to emphasize that one output of the Project is a coordinated research/extension/training system appropriate for increasing agricultural productivity. An efficient and cost-effective system for generating and delivering information tailored to the farmer and considered reliable and trustworthy by the farmer is part of that overall effort. (Annex G).

2. Host Country's Ability to Utilize and Maintain the Technology:

The Project purpose is to establish and institutionalize a viable mechanism capable of developing and disseminating appropriate agricultural technology for fruit and vegetable production in the Jordan Valley. The project provides technical assistance, commodities and training to elevate existing constraints to effective agricultural research and extension and to institutionalize an applied agricultural research and extension center in the Valley. Considerable detail is presented in the annexes on the adaptive research and extension program (Annexes G and K), the operation of the center (Annex J), and the training of its staff (Annex L). In 1986, the planned project termination date, the Project will leave in place a fully operational farmer-oriented research and extension program with its own Director and budget, fully-equipped facilities, logistical support, and operated completely by a cadre of well-trained Jordanian researchers, subject matter specialists and extension agents.

Of importance to this institutionalization and Jordan's ability to utilize, maintain and extend the technology is the removal or minimization of existing constraints to effective research and extension.

(a) Project Impact on Extension Constraints

The MOA is responsible for agricultural extension for Jordan. Within the MOA, the Directorate of Agricultural

Research and Extension (DR&E) is specifically responsible for such activities as are proposed in this Project. However, numerous constraints contribute to the present less-than-effective DR&E extension program including a complicated and confusing administrative arrangement, limited information of value to farmers in a form which agents might understand and extend, low farmer credibility of extension agents, practically no logistical support and low financial rewards.

The Extension Section within the DR&E is comprised of the Head of Section with three staff at headquarters, and about 90 agents in the agricultural regions. There are 33 positions for agents in the Jordan Valley, one in each of the 33 designated Development Areas. There are 21 agents reported to be currently employed.

Administrative responsibility for extension work carried out in the Valley is vested in the office of the MOA through the Director of DR&E. Practically speaking, the Regional Agricultural Directors at Deir Alla and Kerak control extension activities taking place in their regions (Directorates). Support in terms of programming, training, and communication comes through the Extension Section in Amman. Linkage of the administrative and technical functions is a weak point in providing effective support to field level personnel. The MOA has agreed to recruit/assign 10 extension agents to this Project. This project is designed to eliminate this problem in that these agents will take their directions from and be responsible to Project management.

Another constraint is that the agents in the Valley currently are assigned many regulatory and service type activities for the MOA instead of working with farmers in an educational capacity. The World Bank Report of 1977, cited earlier, emphasizes that agents should devote 100 percent of their time to educational programs in agriculture so as to develop trust and respect with the farmers. Every effort will be made to eliminate or minimize outside duties being assigned to the Project's extension staff.

Extension agents face serious transportation problems in the Valley. A 1980 FAO report stated that the work of extension agents in the Valley is being rendered almost totally ineffective because of the lack of transportation. Many agents commute to the Valley from Amman or Irbid by bus, leaving for work at 6:00 a.m. and returning by 2:00 p.m. This Project will ease this problem through the purchase of 15 vehicles for use on the project and providing for transportation allowances when private vehicles are used on the job. The AID contribution to the Project further provides for replacing these 15 vehicles during the Project life. The Project will also make available housing for U.S. and Jordanian staff so as to facilitate their spending longer hours in the Valley.

Other important constraints are the lack of incentives. Salaries are low for extension personnel. An agent will earn about 140 JD per month as compared to 400 JD for a person of similar academic training in the private sector. Payment for hardship and overtime, transportation, and support allowances are non-existent or insufficient. Training opportunities are lacking. A training program of three months duration on selected subject matter previously offered annually at Deir Alla for all agents was dropped in 1977. It is planned to provide allowable financial incentives and 544 person-months of training, much of it for extension staff, through the Project.

Jordan Valley farmers have indicated limited confidence in the extension agents. Several surveys in the Valley have indicated that from 60-to-80 percent of the farmers did not know who their extension agent was, and the majority of farmers interviewed reported they received most of their agricultural information from commercial salesmen. Farmers have little reason to view agents with respect because the latter have limited technical information to share. The research component of the Project is designed to provide the needed technical information to extension personnel.

The extension worker often lacks knowledge concerning the production systems currently being used by farmers and has limited familiarity with ongoing research

activities. Therefore, the agent also has little of real use to suggest to researchers concerning farmer problems. The extension staff assigned to the Project will receive training and be intimately involved in the research program.

Taken all together, it is assumed that the above measures will inculcate in better extension and research staff pride in their jobs and greater willingness to serve in the Valley. It is also assumed that Valley agriculturalists will come to utilize extension services and information more fully as they are shown to have appropriate and useful information to impart.

(b) Project Impact on Research Constraints

In the MOA, research is carried out by the Department of Research and Extension. The six major units of the Research Section of the Department are field crops, horticulture, fruit trees, soils and irrigation, plant protection, and tobacco. There are 53 researchers and eight technicians working on research projects throughout the country. Generally speaking, the researchers are well qualified, and a number have their M.Sc. and/or Ph.D. degrees. However, the researchers are seriously hampered by lack of funds, equipment, transportation, technical and laboratory assistants, and in the case of the Jordan Valley, the commuting distance from Amman. These all serve as constraints to conducting effective research. Central budgeting, and the numerous approvals required for an action have also greatly inhibited MOA's developing an effective research program. This Project will have its own budget with the Project Director having control. Funds are included for the provision of laboratory equipment and other research support staff as well as for transportation and housing.

Researchers have tended to do most of their research on the Deir Alla Research Station or in their laboratories in Amman and have conducted only limited field work in the Valley on farms where farmers might more easily view field or demonstration plots. Researchers often have planned their research in response to national goals established at the highest levels of Government, or, at the opposite extreme, in response to their own interests without considering its applicability to farm problems or other constraints on the farmer. This Project stresses feedback from farmers and applied research and demonstrations in farmers fields on identified production problems directly impacting on farmers.

Considerable crops research has been conducted in the Jordan Valley and similar areas in the Middle East over the years. However, most of it is narrowly focused basic research that does not address the farmers' requirements. A body of research data is, thus, available that needs to be analyzed, refined and evaluated for farmer application. The PP Design Team believes it is appropriate to begin a field testing program based on present knowledge. Additional crop production research will be needed, some of which has been identified, while other research needs will be identified and addressed during the Project. This involves the information flow from the farm level through the extension unit to the research unit. Considerable attention will be paid to applied, small-scale, on-the-farm demonstration plots by the Project. The priority areas for such adaptive research under this activity have been identified and limited to pest management, soils, water, and production economics.

In summary, this Project will establish an agricultural research and extension center (AR&EC) in the Jordan Valley with its own budget, staff and facilities. The Center will be responsible for all applied agricultural research, demonstrations trials and extension activities relating to the production of vegetables and fruits in the Valley. The Project is designed to eliminate or minimize the major constraints which have hampered previous efforts for an effective research and extension program and to provide farmers with new technical information and to help them use this information to solve their production problems.

B. ECONOMIC ANALYSIS

1. Role of Agriculture in the Jordanian Economy

During most of the 1970's, agriculture (including livestock) accounted for 10-11 percent of Jordan's Gross Domestic Product. The principal subsectors are fruits and vegetables, field crops (e.g. wheat, barley, alfalfa), and livestock. However, fruits and vegetables dominate the sector's output; the production of these account for 40 percent of the agriculture sector's contribution to GDP. About 20-25 percent of the country's labor force derived employment from agricultural pursuits; this figure is believed to be lower today in spite of the influx of foreign farm workers.

Agricultural products (primarily fruits and vegetables) play a key role in Jordan's balance of payments structure. Domestic export earnings rose at a compound annual rate of 22 percent and exports by 10 percent in real volume during 1975-79 despite generally low prices for phosphate - Jordan's principal export commodity. Sustained export growth during the period mainly resulted from rising production of fruits and vegetables, and in chemicals and other light manufactured goods. In 1979, the agriculture sector provided 31 percent of the country's exports.

The increased production of the principal crops (tomatoes, eggplants, cucumbers, squash, and citrus fruits) has resulted from the adoption of new production technologies and expanded irrigation in the Jordan Valley. The prospects for continued increases in output are promising, and rising domestic production of foodstuffs should slow down the overall rapid growth in Jordan's imports. Nonetheless, the country will remain dependent on food imports - especially of staples - in order to meet domestic demand; in 1979, Jordan imported about 60 percent of its food needs.

2. Agriculture in the Jordan Valley

Water is the major constraint to increasing agricultural production in Jordan, and recent droughts have underscored the importance of irrigated agriculture, especially in the Jordan Valley. There are currently about 290,000 dunums ^{1/} of irrigated or partially irrigated land in the Valley or almost 80 percent of all irrigated land. Another 70,000 dunums is potentially irrigable. The Jordan Valley, where generally frost-free winter-time temperatures give Jordan an early market advantage over other producing countries, produces 80-90 percent of all irrigated products.

^{1/} Because of double-cropping, total cultivated area in 1980 was 107% of total agricultural area.

Excluding livestock and poultry, Jordan Valley production accounts for about one-half of agriculture's contribution to Jordan's GDP. The Valley's fruits and vegetables form the majority of Jordan's agricultural exports and constitute over 25 percent of total commodity exports.

The cropping pattern in the Valley given in Table IV-B-1 shows the importance of fruits and vegetables (especially tomatoes) to the Valley's agricultural production. While vegetables and fruits comprised two-thirds of crop distribution, tomatoes, eggplant, cucumber, and squash together accounted for approximately 37 percent of Valley crops in 1974-78. The table also indicates the significance of tomato production as this crop accounted for about 35 percent of Valley vegetable production during the period.

TABLE IV-B-1

Cropping Pattern in the Jordan Valley during 1974-78
(----- tons of production -----)

CROPS	1974	1975	1976	1977	1978	Average	Percent
Tomatoes	57	38	47	52	59	51	19
Eggplant	37	18	24	19	26	25	9
Cucumber	3	7	9	6	11	7	3
Squash	6	10	23	23	24	17	6
Potatoes	1	3	7	10	6	5	2
Cauliflower & Cabbage	8	2	2	3	10	5	2
Other Vegetables	42	53	32	32	32	38	14
Total Vegetables	154	132	145	146	168	148	56
Citrus	30	17	19	20	23	22	8
Bananas	4	3	2	2	7	4	1
Other Fruits	3	2	2	2	2	2	1
Total Fruits	37	26	23	24	32	27	10
Wheat	104	70	62	51	43	66	25
Other Field Crops	25	23	27	24	20	24	9
Total Field Crops	<u>129</u>	<u>94</u>	<u>89</u>	<u>75</u>	<u>63</u>	<u>90</u>	<u>34</u>
GRAND TOTAL	320	252	257	245	263	267	100

Source: USAID/Jordan "Agriculture Sector Assessment" (January, 1980)

3. Impact of Technology on Valley Agriculture

Together with the completion of irrigation projects such as the East Ghor Main Canal and its 18 kilometer extension, the employment of plasticulture and drip irrigation has had a major impact on Valley agriculture production. Plastic greenhouses and tunnels have proliferated in the Jordan Valley since 1975; concomittantly there has been a trend favoring the use of drip as opposed to sprinkler irrigation. Growing vegetables under plastic covers is advantageous, permitting:

- (a) Production of weather sensitive crops during winter.
- (b) A longer annual production period, thus increasing total crop yields.
- (c) Production and marketing of vegetables during the early winter season when export prices are highest, thus increasing returns.

The latter point is particularly important to Valley producers as demand for vegetables, especially in the Arab oil-producing countries, is quite high during the months of December through March. 2/

Despite the high cost of plastic greenhouses (total initial investment required is JD 17,180) farmers are readily accepting them. This is evidenced by the fact that only 285.5 dunums were devoted to greenhouse cultivation in 1977-78, increasing to 741.3 dunums by the next season. Dajani et.al. conservatively estimate that the area under plastic houses by 1979-80 was 1,000 dunums. About 56 percent of this area is cultivated using drip irrigation. Ninety-five percent of all production in greenhouses is in cucumbers and/or squash. 3/

Plastic tunnels are relatively inexpensive (JD 87/dunum) in comparison to greenhouses, and they too, are used primarily for cucumbers and squash. Although they require that the farmer move the plastic sheets to spray, irrigate, or harvest the crop, they are also being increasingly employed, mostly in tandem with traditional methods of surface irrigation. About 3,800 dunums were cultivated under tunnels in 1977-78; this had increased to 6,000 dunums by 1978-79. By the following season, the area had increased to an estimated 8,000 dunums. 4/

2/ Dajani, Jarir et.al., An Interim Evaluation of the Jordan Valley Development Effort: 1973-1980. (USAID/J: August 1980), p. 78

2/ Ibid., pp. 78-80

4/ Ibid., pp. 80

A major factor in the trend towards a greater use of greenhouses and tunnels is the potential for sizeable increases in net revenues for the farmer. Return on investment in plasticulture and drip irrigation can be quite high as indicated in Tables IV-B-2 and IV-B-3. The considerable variation in net revenues per dunum for both cucumbers and tomatoes grown under alternative technologies is primarily attributed to wide differences in yields. For example, traditional growing methods yield 1.52 tons of tomatoes per dunum while the use of plastic houses coupled with drip irrigation permits up to 10.0 tons/dunum.

The data presented in Tables IV-B-2 and IV-B-3 illustrate the potential for increasing overall average yields in the Jordan Valley. According to Department of Statistics data, in 1977 the average yield per dunum for tomatoes in the Jordan Valley was .981 - this had increased to 2.11 in 1979. ^{5/} The increase in average yield in the Valley is consistent with the evolution of the growing pattern into year-round cultivation resulting from the employment of plasticulture.

The increasing utilization of drip irrigation and plasticulture indicates that farmers are receptive to new practices which are demonstrably profitable. However, what is lucrative in the short-term may have a negative impact in the long-term, especially since farming techniques in the Valley have not kept pace with technological changes. As noted by Morgan ^{6/}, plant bed preparation is substandard and harmful to soil balance. The use of fertilizers and pesticides is widespread, but Hyslop ^{7/} and Stevens ^{8/} both conclude that farmers may be applying them in ineffective or inappropriate amounts. Cultivation under plastic provides an ideal environment for the growth of pests, and by extending the growing season throughout the year it promotes pest survival. Indeed, because of resistance and the disruption that results from overuse, simple, heavy application of pesticides is not enough to curb pest problems. The white fly, which transmits the Tomato Yellow Leaf Curl Virus (TYLCV) and which is accordingly largely uncontrolled, and other problems such as resistant spider mites threaten the Valley's productivity. Without emphasis on integrated pest control, agriculture in the Valley may very well decline in productivity in coming

^{5/} Ibid., pp. 105

^{6/} Morgan, Stephen R., Jordan Valley Irrigation Project, Stage II: Agricultural Production, Extension, and Research Component. (World Bank: April 1979).

^{7/} Hyslop, John D., Tomato Production in the Jordan Valley: A Report on a Survey of Tomato Producers. (USAID/Jordan: 1979).

^{8/} Stevens, M. Allen, Incidence of Control of Diseases of Tomatoes, Cucumbers, Eggplant, and Peppers Under Sprinkler Irrigation in the Jordan Valley. (Department of Vegetable Crops, University of California, Davis: July 1977).

TABLE IV-B-2

**COMPUTATION OF NET RETURNS FROM PRODUCTION OF CUCUMBERS AND
TOMATOES USING DIFFERENT TECHNOLOGIES
IN THE EAST JORDAN VALLEY
1977 - 1978**

Item	Cucumbers			Tomatoes		
	Tradi- tional	Plastic Houses and Drip	Plastic Tunnels and Surface	Tradi- tional	Plastic Houses and Drip	Open Field and Drip
Yield (tons/du)	0.86	9.0	2.0	1.52	10.0	4.5
Average Price (JD/ton)	120	205	230	100	150	120
Gross Revenue (JD/du)	103	1,845	460	152	1,500	540
Production Cost (JD/ton)	61.3	49.6	99.1	45.8	46.7	38.6
Marketing Cost (JD/ton)	25.1	31.2	33.0	23.0	23.8	24.5
Total Var. Cost (JD/ton)	86.4	80.8	132.1	68.8	70.5	63.1
Total Var. Cost (JD/du)	74.3	727.2	264.1	104.6	704.3	284.2
Net Revenue (JD/ton)	33.6	124.2	97.9	31.2	79.5	56.9
Net Revenue (JD/du)	28.7	1,117.8	195.9	47.4	795.7	255.8
Investment (JD/du)	-	1,998.0	86.7	-	1,998.0	280.0
Payback Period (years)	-	1.79	0.44	-	2.51	1.09

Note: Data pertain only to the Middle Region of the East Jordan Valley.

Source: Stetieh, Akram and Abbas, Mohammad Falah,
A Preliminary Economic Analysis of Returns from Producing Cucumber and Tomato
Under Plastic Covers and Drip Irrigation. (The Faculty of Agriculture, The
University of Jordan: November 1978.)

BEST AVAILABLE DOCUMENT

TABLE IV-B-3

COMPUTATION OF NET RETURNS FROM PRODUCTION OF CUCUMBERS AND
TOMATOES USING DIFFERENT TECHNOLOGIES
IN THE EAST JORDAN VALLEY
1978 - 1979

-32

Item	Cucumbers				Tomatoes
	Plastic Houses		Plastic Tunnels		Open Field and Drip
	Drip	Surface	Drip	Surface	
Yield (tons/du)	8.5	6.0	2.2	1.7	3.4
Average Price (JD/ton)	256.0	266.5	283.0	283.0	113.8
Gross Revenue (JD/du)	2,176.0	1,599.0	622.6	481.0	386.9
Production Cost (JD/ton)	39.7	53.4	50.6	65.7	24.2
Marketing Cost (JD/ton)	36.9	37.6	38.8	38.8	26.1
Total Var. Cost (JD/ton)	76.6	91.0	89.4	104.5	50.3
Total Var. Cost (JD/du)	651.0	546.3	196.7	177.6	171.7
Net Revenue (JD/ton)	179.4	175.5	196.3	178.5	63.5
Net Revenue (JD/du)	1,525.0	1,052.7	425.9	303.4	215.8
Investment (JD/du)	1,998.0	1,718.0	366.7	86.7	280.0
Payback Period (years)	1.31	1.63	0.86	0.29	1.30

Source: Steitieh, Akram and Musa, Abdul Hameed, Vegetables Grown Under Plastic Cover and Drip Irrigation Systems in the East Jordan Valley. (The Faculty of Agriculture, University of Jordan: 1980).

years according to one expert. 9/ Although drip irrigation entails a more efficient use of water, it also leads to increased soil salinity.

The individual farmer has a strong incentive to adopt practices which provide an immediate and noticeable return on funds invested. However, the incentives provided by the market mechanism may not be sufficient to stimulate better cultivation practices; for example, Valley farmers presently have an incentive to concentrate on vegetable production to the exclusion of field crops and fodder, although a more balanced cropping pattern might provide higher returns in the long-run.^{10/}

4. Potential Economic Impact Derived from the Project

Research on the returns from agricultural research in other countries on field crops such as wheat and corn shows that agricultural research is generally a good investment.^{11/} In Jordan, public investment in research combined with extension should translate into economic gains such as increased foreign exchange earnings from vegetable crops. This would occur not only from increased yields but also from sales of better quality produce to export markets.

From the JVASP, with its emphasis on both research and extension, improved quality of crops and the reduction of losses from the tomato yellow leaf curl virus and the yellow watermelon mosaic virus can be significant for agricultural production in the Valley. These viruses, as mentioned earlier, are presently serious problems in the Valley.^{12/} The Ministry of Agriculture's estimates of annual losses incurred from diseases and pests are given below in Table IV-B-4.

^{9/} Allen, William W., "Environmental Assessment of Pesticide Use in Jordan". (USAID/J: 1980), p. 16. It is estimated that TYLCV reduces tomato yields by more than 90% in the worst cases and by about 50% on the average.

^{10/} Dajani et al., p. 99.

^{11/} For example see Griliches, Z., "Hybrid Corn: An Explanation in the Economics of Technological Change", Econometrica 25:501-22 (Oct. 1957) and Evenson, R. and Kislev, K. Agricultural Research and Productivity. (Yale University: 1975).

^{12/} See also Stevens (1977).

CURRENT ESTIMATES OF LOSSES FROM DISEASES
AND PESTS IN JORDAN

	<u>Value (JD)</u>
Soil Fungi diseases and nematodes	7 million
Tobacco White Fly (Yellow leaf curl virus)	2-2.5 million
Yellow Melon Virus	0.5-1.0 million
Scale on Citrus (Florida Red Scale)	<u>2 million</u>
TOTAL	11.5 - 12.5 million

Source: Ministry of Agriculture

As described in the Background section of this paper, farmers in the Valley are presently planting later in order to minimize losses from the tomato yellow leaf curl virus. However, harvesting then coincides with that in the highlands, causing a glut in local and export markets. By emphasizing integrated pest control, the Project will promote economic benefits derived from improved quality of crops as well as increasing production during the winter months when both domestic and external demand is high.

Another potential benefit from JVASP will be the increased efficiency in the use of fertilizers and pesticides. According to Hyslop's survey of tomato producers in the Valley, respondents were applying twice the recommended level of nitrogen but about three-quarters of the recommended level of phosphorous. Hyslop concludes "there is considerable scope for increasing the efficiency of fertilizer use." ^{13/} With the 1979 average of ammonium sulfate JD 49/ton and superphosphate JD 32.4/ton, the cost of these inputs for farmers is not insignificant. According to the Ministry of Agriculture, farmers spent an average of JD 111/dunum on pest control in plastic greenhouses. Yet, despite such expenditure, considerable pest problems continue in the Valley and threaten future productivity. Also, the misuse and poor spraying patterns of pesticides present health hazards to humans (as described in the Social Soundness Analysis). Thus, extension efforts to train farmers in more efficient and appropriate use of these chemicals should reduce the cost to human life as well.

^{13/} Hyslop, p. 21.

Clearly, the full economic impact of JVASP depends upon farmer acceptance of advice given by extension agents. According to Hyslop's study of tomato farmers in the Valley, farmers in the North tend to be more conservative and less receptive to new ideas than farmers in south of Deir Alla. Interestingly, 9 out of 30 respondents in the study admitted assistance from extension agents. Hyslop concludes that although few admitted to receiving advice from commercial sources, still "probably most" of the respondents received and used advice from merchants or suppliers. As it is in their economic self-interest to promote sales of fertilizers, pesticides, plastic mulch and other inputs, these salesmen are most likely promoting quantities of items, resulting in unnecessary expenditures and higher production costs by farmers dependent on merchant advice for solutions to production problems. Increasing the knowledge of extension workers in crop problems and cost effective solutions and broadening the extension network promotes the goal of increasing the Valley's agricultural production, if only by permitting farmers to make better economic decisions from having a broadened information base.

The agricultural census data for 1975 and 1978 show that non-farm employment is growing faster than farm employment and that the use of unpaid (i.e. family) farm workers appears to be decreasing rapidly. 14/ This reflects the availability of better jobs and higher wages in the highlands and in the oil-producing Arab countries, as well as increased educational opportunities. It is estimated that foreign laborers, mainly Egyptians, now constitute 80 to 90 percent of all hired labor in the Valley. Jordanian farm labor, preferred by farmers, is becoming more scarce and is increasing in cost. These shifts in employment indicate a more influential role, as labor costs rise, for capable tenants and sharecroppers vis-a-vis land-owners.

The intensification of agriculture in the Jordan Valley, including the adoption of cultivation under plastic covers, the use of drip irrigation, and the utilization of hired labor, demonstrates that landlords, owner-operators, and sharecroppers are receptive to technological change. Available data on agricultural decision-making reveal that landlords and tenants tend to share the costs of production and returns; both groups have an interest in increasing profits. If new techniques and technology, entailing better utilization of farm inputs, are demonstrated to bring about increased yields or even merely reduce losses, both groups have an incentive to make operations efficient. The land tenure system in the Valley per Dajani et.al. is judged to be efficient and fairly equitable.

14/ Dajani et.al, pp. 116-120. Non-agricultural employment grew about 12 percent yearly between 1973-1979.

Table IV-B-5 helps to illustrate the estimated potential economic benefits which should result from this Project. Out of the total of 206,538 dunums in the Valley currently devoted to vegetable production, 78,500 are planted in tomatoes. ^{15/} If ten extension agents each have regular contact with 60 farmers per year and the average size of these farms is 40 dunums, then an estimated 24,000 dunums will be covered by extension services. Assuming that agents will concentrate on contacting farmers of tomatoes, cucumbers, and squash, and that cropping patterns remain basically the same as present, then approximately 9100 (roughly 38 percent of 24,000) dunums of tomatoes per year will be covered by an improved extension network.

TABLE IV-B-5

ILLUSTRATION OF DUNUMS PLANTED IN
TOMATOES AFFECTED BY PROJECT

<u>YEAR</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>
Tomato Dunums	9100	9100	9100	9100	9100
Adoption rate (%)	0	20	30	40	50
Dunums directly affected by Project		1820	2730	3640	4550

^{15/} Includes double-cropped dunums.

By assuming the adoption rates given in Table IV-B-5, they show that results from better techniques should be evident on 1820 dunums in 1983, 2730 in 1984, 3640 in 1985, and 4550 in 1986. The probability that even more dunums will be affected, through the adoption of practices by farmers not contacted by extension agents, is high. The willingness of farmers to visit demonstration plots implemented under the Tomato Better Practices Program of USAID/Jordan's Water Management Technology Project has been documented. ^{16/} It is highly likely that, of the estimated 9100 dunums, at least 10 percent more land will be affected by 1984, 15 percent in 1985, and 20 percent by 1986. Therefore, it is projected that approximately 6370 (20 percent of 9100 plus 4550) dunums of tomatoes will be positively affected by extension in 1986.

If just the losses resulting from the tomato yellow leaf curl virus can be eliminated or at least minimized by the end of Project, then JVASP can have a sizeable impact on net revenue for small farmer in the area covered by extension. If a sharecropper, for example, who presently nets JD 40 per dunum can cut losses from the virus ^{17/} and increase yield from 2.0 to 4.0 tons per dunum, his net revenue per dunum will rise to JD 80, since present yields and revenues are only half of what they could be without the virus problem. If, hypothetically, all the farmers in the affected area were those who presently net JD 40/dunum and have 2.0 tons/dunum yields, the total revenue in the area generated as a result of the Project would be JD 509,600, as compared to JD 254,800 with present yields and revenues. This represents an increase in the area's net earnings in 1986 of U.S. \$ 764,400 (present exchange rates: 1 JD = U.S. \$ 3.00) or approximately 8 percent of Project cost which would result from JVASP and which would not otherwise occur.

As this hypothetical case is based on the assumption that all beneficiaries in the 6370-dunum area are sharecroppers with relatively low yields, increased revenues generated from the Project are likely to be much higher. Some farmers - especially those utilizing plasticulture and drip irrigation - could have yields of 15 tons/dunum or more. Also, improvement of crop quality can result in higher prices for farm output. This example, by focusing on one crop and one production problem, and being based on present information on yields and prices merely illustrates a minimum potential economic impact derived from the Project for Valley farmers. Since JVASP encompasses research and extension for other crops and production constraints and deals with the long-term effects of better farming practices on Valley productivity, overall economic impact should be considerable.

^{17/} As mentioned earlier, TYLCV reduces tomato yields by 90 percent in the worst cases and by about 50% on the average. According to the Ministry of Agriculture, white fly infestation results in a 25-40% crop loss.

5. Cost Effectiveness of Project Design

By providing technical assistance to the Ministry of Agriculture in supporting the effective implementation of an applied research and extension program in crop production, pest management, soils and water useage, and economic decision-making, the Project addresses a broad range of agricultural production constraints in the Valley. With the availability of water limiting the total number of dunums which can be cultivated, it is reasonable to assume that improved farm techniques can result in improved long-term productivity of land currently cultivated and improved efficiency of water use. By employing a problem-solving approach to research and extension, the Project will address problems where knowledge of solutions is minimal. In focusing on the dissemination of information on the better use of the factors of production, the Project focuses on furthering farm efficiency. As water supplies for agricultural purposes are reallocated to urban areas and the cost of land, labor, and other inputs increase, the Valley's potential agricultural productivity will hinge upon not only technological innovations per se, but also on their effective application.

Because research and extension activities will be coordinated and inter-related, project inputs should be utilized efficiently. Researchers will work on problems relayed to them by extension workers and in response to farmer problems; extension agents will disseminate information which is based on actual conditions in the Valley. By jointly emphasizing these activities and allowing them to function in tandem, Project design encourages the cost-efficient use of Project resources such as vehicles and personnel.

Because of the inclusion of incentives for MOA employees, the Ministry should be able to attract competent staff. Although the cost of overseas training is high, such training should act as a magnet for potential employees. The provision of on-the-job training allows a greater number of workers to be trained as well. Given the present circumstances in the Department of Research and Extension, the costs of such training are justifiable. Training opportunities should increase staffers' motivation and willingness to perform their jobs.

Project design also allows the MOA to maximize the use of its facilities in Deir Alla. Basing project operations in the Valley, requiring employees to reach the area earlier in the day, as well as paying travel and overtime expenses, should improve the Department's effectiveness. Farmers will be contacted at times when they are in the fields (early in the morning and late in the afternoon) when they are more likely to respond to extension efforts.

6. Summary and Conclusions

An economic analysis of a project such as this one which is based on technical assistance rests upon the comparison between present use of resources and that which will most likely occur as a result of the Project. Without JVASP, vegetable production would increase as it has in recent years, due to more land being brought under cultivation by expanded irrigation and the trend in utilization of plasticulture, fertilizers, and pesticides. However, the lack of improved farming techniques and effective utilization of inputs such as fertilizers and pesticides would result in impairment of the Valley's potential in agricultural production in the long-run.

With the Project, however, resources utilization should be improved and the potential for decreasing crop losses is sizeable. As the example of potential benefits for tomato farmers indicates, economic impact in terms of farmer income and output can be significant. Increased attention to research and extension on fruit and vegetable production in the Valley should result in improved crop quality; this should translate into higher earnings garnered from Jordan's exports to neighboring countries. Research and extension efforts in other countries, cited earlier, suggest that such efforts can be economically beneficial if they are carried out in an efficient and effective manner and farmers are willing and receptive to technological changes. Therefore, based on this analysis and present trends in Valley agriculture, the allocation of resources for applied research and the dissemination of findings is critical to increasing if not maintaining the Jordan Valley's agricultural productivity.

C. SOCIAL SOUNDNESS ANALYSIS

The detailed Social Soundness Analysis which is given in Appendix H provides a description and analysis of the various components of the agricultural system in the Jordar Valley, with an emphasis on the ways that these components affect the productivity, livelihood, and well-being of both agricultural and non-agricultural households in the Valley. The analysis lends to the conclusion that the proposed research and extension project has the potential of positively contributing to the economy of the country, to the incomes and employment opportunities of both agricultural and non-agricultural workers in the Valley, to the general health and well being of the residents of the Valley, and to the productivity and self-esteem of women. The extent of the project's success, however, is dependent on the ability of the implementation team to alleviate the problems which have hitherto hampered the success of similar efforts. These problems include (i) the ability to attract and retain committed research and extension agents, (ii) the ability of these agents to reach small farmers and to establish their credibility with them, (iii) the ability to demonstrate the technical and economic viability of suggested innovations, and (iv) the ability to better integrate women into the process of agricultural production through the use of a well-designed extension program which is targetted to women in particular.

The data provided in the analysis, and the studies described in it, point to the fact that in spite of the absence of an effective extension service, strides have been made in the past few years in such areas as improved technology, increased yields, higher incomes, more agricultural and non-agricultural jobs, and higher levels of participation by women. This historic change suggests that farmers have the potential for learning and innovating, and that the residents of the Valley have the interest in and the willingness to undergo social change. This progress, however, has not been without misgivings. Foremost among these is the fact that innovations which are championed by the private sector do not necessarily have a long-term perspective. It is not clear to the farmer, for example, what negative impacts will result from these innovations in the long-run. It is also possible that farmers are not necessarily adopting the most economic and/or suitable technologies. Another misgiving is that the richer farmers are the ones most likely to adopt innovations, and the ones in which a private operator functioning with a profit motive is most interested in. This results in widening the productivity yield, and income gaps between agricultural holdings. A third misgiving is that the need for assisting women to better participate in the agricultural economy has not been addressed in any systematic way.

A major objective of the project is to provide for the development of an ongoing institutional structure which will provide research and extension services to the farmers of the Jordan Valley and the Southern Ghors. The lack of such an institution which has the credibility and confidence of the farmers, has been one of the major problems in the agricultural development of these areas. This lack has also hampered the development and implementation of long range agricultural policies which would be directed at reducing the risks of pest infestation and market fluctuation, and at utilizing the most appropriate technology in both the short and long run. The availability of a successful institutional mechanism can be expected to contribute to the filling of the gaps described above, and thus to the improvement of the long run productivity and well-being of the farmers and residents of the Jordan Valley and the Southern Ghors.

D. ADMINISTRATIVE ANALYSIS

1. Pre-Project Structure

The MOA is responsible for, inter alia, agricultural research and extension for Jordan. The organizational structure of the Ministry is shown in Figure 1. Within the MOA, the Directorate of Agricultural Research and Extension (DR&E) is specifically responsible for such activities as are proposed under the JVAS Project. However, researchers and extension agents now report to regionally defined Directorates of Agriculture (DOA), e.g., the Project will be active in the areas assigned to the Kerak and Ghors DOA's.

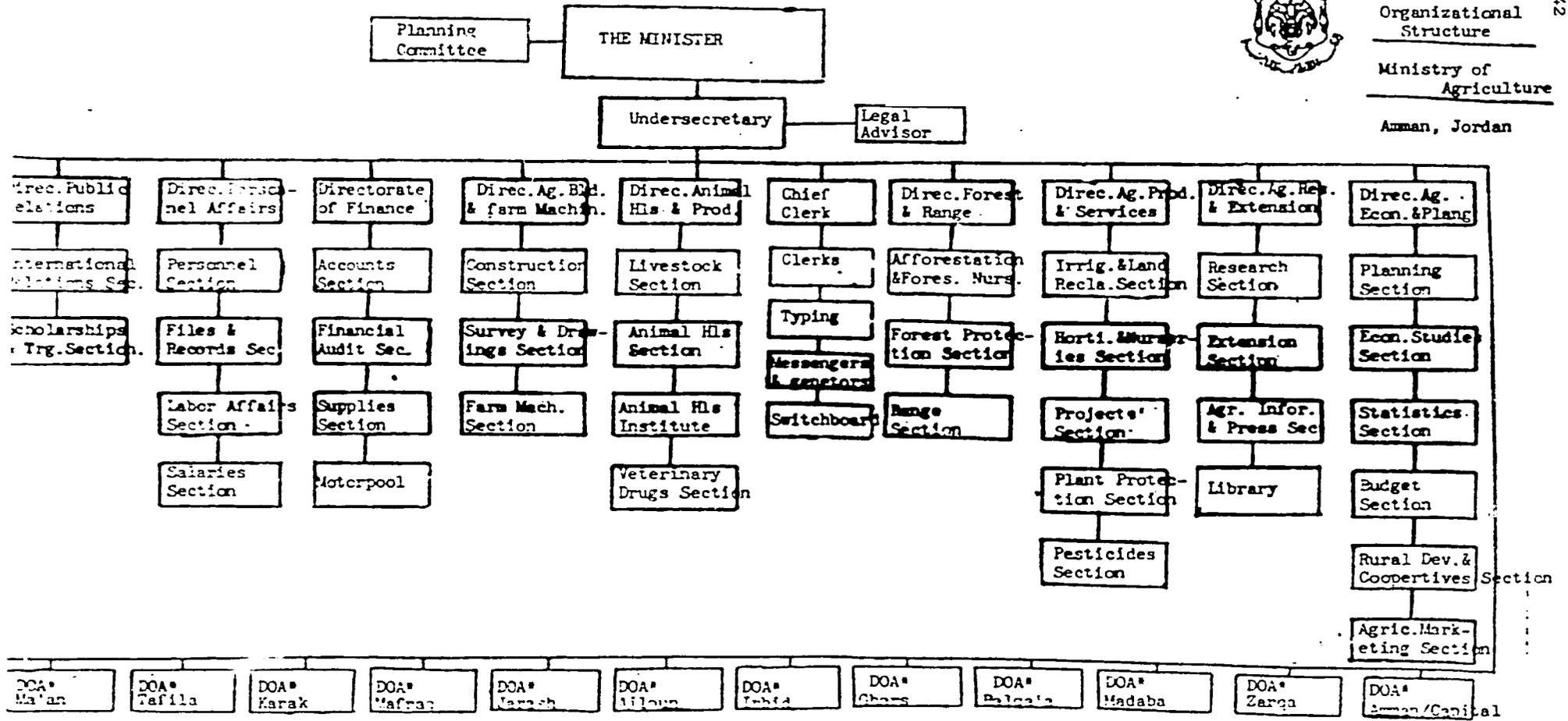
At present, the MOA operates a major research station at Deir Alla and maintains smaller research sites at Wadi Yabis and Ghor Saif; the former two being located in the Jordan Valley proper and the latter in the Ghor south of the Dead Sea. Managers of these stations report to their respective DOA area Directors. Primarily basic agricultural research is conducted at these facilities. As earlier discussed under the Technical Analysis, research has been hampered by insufficient funds, equipment, transportation, technical support staff and by the fact that many researchers commute the long distance from Amman to the Valley. Of equal significance is the difficulty in coordinating with the central Amman based DR&E headquarters.

As mentioned above, the extension agents are directed by the Directors of the DOA to which they are assigned. This is so in spite of the inclusion within the DR&E of the Extension Section as indicated in Figure 1. The actual situation is that the extension agents are administratively responsible to, and dependent upon, the DR&E, while concurrently accepting direction and limited logistical support from their respective DOA.

Figure 1.



Organizational Structure
 Ministry of Agriculture
 Amman, Jordan



* DOA - Directorate of Agriculture

The above described administrative structure has impeded the development and flow of information from extension agents necessary to farmers and an extension service less effective than required, including the lack of important element of feedback from the farmers to research efforts that can assist in resolving problems.

2. Project Effected MOA Structural Modifications

The JVAS Project proposes to remedy the above described situation. The Project activities are restricted to the Jordan Valley and the Ghor Safi area, thereby only affecting the existing DOA's of the Ghors and Kerak. As the Project, therefore, does not affect the full scope of the MOA's responsibilities, the Project will form an administrative sub-unit within the MOA; more specifically, a sub-unit within the DR&E. The JVASP's administrative position within the MOA is illustrated in Figure 2.

The Project Director will have his own budget and staff although administratively contained within the DR&E. He will report to the MOA through the DR&E Director, but more informational purposes than management or control purposes in implementation of the Project. Only in this way can the technical concepts to be introduced and demonstrated by the Project be fully developed and effectively when compared to the present system which has been less than effective.

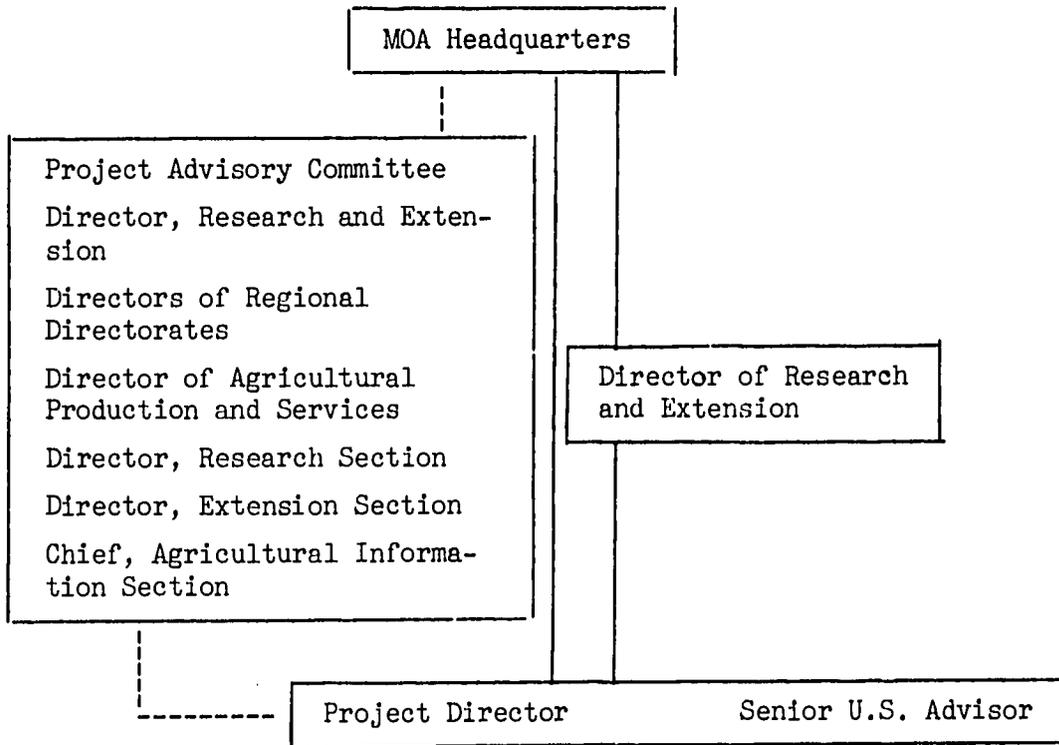
At the same time, it is important that the JVASP be organizationally placed within the DR&E. It has been recognized by AID, the World Bank and other institutions providing such assistance, that for institutionalization to take place, new or different organizational concepts must be developed and implemented within the organization to be affected. To parallel or attempt to supplant an existing organization is often less than successful.

While effective implementation of the technical aspects of the Project require the degree of administrative independence described above, it is also important that Project activities be coordinated with, or at least known to, other Departments within the MOA and other entities engaged in agricultural activities. It has been proposed that a Coordination Committee be formed within the MOA as described in Figure 2 to satisfy this need.

Another administrative modification as a result of the Project will be that the extension agents assigned to the Project will be responsible to the Project Director, receiving all their direction and support therefrom. This does not alter the organizational structure as illustrated in Figure 1, but does require DOA Directors to relinquish their existing control over these

FIGURE 2.

ORGANIZATIONAL CHART
JORDAN VALLEY AGRICULTURAL SERVICES PROJECT



Project extension agents. Affected DOA Directors will receive information copies of all reports on activities conducted under the Project and are members of the recommended Coordination Committee.

3. JVAS Project Structure

To effectively implement the technical aspects of the Project, administrative modifications within the MOA as described above are required. In addition, adoption of a new administrative structure embodied in the JVASP must be accepted within the MOA.

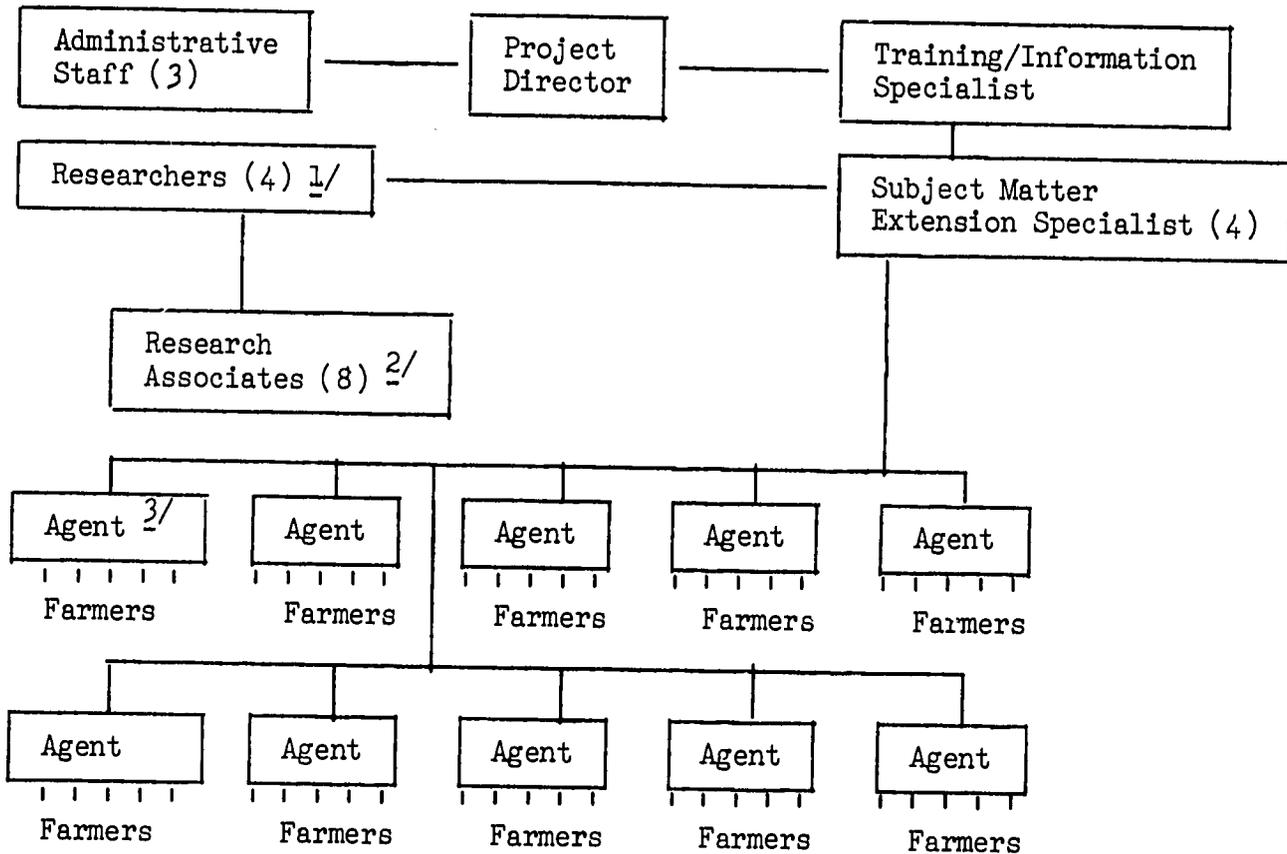
The administrative structure of the JVAS Project sub-unit is illustrated in Figure 3. The Project Director will be a Jordanian agricultural professional assigned on a full time basis to the Project. The Project Director will have full responsibility and authority for implementation for the Project as described in Annex I to the Grant Agreement. The Project Directors suggested qualifications and duties are contained in PP Annex I, Job Descriptions. Of particular significance is the authority to control the budget once authorized and appropriated; to select, hire, and terminate Project employees; and to control both research and extension activities within the scope of the Project. The senior U.S. advisor, provided under an AID direct contract with a U.S. university, will serve in an advisory role to the Project Director to assist in implementing the Project.

To effectively implement the technical aspects of the Project, and to provide the basis for a cadre of trained Jordanian professionals necessary to result in institutionalization of the applied research and extension services, the JVASP sub-unit will consist of the following professionals:

- a. The Project Director and his supporting administrative staff;
- b. One communications, information and training officer;
- c. Four subject matter extension specialists;
- d. Four researchers;
- e. Eight research/extension associates; and
- f. Ten extension agents.

FIGURE 3.

APPLIED RESEARCH AND EXTENSION PROJECT
JORDAN VALLEY ORGANIZATIONAL CHART



1/ Researchers, subject matter extension specialists, and associates will have backgrounds in agronomy, plant pathology, entomology, soils, horticulture, irrigation, production economics or related agricultural fields.

2/ Research Associates will divide their time between research and extension activities as appropriate.

3/ Extension agents will be located in different geographical areas of the Jordan Valley from North Shuna to Ghor Safi.

The qualifications and duties for each of these positions are included in Annex I, Job Descriptions. These 28 professionals will be supported by an administrative staff of three (administrative assistant, supply officer/expeditor and typist), four laboratory technicians, four drivers for vehicles and tractors, two mechanics and ten farm laborers.

As mentioned above, the technical methods to be employed by the Project are sufficiently different from those currently in use in Jordan to warrant separation to some extent from existing organizations. In addition, the methodologies to be employed require an administrative structure as described for effective implementation. Most importantly, if an effective applied research and extension program is to be institutionalized in Jordan, not only for the Valley, but expanded for all of Jordan, the Project must provide not only useful technical support, but also an effective functioning administrative structure in which the effort may continue and be expanded.

4. JVAS Project Structure Feasibility

The administrative organization described above, as well as its described relationship to other administrative organizations, is required for Project effectiveness. The administrative details have been discussed at length with the MOA. Agreement has been reached on all aspects with implementation to be assured through appropriate Conditions Precedent to Disbursement under the proposed Grant Agreement.

An important aspect affecting the feasibility of the above described administrative arrangement is the ability of the Project to attract, hire and retain qualified professionals. It has been particularly difficult for Ministries to attract professionals for service in the Valley; away from the conveniences of Amman.

The proposed Grant Agreement will obligate the GOJ to provide qualified professionals for the Project. If successfully negotiated, the Grant Agreement will require the GOJ to assure that adequate incentives and allowances (i.e., those authorized under existing GOJ Civil Service Codes) will be included in the Project budget as a best effort to attract and retain the required personnel. The training opportunities available under the Project should also constitute a substantial incentive. In addition, housing for Project personnel will be made available as an inducement.

It is reasonable to conclude that the administrative organization as proposed, when assured by terms of the Grant Agreement, is feasible.

5. A.I.D. Support

The JVAS Project has been designed by a U.S. Land Grant University. Both the technical aspects and administrative structure of the proposed applied research and extension program are modeled after successful Land Grant University efforts. To assist in all aspects of Project implementation the services of a U.S. Land Grant University will be provided by an AID direct contract. The Project Director and U.S. counterpart will coordinate Project activities with the contracted institution through a Campus Coordinator, who will assist in recruitment of advisors, arrange technical training and academic programs for participants, arrange backup from the faculty for overseas staff, provide liaison with the Purchasing Office, Office of International Programs and International Students Office.

Approximately 190 person-months of such assistance will be provided to support the Jordanian professional staff. Job titles, qualifications and duties for these U.S. advisors are contained in Annex I, Job Descriptions. The scheduling sequence for the advisors is presented in the Implementation Plan, Part VI.

E. ENVIRONMENTAL CONCERNS

The use of various pesticides, herbicides and methods of irrigation in the Jordan Valley is causing a widespread concern about the environment. Drip irrigation could lead to excessive salinity in the soils, and excessive use of water is not only wasteful, but could cause future ground water contamination and subsurface drainage problems.

The farmers are operating in the Valley with a minimum of advice about mitigation of negative environmental impacts because of the lack of data available to convey to farm operators. Pesticides and herbicides are applied without adequate knowledge about the various types, rate of application, proper disposal and their adverse impact on the environment. There is already an increased incidence of reports of pesticide poisoning.

The Project will identify the above mentioned negative impacts and find the best practical measures to reduce them. Subsequently, the results from the research will be passed on to the farmers and, therefore, the Project will reduce the negative impacts currently occurring in the Valley or anticipated to occur if the present farming practices continue.

One of the Project components is a limited pesticide testing research program. This will not affect the environment because of its limited scope, carefully controlled research nature and effective monitoring. This research is aimed at establishing a unified standard which will be passed on to the farmers for helping them in using pesticides without adverse impact on their crops, in particular, and on the environment, in general. Use of pesticides will be controlled by the U.S. Advisors under the Project and pesticide testing will be conducted using the integrated pest management approach. Researchers will adhere to those standards approved by MOA/J, EPA/USA or FAO/UN.

Also, the research will establish a general criteria for selecting appropriate methods of irrigation suitable for particular crops and particular lands. Research results, when applied by farmers of the Jordan Valley, are anticipated to minimize adverse environmental impacts currently occurring in the Jordan Valley due to inadequate practices of the farmers.

Project activities are considered within the categorical exclusion in 22 CFR section 216.2(c)(1)(iii), research activities and (c)(2)(i) education, technical assistance or training programs. With respect to the pesticide testing aspect of the Project, AID policy guidelines (the Policy Paper dated May 1978, as included in HB3) have been reviewed and found satisfied; specifically, with respect to pesticide usage, the Project is aimed at the furnishing of integrated and balanced pest management techniques, as opposed to a sole or disproportionate reliance on pesticides per se.

Finally, it should be noted that the NE Bureau's Environmental Coordinator, by memo of April 10, 1981, concurred in the Mission's recommendation, contained in the PID, that the project falls within the "categorical exclusions" category, as noted above.

V. PROJECT FINANCIAL PLAN

The Project is essentially an institution building activity. Project resources will be utilized in developing the research and extension center for the Jordan Valley. The Project does not involve revenue generation to the affected entity, the MOA. The scope of the financial analysis of the budget is accordingly limited to (1) budgetary analysis, (2) Project financial implementation and (3) recurrent cost implications.

A. BUDGETARY ANALYSIS

The Project budget is summarized in table 1. The total project cost is estimated at \$9,863,000. A.I.D. inputs total \$ 5,620,000 or 57% of the Project cost. G.O.J. inputs total \$ 4,243,000 or 43% of the total. The Project budget includes provision for inflation, which is estimated at a rate of 10% p/a and a provision of 5% for contingencies has been added into the costing of each input. Project inputs are summarized below.

1. USAID Input:

(a) Technical Services:

The total U.S. advisory contribution amounts to 190 person months, which is estimated as follows: 79 months on integrated pest management; 41 months horticulture; 39 months production economics; 24 months soil, water and irrigation; and seven months extension and agricultural information.

The total amount budgeted for technical services is \$2,977,000. This provides for base salaries, post differential, overhead employee benefits, professional back-up and administrative support at the Contractor's institution, Sunday differential, Local Administrative Assistant for the senior advisor in Jordan, travel including attendance at professional meetings, shipment and/or storage of personal property, housing, furnishings and utilities in the host country, inflation over the life of the contract, contingency, etc.

As detailed in Annex (), there are 82.4 person-months of professional back-up and administrative support at contractor's university and 52 person-months for an administrative assistant for the senior advisor in Jordan.

(b) Training:

The total training costs are computed at \$1,030,000. Excluding the training in English proficiency, 544 person-months are provided in the training schedule.

Both technical and academic training in the U.S. and other countries outside Jordan will be coordinated through the Campus Coordinator in cooperation with the International Student Office at the contractor's university.

TRAINING BUDGET SUMMARY

<u>Program</u>	<u>No. of Parti- cipants</u>	<u>Months per Par- ticipant</u>	<u>Total Months</u>	<u>Total Estimated Costs <u>1/</u></u>
1. Short-Term Training				
a. In Jordan	30	4.5	135.0	14,616
b. U.S. & Third Countries	6	3.0	18.0	412,162
	15	4.5	67.5	
2. Long-Term Academic				
a. In Jordan	8	18.0	144.0	33,991
b. U.S. & Third Countries	8	19.5	156.0	388,611
3. English Training in Jordan	10	N.A.*	N.A.	4,714
4. Special Training	5	1.0-2.0	6.0	27,027
5. Special Training in USDA Courses or at Interna- tional Centers	5	3.5	17.5	76,214
TOTAL	N.A.	N.A.	544.0	957,335
University overhead @ 8% on U.S. Training (\$860,966)				68,877
5% Contingency on \$ 68,877				<u>3,444</u>
				1,029,656

* N.A. = Not Applicable. Some participants will receive more than one type of training.

1/ Costs include 10% annual inflation factor.

(c) Commodities ^{1/}

(1) Laboratory Equipment	
i. Plant Pest Research & Diagnostic Lab	\$ 350,186
ii. Soil, Water, and Plant Tissue	223,539
(2) i. Office Equipment	23,864
ii. Residential Furnishing and Furniture	44,000
(3) Tractors and Farm Equipment	149,955
(4) Vehicles	316,581
(5) Greenhouses and Plastic Houses	134,385
(6) Microclimatic Equipment	27,170
(7) Irrigation Equipment	106,873
(8) Audiovisual and Other Equipment	118,937
(9) Books and Journals	13,431
(10) Literature Searches	<u>5,375</u>
	\$1,514,296
Contingency @ 5%	<u>75,715</u>
TOTAL	<u>\$1,590,011</u>

Detailed budget for commodities are in Annex O.

(d) Project Evaluations:

Project evaluations will be conducted by the GOJ, USAID, and the Contractor. In accordance with standard AID evaluation covenants, the parties are pledged to develop

^{1/} Costs include 10 percent annual inflation factor.

an intensive evaluation program to be conducted (1) as an internal evaluation at the end of the first year (FY 1983), (2) an in-depth evaluation at the end of the first two years of project (FY 1984), and (3) a final evaluation in FY 1987 at the completion of the Project. See Evaluation Plan, Section VII for full details. The cost of evaluations is budgeted at \$23,000 (See Annex O). In that the final evaluation is scheduled after the PACD, funding will be provided from other sources.

2. Government of Jordan Input:

GOJ/MOA will fund: (1) all salaries and allowances for Jordanian nationals assigned to the Project; (2) vehicle and farm equipment operation and maintenance; (3) some local procurement, and (4) international travel for training of Jordanian nationals. See Annex O for details of the GOJ Budget.

A total staff of 51 Jordanians is proposed, and their salaries and allowances are computed at \$2,696,090 for the 5-year project.

Vehicles and most farm machinery required for the Project are budgeted as USAID input. The operation and maintenance of vehicles, as well as mileage allowances for Project staff using their own vehicles, is budgeted as a GOJ/MOA input. Total costs of vehicle operation and maintenance are computed at \$734,050. For a project concentrating on the development of a productive applied research and extension program -- these inputs are essential.

Other GOJ/MOA inputs include local procurement of items of equipment and supplies, provision of space in existing buildings for offices, research laboratories, and training programs at Deir Alla, office space at the Department of Research and Extension in Amman, approximately 170 dunums of irrigated land at three sites in the Valley and moveable storage facilities at these sites, plus 10 dunums of irrigated land at the Deir Alla station, construction of three plastic houses, provision of an existing plastic house (from a formerly USAID assisted JVA program) are estimated at \$416,669. Breakdown for these various categories is contained in Annex O. Adequate space exists at Deir Alla for the two planned laboratories. The Design Team believes space for offices initially can be provided at Deir Alla by either, (a) utilizing space available in the Administration building by partitioning the large entry reception room and/or consolidating the library area, or (b) by converting some of the currently unused dormitory rooms in the

Training Center into office space. If this space were used, the only cost to the GOJ/MOA would be actual cost of partitioning, remodelling, and air conditioning and furnishing. In the long-run, standard offices should be constructed for the Project staff. Adding a second story to the existing office/laboratory building at Deir Alla is recommended if technically feasible. Space requirements are estimated at 175²M and the construction cost at \$ 50,000. Additionally, GOJ will provide two houses (and their maintenance costs) in the Valley for overnight use by the Project staff. One house is recommended in Ghor Safi and one in the Deir Alla area at an estimated cost of \$33,390 over the life of the project. Six two-to-three bedroom, furnished houses will also be provided for married Jordanian Project staff; one at Ghor Safi and five near Deir Alla. Two additional furnished houses will be provided near Deir Alla for use by single Jordanian Project staff. The costs of furnishings and furniture plus utilities are estimated at \$ 217,560. GOJ/MOA will pay for travel for 28 nationals to other countries for technical and academic training. This is computed at \$95,726. The value of the GOJ/MOA inputs discussed in this paragraph is budgeted at \$ 813,345.

The total GOJ/MOA input is budgeted at \$4,243,485. This figure includes a 10 percent annual inflation factor and a 5.0 percent allowance for contingencies for salaries, vehicle and machinery operation and maintenance, and international travel. The values for facilities provided contains a 5.0 percent contingency factor but are not inflated.

B. PROJECT FINANCIAL IMPLEMENTATION

Responsibility for project financial implementation will rest almost entirely with the university under contract. All inputs, with the exception of the evaluation, will be included under and funded through the contract. In accordance with AFD financial management policy, the use of the FRLC may be appropriate as a disbursement mechanism, in that the contractor will be a non-profit institution. It should be noted however, that approximately \$1,076,226 represents local currency costs which are included under the contract. Because of this local currency component, an alternative financing mechanism may be to utilize direct advance of funds to the contractor with the submission of supporting vouchers. The decision as to the financing mechanism utilized will be part of the contracting process.

Table 1 indicates projected disbursements through the life-of-the-project implementation. Technical assistance expenditures will begin in May 1982 with the arrival of the first technicians and continue through the life of the project. Expenditure for commodities will be completed for the most part by FY 1983. The training program expenditures will be retained in the project budget for shifting of funds between the AID financed project inputs.

C. RECURRENT COST IMPLICATIONS

The Project is an institution building activity. As such, increased recurrent costs to the MOA represent a desired result of the project. It is anticipated that the research center and the revitalized Jordan Valley extension service will continue after the completion of the project, and that the resources required for this continuation, will be in addition to the current funding level of the MOA. The GOJ contributions to the project are essentially recurrent costs of the center including 28 professional employees and approximately 20 other employees. At the beginning of the project, some of the employees will be supplied by the MOA staff and others will need to be hired. At the completion of the project, it can be assumed that funds for the entire staffing of the center, administrative support, and necessary equipment and supplies will be available.

In subsequent years, after the completion of the project, continued operation of the center will require budgeting for replacement of some equipment, including vehicles, purchase of additional equipment and supplies, and salaries. Including a 10% inflation factor, the following figures are presented as guidelines for FY 1987.

- Salaries with the same staffing level as previously	\$ 775,761
- Vehicle and tractor operation, maintenance & replacement	275,000
- Other commodities, maintenance, purchase & replacement, and general administration	<u>425,000</u>
- Subtotal	\$ 1,475,761
- Contingency @ 5%	<u>73,788</u>
- TOTAL	<u><u>\$ 1,549,549</u></u>

VI. IMPLEMENTATION PLAN

A. INTRODUCTION

This Project has been designed and will be implemented under the Title XII Collaborative Assistance Mode. Under a direct AID contract the contractor will work with the GOJ/MOA as the implementing agency.

Under this mode, AID procures the services of an U.S. educational institution, organization, or International Research Center for Design, including problem analysis, project identification, and definition. If the Project design on which this PP is based and developed by Washington State University (WSU), is acceptable to GOJ and AID, then WSU will also participate in Project implementation.

AID retains responsibility for setting policy, formulating strategy, monitoring and evaluating programs, and maintaining relationships with senior host country officials. The contracting institution and collaborating agency of the host country are given the authority to make the tactical, operating decisions.

B. PROJECT IMPLEMENTATION

The design team has used a logical approach with definite objectives in the proposed scheduling outlined here and in the accompanying flow chart and tabular presentation of U.S. advisor's arrivals and length of individual assignments. During the initial implementation stages of the Project all staff will become thoroughly familiar with information already available on production constraints in the Jordan Valley and results of previous research.

Project activities are scheduled to start in Jordan on January 1, 1982, with the appointment of the Jordanian Project Director and his assuming full-time duty. He will begin to identify personnel for the Project and arrange for use of the offices and laboratories allocated to the Project at Deir Alla Research Station and at the DR&E, Amman. A Jordanian Administrative Assistant will also be hired in January 1982 to assist the Project Director in expediting commodity procurement. It is essential that commodities be ordered early to permit the Project to start full-time operation on schedule. A Purchasing Office buyer (half-time) and a clerk (half-time) have been budgeted at the contractor institution from January 1, 1982 to May 1, 1982 (four person months total). These two home office positions

permit the preparing and placing of orders for commodities so essential commodities will begin arriving in Jordan soon after Project initiation. Lists of commodities needed for the Project are included in the budget (Annex 0).

The senior U.S. advisor will arrive in Jordan on May 1, 1982, and will be the first member of the Contractor's team to arrive. He will assist the Project Director in finalizing staff selection, ascertain major equipment items and supplies needed and not previously ordered, develop specification and initiate orders. He will also assume his responsibility for receipt of commodities purchased by the Project, arrange housing and furnishings for himself and other U.S. staff; and finalize with the Project Director selection of other long-term U.S. personnel scheduled to start arriving August 1, 1982. He will assist the Project Director in having offices and laboratories prepared for staff use, examine other facilities and land being made available to the Project, and procure locally items of equipment (including vehicles) and supplies needed to commence research and extension.

The arrival date of the senior U.S. advisor is based on the lead time needed prior to starting a comprehensive, integrated program in applied research and extension by the time of the fall 1982 growing season.

A Plant Pathologist is recommended as the initial senior advisor because of the serious disease problems in the Valley. Several major diseases are viruses transmitted by insects; consequently a Integrated Pest Management Specialist with an Entomological background will join the Plant Pathologist/senior advisor on September 1, 1982 to develop joint programs.

Little work can be accomplished in soil and water problems until a laboratory is established where soil, water and plant tissue samples can be analyzed. The primary responsibility of the soil and water scientist who arrives August 1, 1982, will be to establish this laboratory and train personnel to carry out the various analyses required. He will also initiate research on leaching and drainage in the Ghors and at Safi.

The next arrival will be the Production Economist (about September 1, 1982). He will begin to develop a farm management program designed to determine and analyze costs of and returns from alternate production technologies for selected crops.

About September 15, 1982, an Extension Organizational Specialist will arrive to assist the Jordanian Communications, Information and Training Specialist in the organization of short-term training to be conducted in Jordan for staff personnel. These two individuals will assist the Project Director and senior advisor in the selection of staff personnel to participate in the training programs outlined in Annex L.

Thus by mid-September 1982 the research and extension teams will have their programs in operation, the flow of commodities will be well under way, and the initial selection of Jordanian staff to participate in training programs will have been completed.

The scheduling of other advisor's arrivals, major activities, and departures are presented in Tables 1 and 2. A transitional period will occur between February and May, 1984, as the first group of advisors on long-term assignment complete their tours and the second group of those on long-term assignment arrive. To minimize the effect of this transition on the Project's program, an overlap occurs between the first vegetable horticulturalist and the next senior advisor, also a vegetable horticulturalist.

Thus, as the new senior advisor becomes familiar with his administrative responsibilities, he will have support in his area of professional responsibility. This horticulturalist is scheduled for a 23 month tour. The second long-term Soil and Water scientist is scheduled to commence his tour on September 1, 1985, and to continue to the end of the Project. He is scheduled to be the senior advisor during the last year of the project.

Because of the critical importance of Pest Management to solving production constraints, this area is covered throughout the life of the Project. It is recommended production economics be covered for 39 months of the Project, including the final year when the economist will assist the Project Director and senior advisor to evaluate the Project's impact on production methods and levels, farmers' costs and returns, market timing, the quality of vegetable production and prepare their final report. Conclusion of the project is scheduled for August 31, 1986.

While contract advisors are identified by their areas of agricultural specialization, it is emphasized that prior involvement in extension as a general agent, as a subject matter specialist, or an administrator with responsibility for extension will be a criterion used in selecting all advisors. Thus will the emphasis on extension be infused into all project activities.

Table 1: Sequence of Assignments for Expatriate Staff
 First Fiscal Year-Activities start-up in Jordan on May1, 1982

<u>Position</u>	<u>Arrival Date</u>	<u>Termination Date</u>	<u>Length of Tour</u>	<u>Months in FY</u>
Plant Pathologist (senior advisor)	May 1, 1982		24 mos.	5
Soil and Water Specialist	Aug. 1, 1982		12 mos.	2
Pest Mgmt. Specialist (Entomologist)	Sept. 1, 1982		20 mos.	1
Production Economist	Sept. 1, 1982		21 mos.	1
Extension Specialist (Organization)TDY	Sept. 15, 1982		3.5 mos.	0.5
TOTAL First Fiscal Year (1982)				9.5 mos.
Second Fiscal Year - (October 1, 1982 - September 30, 1983)				
Plant Pathologist (senior advisor) (con't)	May 1, 1982		24 mos.	12
Soil & Water Specialist (con't.)	Aug. 1, 1982	July 31, 1983	12 mos.	10
Pest Management Specialist (con't.)	Sept. 1, 1982		20 mos.	12
Production Economist (con't.)	Sept. 1, 1982		21 mos.	12
Extension Specialist Org. (con't.)	Sept. 15, 1982	Dec. 31, 1982	3.5 mos.	3
Agricultural Information Officer (New)TDY	Feb. 1, 1983	Mar. 15, 1983	1.5 mos.	1.5
Vegetable Horticulturalist (new)	Aug. 1, 1983		12 mos.	2
Extension Program Development (new) TDY	Aug. 1, 1983	Sept. 30, 1983	2 mos.	2
Citrus Horticulturalist (new)	Sept. 1, 1983		6 mos.	1
TOTAL Second Fiscal Year (1983)				55.5 mos.
Third Fiscal Year - (October 1, 1983 - September 30, 1984)				
Plant Pathologist (senior advisor) (con't.)	May 1, 1982	April 30, 1984	24 mos.	7
Pest Mgmt. Specialist (Entomology) "	Sept. 1, 1982	April 30, 1984	20 mos.	7
Production Economist (con't.)	Sept. 1, 1982	May 1, 1984	21 mos.	8
Veg. Horticulturalist (con't.)	Aug. 1, 1984	July 31, 1984	12 mos.	10
Citrus Horticulturalist (con't.)	Sept. 1, 1983	Feb. 28, 1984	6 mos.	5
Veg. Horticulturalist (senior advisor-new)	June 1, 1984		23 mos.	4
Pest Mgm. Specialist (Virologist-new)	Sept. 1, 1984		18 mos.	1
TOTAL Third Fiscal Year (1984)				42 mos.

Fourth Fiscal Year (Oct. 1, 1984 - September 30, 1985)

<u>Position</u>	<u>Arrival Date</u>	<u>Termination Date</u>	<u>Length of Tour</u>	<u>Months in FY</u>
Veg. Horticulturalist (senior advisor con't.)	Jun. 1, 1984		23 mos.	12
Pest Mgmt. Specialist (Virologist con't.)	Sep. 1, 1984		18 mos.	12
Pest Mgmt. Specialist (Pesticies-new) TDY	Oct. 1, 1984	Feb. 28, 1985	5 mos.	5
Production Economist (new) TDY	Dec. 1, 1984	May 31, 1985	6 mos.	6
Pest Mgmt Specialist (new)	Jun. 1, 1985		12 mos.	4
Production Economist (new)	Jun. 1, 1985		12 mos.	4
Soil and Water Specialist (new)	Sep. 1, 1985		12 mos.	1
TOTAL Fourth Fiscal Year (1985)				44 mos.

Fifth Fiscal Year (October 1, 1985 - September 30, 1986)

Veg. Horticulturalist (senior advisor con't.)	Jun. 1, 1984	Apr. 30, 1986	23 mos.	7
Pest Mgmt. Specialist (Virologist con't.)	Sep. 1, 1984	Feb. 18, 1986	18 mos.	5
Pest Mgmt. Specialist (con't)	Jun. 1, 1985	May. 31, 1986	12 mos.	8
Production Economist (con't)	Jun. 1, 1985	May. 31, 1986	12 mos.	8
Soil and Water Specialist (Senior Advisor)	Sep. 1, 1985	Aug. 31, 1986	12 mos.	11
TOTAL Fifth Fiscal Year (1986)				39 mos.
TOTAL MAN MONTHS FOR ALL FISCAL YEARS				190 mos.

The Contractor's primary responsibilities are to guide and advise their counterparts in regard to solving through applied research and extension the production constraints recognized by both as deserving priority. Jordanians will assume an increasing leadership role in planning and performing applied research and extension responsibilities as the Project progresses. At the end of the Project, an institutionalized, well functioning AR&EC will be in place and completely staffed by experienced Jordanians, and capable of continuing all aspects of AR&E on vegetables and fruits in the Jordan Valley.

C. IMPLEMENTATION SCHEDULE

DATE	MAJOR ACTION	RESPONSIBILITY
9/30/81	Signature of Grant Agreement	USAID/J, GOJ
10/15/81	Issuance of Implementation Letter No. 1	USAID/J
11/1/81	PIO/T Issued	AID
12/31/81	Meet Conditions Precedent to Disbursement	GOJ/NPC
1/1/82	International Office Finalizes Campus Coordinating Group	Contractor
1/1/82	Project Director on Job	GOJ/MOA
1/1/82	Administrative Assistant (Expeditor) on job	GOJ/MOA
1/1/82	Buyer and Clerk in Campus Purchasing Office on Payroll	Contractor
1/1/82	Campus Coordinator on Payroll	Contractor
1/4/82	Contract Signed	AID/Contractor
1/15/82	Initial Procurement Initiated	Contractor
4/1/82	Senior Advisor Appointed	GOJ/MOA, USAID, Contractor
5/1/82	Arrival of Senior Advisor	Contractor

DATE	MAJOR ACTION	RESPONSIBILITY
5/15/82	Research Sites and Land Prepared	Contractor/GOJ/MOA
6/1/82	Offices Organized and Furnished for all Project Staff in Amman and Deir Alla	GOJ/MOA
8/1/82	Majority of GOJ Positions Staffed	GOJ/MOA
8/1/82	Arrival of Soil and Water Specialist	Contractor
9/1/82	First Group Begins Academic Training	Contractor/MOA
9/1/82	Arrival of Production Economist	Contractor
9/1/82	Arrival of IPM Specialist	Contractor
9/15/82	Laboratories Set Up and Operation Initiated	Contractor/MOA
9/15/82	20 On-Farm Demonstrations Planned	Contractor/MOA
9/15/82	Arrival of Extension Organization Specialist, TDY	Contractor
9/15/82	Research Programs Initiated	Contractor/MOA
9/15/82	Extension Programs Initiated	Contractor/MOA
9/15/82	First In-Service Training in Jordan Program Begins	Contractor/MOA
9/30/82	First Project Evaluation	Contractor/MOA/USAID/J
10/1/82	Second Group of 10 Project Staff Selected for In-Service Training in Jordan	Contractor/MOA
10/1/82	7 Project Staff Selected for Foreign Short-Term Training	Contractor/MOA
12/1/82	Soils and Water and Plant Tissue and Pest Labs in Full Operation	Contractor/MOA
12/1/82	Begin Selection of Candidates for Intensive English Training in Jordan	Contractor/MOA

DATE	MAJOR ACTION	RESPONSIBILITY
2/1/83	Short Term Technical Training Commences in U.S. or Other Countries	Contractor/GOJ
2/1/83	Arrival of Agricultural Information Officer TDY	Contractor
2/1/83	Second In-Service Training Group of 10 Project Staff Begins Program in Jordan	Contractor/MOA
3/1/83	Begin Selection of 8 Candidates From Project Staff for M.Sc. Work Abroad (in U.S. or other countries)	Contractor/MOA
4/1/83	Selection and Processing of 4 Candidates for Special Short-Term Training in Areas of Agricultural Information	Contractor/MOA
4/1/83	Selection of 5 Project Staff for USDA or International Ag. Res. Center Short Term Training	Contractor/MOA
4/1/83	Four Field Days Held	Contractor/MOA
6/1/83	Third Group of 10 Project Staff Selected for In-Service Training in Jordan	Contractor/MOA
6/1/83	Begin Selection of 8 Project Staff For Graduate Program at UOJ	Contractor/MOA
6/15/83	Staff Selected (8) for Long-Term Academic Training Abroad Commence Program	Contractor/MOA
7/1/83	Project Director Commences Short-Term Training in U.S.	Contractor/MOA
7/1/83	Arrival of TDY Extension Program Evaluation Specialist	Contractor
7/1/83	4 Staff Selected for Specialized Training in U.S. Commence Training	Contractor/MOA
7/1/83	5 Project Staff Selected for USDA or International Ag. Res. Center Short-Term Training Commence Program	Contractor/MOA

DATE	MAJOR ACTIONS	RESPONSIBILITY
8/1/83	Vegetable Horticulturalist Arrives	Contractor
8/1/83	Extension Program Development Specialist Arrives	Contractor
9/1/83	Second Group Begins Academic Training	Contractor/MOA
9/1/83	Arrival Citrus Horticulturalist TDY	Contractor
9/15/83	Third In-Service Training Program for 10 Selected Staff in Jordan Begins	Contractor/MOA
9/15/83	Additional Project Staff Selected for Foreign Short-Term Training Commence Programs	Contractor/MOA
9/15/83	Selected Project Staff Commence Graduate Programs at UOJ	Contractor/MOA
9/15/83	Project Staff Requiring Intensive Instruction in English Commence Courses	Contractor/GOJ
11/1/83	20 On-Farm Demonstrations Planned	Contractor/MOA
4/1/84	4 Field Days Held	Contractor/MOA
4/1/84	Mid-Term Project Evaluation	Contractor/MOA, USAID/J / External
6/1/84	Horticulturalist (Senior Advisor) Arrives	Contractor
9/1/84	Third Group Begins Academic Training	Contractor/MOA
9/1/84	Pest Management Specialist (Virologist) Arrives	Contractor
10/1/84	Arrival IMS Pesticide Specialist, TDY	Contractor
12/1/84	Production Economist Arrives	Contractor

DATE	MAJOR ACTION	RESPONSIBILITY
4/1/85	4 Field Days Organized	Contractor/MOA
6/1/85	Arrival Pest Management Specialist	Contractor
6/1/85	Arrival Production Economist	Contractor
9/1/85	Soil and Water Specialist (Senior Advisor) Arrives	Contractor
11/1/85	20 On-Farm Demonstrations Planned	Contractor/MOA
3/1/86	4 Field Days Organized	Contractor/MOA
8/31/86	Project Conclusion	Contractor/MOA/USAID/J
8/1/87	Final Project Evaluation	External

D. PROJECT MONITORING AND EVALUATIONS

USAID/J will be responsible for continuous project monitoring. Within the Mission, primary monitoring responsibility will rest with the Project Manager - Agriculture supported by a Project Committee, which will include representatives from other USAID offices. The USAID Project Manager - Agriculture will coordinate and liaise with the Director of the JVACP and the Project's senior U.S. advisor. All project elements will be monitored at the input and output levels to ascertain status, to identify problem areas, and to seek solutions.

Three evaluations are planned: The first in September 1982; a second in April 1984, and the third in August 1987, one year after the project's conclusion so as to evaluate the project's achievement of its goal and purpose. The first evaluation will be conducted nine months after the Project Director has been on the job and commodity procurement initiated and five months after the arrival of the U.S. senior advisor. The main items to be addressed are the GOJ's satisfaction of the Conditions Precedent; how well project targets on staffing, commodity procurement, training plans and facility development are being met, and to review project administrative arrangements.

This evaluation cannot address in-depth the progress of the Project toward achieving goal and purpose as it will be too soon in the Project's life, but it should be alert to potential areas of an organizational nature, to matters affecting institutionalization, and to operation of research and extension activities so that expected potential issues can be resolved early enough in order not seriously to jeopardize the program. This evaluation will be conducted internally by the Mission, GOJ/MOA, and the Contractor.

The second evaluation is planned for the end of the second complete cropping season under the Project and just prior to the original senior advisor's departure from Jordan. By this time in-depth evaluation of the Project's research, extension, training and budget activities should be possible, including the extent to which the AR&EC is becoming institutionalized and effectively reaching the farmer target group. Particular attention will be given to factors identified in the social and other analyses as being crucial to project success, such as the ability to attract and retain capable, committed research and extension personnel; the ability of extension staff to reach the target group; coordination within the Ministry and among different GOJ agriculture entities operating in the Valley; the adoption and impact of suggested technological innovations, and how effectively women are benefitting from extension efforts under the project. At least two members of the evaluation team will not have been previously associated with the Project but will be selected from another U.S. Land Grant University or other agency having experience with integrated crop research-extension programs. Representatives from the Mission, GOJ/MOA and Contractor will participate in the evaluation. One member of the team should be a social analyst.

The final evaluation is recommended for one year after the departure of all U.S. advisors and the completion of the Project. Using baselines data, such as that developed by Dajani, et.al and JVA (both cited earlier), the evaluation team should be able to assess the extent of the Project's contribution to increasing Jordan Valley production of fruits and vegetables. By delaying this final evaluation for one year after all U.S. advisors have departed, the team should also be able to observe how well the project's purpose has been achieved of institutionalizing a viable mechanism in the Valley to develop and disseminate appropriate agricultural technology. The review will also evaluate the "success" factors covered in the second evaluation, identify lessons learned of benefit to AID and the GOJ, and indicate those key factors in project success or failure. This team would preferably include the same two external evaluators who participated in the second evaluation along with representatives from GOJ/MOA, AID/W, and the Mission. Funding for the final evaluation, unlike that for the earlier interviews, shall come from outside the project, i.e. from TSFS or PD&S monies.

VII. CONDITIONS, COVENANTS AND NEGOTIATING STATUS

A. CONDITIONS PRECEDENT

The following six conditions precedent to any disbursement of Grant funds are proposed:

1. Standard requirements for the receipt of a statement from the National Planning Council (NPC) of the name(s) of the person(s) representing GOJ, a specimen signature of each person so designated, and receipt of a legal opinion from the GOJ stating that the Agreement has been duly authorized and/or ratified by, and executed on behalf of Jordan, and that it constitutes a valid and legally binding obligation of Jordan.

2. A statement of the name of the person within the Ministry of Agriculture who will serve full-time as the Jordanian Project Director, whose duties will commence no later than January 1, 1982, together with a statement of that official's authority, duties and responsibilities.

3. Concerning the Center to be established under this Project, a statement of its planned date of administrative establishment; its planned relationships with the Ministry of Agriculture's regional directorates and the Department of Research and Extension, and its organizational chart, to include the estimated dates for the filling of all positions.

4. Assurances that adequate office space and laboratory space for both Jordanian and U.S. advisory project staff will be in place and ready at Deir Alla and Amman on a timely basis.

5. Evidence that adequate housing in the Jordan Valley for the use of Project advisors to be assigned to the Center will be made on a timely basis; and confirmation that maintenance and utilities with respect to such housing will be Grantee responsibilities under this Agreement.

6. Evidence that suitable land for research sites is available to the Ministry of Agriculture, or will be made available on a timely basis.

B. SPECIAL COVENANTS

The following three special covenants are recommended:

1. Project Evaluation:

The parties agree to establish an evaluation program as part of the Project. Except as the parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

- (a) Evaluation of progress towards attainment of the objectives of the Project;
- (b) Identification and evaluation of problem areas or constraints which may inhibit such attainment;
- (c) Assessment of how such information may be used to help overcome such problems; and
- (d) Evaluation, to the degree feasible, of the overall development impact of the Project.

2. Administrative Planning:

In recognition of the importance to successful project implementation of the Conditions Precedent contained in Section A (2) through (6), above, Grantee will continue throughout the Project, except as A.I.D. shall otherwise agree in writing, to comply with the substance of the presentations made to A.I.D. in satisfaction of those Conditions.

3. Personnel Incentives:

In recognition of the importance to successful Project implementation of the Grantee's recruiting and retaining qualified Jordanian personnel to be assigned to Project work in the Jordan Valley the Grantee will, during the life of the Project, offer levels of incentives and allowances, on a basis comparable to those provided to personnel of other Government of Jordan ministries, necessary to such recruitment and retention.

C. NEGOTIATING STATUS

The Project has been under discussion since early 1980 when an Agriculture Production and Marketing PID, prepared with the assistance of NE/TECH, stimulated the interest of GOJ. An issue of considerable importance then was coordination among various entities involved in Valley agriculture and seeking a clear assignment of responsibility for agriculture there. After about one year of internal debate the Ministry of Agriculture was designated as the responsible GOJ agent, and the USAID began to develop a revised PID with the MOA. Although the USAID has not been advised in writing of the designation, it has been so advised verbally by NPC, JVA, and the Ministry. PID and PP preparation have proceeded on this basis as has negotiation and GOJ approval of the Project Agreement (see below). The USAID, therefore, feels confident that this concern has been resolved. It was decided with the Ministry to narrow the scope of the initial PID by deleting the marketing component (now handled by other donor programs) and to reduce the level of proposed technical assistance accordingly. A revised PID, Jordan Valley Agricultural Services, was prepared and discussed with the Minister of Agriculture in February 1981. AID/W approved the PID in April 1981.

The Title XII collaborative assistance mode for PP design was used and Washington State University was competitively selected. The 5-man design team arrived in Jordan in July and departed in mid-August 1981. In developing the draft PP the team and USAID/J staff worked closely with MOA assigned counterparts.

The issues raised in the PID and elsewhere were topics of constant discussion among the design team, MOA, and USAID/J. Administrative arrangements in particular were discussed at length among all three parties. Numerous meetings were held with MOA staff, including the Minister and the Undersecretary. Minutes of these meetings are in USAID/J files and the agreed actions are reflected in the provisions of the PP. The PP and the Project Grant Agreement have been discussed with MOA and NPC officials with particular attention to the Conditions Precedent and Special Covenants described above. Subsequently, the Project Grant Agreement and Annex I were forwarded to the Council of Ministers with the recommendation for approval.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title: Jordan Valley Agricultural Services
Project Number: 278-0241

Life of Project:
From FY 1981 to FY 1986
Total U.S. Funding \$ 5,620,000
Date Prepared: September 20, 1981

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program of Sector Goal: The broader objective to which this project contributes: (A-1)	Measures of Goal Achievement (A-2)	(A-3)	Measures for Achieving Goal Targets: (A-4)
To increase the Jordan Valley's agricultural productivity, pri- marily of vegetables and fruits, for local consumption and export, through increasing farmers' access to inputs and services.	Trend in rising yields and increased production of horticultural and field crops in the Valley.	GOJ and JV/JVFA reports and records	GOJ continues to emphasize agri- cultural development in the Jordan Valley. Absence of any significant force majeure. Project proceeds according to plan. Favorable market conditions and other infrastructure, particularly irrigation, function effectively.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title: Jordan Valley Agricultural Services

Project Number: 278-0241

Life of Project:

From FY 1981 to FY 1986

Total U.S. Funding \$ 5,620,000

Date Prepared: September 20, 1981

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1)	Conditions that will indicate purpose has been achieved: End-of-project status: (B-2)	(B-3)	Assumptions for achieving purpose: (B-4)
Establish and institutionalize a viable mechanism capable of developing and disseminating appropriate agricultural technology for vegetable and fruit production in the Jordan Valley.	One applied research and extension center with three substations staffed and operating.	Visual observation	Facilities, staff, budget, and transportation support continue to be available.
	The center functioning as an important and integral component of the agricultural development efforts in the Valley.	MOA, USAID and contractor records and evaluations.	Incentives adequate to attract and retain qualified staff. The organization/administrative procedures outlined in the draft Pro. Ag and PP are implemented and adhered to by MOA.
	Trained extension personnel providing research results and other technological information to farmers.	USAID, MOA and contractor records and evaluations.	Regional Ag Directors, other MOA personnel, Faculty of Agriculture, JVFA and related agricultural organizations are cooperating with the Center.
	At least 50% of Jordan Valley farmers using improved technology, cultural practices and management techniques.	USAID, MOA, and contractor records and evaluations and farmer surveys.	Committed and qualified MOA management, technical and extension staff are involved in the project.
			A lower than historic staff turnover rate and staff vacancies are filled with qualified people.
			Farmers willing and able to cooperate with Center activities and staff.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title: Jordan Valley Agricultural Services

Project Number: 278-0241

Life of Project:
From FY 1981 to FY 1986
Total U.S. Funding \$ 5,620,000
Date Prepared: September 20, 1981

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs:(C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for Achieving Outputs: (C-4)
An applied agricultural re- search-extension center established and operating in the Jordan Valley.	Appropriate GOJ regulations issued and no less than 80% of management research, and extension positions filled at the end of 5-year project.	GOJ and MOA records.	Center operating with MOA contri- bution to adequate budget, trans- portation, facilities and quali- fied staff.
Research sites and facili- ties established.	No less than 3 locations developed and continuing research program underway.	MOA, USAID and contrac- tor records and visual observation.	Research sites provided by GOJ. Research program is relevant and positive production recommenda- tions are developed.
Organized research program.	Projects underway in all 3 areas identified as major constraints to production.	MOA, USAID and contrac- tor evaluations.	Researchers and extension agents work effectively as a team.
Laboratories established, equipped and staffed.	Two laboratories operating: plant and pest protection-plant tissue and soils and water.	MOA, USAID records and visual observation.	Designated laboratory and office space at Deir Alla provided.
Farmer demonstration ; program.	Twenty on-farm demonstrations annually.	MOA, USAID and visual observation.	Agents suitably reimbursed for driving own car or able to drive project car.
Farmer-extension program.	Each agent working directly with no less than 25 primary contacts and 150 total contacts.	MOA and USAID records and farmer surveys.	Farmers willing to cooperate.
Research, extension, farmer seminar-fieldday program.	A minimum of 4 one-day programs	MOA and USAID records and visual observation.	Resources of the MOA Ag. Informa- tion Unit available to the Center.
Research and Extension publications.	Average of one per scientist per full work year.	Project records.	

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

A-4

Project Title: Jordan Valley Agricultural Services

Project Number: 278-0241

Life of Project:
From FY 1981 to FY 1986
Total U.S. Funding \$ 6,620,000
Date Prepared: September 20, 1981

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs:(D-1) USAID: Technical Assistance Commodities and Training:	Implementation Target (Type and Quantity): (D-2)	(D-3)	Assumptions for Providing Input: (D-4) Expert advisors available on a timely basis.
1. Approximately 15.8 person-years of ex- pert advisors.	Contract	Signed Contract	Qualified participants available.
2. Training for 28 participants	Participants selected	USAID documents	The organization/administrative procedures outlined in draft Pro. Ag. and PP are implemented and adhered to by MOA.
3. Laboratory, office, and farming equipment.	Requirements identified and ordered.	Procurement documents.	Expected funds are forthcoming in GOJ budgets.
4. Vehicles.	On order.	Procurement documents.	
GOJ: Personnel Facilities and Operating Budget:			
1. Professional and support staff.	Positions identified.	MOA documents in support of Pro.Ag. C.P.	
2. Research sites, labo- ratory, office space and staff housing.	Facilities identified and assigned to project .	MOA documents in support of Pro.Ag. C.P.	
3. Operating expenses	MOA budget approved.	MOA documents in support of Pro.Ag. C.P.	

PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual funding sources: Development Assistance (with subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? Yes
 HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT? Yes

A. GENERAL CRITERIA FOR PROJECT1. Continuing Resolution Unnumbered; FAA Sec. 634A; Sec. 653(b)

(a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure) ?

(a) Notification will be accomplished by an Advice of Program Change to the Congress.

(b) Yes.

2. FAA Sec. 611(a) (1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial 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); 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?

N/A.

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?

N/A.

6. FAA Sec. 209. Is project susceptible of 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.

N/A.

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 loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

Project will encourage efforts under "b", and "e" by improving farmers' production capabilities.

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

U.S. private enterprise is expected to furnish a major portion of the equipment required for the project.

9. FAA Sec. 612(b), 636(h); Continuing Resolution Sec. 508. 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 GOJ is contributing approximately 40% of the total project cost and approximately 75% of the local currency costs. Local currency expenditures financed by AID are limited to costs ancillary to AID inputs.

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?

Jordan is not an excess currency country.

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. 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?

Production is during off-season when world markets are in short supply of fruit and vegetables. Exports will be to neighboring Middle East countries and no injury is anticipated to U.S. producers.

2. Project Criteria Solely for Economic Support Fund

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

The Project will promote the economic and political stability by increasing the quantity and quality of foodstuffs and reducing Jordan's trade deficit. The project is consistent with FAA Section 102 (b)(4)(A).

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

No.

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 heading 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?

All U.S. procurement for equipment and commodities will be by competitive bidding and will include provision for small business in accordance with AID regulations.

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 U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do a marine insurance business in the U.S.?

N/A.

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.).

N/A.

5. 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 liners, 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?

N/A.

6. FAA Sec. 621. If technical assistance is financed, to the fullest extent practicable will such assistance, goods and professional and other services be furnished from private enterprise on a contract basis? 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?

Technical assistance will be provided by a Land-Grant University, pursuant to Title XII procedures.

7. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S. carriers will be utilized to the extent such service is available?

Yes.

8. Continuing Resolution Sec. 505. 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?

Appropriate provisions will be included in all contracts for procurement.

B. Construction

1. FAA Sec. 601(d). If capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interests?

N/A.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on competitive basis to maximum extent practicable?

N/A.

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?

N/A.

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?

N/A.

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?

N/A.

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-bloc countries?

Yes.

4. Continuing Resolution Sec. 514. If participants will be trained in the United States with funds obligated in FY 1981, has it been determined either (a) that such participants will be selected otherwise than by their home governments, or (b) that at least 20% will be for participants selected otherwise than by their home governments?

It has been determined that agency-wide at least 20 percent of the participants will be selected otherwise than by their home governments.

5. Will arrangements preclude use of financing:

- a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization?

Yes.

- 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.

- e. FAA Sec. 636(1). 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. Continuing Resolution Sec. 904. To pay pensions, annuities retirement pay, or adjusted service compensation for military personnel?

Yes.

- g. Continuing Resolution Sec. 906. To pay U.N. assessments, arrearages or dues.

Yes.

- h. Continuing Resolution Sec. 907. To carry out provisions of FAA Section 209(d) (Transfer of FAA funds to multilateral organizations for lending).

Yes.

- i. Continuing Resolution Sec. 909. To finance the export of nuclear equipment fuel, or technology or to train foreign nationals in nuclear fields?

Yes.

- J. Continuing Resolution Sec. 510. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the populations of such country contrary to the Universal Declaration of Human Rights?

Assistance for such purpose will be precluded.

- k. Continuing Resolution Sec. 516. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?

Yes.

A.I.D. Project Number 278 - 0241

PROJECT GRANT AGREEMENT

BETWEEN

THE HASHEMITE KINGDOM OF JORDAN

AND

THE UNITED STATES OF AMERICAN

FOR

JORDAN VALLEY AGRICULTURAL SERVICES

DATE:

TABLE OF CONTENTS
PROJECT GRANT AGREEMENT

	<u>Page</u>
Article 1: The Agreement	1
Article 2: The Project: Definition of Project	1
Article 3: Financing	1
SECTION 3.1. The Grant	1
SECTION 3.2. Grantee Resources for the Project	2
SECTION 3.3. Project Assistance Completion Date	2
Article 4: Conditions Precedent to Disbursement	2
SECTION 4.1. First Disbursement	2
SECTION 4.2. Notification	3
SECTION 4.3. Terminal Dates for Conditions Precedent	4
Article 5: Special Covenants	4
SECTION 5.1. Project Evaluation	4
SECTION 5.2. Administrative Planning	4
SECTION 5.3. Personnel Incentives	5
Article 6: Procurement Source	5
SECTION 6.1. Foreign Exchange Costs	5
SECTION 6.2. Local Currency Costs	5
Article 7: Disbursements	5
SECTION 7.1. Disbursement for Foreign Exchange Costs	5
SECTION 7.2. Disbursement for Local Currency Costs	6
SECTION 7.3. Other Forms of Disbursement	7
SECTION 7.4. Rate of Exchange	7
Article 8: Miscellaneous	7
SECTION 8.1. Communications	7
SECTION 8.2. Representatives	8
SECTION 8.3. Standard Provisions Annex	8
Annex 1 Project Description	9
Annex 2 Project Grant Standard Provisions	17

PROJECT GRANT AGREEMENT

Dated: September , 1981

BETWEEN

The Hashemite Kingdom of Jordan ("Grantee") acting through the National Planning Council ("NPC") as its representative and the Ministry of Agriculture ("MOA") as its implementing Agency,

AND

The United States of America, acting through the Agency for International Development ("A.I.D.")

Article 1: The Agreement

The purpose of this Agreement is to set out the understandings of the parties named above ("Parties") with respect to the undertaking by the Grantee of the Project described below, and with respect to the financing of the Project by the Parties.

Article 2: The Project; Definition of Project

The Project, which is further described in Annex 1, will consist of establishing and institutionalizing a viable mechanism capable of developing and disseminating appropriate agriculture technology for vegetable and fruit production in the Jordan Valley. Within the limits of the above definitions of the Project, elements of the amplified description stated in Annex 1 may be changed by written agreement of the authorized representatives of the Parties named in Section 8.2, without formal amendment of this Agreement.

Article 3: Financing

SECTION 3.1. The Grant

To assist the Grantee to meet the costs of carrying out the Project, A.I.D., pursuant to the Foreign Assistance Act of 1961, as amended, agrees to grant the Grantee under the terms of this Agreement not to exceed Five Million Six Hundred and Twenty Thousand United States ("U.S.") Dollars (\$5,620,000) ("Grant"). The Grant may be used to finance foreign exchange costs, as defined in Section 6.1., and local currency costs, as defined in Section 6.2., of goods and services required for the Project.

Article 3: Financing (Cont'd)

-2

SECTION 3.2. Grantee Resources for the Project

(a) The Grantee agrees to provide or cause to be provided for the Project all funds in addition to the Grant, and all other resources, including personnel, required to carry out the Project effectively and in a timely manner.

(b) The resources provided by Grantee for the Project will be not less than the equivalent of U.S. \$4,243,000 including costs borne on an "in-kind" basis.

SECTION 3.3. Project Assistance Completion Date

(a) The "Project Assistance Completion Date" (PACD), which is August 31, 1986, or such other date as the Parties may agree to in writing, is the date by which the Parties estimate that all services financed under the Grant will have been performed and all goods financed under the Grant will have been furnished for the Project as contemplated in this Agreement.

(b) Except as A.I.D. may otherwise agree in writing, A.I.D. will not issue or approve documentation which would authorize disbursement of the Grant for services performed subsequent to the PACD or for goods furnished for the Project, as contemplated in this Agreement, subsequent to the PACD.

(c) Requests for disbursement, accompanied by necessary supporting documentation prescribed in Project Implementation Letters, are to be received by A.I.D. or any bank described in Section 7.1. no later than nine (9) months following the PACD, or such other period as A.I.D. agrees to in writing. After such period, A.I.D., giving notice in writing to the Grantee, may at any time or times reduce the amount of the Grant by all or any part thereof for which requests for disbursement, accompanied by necessary supporting documentation prescribed in Project Implementation Letters, were not received before the expiration of said period.

Article 4: Conditions Precedent to DisbursementSECTION 4.1. First Disbursement

Prior to disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the Parties may otherwise

Article 4: Conditions Precedent to Disbursement (CONT'D) -3

agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., the following:

(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, and that it constitutes a valid and legally binding obligation of the Grantee 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 specified in Section 8.2., and of any additional representatives, together with a specimen signature of each person specified in such statement.

(c) A statement of the name of the person within the Ministry of Agriculture who will serve full-time as the Jordanian Project Director, whose duties will commence no later than January 1, 1982, together with a statement of that official's authority, duties and responsibilities.

(d) Concerning the Center to be established under this Project, a statement of its planned date of administrative establishment; its planned relationships with the Ministry of Agriculture's regional directorates and the Department of Research and Extension; and its organizational chart, to include the estimated dates for the filling of all positions.

(e) Assurances that adequate office space and laboratory space for both Jordanian and U.S. advisory project staff will be in place and ready at Deir Alla and Amman on a timely basis.

(f) Assurances that adequate housing in the Jordan Valley for the use of Project advisors and for Jordanian staff to be assigned to the Center will be made on a timely basis; and confirmation that maintenance and utilities with respect to such housing will be Grantee responsibilities under this Agreement.

(g) Evidence that suitable land for research sites is available to the Ministry of Agriculture, or will be made available on a timely basis.

SECTION 4.2. Notification

When A.I.D. has determined that the conditions precedent specified in Section 4.1. have been met, it will promptly so notify the Grantee.

Article 4: Conditions Precedent to Disbursement (CONT'D) -4

SECTION 4.3 Terminal Dates for Conditions Precedent

(a) If all of the conditions specified in Section 4.1. have not been met within 90 days from the date of this Agreement, or such later date as A.I.D. may agree to in writing, A.I.D., at its option, may terminate this Agreement by written notice to Grantee.

Article 5: Special CovenantsSECTION 5.1. Project Evaluation

The Parties agree to establish an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:

- (a) evaluation of progress toward attainment of the objectives of the Project;
- (b) identification and evaluation of problem areas or constraints which may inhibit such attainment;
- (c) assessment of how such information may be used to help overcome such problems; and
- (d) evaluation, to the degree feasible, of the overall development impact of the Project.

SECTION 5.2. Administrative Planning

In recognition of the importance to successful Project implementation of the Conditions Precedent contained in Section 4.1(c) through (g), above, Grantee will continue throughout the Project, except as A.I.D. shall otherwise agree in writing, to comply with the substance of the presentations made to A.I.D. in satisfaction of those Conditions

Article 5: Special Covenants (CONT'D)

-5

SECTION 5.3. Personnel Incentives

In recognition of the importance to successful Project implementation of the Grantee's recruiting and retaining qualified Jordanian personnel to be assigned to Project work in the Jordan Valley, the Grantee will, during the life of the Project, offer levels of incentives and allowances, on a basis comparable to those provided to personnel of other Government of Jordan ministries, necessary to such recruitment and retention

Article 6: Procurement SourceSECTION 6.1. Foreign Exchange Costs

Disbursement pursuant to Section 7.1 will be used exclusively to finance the costs of goods and services required for the Project having their source and origin in the United States (Code 000 of the A.I.D. Geographic Code Book as in effect at the time orders are placed or contracts entered into for such goods or services) ("Foreign Exchange Costs"), except as A.I.D. may otherwise agree in writing, and except as provided in the Project Grant Standard Provisions Annex, Section C.1(b) with respect to marine insurance.

SECTION 6.2. Local Currency Costs

Disbursement pursuant to Section 7.2. will be used exclusively to finance the costs of goods and services required for the Project having their source and, except as A.I.D. may otherwise agree in writing, their origin in the Hashemite Kingdom of Jordan ("Local Currency Costs").

Article 7: DisbursementSECTION 7.1. Disbursement for Foreign Exchange Costs

(a) After satisfaction of conditions precedent, the Grantee may obtain disbursements of funds under the Grant for the Foreign Exchange costs of goods or services required for the Project in accordance with the terms of this Agreement, by such of the following methods as may be mutually agreed upon:

(1) by submitting to A.I.D. with necessary supporting documentation as prescribed in Project Implementation Letters,

Article 7: Disbursements (CONT'D)

-6

(A) requests for reimbursement for such goods or services, or,
 (B) requests for A.I.D. to procure commodities or services in
 Grantee's behalf for the Project; or,

(2) by requesting A.I.D. to issue Letters of
 Commitment for specified amounts (A) to one or more U.S. banks,
 satisfactory to A.I.D., committing A.I.D. to reimburse such
 bank or banks for payments made by them to contractors or
 suppliers, under Letters of Credit or otherwise, for such goods
 or services, or (B) directly to one or more contractors or
 suppliers, committing A.I.D. to pay such contractors or
 suppliers for such goods or services.

(b) Banking charges incurred by Grantee in connection with
 Letters of Commitment and Letters of Credit will be financed
 under the Grant unless Grantee instructs A.I.D. to the
 contrary. Such other charges as the Parties may agree to may
 also be financed under the Grant.

SECTION 7.2. Disbursement for Local Currency Costs

(a) After satisfaction of conditions precedent, the
 Grantee may obtain disbursements of funds under the Grant for
 Local Currency Costs required for the Project in accordance
 with the terms of this Agreement, by submitting to A.I.D., with
 necessary supporting documentation as prescribed in Project
 Implementation Letters, requests to finance such costs.

(b) The local currency needed for such disbursements may
 be obtained:

(1) by acquisition by A.I.D. with U.S. Dollars by
 purchase; or

(2) by A.I.D. (A) requesting the Grantee to make
 available the local currency for such costs, and (B) thereafter
 making available to the Grantee, through the opening or
 amendment by A.I.D. of Special Letters of Credit in favor of
 the Grantee or its designee, an amount of U.S. Dollars
 equivalent to the amount of local currency made available by
 the Grantee, which dollars will be utilized for procurement
 from the United States under appropriate procedures described
 in Project Implementation Letters.

The U.S. dollar equivalent of the local currency made
 available hereunder will be, in the case of subsection (b) (1)

Article 7: Disbursements (CONT'D)

-7

above, the amount of U.S. dollars required by A.I.D. to obtain the local currency, and in the case of subsection (b)(2) above, an amount calculated at the rate of exchange specified in the applicable Special Letter of Credit Implementation Memorandum hereunder as of the date of the opening or amendment of the applicable Special Letter of Credit.

SECTION 7.3. Other Forms of Disbursement

Disbursements of the Grant may also be made through such other means as the Parties may agree to in writing.

SECTION 7.4. Rate of Exchange

Except as may be more specifically provided under Section 7.2., if funds provided under the Grant are introduced into the Hashemite Kingdom of Jordan by A.I.D. or any public or private agency for purposes of carrying out obligations of A.I.D. hereunder, the Grantee will make such arrangements as may be necessary so that such funds may be converted into currency of the Hashemite Kingdom of Jordan at the highest rate of exchange which, at the time the conversion is made, is not unlawful in the country.

Article 8: MiscellaneousSECTION 8.1. Communications

Any notice, request, document, or other communication submitted by either Party to the other under this Agreement will be in writing or by telegram or cable, and will be deemed duly given or sent when delivered to such party at the following addresses:

To the Grantee:

Mail Address: National Planning Council
Amman, Jordan

Alternate address for cables: NPC, Amman-Jordan

To A.I.D.:

Mail Address: U.S.A.I.D./Jordan
American Embassy
Amman, Jordan

Article 8: Miscellaneous (CONT'D)

-8

Alternate address for cables: AMEMBASSY, (USAID),
AMMAN, JORDAN

All such communications will be in English, unless the Parties otherwise agree in writing. Other addresses may be submitted for the above upon the giving of notice.

SECTION 8.2. Representatives

For all purposes relevant to this Agreement, the Grantee will be represented by the individual holding or acting in the Office of the President, National Planning Council and A.I.D. will be represented by the individual holding or acting in the Office of the Mission Director, A.I.D. Mission to Jordan, each of whom, by written notice, may designate additional representatives for all purposes other than exercising the power under Article 2 to revise elements of the amplified description in Annex 1. The names of the representatives of the Grantee, with specimen signatures, will be provided to A.I.D., which may accept as duly authorized any instrument signed by such representatives in implementation of this Agreement, until receipt of written notice of revocation of their authority.

SECTION 8.3. Standard Provisions Annex

A "Project Grant Standard Provisions Annex" (Annex 2) is attached to and forms part of this Agreement.

IN WITNESS WHEREOF, the Grantee and the United States of America, each acting through its duly authorized representative, have caused this Agreement to be signed in their names and delivered as of the day and year first above written.

THE HASHEMITE KINGDOM OF JORDAN

BY: _____
TITLE Secretary General
National Planning Council

THE UNITED STATES OF AMERICA

BY: _____
TITLE: Ambassador

ANNEX 1 TO PROJECT AGREEMENT

PROJECT DESCRIPTION

A. Project Objectives

(a) Establish and institutionalize a center capable of developing and disseminating appropriate agricultural technologies for increasing vegetable and fruit production in the Jordan Valley.

(b) Develop innovative systems for (1) identifying both short-term and long-term agricultural production problems in the Jordan Valley, (2) assembling the resources needed to carry out adaptive research on these problems, (3) integrating research results with other relevant scientific information; and (4) presenting the results in a format which will be useful to Valley farmers, emphasizing smallholders.

(c) Provide a functioning model of effective problem-solving research and extension which can (with minimum modification) be applied to all the research and extension activities of Jordan's Ministry of Agriculture.

These objectives will be accomplished through efforts directed at agricultural problems and weaknesses in the Valley. Through a direct A.I.D. contract with a U.S. university, and on terms acceptable to the Government of Jordan, technical assistance in such fields as horticulture, plant pathology, pest management, soils and water, extension, and agriculture economics will be provided to assist in the establishment of an applied agricultural research and extension center in the Jordan Valley. This assistance will focus upon alleviating the major identified constraints to increased yields and productivity which are:

- Plant pests and diseases, especially the tomato leaf curl virus and vegetable nematodes and insects.

Inefficient production and management practices including inappropriate field preparation techniques, improper use and application of fertilizers and pesticides, and suboptimal cultural practices.

Soil and water management problems, including the lack of information on the quantity, frequency and quality of improper soil leaching practices, and over-irrigation often compounded by poor drainage.

The Project will establish a cadre of trained Jordanians, and an administrative structure (the center referred to above), with supporting infrastructure, capable of continuing an effective, integrated applied research and extension program. The expected Jordanian staffing will include a Project Director, a training specialist, and eight senior agriculturalists divided equally between applied research and extension. They will be backed by eight junior agriculturalists. The latter will assume responsibility for elements of the program and move into senior positions as they become more accomplished and as vacancies arise. In addition, ten extension agents will be assigned to the Project and be responsible for building close relationships with farmers, informing applied researchers and subject matter specialists of farmers' problems, and bringing new knowledge, methods and techniques to the farmer by demonstrations, seminars, field days and other educational means. These extension agents, and all other Jordanian staff working on the Project, will be responsible to the Project Director.

B. Project Components

The Project consists of the following major elements:

1. A.I.D. Contribution:

(a) Technical Assistance

A.I.D. will provide a total of approximately 16 person years of long- and short-term technical assistance. Specialists will be provided in the following areas:

- Integrated Pest Management
- Horticulture
- Production Economics
- Soil, Water and Irrigation
- Extension and Agricultural Information

(b) Training

All twenty eight of the Jordanian professional staff will receive some form of training. The training component of the Project is currently envisioned as follows:

<u>Type</u>	<u>No. of Parti- cipants</u>	<u>Months per Par- ticipant</u>	<u>Total Months</u>
1. Short-term Training			
a) In Jordan	30	4.5	135.0
b) US & Third Countries	6 15	3.0 4.5	18.0 67.5
2. Long-Term Academic			
a) In Jordan	8	18.0	144.0
b) US & Third Countries	8	19.5	156.0
3. English Training In Jordan	10	N.A.*	N.A.*
4. Special Training	5	1.0-2.0	6.0
5. Special Training in USDA Courses or at International Centers	5	3.5	17.5
TOTAL	N.A.	N.A.	544.0

The U.S. contractor, the Project Director and A.I.D. will periodically review training requirements, and make mutually agreeable adjustments, if necessary, to the above training program.

* N.A. = Not Applicable. Some participants will receive more than one type of training.

(c) Commodities

A soil and water analysis laboratory will be equipped. Specifically, necessary scientific equipment for these laboratories will also be provided with Project funds. Also, the Project will fund such other necessary items as vehicles, irrigation equipment, greenhouses, plastic houses, tractors and farm implements.

2. Government of Jordan Contribution:

(a) Personnel

The Jordanian professional-level staff is estimated at 28 persons with an input of approximately 1500 person months. Some 24 additional support personnel (laboratory technicians, drivers, mechanics, secretaries and laborers) are also budgeted.

(b) Facilities

The Project offices and two laboratories will be at the Deir Alla Agricultural Experiment Station. The GOJ will cause to be constructed the necessary office space (approximately 175M²) for the Project staff. Satellite research sites will be located in Development Area 27 (Farm Unit 86) or a mutually agreeable alternative. Development Area 17 (Farm Units 60 and 61), and the Agricultural Experiment Station at Ghor Safi. Additionally, about 10 dunums will be set aside at the Deir Alla Station for Project use along with joint use with other MOA scientists of the existing greenhouse. Also, GOJ will provide two three bedroom houses (and their utilities and maintenance for contract advisors use when spending nights in the Valley; one at Ghor Safi and one near Deir Alla. Six two-to-three bedroom furnished houses will be provided for married Jordanian Project staff; one at Ghor Safi and five near Deir Alla. Two additional furnished houses will be provided near Deir Alla for use by single Jordanian Project staff. One office in the Ministry of Agriculture, Amman, will be assigned for use by the Project staff.

(c) Vehicle Licencing and Maintenance

The U.S. contribution to the Project includes the purchase of 15 vehicles in 1892 and the replacement of these vehicles near the end of the Project life to support continued operation of the center. The GOJ has agreed that these vehicles will be available to Project personnel on a timely

(c) Vehicle Licencing and Maintenance (CONT'D)

-13

basis through the issuance of suitable licence 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. All vehicles will become the property of GOJ upon Project termination.

(d) Participant Training

The GOJ will furnish round-trip international air fare with respect to participant training funded under this Project.

C. Project Cost Estimate and Financial Plan

The total Project cost is estimated at U.S. \$ 9,863,000, of which A.I.D.'s contribution is \$ 5,620,000 and the GOJ's is the equivalent of \$ 4,243,000. Table 1 to this annex is the summary Project budget.

D. Project Implementation Plan

The selected university, whose services are expected to be provided under a direct A.I.D. Project, will serve the Government of Jordan in an advisory and supporting role. Primary responsibility for project implementation will rest with the appointed GOJ Project Director. It is intended that the Project Director, acting jointly with the senior U.S. advisor, will have flexibility in adjusting the proposed training schedule, technical assistance mix and timing, and commodity mix to enhance progress towards achieving the Project's stated purpose and objectives.

Implementation details for specific Project components will be the subject of Project Implementation Letters, as noted in Article A of the Project Grant Standard Provisions, Annex 2, to the Project Grant Agreement. The following implementation plan lists, in summary, key target dates for Project related activities:

<u>ACTIVITY</u>	<u>DATE</u>
Signature of Grant Agreement	09/30/81
Issuance of Implementation Letter No. 1	10/15/81
PIO/T* Issued	11/01/81

* Project Implementation Order/Technical Services

Meet Conditions Precedent to First Disbursement	12/31/81
Title XII Contractor Selected and Contract Signed	12/20/81
Project Director on Job, full time	01/01/82
Contract Signed with U.S. University	01/04/82
Initial Procurement Initiated	01/15/82
Arrival of Senior Advisor (Chief of Party)	05/01/82
Research sites and land prepared for work	05/15/82
Offices organized and furnished for all project staff in Amman, and Deir Alla	06/01/82
First Group of Selected Project staff commence Graduate Program	09/01/82
First In-service training of 10 Project Staff Begin Program in Jordan	09/15/82
First Project Evaluation	09/30/82
7 Project staff selected for foreign short-term training.	10/01/82
Soils and Water and Plant Tissue and Pest Labs in full operation	12/01/82
Second in-service training group of 10 Project staff begins program in Jordan	02/01/83
Project Director Commences Short-Term Trainin in U.S.	07/01/83
Third In-Service Training Program for 10 selected-Staff in Jordan Begins.	09/15/83
Second Group of Selected Project Staff Commence Graduate Program	09/01/83
Mid-Term Project Evaluation	04/01/84
Third Group of Selected Project Staff Commence Graduate Program.	09/01/84
Project Termination	08/31/86
Final Project Evaluation	08/01/87

E. Project Coordination

Coordination of Project activities with organizations* outside the Ministry of Agriculture will be the responsibility of the Project Director. Coordination within the Ministry will be facilitated by a Project Coordination Committee made up of representatives from related Ministry Departments.

* These include the Higher Agricultural Council, the Jordan Valley Authority, the Agricultural Credit Corporation, the Jordan Valley Farmers Association, the Jordan Cooperative Organization, the Agricultural Marketing Organization, the Natural Resources Authority and the Faculty of Agriculture University of Jordan.

F. Project Evaluation

Two evaluations are to occur during the life of the project. The first will take place about September 1982, i.e., nine months after the Project Director assumes his duties and initiation of commodity procurement commences, and five months after arrival of the U.S. Senior Advisor. This evaluation will focus on those actions required to initiate Project implementation and judged crucial to Project operations, such as staffing, procurement, training plans and Project administration. The evaluation, to be conducted by GOJ, USAID and contractor personnel working in Jordan, should also be alert to developments and potential actions identified as having significance for Project operations and Project objectives in coming years.

The second evaluation is scheduled for about April 1984, i.e. after the second complete cropping season under the Project. This review will assess, in addition to the topics covered in the preceding evaluation, Project research, extension and training activities, progress in institutionalization of the Center, impact on the Project target group, and other factors identified as crucial for successful attainment of the Project purpose and goal. The evaluation will be conducted by those officials responsible for the first review and by two outside evaluators.

A final, in-depth assessment of the Project is scheduled for one year after the PACD to review overall Project achievements and its contribution to increasing Jordan Valley production of fruits and vegetables, and to identify factors crucial to Project success and/or shortfalls as well as lessons learned from the Project which can be of use to the GOJ and A.I.D. in similar, subsequent endeavors. A.I.D. will attempt to fund the cost of this final evaluation from resources other than those available under this Project. The final evaluation team is expected to consist of the two outside evaluators who were involved in the second evaluation, together with GOJ, A.I.D. and contractor personnel.

TABLE 1
SUMMARY BUDGET
U.S. DOLLARS (000)

	<u>FY82</u>	<u>FY83</u>	<u>FY84</u>	<u>FY85</u>	<u>FY86</u>	<u>Total</u>
U.S. CONTRIBUTION						
Technical Assistance						
Expatriate Service	207	731	633	703	660	2,934
Admin Asst (National)	3	9	10	10	11	43
Total	210	740	643	713	671	2,977
TRAINING						
US Long-Term	-	15	141	192	22	370
US Short-Term	-	163	328	-	-	491
University of Jordan	-	2	14	17	-	33
In service	-	9	5	-	-	14
English Training	-	4	-	-	-	4
Contingency, Overhead, etc	-	24	64	27	3	118
Total	-	217	552	236	25	1,030
COMMODITIES	790	590	4	4	202	1,590
EVALUATION			23			23
Total U.S.	1,000	1,547	1,222	953	898	5,620
GOJ CONTRIBUTION						
Personnel Salaries	254	539	593	652	658	2,696
Other	257	335	357	306	292	1,547
Total GOJ	511	874	950	958	950	4,243
Total USAID and GOJ	1,511	2,421	2,172	1,911	1,848	9,863

THE HASHEMITE KINGDOM
OF JORDAN
NATIONAL PLANNING COUNCIL
AMMAN

Tel. 44466 - 44470
Tlx : 21319 - P.O. Box 555
Teleg. NPC - Amman



المملكة الأردنية الهاشمية

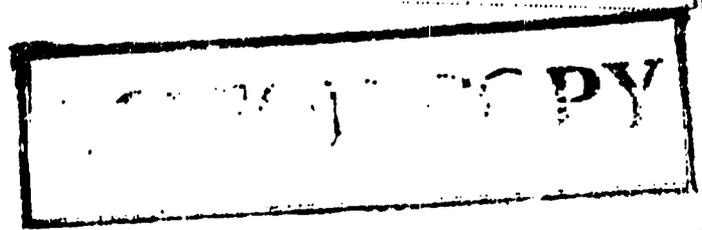
الجلس القومي للتخطيط
عمان

الهاتف : ٤٤٤٦٦ - ٤٤٤٧٠
تلكس : ٢١٣١٩ - ص. ب. ٥٥٥

No. 58/1/4591
Date 22/9/1981
Ref. _____

الرقم _____
التاريخ _____
المرادف _____

Mr. Walter Bollinger
Director
USAID / Jordan
c/o American Embassy
AMMAN / JORDAN.



ATP

Dear Mr. Bollinger:

This letter has reference to my past discussions concerning the possibility of USAID providing assistance in the establishment of an agriculture research and extension center for fruits and vegetables and emphasizing applied research and extension.

The Project design prepared by Washington State University is acceptable in principle. It would be appreciated if USAID would provide grant assistance in the amount of U.S.\$5.6 million to assist in the establishment of such a center. The Government of Jordan plans to provide an equivalent amount of approximately U.S.\$3.9 million as in kind contribution.

Sincerely yours,

Handwritten signature
President.

c.c.H.E.Minister of Agriculture

PROJECT AUTHORIZATION

Name of Country : Hashemite Kingdom of Jordan
 Name of Project : Jordan Valley Agricultural Services
 Number of Project: 278-0241

1. Pursuant to Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Jordan Valley Agricultural Services Project for Jordan involving planned obligations of not to exceed \$5,620,000 in grant funds over a five year period from date of authorization, 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.
2. The Project consists of establishing and institutionalizing a viable center capable of developing and disseminating appropriate agriculture technology for vegetable and fruit production in the Jordan Valley.
3. The Project Agreement, which may be negotiated and executed by the officer(s) 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. Source and Origin of Goods and Services

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

- b. Conditions Precedent to Disbursement

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement, the Cooperating Country shall furnish, in form and substance satisfactory to A.I.D., and in addition to the standard legal opinion and specimen signature(s):

(1) A statement of the name of the person within the Ministry of Agriculture who will serve full-time as the Jordanian Project Director, whose duties will commence no later than January 1, 1982, together with a statement of that official's authority, duties and responsibilities.

(2) Concerning the Center to be established under this Project, a statement of its planned date of administrative establishment; its planned relationships with the Ministry of Agriculture's regional directorates and the Department of Research and Extension; and its organizational chart, to include the estimated dates for the filling of all positions.

(3) Assurances that adequate office space and laboratory space for both Jordanian and U.S. advisory project staff will be in place and ready at Deir Alla and Amman on a timely basis.

(4) Evidence that adequate housing in the Jordan Valley for the use of Project advisors and for Jordanian staff to be assigned to the Center will be made on a timely basis; and confirmation that maintenance and utilities with respect to such housing will be Grantee responsibilities under this Agreement.

(5) Evidence that suitable land for research sites is available to the Ministry of Agriculture, or will be made available on a timely basis.

c. Special Covenants

(1) Administrative Planning

Grantee will continue throughout the Project, except as A.I.D. shall otherwise agree in writing, to comply with the substance of the presentations made to A.I.D. in satisfaction of the Special Conditions Precedents to Disbursement, as set forth above.

(2) Personnel Incentives

Grantee will, during the life of the Project, offer levels of incentives and allowances necessary to recruitment and retention of qualified Jordanian personnel to be assigned to Project work in the Jordan Valley.

d. Waivers

The following waivers to A.I.D. regulations are hereby approved:

(1) Third-Country Training

Up to \$100,000 of Project funds may be spent for participant training in countries included in A.I.D. Geographic Code 899.

(2) Shelf-Item Procurement

Up to \$150,000 of Project funds may be spent for procurement in the Cooperating Country of plastic structures and greenhouses having their origin in A.I.D. Geographic Code 899.

Approved: Walter G. Bollinger

Walter G. Bollinger, Director
U.S.A.I.D./Jordan

Date: Sept. 27, 1981

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

AMERICAN EMBASSY
AMMAN - JORDAN

وكالة الولايات المتحدة للامانة الدولي
السفارة الاميركية
عمان - الاردن

NATIONALITY WAIVER

WAIVER CONTROL NO: 278/001

ACTION MEMORANDUM FOR THE DIRECTOR, USAID/JORDAN

THROUGH: Lois Richards, Deputy Director 

FROM : Amos D. Jones, Office of Technical Projects

PROBLEM: Request for Nationality Waiver from Geographic Code 000 (U.S. only) and the Cooperating Country, to Geographic Code 935.

- (a) Cooperating Country: Jordan
- (b) Authorizing Document: Project 278-0241
- (c) Project: Jordan Valley Agricultural Services
- (d) Nature of Funding: Development Grant (ESF)
- (e) Description of Goods: Specialized training
- (f) Approximate Value: \$ 100,000
- (g) Probable Origin: Middle East and North Africa
- (h) Waivers Previously Granted from Nationality Requirements: None.

DISCUSSION: Training of Cooperating Country staff in agricultural research and extension is a major component of the Project. The budget provides for 544 person-months of various types of training. U.S. and host country research/education institutions will be the primary source of this training. However, some very specialized training may be more appropriate at other research/educational institutions in the Middle East or North Africa with agricultural production problems and conditions similar to those of host country. Minor short-term training in Europe, e.g., Holland, is another possibility.

PRIMARY JUSTIFICATION: As the Project is implemented and host country staff are selected and assigned, it is anticipated that some specialized training needs will be identified that host country institutions cannot adequately fulfill and that can be better and more economically provided by research/educational institutions near the cooperating country rather than those in the United States.

RECOMMENDATION: For the above reasons, I conclude that Nationality Waiver as requested above is necessary to the attainment of U.S. foreign policy objectives and objectives of the foreign assistance program. I recommend that you so certify by approving this request from waiver as part of the Project Authorization.

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

AMERICAN EMBASSY
AMMAN - JORDAN

وكالة الولايات المتحدة للامانة الدولي
السفارة الاميركية
عمان - الاردن

PROCUREMENT ORIGIN WAIVER

WAIVER CONTROL NO: 278/002

ACTION MEMORANDUM FOR THE DIRECTOR, USAID/JORDAN

THROUGH: Lois Richards, Deputy Director *ل.ال*

FROM : Amos D. Jones, Office of Technical Projects

PROBLEM: Request for Procurement Origin Waiver from Geographic Code 000 (U.S. only) and the Cooperating Country, to Geographic Code 935.

- (a) Cooperating Country: Jordan
- (b) Authorizing Document: Project 278-0241
- (c) Project: Jordan Valley Agricultural Services
- (d) Nature of Funding: Development Grant (ESF)
- (e) Description of Goods: Plastic Structures and Greenhouses
- (f) Approximate Value: \$ 150,000
- (g) Probable Origin: United Kingdom or France
- (h) Waivers Previously Granted for Commodity Procurement: None.

DISCUSSION: One phase of the Project's vegetable production research will be conducted using facilities like those being used by Valley farmers. Off-the-shelf procurement in Jordan of necessary facilities is envisioned to ensure the validity and applicability of test results. The major components of the tubular-framed, plastic covered hot-houses, widely used by Valley farmers, are imported from Europe. Mission believes there are no comparable U.S. made facilities. Additionally, private dealers in Jordan can readily supply spare components and repair services for these facilities. Estimated cost of each facility is about \$ 6000, thus exceeding the normal \$ 2,500 limit on shelf-item procurement of non-U.S. origin.

PRIMARY JUSTIFICATION: The subject equipment is essential to this A.I.D.-financed project, is not available from the authorized origin, and non-A.I.D foreign exchange is not available for the purpose.

RECOMMENDATION: For the above reasons, I conclude that procurement from the origin requested above is necessary to the attainment of U.S. foreign policy objectives and objectives of the foreign assistance program. I recommend that you so certify by approving this request for waiver as part of the Project Authorization.

Department of State

OUTGOING
TELEGRAMSPAGE 01 OF 01 DATE 04-19-81
ORIGIN 010

RUMJ 05010 0101541

STATE 01007

01001

ORIGIN OFFICE 0100-02
 INFO NEFD-04 A-NE-01 NEOP-02 PPEC-01 PDR-01 PFTB-03 GC-01
 PFA-01 GCFL-01 GCNE-01 CTA 10 AADS-01 BIFA 01 CMUJ-02
 CIR-01 DSWG-02 CNG-01 AGRI-01 RLO-01 7041 AD

INFO OCT-03 /035 R

DRAFTED BY AID/NE/TECH/AD:L. VOTH:AN
 APPROVED BY AID/A-AA/NE:ALFRED D. WHITE
 AID/NE/JLS:D. MORRISSEY
 AID/NE/TECH:A. WILBURN
 AID/NE/DP:B. LANGHAID
 AID/NE/DP:S. CHERNENKOFF (SUBS)
 AID/PD:R. BELL (SUBS)
 AID/GC/NE:M. KLEINJAN (SUBS)
 AID/NE/TECH/AD:K. SHERPER
 AID/NE/TECH:G. GARDNER (SUBS)
 USDA/OICD/TA:C. DOKE (INFO)
 AID/BIF/D/S:R. HUSCHMANN (INFO)
 AID/CH/ROD/NE:W. KNIGHT (SUBS)

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ADM AID

E.O. 12065: N/A

TAGS:

SUBJECT: NEAC REVIEW OF PID ON JORDAN VALLEY AGRICULTURAL
 SERVICES (278-0241)

REF: (A) STATE 068564 (B) AMMAN 02059

1. THE SUBJECT MEETING WAS HELD ON WEDNESDAY, APRIL 1, 1981.
2. THE NEAR EAST ADVISORY COMMITTEE (NEAC) COMMENTS THE MISSION ON THE PREPARATIONS WHICH HAVE GONE INTO THE PID AND APPROVED THE PID FOR DESIGN OF THE PROJECT PAPER (PP). CERTAIN FACTORS WERE NOTED WHICH WILL NEED TO BE CONSIDERED BY THE DESIGN TEAM AND INCORPORATED INTO THE PP. SOME OF THESE HAVE BEEN REFERRED TO IN THE REFTELS BUT ARE REPEATED HERE.
3. THE NEAC CONCURS ON THE TITLE XII COLLABORATIVE ASSISTANCE MODE OF DESIGN AND IMPLEMENTATION OF THE PROJECT.
4. WHEN THE PROJECT PAPER IS COMPLETED THE USAID IS AUTHORIZED BY RE-DELEGATED AUTHORITY FROM THE A-AA/NE TO APPROVE AND AUTHORIZE THE JORDAN VALLEY AGRICULTURAL SERVICE PROJECT (278-0241) UP TO A MAXIMUM OF TEN MILLION DOLLARS. MISSION IS REMINDED THAT A CONGRESSIONAL ADVICE IS NECESSARY. PLEASE CABLE DETAILS FOR PREPARATION OF ADVICE BY AID/W JUST PRIOR TO MISSION APPROVAL. SEE PARA 14 FOR DETAIL.
5. THE NEAC CONTINUES TO BELIEVE THERE IS INSUFFICIENT EMPHASIS ON THE AGRICULTURAL EXTENSION ASPECT OF THE PID. THE NEAC RECOMMENDS THAT THE PP DESIGN TEAM STRENGTHEN THE AGRICULTURAL EXTENSION PORTION OF THE PROJECT INCLUDING LINKAGES WITH THE FARMERS I.E. DATA COLLECTION, INTERPRETATION AND FEEDBACK BETWEEN END-

USER AND APPLIED RESEARCH. THE NEAC COMMENTS THAT THAT REFTEL B PARA ONE INDICATES THAT THE LETTER AGENTS WILL BE SELECTED FOR THE PROJECT WHICH WILL FACILITATE THE PROJECT BUT STILL WITHIN AN AGENCY WORK INSTITUTION WITH WHICH THE PROJECT WILL NEED TO HAVE STRONG LINKAGES TO THE FARMERS. THE SHORT COURSES IN JORDAN FOR THE AGENTS AND THEIR OWN DEMONSTRATION PROGRAMS NOTED IN REFTEL B WILL NEED SKILLED GUIDANCE AND DEVELOPMENT TO BE EFFECTIVE AND AVOID MULTIPLICATION OF IN-HOUSE PROBLEMS. THE RECENT PES ED-4 ON THE JORDAN VALLEY FARMERS ASSOCIATION (2165) AND CREDIT FOR JORDAN VALLEY FARMERS (0207) INDICATED THAT EXTENSION IN THE VALLEY WAS WEAK AND PARTIALLY RESPONSIBLE FOR LACK OF PROGRESS ON THE TWO JVFA PROJECTS. THE MAY 12, 1980 REPORT ON "MARKETING POLICY FOR FRESH VEGETABLES AND FRUITS IN JORDAN" BY CHEMUNICS INTERNATIONAL ALSO POINTS OUT THE NEED TO DEVISE AN EFFECTIVE EXTENSION SERVICE. END FYI.

6. RELATIONSHIPS BETWEEN THE PROJECT AND OTHER GOVERNMENTAL AND QUASI-OFFICIAL ENTITIES IN THE JORDAN VALLEY INCLUDING JVA, JVFA, UNIV. OF JORDAN, AND COOPS WILL NEED TO BE FULLY DESCRIBED IN THE PP. WHERE FORMAL LINKAGE IS NECESSARY TO PROJECT GOALS APPROPRIATE COVENANTS OR CONDITIONS PRECEDENTS SHOULD BE INCLUDED.

7. THE RECEPTIVITY OF PROJECT RESEARCH RESULTS WILL DIRECTLY IMPACT ON THE EFFECTIVE MARKETING OF PRODUCE FROM THE VALLEY. THUS, THE PP DESIGN TEAM SHOULD DETERMINE METHODS BY WHICH THIS PROJECT CAN MAINTAIN LINKAGES WITH MARKETING SYSTEMS IN THE VALLEY SO THAT THE APPLIED RESEARCH AND EXTENSION EFFORTS MAY BE RESPONSIVE TO MARKETING TRENDS AND EFFECTIVELY STIMULATE PRODUCTION. MISSION SHOULD HAVE PRODUCTION ECONOMIST ANALYZE AND DEVELOP THIS ASPECT.

8. ACCESS TO FACILITIES IN THE VALLEY FOR PROJECT USE, E.G. APPLIED RESEARCH CENTER, LABORATORIES, AND IRRIGATION WATER, SHOULD BE INCLUDED IN THE PP AND WHERE

NECESSARY, INCLUDED IN COVENANTS, OR CONDITIONS PRECEDENT TO ENSURE THEIR AVAILABILITY.

9. THE PP SHOULD REVEAL THE EXTENT TO WHICH LAND TENURE PROBLEMS WILL INFLUENCE THE RATE OF ACCEPTANCE AND/OR DEGREE OF UTILIZATION OF THE RESULTS FROM APPLIED RESEARCH AND THE RESULTING EFFECT ON TOTAL VALLEY PRODUCTION. FOR EXAMPLE, HOW FREE ARE TENANTS AND SHARECROPPERS TO DETERMINE CROP SELECTION AND FARM INPUTS?

10. THE PP SHOULD JUSTIFY THAT VEGETABLES AND FRUITS ARE IN FACT THE CROPS WHICH WILL HAVE THE MOST MEANINGFUL INCOME EFFECT ON THE VALLEY FARMERS, TENANTS AND SHARECROPPERS.

11. CAPACITY OF MOA AND STAFF IN THE VALLEY SYSTEM SHOULD BE FULLY DISCUSSED IN THE PP INCLUDING THE DESIRABILITY OF PROVIDING SALARY DIFFERENTIAL TO ATTRACT AND RETAIN QUALITY STAFF.

12. AT THE NEAC, QUESTION WAS RAISED AS TO ADEQUACY OF ID CARDS JORDAN PROVIDES U.S. CONTRACTORS TO PERMIT EASY MOVEMENT WITHIN, TO, AND FROM THE VALLEY AS NECESSARY TO CONDUCT THE WORK OF THE PROJECT. REQUEST CABLE COMMENT.

13. PID IS SILENT ON RESIDENCES OF U.S. CONTRACT TEAM. NEAC BELIEVES EFFECTIVENESS OF TEAM WILL BE SUBSTANTIALLY LESSENED IF IT IS NOT RESIDENT IN VALLEY

UNCLASSIFIED
 BEST AVAILABLE DOCUMENT

UNCLASSIFIED
*Department of State*OUTGOING
TELEGRAM

FORM NO. 64 (REV. 12-11-64) 4.74 052876 W101241
AND ASSURE THAT THIS ASSISTANCE IN VALLEY IS FURNISHED
REQUEST DATE SERVICE AND JUSTIFICATION IF ALTERNATIVE
ARRANGEMENTS ARE PLANNED

14. PURSUANT TO THE AUTHORITY DELEGATED TO AAR NE BY
AID DELEGATION OF AUTHORITY NO. 133 DATED FEBRUARY 1
144 FROM SO, AAR NE HEREBY REDELEGATES TO THE MISSION
DIRECTOR, USAID/JORDAN, AUTHORITY TO APPROVE AND
AUTHORIZE THE JORDAN VALLEY AGRICULTURAL SERVICES
PROJECT (278-0241) IN THE EVENT U.S. ASSISTANCE EXCEEDS
\$5 MILLION, BUT NOT IN EXCESS OF \$10 MILLION. THE
PURPOSE OF THIS REDELEGATION IS TO PERMIT THE MISSION
TO APPROVE THIS PROJECT IN THE EVENT OF A SLIGHT COST
ESCALATION FROM THE ESTIMATED \$4.92 MILLION TO ABOVE
\$5 MILLION, AND NOT TO ADD NEW ELEMENTS. THE AUTHORITY
CONTAINED HEREIN MAY BE EXERCISED ON THE SAME TERMS
AND CONDITIONS AS THOSE SET FORTH IN REDELEGATION OF
AUTHORITY NO. 133.2, DATED FEBRUARY 2, 1979. STOEESSEL

UNCLASSIFIED

VZCZCAMI *
 PP RUEHC
 PP RUEHAM #3061 110 **
 ZNR UUUUU 7ZH
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 FM AMEMBASSY AMMAN
 TO SECSTATE WASHDC PRIORITY 1121
 BT
 INCLAS AMMAN 03061

CLASS: UNCLASSIFIED
 CHRG: AID 4/20/81
 APPRV: AID:DIR:ECHARRELL
 DRFTD: OTP:AJONES:SS
 CLEAR: 1 PRG:DLEAFY
 DISTR: ~~AID-6~~ AMB DCM
 CRU

AIDAC

A.J.12065: N/A
 SUBJECT: NEAC REVIEW OF JORDAN VALLEY AGRICULTURAL
 SERVICE (278-0241)

REF: STATE 93027

1. MISSION PLEASED WITH PROMPT NEAC REVIEW AND PID APPROVAL. COMMENTS SHOULD BE USEFUL TO PP DESIGN TEAM. FOLLOWING ARE MISSION RESPONSES TO REFTEL.
2. PARA 5: PP TEAM IS EXPECTED TO MORE FULLY DEFINE ROLES OF COOPERATING AGENCIES AND EXPAND ON AGRICULTURAL EXPENSION ASPECT OF PROJECT.
3. PARA 9: AID/W IS REFERRED TO FINDINGS OF PES 80-5, AN INTERIM EVALUATION OF THE JORDAN VALLEY DEVELOPMENT EFFORT: 1973-1980, BY DAJANI ET. AL. FOR FULL DISCUSSION OF LAND TENURE WHICH WE BELIEVE FULLY ADDRESSES QUESTION POSED REFTEL. USAID DOES NOT BELIEVE TENURE PATTERNS ARE CONSTRAINT TO TECHNOLOGY DECISIONS.
4. PARA 10: THE IMPORTANCE OF FRUITS AND VEGETABLES IN THE JORDAN VALLEY TO VALLEY FARMERS AND TO THE GOJ HAS BEEN ANALYZED MANY TIMES AND HAS MOST RECENTLY BEEN DISCUSSED IN FY 82-83 CDSS'S, USAID AGRICULTURE SECTOR PAPER OF JANUARY 1980, AND THE PROJECT PAPERS FOR WATER MANAGEMENT TECHNOLOGY, JVFA, AND JVFA CREDIT. SIMILAR DATA WILL BE DEVELOPED FOR THIS PROJECT IN THE FINANCIAL ANALYSIS SECTION OF THE PROJECT PAPER.
5. PARA 12: ONE PROPOSED RESEARCH SITE IS IN A SECURITY AREA. GOJ IS EXPECTED TO PROVIDE ADEQUATE ID CARDS SIMILAR TO THOSE ISSUED CONTRACTORS FOR ACCESS TO NEARBY POTASH PROJECT SITE. DO NOT ANTICIPATE ANY UNUSUAL PROBLEMS AT OTHER RESEARCH SITES.
6. PARA 13: MISSION AGREES CONTRACTOR TEAM RESIDENCE IN VALLEY VERY DESIRABLE TO IMPLEMENT AND CARRY OUT PROJECT. DESIRABILITY OF MOA STAFF LIVING IN VALLEY ALSO APPARENT. IT IS MISSION'S POSITION THAT CONTRACTORS WILL BE REQUIRED TO WORK A FULL 40-HOUR WEEK IN THE VALLEY EXCLUSIVE OF ANY COMMUTING TIME. HOWEVER IT IS NOT POSSIBLE TO SPECIFY RESIDENTIAL ARRANGEMENTS AT THIS DATE. SUCH ARRANGEMENTS WILL BE A MATTER OF EVALUATIONS AND NEGOTIATION WITH MOA, THE MISSION AND THE DESIGN TEAM/CONTRACTOR DURING PREPARATION OF THE

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SHOULD INITIATE IMPROVEMENT IN THE OVERALL EFFECTIVE-
NESS OF THE EXTENSION PROGRAM NOW, AND IN FUTURE
YEARS.

ACTION OFFICE NEJL-03
INFO NEPD-04 NEDP-02 PPCE-01 PDPR-01 PPPB-03 GC-01 GCFL-01
GCNE-01 FM-02 AAST-01 CMGT-02 CTR-02 STAG-02
AGRI-01 RELO-01 ~~TELE-01~~ MAST-01 /031 A1 1124

INFO OCT-01 EB-08 NEA-07 AGRE-00 /B51 W
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FM AMEMBASSY AMMAN
TO SECSTATE WASHDC IMMEDIATE 3271

UNCLAS SECTION 01 OF 03 AMMAN 07009

AIDAC

E.O. 12055: N/A
SUBJECT: JORDAN VALLEY AGRICULTURAL SERVICES
PROJECT, 276-0241

REF: (A) AMMAN 03061, (B) STATE 93027,
(C) AMMAN 6187, (D) AMMAN 2099

SUMMARY: REF A RESPONDED TO SOME OF THE ISSUES AND
CONCERNS RAISED IN PRC AND NEAC REVIEWS OF SUBJECT
PID AS REPORTED IN REFS B AND D. NOW THAT PP IS
BEING FINALIZED, MISSION CAN ADDRESS THESE ISSUES
AND CONCERNS NOT ADDRESSED IN REF A AND ELABORATE
ON SOME OTHERS PREVIOUSLY ADDRESSED THEREIN AND IN
REF D.

1. AS PRESENTLY DESIGNED THE PROJECT WILL HAVE A
LIFE OF PROJECT FUNDING LEVEL OF DOLS 5,600,000.
ALTHOUGH THIS LEVEL IS HIGHER THAN
THE PID ESTIMATE, IT REMAINS WELL WITHIN THE RANGE OF
DELEGATION OF AUTHORITY (REF A) TO APPROVE AND
AUTHORIZE THE PROJECT UP TO A MAXIMUM OF DOLS
10 MILLION. THE DOLS 5.6 MILLION FIGURE WAS IN-
CLUDED IN THE ADVICE OF CHANGE FORWARDED TO AID/W
BY REF C. THE INCREASE IN ESTIMATED LOP FUNDING
COVERS A NEAR DOUBLING IN COMMODITY SUPPORT BASED
ON THE WSU DESIGN TEAM'S REVIEW OF AVAILABLE
EQUIPMENT IN PROJECT RESEARCH FACILITIES, VEHICLES
NEEDED FOR EXTENSION WORK, AND ITEMS NEEDED TO
FURNISH HOUSING FOR TA PERSONNEL IN THE VALLEY.
THERE ARE NO NEW COST ELEMENTS ADDED TO PP FROM
THOSE SHOWN IN PID.

2. THE AGRICULTURAL EXTENSION PORTION OF THE PROJECT
RECEIVES CONSIDERABLE EMPHASIS IN THE PP. ALL U.S.
ADVISORS WILL HAVE EXTENSION BACKGROUNDS IN ADDITION
TO AREA/CROP SPECIALIZATIONS. THE EIGHT SENIOR GOJ
AGRICULTURALISTS WILL BE DIVIDED EQUALLY BETWEEN
APPLIED RESEARCH AND SUBJECT MATTER EXTENSION SPE-
CIALISTS; IN ADDITION, THERE WILL BE TEN FULL-TIME
JORDANIAN EXTENSION AGENTS ASSIGNED TO THE PROJECT
REPORTING DIRECTLY TO THE PROJECT DIRECTOR. THESE
EXTENSION AGENTS WILL BE RESPONSIBLE FOR BUILDING
CLOSE RELATIONSHIPS WITH FARMERS, INFORMING APPLIED
RESEARCHERS AND SUBJECT MATTER EXTENSION SPECIALISTS
OF FARMER'S PROBLEMS, AND BRINGING NEW KNOWLEDGE,
METHODS AND TECHNIQUES TO THE FARMERS BY DEMONSTRATIONS,
SEMINARS, FIELD DAYS AND OTHER EDUCATIONAL
MEANS. THUS, 14, OR HALF, OF TOTAL GOJ STAFF IS
TO WORK IN EXTENSION AS CONTRASTED WITH RESEARCH
AND/OR ADMINISTRATIVE FUNCTIONS. PROJECT TRAINING
PROGRAM FEATURES SIGNIFICANT EMPHASIS ON CONTINUOUS
TRAINING FOR EXTENSION PERSONNEL. THIS, COUPLED
WITH POSSIBLE INCENTIVES AND ADDITIONAL ALLOWANCES,

3. GOJ PROJECT DIRECTOR TO BE RESPONSIBLE FOR
COORDINATION BETWEEN THE PROJECT AND OTHER GOVERN-
MENTAL AND OFFICIAL ENTITIES IN THE JORDAN VALLEY.
AGENCIES/ORGANIZATIONS THAT ARE OF CONCERN INCLUDE
THE HIGHER AGRICULTURAL COUNCIL, JVA, JVFA, AGRI-
CULTURAL CREDIT CORPORATION, THE AGRICULTURAL
MARKETING ORGANIZATION, JORDAN COOPERATIVE ORGANI-
ZATION, NATURAL RESOURCES AUTHORITY, AND THE FACULTY
OF AGRICULTURE, UNIVERSITY OF JORDAN. THE FACT THE
PROJECT DIRECTOR HAS BEEN THE DEPUTY DIRECTOR OF
RESEARCH IN THE MOA AID IS A FORMER MEMBER OF THE
FACULTY OF AGRICULTURE, SHOULD FACILITATE HIS
COORDINATION RESPONSIBILITIES. AS AID/W AWARE WSU
WAS CONTRACTOR IN CONCLUDED AID PROJECT TO DEVELOP
FACULTY, AND WE EXPECT SEVERAL PROJECT PERSONNEL TO
HAVE PREVIOUS EXPERIENCE ON THE FACULTY. FINALLY
MOA HAS APPROVAL AUTHORITY OVER THE IMPORTATION AND
USE OF PESTICIDES THROUGHOUT JORDAN, AND ACCORDINGLY
WORKS CLOSELY WITH JVFA WHICH IS AN IMPORTANT
DISTRIBUTOR OF AGRICULTURAL INPUTS IN THE VALLEY.
PROJECT RECOMMENDATIONS ON FERTILIZER AS WELL AS
PESTICIDES SHOULD THEREFORE REACH JVFA.FYI, JVA
HAS ALREADY COMMITTED ITSELF TO PROVIDING TWELVE
HOUSES IN THE VALLEY TO BE USED BY THE PROJECT STAFF
AND THE PROJECTS' ADVISORS. END FYI.

4. RE EFFECT OF RESEARCH RESULTS AND THEIR IMPACT
ON MARKETING IN THE VALLEY, PP LIKE PID, DOES NOT
CONTAIN SPECIFIC MARKETING COMPONENT. ACTIVITIES
PLANNED UNDER THIS PROJECT HAVE BEEN DISCUSSED AND
CLOSELY COORDINATED WITH THE VALLEY AGRICULTURAL
MARKETING ADVISOR FROM THE U.S. THROUGH THE MOA

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ACTION AID-35

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PROVIDED IN EARLIER REPORTS. SIGNIFICANT DATA INCLUDE: (A) THE VALLEY'S FRUITS AND VEGETABLES FORM THE MAJORITY OF JORDAN'S AGRICULTURAL EXPORTS AND CONSTITUTE OVER 25 PERCENT OF TOTAL COMMODITY EXPORTS; (B) VEGETABLES AND FRUITS COMPRISE TWO-THIRDS OF THE CROP DISTRIBUTION IN THE VALLEY, AND (C) TOMATO PRODUCTION ACCOUNTS FOR ABOUT 35 PERCENT OF VALLEY VEGETABLE PRODUCTION.

ACTION OFFICE NEJL-03
INFO NEPD-04 NEOP-02 PPCE-01 PDPR-01 PPPD-03 GC-01 GCFL-01
GCNE-01 FM-02 AAST-01 CMGT-02 CTR-02 STAG-02 STXI-01
AGRI-01 RELO-01 TELE-01 MAST-01 /031 A1 1124

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FM AMEMBASSY AMMAN
TO SECSTATE WASHDC IMMEDIATE 3272

UNCLAS SECTION 02 OF 03 AMMAN 07009

DENTER FOR POST HARVEST STUDIES. IT HAS BEEN AGREED THAT MARKETING-RELATED ACTIVITIES OF PROJECT EXTENSION EFFORTS SHALL INCLUDE HARVESTING METHODS, FIELD GRADING AND PACKING, AND REDUCING FIELD LOSSES UP TO THE CROPS' DELIVERY TO THE GRADING AND PACKING CENTERS. AT THIS POINT THE UN-SUPPORTED PROGRAM TAKES OVER. IT IS ANTICIPATED THAT AS A DIRECT RESULT OF THE PROJECT THE OVERALL QUALITY OF PRODUCE IN THE VALLEY WILL IMPROVE THEREBY OFFERING A BETTER MARKET PRODUCT. FURTHER, PP INDICATES THAT IMPROVED TECHNIQUES OF PEST MANAGEMENT SHOULD ENABLE JORDAN VALLEY FARMERS TO MAKE BETTER USE OF COMPARATIVE ADVANTAGE VALLEY CLIMATE GIVES VIS-A-VIS MARKETS IN GULF. FYI, TO REDUCE CROP LOSSES DUE PESTS JORDANIAN FARMERS HAVE BEGUN PLANTING, AND THEREBY HARVESTING, LATER, SO THAT PRODUCE REACHES MARKETS AT SAME TIME AS OTHER SUPPLIES. BY CONTRAST, "NORMAL" VALLEY PLANTING TIME ENABLES VALLEY PRODUCE TO REACH MARKETS SEVERAL MONTHS EARLIER BEFORE COMPETITION. END FYI. THEREFORE, ALTHOUGH PROJECT IS NOT SPECIFICALLY DESIGNED TO ADDRESS MARKETING PROBLEMS AND CONCERNS, IT WILL HAVE AN IMPACT ON SOME MARKETING CONCERNS.

5. DESIGN TEAM AND MISSION PERSONNEL HAVE VISITED PROPOSED SITES AND FACILITIES. ADEQUATE FACILITIES, I.E. LABORATORIES, RESEARCH PLOTS, AND OFFICE SPACE, WILL BE MADE AVAILABLE FOR BOTH JORDANIAN AND U.S. CONTRACTOR STAFF PERSONNEL. THIS UNDERSTANDING IS REINFORCED BY A CP IN THE AGREEMENT WHICH REQUIRES ASSURANCES THAT FACILITIES WILL BE MADE AVAILABLE.

6. AS STATED REF A, PES 80-5 COVERS IN DEPTH LAND TENURE SITUATION. TO ELABORATE ON AND AMPLIFY THE CURRENT SITUATION RELATING TO THE EXTENT OF DECISION MAKING ON THE PART OF TENANTS AND SHARECROPPERS, THE SOCIAL SOUNDNESS ANNEX AGAIN DISCUSSES THIS SUBJECT. IN SUMMARY, TENANTS AND, SPECIFICALLY, SHARECROPPERS, MAKE MAJOR DECISIONS, SUCH AS DATES OF PLANTING AND HARVESTING AND METHOD OF HARVESTING. OTHER MAJOR DECISIONS, SUCH AS TYPE OF CROP, LAND PREPARATION, QUANTITY AND KIND OF FERTILIZER, AND SALE OF PRODUCE ARE MADE BY MUTUAL AGREEMENT BETWEEN THE OWNER AND SHARECROPPER WITH LATTER HAVING SIGNIFICANT INFLUENCE ON DECISIONS MADE.

7. AS STATED IN REF A, THE IMPORTANCE OF FRUIT AND VEGETABLES IN THE JORDAN VALLEY TO VALLEY FARMERS AND TO THE GOJ HAS BEEN ANALYZED NUMEROUS TIMES. REF A DID STATE THE PP WOULD PROVIDE UPDATED OR NEW DATA COVERING VEGETABLE AND FRUIT PRODUCTION IN THE VALLEY IN THE "FINANCIAL" RPT "FINANCIAL" ANALYSIS SECTION OF THE PP. THE DATA PRESENTED IN PP IS IN FACT PART OF THE "ECONOMIC" ANALYSIS SECTION AND CONFIRMS AND UPDATES INFORMATION

8. WITH REFERENCE TO PARA 11, REFTEL B, INCENTIVES (SUCH AS TRAINING OPPORTUNITIES) AND ALLOWANCES, (INCLUDING HOUSING, OVERTIME AND TRANSPORT) ARE BEING CONSIDERED IN AN ATTEMPT TO ATTRACT AND RETAIN QUALIFIED JORDANIAN PERSONNEL TO WORK ON THE PROJECT. HOWEVER, GOJ WILL NOT SET UP SEPARATE SALARY SCALE FOR WHAT ARE CIVIL SERVICE EMPLOYEES - A POSITION WHICH MAKES SENSE MANAGERIALLY TO US. FYI, GOJ CONCERNED ABOUT MULTIPLYING INDEPENDENT AUTHORITIES WHICH ARE SEPARATE FROM AND COMPETE WITH CIVIL SERVICE YET STILL ARE INCLUDED IN RECURRENT BUDGET. END FYI. INCENTIVES AND ALLOWANCES ARE DISCUSSED IN THE PP AND INCLUDED IN THE PROJECT AGREEMENT AS A SPECIAL COVENANT REQUIRING THEIR PROVISION ON BASIS COMPARABLE TO THESE PROVIDED TO PERSONNEL OF OTHER GOJ MINISTRIES.

9. THERE HAS BEEN NO PROBLEM TO DATE WITH TRAVEL TO, FROM, OR WITHIN THE VALLEY, AND NONE IS EXPECTED. ONLY AREA WHERE MILITARY PASS MAY BE REQUIRED IS GHOR SAFI; THIS WAS DISCUSSED WITH THE MOA EARLY ON, AND WE HAVE BEEN ASSURED THERE WILL BE NO PROBLEM. USAID EXPERIENCE IN THIS AREA UNDER VILLAGE DEVELOPMENT III PROJECT SUPPORTS THIS CONCLUSION. SEE ALSO PARA 5, REF A.

10. PP MENTIONS THE IMPORTANCE OF BOTH CONTRACTOR

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APPROVED BY AID/NE/TECH: LEWIS P. READE
AID/NE/JLS/J: D. MORRISSEY (PHONE)
AID/NE/PD: S. CHERNEIKOFF (PHONE)

DESIRED DISTRIBUTION

ORIGIN NETC INFO NEPD NEPD NEJL AAST STAG 3T-00 END

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ADM AID.

E. O. 12065: N/A

TAGS:

SUBJECT: JORDAN VALLEY AGRICULTURAL SERVICES (278-0241)

REF: STATE 245520

1. WAITING PERIOD OF CONGRESSIONAL NOTIFICATION EXPIRED WITH NO OBJECTION.
2. MISSION MAY AUTHORIZE AND OBLIGATE THE SUBJECT PROJECT AT DOLS 5,620,000. CLARK

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ANNEX G - ADAPTIVE RESEARCH AND EXTENSION PROGRAM.

A. Introduction

The Jordan Valley is the country's major irrigated vegetable and fruit producing area. Approximately 60 percent of the country's exports come from the Valley. Recent technological introductions such as greenhouses, pesticides, plastic tunnels, fertilizers, and drip irrigation have influenced production, but there is much more potential to be realized. Valley yields of vegetables and fruits are generally low by regional and international standards.

B. Constraints--Technical and Institutional

Major constraints to increased yields and productivity are: (1) soil and water management problems including the lack of information on the quantity, frequency, and quality requirements of different plants for fertilizer and water, lack of, or improper soil leaching practices, and over-irrigation often compounded by poor drainage, (2) inefficient production and management practices including inappropriate field preparation technologies, improper use and application of fertilizers, and suboptimal cultural practices, and (3) plant pests and diseases, especially the tomato yellow leaf curl virus and vegetable nematodes and insects.

Changes in crop production patterns, especially for tomatoes in the last two years, have resulted in widely fluctuating market prices. In addition, farmers have focused on growing selected cash crops without crop rotation due mainly to the considerable market demand which has precluded them from instituting proper scientific crop rotation schedules. These two factors have led to alternating market scarcity and glut. Research, extension, and agricultural service sectors must find technological means of achieving increased production in relation to market demand.

The impact of these constraints is reinforced by the absence of a viable applied research program and an ineffective agricultural extension system that lacks adequate knowledge and logistical support to overcome them. Additionally, the introduction and expanding use of plastic tunnels and greenhouses in the Valley has intensified insect and disease problems by creating an environment conducive to their longevity and reproduction.

As in many developing countries, agriculture continues to be constrained by many characteristics retained from traditional export efforts. A major influence is the overriding attention given to export cash crops and minimal concern for lower-valued but critically important food crops. Such crops may hold an important future in cropping rotations in the Jordan Valley to decrease soil salinity problems and certain pest problems. A major concern of this Project and a significant opportunity lies in focusing attention on all types of farmers and of increasing food-crop production for domestic food needs as well as meeting export demand.

Technological introduction and development has largely been left to commercial interests pushing their individual products with little or no coordination among suppliers and with each promising more performance and better results with little concern for Jordan Valley production resources or the environment. Small owner-operators, tenants and sharecroppers, who comprise the majority of Valley farmers, have been particularly disadvantaged by the lack of tested and impartial production recommendations and the commercial firms' inclination to concentrate their efforts on the larger, input-consuming farmers.

As many as six GOJ or quasi-government agencies claim some role in regard to the development of Jordan Valley agriculture. This has led to confusing and often conflicting organizational responsibility, constant shuffling of a relatively thin professional staff, and has neglected the opportunity for developing the information needed to significantly improve crop yields and production. The agricultural extension system has consequently suffered from having to perform regulatory functions, and from offering little job satisfaction or work incentives to its staff.

The JVASP will establish an Applied Research and Extension Center (AR&EC) in the Jordan Valley. The Center will be responsible for all applied research demonstration trials and extension activities relating to the production of vegetables and fruit in the Valley.

The educational program deriving from AR&EC cannot be viewed simply as a transfer of a given stock of technical knowledge to farmers. The Project staff, others in MOA, and staff of other agricultural agencies must recognize that a developing agriculture is constantly changing. A science-based agriculture is dynamic. Each innovation in technology sets off a new series of adaptations and further changes and creates both new opportunities and new problems. The program of the AR&EC must be designed to provide farmers with new technical information and to help them use this information to solve their production problems.

The system must keep policy makers and research workers aware of problems caused by innovation and change in the Valley.

The primary objective of the Project, therefore, will be to develop an AR&E system that not only will perform appropriate research but will also facilitate the timely flow of the results of that research to farmers through subject matter specialists and extension agents in a way that will lead to its effective utilization.

C. Institutional Programs and Priorities

An analysis of some of the problems associated with the current research and extension programs and with their inter-relationships will be useful in laying the groundwork for the proposed JVASP. Major topics reviewed are: (1) Agricultural Research, (2) Current Extension Delivery Systems, (3) Ministry of Agriculture Training Programs, (4) Need for Research and Extension Linkage, and (5) the Organization of the Jordan Valley Agricultural Services Project.

1. Agricultural Research

A major component of agricultural research in Jordan is carried out by the Department of Agricultural Research and Extension. The Research Section includes six units; field crops, horticulture, fruit trees, soils and irrigation, plant protection and tobacco. There are 53 university graduates and 8 technicians working in research. Approximately ten researchers are engaged in research studies in the Jordan Valley.

Much of the research is directed toward very specific problems and may not be especially beneficial to solving the major production problems in the Valley. Generally speaking, the researchers are well qualified but the performance of effective research is seriously hampered by lack of funds, equipment, training, transportation, technical assistants and distance from Amman to the Jordan Valley. Members of the Faculty of Agriculture at the University of Jordan have similar problems in addition to their teaching loads. These researchers have primary responsibility for research and not extension or demonstrations. Thus many researchers are not directly in contact with extension agents or farmers.

2. Current Extension Delivery System

Agricultural Extension constitutes a section within the Department of Agricultural Research and Extension. This arrangement has the advantage, at least on paper, of insuring a closer contact between research and extension. Several researchers interviewed indicated very limited contacts with field agents.

The Extension Service is comprised of the Head of the Section with three staff at headquarters, and about 90 agents in the agricultural regions. The number of agents depends on the agricultural importance of the area.

Administrative responsibility for extension work carried out in the Valley is vested in the Office of the Minister of Agriculture through the Director of Research and Extension. Practically speaking, the Regional Directorate (s) for the Ghors and Kerak control extension activities taking place in their regions. Support in terms of programming, training, and communications comes through the Department of Research and Extension in Amman. Linkage of the administrative and technical functions needs to be strengthened to provide effective support to field level personnel. The chief officer at the regional level is the Regional Director of the Directorate. He is administratively responsible to the Minister of Agriculture.

Although the present institutional framework seems to include some of the necessary prerequisites for success, some serious constraints may be a hindrance to the goal of close cooperation between research and extension. Perhaps the most serious constraint to the coordination of training, research and extension is that resulting from the organizational relationships between these activities which should be mutually supportive.

The Department of Agricultural Research and Extension is under the heavy administrative routine of the Ministry of Agriculture which is not highly responsive to immediate needs. Many agents find themselves performing regulatory and service type activities for MOA or for other Ministries instead of working with farmers in an educational capacity. Most extension authorities agree with Benor and Harrison of the World Bank that an extension agent must be free to perform an educational role as a teacher with farmers and not become engaged in conflicting regulatory work.

Agents face serious transportation problems as another constraint. A 1980 FAO report stated that the work of extension agents is being rendered almost totally ineffective because of the lack of transportation facilities. The basic job of the agent is with the farmer on his farm. Many agents have to commute from Amman to the Jordan Valley leaving at 6:00 a.m. in the morning for the Valley. Their work day is officially from 8:00 a.m. to 2:00 p.m. The agent then has to come back late in the afternoon by bus. Under this system the agent receives no overtime pay, and in addition, lacking transportation, is unable to meet with farmers or groups of farmers in the evening. Obviously, transportation needs to be addressed in order to provide needed mobility for extension agents in the Valley. Furthermore, incentives must be provided which will encourage agents to live in the Valley.

Salaries are very low for extension personnel. An agent will earn about 140 J.D. a month as compared to 400 J.D.'s for a person of similar academic training and experience in the private sector. Good agents leave the extension service for opportunities in the private sector or in other Arab countries.

The major factors that need to be improved are: (1) more incentives through higher salaries, better allowances, and overtime pay, (2) improved transportation facilities, (3) organization of in-service training programs, (4) 100 percent of the job devoted to working with farmers in an educational capacity, and (5) strengthening the flow of technical information and problem identification between the agent and the researcher. The Design Team understands the MOA employees do not receive incentives received by employees of other Ministries.

3. Ministry of Agriculture Training Program

The Deir Alla Training Center is the only one concerned with training agricultural extension agents and technical staff. This center was established and operated with the help of FAO. During the period 1973-1977, training sessions were held and 291 researchers and extension agents completed their training. The Center's program extended beyond Jordan; some sessions were attended by researchers and extension agents from other Arab countries.

FAO activities and participation in the Center's programs were discontinued near the end of 1977, and the effort to train researchers, agents and farmers was discontinued. The lack of a systematic in-service educational training program for researchers and agents hampers the updating process needed to convey and disseminate current information to farmers.

Of the 26 extension agents on the job in the Jordan Valley, 17 are B.Sc. graduates while nine agents have had but two years of agricultural training past the high school level. Agricultural researchers in general have their M.Sc. degrees and several have Ph.D's.

There is an urgent need to develop a systematic training approach which emphasizes technical up-dating and extension methods. This staff development effort is an integral part of the Project's plan and is described in the training section of the paper (Annex L).

4. Need For Reseach-Extension Linkage

In Jordan the research-extension-farmer communications system suffers from several serious weaknesses that prevent the system from working effectively. Breakdowns in communication occur at all levels; farmer-extension worker, extension workers-researchers and researcher-farmer. Farmers and extension workers fail to communicate effectively. Several surveys in the Jordan Valley have indicated that from 60-80 % of the farmers do not know who their extension agent is, and the majority of farmers interviewed indicated they receive most of their agricultural information from commercial salesmen. Farmers have little reason to view extension workers with respect because the latter have limited communication linkages with and receive little technical information from researchers. Extension personnel having almost no support and a minimal amount of in-service training are faced with trying to educate farmers. Some farmers have had little previous farming experience and desperately need information and guidance.

Agents also have problems with role definitions. Agents are assigned responsibilities for technical information programs in disciplines other than agriculture, for regulatory programs, and for government promotional efforts. The World Bank Report* of 1977 states that agents must devote 100% of their time to educational programs in agriculture so as to develop trust and respect with the farmer.

Since 1978 plans have been "in the air" to have agents work as secretaries for the JVFA farmer committees in their districts. These plans have yet to materialize. Part of the agreement was for JVFA to build or supply an office for each extension agent; however, only a limited number of offices have been supplied to agents. JVFA officials complain that agents are not working with JVFA groups, and agents indicate they will not work with JVFA groups until they are furnished with office space and are given additional incentives.

* (Benor and Harrison, J. Agricultural Extension, World Bank, 1977)

All this simply adds to the confusion of the role(s) of agents. It is confusing to both the agent and his clientele, the farmers of his district.

The extension worker often lacks knowledge concerning the production systems currently being used by farmers and has very limited familiarity with ongoing research activities. Therefore, the agent generally has little to suggest to researchers concerning needed research. There is no effective feedback mechanism by which farmers can influence research programs. In addition, researchers tend to work mostly at research stations, not at various locations in the Valley where farmers might view research and/or demonstration plots. Researchers spend only limited time on farms and thus plan their research in response to national goals established at the highest levels of government, or at the opposite extreme in response to their own interests without considering its applicability to farm problems or other constraints on the farmer.

Because research and extension do not systematically focus on the needs of farmers, their efforts have met with only limited success which is reflected by the failure of farmers to adapt research and field tested technologies. This results in the government giving low priority to research and extension. To break out of this cycle, the JVASP aims to implement a program that will change practices in the following manner:

1. Encourage farmers to adopt technology already tested in the Jordan Valley and proved effective.
2. Improve the quality and relevancy of research to farmer's needs.
3. Increase the resources allocated to applied research.
4. Demonstrate research results in farmers' fields so as to encourage adoption of new technology.
5. Develop a mechanism for communicating farmer problems through extension workers to researchers, who are encouraged to design research projects in response to farmer needs.
6. Increase incentives within the extension service by paying competitive salaries, providing essential transportation, and supplying needed support services.
7. Inform extension agents of technologies ready for demonstration to farmers. This requires continual upgrading of agents' skills through a planned and systematic in-service educational program.
8. Support by planning, programming, and budgeting for agricultural research that reflects farmer's needs and the existing constraints on production.
9. Develop an improved system of data collection on farm management to help evaluate viable economic production alternatives.
10. Develop a reliable system to evaluate the results obtained by farmers from utilizing recommended practices.
11. Convince farmers that it is technically possible to improve output.

12. Demonstrate the economic advantages resulting from adoption of new technology.
13. By demonstrating increased returns from new technology, encourage producers to assume the risks involved in significant changes in technology and production systems.
14. Encourage the development of a supply system that assures that essential inputs recommended to farmers will be available.
15. Limit JVASP activities to crops for which there is or will be a market.
16. Recognize that new technologies adopted to solve previously severe problems invariably results in the occurrence of still other (but usually less serious) problems which in turn must be investigated.

5. Organization of Jordan Valley Agricultural Project (JVASP)

To test, demonstrate, and implement the AR&E approach in the Jordan Valley, a Project staff will be organized consisting of 4 components: (a) researchers, (b) subject matter specialists, (c) research/extension associates, and (d) extension agents. The organization for JVASP is outlined in Figure 2 on page 28.

The Project Director will have direct administrative and supervisory control over the Project staff. The director should have a Ph.D. in an agricultural discipline and some administrative experience.

Essential to the operation of the Project is an administrative staff and training officer responsible directly to the Project Director. The administrative staff includes an administrative assistant (expeditor), secretary, and typist. The training officer will assist the Project Director and staff in organizing in-service training courses, teaching Project staff extension methods and communication techniques, and planning and evaluating programs. The training officer will also serve as the primary liaison between the Project Staff and the Agricultural Information & Press Section in the Department of Agricultural Research and Extension. This officer should have a Master's Degree in an agricultural discipline and some extension experience.

A total of four researchers are needed for the project. Each researcher should have at least an M.Sc. degree in an area such as horticulture, soils, integrated pest management (or entomology or plant pathology), agricultural economics, irrigation engineering, etc. Researchers will need to be recruited from among the ranks of existing Jordanian agricultural institutions or from the private sector. Researchers will have primary responsibilities for applied research including problem identification, development of research facilities, designing, planning, and conducting research at station and field plots and analysis of research results. Much of the research will deal with problems already identified

as serious in the Jordan Valley, i.e. white fly, salinity, nematodes, etc. Researchers will work in a collaborative manner with subject matter specialists and agents. Consequently researchers must also be involved in teaching their subject matter.

Research workers will be involved in developing production packages in the areas of integrated pest management, pesticides education, irrigation, horticulture, soils, and production economics. Researchers will also assist in the establishment of demonstration trials, work closely with agriculturalists in other institutions working on major production problems. Adaptive research will be based on the scientific facts available. Extension will provide the vehicle for dissemination of new technology.

Perhaps the key to the success of the project is the development of an effective group of subject matter specialists. A total of 4 SMS's positions in the fields of horticulture, soils and water, pest management, and agricultural economics are contemplated for the project. Candidates with an M.Sc. degree are preferred; however, candidates with a B.Sc degree and some field experience will be considered for specialist positions with the expectation that some selected for these positions will have an opportunity to obtain an M.Sc. degree through the Project's training program.

The specialist group will be concerned with relaying research needs from farmers and agents to researchers. Specialists will view the broader problems of production and relate their subject matter to all phases of program development and execution. Five broad groups of functions are to be performed by subject matter specialists, namely: (1) field studies to increase the effectiveness of their work in their respective subject matter areas, (2) the preparation of teaching materials (3) direct teaching, (4) training functions, (5) program planning.

An important element of the Project are the Research/Extension Associates. Recent graduates (B.Sc) in agricultural disciplines will be considered for these positions. The Associates will assist both researchers and specialists in carrying out their respective duties. The associate positions are important support positions for the Project. Promising associates will be selected for short-term and longer training opportunities. This cadre of trained personnel will form an important part of the manpower needed to fill research and specialist positions while the latter individuals are engaged in graduate study. Specific duties of the Associates are outlined in the job description section (Annex I).

Ten extension agents will be selected for the project. Agents will need to have a B.Sc. degree in an appropriate field of agricultural science. Agents will be assigned to work in areas from North Shunah to Ghor Safi.

Agents will work closely with specialists, associates, and researchers in all steps from selection of problems needing research to the collection of experimental data. In this role agents will be supportive of research. Other major responsibilities of agents will include: (1) Above all else help farmers identify production constraints and provide farmers with solutions for such production constraints. In accomplishing this major responsibility the agent has the support of the Project's entire personnel. When solutions for constraints are not known, the agent becomes involved in all the following responsibilities. (2) Provide information for specialists to use in determining, with researchers, tentative vegetable crop practices to be tested at the farm level. (3) Plan and conduct farm demonstrations in cooperation with the SMS. These tests will include a combination of research-managed and extension-managed farm trials. (4) Monitor and evaluate farm tests and compare results with tests in similar areas. (5) Communicate results to researchers via specialists. (6) Work with specialists to develop recommendations for farmers. (7) Be available to respond to problems that require specialized assistance and analysis. (8) Plan effective dissemination of recommended practices and demonstrate them. Performance of item 8 by the agent completes the sequence initiated by item 1 when a solution for a recognized constraint is not initially available.

The Deir Alla Agricultural Research Station will be the base of operations for the JVASP. In addition there will be 3 sub-units in the Jordan Valley where research and demonstration plots will be located. The project will require offices, laboratories, space in which to conduct training programs, and storage space for its vehicles at Deir Alla. Assignment of some land (10 dunums) with irrigation facilities and either plastic houses (2) or a greenhouse is desirable. The equipment and vehicles assigned to and purchased by the Project will be housed at Deir Alla. The Project will have its own drivers (4 in number), mechanics (2), and laborers (10), laboratory technicians (4), and its budget provides for maintenance and operation of its farm machinery and vehicles.

D. Crop Production Programs and Priorities

1. Introduction

Crop production in the Jordan Valley consists primarily of vegetables and fruit, crops, grown under irrigation. Main crops are tomatoes, cucumbers, eggplant, peppers, muskmelons, watermelons, bananas, squash and citrus

fruit. Grape vineyards and olive plantings are currently being established. Vegetables are produced for the local market and export. Vegetables grown in the Jordan Valley command a high export price during the winter off-season.

Changes in crop production patterns, especially for tomatoes in the last 2 years, have resulted in widely fluctuating market prices. In addition, farmers have focused on growing selected cash crops without crop rotation due mainly to the considerable market demand which has precluded them from instituting proper scientific crop rotation schedules. These two factors have led to alternating market scarcity and excess. Research, extension, and agricultural service sectors must find technological means of relating production to demand.

2. Tomatoes in the Jordan Valley

a. Introduction

In its tomato program the JVASP will include integrated pest management, varietal testing, soils and irrigation, and production economics. Emphasis will be on known problems and those identified by project personnel.

Research workers will continue developing production practice packages in the areas mentioned above. Researchers will also assist in the establishment of demonstration trials, and cooperate with other scientific institutions working on tomatoes, particularly with other staff within MOA not assigned to this Project, and with FA/UOJ. Subject Matter Specialists and extension agents will continue adapting and disseminating information to farmers.

Tomatoes are grown on approximately 80,000 dunums of irrigated land in the Jordan Valley. Most of the tomatoes are grown in open fields; about 70% are drip irrigated and around 50% mulched. Tomatoes are provided for the local and export fresh market. Tomato varieties must produce good colored fruit, have acceptable storability, and show good resistance to pests.

Tomatoes are preferred by Jordan Valley farmers as a cash crop because of the high potential profit for winter off-season tomatoes. Tomatoes are high yielding under favorable conditions, though there are a number of pests present that impose severe constraints on tomato production. Tomatoes respond well to management with corresponding higher yields and increased profitability.

Scientific research is being conducted throughout the world and in the Jordan Valley on tomatoes suggesting that many tools are available

for improving tomato production. Some of these tools may be adaptable to the Jordan Valley, and the probability of using known research data to develop new, adaptable technology for Jordan is high. Some of these inputs include such factors as pest management practices, planting dates, varieties, spacing, soil fertility, fertilizer recommendations, and land management. Much of this information needs to be field tested and transferred to farmers.

b. Varieties

Claudia R.A.F. is the main tomato variety grown in the Jordan Valley. About 80% of the tomato land is planted to this variety. It is an indeterminate variety and was introduced to Jordan in 1966. Claudia R.A.F. seed is produced in France. Special Pack is the second most popular variety. It is a determinate variety and seed is produced in the U.S.A. R.A.F. has some desirable characteristics such as disease resistance but does not have good quality fruit even though it bears fruit over a long period. Special Pack has some good features such as short bearing season and good color fruit but the fruit are soft. Further screening trials for a more desirable variety need to be conducted.

c. Cultural

Most tomatoes are grown in open fields, where land preparation is not always uniform. Many growers transplant month-old seedlings that they either grow themselves or purchase. The two main planting seasons are September-October and January-March. During the last few years many growers have delayed fall planting to November-December to try and reduce virus disease problems. Organic (chicken manure) and inorganic fertilizers are used. Fertilizer use is hampered by the inability of farmers to obtain soil analyses so as to determine amounts of nutrients present and amounts needed by the plants. Most growers irrigate at irregular intervals because there is apparently little data on consumptive water rates for tomatoes. Few growers stake or prune tomatoes, practices which have been shown to increase yields and improve quality.

d. Integrated Pest Management (IPM)

There are approximately 14 important plant pathogens (fungi, bacteria, viruses, and nematodes) attacking tomato. Amount of infestation and severity varies depending on casual organism, weather, and host variety, though any of these can be limiting factors for tomato production at any one time or place. The most wide-spread and severe diseases are tomato yellow leaf curl virus and root-knot nematodes. Approximately 6 different insects attacking tomatoes limit production. Their severity varies with time, year, and location. The most wide-spread and severe are whiteflies both as direct pests and vectors of virus, and cutworms. Weeds can also create a problems.

Integrated pest management (IPM) is based on not allowing pest populations to reach their economic threshold. The IPM system incorporates different tactics such as cultural, physical, and mechanical practices and use of the least ecologically disruptive pesticides. The IPM approach monitors various factors in the ecosystem and aims at determining economic thresholds for pesticides. IPM also implies the development and use of practical training and delivery systems.

IPM requires research data before such strategies can be implemented by farmers. In Jordan and other parts of the world, data is available to begin putting together an IPM package for some of the major tomato pests. Some of the components of an IPM package are available while others will require more research. Inherent in the IPM approach is an effective delivery system; delivery is best accomplished through the Extension service. One of the Project's objectives is to strengthen the Extension Service in Jordan.

e. Pesticides

No pesticides are manufactured in Jordan. Most imported pesticides are pre-packaged before entering Jordan. All imported pesticides must be registered in the country of origin. The decision on what pesticides to import is largely left to the importer. More local, adaptive research to ascertain the best pesticides for particular uses is needed.

Most of the insecticides, miticides and fungicides used on tomatoes are EPA/USA restricted use pesticides (Table 1). Restricted use pesticides usually require special safety precautions because they may create human health problems. Pesticide poisoning is a problem in Jordan with at least 70 cases and 8 deaths reported in 1980. An educational program on pesticide safety would have a significant impact in the Jordan Valley.

Most pesticides used on tomatoes are broad spectrum, killing both pests and beneficial organisms. Type of chemicals and rates used are often based on data from other areas without local testing. An example is the large amounts of synthetic pyrethroids being used. These can often lead to secondary pest problems, resistance, and pest resurgence. The large number of different types of chemicals, each provided in varying concentrations, and under different trade names, leads to confusion. The data needed to fit various pesticides into an IPM program are not readily available.

Table 1. Insecticides and Miticides Used On Tomatoes and Amounts Imported in 1980.

<u>NAME</u>	<u>EPA Restricted</u>	<u>USA Registered</u>	<u>Amounts</u>		
			<u>Liters</u>	<u>Tons</u>	<u>Kg</u>
Parathion	yes	yes	33,040	30	-
Azinphosethyl	yes	?	1,555	-	-
Monocrotophos	yes	yes	11,870	-	-
Methamidopnos	yes	yes	15,555	-	-
Methomyl	yes	yes	-	8	465
Oxamyl	yes	yes	-	3	-
Malathion	No	yes	4,555	-	-
Dimethoate	No	yes	10,260	-	-
Roxon	?	?			
Pirimiphosethyl	?	?	1,050	-	-
Carbaryl	No	yes	-	-	500
Pyrethroids	?	?	21,382	-	-
Sulfur	no	yes			
Methyl bromide	yes	yes	-	32	1069
Mevinphos	yes	yes	1,558	-	-
Furdan	yes	yes	-	5	-
Phosphamidon	yes	yes	1,555	-	-
Metuidathion	yes	yes	6,555		
Pirimicarb	-	no			185
Omite	no	yes			
Plicutran	no	yes			

f. Priorities in Tomato Research and Extension

- A. IPM Program for TYLCV/TWF
 - 1. See Section 3, page 16, this Annex
- B. Horticulture
 - 1. Improvement of transplant quality
 - a. Cultural
 - b. Speedling and Jiffy transplant systems
 - 2. Variety Screening
 - 3. Fertility
 - 4. Pruning and Staking
- C. Soil Pathogen Management (Root Knot Nematode and Fusarian Wilt)
 - a. Solar
 - b. Rotation
 - c. Chemical
- D. Irrigation
 - a. Consumptive water use
 - b. Salt
- E. Spider Mites and Cutworms
- F. Rotation
- G. Intercropping
- H. Production Economics

g. Tomato Yellow Leaf Curl Virus

- A. Introduction
- B. Seedling Production
- C. Open Field Tomato IPM
 - 1. Insecticides
 - 2. Planting Dates
 - 3. Sanitation
 - 4. Tomato Varieties
 - 5. TWF Population Dynamics
 - 6. Biological Control
 - 7. Cultural Control for TWF
 - 8. TYLCV

D. Plastic And Greenhouses

E. Proposed IPM Program in Agricultural Research and Extension on the TWF and TYLCV

3. Tomato Yellow Leaf Curl Virus

A. Introduction

This presentation on the single most important disease of the most important cash crop grown in the Jordan Valley is representative of the type of programs that must be developed in connection with other constraints to production in the Jordan Valley. Some other major production problems are identified later in this Annex. The JVASP will develop similar programs for other important constraints to production during the early phase of the Project. Selection of problems for investigation and demonstration will be based on: (1) the current or prospective value of the crop to Jordan, (2) severity of the problem, (3) availability of information needing only demonstration as to its applicability to the Jordan Valley; and (4) basic research data indicating areas of applied research likely to produce immediate application of the technology by farmers within the life of the Project.

Tomato yellow leaf curl virus (TYLCV) is the most serious constraint to increased tomato production of Jordan's most important cash crop. It is transmitted by the tobacco white fly (TWF), Bemisia tabacci Genn. Control of this disease is difficult but essential because yield losses average around 50% per year. It is most serious to the early fall-planted crop which is the important off-season export crop. In recent years TYLCV has greatly reduced the early (December-February) tomato crop in the Jordan Valley. There is a considerable amount of research data available from Jordan and other countries on this pest complex. Several management techniques that should markedly reduce TYLCV severity are ready for farmer adoption. TYLCV is such a serious problem that a major thrust is needed using an Integrated Pest Management (IPM) approach to reduce its severity.

Management of TYLCV is based on preventing infection of seedlings before they are transplanted and for as long as possible after transplanting. Management is aimed at TWF, the only known vector of TYLCV. The more growth before a tomato plant becomes infected, the better its ability to produce a good crop. The longer initial introduction is delayed, the less the spread and impact of TYLCV on production. Reduction of disease severity appears feasible using an IPM approach. The apparent key to

success is to eliminate TWF from tomatoes as long as possible.

B. Seedling Production

Exclusion of TWF from seedling tomatoes is feasible using one or more combinations of techniques. Insect proof greenhouses and/or plastic houses are one method. Greenhouses have the advantage of temperature and humidity controls though they are more expensive than plastic plus screen houses. Double entry doors are needed in these houses. Employment of trapping systems for TWF in the screened off entry way would reduce the likelihood of any stray TWF entering the inner door and gaining entry to the house. Trapping can currently be accomplished by using colored plastic covered with an adhesive. The development and use of pheromones for the TWF is a future possibility.

Exclusion of TWF during tomato seedling production should result in the production of virus-free seedlings. The full potential of this system has not been made known to farmers. It should also be possible for individual farmers, by employing the same principle, to produce virus free seedlings in screened tomato seed beds.

Controlled environment greenhouses are now being used to produce seedlings for transplant to commercial fields. Maintaining tomato seedlings virus-free before transplanting is so important that additional TWF management techniques may need to be investigated to ensure virus-free stock at time of transplant. These include: (1) type, time and rate of application of systematic insecticides; (2) type, time and rate of application of contact insecticides as determined by an IPM monitoring program; (3) an attractant trapping system using colored, sticky boards; (4) cucumber "sink" system; (5) repellents; and/or (6) elimination of TWF weed hosts. Use of systematic insecticides during seedling production and for the first few weeks after transplanting would not result in pesticide residue levels in fruit formed and maturing later.

C. Open Field Tomato IPM

1. Insecticides

Management of TYLCV and its vector, TWF, under open-field conditions is difficult. The present non-IPM approach relies heavily on insecticides for TWF control (Table 1). This program is not successful. Research data tends to support the general conclusion that chemical control of TWF does not reduce TYLCV incidence. Part of the reason is that tomato is not a preferred host for TWF with the result that TWF move frequently from plant to plant, and infect several plants before being killed by either contact or systematic insecticides. Heavy reliance on pesticides

can also lend to increased pest problems as a result of the development of resistant strains and secondary pest problems. Standard spray equipment gives inadequate foliar coverage especially on leaf undersides where TWF feeds and reproduces. Fog applicators are available which give much more complete coverage. Several TWF management techniques relating to pesticide use need to be investigated: (1) type, time, and rate of application of systemic insecticides in the seed bed, after transplanting, and during the growing season, (2) type, time and rate of application of contact insecticides, (3) obtaining better coverage on target crop by use of fogging machines and (4) use of mineral or vegetable oils on tomato foliage to impede movement of TWF from plant to plant.

2. Planting Dates

A second TWF management approach used in the Jordan Valley is delaying planting dates. The traditional Sept.-Oct. planting date has been shifted to Nov. -Dec. or later in the belief that the effect of TYLCV on production will be reduced. The result of this shift has been production of fewer tomatoes for the high priced, off-season local and export markets, with a later market glut and lower prices. Tomato production yields have been forced into a restricted rather than a spread-out time frame.

Research data to support this shift in planting and resultant decrease in TYLCV incidence and severity is inadequate. The IPM program outlined in this paper for tomatoes will focus on planting tomatoes in September and October and keeping them virus free so as to harvest quality fruit at the peak market prices. Avoiding the impact of TYLCV by delaying planting date is not a solution to the basic problem.

3. Sanitation

TWF has at least 200 weed and crop host plants many of which occur in the Jordan Valley. Elimination of TWF hosts and TYLCV hosts would help to reduce TYLCV incidence in tomatoes. Little attention has been paid to this approach. Elimination of oversummering hosts would have to be thorough and systematic over wide areas. Such a sanitation program probably should not be attempted on a large scale until there is more data on: (1) plants that are hosts for both TWF and TYLCV; (2) the effects of these hosts on viruliferous TWF populations; (3) effects of these hosts on population dynamics of TWF; (4) the role as hosts for TWF of crops grown during the summer or to be grown in this period in the future as crop diversity is increased and land use is intensified by double and triple cropping. Removal of plants showing disease symptoms in the field is probably ineffective because symptoms are not expressed until 3-4 weeks after inoculation.

4. Tomato Varieties

R.A.F. has a long bearing season. A determinate tomato variety with a short bearing season maturing in 90-120 days would be desirable. By planting such a variety in September or earlier maximum production would occur when market prices are maximum. The longer a plant is infected with TYLCV, the greater its effect on production. The use of determinate varieties and staggered planting dates is an area needing investigation for TYLCV management. Screening for varieties that may be tolerant to TWF or TYLCV should be continued even though this approach has been unproductive to date.

Some resistance to TYLCV exists in the wild species, Lycopersicum pimpinellifolium. There may be some resistance to TWF in other breeding lines. These are logical endeavors to be included in regional projects. Such breeding programs involve basic research and there is little chance of developing a commercial variety with resistance during the tenure of the Jordan Valley Agricultural Services Project.

5. Population Dynamics of TWF

The body of research data on population dynamics of TWF needs to be examined for possible clues as to control. The relationship between TWF populations and TYLCV incidence needs to be clarified. The number of viruliferous adult TWF at different times of year and their rate of movement needs to be investigated. It has been established that acquisition and inoculation times are 15 and 30 minutes, respectively. TWF adults remain viruliferous for up to 20 days and are able to fly up to 2 kilometers.

There appears to be a general assumption that population dynamics are governed by abiotic factors. High temperatures and drought during late summer are believed to impede oviposition and cause high mortality among the adult TWF's. Research on this aspect may lead to an applicable management strategy.

Monitoring tools for TWF such as colored sticky surfaces need to be refined, and extension agents need to be informed as how to collect data from them so IPM specialists can follow population dynamics throughout the Jordan Valley during the entire year.

6. Biological Control of TWF

Limited research data indicates at least 4 insect parasites and predators play a role in TWF population dynamics. These biological control agents do not occur in areas where pesticides are used. In limited situations, where no pesticides are used, 70-75% parasitism has been found.

While TWF parasitized by fungi have been observed, no information as to their impact of TWF population dynamics is available. Effects of the total agroecosystem on beneficial populations of insect predators and insects fungal, and possibly bacterial parasites need to be explored and considered for inclusion in an IPM program.

7. Cultural and Physical Controls for TWF

Attractants may offer a feasible means for managing TWF populations. Research has shown that yellow, white and green colors attract TWF. Though some of the data is conflicting, a colored plastic mulch may have potential as a management tactic.

Repellants should be sought in wild hosts and in commercial crops not attacked by the TWF.

Research indicates that cucumber may act as a "trap crop" or "sink" for TWF when interplanted with tomatoes. Cucumber seems to be a preferred host compared to tomatoes. The result is reduced incidence of TYLCV even though cucumbers are hosts of TYLCV. The application of oils to cucumbers might further restrict movement of TWF. Further research in this area may result in practical applications.

Effects of various crop rotations on TWF and TYLCV on tomato need to be examined. In addition, the influence of various cultural practices on the incidence of TWF and TYLCV needs to be examined. To date, research has not indicated any relationship except that healthier plants may be more attractive to TWF. Some data indicates better pesticide coverage on staked tomatoes though data correlating this to TYLCV incidence is lacking.

8. TYLCV

Tomatoes infected late in the growing season have less severe symptoms than plants infected early. Tolerance may be related to state of plant development at the time of inoculation. It also may be an indication that there are strain differences in the virus. A search for attenuated strains of the virus which could be inoculated to provide cross protection should be initiated.

There is some indication that Bavistin will reduce the severity of TYLCV; this needs further investigation.

D. Plastic and Greenhouses

If tomato production continues in controlled environment greenhouses or in plastic houses, the same procedures as outlined for seedling production can be used. However, plastic houses need not be as sophisticated as the controlled environment used for seedling production. The ends and portions of the sides and the roof should be screened to provide

ventilation and screened entry ways should be provided. With electricity now generally available in the Jordan Valley probably more growers will incorporate fans together with "swamp" coolers into their plastic houses. Such mechanisms reduce the opportunities for TWF to gain entry. Better control of temperature and humidity permits control of factors influencing other plant diseases, especially early and late blights and blossom end rot.

E. Proposed IPM Program In Agricultural Research and Extension On The TWF and TYLCV

- a. Priority items for immediate demonstration and implementation. TYLCV is the factor currently limiting both overall tomato production and production timed to coincide with maximum prices in the market. By employing the procedures presented herein to control TWF the incidence of this disease can be reduced and the initiation of infection delayed sufficiently to permit the production of good crops of tomatoes in December and January.

The keys to success are: (1) produce disease-free transplants; (2) prevent infection after transplanting as long as possible. Steps to take:

1. Exclude TWF from seedlings by producing them in insect proof houses and seed beds.
2. Transplant seedlings into a fresh straw or yellow plastic mulch.
3. Use a systemic insecticide prior to and immediately after transplanting.
4. Spray frequently (every 3-5 days) with a 1% solution of 20% Guthion for up to six weeks after transplanting.

Priority is for this approach to be field demonstrated. Data on symptoms, total yield and quality are to be taken from all demonstration plots.

b. Areas needing research before demonstration and adoption.

1. TYCLV

- a. Test the effect of Bavistion and similar compounds on symptom expression, yield and quality.
- b. Attempt to isolate attenuated strains of TYCLV for cross inoculation.
- c. Ascertain host range of TYCLV in the Jordan Valley.

2. TWF

- a. Test effectiveness of different systemic insecticides.
- b. Test effectiveness of different contact insecticides.
- c. Test effectiveness of different methods of pesticide application, especially fogging.

- d. Test effectiveness of different attractants and/or repellants.
 - e. Test the effectiveness of intercropping with trap crops.
 - f. Test and develop monitoring tools.
 - g. Seek biological controls.
 - h. Ascertain factors influencing adult population dynamics and their virus load.
3. Determine Influence of Different Horticultural Procedures on TWF Populations and on Incidence of TYLCV
- a. Determine influence of planting dates on incidence and severity of TYLCV and on yield and quality.
 - b. Test the productiveness of determinate varieties in the Jordan Valley.
 - c. Ascertain the effects of (1) intercropping, (2) various crop rotations, and (3) sanitation on incidence and severity of TYLCV and on yield and quality.
 - d. Determine influence of different fertilizer regimes on yield and quality.
 - e. Ascertain effect of different growth hormones on the TYLCV complex.
 - f. Test for possible sources of tolerance or resistance within existing tomato varieties.

Development and continuing refinement of a crop management package for tomato culture will be based on results of both research and demonstration. The ultimate objective of this program is the delivery to the farmer of information he can use to increase his tomato production.

F. Note

Extremely valuable information could be collected during the 1981-82 growing season if the incidence and severity of symptoms, total yield and quality of fruit were ascertained and compared in September plantings of tomatoes grown under the following varying conditions:

1. Direct field seeding.
2. Field crop established with transplants from seed beds not protected by screening.
3. Field crop established with seedlings produced in screened greenhouses.
4. Crop produced by direct seeding or with protected seedlings in plastic houses screened to protect against entry by TWF during the entire period of production.

Such data, if collected during the next growing season by MOA personnel, could provide significant leads as to the type of demonstrations and research that should be undertaken after Project implementation.

4. Cucumber Production Program and Priorities

Cucumbers are also an important cash crop in the Jordan Valley. They are grown in open fields, plastic tunnels, and plastic houses. Ninety-five percent of all production in plastic houses is of cucumbers. Plastic house cucumber farming is a new technology that has developed rapidly in the Jordan Valley. Cucumbers are grown in plastic houses for the high price winter off-season market. New production problems have appeared with plastic house farming as production has become more intensified in time and space.

Main varieties grown in plastic houses are Deleila, Heurst, Merry Cross and Tender Flesh, all of which are apparently parthenogenic. Farmers are unsatisfied with some aspects of these varieties indicating a need for a varietal screening program. Market acceptance however, is a constraint to the introduction of new varieties. Research is needed on fertilizer requirements, rates, placement, and timing which are largely guesswork at present. Consumptive water use for cucumbers is not known, and this information is needed for proper water use management.

The most serious constraint to cucumber production in plastic houses appears to be pests. In 1979, farmers spent an average of \$1,468 U.S. per acre for pest control in plastic houses. Pests include plant pathogens (fusarium wilt, powdery mildew, downy-mildew, nematodes, and viruses) and insects (aphids and mites). Watermelon mosaic virus (WMV), which is aphid transmitted, has the potential to become a very serious problem.

- d. An integrated pest management approach is needed to reduce pest damage to cucumbers. Emphasis should be placed on: solar heating for root-knot nematode and Fusarium, screening for pest resistant varieties, pesticide testing, population dynamics of the vector of WMV, and on control of powdery mildew and downy mildew by environmental manipulation. Exculsion of the vector of WMV from plastic houses needs to be attempted.

5. Cropping Patterns

a. Introduction

The major crops grown in the Jordan Valley (tomatoes, eggplant, cucumbers, melons, and squash) have considerable market demand. The risk factors, as perceived by the farmer/landowner, in growing these crops are low, because he has experience with them and market demand is usually high. Farmers persist in growing traditional vegetable cash crops without regard to future problems created by this practice. Each year more land is devoted to vegetable, primarily tomato, production. Certain vegetables are now grown nearly year around. Problems associated with high intensity-

low diversification agriculture are now becoming apparent in the Jordan Valley. There is seasonal over-production of tomatoes and cucumbers resulting in low market prices.

Increased reliance is placed on chemical pesticides for control of insects, diseases, and nematodes without local adaptive testing, employment of crop rotation or biological controls. Overall soil fertility is reduced because increasing amounts of chemical fertilizers are used without local, adaptive research to ascertain the relative amounts of different nutrients needed in different fields for different crops. Saline land is also a problem associated with increasing use of drip irrigation. The short-term solutions currently being employed require higher inputs but do not always solve the problem.

Inherent risks in specialized agricultural situations can often be reduced by, 1) crop rotation, or 2) development of alternative crops. Agricultural scientists and the National Planning Council have made several crop rotation recommendations over the years but none have been implemented in the Jordan Valley. Development of alternate crops has received little attention. A lack of local adaptive research and extension has hampered development and dissemination of vital information on crop rotation and alternate crops to farmers.

b. Crop Rotation

Continuous cultivation of the same crop in a field often results in pest(s) buildup and yield reductions. Crop rotation is practiced to reduce risk (pests) or to supply inputs (fertilizer). It must be separated from market demand because the crop with the highest return cannot always be planted. Judicious crop rotations usually result in greater benefits to the farmer and his land in the long run.

The following crop rotation proposed by the National Planning Council needs to be seriously considered, tested, and implemented at the farmer level:

<u>1st Year</u>	Sept. - Dec.	Tomatoes
	Jan. - Mar.	Eggplant
	Apr. - June	Corn & chickpeas
	Jul. - Aug.	Berseen clover
<u>2nd Year</u>	Oct. - June	Wheat
	June - Aug.	Chickpeas or peanuts
<u>3rd Year</u>	Oct. - Dec.	Tomato
	Jan. - Mar.	Cucumber
	Apr. - Aug.	Lentils or chickpeas
	Sept. - Dec.	Tomato

As information becomes available from the JVASP other crop rotation systems will be developed and disseminated in response to production and marketing problems. Alfalfa has a possibility and would integrate with livestock production. Peppers can be grown in crop rotations to reduce nematode populations that attack tomatoes.

Information on crop rotation developed by the FAO crop pattern committee should be evaluated for use in Jordan and tested.

c. Alternate Crops

Alternate crops increase diversification and can often reduce the severity of other production and marketing problems outlined in this Project Paper. They usually have a good profit potential. In the Jordan Valley crop diversification has been limited and the only alternate crops developed have been vegetables. There is a need for alternate cash crops for the Jordan Valley.

Varietal screening trails will be conducted on selected crops that have potential for good production in the Jordan Valley.

The following crops are suggested for inclusion in this part of the Project:

1. Now being grown in Jordan Valley:

- | | | | |
|---------------|------------|-----------------|-------------|
| 1. potatoes | 5. wheat | 9. chickpeas | 13. peanuts |
| 2. greenbeans | 6. barley | 10. cauliflower | 14. vetch |
| 3. onions | 7. peppers | 11. Jew melon | 15. citrus |
| 4. okra | 8. lentils | 12. fresh corn | 16. grapes |
| | | | 17. olives |
| | | | 18. bananas |

2. Crops that will grow in Jordan Valley:

- | | |
|-----------------|---------------|
| 1. alfalfa | 4. sunflowers |
| 2. field corn | 5. safflower |
| 3. head lettuce | |

3. Crops that may have potential:

- | | |
|-----------------|--------------------------------------|
| 1. strawberries | 4. sweet potato |
| 2. cranberries | 5. kewi fruit (Chinese gooseberries) |
| 3. celery | |

4. Summary

A part of the JVASP will be research on crop rotations and alternate crops. Experimental data will be collected to determine which crops are feasible to produce and integrate into the current cropping patterns of the Jordan Valley.

Selected crops showing potential will be demonstrated in small plots and on farms, and if production is feasible, market demand will be tested.

6. Other Crop Production Programs and Priorities

a. Some production problems requiring local, adaptive research and extension on all crops are:

1. Fertilizer rates, requirements, timing, and placement.
2. Consumptive water use.
3. Salinity and leaching.
4. Herbicides for weed control.

b. Special problems that have been identified and need attention are: (with no attempt to be complete, other known constraints on crops currently produced in the Jordan Valley are listed here).

1. Pollination requirements of eggplant.
2. Pollination requirements of citrus.
3. Nutritional and virus problems of citrus.
4. Weed control in onion fields.
5. Factors affecting low production and quality of potatoes.
6. Virus diseases, late blight and nematodes on potatoes.
7. Potato seed production in Jordan has frequently been proposed but not implemented. Why?
8. Fusarium Wilt on green beans.
9. Downy Mildew and Botrytis rots on onions.
10. Rusts and Cockle nematode (Anguina tritici) on wheat.
11. Yield potential of different wheat varieties grown under irrigation in the Jordan Valley?
12. Downy Mildew on lentils.
13. Phylloxera on grapes.

Conclusion

The crop production program and priorities outlined herein provide the strategy and tactics to accomplish the purpose of JVASP to increase agricultural production in the Jordan Valley. Problem-solving research and extension in the Jordan Valley are presently at a low level, though many production problems have been identified and some problem-solving progress accomplished. The crop production programs and priorities proposed herein indicate what needs to be done and by inference what is not being done at the present. A major research/extension thrust is needed to increase Jordan Valley agricultural production.

Technically, given the PP assumptions, there is reason to believe that agricul-

tural production in the Jordan Valley can be substantially increased. In addition, JVASP will continue heavy emphasis on training, at all levels, during the Project.

SOCIAL SOUNDNESS ANALYSIS

I. INTRODUCTION

The major objective of this project is to provide for the development of an ongoing institutional structure which will provide research and extension services to the farmers of the Jordan Valley and the Southern Ghors. While it is realized that major strides have been made in these areas in both the agricultural and social dimensions during the past eight years, it is also obvious that the weakest link in the chain has been that of agricultural research and extension, which forms the focus of the proposed project. The major components of these activities include the horticultural, soil and pest management, irrigation, rotation and intercropping and production economics aspects of agricultural activities in the Valley. All of these are eventually intended to increase yields of marketable crops, and to benefit both the Jordanian economy and the farmers of the Valley. Benefits to farmers include both increased incomes and the reduction of risks resulting from both pest infestation and market and production fluctuations. Ancillary benefits include an increase in employment and income generation activities, an improvement in the health and well-being of all the residents of the Valley, the training of qualified corps of researchers and extension agents, and increasing the extent of effectiveness of the participation of women in the agricultural economy.

The success of the project is, of course, dependent on (1) the effectiveness of the implementing team, (2) the cultural, social and economic acceptability of any new agricultural technology by the farmers of the area, (3) the effectiveness of the linkage between the proposed institution and other existing credit, supply and marketing institutions, (4) the confidence of the farmers in the capability, competence and commitment of the implementing team, and (5) the ability to reach a large number of small farmers in the area. This analysis will address some of the major social, cultural and economic issues affecting the success of the project. Background information will be kept to a minimum, since it is available in two comprehensive reports which cover the Jordan Valley developments effort and the socio-economic status of the Southern Ghors respectively. ^{1/} The reader desiring detailed descriptions of the areas involved is referred to both of these reports. The following section describes the major elements of the agricultural system which influence the ability of Valley farmers to benefit from the proposed project. The following sections will discuss some of the major social impacts of the proposed project.

^{1/} Dajani, J.S., et al, An Interim Evaluation of the Jordan Valley Development Effort: 1973 - 1980.

U.S. Agency for International Development.

Evaluation 278-0181, August 1980, 262 pp.

Dajani, J.S., A Baseline Socio-Economic Study of the Southern Ghors and Wadi Araba, U.S. Agency for International Development Prj. 278-0221, April 1979, 35 pp.

II. THE AGRICULTURAL SYSTEM

1. Farm Structure and Management

Farms and farmers in the Valley do not conform to any common stereotype. The various Jordan Valley development laws have sought to redistribute irrigated lands in order to prevent large holdings (over 200 dunums), to provide new holdings to landless farmers, and to consolidate very small or fragmented units into viable holdings of 30 dunums or more. Dajani, et al., conclude that the redistribution effort has been a success. The most recent (1975) census of the Ghors reported 6,328 holdings operated as one technical unit. Of these, 956 were less than 10 dunums, 2,421 had 10-30 dunums, 1,630 had 30-50 dunums, 1,180 had 50-200 dunums and 141 more than 200 dunums. Land distribution has not yet been completed in the Southern part of the Jordan Valley, neither has it commenced in the Southern Ghors. Efforts to implement the land distribution law, however, are underway in both areas.

In 1975, about 20% of the land north of the Dead Sea, was in holdings of more than 200 dunums, whereas 58% of the Southern Ghor was in such large holdings. Conversely, the proportion of holdings of less than the minimum 30 dunums was 62.1% in the Southern Ghor, compared to 59.0% in the Middle Ghor and 46.4% in the Northern Ghor. Clearly, both large holdings and small are of practical importance for any successful educational program.

The number of holdings is not synonymous with number of farms or number of farmers. One farmer may operate a number of holdings, either contiguous or geographically separate. A number of individuals, whether members of families, cooperatives or associations may operate one or more holdings in common. No good data are available on the incidence of each form of operation.

Only 34.6% of the holdings and 37.1% of the agricultural land north of the Dead Sea was owner-operated in 1975. More than half was totally or partly rented, either for a share of the crop or for a fixed fee. In general, sharecropping and renting were more common as one moved southward to the more recently developed areas.

Data on ownership, sharecropping, and rental for a fixed fee tell only part of the story on farm structure. Dajani, et al., describe four common types of operation (1) resident owner-operation, (2) non-resident owner operation, where the owner lives within an hour's commute and is actively involved in farm decisions, (3) sharecropping for an absentee owner, and (4) fixed fee rental either of all one's land or of land additional to that owned. Thus there are at least four distinct types of landowners and a number of types of tenants.

Sharecroppers usually share 50% of expenses (other than labor) and output, although for new technology and share of output tends to be smaller. Dajani, et al., suggest that sharecropping in the Jordan Valley may be relatively efficient and reasonably equitable to sharecroppers because of a shortage of experienced, skilled sharecroppers. Most farm labor in the Jordan Valley is provided by foreign (mostly Egyptian) cyclical workers: a situation necessitated by the full employment economy of Jordan, and the availability of more lucrative work opportunities both in Jordan and in neighboring countries. A recent study has shown that the majority of sharecroppers made the major decision with regard to the date of planting, the date of harvesting and the method of harvesting. Other decisions pertaining to the type of crop, land preparation, quantity and kind of fertilizers, and the sale of produce are made, in most cases, by mutual agreement between the owner and the sharecropper.^{2/} A more recent study finds more evidence of a stronger decision-making role for sharecroppers.^{3/}

2. Diffusion of Innovation

Jordan Valley farmers and landowners have rapidly adopted promising new technologies. Drip irrigation, which was unknown prior to 1974, was available on 8,514 dunums in 1978-1979 and an estimated 20,000 dunums in 1981. Use of plastic was first introduced in 1972. By 1978-79, 6,015 dunums were under plastic tunnels and 741 dunums under plastic houses. Use of plastic is thought to have grown since that period though at a slower pace than prior to 1978-79. The greatest concentration is in the area between Karama and El Rama in the southern half of the Middle Ghors. ^{4/}

Compared to the traditional methods of cultivation still dominant in the Jordan Valley, these new technologies are expensive and capital intensive. Stetieh and Abbas estimated in 1977-78 that the initial investment cost per dunum of plastic houses was JD 1,718, of plastic tunnels JD 86.7, and of a drip irrigation system, JD 280. The annual fixed costs, including depreciation and interest were JD 399, JD 60, and JD 88 respectively ^{5/}. Plastic houses and tunnels are devoted mainly to cucumber production, drip irrigation to tomato production in open fields.

^{2/} Sharab, Hisham, Agro-economic Aspects of Tenancy in the East Jordan Valley. The Royal Scientific Society, Amman, 1975.

^{3/} Hyslop, John, D., Tomato Production in the Jordan Valley: A Report on a Survey of Tomato. USAID/J, 1979

^{4/} Stetieh, A. and M. Falah Abbas, A Preliminary Economic Analysis and Drip Irrigation Systems. University of Jordan, Faculty of Agriculture, 1978.

^{5/} To convert to more familiar measure of Dollars per acre multiply the above figures by 12.

The introduction of these technologies has presented farmers with a new set of managerial decisions. In order to cover the heavy fixed costs, the farmer must invest in more purchased inputs to boost yields. At the same time, plastic technology in particular intensifies the problems of infestation by pests and diseases. This means there are more expenditures to reduce the impact of infestation.

Almost all observers agree that the pace of technological change in Jordan Valley agriculture has been so rapid that at least some decision-makers may have proceeded on the basis of inadequate or misleading information. Provision of knowledge from public sources, especially research and extension, has been hampered by a hemorrhage of talent to other countries. This has been particularly severe among agricultural economists whose training permits them access to careers in banking, management, administration, etc. As a result there is a dearth of information on the economic aspects of agricultural production and marketing and on how the physical problems of managing soil, water, pests, crops, etc. affect such economic goals as profit or return on investment. Experience shows, however, that land evidence which is based on demonstrated success will convince the farmers to adopt innovative technologies.

3. Credit and Inputs

The Agricultural Census of 1975 revealed that the operators of 92.8% of all holdings in the Valley provided some of their own financing, 14.9% received some financing from their landlord, 11.0% from merchants and 6.5% from middle-men. Only 2.9% reported receiving credit from the government-sponsored Agricultural Credit Corporation.

Much of the financing for new technologies is thought to have come from private sources. In addition, since 1975, the lending activities of two other government agencies, the Jordan Cooperative Organization (JCO) and the fledgling Jordan Valley Farmers Association (JVFA) have expanded. A recent ruling by the Government of Jordan attempts to rationalize government sources of farm credit by having JVFA provide operating funds, ACC long-term credit and JCO credit to cooperative organizations.

An ongoing controversy surrounds the adequacy of the credit available to the numerous smallholders in the Jordan Valley whether credit from merchants and middle-men is unreasonably expensive, and whether credit from commission merchants gives them an unfair bargaining advantage in dealings with small-holders. To our knowledge, no empirical evidence has been presented on this issue. The Chemonics Consulting team which visited Jordan in March-April 1980 were given one commission merchant's view. This commission agent claimed that he himself borrowed money from a bank at 10% interest. He would advance 1,000 JD to a

grower with the expectation that the grower would eventually sell produce worth 5,000 JD through him. The commission merchant would charge 5% commission fee, or 250 JD. After paying the bank 100 JD he would net 150 JD for his credit advance and his marketing services. Of course, if the crop failed, the commission agent might not cover his interest costs and would have to decide whether or not to finance the farmer for another season in hopes of recouping his losses.

Clearly, much more detail is needed on the nature and risk of private credit arrangements, before any improved method of financing can be developed.

Jordan Valley agriculture draws its purchased inputs from all over the world. Included are tractors and implements, irrigation and other equipment, fertilizers, plastics and agricultural chemicals. For example, total Jordanian imports of pesticides and herbicides and phosphatic and nitrogenous fertilizers more than doubled between 1974 and 1979. Much of this was used in the Valley. In 1978, Jordan purchased agricultural chemicals from 26 different countries, including the U.K., West Germany, Cyprus, Belgium, the U.S., Italy and France. Although all labels are eventually supposed to be in Arabic, there are clearly numerous opportunities for inappropriate use of the chemicals now available.

Most foreign chemical companies are represented by private Jordanian agents. These have been criticized for overselling their products without providing adequate advice or follow-up, and for excessive prices. As in the case of credit, a number of government entities including JCO and JVFA have gone into competition with the private sector in agricultural supplies. The study by Hyslop (1979) suggested that the price of pesticides tended to be lower where JCO and the cooperative movement was strongest but found no comparable difference in fertilizer prices. Despite their potential advantages in bulk buying and greater ability for cross-subsidization of their chemical sales from other activities, neither JCO nor JVFA have shaken the dominance of the private agents. These agents remain as important mediators in educating farmers on new materials and need to be involved in any effective applied research and extension efforts related to improved use of purchased inputs.

4. Cropping Pattern

Because of the incidence of double-cropping, total area under fruit trees, field crops and vegetables in all the Ghors in 1980 was 107% of the total agricultural area. Vegetables accounted for 206,538 dunums, field crops for 44,520, and fruit trees for 39,329 dunums. Tomatoes accounted for 38% of the vegetable area, summer squash and eggplant for 13% and all melons and broad beans for about 5% each. Wheat accounted for 68% and barley for 24% of field crops. Citrus was the dominant fruit with bananas accounting for less than 5% of the fruit area.

Tomatoes accounted for about one-third of the vegetable area in the Northern and Middle Ghors and for 70% in Ghor Safi. Cucumber was relatively most important in the Middle Ghor (where there is the heaviest concentration of plastic houses) and squash in the Northern Ghor. Most citrus plantings were in the Northern Ghor and bananas in the Middle Ghor. Wheat and barley were most important in the Northern and Middle Ghors.

There has been much debate in Jordan on the benefits and hazards of heavy reliance on vegetables, particularly tomatoes, year after year. There have been many suggestions for, and studies of, alternative crops and of alternative cropping patterns. In 1973, the Ministry of Agriculture was given the authority (never exercised) to impose cropping patterns. The 5-year plan of 1976-1980, called for expansion of field crop acreage, setting targets of 30,000 dunums for clover, 40,000 for maize and 28,000 for oilseeds. These recommendations were ignored.

The issue came to a head again in Spring 1981 when the Government of Jordan had to intervene in the market at a reputed cost of JD 5 million to buy 90,000 tons of tomatoes which could not find a buyer. Although precise data are scanty, it appears that the present cropping pattern is a rational reaction to the alternative risks and returns as seen by the farmers.

Tomatoes provide reasonable yields and acceptable prices in most years and are thus the basic crop for most farmers in most years. Cucumber production in plastic houses can yield large returns but requires large infusions of capital and involves risk of large monetary losses. For minor vegetables, the markets are "thin" compared to that for tomatoes, so that price is sensitive to small changes in quantity. Grains have a longer growing season, require water over a longer period and consistently yield lower net returns than tomatoes. The return per dunum from citrus or bananas may be higher, but the risk of water cut-off in times of drought has inhibited new plantings. Fodder crops require a simultaneous development of animal production. Industrial crops, such as sugarbeet and oilseeds, require commitment of large blocks of acreage to meet minimum efficient plant size requirements. It is difficult to accumulate the needed acreage from numerous, widely dispersed, small holdings. Most farmers strongly believe that tomato production is both more profitable and less risky than the production of other crops. It is clear that the alteration of farm cropping patterns, either for the control of endemic pests and diseases or for the development of processing industries cannot be achieved unless the farmers have solid and demonstrated evidence of the improved returns and the decreased risks involved in the alternative cropping patterns.

5. Marketing

While marketing studies are specifically excluded from the scope of this project, the needs and constraints of the marketing system will be of relevance to almost every phase of the project. A pivotal role in the system is played by the commission agents operating out of the Kingdom's largest wholesale market in Amman. There are lesser wholesale markets at Irbid and Zarqa. Trade is made by mini-auction. One of the many auctioneers may call for bids on a lot (as is) when he has two or more interested buyers. Many of these mini-auctions can be held simultaneously throughout the market. Inspectors are supposed to record all sales and a daily price report is issued. These have been used as the basis for government setting of minimum retail prices.

The Director of the Amman wholesale market estimated that 10 of the 50 commission agents might do 40% of the total business, a lower estimate of concentration than had been cited by critics of the system. A spokesman for the Amman Commission Agents claimed that of the 50, only 2 or 3 were also exporters. Between 12 and 15 firms are exporters only, buying their needs both in Amman wholesale market and in the Jordan Valley. Exporters are reputed to own 1,000 refrigerated trucks ferrying produce throughout the Middle East. The spokesman claimed that only 10% (5 agents) were also landlords in the Jordan Valley, some admittedly on a large scale.

The Irbid Wholesale market has 18 commission agents. The operation is similar to that of Amman. Irbid handles local vegetables, much of the citrus from the Northern Ghors and some Valley vegetables. While there are four exporters in Irbid, only 1 has a bay in the wholesale market.

No data were available on the even smaller Zarqa wholesale market. We visited the quasi-legal assembly market at Sawalha in the Jordan Valley which is popular with local farmers. Of the 10 commission agents operating in Sawalha, 8 have partners or working relationships with agents in Amman or Irbid. Some commission agents in Irbid or Sawalha also own land in the Jordan Valley, as do merchants who supply inputs.

Since most farmers and sharecroppers have small and erratic quantities of fresh fruits and vegetables available on any day during the season, and do not have facilities for grading, storing, diverting to processing, or consigning products directly to customers, they depend on the commission agents to stand ready to buy whatever quantity is supplied on any day. This, the commission agents will usually do -- at a price. When supplies are short, prices rise rapidly. When supplies are greater than the commission agents can handle immediately, prices plunge. Beyond a certain point commission agents stop buying, and farmers must either leave their crops unharvested or hope for the government to buy the surplus. This feast or famine situation is typical of fresh produce markets the world over, and there is no reason to believe that Jordanian commission agents are any less effective than their counterparts elsewhere in similar situation.

However, for a number of reasons, a thread of unease about the role of commission agents runs through most analyses of the Jordan Valley produce marketing system. These reasons are: (1) agents appear to have a relative advantage over farmers in terms of relevant market information, (2) the agent deducts his commission even when the net price to the farmer is below production cost, (3) agents have not worked with farmers in broadening their marketing options through improvements in picking, handling, storage, etc., (4) a conflict of interest may arise when the agent is landlord or banker and at the same time marketer for a farmer or sharecropper, and that conflict will usually be resolved in the agent's favor.

The government of Jordan has made numerous, but often ineffective efforts to improve the marketing system. These efforts have been consistently marred by inadequate preparatory analysis. Too often, visiting teams of experts have accepted official assumptions or plans as accomplished facts and have made recommendations on such shaky ground. The schemes have been overambitious, seeking to start on a grand scale rather than go through the tedium of a pilot project and expand only on proven ground and experience. Staffing and organization have been a problem. The volatile fresh produce business requires that participants take instantaneous decisions and have the instincts of a gambler, attributes not usually found in civil servants with their studied examination, consultation and adherence to the chain of authority. Improvements in the marketing system are likely to come very slowly during the course of the proposed agricultural services project.

6. The Physical and Social Infrastructure

Tremendous strides have been made in restoring the infrastructure of the Jordan Valley which was severely disrupted by the 1967 war and subsequent hostilities. The population now approaches 100,000 mostly in thriving communities along the main Yarmouk-Dead Sea highway. There has been recent heavy investment in public roads, schools, basic housing, clinics and other services, but there are still serious deficiencies in the general quality of housing, community and social life compared to that which is common place in Amman, Irbid or Salt, all within one hour's commute from the Valley. Telephone communications continue to be a problem. Combined, these factors have been a serious impediment to attracting professionals in agricultural services to work in the Valley.

III. POTENTIAL IMPACTS

The research and extension activities which are to be carried out under this Project are designed to result in change. All changes have socio-cultural impacts. This analysis describes those people to be affected and the major issues confronting them.

The primary beneficiaries of this Project are the farmers of the Jordan Valley. Included are farm owners, sharecroppers, and farm managers. Most farms involved range from 10 to 200 dunums in size. Mechanical power is generally used for land preparation, and family or hired labor is employed for weeding and harvesting.

The initial target groups consist of those farmers or farmer groups who indicate a desire and willingness to try improved farming techniques and accept the associated risks. Some farmers must adopt new technologies slowly as resources permit; others with available capital and willing to accept higher risks will incorporate advanced technology more rapidly.

A secondary group of beneficiaries are other Valley residents including laborers, women, and children. Improved safety practices brought about by pesticides safety education will benefit this population. Agricultural diversification and improve income levels will be another positive impact on secondary beneficiaries. Improved agricultural skills and competencies should result from the program for this audience.

Care must be taken that those benefiting are not only those who are relatively better off. There is generally a high positive correlation between the early adopters or "progressive farmers" and their level of well-being. Moreover, experience with introducing social change suggests that these early adopters will likely be the Project's initial beneficiaries.

While the project designers recognize these problems and accept them, they also realize that the project's real challenge lies in its ability to reach the predetermined target of 50 percent of all farmers in the Valley, during the initial five years. If it is assumed that the operators of larger holdings represent the earlier adopters of innovations, then almost all operators of farms of 20 dunums or more will be reached. Needless to say, only a well-designed and carefully implemented extension program can reach the smaller, less accessible, and less initiated farmer community.

The following subsection will discuss the potential effects of the project on (1) agricultural income, (2) employment, (3) reduction of risk, (4) access to agricultural services, (5) health and safety, and (6) the role of government. A separate section will address the question of the role of, and impact on, women in the Valley.

1. Agricultural Income

Precise information on income distribution in the Jordan Valley is not available; however, Dajani, et al make some rough estimates. They report that non-Jordanian farm workers are estimated to make about \$ 170 - \$ 190 per month. Jordanian workers are paid higher wages and are preferred by farmers. The monthly wage paid to Jordanian farm workers is estimated at about \$ 255-300 per month.

There are very wide variations in the annual income of the estimated 3800 sharecroppers in the Valley. Assuming the typical sharecropper works about 25 dunums and splits the net return of JD 50 to JD 100 (\$ 170-340) per dunum with the owner on a 50-50 basis, he earns about JD 1,200 (\$ 4,100) per year. Each sharecropper's income supports about 5.2 persons on the average; thus resulting in a per capita income of JD 231 (\$ 800) per year. This places sharecroppers slightly below the national average of JD 250 to JD 350 (\$ 850 - 1,200) per year.

Of course, some sharecroppers do less well than others because they work smaller holdings and/or use more traditional practices. A five person sharecropper family working 15 dunums and using traditional practices (average net return of JD 60 per dunum), would have a per capita income of only JD 90 (\$ 300) per year. It is estimated that 20% of sharecropper families have per capita incomes of less than JD 150 (\$ 500) per year.

For the 2,000 land owning farmers in the Valley, there is an extremely broad range of farm size, technology and income levels. By making a few reasonable assumptions an estimate of average income can be obtained. Assuming a median farm size of 40 dunums and average net return (after expenses) of JD 40 to JD 80 (\$ 140-280) per dunum, per year, the per capita annual income may reach JD 462 (\$ 1,600), which is considerably higher than the national average of \$ 1,180.

Some farmers have extremely high incomes while other have little or no income, especially in bad years. However, in general, Valley land owning farmers do quite well. We estimate that about 15% of land owning farmers have per capita incomes of less than JD 150 (\$ 500) per year. This would be the income earned in an eight person farm family working 20 dunums with an average return of JD 60 per dunum. These farmers represent the group which is most inaccessible, in as far as extension is concerned. Their inaccessibility is compounded by their lack of capital and their low levels of education.

The above figures are based on traditional technologies. Farmer incomes can be increased by both the introduction of new technology and the elimination of plant disease. Experience in the Valley indicates that the use of plastic houses and drip irrigation for example, can increase

cucumber yields from 0.86 tons/dunum (under traditional technology) to 9.0 tons/dunum. Tomato yields could be increased from 1.52 to 10.0 tons/dunum. The payback period for plastic houses and drip irrigation equipment is about two years. These figures show the potential short-range effects on farmer incomes of technological change. Negative side-effects of these two particular technologies, include both increased potential for disease infestation and increased soil salinity. Both of these negative effects can be ameliorated through a serious research and extension effort. It should also be noted that it is currently estimated that the losses resulting from one problem (nematodes) amounts to 20% of the crop in a given year. It is thus clear that significant income benefits could accrue to farmers who would be reached by a strengthened extension service, and who would be able, by virtue of access to credit and supplies, to adopt the recommendations resulting from such a service.

In terms of equity, it should be noted that the new emphasis of the project on improving returns on tomatoes, and in particular combating the harmful effects of the white fly will be particularly beneficial to small farmers. They tend to have the greatest reliance on tomatoes and to grow fewest alternative crops. They currently have least access to knowledge of improved practices which would increase production and avoid harmful side-effects.

2. Employment

The agricultural census of 1978 shows that there were about 12000 permanent employee equivalents (P.E.) of paid agricultural worker in the Jordan Valley.^{6/} There were also about 9000 P.E.'s of unpaid agricultural workers. Eighty percent of the former category and sixty percent of the latter were males. The total number of female agricultural workers was about 5,600, less than 40 percent of whom were paid. The three year period between 1975 and 1978 has witnessed a 15 percent increase in male paid workers and a 20 percent increase in female paid workers. Unpaid female workers have decreased by more than 25 percent. These changes in agricultural employment patterns can be attributed to rising income and educational levels, improved technology and the availability of relatively cheap foreign labor. Further improvement in technology, rises in income and educational levels, and amelioration of pest and disease problems can be expected to further reduce the number of unpaid women workers and to attract more agricultural workers to the Valley.

^{6/} A Permanent Employee equivalent is a weighted average of the number of workers which accounts for the temporary and occasional worker equivalents provided by the agricultural census of 1978. See Dajani, et al, pp 119.

Non agricultural employment has grown at the rate of 12 percent per year between 1973 and 1979. Most of the growth has occurred in the public utilities, construction, and transportation sectors. Existing data indicate that between 1973 and 1978, female non agricultural employment doubled. Females, however, hold only about 7% of all permanent non-farm positions in the Valley. This tremendous growth in non-agricultural employment in the Valley reflects the extensive socio-economic development which occurred during the Seventies. Increases in crop yields which can be expected to result from a serious research and extension effort can be expected to generate another round of demand for service and non-agricultural employment, for both males and females.

3. Reduction of Risk

Perhaps one of the most important problems associated with agriculture, is that of continuously risking the dangers of plant infestation and disease, on the one hand, and of market fluctuations on the other. Such risks render agricultural life difficult and may even cause farmers to abandon that life-style. This is particularly true when agricultural incomes are marginal, and when alternative opportunities are abundant, as is the case in Jordan. Some of the risks appurtenant to agriculture, however, are avoidable, or at least amenable to reduction. Of particular mention are those of infestation, disease and market fluctuations. The elements of the proposed project which are directed at researching and disseminating information on the appropriate use of insecticides and pesticides, and on the pursuit of scientifically proven approaches to crop patterning, timing and rotation, can go a long way toward the reduction of losses which are attributable to poor practices in these areas. Assuring the farmer of a lower level of risk will improve both his income and morale. It will also contribute to the stability of the rural community which he is a part, and thus reduce that portion of outmigration which is attributable to a perception of lack of stability and of high risk.

4. Access to Agricultural Services

One of the major impediments to the adoption of new technology for small farmers in the Jordan Valley, is their access to such agricultural services as extension, credit, supplies and marketing. While this project is designed to provide adequate extension service, it should be recognized that unless these farmers have adequate access to the other three services, the probabilities of success will be appreciably diminished. As discussed in the previous section, both formal and informal mechanisms exist for the provision of these services, in the form of governmental agencies and commission agents. It is imperative that small farmers be assisted in accessing these organizations in order to fully benefit from the result of the research and extension effort.

5. Health and Safety

Pesticide safety is a major problem in the Jordan Valley. Estimates range from a high of 40 deaths and 310 poisonings a year to eight deaths and 70 poisonings. In any event, a serious health problem affects farmers, laborers, women and children in the Valley.

Also, food products with excessive and dangerous amounts of pesticide residues can be harmful to consumers. This could have severe economic consequences on the Valley's economy if produce were banned by local or foreign governments because of excessive pesticide residues.

Various Ministries in GOJ are concerned about pesticide use in Jordan. In July of 1981 the Minister of Agriculture directed the Regional Agriculture Directors to place special emphasis on pesticide safety. In addition, the seriousness of the problem was brought out by two USAID sponsored studies in 1980.

The Project will emphasize research into integrated pest management methods for pest control, and the development of a pesticide safety educational program. If such a program is well-designed and if it is targetted at such specific audiences as fieldmen, applicators and farmers, as well as women, health clinic operators and school children, it should contribute positively to the amelioration of the dangers inherent in the use of some pesticides, and thus to the avoidance of both unnecessary deaths and injuries and potential economic losses. The increased safety for consumers both in Jordan and in other countries is another positive impact. It should also be noted that the potential contamination of underground water sources which could result from misuse and improper disposal of containers and leftover pesticides may also be reduced, with the concomitant health benefits which will accrue to all residents of the Valley.

6. The Role of Government

Most technological and agricultural innovation in the Jordan Valley has been introduced by private entrepreneurs and salesmen who have aggressively worked on convincing farmers to purchase their goods. Government extension work has been poor and suffering from the lack of an overall agricultural policy. Most Government extension workers do not reside in the Valley and do not have adequate transportation for carrying on with their work. Their compensation is much lower than their counterparts in the private sector, and somewhat lower than their colleagues in other independent governmental agencies. This situation has led to low morale, a low level of commitment, a high turnover rate, and a low level of effectiveness. More importantly, it has resulted in a general environment of lack of confidence and credibility between farmers and extension workers on the one hand, and between extension agents and the private sector on the other hand. The ultimate loser, of course, is the small farmer who is not reached by

extension agents, and /or who may find himself purchasing equipment and supplies which are not necessarily best suited for his needs. The small farmer is obtaining objective know-how, since he does not have access to the professional management and professional advice which the larger farmer can obtain and pay for. In order to better serve these small farmers, many of the constraints described above must be removed, as a first step toward building the farmer's confidence in the government-supplied service, and toward building up the credibility of government extension workers. By making the job of the extension worker more attractive and competitive, better workers can be attracted and retained. By building-in incentives, their morale can be improved. By providing transportation and housing in the Valley, extension workers become more accessible to the farmers. And above all, by demonstrating the benefits to be derived from heeding their advice, the credibility can be established. The Project Paper addresses all these issues, and to the extent that they can be achieved, the project will be successful. Its success will then result in a capability to develop and implement an agricultural policy which would benefit both the economy of the country and the well-being of the average farmer.

IV. THE ROLE OF WOMEN

Women play an important role in the Valley's economy and development. They constitute one quarter of the total labor inputs in the Valley: 20% of all paid labor and 40% of all family unpaid labor. The lives and attitudes of women in the Valley have been influenced by the variety of development projects which have been completed there during the past few years.

While about 90% of all women of age 15 and above were illiterate in 1973, this percentage has dropped to about 77% in 1978. The number of females in school has increased by 77% during the same period, with the largest relative strides made in both the preparatory and secondary stages in which growth was 109 and 181 percent, respectively, during the same period. This jump accounts, at least partially, for a drop in the number of women who work on an unpaid basis in family farms. It should be noted, however, that the number of females per 10,000 population who are actually enrolled in school, continues to lag behind the national average by about 30 percent. Other reasons for the drop in the number of unpaid women working in agriculture include the combination of increased farm income resulting from better yields and higher agricultural prices, and the availability of cheap foreign labor. These two factors have probably contributed to the substitution of this labor for unpaid work by women.

As part of an environmental assessment for Stage II of the Jordan Valley Development Project, Arthur D. Little, Inc. conducted interviews with more than 40 Valley women. ^{7/} It was concluded that female participation in the agricultural labor force is correlated with poverty, and

^{7/} Arthur D. Little, Inc., Environmental Assessment for the Proposed Maqarin Dam and Jordan Valley Irrigation System Project. Cambridge, Mass. Arthur D. Little, Inc., July 1979.

that paid women laborers were predominantly widows, single, or members of very poor families by village standards. There are about 2000 women who are employed in paid agricultural jobs. Their low economic status is reinforced by the wage structure which pays women at only half the rate of males, including foreign males. This discrepancy is justified by such comments as: "men work harder than women", and "men's work is harder than that of women". Assuming that a woman is the only wage earner in her household, as happens often when children attend school, her annual income, including some overtime, would probably total about \$ 680. If she supports a family of three, herself plus two children, their per capita income is only \$ 226, considerably lower than Jordan's national average of \$ 610.

In addition, rural women care for each family's domestic animals: cows, goats and chicken. However, the most important responsibility of most rural women, of both high and low income, is carrying the family's domestic water, typically about $\frac{1}{2}$ to $1\frac{1}{2}$ miles each day from a public well or tap. The piping of water is quickly reaching an increasing number of households, and is planned for all houses in the Valley. The main transmission lines and associated reservoir have been completed, and work on distribution networks is currently underway.

Nearly all women interviewed stated their desire to limit their family's size. However, their efforts have been hampered to date by lack of clinics and clinic female staff. Many women would like to improve their skills, most think primarily of household skills, such as nutrition, child care, sewing, spinning, and embroidery, rather than marketable skills. Nearly all responded favorably to the establishment of community centers; these centers and their programs were viewed primarily as social outlets, rather than as opportunities for developing employable skills.

Although many of the women work in agricultural activity, either with their husbands or as paid laborers, only those of Karama expressed an interest in improving their agricultural skills. To other women, working in the fields indicates low status. In general, those women in the most desperate financial circumstances, namely widows and wives and daughters of very poor families were interested in finding better jobs and earning more money. Most said that child care would not be a problem, since their mothers-in-law or eldest daughters would care for the children.

Awareness and understanding of economic and social development processes increased with literacy. Female teachers were the only women who felt comfortable talking about how local decisions were made, about the types of community development projects most suitable for the village, and about investment strategies.

Although the Valley women are energetic and vital, they expressed boredom with their lives. The level of modernization in rural Jordan is high as measured by exposure to the outside world, urban-rural linkages, and attitudes toward change. The constricting lives of rural women is manifested throughout the Third World by the migration of young women to urban centers at a rate which approaches that of young men.

It is unlikely that an increasing out-migration of educated Valley women will occur over the next generation. Both mothers and daughters interviewed in the Little survey aspire to achieve high educational levels and to qualify for occupations such as teachers and nurses. This is at least partially attributable to increased levels of education and to exposure to urban ways of life which are occurring as a result of improved services. Women, for example, are being relieved from the duties of carrying domestic water, since water supplies systems have or are in the process of being installed in most parts of the Valley. The introduction of electricity and the concomitant acquisition of appliances such as refrigerators, and television sets also contributes to the urbanization of attitudes of both men and women in the Valley.

Work available to females has traditionally been repetitive and unchallenging. The more challenging tasks of decision-making, marketing, and equipment handling have traditionally been considered man's work. While no major program has been undertaken to train women for these more challenging tasks, JVA has endeavored to hire women for work in the grading and marketing center at Arda, where about one half of all workers during the first experimental season in 1980 were women. They were paid the same as their male co-workers, and were provided with transportation to and from the job. It is interesting to note that this short experience is already having an impact on the attitudes of males, who sometimes concede that "Women are at least as good, perhaps better" than men for this type of work. This type of transformation, however, is inevitable as a result of higher levels of education and aspiration among Valley women.

In an effort to assess the attitudes of Valley women toward work in agricultural industries and particularly in the Arda grading and marketing center, the JVA Planning and Analysis Unit conducted a study in which 185 women residing within 15 kms. of Arda were interviewed.

Half of the women interviewed were working, and two thirds of those working were unpaid. No significant differences in the literacy rate was found between working and non-working women. The probabilities of working in agriculture, however, have been found to decline as the women's level of educational attainment increased.

Of those women not working, 39.2% cited their family's objection as the main reason for not joining the labor force. Other reasons given included being occupied in raising a family (47.9%), no need to work (6.8%), and other reasons (6.1%). When asked about their willingness to work in the grading and marketing center, 11.9% of the total sample provided a positive response.

Three quarters of those willing to work in the Center preferred work in the mornings, while 13.6% preferred the afternoons or evenings in order to devote the mornings to their homes and families. The average individual expected pay was (\$ 200) per month plus transportation to and from work. When asked whether they would be willing to learn how to operate farm machinery and be subsequently employed in that line of work, 14 women provided positive responses, with the provision that employment be on their family farms. Some of those who rejected the idea cited such reasons as "this is a man's job", or "our families would not permit this".

It is clear that while many social and cultural values stand in the way of large-scale employment of women in other than family-sponsored agriculture, some women are getting increasingly involved in paid non-family-sponsored agriculture or non-farm employment. This is occurring as a result of education and/or financial need. The willingness to participate in such activities is highest among younger women with few family responsibilities and with some level of education.

Women's status in Jordan varies according to the district in which they live and the class of society to which they belong. Women in traditional (less-educated) rural society do not mix with men and, therefore, male visitors will generally only meet with men. However, women may meet their nearest male relations. There are, in fact, almost separate societies for men and women. This system keeps women away from most public and community activities and reinforces their role in the household.

The woman's world must be her home, her basic tasks are cooking, cleaning, nursing children, etc. Girls drop out from school at an early age. By the time a girl acquires basic skills, such as reading and writing, any further education might be regarded as harmful for a happy married life. One feature of this social class is that it is the woman's father or husband who decides whether she should work or continue her education and what sort of a job or education can be undertaken. The men of this social class can also refuse to share in household work because it is regarded as a woman's job and hence inferior.

There is a strong belief that the woman's place should be confirmed to the house and that the man is responsible for supporting the family. For instance, the term hurma, used for the female in this society, implies something forbidden or something to be protected. In traditional rural society, therefore, the man whose wife is working may lose status on account of the implication that he is not able to support his family properly.

However, many factors today are encouraging more of these women to work. These include higher costs of living which require the homemaker to contribute to the family income. It may also be the influence of women who have achieved a higher educational level and can persuade their parents to allow them to work. Increases in the number of paid working women in recent years is a testament to that. It is clear, however, that no effort is presently underway to integrate women into the agricultural economy. A recent survey of rural women involved in agricultural business in the Valley showed that all the women interviewed had never been advised by an extension agent, invited to an agricultural demonstration or taken part in any agricultural discussion.^{8/} Not only will reaching those women integrate them into the agricultural economy and increase their family incomes, but it should also help them better operate their small house farms which are typical in the Valley, and which usually consist of poultry and a small number of livestock. This extension should also result in improved nutritional and hygienic practices. There is every evidence that Valley women are willing to adopt better practices in these areas and that they have the potential of better contributing to family income and the agricultural economy, if given the chance. Cultural factors, however, preclude reaching them through male extension agent. The availability of female agents is necessary for communicating with the Valley's women, and for allowing them to better contribute to the economy of the Valley.

V. CONCLUSIONS

The former description and analysis of the different components of the agricultural system in the Jordan Valley leads to the conclusion that the proposed research and extension project has the potential of positively contributing to the economy of the country, to the incomes of those involved in both agricultural and non-agricultural activities, and to the general well-being of the residents of the Valley. The extent of the project's success, however, is dependent on the ability of the implementation team to alleviate the problems which have hitherto hampered the success of similar efforts. These problems include (i) the ability to attract and retain committed extension agents, (ii) the ability of these agents to reach small farmers and to establish their credibility with them, (iii) the ability of the extension agents to coordinate their work with other existing marketing, supply and credit organizations and to improve farmers access to these organizations, (iv) the ability to demonstrate the technical and economic viability of suggested innovations, and (v) the ability to better integrate women into the process of agricultural production through the use of a well-designed extension program which is targetted to women in particular.

^{8/} Hammad, Hassan, Problems and Prospects of Women in Rural Development in Jordan. M.A. Thesis. Reading University, England, 1980

The data provided in this analysis and the studies described above point out to the fact that in spite of the absence of an effective extension service, strides have been made in the past few years in such areas as improved technology, increased yields, higher incomes, more agricultural and non-agricultural jobs, and higher levels of participation by women. This historic change suggests that farmers have the potential for learning and innovating, and that the residents of the Valley have the interest in and the willingness to undergo social change. This progress, however, has not been without misgivings. Foremost among these is the fact that innovations which are championed by the private sector do not necessarily have a long-term perspective. It is not clear to the farmer, for example, what negative impacts will result from these innovations in the long-run. It is also possible that farmers are not necessarily adopting the most economical and/or suitable technologies. Another misgiving is that the richer farmers are the one most likely to adopt innovations, and the ones in which a private operator functioning with a profit motive is most interested in. This results in widening the productivity yield, and income gaps between agricultural holdings. A third misgiving is that the need for assisting women to better participate in the agricultural economy has not been addressed in any systematic way.

The proposed project has the potential for addressing these issues, for filling the gaps which have hitherto not been systematically addressed, and thus for contributing to the improvement of the long-run productivity and well-being of the farmers of the Jordan Valley.

ANNEX I JOB DESCRIPTION

JORDANIAN

1. Extension Agents
2. Extension Training Specialist
3. Subject Matter Specialists - General
4. Subject Matter Specialist - Integrated Pest Management
5. Integrated Pest Management - Research
6. Horticulturalist - Research
7. Soils and Water - Research
8. Associate Specialists - General
9. Production Economist - Research
10. Director

EXPATRIATE - LONG TERM

1. Integrated Pest Management - Plant Pathology
2. Production Economist
3. Soil Scientists
4. Horticulturalist
5. Horticulturalist - Vegetables
6. Integrated Pest Management - Entomology
7. Integrated Pest Management
8. Chief of Party - Plant Pathology

T D Y

1. Pesticide Management Specialist
2. Horticulturalist - Citrus
3. Extension Administration and Organization
4. Extension Information
5. Extension Program Development Specialist

JORDANIANS

JOB DESCRIPTIONS

TITLE : Agricultural Extension Agent (Total 10)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Extension Training Specialist

Receives pre-service and in-service training from project training unit consisting of specialists and researchers. Exercise judgement in his own area. Submits reports on the results of his work to the Project Director.

QUALIFICATIONS:

- A. Academic: Has a B. Sc. degree in an agricultural or a related field.
- B. Experience: Has a practical agricultural background. Lives in the area and knows local farming conditions.
- C. Personal: Must have demonstrated inter-personal skills and the ability to work as a team member.

DUTIES:

- 1. Responsible for identifying specific production problems of farmers.
- 2. Develop and implement programs to provide information and assistance to farmers.
- 3. Teach farmers to make the best and most efficient use of available resources.
- 4. Collaborate with specialists in planning and prioritizing problem solving research programs.
- 5. Assist specialists and researchers in developing field and demonstration trials on farms.
- 6. Provide on-farm visits for the purpose of technology diffusion.
- 7. Carry out training meetings and demonstrations with groups of farmers.
- 8. Develop an annual plan of work, evaluate programs and prepare annual reports.

TITLE : Extension Training Specialist (1)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Master's degree preferred in an agricultural or related field.
- B. Experience: Practical agricultural background. Some background or training in extension program design or comparable field experience. Teaching experience desirable.
- C. Personal: Must have demonstrated inter-personal skills and the ability to work as a team member.

DUTIES:

1. Provide training and guidance to specialists and agents in principles and methods of extension to facilitate the transfer of research findings to farmers.
2. Design, test, and monitor alternative methods for involvement of farmers with specialists and agents in agricultural production programs.
3. Design, test, and monitor alternative methods whereby communications can be improved between project staff and farmers.
4. Systematically obtain and evaluate feedback from farmers, project staff and others concerning the impact of production-education programs.
5. In cooperation with researchers and specialists translate research findings into language or other dissemination approaches that are compatible with farmers' literacy levels and cultural backgrounds.
6. Serve as liaison between Project Director and staff of the Agricultural Information and Press Section of DR & E. Secure needed support for publication of bulletins, pamphlets, news releases and radion and TV programs.
7. Assist specialists in designing and evaluating training programs appropriate for agents and farmers.
8. Document in reports, and other appropriate publications major research and extension findings useful to other agricultural development agencies.
9. Design training aids and develop training curricula.

EXTENSION SUBJECT MATTER SPECIALIST (SMS) - General Statement (total 3)

TITLE : Extension Subject Matter Specialist
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Master's degree in agriculture or closely related field.
- B. Experience: Extension or research experience desired. Has practical agricultural background. Knows local farming conditions. Teaching experience desirable.
- C. Personal: Must have demonstrated inter-personal skills and the ability to work as a team member.

DUTIES:

- 1. Plan and implement educational programs designed to influence agricultural productivity in the Jordan Valley.
- 2. Design comprehensive programs to give farmers effective production planning and information required for decisions.
- 3. Provide research workers with information on farmers' needs by bringing practical field problems of the farmers to researchers.
- 4. Train agents in technical subject matter, recommended production technology, and strategies for transferring technology to farmers.
- 5. Keep informed of the latest developments in research.
- 6. Together with researchers, other SMSs and agents design and carry out a program of field trials on farmer's fields.
- 7. Monitor field trials and ascertain results on a continuing basis.
- 8. Review and collect available research and production data from the MOA and other agencies.
- 9. Organize and process research material so that it can be presented to others. This includes writing bulletins, use of mass media, etc.
- 10. Develop an annual program of work which includes a work plan and a means of evaluating it.
- 11. Submit annual reports on accomplishments.

TITLE : Subject Matter Specialist (SMS) Integrated Pest Management (IPM)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. in entomology, plant pathology, integrated pest management or plant protection; Ph. D. desirable.
- B. Experience: Experience in research or extension and/or on an integrated pest management team desirable.
- C. Personal: Must have demonstrated inter-personal skills and the ability to work as a team member. Agricultural background desirable.

DUTIES:

1. Collaborative with research and extension scientists in the development and planning of problem-solving research programs.
2. Assume leadership in development of extension integrated pest management (IPM) programs.
3. Develop training programs on IPM for in-service training of extension agents.
4. Prepare extension bulletins and other mass media related to IPM.
5. Develop a diagnostic lab for pests of vegetables and fruits in the Jordan Valley with management recommendations.
6. Collaborate with extension agents in on-farm demonstrations.
7. Assume leadership in pesticide safety educational program.
8. Supervise assigned Associate Specialists.
9. Participate in training (in-service and formal course work) and stay abreast of new advances in integrated pest management (IPM).
10. Assist in evaluation of JVASP as a whole and in particular the IPM aspects.
11. Prepare annual plans of work and reports.

TITLE : Integrated Pest Management Specialist - Research (1)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. in entomology, plant pathology, integrated pest management or plant protection. Ph. D. desirable.
- B. Experience: Experience in research or extension and/or an integrated pest management team desirable. Agricultural background desirable.
- C. Personal: Must be able to maintain good personal relationships with other members of the Project staff, government officials and growers. Must be highly motivated to make research successful even if personal hardship is involved, including working more than normal hours and staying in the Valley when necessary. Must understand agriculture in the Valley and the soil and water constraints to production in the Valley. Must appreciate the importance of extension personnel in planning, conducting and reporting research. Must communicate fluently in both Arabic and English.

DUTIES:

1. Collaborate with other scientists in development of an integrated pest management program on vegetables in the Jordan Valley.
2. Assume leadership in problem solving research on integrated pest management.
3. Assemble data from Jordan and overseas on the latest scientific advances relating to integrated pest management for incorporation into experimental programs.
4. Supervise Associate Specialists and laborers.
5. Publish research results.
6. Prepare annual plans of work and reports.

TITLE : Soil and Water Research Specialist (1)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. required, Ph. D. preferred, in soils and/or irrigation-drainage.
- B. Experience: At least 5 years of total job experience, including not less than 2 years of soil and water research on problems closely related to Jordan Valley agriculture.
- C. Personal: Must be able to maintain good personal relationships with other members of the Project staff, government officials and growers. Must be highly motivated to make research successful even if personal hardship is involved, including working more than normal hours and staying in the Valley when necessary. Must understand agriculture in the Valley and the soil and water constraints to production in the Valley. Must appreciate the importance of extension and be willing to work cooperatively with extension personnel in planning, conducting and reporting research. Must communicate fluently in both Arabic and English.

DUTIES:

1. Identify and prioritize research needs in soil and water, in close cooperation with other research and extension Project personnel.
2. Design and conduct research on soil and water problems, providing leadership, and supervision of technical staff and laborers.
3. Analyse and report research and demonstration results in cooperation with extension when appropriate.
4. Advise Project staff on procedures and precautions regarding the use of research results.
5. Be cognizant of related studies in the Valley and elsewhere, and coordinate work with that of others where appropriate.

TITLE : Horticulture Research Specialist (1)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. required, Ph. D. preferred, in an aspect of horticulture directly related to production of vegetables and/or fruit.
- B. Experience: At least 5 years of total job experience, including not less than 2 years of research in horticulture directly related to the production of vegetables and fruit appropriate to Jordan Valley conditions.
- C. Personal: Must be able to maintain good personal relationships with other members of the Project staff, government officials and growers. Must be highly motivated to make research successful even if personal hardship is involved, including working more than normal hours and staying in the Valley when necessary. Must understand agriculture in the Valley and the horticultural constraints to production in the Valley. Must appreciate the importance of extension and be willing to work cooperatively with extension personnel in planning, conducting and reporting research. Must communicate fluently in both Arabic and English.

DUTIES:

1. Identify and prioritize research needs in vegetables and fruit production in close cooperation with other research and extension Project personnel.
2. Design and conduct research on horticultural problems, provide leadership and supervision of technical staff and laborers.
3. Analyse and report project results in cooperation with extension personnel when appropriate.
4. Advise Project staff on procedures and precautions regarding the use of research results.
5. Be cognisant of related studies in the Valley and elsewhere, and coordinate work with that of others where appropriate.

TITLE : Associates (total 8)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO : Director, JVASP. Is directly supervised by respective
Subject Matter Specialist and/or Researcher

QUALIFICATIONS:

- A. Academic: B.S. in agriculture or closely related field.
- B. Experience: Extension or research experience desirable.
- C. Personal: Must have demonstrated inter-personal skills and the ability to work as a team member. Agricultural background preferred.

DUTIES:

1. Collaborate with designated SMS and/or Researcher in the development of experimental design and methodology in subject matter discipline.
2. Perform routine analytic work, establish research and/or demonstration plots, record data.
3. Design and develop topic-specific research and extension programs.
4. Keep up with subject matter literature.
5. Participate in both short and/or long-term training.
6. Develop an annual plan of work and narrative report.
7. Participate in on-farm demonstration and on-site research.
8. Develop leadership qualities in area of expertise and extension methods.
9. Evaluate and monitor field trials and demonstrations.

TITLE : Production Economist, Research (1)
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. in agricultural economics with specialization in production economics, farm management, or farm financial management. Knowledge of quantitative methods.
- B. Experience: 2-5 years experience in research or extension in production economics or farm management.
- C. Personal: Evidence of initiative and management ability in design and execution of research programs and in supervision and training of subordinates.

DUTIES:

- 1. Gather information from Jordan and overseas on the latest scientific advances in production economics and farm management.
- 2. Collaborate with other scientists in analyzing existing farm management schemes in the Jordan Valley.
- 3. Develop procedures applicable by farmers to decisions on enterprise choice, cropping patterns and investment procedures.
- 4. Publish research results and farmer guides.
- 5. Provide training and supervision in production economics to subordinate researchers and extension workers.
- 6. Prepare annual work plans and reports.

TITLE : Project Director
LOCATION : Jordan Valley Agricultural Services Project at Deir Alla
REPORTS TO: Director of the Department of Research and Extension, MOA,
and to Agricultural Program Officer, USAID/J

QUALIFICATIONS:

- A. Academic: Ph. D. in an agricultural science with relevant administrative experience.
- B. Experience: Minimum of five years experience in research and/or extension. Prior teaching experience desirable.
- C. Personal: The most critical requirement for this position is an administrator of experience and proven ability. He must have leadership, mature judgement and personnel management skills. Must be oriented toward problem solving.

DUTIES:

1. Full responsibility and authority for staffing, planning, implementing and managing the project's program, with budgetary control of the funds allocated to the JVASP.
2. Responsibility for recruiting, selecting, hiring, supervising, and evaluating performance of project staff.
3. Determine and formulate project management policy in cooperation with other project personnel.
4. Identify constraints to the accomplishments of the objectives of the Project, and, if necessary call these to the attention of the Minister of Agriculture for resolution.
5. Integrate and coordinate project financial matters including capital and operating budgets.
6. With the Senior Expatriate Advisor give operating guidance to other staff members.
7. Establish and maintain linkages between this Project and other agricultural development agencies in the Valley.
8. In collaboration with the Senior Expatriate Advisor identify, select and schedule candidates for all short term, graduate and special training opportunities.
9. Initiate and develop annual program for the Project. This will include the development of problem statements, identification of needs, formulation of objectives, outline of activities, and evaluation plans. Project staff will participate in this effort. Periodic and annual reports will be communicated to the Ministry through the Director of the Department of Research and Extension and to other organizations.

10. Responsible for coordination of research and extension activities with other Departments and Agencies of the MOA operating in the Jordan Valley.
11. Will collaborate with counterparts in developing plans for the integration of extension activities into the system of technology development, and for the transmittal and adoption of technical information.
12. Will work cooperatively with the Senior Expatriate Advisor in the accomplishment of these duties.

EXPATRIATES:

TITLE : Integrated Pest Management Specialist (IMP) - Plant Pathology
LOCATION : Deir Alla, Jordan as a member of the Jordan Valley Agricultural
Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in integrated pest management, plant pathology or a closely related field.
- B. Experience: 2-5 years of IPM or plant pathology research and/or extension. Experience in virology highly desirable.
- C. Personal: Ability to function effectively in research and extension and relate to people. Ability to work as a member of an interdisciplinary unit. Demonstrated ability to plan and carry out IPM research/extension programs.

DUTIES:

1. Develop, in collaboration with appropriate research and subject matter specialists and extension agents, an IPM problem-solving research/extension program for vegetables, primarily plant pathogens of tomatoes, in the Jordan Valley.
2. Conduct collaborative problem-solving research to develop IPM package for reducing pest(s) damage to vegetables.
3. Demonstrate, in close collaboration with counterparts, the potential and scope of IPM researchers and subject matter specialists (SMS).
4. Develop IPM training programs for MOA researchers, Subject Matter Specialists, and extension agents.
5. Collaborate with extension agents in disseminating for farmer adoption IPM package components as they become available.
6. Consult and coordinate with scientists from other organizations involved in IPM research and extension on vegetables.
7. Collaborate in the preparation and publication of research results and extension bulletins.
8. Assist in pesticide education programs.
9. Assist in experimental design of on-farm demonstration plots.

10. Develop a means for evaluation of the IPM program
11. Assist in establishing a plant pest diagnostic laboratory.
12. Prepare annual work plans and reports.

TITLE : Production Economist
LOCATION : Deir Alla, Jordan as a member of the Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

NATURE OF POSITION:

This individual will be the production economist on a four-person team implementing an agricultural services project in the Jordan Valley. The assignment will involve working closely with team members and Jordanian counterparts to set up a functioning research and extension center at Deir Alla in the Jordan Valley.

QUALIFICATIONS:

- A. Academic: Ph. D. in agricultural economics, with emphasis on production economics preferred.
- B. Experience: Experience in project planning, implementation and leadership. Interest and ability to work effectively in applied research and extension.
- C. Personal: Ability to work effectively in a multidisciplinary team in a developing country.

DUTIES:

1. Identify major inadequacies in farm management information currently available to individual farmers, agricultural development agencies and GOJ, and develop systems for providing needed information.
2. Assist farmers of limited literacy in developing farm record systems useful for decision making.
3. Demonstrate simple methods of analyzing farm records to improve decision making on enterprise choice, crop mix, production practices, risk analysis and investment analysis.
4. Work with crop production specialists, integrated pest management specialists, soil and water specialists, etc. in the design and analysis of research and extension demonstrations, experiments and pilot projects.
5. Provide training and supervision in production economics to subordinate researchers, and extension workers.

TITLE : Soil Scientist
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services
Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in a soil science required, or an M.S. with at least 15 years of relevant experience.
- B. Experience: Substantial experience either full time or in conjunction with other work in the laboratory analysis of agricultural soil, plant tissue and water samples, including sampling and sample preparation. Organization and management of testing laboratories highly desirable. International experience desirable.
- C. Personal: Must be able to maintain good relations with other project personnel, both national and expatriate. Must be motivated to achieving effective programs of soil, plant tissue and water testing. Must be interested in training laboratory technicians.

DUTIES:

1. Advise the Project Director on the establishment and operation of testing programs for agricultural soils, plant tissue and irrigation and drainage water in the Jordan Valley, including space, equipment, sampling, testing, staffing and management.
2. Specify, order and install laboratory equipment.
3. Train lab personnel in sampling and analysis techniques and in management of testing laboratories.
4. Assemble base-line data describing soils on the Project sites for use in subsequent experiments.
5. Assemble general information on soils in the Jordan Valley for use in selection of sites for research or demonstration.
6. Assist other project personnel in laying out test plots to minimize unwanted soil variation.
7. Assist other Project personnel in establishing micro-climate measuring stations at Project sites, including soil micro-climate.
8. Prepare annual work plans and reports.

TITLE : Horticulturalist
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in an aspect of horticulture dealing directly with production of vegetables and/or fruit.
- B. Experience: At least 5 years in research directly related to production of vegetables and/or fruit, particularly citrus. Field experience with production of both vegetables and fruit is highly desirable. International experience is useful.
- C. Personal: Must be able to maintain good relations with other project personnel both national and expatriate. Must be motivated to achieve effective applied research and demonstration work in cooperation with other project personnel.

DUTIES:

1. Become familiar with constraints to horticulture production in the Jordan Valley, and work with others in the Valley to remove those constraints.
2. Advise the Project Director on plans and procedures to achieve the horticultural objectives of the JVASP.
3. Advise, assist and train on-site project personnel in the conduct of applied research for the production of both vegetables and fruit, particularly citrus, which are common or have potential for production in the Jordan Valley.
4. Advise, assist and train project personnel in the analysis, reporting and publication of research results.
5. Provide continuity to the contributions of all horticultural personnel; continue work on vegetable and/or fruit in progress and initiate work still needed.
6. Cooperate with other project personnel in the conduct of multi-disciplinary studies.
7. Prepare annual plans of work and reports.

TITLE : Horticulturist - Vegetables
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project.
One-year assignment implementing research/extension programs
in collaboration with MOA.
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in horticulture.
- B. Experience: 3-5 years of research and/or extension on vegetables.
- C. Personal: Ability to function effectively in research and extension and relate to people. Ability to work as a member of an interdisciplinary team. Demonstrated ability to plan and carry out vegetable research/extension programs.

DUTIES:

- 1. Evaluate experiments in progress and farmer practices in relation to tomato production.
- 2. Collaborate with Project members in design and development of varietal trails and screening programs for yield data and pest resistance.
- 3. Collaborate with other Project staff in the development of experimental programs on horticultural practices and tomatoe yields.
- 4. Provide training in tomato horticultural practices to Project staff.
- 5. Demonstrate in close collaboration with counterparts the potential and scope of the Horticultural positions.
- 6. Collaborate in the publication of research results and extension materials.
- 7. Collaborate in dissemination through the extension agents of new horticultural practices ready for adoption by farmers.
- 8. Prepare annual plans of work and reports.

TITLE : Integrated Pest Management Specialist (IPM) - Entomology
LOCATION : Deir Alla, Jordan, as a member of Jordan Valley Agricultural
Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in integrated pest management or closely related field.
- B. Experience: 3-5 years of IPM research and extension experience.
- C. Personal: Ability to function effectively in research and extension and relate to people. Ability to work as a member of interdisciplinary team.

DUTIES:

1. Develop, in collaboration with appropriate research and subject matter specialists and extension agents, an IPM problem-solving research/extension program for vegetables, primarily tomatoes, in the Jordan Valley.
2. Conduct collaborative problem-solving research at unit stations to develop an IPM package for reducing pest(s) damage to vegetables.
3. Demonstrate, in close collaboration with counterparts, the potential and scope of the position of IPM researchers and subject matter specialists (SMS).
4. Develop IPM training programs for MOA/IPM researchers, SMS-IPM and extension agents.
5. Collaborate with extension service in dissemination of IPM package components ready for adoption by farmers.
6. Consult and coordinate with scientists from other organizations involved in IPM research and extension on vegetables.
7. Collaborate in the preparation and publication of research results and extension bulletins.
8. Assist in pesticide education program.
9. Assist in experimental design and establishment of on-farm demonstration plots.
10. Develop a means for evaluating the IPM program.
11. Assist in establishing a plant pest diagnostic laboratory.
12. Prepare annual plans of work and reports.

TITLE : Integrated Pest Management Specialist (IPM)
LOCATION : Deir Alla, Jordan, as a member of Jordan Valley Agricultural
Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in integrated pest management or closely related field.
- B. Experience: 2-5 years of IPM research and/or extension.
- C. Personal: Ability to function effectively in research and extension and relate to people. Ability to work as member of interdisciplinary unit. Demonstrated ability to plan and carry out IPM research/extension programs.

DUTIES:

- 1. Develop and continue, in collaboration with other scientists an IPM program for crops in the Jordan Valley.
- 2. Conduct collaborative problem-solving research aimed at developing IPM packages for reducing pest(s) damage to crops.
- 3. Demonstrate, in close collaboration with counterparts, the potential and scope of the positions of IPM researchers and subject matter specialists.
- 4. Collaborate with extension service in dissemination of IPM package components ready for adoption by farmers.
- 5. Consult and coordinate with scientists from other organizations involved in IPM research and extension.
- 6. Collaborate in the preparation and publication of research and extension publications.
- 7. Assist in experimental design and establishment of on-farm demonstration plots.
- 8. Assist in the operation of the plant pest diagnostic laboratory.
- 9. Prepare annual plans of work and reports.

TITLE : Senior Expatriate Advisor (Chief of Party)
LOCATION : Deir Alla, Jordan, as senior advisor to the Project Director, and chief of party for expatriates assigned to the Jordan Valley Agricultural Services Project to implement a research/extension project in collaboration with MOA/Jordan.
REPORTS TO: Jointly with Project Director to Director of Research and Extension/MOA; also to Campus Coordinator and Contractor's University.

QUALIFICATIONS:

- A. Academic: Ph. D. in an agricultural science.
- B. Experience: 10-15 years experience in an agricultural science field with a minimum of 3 to 5 years administrative experience. Extension experience highly desirable. Experience in a developing country.
- C. Personal: Ability to function effectively in research and extension and to relate to people. Demonstrated leadership, mature judgement, and personnel management skills. Ability to organize and work as a member of a team oriented towards problem solving.

DUTIES:

1. Assist and advise the Project Director on all aspects of the Project.
2. Collaborate with Project Director in integrating and coordinating Project's efforts and financial matters, including capital and operating budgets.
3. Provide overall planning expertise for the Project.
4. Collaborate with Project Director to identify constraints to the accomplishment of the objectives of the Project.
5. In collaboration with the Project Director identify, select and schedule candidates for all short term, graduate, and special training opportunities.
6. Collaborate with Project Director to give operating guidance to all staff members.
7. Assist in the recruitment, selection and placement of all staff.
8. Advise and assist in the development and performance of research and extension programs in his/her area of expertise.
9. Serve as the contractor's representative with the officials of the Ministry of Agriculture of Jordan, USAID/J, and other organizations. Serve in a cooperative, liaison capacity with appropriate GOJ/MOA officers, representatives of other donor agencies, and other agriculturally related organizations.

10. Administrative responsibility in regard to contractor obligations, agreements and requirements and responsibility for expatriate scientists (including long-term and short-term personnel).
11. Manage the Contractor cash account and keep all necessary records as to expenses. Provide monthly reports to the Contractor.
12. Prime responsibility, with Project Director for ordering commodities; for the Contractor, maintain inventory, and report receipt of commodities and assist Contractor in tracing and locating or making claim for lost shipments.
13. Responsible for all non-professional problems encountered by expatriates, resolution of which contributes to Project goals.

TDY

TITLE : Pesticide Management Specialist TDY (5 mos.)
LOCATION : Deir Alla, Jordan, as member of Jordan Valley Agricultural Services Project. Five months TDY assignment working closely with Project staff developing and disseminating pesticides educational programs.
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: MS. in agriculture or closely related field.
- B. Experience: 3-5 years extension experience and experience in pesticide educational programs.
- C. Personal: Ability to function effectively in extension and relate to people. Ability to work as a member of an inter-disciplinary unit. Demonstrated ability to plan and carry out extension programs.

DUTIES:

- 1. Evaluate pesticides and pesticide use patterns for Jordan Valley agricultural crops to provide base-line data for a pesticides educational program.
- 2. Leadership in collaborative development of pesticide educational packages for extension agent training and extension agent use.
- 3. Present pesticide educational training to extension agents, prepare extension bulletins for farmer use and develop mass medial presentations.
- 4. Provide leadership in review of MOA pesticide regulations, requirements and suggested recommendations.

TITLE : Horticulturalist - Citrus TDY (6 mos.)
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Ph. D. in horticulture or closely related field.
- B. Experience: 3-5 years experience in research and extension with citrus crops. Experience with citrus problems in several countries is desirable. Able to handle standard horticultural problems on citrus and to recognize significant pest problems.
- C. Personal: Ability to function effectively in extension and research and to relate to people. Ability to work as a member of an interdisciplinary team. Demonstrated ability to plan and carry out research/extension programs.

DUTIES:

1. Evaluate previous experimental trails and farmers' practices for citrus production in the Jordan Valley.
2. Collaborate with JVAS staff in design and development of a program addressing citrus production problems.
3. Demonstrate, through close counterpart collaboration, the potential and scope of the horticultural positions.
4. Design an ongoing program in citrus horticulture that can be continued by research and extension personnel after his departure.
5. Identify inputs that expatriate horticulturalists scheduled to participate in JVASP subsequent to the completion of his tour can make.
6. Collaborate in the publication of research results and extension bulletins.
7. Provide training in citrus horticultural practices to Project staff.
8. Collaborate with extension personnel in dissemination of new technological practices for adoption by farmers.

TITLE : Extension Administration and Organization Specialist TDY (3.5 mos)
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Doctorate in agricultural sciences, agricultural economics, or administration with highly relevant administrative experience.
- B. Experience: Five years experience in administrative assignments at a relatively high level in research, extension or both within the land grant University system or similar agricultural administrative assignments. Experience in teaching Extension Field Methods. Experience in a developing country, preferably the Middle East.
- C. Personal: The most critical requirement for this position is administrative experience and proven ability.

DUTIES:

1. In concert with the Project Director and Project staff,
 - a. Assist in appropriate administrative planning, program management, and budgeting activities and policies.
 - b. Review project extension problems and needs to make recommendations as to resources required and management action needed.
2. In collaboration with Project Director and staff examine and make recommendations on:
 - a. Appropriate institutional arrangements for coordinating and managing the implementation of agricultural development activities in the Jordan Valley.
 - b. Plan and evaluate processes for coordinating Project agricultural research and extension activities.
 - c. Coordination of activities with other agricultural development institutions in the Jordan Valley.
3. Assist in developing plans for the speedy integration of Project extension and research activities into a system of technological development, transmittal and adoption.
4. Assist Director in assessing future needs and developing plans concerning personnel, transportation, facilities and financial resources.
5. Organize and present a semester course on extension field methods.

TITLE : Agricultural Information Specialist TDY (1.5 mos.)
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: M.S. Degree in agricultural journalism, communications or mass media. Minimum of 5 years experience as director of an agricultural information unit at a land grant university.
- B. Experience: Experience in a developing country.

DUTIES:

1. In collaboration with Project Director, Director of the Agricultural Information and Press Section, DAR & E, and Project staff, review and make recommendations concerning:
 - a. Short and long term training needs, equipment and support needs.
 - b. Procurement of various materials such as slides, posters, films, bulletins, filmstrips, or other materials suitable for communication with extension agents and farmers. These materials are to be useful to and by both men and women.
 - c. Expansion of of the Agricultural Information and Press Section's production capability.
 - d. Liaison and mutual support between Agricultural Information and Press Section and Project effort.
 - e. Budgeting for information activities.
 - f. Obtaining, operating, and scheduling use of audio-visual equipment by Project staff.
2. Advise and train the Project's training officer in the utilization of audio-visual materials.
3. Conduct a basic training course for specialists and agents in the operation and use of audio-visual equipment in extension programs.

TITLE : Extension Program Development Specialist TDY (2 mos.)
LOCATION : Deir Alla, Jordan, Jordan Valley Agricultural Services Project
REPORTS TO: Director, JVASP

QUALIFICATIONS:

- A. Academic: Doctorate in Adult or Extension Education.
- B. Experience: Minimum of ten years as an Extension Staff Development Specialist or Training Officer. Experience in a developing country.

DUTIES:

1. Train Project's training officer in areas of: (a) training program design, implementation and evaluation; (b) preparing teaching materials; (c) extension methods; and (d) program planning and evaluation.
2. Design and teach an intensive workshop in extension methods to subject matter specialists, associates and agents.
3. Train researchers and specialists to translate research findings into language or other dissemination approaches that are compatible with the literacy levels and cultural backgrounds of the men and women farmers and laborers in the Jordan Valley.
4. Advise Project Director and staff concerning alternative means of communication so as to reach Project's beneficiaries.
5. Assist Subject Matter Specialists in designing training aids and developing relevant training curricula.
6. Identify with Project Director and staff long-term in-service, external short-term training, and external academic training needs.
7. Recommend specific short and long-term training policies.
8. Monitor field and graduate training at U.S. institutions.

- OPERATION OF THE APPLIED RESEARCH AND EXTENSION CENTER

PURPOSE

The purpose of the applied research and extension team is to increase farm productivity by providing the link between vegetable, fruit, and food crop research and the ultimate user - the Jordan Valley farmer. In order to increase agricultural output, traditional farming practices must be replaced by modern, scientifically based technology. Requisite to this transformation is the creation of a broad base of researchers, subject matter extension specialists, and extension agents skilled in applied research methodology, program planning, and program implementation.

Agricultural research should have as one of its basic purposes the formulation of technologies which can be widely used by farmers. Two themes are basic to the Jordan Valley Agricultural Project. These are: (1) that effective research on agricultural technology starts and finishes with the farmer, and (2) the integration of the perceptions of biological scientists and social scientists is an essential element in such research.

Several basic concepts need to be reviewed. First, a technology is a combination of all the management practices for producing or storing a given crop or crop mixture. Each practice is defined by the timing, amount and type of various technological components such as seedbed preparation, fertilizer use or weeding. A farmer who uses no purchased inputs is nevertheless using a technology -- sometimes quite complex. The Project is particularly concerned with developing technologies appropriate to the circumstances of target groups of farmers. Farmers' circumstances are all those factors which affect farmers' decisions with respect to a crop technology -- in the Jordan Valley, for example, their natural environment, their economic environment (such as product markets) and their own goals, preferences and resources constraints. If technologies are appropriate to farmer circumstances they will, by definition, be rapidly adopted by farmers.

STEPS IN THE ADAPTIVE RESEARCH AND EXTENSION APPROACH

Researchers, subject matter extension specialists, and extension agents from different disciplines working to solve immediate and high priority problems -- are, with farmers, the main actors in the process. In the Jordan Valley, for example, a research team should include a biological scientist, usually a horticulturalist or an agronomist to integrate the physical and biological aspects of production, and a social scientist, usually an agricultural economist, to integrate various aspects of the farmers' resource endowments, goals and market environment. These disciplines will be supplemented where there are specialized problems - for example an entomologist working on the Tobacco White Fly problem or a

soils scientist working on salinity problems. It is essential that team members collaborate in all phases of the research and that major decisions, such as the design of farm trials and demonstrations, are made jointly.

With these concepts as background, Figure 1 gives an overview of an integrated research and extension program to develop technologies for farmers. The sequence begins with target area and research site selection and progresses through problem identification and development of a research base, research design and planning, on-site research and analysis, and extending the results to farmers and groups of farmers through extension. Experiment station collaboration, is a key to the research process, which supports on-farm activities. Research, testing of known production technologies, developing and screening new technological components (e.g. varieties, new herbicides, pesticides), and linking these into field trials on farmers' fields are essential tasks for researchers. Feedback of the results obtained from later steps can be used to improve the earlier steps. While these steps are shown as being sequential and discrete, in practice, the division between them often becomes blurred as some mesh with others, some are taken out of sequence, or some are repeated before completing the process.

The extension service plays a vital role in each step of the adaptive research and extension process. Figure 2 outlines some of the tasks that extension participates in during each one of the steps in the process.

Extension's involvement is in a supporting role early in the basic steps of target area selection, problem identification, research design and planning, research and analysis, but takes on a major and increasing role in terms of extending and promoting the research results.

Once the promising results of research have been organized and tested on individual farmer's fields, the extension agent organizes field days based on trials and tests. The next step is organizing the testing of the new technology on a number of farms. This is called multi-location testing. The agent assists in the selection of farms, helps in supervising tests, provides feedback from farmers to researchers and vice versa, and helps specialists and researchers in the preliminary steps in the packaging of the new technology for diffusion.

Once the new technology has been proven through the multilocational step, the agent takes the lead with the team in organizing pilot production programs. The basic purpose of pilot production testing is to help determine the feasibility of new technology on an extensive scale. Support for bringing about needed changes in the infrastructure and assisting in defining and coordinating tasks of cooperating institutions is generally needed by the AR&E team at this point.

Figure 1 - Overview of an Integrated On-Farm and Experimental Station Applied Research and Extension Program

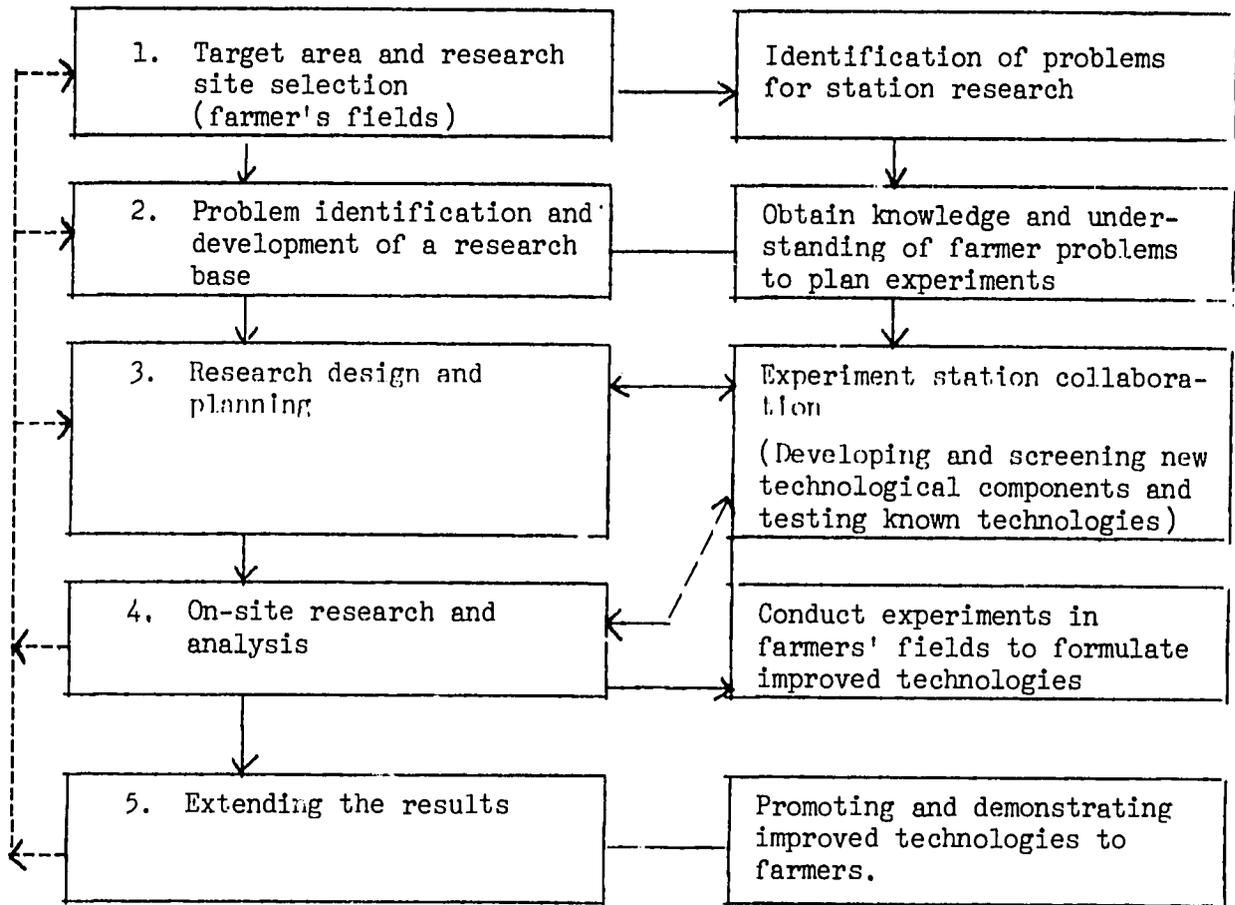


Figure 2 - Extension's Participation in the Applied Research and Extension Process

STEP	EXTENSION'S PARTICIPATION
Target Area Selection and Initial Research	<ul style="list-style-type: none"> - Suggest relevant criteria for target area selection - Cooperate in assembling and analyzing secondary and primary data for target area selection - Cooperate in choosing the relevant criteria for research site selection on farmers' fields - Cooperate in assembling and analyzing secondary data and in making exploratory surveys, especially in selecting and locating farmers
Problem Identification and Development of a Research Base	<ul style="list-style-type: none"> - Help researchers become familiar with local conditions and establish contacts with farmers and others - Cooperate in assembling secondary data and in making reconnaissance survey - Participate in problem identification - Provide comprehensive outlook of farming and community systems.
Research Design and Planning	<ul style="list-style-type: none"> - Contribute knowledge of current farmer practices and farmer environment - Help in making farmer surveys - Provide feedback from farmers to researchers and vice versa
On-Site Research and Analysis	<ul style="list-style-type: none"> - Help researchers select farmers for trials and tests - Assist in supervision of farmers' tests - Check on farmer acceptance of new technology - Provide feedback from farmers to researchers and vice versa - Help in making surveys, supervising farmer record keeping and project monitoring
Extending the Results	<ul style="list-style-type: none"> - Organize field days on trials and tests in farmer fields - Conduct training sessions with farmers and farmer groups

Figure 2 (Cont'd)

STEP	EXTENSION'S PARTICIPATION
Multilocation Testing	<ul style="list-style-type: none"> - Assist in selection of farms - Help in supervising tests - Cooperate in adaptation of new technologies to different conditions - Provide feedback from farmers to researchers and vice versa - Help in preliminary packaging of the new technology for diffusion, and in developing preliminary transfer methods
Pilot Production Programs	<ul style="list-style-type: none"> - Help determine feasibility of new technology on extensive scale - Assist in bringing about needed changes in the infrastructure - Assist in defining and coordinating tasks of cooperating institutions - Help finalize packaging of new technology and transfer methods for widespread diffusion.

TRAINING

Training efforts with an applied research and extension emphasis will be important for maximum project impact. The success of the Project will depend on adequate numbers of well-trained staff. While the academic degree work requirements of staff will be met, there has been very limited in-service training in either research and extension since 1977. A pressing need is to up-date subject matter training through: (1) pre-service, (2) in-service, (3) short-term external, (4) graduate study, both external and internal, and (5) special training.

(1) PRE-SERVICE: Pre-service training will be conducted for contract staff who will provide advisory services for AR&E. The orientation will include both classroom and field experience. Language and cultural training of U.S. personnel will precede joint U.S.-Jordanian training.

An additional pre-service option utilizing seniors at the Faculty of Agriculture at the University of Jordan could be employed. The pre-service training is primarily for young candidate researchers, specialists, and agents in AR&E concepts and methods. This type of practical

training would complement their academic work. The advantages for the Project are twofold: (a) additional help for the Project can be obtained, and (b) the semester experience would be useful in evaluating potential candidates for the Project. The student would receive academic credit.

(2) IN-SERVICE: Upon entry as a member of the Project team, all new researchers, subject matter extension specialists (SMS's), associates, and agents will take part in a five month in-service education course. Participants will be able to receive three hours of credit (graduate) at the University of Jordan.

The first course will be taught by a TDY extension management and administrative specialist early in the Project with the support of U.S. staff. The training will be field oriented and be taught at Deir Alla. The training will involve teaching new staff basic AR&E concepts and methods. The team teaching approach will enhance research and extension cooperation.

The general objective of AR&E training is for participants to learn the basic AR&E concepts and develop the required skills to work as a team and with farmers in the testing, validation, and diffusion of new technologies.

The basic subjects to be covered will include technical subject matter up-dating, research, design and planning, statistics, economic analysis, extension methods, and communications. The focus of field work should prepare the staff to develop competencies required in their participation in each of the AR&E steps. Some of the recommended activities include: (a) establishing relevant criteria for selecting target areas and research sites, (b) helping to select cooperating farmers, (c) 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.

Candidates for training should be selected by both research and extension personnel experienced in AR&E philosophy and methodology. Technical background, a farmer-oriented philosophy, communication skills, and an ability to work in an interdisciplinary team are important factors for selection.

Trainees should go through an entire crop production cycle. Possibilities include one or two days a week during the cycle or an initial one-week concentrated course followed by four hours of training per week during the cycle. Alternatively, a 30-day intensive course might be tried in

which various aspects of each crop stage is simulated. Rather than simulation, actual observation might be possible where different crops are going through the different stages when the intensive course is being held.

Approximately 25 percent of the training should be conducted at the Deir Alla Station. Methods used in classroom training include seminar, lectures with handouts, case studies, workshops, laboratory work, demonstrations, and simulations.

Field work represents 75 percent of the training experience and includes farmer visits, surveys, setting up trials and demonstrations, field days, consultations with researchers, field conferences with team members, and one-on-one consultations with team leaders. In this process, the trainees gain skills as they learn to become trainers.

Team building is one of the most important aspects of training. Some team building skills can be taught, but most of the skills for working effectively on interdisciplinary teams evolve through interaction with team members. The coordinator for training can facilitate this process.

Candidates or participants who successfully complete this intensive in-service course can be considered for short-term field training in the U.S. or other countries.

(3) SHORT-TERM EXTERNAL TRAINING: It is proposed to send 15 participants for short-term training in the U.S. Participants will be selected on the basis of: (a) job performance, (b) in-service training performance, and (3) a minimum score of 500 on the TOFEL exam.

The training will be individually designed for each participant. The program will include the possibility to take up to six credits of graduate work. One course will be in a technical field, and the other course a directed study or internship relating to specific field experience with a researcher or extension specialist. Additional specialized training in specific areas such as communications, program planning and evaluation, and research and extension methods will be designed.

This graduate credit can be applied toward a Master's degree at the University of Jordan or a U.S. university. Participants who demonstrate a high standard of performance during this training and score a minimum of 520 on the TOEFL examination will be considered as candidates to proceed to work on their M.Sc. degree at a U.S. university. Those candidates who perform at a high standard, but who score below 520 on the TOEFL will be considered as possible candidates for degree work at the University of Jordan.

(4) EXTERNAL GRADUATE TRAINING: A total of eight participants from the ranks of specialists and research and extension associates will be considered for external graduate training. Outstanding agent participants will also be considered.

Acceptance as a candidate for external graduate training will depend on the criteria outlined above. Selectees will be able to earn six graduate hours during the period of short-term training and this can apply to their M.Sc. program. Training will be in the subject matter areas appropriate to the Jordan Valley Agricultural Services Project.

Some recommendations for M.Sc. degree programs are:

- (a) competence within an existing discipline is required;
- (b) interaction among disciplines is a key feature of AR&E; thus graduate students should be conversant with and sensitive to the basic concepts, terminology and methodology of several other core disciplines. This might be accomplished by taking one or two carefully selected courses, for example, in agricultural economics, or a relevant discipline.

Graduate training at the M.Sc. level will be in a priority discipline needed in the Jordan Valley Project.

(5) SPECIALIZED TRAINING: Specialized training will be required for a number of the participants. The project manager is slated for two months of management training near the beginning of the Project. Short-term training for some of the staff of the agricultural information office in an Arabic speaking country is essential. This training will be in the areas of printing, editing, photography, and radio and TV.

Participants will also be considered for a number of the USDA short courses which vary from two to 13 weeks. Course announcements will be examined, and candidates selected on a basis of course content relevancy to the Project.

The international and regional centers offer in-depth courses and seminars. It is anticipated that several of the Project staff may attend relevant short courses at one or more of these centers.

The Soil and Water* Program

I. CURRENT SITUATION

A. Soils

Soils in the Jordan Valley are highly variable, both regionally and locally. They are mainly alluvial and of medium to heavy texture. Depth is generally adequate for most agricultural crops now grown in the Valley, but dense layers in the profile can cause high water tables and salinity locally. Rock content varies from essentially none to enough to affect soil properties and mechanical tillage. Rainfall, which averages 400 mm annually in the north and less than 100 mm annually in the south, is inadequate for consistent leaching of salts, especially in the south. Salted soils are found throughout the Valley, but are most common near the Jordan River and in the south near the Dead Sea. In affected land alkalinity is not common. Land in the East Ghors area generally slopes westerly from the main canal to the Jordan River. Topography ranges from uniform to so irregular as to be impractical either to farm with mechanical equipment or to consider leveling.

The most extensive classification of Valley soils was apparently made by JVA several years ago for use in irrigation planning. This was not intended to provide sufficient detail for day-by-day management of the land, especially in view of the great variability even in local areas. More detailed studies are now underway by JVA and by other organizations such as UOJ. These studies are, however, largely limited to lands in which each agency has particular interest. In general, the growers do not have access to soil information in sufficient detail and with sufficient frequency to support management decisions. A soils lab to handle limited soil and water testing was activated recently by MOA at Deir Alla, but is not yet well equipped or heavily used by growers. A similar MOA lab at Jubeiha near Amman is much more complete but is remotely located with respect to the Jordan Valley. Another more complete soil testing lab is planned for construction in the Valley by EEC, but JVA needs are expected to utilize its entire capacity. If efficiency of agricultural production in the Valley is to be increased and if the need for analyses is to be met, a soil, water and plant tissue analyses laboratory, as proposed for JVASP, is required.

* Soil and Water (SW) as used here includes soils, plant-water relations, water requirements, irrigation methods and systems, drainage, salinity control, water quality and supply, erosion control and related issues.

B. Water

Water for the more than 240,000 dunums of land now irrigated in the Valley comes mainly from surface sources, including the Yarmouk River and tributaries to the Jordan from the eastern highlands. The Jordan River is not of suitable quality for irrigation. The quality of the waters now available varies with place and time, with salt content varying inversely with flow rate during the year (i.e., salt content is lower in winter than summer). Yarmouk water tends to be USDA class 2, while in some of the eastern tributaries the quality drops to class 3. Return flow from irrigated fields is usually of lower quality than the source from which it came. Facilities exist for obtaining water quality assessments, but widespread use by growers would quickly exceed capacity. There is need in the Valley for more general information on water quality and for a service to provide more local and specific information for irrigating, planning, design and management decisions.

The quantity of water available for irrigation in any given year depends primarily on the natural precipitation in the watershed areas and the resulting run-of-river flow since reservoir storage is limited. Generally, there is not sufficient water to irrigate all the irrigable land in the Valley, which tends to restrict expansion of irrigation. This situation is aggravated by the other demands for water, such as the M&I requirement in Amman. This situation in which demand exceeds supply is forcing the use of water conserving practices such as drip irrigation at considerable cost to growers. Water cost is, however, not generally regarded as prohibitive. Under these supply and demand conditions growers have a general and urgent need for guidance on ways to achieve the highest efficiency possible with current technology, consistent with other constraints such as salinity control.

C. Irrigation

The irrigated area in the Valley has increased only slightly from the 240,000 dunums reported in 1978. Substantial expansion is dependent upon additional water, perhaps from storage in the Maqarin or other yet unbuilt reservoirs. Contributions from any such sources are not expected to be significant in the near future. The land now under irrigation is served by all three common methods -- surface, drip and sprinkling -- listed here in descending order of area served. Drip irrigation is expanding rapidly in spite of high cost, while sprinkling has not become popular even though pressurized water is available to many growers. Surface irrigation, with little change from methods used anciently, remains popular in spite of lower efficiency and higher labor costs than the alternative methods, in part because of lower first cost.

Several matters related to irrigation require attention. Some of these issues are increasing the efficient use of water and reduction of waste by more precisely scheduling the amount and frequency of irrigation for different crops, and determining the effects of moisture deficits on crops throughout their growing cycles and the influence of plastic covers on water requirements. Interactions between method, timing, frequency and duration of irrigation and other determiners of crop production, such as varieties and diseases, need investigation.

D. Drainage and Salinity

It is estimated that 84,000 dunums in the Jordan Valley are so heavily salted as to be unusable for agriculture (class 4) without leaching. Another 49,000 dunums contain enough salt to severely restrict production (class 3), though production is possible with good management. These salted lands are mainly in the south, but are found in more northerly areas as well. Fortunately the salted soils are generally saline rather than alkaline, which simplifies the reclamation process considerably. Here as elsewhere, salt has accumulated due to the imbalance between water and salt inflow and outflow, there being no outflow of salty water from the Dead Sea basin. In localized areas perched water tables have caused surface accumulation of salt, creating considerable variation in salinity within single farm units. Drainage and salt accumulation are closely related, and good drainage is essential before leaching for salt removal.

Salt in the Jordan Valley soils constrains production in several ways, including impairment of nutrient and water uptake. These effects are more troublesome in areas of high evaporative demand such as the Valley. They are also more troublesome with crops, including a number of vegetables, that are especially sensitive to moisture deficits and salt.

Therefore, for high and sustained production in the Jordan Valley, salinity control must be undertaken. Growers need information and assistance in three general areas:

1. How to produce desired crops economically on soils with salts present.
2. How to remove salt.
3. How to prevent the recurrence of drainage problems and associated salinity accumulation.

E. Organizations Active in Soil and Water

Several agencies are addressing the SW problems mentioned above. The JVA, while primarily involved in water delivery and other development

matters in the Valley, has done much work on soil classification, land drainage and salinity evaluations. It has also performed some applied research on crop response to irrigation. The JVA does not maintain an agricultural research staff, but has nevertheless been a useful source of information for growers. The JVFA fills an informational role for subjects within its interest but has no research program. UOJ/FA has no formal extension responsibility but has an active and relatively broad research program in the Valley carried on by several of its approximately 40 members. This research is centered at the University Farm. The Royal Scientific Society has conducted studies involving Valley agriculture, but its interest in production is limited. The MOA through the DR&E is involved in both research and extension. Unfortunately budget and other constraints sharply limit its effectiveness in both activities. Consequently although several agencies have research or informational interests in the Valley, none of the programs are strong enough to address SW problems effectively. There appears to be little coordination between programs.

F. Conclusion

The above summary makes it evident that:

1. SW problems that require both research and education exist in the Valley.
2. The present research capability is inadequate to address these problems effectively, especially in view of the rapid rate at which new technology and products are being introduced.
3. The extension and information services in the Valley are not supplying information now available on SW problems for growers.

There is an urgent need for substantial expansion of both research and extension programs if SW problems are to be solved or even contained. Historically, water mismanagement and salinity have caused agricultural lands to be abandoned. This could happen in the Jordan Valley, negating much of the Valley's development in recent years.

II. PROPOSED PROJECT ACTIVITIES IN SOIL AND WATER

SW problems are important constraints to production of vegetables and fruits in the Jordan Valley, and will be addressed by the JVASP. Some of these matters can best be handled by SW specialists, while others must be tackled cooperatively with other agriculturalists. In keeping with Project objectives both applied research and extension aspects will be addressed. Responsibility for work initiated will rest with Jordanian project personnel, assisted by two U.S. advisors

over the life of the Project. Limited resources require that the scope of work undertaken be smaller than desired, but substantial contributions to Valley agriculture can nevertheless be made by establishing programs that can be continued after Project termination. Work proposed is indicated in Section A following. Section B gives details on how the proposed SW lab will support other activities.

A. Operational Aspects

The SW program will consist of 3 phases. In Phase 1, i.e. in the first twelve months of the Project the main effort will be to establish and make operational a soil, water and plant tissue testing laboratory and to prepare land assigned to the Project for plot work. Equipment ordered early in 1982 should arrive and be put into operation while the first SW expatriate is in Jordan. The first advisor will be a soils specialist selected to assist with the establishment of the laboratory, including equipment installation, personnel training and development of operational procedures. He must also characterize soils on Project lands. In addition, he must handle other aspects of the SW program such as identifying those Project lands requiring special treatment, assisting others in the design and implementation of research, and developing plans for work to be conducted by Jordanians.

Phase 2 occurs during the middle three years of the Project and will be conducted by Jordanians. They will continue development work on Project lands and will initiate considerable work in close cooperation with other Project personnel. Studies initiated will deal with crop water requirements, crop response to fertilizers and water, irrigation scheduling, techniques for salinity control and analyses of different irrigation systems. This work will include open field and plastic agriculture. Jordanians will also operate the SW lab and extend the results of their programs to Valley farmers.

In Phase 3 the second SW advisor will arrive (in the last year of the Project). By then, drainage and salt removal programs should be well advanced. Production techniques proven effective on salted or reclaimed soil will be demonstrated to farmers. Studies initiated in phase 2 will be evaluated, continued and completed. At the end of the Project approaches all previous work will be summarized, and plans made to continue both research and extension on SW problems after Project termination.

B. Soil, Water and Plant Tissue Testing Laboratory

Purpose: To support applied research and extension activities of the JVASP and to provide a testing service for growers in the Valley. The laboratory will be equipped (see Annex P, 3a, 2) to analyze agricultural soils, water and plant tissues.

Location: Deir Alla.

Facilities: Rooms containing approximately 180 m² in the laboratory building at the MOA station now used for soil analysis by the DR&E will be renovated and equipped for this expanded activity.

Services: The lab will offer to Project personnel and growers a complete and practical testing service, including advice on collecting and handling samples. Reliable and prompt analyses will be provided for all samples submitted, together with practical interpretation thereof and recommendations as to treatment and management.

Personnel: A technical supervisor holding an M.S. in soil chemistry or equivalent experience, two technicians holding B.S. degrees, plus assistants and laborers as needed.

Equipment: (See Annex O, 3a, 2)

III. ANALYSIS

A. Technical Analysis

1. Soil, water and plant tissue testing work. The development of a testing laboratory and associated services is necessary for Project research and for extension of results to growers throughout the Valley. MOA has agreed to provide existing space at Deir Alla for the laboratory. Adequate funds have been provided in the budget to equip the lab (See Annex P, 3a, 2). A core of personnel exists to operate laboratory. Project funds are available to train and upgrade this staff and new employees. Jordanian project specialists and an expatriate soil scientist will be available to guide the work. No other serious obstacles to establishment of the lab are evident at this time.

Numerous factors could contribute to under-utilization of the lab once it is established, most of which are beyond the control of Project personnel. Of concern are such factors as transport and communication in the Valley, acceptance of Project personnel by growers as trusted and valuable sources of information, effectiveness of publicity efforts, and awareness that these services are of value to producers. While these constraints cannot be eliminated entirely, the Project's activities should do much to reduce them. Demonstrations that research results are useful and practical should stimulate interest. Active extension agents should inspire confidence in growers, willingness to try Project suggestions, and utilization of laboratory's services. Successful experiences will stimulate acceptance of the lab by other growers. Research and extension programs on SW problems should stimulate use of the lab and its services. Under these conditions establishment of a testing lab is technically a feasible part of this Project.

2. Irrigation and water management studies. More definitive information on irrigation practices in open field and under plastic is needed, as are much more effective means of distributing this information to growers. This project addresses both the research and extension needs in soil and water. Limitation of funds, personnel and time requires, however, that the scope of work be restricted. Priority will be given to applied work dealing with the most urgent needs and those from which useful information can most likely be obtained with the resources available. No attempt will be made to find ways to increase the amount of water available to agriculture, and no basic research will be undertaken. Instead studies will deal with ways to use available water more effectively. Water requirements of various crops grown in the open and under plastic, effective irrigation schedules to reduce water waste, crop responses to fertilizer and moisture levels, identification of crops and varieties that use less water, and improved design and operation of irrigation systems will be investigated. In cooperation with extension agents SW information will be prepared for dissemination.

The main constraints to acceptance of SW information are those associated with extension in the Valley. Insofar as possible this Project will counter these constraints by the broad range of efforts being proposed to strengthen extension.

The program of applied research on SW problems and the dissemination of its results to growers can be conducted with the resources and personnel scheduled for the Project.

3. Drainage and salinity management studies. The need for information and recommendations regarding drainage and salinity management mentioned earlier will be addressed. Such studies usually progress slowly, requiring months and often years of time and much money and water for leaching. Project resources will limit work to a few selected sites, probably in the south Ghors and at one site at Ghor Safi. Simple demonstrations will be undertaken, the results of which can be seen within the life of the Project. These are expected to include production on land with salts present and long-term removal of salt.

Successful field work in this subject requires salted land, drains or funds to install drains, soil and water testing facilities, equipment and water for leaching, and trained personnel for the program proposed here. These resources are available. Salted land is available from both JVA and growers, as is sprinkling equipment and water for leaching. For example, fresh water from springs which could be used for leaching is now unused at Ghor Safi during summer.

Drainage required will be provided for on lands selected for Project use. The Project will provide funds and personnel to conduct the studies, including contract advisors. Remaining issues will be handled as they arise by trained people which the Project is providing. The proposed studies are considered technically feasible and a necessary part of the Project.

B. Environmental Analysis

The SW activities proposed in this Project should have a positive environmental impact. Little movement of soil through land levelling is proposed. Studies contemplated will involve approximately the same inputs and soil tillage as conventional farming in the area.

Drains that may be installed should lower the water table and thus increase the land's value to both growers and society. Likewise, leaching for removal of salt should leave the land more acceptable for most uses than it was before the Project was activated. Leaching would be done during the non-growing season so the water used will not adversely affect other users. For these reasons the net effect of the soil and water activities of the Project are considered positive.

TRAINING PROGRAM1. Introduction:

Training will be an integral part of the Project's program. Five types of training will be provided so Project staff can organize and conduct effective research and extension programs. Because salaries within the MOA are based partly on the degree held, the training schedule proposed, while strongly oriented towards practical technical training, has been designed to provide to qualified Project staff opportunities to undertake graduate study. All training in Jordan will be supervised and monitored by the Project Director and senior advisor. The Campus Coordinator, cooperatively with the Office of International Students, at the contractor's university will assist the Project Director in arranging and scheduling all training outside of Jordan.

2. In-Service Training

In-service training will receive a major emphasis early in the Project. Some 28 researchers, subject matter specialists, associates and extension agents will staff the project. In-service training will be provided to all qualified staff. Selection criteria for short-term training will include: (a) prior academic training (B.S. in agriculture), (b) English proficiency, (c) experience, (d) previous job performance, and (e) personal characteristics. An intensive 4½ month training course organized by project staff and the UOJ/FA will be required of all project staff in the categories mentioned below. The course will be designed to qualify for graduate credit at the University of Jordan. Dean Kamal of the Faculty of Agriculture has indicated he would petition the Council of Deans for its approval. The course will be taught at the Deir Alla Station by Project personnel and University faculty. Facilities at Deir Alla, at the University Farm and other locations in the Jordan Valley will be utilized.

Course content will focus on; (a) identification of research problems, (b) technical subject matter training, (c) identifying and solving problems under actual field conditions, (d) establishment of field and demonstration plots, (e) developing technical recommendations for farmers, (f) educational methods with emphasis on effective use of audio-visual aids, (g) communication, and (h) program development and evaluation.

This training will start in the fall semester of 1982. Since classes start approximately October 1 at UOJ, the first group of 10 students is budgeted for FY83 (Annex 0). The second group of 10 will start in the second semester 1982-3 (FY83) and the third group of 10 in the fall of 1983 (FY84). If it is possible to select qualified candidates more quickly, the size of the first and second classes will be increased, not to exceed 15 each. If enrollment from the Project does not exceed 15, other students enrolled for graduate work at the UOJ will be allowed to enroll. One hundred thirty-five months of short-term training is scheduled in Jordan.

In addition to the 4½ month graduate level course, continuous in-service courses or sessions will be organized and taught to project staff. Subject Matter Specialists in particular will be assigned the lead role in organizing training for research and specialist associates and agents. In time technical training courses may be offered to other professionals in agricultural development. Since both participants and instructors for this training will be full-time employees of this project, no funds are budgeted for this purpose. Participation as instructors or trainees is to be included in the work assignment of Project employees.

3. Short-Term Training in the U.S. and in other Countries

Short-term training in the U.S. and in other countries will be provided for selected researchers, subject matter specialists, research and extension associates and extension agents. The emphasis will be on selected, intensive short courses and field experience with the opportunity to take some courses for graduate-level credit. The short-term training period for all associates or extension agents selected will be 4½ months.

Short-term external training will emphasize practical extension and research field work. Specialized training and experience in specific disciplines will be provided through working with appropriate staff. Each participant's training program will be jointly planned by appropriate Project staff and the individual and tailored to his/her specific need.

The training periods will coincide with academic semesters at American or other Universities so that enrollment in 1-2 academic courses can be scheduled for those qualified.

It is recommended that no more than a maximum of six semester hours be taken by any participant. Some of the graduate credit can be taken in the form of directed study, or internships. This will incorporate practical field experience into graduate credit. For participants to receive graduate credit for academic work they must have previously been granted admission to the graduate school involved.

Selection criteria will include: (a) previous job performance; (b) performance in the in-service training program conducted in Jordan; and (c) English competency (TOEFL 500). In that this short-term training will be intensive and concentrated, past experience indicates trainees with lower TOEFL scores will have difficulty. Stateside training programs will be individually designed.

In addition, three researchers and three subject matter specialists will be sent abroad for three months of short-term training.

Successful completion of short-term training will be utilized as a selection criterion to identify individuals (lacking the M.S. degree upon entering the program) who could benefit from continuing study towards a Master's degree as extension subject matter specialists or researchers. Most researchers selected for short-term training will have the M.S., but not all subject matter specialists or research/extension associates are likely to.

Twenty-one staff are provided a total of 85.5 months of short-term training in the U.S. and other countries. For budget purposes all short-term technical training is budgeted on U.S. costs. If a significant proportion of total participants are sent to other countries, the cost will likely be less, and the number of participants or length of training may be increased.

Promising candidates selected from those receiving the initial in-service training in Jordan who have difficulty with the TOEFL examination will be provided additional individualized training in Jordan emphasizing quick comprehension of English. This training will be arranged at the University of Jordan or at appropriate international centers in Amman. It is assumed that 10 individuals scheduled for training in the U.S. will benefit from an extensive English course. Cost is calculated on the basis of enrollment costs at the University of Jordan for six hours of credit (See Annex O).

4. Long-Term Academic Training:

It is anticipated that 8 Project staff sent to the U.S. for short-term training will qualify for Master's degree programs in appropriate subject matter fields. Both subject matter specialists and researchers will be selected. "Promising" candidates from the agent ranks will also be considered for academic training. A total of 154 months of academic training in the U.S. is provided for.

Candidates for degree training will be selected on the basis of: (a) work performance, (b) performance in previous in-service and short-term training, and (c) TOEFL score (520) minimum; this is the minimum for admittance to graduate student standing at the majority of U.S. universities.

Outstanding candidates who encounter language difficulties will be selected to pursue a Master's degree at the University of Jordan. Eight staff are budgeted for M.Sc. programs at UOJ/FA for a total of 144 months.

The UOJ/FA will be petitioned to appoint contract staff to courtesy membership so that they may serve on student committees.

Research for the M.Sc. degree should be accomplished in Jordan to make the entire training program relevant to the student, Project, and Jordan Valley agricultural development needs. This can easily be arranged for students studying at the University of Jordan. This same approach should be encouraged for students studying in the U.S. A team member in-country or an expatriate who has returned to the contracting university could serve as a member of the student's committee or as advisor. "Backstop" faculty members are also logical members of students' committees. Where appropriate a Jordanian faculty member could serve on the students' committee. Such participation is permitted in an advisory but non-voting status by many graduate schools in the U.S. The reverse procedure could be employed if the student were working toward a degree in Jordan. The Project staff in the appropriate subject matter field could serve on the students' committee with a courtesy appointment at the UOJ.

These types of collaborative efforts will increase cooperation between the MOA, UOJ, and the JVASP.

5. Specialized Training in the U.S.

There will be some specialized training needs during the development of the Project. Two months of management training are scheduled for the Project Director.

The Project will utilize the Agricultural Information and Press Section of DR&E/MOA for preparation of audio-visual material and publication of materials to be distributed by Project staff. Four short-term training courses for individuals selected from that section in the areas of photography, printshop operation, radio and TV, and publication editing are planned.

6. Training at USDA and International Agricultural Centers:

Several of those receiving short-term practical training in the U.S. who are not selected for academic training could benefit from concentrated subject matter courses such as those offered by USDA. These courses vary from 4-13 weeks in duration and in 1981 costs varied from \$3,235 to \$7,938 depending on length and other factors. For budget purposes an average cost of \$6,000 per course (2 months) in FY81 is utilized. (Annex O) In addition, it is calculated that there would be an average delay of 1½ months between termination of the participants' initial short-term training and commencement of particular USDA courses. This time interval would be utilized for additional technical training. Such training is planned for four participants. The specific course each will take will be determined on the basis of the candidate's area of specialization. The majority of these courses are offered in the summer months. Consequently those entering short-term training in February of any year could extend their stay in the U.S. to include a USDA course without additional international travel. Where this interval is more than 1½ months (as for those short-term participants commencing their programs in September-October of a given year) it is less expensive to return the candidate to Jordan until the commencement of the USDA course.

Candidates will also be considered for training at the International Agricultural Centers (ICARDA, ICRISAT, CYMMIT). Budget costs are based on those for USDA training courses, but will probably be less. One participant is budgeted (Annex O) for training at an IAC but the number of participants can be increased and enrollees in the USDA courses decreased accordingly.

Candidates will be selected on the basis of (a) their demonstrated performance in prior in-service training programs and (b) their competence in the language spoken in the country where training is to occur.

It is anticipated that this training will be programmed in FY83, FY84 and FY85. While it is desirable to complete all technical training as early as possible so the Project will benefit longer from its staff's participation therein, some qualified individuals cannot be identified until they have completed prior parts of the program.

7. Summary:

The numbers of participants indicated for each successive type of training and education are considered realistic and have been used for budgetary purposes. However the participant training program should be so organized that no outstanding candidate is denied the opportunity for maximum benefit to himself or herself and to the Project. Conversely, if the procurement of qualified staff for the Project should be a constraint, the numbers qualified for each type of training may be lower than anticipated.

All staff receiving training must remain in GOJ/MOA service for a period equal to their training period.

Budgets for each type of training are in Annex O.

LAND AVAILABILITY SURVEY

In accordance with the decision to conduct applied research and demonstrations at three representative sites in the Jordan Valley (northern, central and southern regions) members of the design team, with the help of MOA and USAID/J personnel, appraised Project needs and reviewed alternative sites that were apparently available. Appreciation is expressed to personnel of JVA for their help in identifying and describing the sites and land. It is recognized that this brief review was exploratory and that the final decision and action to secure land for Project use rests with USAID/J and GOJ personnel at a later date. The following information summarizes the Design Team's recommendations.

Northern Region -- North of Deir Alla

Three sites were reviewed in the general area of Wadi Yabis. One site, the largest, and only recently acquired by the MOA, was dismissed at the time of inspection because of unsuitable topography and apparent salinity.

The second site considered was the MOA research sub-station at Wadi Yabis. This station is conveniently located and is relatively well developed agriculturally. Containing approximately 100 dunums, and expansion to over twice that size is being considered. A substantial portion of the land is devoted to citrus studies, with trees in various stages of growth. The soil and topography appear satisfactory for Project purposes, though previous experimentation may have introduced residual differences in soils. Vehicular access is convenient and limited station facilities and machinery could probably be made available. The amount of land available for open field and plastic house studies is, however, very limited. For this reason the design team recommends use of this land be limited to citrus work on existing trees, assuming permission for their use can be obtained.

A third site several km south of Wadi Yabis appears to have considerable potential for Project use. This tract contains five farm units owned by the Ministry of Education (Units 60-64, Development Area 17). Location of these units is shown on the appended map, Fig. 1. These units contain in total much more land than will be required. They are adjacent to the main north-south highway, providing convenient access. Drains have already been installed on part of the land by JVA, and some of the land was cropped last year. The soil is heavy textured, up to 3m deep, has good permeability and no obvious salinity problems. Electricity appears to be available nearby. The design team feels this is the best of the three sites brought to our attention and could serve as the main station in the northern region. The team therefore recommends that two units, units 60 and 61, be requested for Project use.

Two alternative sites were brought to the attention of the team, but were not visited. These may deserve study before final selection is made. One farm unit could be selected in the Northeast Ghor project located between the main canal and the village of Waqqas, about 7 km south of North Shuna. See Fig. 2. No site information is available at this time. The remote location with respect to Deir Alla is an obvious disadvantage.

A second alternative site in the north is located above the main Ghor canal and slightly south of the MOE units. This land lies between Abu Sedo and Wadi Abu Gharroub in the Qarn area about 15 km north of Deir Alla. The land has not been divided into farm units or been provided with irrigation water. Topography and soils are reportedly very good, and previous agriculture (mostly cereals) is believed to have been rainfed and extensive. Water would have to be pumped from the canal to the plot land adjacent to the canal. Permission would have to be obtained to use both the land and water at this site. Of the two alternative sites in the north, this may be the more useful. Both should probably be examined before a decision on the northern alternative is made.

Central Region -- Deir Alla to the Dead Sea

The Design Team was shown one farm unit described as being available and acceptable for Project use. This is Farm Unit 86, Development Unit 27, in the 18 km extension project shown in Figure 3. The unit contains approximately 40 dunums, has good topography and is relatively free of rocks. It is served with pressurized irrigation water. Soil is apparently of medium texture, variable depth to underlying marl with some lighter textured soil below the surface. Significantly, much salinity is evident, at least in the surface layers, and JVA confirms the presence of much salt. No drains have been installed in the unit or surrounding area. Leaching will probably be required prior to project use on at least part of the land, which may be questionable until drains are installed. Soil details are not available at the time of this writing but will be obtained by JVA within two months. Details will be made available to N. Haddadin of MOA and will be available to USAID/J for consideration prior to a final decision. If the preliminary JVA expression of salt concentration is born out by further analysis, the design team recommends another site be found which poses fewer problems for near-term plot work. While the Project may well address the problems of growing vegetables and fruits on salted soils, it may not be wise to attempt this on land that is more than typically salted and which may require several years for salt removal. The design team therefore recommends that final decision on this site await further information.

If further study reveals that Unit 86 is undesirable an alternative site should be selected. One possibility mentioned to the design team is to select one unit yet to be identified from among 42 units to be added to the 18 km extension which will receive water from pump 16. It is believed soils in this area are medium textured and reasonably free of salinity but with irregular topography. Construction of the water delivery system into this area is scheduled for completion within one year. If this alternative is considered, it will be necessary to inspect the site, tentatively select one farm unit and obtain necessary site information on that unit. The design team recommends this action be deferred until soil information on Unit 86 is available.

Within the southern region is another facility of use to Project personnel: the pair of plastic research houses used in the USAID assisted JVA Water Management Study. These houses are equipped with screens for insect control, and would permit IPM work to be initiated with minimum cost and delay. While the Project would be more concerned with the improvements than with the land, the design team obtained as part of its land survey the description of this installation. These houses (Figure 4) are on land not included in any farm unit. They are adjacent to pumping station 16.

Southern Region -- Ghor Safi area south of the Dead Sea

This area is remotely located and relatively isolated from the northern and central regions of the Valley. This isolation will be a severe deterrent to Project activity, at least until the highway along the Dead Sea is completed, probably late in the Project's life. In the meantime, Project involvement in the area will involve considerable cost in both time and money. Honoring an MOA request that the Safi area be included, the design team visited the area for orientation and land review. The team now feels that the logistic problems mentioned above restrict Project involvement there. Work done in the north should in most instances also apply in Safi. Even if field research at Safi is limited, its concerns have not been ignored. Initial results could be tested and demonstrated later at sites at Safi. Relatively little land would be required. The design team recommends that Project research and demonstration be conducted on the existing MOA experiment station at Safi. The land available is in need of drainage and subsequent leaching for salt removal. Construction of drains is to begin shortly by MOA. Leaching should follow to reduce salt levels sufficiently to support vegetable production before plot work is undertaken. In the meantime, the reclamation work itself has demonstration value and should be documented for such purposes. The design team sees no need for other site evaluations at this time. If experience indicates that the station land cannot be reclaimed soon enough or well enough for Project use, another site could be found.

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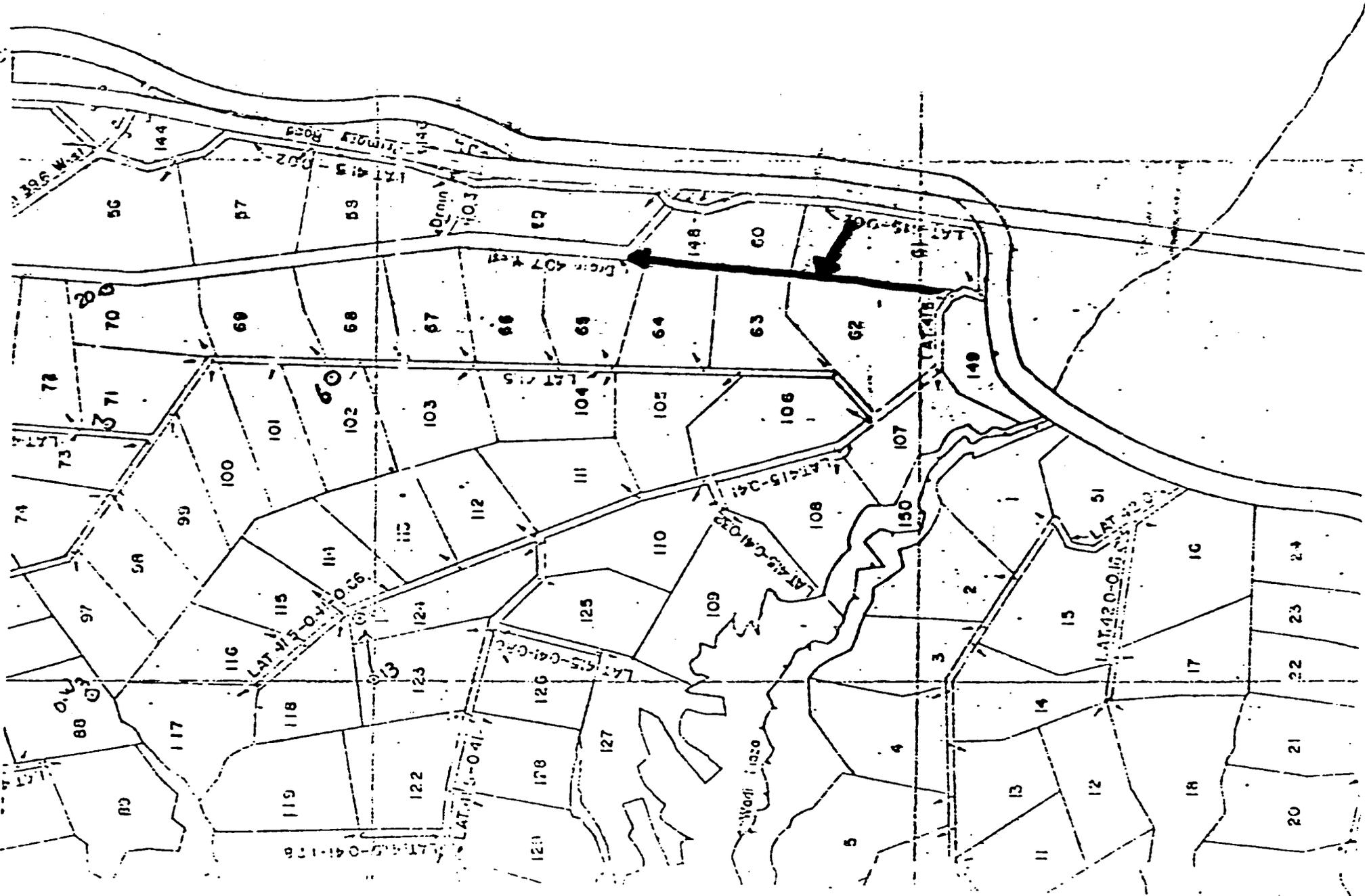


Fig. 1 . Map of that portion of Development Area 17 showing the

location of MOE farm units 60-64, which one farm unit might be selected for Project use.

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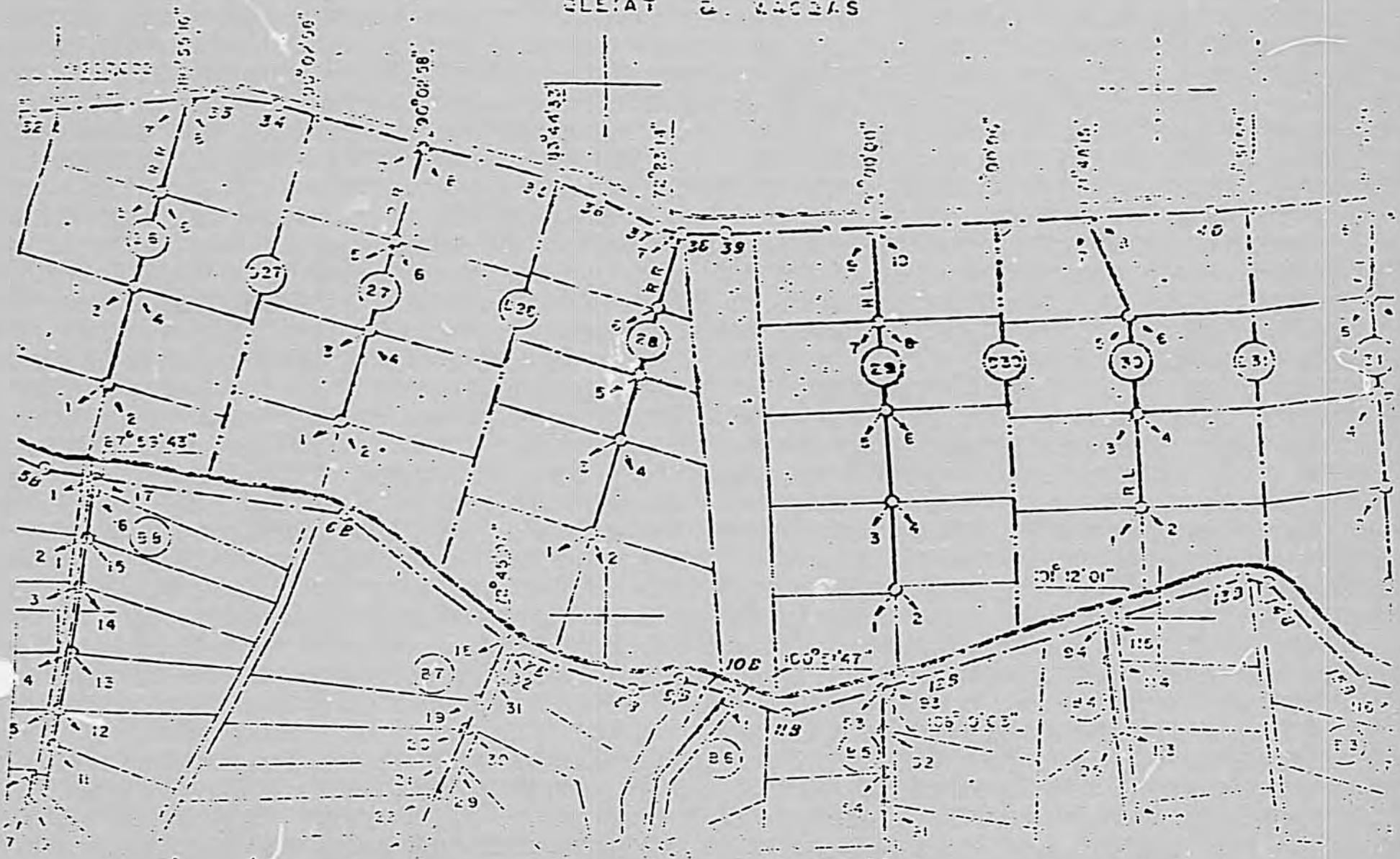


Fig. 2. Map of that portion of the Northeast Chor project from which one farm unit might be selected for Project Use

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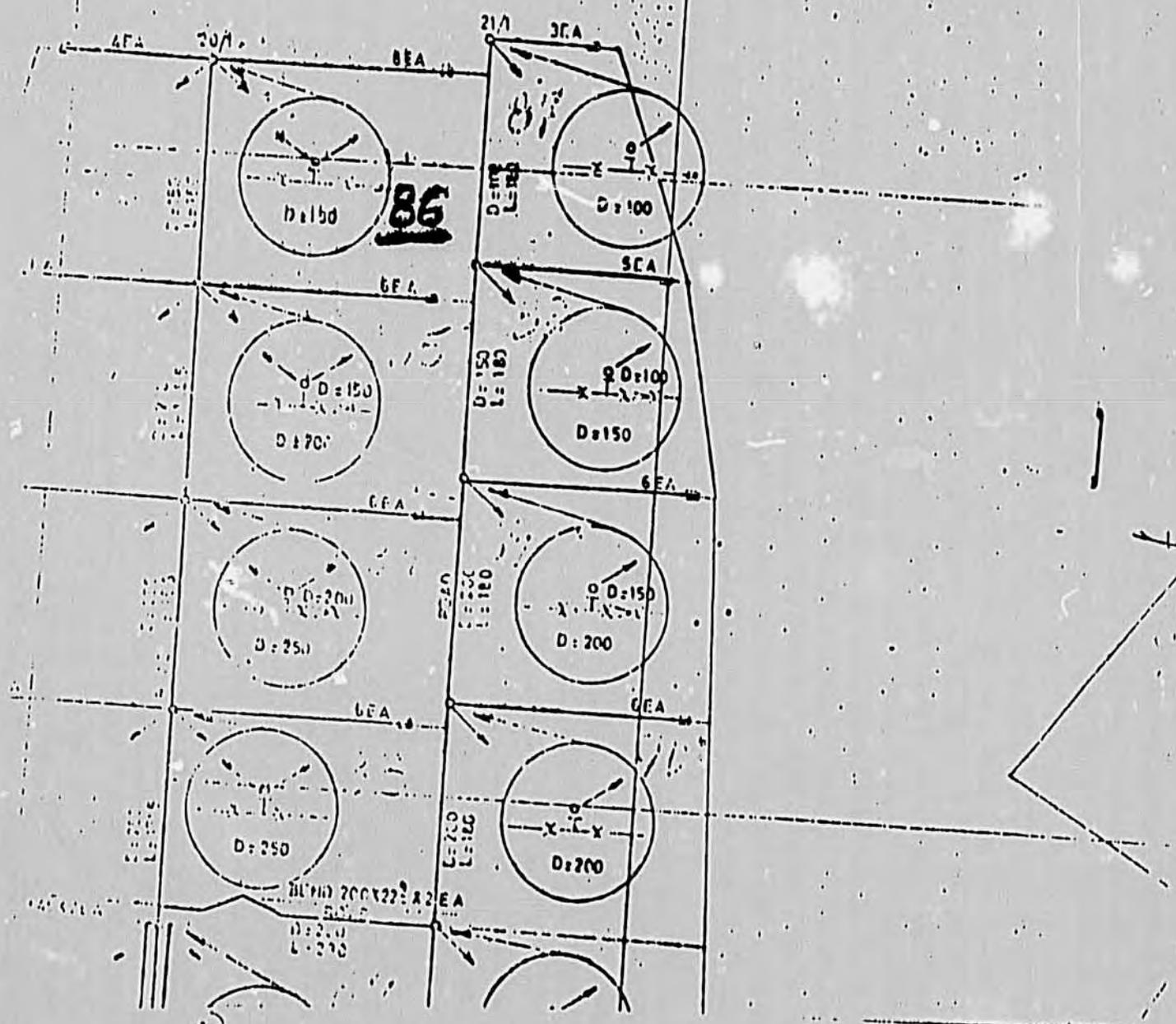


Fig. 3. Map of that portion of Development Area 27, 18 Km Extension Project, showing the location of farm unit 86.

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Fig. 4 . Map of that portion of the 18 Km Estension Project showing the location of the plastic houses used by Marlowe in the JVA Water Management Study.

AGRICULTURAL INSTITUTIONS SERVING AGRICULTURE IN JORDAN

There are nine bodies and/or institutions directly concerned with one or more of the functions involved in the development of and services to the agricultural sector in Jordan. These are:

1. The Ministry of Agriculture
2. Jordan Valley Authority
3. University of Jordan, Faculty of Agriculture
4. Agricultural Credit Corporation
5. Jordan Cooperative Organization
6. Jordan Valley Farmers Association
7. Agricultural Marketing Corporation
8. Natural Resources Authority
9. The Higher Agricultural Council

In addition, the private sector is represented by several agricultural trade companies. Several companies manufacturing agricultural inputs and a powerful group of commission merchants (middlemen), play an important and active role in providing farmers with production inputs, marketing facilities and, to a great extent, in influencing the decisions of farmers in carrying out their agricultural activities.

The following is a brief presentation of the nine bodies and/or institutions with a focus on their functions.

1. Ministry of Agriculture (MOA)

The MOA is the oldest of the institutions established in Jordan to serve agriculture. The main activities of the MOA in recent years have focused on:

a) All regulatory matters related to the export and import of agricultural commodities and agricultural production inputs. In several areas, the Ministry of Supply, the Ministry of Economy and Industry, and the Agricultural Marketing Corporation coordinate with MOA in taking some decisions.

b) Distribution of fruit tree seedlings at subsidized prices. This activity is linked with a cooperative program which the MOA is implementing with the World Food Program (WFP). In 1978, MOA signed an agreement with the WFP through which the latter offered 12 million US dollars to be spent over four years to promote the development of sloping rainfed uplands. The program includes offering subsidies to farmers who engage in soil and water conservation activities (e.g. building terraces) on their land and plant it with fruit trees.

c) Implementation of the afforestation and range management program. About one of three million forest tree seedlings are planted each year. The total area allocated to afforestation (sloping land of 25% and above) comes to about 1.3 million dunums. There are 300,000 dunums which are naturally forested and 200,000 dunums which have been forested mostly since 1952.

This leaves 800,000 dunums to be forested in the future. The UNDP is preparing a program aimed at developing and managing range lands. Once this program is approved, the MOA will be the implementing agency. The program will be financed cooperatively with the UN Development Fund (UNDP).

d) Providing veterinary services, extension and research services. There are few complaints from all concerned about the veterinary services. However extension and research services suffer from inefficiency and need re-organization, reorientation of scope, and more clarity of mission (1).

d) As a result of a recent decision by the Higher Agricultural Council, the MOA will propagate and provide a major part of the improved wheat seed needed by the farmers. The Government has bought two pieces of land (about 5 thousand dunums) in high rain fall areas for seed production.

2. Jordan Valley Authority (JVA)

JVA is primarily responsible for development of water and land resources and social infrastructure in the Jordan Valley. Recently, the scope of JVA's responsibility has been widened to include the Southern Ghors and the development of Wadi Araba in the South. In the last four years, JVA has been administering Arabain in the South. In the last four years, JVA has been administering a comprehensive social and economic plan for the development of the Jordan Valley.

3. The Faculty of Agriculture, University of Jordan (UOJ/FA)

The UOJ/FA was established in 1972 by the University of Jordan with the objective of developing a program of teaching, training, research and information aimed at serving the agricultural sector in Jordan. With the help of several agencies, including U.S. A.I.D. the Faculty implemented a building program which will serve its objectives. The program is complete and includes the main laboratory and classroom building on the UOJ campus, a greenhouse unit, a machinery unit, a poultry unit, sheep unit and a training center in the Jordan Valley. The Faculty consists of about 40 Ph. D's, 30 MS assistants and 40 technicians. BSc and MSc degree programs are established in three major disciplines, namely plant production and protection, soils and irrigation, and animal production and health.

Immediate future plans of the Faculty include introducing a BSc program in agricultural economics, expansion of research activities in the Jordan Valley, and engagement in an information and field demonstration program in the Valley. The budget of the Faculty which is approximately JD 2 million a year is divided into 65% for research and 35% for teaching.

(1) Thabet, Kamal, Agricultural Research in Jordan. FAO.

4. Agricultural Credit Corporation (ACC)

ACC is at present the institution mainly responsible for providing intermediate and long-term credit to farmers. It is financed by loans from outside Jordan and supported by the Government. ACC in the period 1974-1979 issued almost 7500 loans to more than 5000 farmers. The loans have totaled about JD 13 million. The activities supported by ACC were as follows:

Activities Supported	Total sums credited in ('000) J.D. for the years				
	1974	1975	1976	1977	1978
Develop rainfed areas	262	135	89	102	136
Develop irrigation activity	355	290	232	406	1034
Develop poultry & animal production	401	968	996	998	1195
Agricultural machinery	380	629	658	220	186
Seasonal loans	219	288	353	388	553
Others	571	180	443	253	109
Number of farmers credited	2122	1617	1412	1166	1078

Source: ACC Annual Reports 1974-1978

5. Jordan Cooperative Organization (JCO)

JCO is primarily responsible for promoting cooperative work with major emphasis on rainfed rural areas. It provides member farmers with agricultural inputs at prices lower than the open market. Such inputs include machinery, seeds, fertilizers and pesticides. Recently JCO organized a vegetable marketing cooperative in the Southern Ghors (south of the Dead Sea). In 1979-1980 the budget of JCO has been increased through loans from Iraq and the United Kingdom (about JD 10 million) and through Government support. The work of JCO will

concentrate more on providing short-term credit to farmers, promotion of agricultural cooperatives in the rainfed areas with the objective of consolidating land holdings of small farmers into larger production units, and in providing agricultural production inputs on a larger scale and at competitive prices.

6. Jordan Valley Farmers Association (JVFA)

JVFA is a Government sponsored, but non-governmental association, which was established by a special regulation to organize the farmers of the Jordan Valley. JVFA is a young and growing institution and has the support of the Government to play a major role in improving social and economic conditions of the farmers in the Jordan Valley. Among present and future responsibilities of JVFA are:

a) Extending credit to the farmers as well as providing farmers with production inputs at competitive prices.

b) Administering packing and grading centers which are planned to receive all Jordan Valley agricultural products.

c) Providing direct services to farmers on the basis of competitive fees. Such services include machinery used in implementing various agricultural practices and distribution of seedlings.

d) Representing farmers in all matters which will improve their conditions.

7. Agricultural Marketing Corporation (AMC)

This organization has gone through several changes in functions and administration. Its original function was to improve and administer marketing procedures for agricultural products. Its present status is not clear and its role has been limited to a few attempts at exporting certain agricultural commodities, importing seed potatoes, and seeking outside markets for Jordanian vegetables and fruits. Its functions overlap those of JVFA, JCO, MOA and Ministry of Supply.

8. Natural Resources Authority (NRA)

The functions of this Governmental institution has also gone through many changes. At present, NRA is responsible among other things for the regulation and development of underground water in the uplands. Its work is becoming more and more related with the Water and Sewage Authority and is currently focusing on development of the country's mineral resources. Since water for household and industry

is exhausting all available water resources in the uplands, NRA is abandoning little by little its original activities in developing agricultural irrigation schemes in the uplands. All of the activities of NRA in the Jordan Valley, in the Southern Ghors, and in Wadi Araba have been taken over by JVA.

9. The Higher Agricultural Council

This Council was established in 1979 through a special by-law to address policy issues in the development and service of the agricultural sector. The Council consists of: The Prime Minister as Chairman, Ministry of Agriculture as Vice Chairman, and 15 others, including the Minister of Supply, Ministry of Industry, and Commerce, President of JVA, President of National Planning Council, Director of ACC, Director of JCO, Dean of the Faculty of Agriculture (UOJ), President of NRA, President of JVFA, Director of AMO, Head of Agricultural Engineers Syndicate, two farmers and two other members from the MOA.

The objectives of the Higher Agricultural Council as outlined in the by-law are as follows:

- a) To decide agricultural policy within the framework and general objectives of the country's development. The agricultural policy should address the following issues:
 - 1) Policies concerning plant and animal production.
 - 2) Policies concerning marketing, production, inputs and prices.
 - 3) Policy related to the use of agricultural resources which include agricultural land, water, capital, manpower, and know-how.
 - 4) Policy related to tax exemption, custom and duty exemption of agricultural products, and agricultural production inputs.
- b) To decide upon developmental projects and plans in the light of the general objectives of development.
- c) To coordinate the activities and functions of the various institutions which are directly connected with the agricultural sector with the objective of consolidating efforts and avoiding duplication.
- d) Suggest any new laws and by-laws or changes in the existing ones which are related to the development of the agricultural sector.

The more important decisions taken by the Council thus far were aimed at the following.

- a) Reduction of marginal costs of marketing with the objective of increasing farmers' net returns.
- b) Strengthening grading and packing centers for vegetables and fruits in the Jordan Valley.
- c) Promotion of wheat production through several measures, most important of which were the setting of a minimum price for locally produced wheat and production of improved seeds. The minimum price of wheat set by the Government for last season, 1980, was 90 JD (\$297) per metric ton.
- d) Strengthening coordination between agencies concerned in exporting and importing agricultural commodities.
- e) No subsidy to production inputs, but support of any measures which will increase productivity.
- f) Support JVFA and JCO in securing production inputs to provide to farmers at competitive prices.

The Higher Agricultural Council may not solve all the institutional issues in the agricultural sector and may not remove all constraints facing agricultural development and services as a result of lack of coordination among institutions, but it is certainly the proper forum where such issues and constraints are to be tackled.

TABLE 1
SUMMARY BUDGET
U.S. DOLLARS (000)

	<u>FY82</u>	<u>FY83</u>	<u>FY84</u>	<u>FY85</u>	<u>FY86</u>	<u>Total</u>
U.S. CONTRIBUTION						
Technical Assistance						
Expatriate Service	207	731	633	703	660	2,934
Admin Asst (National)	3	9	10	10	11	43
Total	210	740	643	713	671	2,977
TRAINING						
US Long-Term	-	15	141	192	22	370
US Short-Term	-	163	328	-	-	491
University of Jordan	-	2	14	17	-	33
In service	-	9	5	-	-	14
English Training	-	4	-	-	-	4
Contingency, Overhead, etc	-	24	64	27	3	118
Total	-	217	552	236	25	1,030
COMMODITIES	790	590	4	4	202	1,590
EVALUATION			23			23
Total U.S.	1,000	1,547	1,222	953	898	5,620
GOJ CONTRIBUTION						
Personnel Salaries	254	539	593	652	658	2,696
Other	257	335	357	306	292	1,547
Total GOJ	511	874	950	958	950	4,243
Total USAID and GOJ	1,511	2,421	2,172	1,911	1,848	9,863

1 TECHNICAL SERVICES COSTS FOR EXPATRIATE STAFF
(FIELD AND HOME OFFICE STAFF)

FIELD STAFF SALARIES	FY82		FY83		FY84		FY85		FY86		TOTAL	
	M	\$	M	\$	M	\$	M	\$	M	\$	M	\$
Plant Pathologist (Senior Advisor)	5	20,081	12	53,015	7	34,018					24	107,114
Pest Mgmt. Specialist (Entrom.)	1	3,308	12	43,659	7	28,015					20	74,982
Production Economist	1	3,308	12	43,659	8	32,017					21	78,984
Soil and Water Specialist	2	6,615	10	36,383							12	42,998
Extension Organizer	0.5	1,654	3	10,915							3.5	12,569
Vegetable Horticulturalist			2	7,277	10	40,020					12	47,297
Citrus Horticulturalist			1	3,638	5	20,010					6	23,648
Agricultural Inf. Officer			1.5	5,457							1.5	5,457
Extension Program Develop.			2	7,277							2	7,277
Veg. Horticulturalist(Sen. Adv.)					4	19,439	12	64,148	7	41,162	23	124,749
Pest Mgmt. Specialist (Viro.)					1	4,002	12	52,828	5	24,213	18	81,043
Production Economist							6	26,414			6	26,414
Pest Mgmt. Spec. (pesticides)							5	22,012			5	22,012
Soil and Water Specialist							1	5,346	11	64,684	12	70,030
Pest Management Specialist							4	17,609	8	38,741	12	56,350
Production Economist							4	17,609	8	38,741	12	56,350
Sub Total	9.5	34,966	55.5	211,257	42	177,521	44	205,966	39	207,541	190	837,274
HOME OFFICE STAFF SALARIES												
Campus Coordinator at 20%	1.0	4,016	2.4	10,603	2.4	11,663	2.4	12,830	2.2	12,937	10.4	52,049
ADM Assis. for C.C. at 33%	1.7	3,586	4.0	9,468	4.0	10,414	4.0	11,456	3.5	11,552	17.2	46,476
Secretary for C.C. at 50%	2.3	3,308	6.0	8,732	6.0	9,605	6.0	10,565	5.7	10,654	26.0	42,864
Temporary Secretary	2.0	2,646									2.0	2,646
Purchasing Officer at 50%	4.5	14,884	6.0	21,830	1.5	6,003					12.0	42,717
Training Advisor at 20%	0.8	1,361	2.4	4,492	2.4	4,941	2.4	5,435	1.6	3,985	9.6	20,214
Librarian at 10%	0.5	851	1.2	2,245	1.2	2,470	1.2	2,717	1.1	2,740	5.2	11,023
Sub Total	12.8	30,652	22.0	57,370	17.5	45,096	16.0	43,003	14.1	41,868	82.4	217,989

	FY82	FY83	FY84	FY85	FY86	TOTAL						
SUPPORT FOR FIELD STAFF												
Post Diff. - 10%	3,497	21,128	17,752	20,596	13,698	76,671						
Overhead - 30%	10,490	63,384	53,256	61,790	41,093	230,013						
Overhead H.C. - 45%	13,793	25,817	20,293	19,351	18,840	98,094						
Backup Supp. F.S. & H.O.- 10%	6,562	26,865	22,262	24,896	17,835	98,470						
Benefits - 23%	15,092	61,789	51,202	57,263	41,135	226,481						
Sunday Diff. F.S. - 8%	2,797	16,902	14,202	16,477	10,958	61,336						
Consult U.S.-F.S.&H.O. - 10%	6,562	26,865	22,262	24,896	17,835	98,470						
Travel - To and From Post	10,200	22,440	21,595	37,323	22,392	113,950						
" Return of S.A. to US		2,805	3,085	6,786	3,733	16,409						
" Emergency	2,550	2,805	3,085	6,786	3,733	18,959						
" R & H		1,099	1,610	1,772	1,950	6,431						
" Excess Baggage	1,320	2,904	3,192	4,897	2,634	14,947						
" To Jordan-Dean or C.C	2,550	2,805	3,085	3,393	3,733	15,566						
" In States 3 trp-CC/SA	700		847		1,025	2,572						
Storage for Long Term	660	1,452	1,597	1,757	1,933	7,399						
H.H & Car Shipment	18,700	20,570	22,627	24,890	54,758	141,545						
House Rental (inc. furn/utl)	12,150	69,984	58,275	56,133	72,621	269,163						
Education Ben. - Away frm Post	11,990	13,189	14,508	15,959	17,555	73,201						
Education Ben. - At Post	7,700	21,175	23,295	25,625	22,552	100,347						
Per Diem	4,000	24,000	22,600	9,500	9,500	69,600						
Sub Total	<u>131,313</u>	<u>427,978</u>	<u>380,630</u>	<u>420,090</u>	<u>379,613</u>	<u>1,739,624</u>						
Grand Total	196,931	696,628	603,247	669,059	629,022	2,794,587						
Contingency 5%	<u>9,847</u>	<u>34,831</u>	<u>30,162</u>	<u>33,453</u>	<u>31,451</u>	<u>139,744</u>						
Total Costs	206,778	731,459	633,409	702,512	660,473	2,934,631						
ADM. Assis. for S.A. (Jordanian National)	5	3,125	12	8,250	12	9,075	12	9,983	11	10,066	52	40,499
Contingency 5%		156		413		454		499		503		2,325
Grand Total (Tech. Support)	210,059	740,122	642,938	712,994	671,042	2,977,155						

TABLE II - TRAINING BUDGET SUMMARY

<u>Program</u>	<u>No. of Parti- cipants</u>	<u>Months per Par- ticipant</u>	<u>Total Months</u>	<u>Total Estimated Costs</u>
1. Short-Term Training				
a. In Jordan	30	4.5	135.0	14,616
b. Other Countries	6	3.0	18.0	
	15	4.5	67.5	412,162
2. Long-Term Academic				
a. In Jordan	8	18.0	144.0	33,991
b. Other Countries	8	19.5	156.0	288,611
3. English Training in Jordan	10	N.A.	N.A.	4,714
4. Special Training in U.S.	5	1.0-2.0	6.0	27,027
5. Special Training in USDA Course or at Int'l Centers	5	3.5	17.5	76,214
TOTAL	N.A.	N.A.	544.0	957,335
Overhead @ 8% on U.S. Training (\$860,966)				68,877
5% Contingency on \$68,877				<u>3,444</u>
				<u><u>1,029,656</u></u>

NOTE:

N.A. = Not applicable. Some participants will receive more than one type of training.

TABLE II (CONT'D)

Table II.1.a. In-Service Technical, on-the-job training in Jordan

Technical Subject Matter Program

	<u>FY 83</u> (Fall)	<u>FY 83</u> (Spring)	<u>FY 84</u> (Fall)	<u>FY 85</u>	<u>FY 86</u>	<u>TOTAL</u>
Participants	10	10	10			30
Man-Months	45	45	45			135

No. of Participants

In FY 83 20 @ 449 = 8,980.00
 In FY 84 10 @ 494 = 4,940.00
 30 13,920.00

5% Contingency 696.00

TOTAL 14,616.00

1. Budget Factors for training in Jordan

a. Technical-on-the-job subject matter training

1. It is assumed participants, as full-time employees of the MOA, will continue on salary. Since only one or two courses will be taken, participants should be continued @ full salary and allowances and required to make up work time devoted to training. Therefore only the costs listed below are budgeted for:

Admission to UOJ	\$ 30.00 in FY81
Deposit	\$ 30.00 in FY81
6 Graduate credit hours (max.) @ 36 each	\$ 216.00 in FY81
Services	\$ 45.00 in FY81
Book Allowance	\$ 50.00 in FY81
	<u>\$ 371.00 in FY81</u>

2. Basic course is 4.5 months

3. Participant Cost

FY81 \$ 371.00
 FY82 \$ 371 + 10% = \$ 408
 FY83 \$ 408 + 10% = \$ 449
 FY84 \$ 449 + 10% = \$ 494

b. English Proficiency Training in Jordan

Costs are figured to permit enrollment @ UOJ in FY83. Enrollment in other English proficiency programs offered in Jordan should be cost less.

Table II.1.b. Short-Term Technical Training in U.S. Or in Other Countries

	FY 1983 (Start FEB 1, '83)	FY 1984 (Start OCT '83)	FY 1984 (Start FEB 1, '83)	TOTALS Parti- cipants	Man- Months
Researchers 3 @ 3 mos.	2 (6)	1 (3)		3	(9)
S.M.S. 3 @ 4½ mos.	2 (6)	1 (3)		3	(9)
Assoc. 7 @ 4½ mos.	1 (4.5)	4 (18)	2 (9)	7	(31.5)
Agents 8 @ 4½ mos.	2 (9)	4 (18)	2 (9)	8	(36)
Total Participants	7	10	4	21	
Total Man-Months	(25.5)	(42)	(18)		(85.5)

Short-Term Training Costs

FY 83	\$ 4,290 x 25.5 man-months	\$ 109,395
FY 84	\$ 4,719 x 60.0 man-months	\$ 283,140
Subtotal	85.5 man-months	\$ 392,535
5% Contingency		19,627
TOTAL		\$ 412,162

Budget Factors for Short-Term Technical Training in U.S. & Other Countries

- One man-month technical training in U.S. for FY82 = \$ 3,900
- Researchers and Specialists - 3 months
- Agents and Associates 4½ months
- Costs figured on U.S. costs; costs will be lower in other countries allowing more participants to be involved in permanent staff members are qualified candidates.
- Man-Month Cost:

FY 82 -	\$ 3,900
FY 83 -	\$ 4,290
FY 84 -	\$ 4,719
FY 85 -	\$ 5,191

TABLE II (CONT'D)

Table II.2.a. Costs of Academic Training at the University of Jordan

	No. of Parti- cipants	FY 1983		FY 1984		FY 1985	
		Fall	Spring	Fall	Spring	Fall	Spring
Starting Spring 1983	2		1,542	1,696	1,696	2,466	
Starting Fall 1984	6			5,088	5,088	7,398	7,398
Total Costs per Semester	8		1,542	6,784	6,784	9,864	7,398
Total Cost			\$ 32,372				
5% Contingency			1,619				
TOTAL COST			<u>\$ 33,991</u>				

Budget Factors for Academic Training at UOJ

- Participants will be continued at 75% of salary in the MOA. Per diem @ 30 JD per month, to be paid by MOA, is recommended.
- Enrollment costs for each semester at the University of Jordan are computed as follows:

Admission	30.00 in FY81
Deposit	30.00 in FY81
Services	45.00 in FY81
12 Graduate credit hrs. @36	432.00 in FY81
Book allowance	100.00 in FY81
Total	<u>637.00 in FY81</u>

- Thesis typing costs estimated @ 300.00/participant in FY85.
- 10% inflation factor is considered for each subsequent FY

FY82	637 + 10% = 701
FY83	701 + 10% = 771
FY84	771 + 10% = 848
FY85	848 + 10% = 933 + 300 (thesis) = 1,233

Table II-2.b. Long-Term Academic Training in U.S. and Other Countries

	No. of Parti- cipants	FY 1983 Man Months	FY 1984 Man Months	FY 1985 Man Months	FY 1986 Man Months
Starting June 15, 1983					
S.M.S.	1	$1 \times 3.5 = 3.5$	$12 \times 4 = 48$	$12 \times 4 = 48$	$12 \times 4 = 48$
Associates	1	$1 \times 3.5 = 3.5$	$12 \times 4 = 48$	$12 \times 4 = 48$	$12 \times 4 = 48$
Sub Total	2	7	24	8	
Starting Feb. 1, 1984					
S.M.S.	2	$2 \times 8 = 16$	$11.5 \times 2 = 23$	$11.5 \times 2 = 23$	$11.5 \times 2 = 23$
Associates	2	$2 \times 8 = 16$	$11.5 \times 2 = 23$	$11.5 \times 2 = 23$	$11.5 \times 2 = 23$
Sub Total	4		32	46	
Starting June 15, 1984					
S.M.S.	1	$1 \times 3.5 = 3.5$	$12 \times 4 = 48$	$12 \times 4 = 48$	$12 \times 4 = 48$
Associates	1	$1 \times 3.5 = 3.5$	$12 \times 4 = 48$	$12 \times 4 = 48$	$12 \times 4 = 48$
Sub Total	2		7	24	8
TOTAL	8		63	78	8
FY83 7.5 mos. @ 2,035 = 15,263					
FY84 63.0 mos. @ 2,230 = 141,057					
FY85 78.0 mos. @ 2,463 = 192,114					
FY86 8.0 mos. @ 2,709 = 21,672					
155 Total		370,106			
5% Contingency		18,505			
TOTAL		388,611			

Budget Factors for Long-Term Academic Training in U.S. and Other Countries

1. Time per long-term participant is 19.5 months (excluding previous 4½ months short-term training).
2. Base cost is computed @ 1,850/month for FY 82
3. 10% inflation factor is calculated for each subsequent fiscal year.
FY83 @ \$ 2,035; FY84 @ \$ 2,239; FY 85 @ \$ 2,463; FY86 @ \$ 2,709
4. Costs should be lower in other countries than in the U.S. Any resulting savings would permit a larger number of qualified Project personnel to receive training.

Table II.3. English Proficiency Training in Jordan

No. of Participants in FY 83	10 @ six hours each	\$ 4,486
5% Contingency Factor		<u>228</u>
TOTAL		<u>\$ 4,714</u>

1. Budget factors for training in Jordan

a. Technical on-the-job subject matter training

1. It is assumed participants, as full-time employees of the MOA, will continue on salary. Since only one or two courses will be taken, participants should be continued @ full salary and allowances as required to make up work time devoted to training. Therefore only the costs listed below are budgeted for:

Admission to UOJ	\$ 30.00 in FY81
Deposit	\$ 30.00 in FY81
Six Graduate credit hours (max.) at 36 each	\$ 216.00 in FY81
Services	\$ 45.00 in FY81
Book Allowance	\$ 50.00 in FY81
	<u>\$ 371.00 in FY81</u>

2. Basic course is 4.5 months

3. Participant cost

FY81	\$ 371
FY82	\$ 371 + 10% = \$ 408
FY83	\$ 408 + 10% = \$ 449
FY84	\$ 449 + 10% = \$ 494

b. English Proficiency training in Jordan

Costs are figured to permit enrollment at University of Jordan in FY83. Enrollment in other English proficiency programs offered in Jordan should cost less.

Table II.4. Specialized Training in the U.S.

	<u>FY 83</u>	<u>FY 84</u>	<u>Participants & Total Man-Months</u>
Project Director	1 (2)		1 (2)
Photographer	1 (2)		1 (1)
Editor	1 (1)		1 (1)
Publications	1 (1)		1 (1)
Print Shop Manager	1 (1)		5 (6)
FY 83 - \$ 4,290 x 6 mon.	\$ 25,740		
5% Contingency	<u>1,287</u>		
Total	<u>\$ 27,027</u>		

Budget Factors for Specialized Training in the U.S.

1. All specialized training is scheduled for FY 1983. This will provide adequate time after initiation of the Project in May 1982 to select qualified individuals and for them to become involved in the Project and to obtain maximum advantage from their short-term training program in U.S.
2. Base cost of participant training:
 - FY 1982 @ \$ 3,900
 - FY 1983 @ \$ 3,900 + 10% = \$ 4,290

TABLE II.5. Participation in Short-Term Courses Sponsored by USDA or International Agricultural Research Centers

	<u>FY 1983</u>	<u>FY 1984</u>
Average Cost of U.S.D.A. course (2 months)	7,260	7,986
Interim Participant Training for 1.5 months	<u>6,435</u>	<u>7,079</u>
	13,695	15,065
Number of Participants	(2)	(3)
FY83 2 participants, $3\frac{1}{2}$ months @ 13,695 =		27,390
FY84 3 participants, $3\frac{1}{2}$ months @ 15,065 =		<u>45,195</u>
7 months		72,585
Contingency @ 5%		<u>3,629</u>
		<u><u>76,214</u></u>

Budget Factors for U.S.D.A. and I.A.R.C. Courses

- a. Average cost per USDA course in FY 1981 6,000
 Estimated Average cost per USDA course in FY 1982 6,600
 Estimated Average cost per USDA course in FY 1983 7,260
 Estimated Average cost per USDA course in FY 1984 7,968
- b. Technical Training costs FY 82 @ 3,900
 Technical Training costs FY 83 @ 4,290
 Technical Training costs FY 84 @ 4,719

TABLE III - COMMODITIES

Annex - 0
Page 12 of 27

a. Laboratory Equipment	
1. Plant Pest Research and Diagnostic Lab	\$ 350,186
2. Soil, Water and Plant Tissue	223,539
b. Office & Residential Equipment	
1. Office Equipment	23,864
2. Residential Furnishing and Furniture	44,000
c. Tractors and Farm Equipment	149,955
d. Vehicles	316,581
e. Greenhouses and Plastic Houses	134,385
f. Microclimate Equipment	27,170
g. Irrigation Equipment	106,873
h. Audiovisual & Other Equipment	118,937
i. Books and Journals	13,431
j. Literature Searches	<u>5,375</u>
Sub-Total	\$ 1,514,296
Contingency @ 5%	<u>75,715</u>
TOTAL	<u><u>\$ 1,590,011</u></u>

Table III.a.1. Integrated Pest Management Field Research and Lab Equipment

<u>Item</u>	<u>No. of Units</u>	<u>Established Unit Cost</u>	<u>Total</u>
Mettler Balance	1	2,500	2,500
Analytical Balance	1	1,500	1,500
Microscopes (compound)	10	1,200	12,000
Microscopes (dissecting)	10	600	6,000
Centrifuge	1	1,500	1,500
Mite brushing machine with scope	1	1,500	1,500
Refrigerators	4	1,000	4,000
Lab Spray Tower	1	2,000	2,000
Deep Freezer	2	3,000	6,000
Drying Ovens	2	700	1,400
Muffle Furnace	1	900	900
Incubators	2	600	1,200
Rearing Chambers	2	4,000	8,000
Day-degree Unite	3	3,000	9,000
Insect Cabinets and Boxes	1	5,000	5,000
Electronic Calculators	4	500	2,000
Spectrophotometer	1	2,000	2,000
Hydrothermotaphs	4	800	3,200
Max-Min Termometers	20	50	1,000
Olfactory Tunnel	1	2,000	2,000
Fogging Machine	1	3,000	3,000
Plot Power Sprayer	2	2,500	5,000
Light Traps	4	500	2,000
Soil Sampler (power)	2	1,500	3,000
Cameras	4	500	2,000
Glassware Washer/Dryer	1	3,500	3,500
Air Conditioner	2	3,000	6,000
Air Velometer	1	900	900
Electronic Top Loader Scale	1	1,500	1,500
Colorimeter	1	1,000	1,000
Air Compressor	2	600	1,200
Conductance Meter	1	800	800
Dessicating Cabinet	2	600	1,200
Sample Concentrator	1	800	800
Stirring Hot Plate	2	500	1,000
Bacterials Colony Counter	1	400	400
Microscope Illuminators	11	100	1,100
Lab Pumps	2	500	1,000
Single Channel Syringe Pump	1	600	600
Pressure Vacuum Pump	1	500	500
Refractometer	1	800	800
Digital Timer	2	400	800
Stopwatch	4	200	800
			<u>111,600</u>

Table III.a.1. (Cont'd)

Sub-Total brought forward	\$ 111,600
Lab Chemicals and Supplies	20,000
Misc. equipment (tensiometers, hand sprayers, sieves, cages, slide file cabinets, office equipment, etc..)	-- <u>32,000</u>
Total	163,600
Shipping and insurance @ 80%	<u>130,880</u>
Total	294,480
Non-maintenance items: 76,500	
Maintenance/Replacement items: 87,100	<u>8,710</u>
TOTAL.	<u>\$ 303,190</u>
50% FY82 \$ 151,595 with 10% inflation	166,755
50% FY83 \$ 151,595 with 10% inflation	<u>183,431</u>
TOTAL	<u>\$ 350,186</u>

Table III.a.2. Soils and Water Lab Equipment List

<u>Item</u>	<u>No. of Units</u>	<u>Estimated Unit Cost</u>	<u>Total</u>
pH Meter	2	1,500	3,000
Ec Meter	2	500	1,000
Colorimeter	2	1,250	2,500
Chloridometer	1	1,800	1,800
Flame emission absorption		15,000	30,000
Saturation extractor	10	500	5,000
Pressure plate apparatus	1	3,000	3,000
Analytical balance	2	2,500	5,000
Sample weighing balance	2	1,500	3,000
Large sample balance	1	500	500
Shaker sieves	1	800	800
Automatic pipettes	3	500	1,500
Dilutors	3	200	600
Test tube stirrers	3	150	300
Automatic solution extractor	1	2,000	2,000
Hot water bath	1	500	500
Soil sample crusher	1	600	600
N Determination system	1	3,000	3,000
Air conditioners	2	1,500	3,000
Refrigerators	2	1,000	2,000
Drying Oven	1	1,200	1,200
Sampling Equipment	1	2,000	2,000
Programmable calculator	1	500	500
			<u>72,800</u>
Misc. equipment			15,000
Misc. glassware			4,000
Misc. chemicals			6,000
			<u>97,800</u>
Office equipment (copier, typewriter, furniture, files desks, chairs)			<u>5,000</u>
TOTAL			102,800
Shipping and Insurance @ 80%			82,240
Maintenance for items requiring @ 10%			<u>8,500</u>
TOTAL			<u>193,540</u>
50% FY82 \$ 96,770 with 10% inflation			106,447
50% FY83 \$ 96,770 with 10% inflation			<u>117,092</u>
TOTAL			<u>\$ 223,539</u>

Table III.b.1. Office Equipment

<u>Item</u>	<u>No. of Units</u>	<u>Estimated Unit Cost</u>	<u>Total</u>
Desks	7	500	3,500
Swivel chairs	2	300	600
Arm chairs	5	100	500
Chairs, 1/office for visitors	7	100	700
Bookcases	7	100	700
Four drawer filing cases	7	285	1,995
Fans	7	100	700
Electric typewriter	2	1,300	2,600
TOTAL			<u>11,295</u>
Shipping @ 80%			9,036
Maintenance & Replacement: 3,300 @ 10%			<u>330</u>
TOTAL			<u>20,661</u>
50% FY82 \$ 10,330.50 with 10% inflation			11,364
50% FY83 \$ 10,330.50 with 10% inflation			<u>12,500</u>
TOTAL			<u>23,864</u>

Table III.b.2. Residential Frunishing and Furniture

Residential furnishings and furnitures to be bought locally in FY 1982, 2 sets @ \$20,000 each		40,000
Inflation at 10%		<u>4,000</u>
TOTAL		<u>44,000</u>

Table III.c. Tractors and Farm Equipment

<u>Item</u>	<u>No. of Units</u>	<u>Estimated Unit Cost</u>	<u>Total</u>
Tractor	2	11,000	22,000
Plough, 3 furrow 14"	2	1,500	3,000
Disc Harrow offset	2	2,000	4,000
Cultivator	2	1,750	3,500
Sprayer, 90 concentrate	1	7,000	7,000
Trank sprayer with handguns	1	3,000	3,000
Rotitiller	1	3,000	3,000
TOTAL			45,500
Misc. Farm Equipment			23,000
TOTAL			\$ 68,500
Shipping 68,500 x 80%			54,480
Maintenance 68,500 x 0.10			6,850
TOTAL			129,830
50% FY82 \$ 64,915 with 10% inflation			71,407
50% FY83 \$ 64,915 with 10% inflation			78,548
TOTAL			<u>\$149,955</u>
Table III.d. <u>Vehicles*</u>			
Sports vans 13 passenger	3	13,000	39,000
2 Ton Trucks	2	12,350	24,700
Pick Up	10	5,300	53,000
TOTAL			116,700
(All vehicles to be bought in Amman)			
Inflation in FY82 at 10%			11,670
TOTAL			<u>128,370</u>
To be replaced in FY86			
Sports Vans 13 passengers	3	20,937	62,811
2 Tons trucks	2	19,900	39,800
Pick Up	10	8,560	85,600
Total to be bought in FY86			<u>\$188,211</u>
TOTAL COST OF VEHICLES			<u>\$ 316,581</u>

* Maintenance after purchase is included in GOJ budget.

Table III.e. Plastic Structures and Greenhouses

<u>Item</u>	<u>No. of Units</u>	<u>Estimated Unit Cost</u>	<u>Total</u>
Standard (8x60m) plastic houses	6	6,434	38,605
Glass greenhouses with controlled environment (20x30 ft @ \$100/sq.ft.)	1	60,000	60,000
Plastic tunnels, 4 dunums @ 3 locations	12	360	<u>4,320</u>
Sub-Total			102,925
Shipping non-local purchase			- 0 -
Maintenance and replacement @ 15%			<u>13,425</u>
Sub-Total			<u><u>116,350</u></u>
FY82 \$ 58,175 with 10% inflation			63,993
FY83 \$ 58,175 with 10% inflation			<u>70,392</u>
TOTAL			<u>\$134,385</u>

Table III.f. Microclimate Equipment

Weather station, portable, battery operated with solar cells		6,500	13,000
Shipping @ 80%			10,400
Maintenance/replacement @ 10%			<u>1,300</u>
Sub-Total			24,700
FY82 with 10% inflation			<u>2,470</u>
TOTAL			<u>\$ 27,170</u>

Table III.g. Irrigation Equipment

<u>Item</u>	<u>No. of Units</u>	<u>Estimated Unit Cost</u>	<u>Total</u>
Water meters (drip)	25	56	1,400
Water meters (sprinkler)	6	500	3,000
Water meters (open channel)	2	1,000	2,000
Tensiometers	50	40	2,000
Watertable sensors	2	500	1,000
Camera	1	500	500
Hygrothermographs	8	850	6,800
Programmable calculator	2	500	1,000
Water stage recorder	2	2,000	4,000
Drip system, complete with headworks mains, laterals			
20 dunum unit (north)	1	9,000	9,000
10 dunum unit (south)	1	5,500	5,500
5 dunum (Safi)	2	4,000	8,000
Sprinkler systems, complete with pump, mains, laterals and heads			
20 dunum unit (north)	1	2,000	2,000
10 dunum unit (south)	1	1,250	1,250
10 dunum unit	1	1,250	1,250
Sub-Total			48,700
Shipping @ 80%			38,960
Replacement/Maintenance @ 10%			4,870
Sub-Total			<u>92,530</u>
50% FY82 with 46,265 10% inflation			50,892
50% FY83 with 46,265 10% inflation			55,981
TOTAL			<u>\$106,873</u>

Table III.h. Audiovisual and Other Equipment

(All equipment must be 220 volts - no transformers acceptable 50 Cycle)

<u>DESCRIPTION</u>	<u>NO.</u>	<u>ESTIMATED COST (US\$)</u>
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 autoloader 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 projector.	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 Projector.	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 Projector	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 Tape Recorder (Heavy Duty) Sync Capacity with slide projector	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
		<u>8,715.00</u>
	<u>SUBTOTAL</u>	

Table III.h. (Cont'd)

<u>DESCRIPTION</u>	<u>NO.</u>	<u>ESTIMATED COST (US\$)</u>
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. Projection Screens, including carrying case 60" x 60"	3	450.00
10. Overhead Projector 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 Chalkboard 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 Projector (Packs)	100	<u>300.00</u>
SUBTOTAL		19,850.00

TABLE III (CONT'D)

Table III.h. (Cont'd)

	<u>NO.</u>	<u>ESTIMATED COST (US\$)</u>
SUBTOTAL Brought Forward		19,850.00
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		<u>20,000.00</u>
SUBTOTAL		\$ 55,150.00
Shipping @ 80%		44,120.00
Maintenance/Replacement @ 10		<u>5,515.00</u>
SUBTOTAL		<u>\$104,785.00</u>
50% FY82 \$33,392 with 10% inflation (items 1-22)		36,732.00
50% FY82 \$38,000 with 10% inflation (item 23)		41,800.00*
50% FY83 \$33,392 with 10% inflation (items 1-??)		<u>40,405.00</u>
TOTAL		<u>\$118,937.00</u>

* Item 23 Analytical Equipment	estimated cost	\$ 20,000.00
Shipping @ 80%		16,000.00
Maintenance/Replacement @ 10%		<u>2,000.00</u>
Total		<u>38,000.00</u>

Item 23 fully inflated in FY82.

Table III.i.& III.j. Books and Journals, and Literature Searches

	<u>Books and Journals Inflated @ 10%</u>	<u>Literature Searches Inflated @ 10%</u>
FY 1982	2,200.00	880.00
FY 1983	2,420.00	968.00
FY 1984	2,662.00	1,065.00
FY 1985	2,928.00	1,172.00
FY 1986	<u>3,221.00</u>	<u>1,290.00</u>
TOTAL	<u><u>13,431.00</u></u>	<u><u>5,375.00</u></u>

LIBRARY

1. 10 Technical Journals @ \$100/year for 5 years	10	5,000.00
2. 250 Books, guides, and references in technical subject matter fields and extension @ \$20 each	250	<u>5,000.00</u>
TOTAL		<u><u>\$10,000.00</u></u>

TABLE IV - PROJECT EVALUATIONS

a. Internal evaluation at end of first year, FY 83	
No Cost	00.00
b. Evaluation at end of first two years, FY 84	
International Travel 3 @ 3,300	9,900.00
Per Diem 3 for 14 days @ 97/day	4,074.00
Salary 3 @ 225/day for 12 days	<u>8,100.00</u>
Subtotal	22,074.00
Contingency @ 5%	<u>1,103.00</u>
TOTAL	<u><u>\$23,177.00</u></u>

GOJ BUDGET FOR JVAG PROJECT

	<u>FY 1982</u> <u>(6 mos)</u>	<u>FY 1983</u>	<u>FY 1984</u>	<u>FY 1985</u>	<u>FY 1986</u> <u>(11 Mos)</u>	<u>TOTAL</u>
1. PERSONNEL						
a. Project Director @ 17,500 FY82 starting Jan 1, 1982	17,500	19,250	21,175	23,292	23,486	104,703
b. Communications & Inform. Officer @ 14,000 FY 1982	7,000	15,400	16,940	18,634	18,789	76,763
c. 8 Specialists @14,000 FY82	56,000	123,200	135,520	149,072	150,314	614,106
d. 8 Associate Specialists @ 10,000 FY 82	40,000	88,000	96,800	106,480	107,367	438,647
e. 10 Extension Agents @ 12,500 FY 82	62,500	137,500	151,250	166,375	167,761	685,386
f. 1 Admin. Assis. @ 9,000 FY 82	4,500	9,900	10,890	11,979	12,079	49,348
g. Secretary @ 7,500 FY 1982	3,750	8,250	9,075	9,982	10,065	41,122
h. Typist @ 5,000 FY 1982	2,750	6,050	6,655	7,321	7,381	30,157
i. 2 Mechanics @ 7,200 FY 82	7,200	15,840	17,424	19,166	19,326	78,956
j. 4 Tractors/Vehicle Drivers @ 4,500 FY 1982	9,000	19,800	21,780	23,958	24,158	98,696
k. 10 Laborers @3,500 FY 82	17,500	38,500	42,350	46,585	46,973	191,908
l. 4 Laboratory Technicians @ 7,200 FY 82	<u>14,400</u>	<u>31,680</u>	<u>34,848</u>	<u>38,333</u>	<u>38,652</u>	<u>157,913</u>
TOTAL Salaries & Benefits*	<u>242,100</u>	<u>513,370</u>	<u>564,707</u>	<u>621,177</u>	<u>626,351</u>	<u>2,567,705</u>
2. VEHICLE AND TRACTORS						
a. Operating expenses @ \$3,000/vehicle FY82 ^{1/}	25,500	56,100	61,710	67,881	68,447	279,638
b. Vehicle allowance @ \$76,500 FY 1982 ^{2/}	38,250	84,150	92,565	101,822	102,670	419,457
3. INTERNATIONAL TRAVEL						
a. @ \$ 2,800/Trip FY 1983						
b. @ \$ 3,080 FY83 x 12		36,960				36,960
c. @ \$ 3,388 FY82 x 16			54,208			54,208

^{1/} Vehicle operation @ \$10,000 miles/year/vehicle @ .30/mi x 17

^{2/} 28 people @ 750 mi/mo @ .30/mi = 76,500

* Proposed salaries include a margin for incentives and allowances

	FY 1982 (6 mos)	FY 1983	FY 1984	FY 1985	FY 1986 (11 mos)	TOTAL
4. LOCAL PROCUREMENT ^{3,4/}	30,000	40,000	30,000	20,000	13,750	133,750
5. PROVISION of Offices & Research/Facilities at Deir Alla @ 36,000 FY82 ^{4,5/}	18,000	36,000	36,000	36,000	33,000	159,000
6. PROVISION of Land at 3 sites, fenced and water delivered. 170 dunums @ \$125/dunum FY 1982 ^{4/}	10,625	21,250	21,250	21,250	19,479	93,854
7. MOVABLE Storage Facilities at 3 locations @ \$2,500 ^{4/}	7,500					7,500
8. 3 PLASTIC houses @ \$4,200 each FY 1982	12,800					12,800
9. PROVISION of JVA/WMT plastic houses (Marlowe) @ \$3,000 FY 1982 ^{4/}	1,500	3,000	3,000	3,000	2,750	13,250
10. PROVISION of Office Space at Dept. of Res. & Ext. at Amman @ \$2,500/yr FY 1982 ^{4/}	1,250	2,500	2,500	2,500	2,292	11,042
11. PROVISION of 2 housing units in Ghors & Safi for contract technicians @ \$3,600 FY 1982 ^{4/}	3,600	7,200	7,200	7,200	6,600	31,800
12. PROVISION of Greenhouses at Deir Alla @ \$3,000 FY 1982 ^{4/}	1,500	3,000	3,000	3,000	2,750	13,250
13. PROVISION of 8 housing units in the Valley for GOJ employers @ \$3,600 each for rent & utilities and \$10,000 each for furnishings & furniture to be provided in FY 1982 ^{4/}	94,400	98,800	98,800	98,800	96,400	207,200
TOTAL	<u>244,925</u>	<u>318,960</u>	<u>340,233</u>	<u>291,453</u>	<u>278,138</u>	<u>1,473,709</u>

^{3/} Includes: demonstration supplies, training aids, office furnishings

^{4/} Not inflated

^{5/} If offices not available, construction at an estimated cost of \$50,000 would substitute

SUMMARY OF GOJ INPUTS

Salaries	\$ 2,567,705
Other Items	<u>\$ 1,473,709</u>
Sub-Total	\$ 4,041,414
5% Contingency	<u>202,071</u>
TOTAL	<u><u>\$ 4,243,485</u></u>