

43209

"not for Distribution"
8/28/78

JORDAN VALLEY FARMERS ASSOCIATION

278-0186

AGRICULTURAL PLANNING AND TECHNICAL SERVICES

FOR THE JORDAN VALLEY

An Interim Report by the USDA/JSAID Team

THE HASHEMITE KINGDOM OF JORDAN

MAY, 1978

James H. Jensen, Elvin F. Frolik, Ernest J. Nesius,
and Daniel Pfarmstiel

TABLE OF CONTENTS

	<u>Page</u>
I. Note of Appreciation	1
II. Abbreviations and Definitions	2
III. Summaries	3
IV. Introduction	8
V. Procedure	11
VI. The Present Situation	12
A. General	12
B. Research	14
C. Extension	17
VII. Strengthening Research Strategy	18
VIII. Strengthening Extension Strategy	21
IX. Administrative Organization	23
A. Possible Alternatives - A Listing	23
B. Retain the Ministry of Agriculture and Faculty of Agriculture Intact - Coordinate Research in the Valley through a Jordan Valley Agricultural Policy Committee	24
C. Establish a New Organization, the Jordan Valley Agricultural Council to Encompass all Research and Extension in the Valley.	27
X. Agricultural Economics	30
A. Agricultural Policy	30
B. The Agricultural Development Plan	31
C. Crop Priorities	32
D. Marketing	33
E. Credit	33
F. Farm Management Activity	34
G. Reliable Data for Decision Making	35
XI. Proposed Follow-Up	37
XII. Appendix	41

1-

. NOTE OF APPRECIATION

The U.S. Team is indebted to many persons (a partial list appears in Appendix B) for their good help and patience in providing pertinent information for the study. No effort was spared in scheduling conferences and in arranging visits to various facilities, in Amman and in the Jordan Valley. Special appreciation is expressed to the high level Jordanian Committee, to the technical task force, and to the individual counterparts, all of whom are listed in the report. The Ministry of Agriculture was most considerate in providing stenographic help, offices, and exclusive use of car and driver. Expatriates listed in Appendix B were also helpful. In addition, the Team wishes to acknowledge the help of the USAID/J staff.

Lastly, appreciation is expressed for the excellent typing services of Mrs. Dalila Kamal, and the extra efforts she put forth to get the report properly completed before the Team departed Jordan.

II. ABBREVIATIONS AND DEFINITIONS

GOJ	Government of Jordan
JVA	Jordan Valley Authority
JVFA	Jordan Valley Farmers Association
JCO	Jordan Cooperative Organization
ACC	Agricultural Credit Corporation
NPC	National Planning Council
MinAg	Ministry of Agriculture
FacAg	Faculty of Agriculture, University of Jordan
USDA	United States Department of Agriculture
USAID	United States Agency for International Development
JVAPC	Jordan Valley Agricultural Policy Committee (proposed)
JVAC	Jordan Valley Agricultural Council (alternately, proposed)
Ghor	Jordan Valley
Dunum	One-tenth of a hectare
GDP	Gross Domestic Product

III. SUMMARY

There are presently 181,000 dunums of irrigated land in the Jordan Valley, which will increase to 360,000 by 1982. Production from the Valley accounts for 42% of agriculture's share of the GDP. However, yields of vegetables, the most important crop now and which will increase significantly in both absolute and relative terms in the future, are low by any standards. Spoilages from harvest through retail marketing for tomatoes, the most important vegetable crop in the Valley, are amazingly high. Estimates place such losses as high as 50%. There are serious shortcomings with respect to utilization of modern technology; use of inputs; research information; the information delivery system (extension); the marketing system, including lack of standards, grading and inspection; and farm management information. There is a lack of reliable data needed for decision-making, to formulate an agricultural development plan, and generally to set policy. The credit policies and programs need clarification.

A U.S. Team of four members with experience in agricultural administration of varying types was assembled by the USDA with support of USAID to come to Jordan to "Assist the Government of Jordan in expanding its capabilities in agricultural planning and in delivery of technical services to farmers in the Jordan Valley and to integrate and coordinate the responsibilities of the various government agencies involved." The U.S. Team worked with and was directly responsible to a high level Jordanian Committee composed of the President of NPC, the Minister of Agriculture, the President of JVA, the Dean of the Faculty of Agriculture, and the Director-General of the JVFA. In addition, a senior technical committee and individual counterparts were designated by the high level Jordanian Committee to work on a day-to-day basis with the U.S. Team. A series of group and individual conferences were held, with persons having knowledge of Jordan Valley agriculture. A number of visits were made to the Valley and agricultural research and extension facilities and programs were reviewed.

The Team makes the following recommendations:

1. Strengthen the agricultural research strategy by adopting the multi-discipline team approach to research. The first step is to identify commodities on a priority order of economics importance in the Valley. Secondly, the principal constraints for each are determined. A research team with the necessary disciplines represented is designated. A team leader is appointed. Contributing research projects are developed. The program is implemented

An extension specialist is named as a team member to (1) help bring problems to the attention of the scientists, and (2) serve as liaison with the receivers to be sure that research information gets to them in a usable form.

There would need to be a research director appointed to coordinate and direct the work of the research teams in the Valley.

The team approach to research is recommended for adoption regardless of the organizational structure selected.

2. Strengthen the agricultural extension strategy as follows:
 - a. Exploit, but do not abuse, the planned close relationship between Extension and the JVFA. The workload planned for the extension agent is unrealistic. He should devote his time principally to traditional extension programs while assistant agents assigned to each of the 33 centers would largely handle routine matters and services for the JVFA.
 - b. Appoint a Director of Extension for the Valley, operating in full unison with agricultural policies established for the Valley and cooperating with the Research Director to assure delivery of research information.
 - c. Appoint, under the Extension Director for the Valley, one supervisor for extension agents in the North and one for the South.
 - d. Upgrade educational requirements of extension agents to a minimum of a baccalaureate degree in agriculture.
 - e. Change working hours from the present six hours for six days a week to eight hours for five days a week.
 - f. Add five to seven subject matter specialists to the extension staff.
 - g. Provide necessary support and equipment such as automobiles, institute well-planned and properly conducted field demonstrations, and provide teaching aids.
3. Select one of the following two organizational structures for research and extension in the Valley:

- a. Retain the present MinAg and FacAg structures, utilize staff members on research teams on an ad hoc and "attached" basis, with direction and coordination provided under the aegis of a Jordan Valley Agricultural Policy Committee. Extension would remain administratively under MinAg. There would be a Research Director employed directly by the JVAPC with a limited supporting budget to direct and coordinate the work of the research teams. The JVAPC, with assistance provided by a secretariat, would also be responsible for agricultural development and policy in the Valley - in harmony with the Jordan Higher Agricultural Development Council.
- b. Establish a new organization for conducting agricultural research and extension in the Jordan Valley, independent of the MinAg and FacAg, to be governed by a Board of Directors, to be known as the Jordan Valley Agricultural Council. Liaison with MinAg could be assured by the Minister of Agriculture serving as Board Chairman. Serving the Board for program implementation would be a three-member Executive Committee. There would be a Director-General and under him a Director of Research and a Director of Extension. The JVAC would have the same responsibilities for agricultural development and policy as stated above for the JVAPC.

Note: A list of possible advantages and disadvantages is presented for each of the two types of organizations.

4. For agricultural economics:

- a. Agricultural economists evaluate existing policies, or absence thereof, and make written report within two months.
- b. On the basis of findings in (a), initiate further research for later consideration.
- c. Develop models (formulae) for determining crop priorities.
- d. Gain experience with the newly-planned marketing system, also with making adjustments. Then evaluate its effectiveness.
- e. No recommendations with respect to credit as studies by others underway.
- f. Conduct comprehensive review of field of farm management after problems, existing resources, and needed resources are identified.

- g. Develop a historical data series for each agricultural commodity and related factors. Expand the statistical unit in the Ministry of Agriculture. Have the data processed in the Department of Statistics.

A proposed follow-up to implement the above recommendations is outlined on the basis of time schedule and utilization of expatriates who might be helpful. Briefly it is as follows:

Step 1. In the next two months.

- a) GOJ decides on research and extension strategies, and continues in-depth review of organizational alternatives.
- b) Agricultural economists initiate discussion group.

Step 2. On request of GOJ, as long as necessary between August 15 - September 15, U.S. Team works jointly with Jordanians to attempt to finalize plans for strategy and organization. Help develop plans and procedures for staff review.

Step 3. During the remainder of 1978-79.

- a) Conduct individual staff evaluations using subject matter review teams.
- b) Conduct pilot operation for one research team. Three months' expatriate assistance suggested.
- c) Review progress in strengthening extension strategy. One month expatriate assistance suggested.
- d) Enact necessary legislation.
- e) Agricultural economics
 - 1) Identify voids in agricultural policy. Three to six months' expatriate assistance suggested.
 - 2) Evaluate the marketing system. Two months' expatriate assistance suggested.

Step 4. Period beginning January 1, 1980.

- a) Continue to develop research and extension strategies. Develop plans and implement the agreed upon organizational structure.
- b) Develop plans for and add needed staff, facilities, equipment and operating support.
- c) Strengthen budgetary planning.
- d) Develop historical data series for each agricultural commodity.
- e) Continue updating policies and implementing plans. Undertake a sector analysis.

A resident expatriate team could be helpful. Suggested make-up of the team: a research and extension administrator, a soils and irrigation specialist, a vegetable production specialist, a marketing specialist, a data base specialist and an agriculture sector analyst.

IV. INTRODUCTION

The Jordan Valley is the most productive agricultural region in the Kingdom of Jordan, accounting for approximately 42% of agriculture's share of the GDP (3). There are 181,000 dunums presently irrigated with an expectation of 360,000 dunums being irrigated in 1982. Presently the irrigated land is devoted 44% to vegetables, 42% to field crops (principally to wheat and barley), and 14% to fruits (citrus and bananas).

Yields of vegetables are low, having been on a plateau since the middle sixties. Production technology in many respects is at a low level.

Huge spoilage losses of vegetables, particularly tomatoes, take place in transportation and marketing.

There are various agricultural or agriculturally-related public and semi-public agencies operating in the Valley. Coordination among them needs strengthening, and there is some overlapping of programs. Most important of these agencies are the JVA-water delivery; MinAg and FacAg-research and extension; JVFA-marketing and credit; and JCO and ACC-credit. From the private sector, the commission agents handle marketing and provide credit. Landlords, relatives and friends also provide credit.

It was on this background of failure to employ modern technology; poor use of inputs; relatively low production; huge spoilage losses in transportation and marketing; an inadequate marketing system; a somewhat confused credit situation; and inadequate and uncoordinated public services that the GOJ requested USAID to bring to Jordan a team from the U.S. to assist in a plan to strengthen agriculture in the Valley.

The ultimate aim is to improve the income of the Valley farmers through obtaining higher production and better quality of crops grown in the Valley, along with strengthening the marketing system.

The members of the Team together with specialized field and periods of time spent in the Kingdom of Jordan were as follows:

James H. Jensen

Agricultural Development Administration
May 3 - 24.

Elvin F. Frolik

Research Planning and Administration
May 3 - 31.

Ernest J. Nesius

Agricultural Economics
May 3 - 24.

Daniel Pfannstiel

Extension Planning and Administration
May 3 - 21.

The U.S. Team was responsible in its deliberations to a high level Jordanian Committee composed of:

1. H.E. Salah Juma', Minister of Agriculture
2. H.E. Dr. Hanna Odeh, President, NPC.
3. H.E. Omar Abdullah Dokhgan, President, JVA.
4. Dr. Subhi Qasem, Dean, FacAg.
5. Dr. Sami Sunna', Director-General, JVFA.

The high level Team in turn appointed a task force of senior technical persons to work with the U.S. Team, with Sami Sunna' serving as chairman, and in his absence Mr. Shafik Hussein filling in. Counterparts to the USAID Team were as follows: James H. Jensen - Issam M. Hussein Ali, JVA; Elvin F. Frolik - Rahmat Shahidi, MinAg; Ernest J. Nesius - Burhan Abu Howaiji, MinAg, and Ghanim Khalidy, JVA; Daniel Pfannstiel - Osama Bilbeisi, MinAg.

The scope of work is given in Appendix A. Briefly, the U.S. Team was to: "Assist the Government of Jordan in expanding its capabilities in agricultural planning and in the delivery of technical services to farmers in the Jordan Valley and to integrate and coordinate the responsibilities of the various government agencies concerned." More specifically the team was requested to:

1. Identify opportunities for immediate positive action on programs and policies;
2. Recommend institutional changes for effecting implementation and coordination of an agricultural plan for the Jordan Valley and;
3. Design a comprehensive framework for planning and budgeting in agricultural research, extension marketing, credit, and agribusiness prices, incomes and trade.

It would not have been possible, and perhaps not wise, to attempt to accomplish all that was outlined in the "scope of work", in the short period of time that the U.S. Team spent in Jordan. A step-wise procedure is more logical. The U.S. Team is presenting in this report recommendations on overall organization and methodology which should be acted on by the GOJ. After that certain other aspects of the assignment, as outlined in the scope of work, can be more logically pursued. This agrees with the initial tentative plan which envisioned a second trip to Jordan by the Team two or three months hence,

V. PROCEDURE

Because several members of the high level Committee were on official missions abroad, during much of the time the U.S. Team was in Jordan, the first and only meeting of the two groups was held on May 20. The Team held individual conferences with all of the members of the High Level Committee, in addition to the joint group meeting.

A number of meetings were held with the Task Force Committee. Although the membership of this Jordanian Committee was not officially designated, largely the same group attended each meeting. Included were persons predominantly from MinAg, but there was also representation from FacAg, JVA and JVFA.

The U.S. Team conferred with various other persons who are involved in the agriculture of the Jordan Valley. A partial list of persons contacted is shown in Appendix B. In addition a number of trips were made to the Valley to become familiar with the agriculture, to inspect research facilities and programs, and to confer with officials of the several GOJ agencies operating there.

Research facilities, offices, laboratories and libraries of both the Ministry and the Faculty of Agriculture were visited along with teaching facilities of the latter. Published reports, commission reports, pertinent laws and other printed material were made available. The list is given in Appendix C.

VI. THE PRESENT SITUATION

A. GENERAL

Problems of achieving improved agricultural production and adequate economic returns in the Jordan Valley seem to be in large part technical, in substantial part educational, and most distressingly organizational, coupled with inadequate and insufficient human resources. A review of some of the overwhelming factors encountered during the last decade provide bases for explanation and understanding.

Foremost perhaps was the turmoil naturally following the armed conflict and loss of important territory adjacent to the present Jordan Valley area.

Escalating prices of land, needed materials and supplies together with market uncertainties contributed atmospheres not conducive to optimum production.

In recent years irrigation activities in the Jordan Valley have undergone remarkable changes. The Jordan Valley Authority was established to provide execution and management of irrigation projects. Its main canals and lateral canals are cement lined to deliver water to the farmers' fields. Under construction is an extensive system to deliver to the fields, water under pressure for sprinkler systems. In addition extensive uses are being made of plastic tubing for drip irrigation. All of these new developments are moving ahead more rapidly than the research activities needed to supply adequate information to growers.

In addition to the extensive research needed to support the new technologies in irrigation techniques, growers have been using plastic "houses" and plastic "tunnels" to provide protection from low temperatures and to increase winter temperatures under which crops are grown. Again, a whole new technology with its new problems moves ahead of the research programs.

Under the dynamic circumstances described together with organizational problems, financial needs, depletion of technical staffs and the community rebuilding it is small wonder that excessive demands appear in many areas. In efforts to meet these demands

various agencies, private industry and research programs find considerable confusion. Results of these factors have contributed to overlapping of assigned responsibilities and lack of coordination. A number of indications suggest that numerous attempts have been initiated to resolve organizational conflicts. In several instances committees or councils were set up. Apparently from all reports, these meetings failed to resolve the vexing issues. Unfortunately up to this time no mechanism has been established to designate priorities and to resolve differences.

Duplication of work is not in itself so detrimental except that the scarce trained manpower and facilities are further diluted.

Along with all other unsettling factors, research and extension staffs of the Ministry were depleted during the past years by transfer to other agencies, by more attractive salaries in private industry and by more financially rewarding opportunities in other countries.

It is difficult to assess the importance of lack of national and regional agricultural policies and plans on production directly, but failure to establish clear-cut and rational national decisions must in turn have made difficult adequate planning within the Ministry staff. Undoubtedly, the lack of national policies contributed to the present inadequate administrative policies within the Ministry.

In answer to a long-felt need, the University of Jordan added a Faculty of Agriculture in 1973, its first class graduating this past year. It is providing quality education in its four departments. At present there are 200 students. The Faculty has launched an extensive agricultural research program and also participates in extension, the Faculty wants to interact directly with farmers. Beck, Olson and Robins (1) have presented a good analysis of the Faculty of Agriculture and its programs in teaching, research and extension.

The Ministry of Agriculture conducts agricultural research and extension programs for the entire Kingdom. The Ministry serves, as it does in almost all countries, as the official governmental agency in agriculture. It is the legal agency through which international agricultural agencies such as FAO deal. The Ministry of Agriculture has responsibilities for testing soils, fertilizers,

pesticides and agricultural chemical in general. It provides on-farm services for spraying, soil treatment and similar needs. It participates with other Ministries in actions controlling food prices.

B. RESEARCH

Agricultural research resources in Jordan are concentrated principally in the Ministry of Agriculture and in the University of Jordan Faculty of Agriculture. The Royal Scientific Society is also empowered to do agricultural research but apparently is inactive in the field at the present time. Research by the private sector is minor or possibly non-existent.

1. Faculty of Agriculture

Most of the agricultural research staff in both of the above agencies is headquartered at Jubeiha in adjoining facilities. The Faculty of Agriculture came into being in 1973. Thus there has not yet been time for the FacAg to develop a great deal of research information although an extensive program has been launched. The physical facilities are good to excellent at Jubeiha. The Faculty has 100 acres of open land for plot work; a good line of field equipment; a poultry plant with a 12,000-bird capacity; a seed-house built and being equipped; sheds for storing and servicing field equipment; a tool room which is presently being equipped; a battery of 4 greenhouses each 7x22 meters, with steam heat and evaporative coolers, and a spacious headhouse with offices, laboratories and service units; a building under construction which will house 22 growth chambers; and an office-laboratory-classroom building with large offices, classrooms and a battery of well-equipped laboratories for research and teaching, a large reading room, a "cold" room (being developed) and a room containing a working herbarium. A second wing is being added to the Building.

The Faculty also has three outlying areas of land for experimental work. One in the north and one in the south on the rainfed uplands are on Ministry-owned land. It has its own station of 400 acres in the Ghor, close to the Damya Bridge about 10 km. from the MinAg Déir Alla Station.

The Ghor Station is in the early stages of development. Dean Qasem reports that in contrast to Déir Alla, this area is protected from northern and eastern winds and hence more suitable for vegetable production.

The Faculty has complete access to the large central University Library containing about 250,000 volumes and a good array of periodicals. They also use a computer of moderate size in the

Faculty of Science and a large NCR computer in the Royal Scientific Society.

The Faculty is organized into four departments, viz. Plant Production and Protection, Animal Production and Protection, Soils and Irrigation, and Agricultural Economics and Extension. The first three named departments are staffed and generally in full operation, the fourth has only a very few staff members and is basically in a formative stage.

Members of the present staff at all ranks are as follows by departments: Plant Production and Protection -- 25; Animal Production and Protection -- 13; Soils and Irrigation -- 11; and Agricultural Economics and Extension -- 5. The total staff numbers 54. Highest degrees held are as follows: doctorate -- 28; masters -- 21; baccalaureate -- 4; and diploma -- 1 (See Appendix D for further details.)

The Faculty staff time is assigned on an approximate basis of 60% research and 40% teaching. The emphasis in research is on the "applied" phase. The research program is well organized with respect to projects (See Appendix E) reporting (annual reports and some shorter-term reports are required) and accounting. The research plan for the Faculty is shown in Appendix F. Publication is encouraged and important for promotion, but there is in addition a provision for promotion on the basis of "excellent services." Publications for the past five years are listed in Appendix G.

2. Ministry of Agriculture

Research in the MinAg is organized under the Research and Extension Department. The MinAg is presently doing no research on animals or forestry, but if any research in these areas were to be undertaken, it would be under the administration of this Department.

The MinAg has no plot land or greenhouse facilities at Jubeiha. Space in the MinAg building consists of offices and laboratories. Adequacy of equipment varies by Sections. That for soils, water and plant analysis is quite sophisticated and complete. In some other areas there are serious shortcomings. There is a Library of modest size. Data are analyzed principally with desk calculators, but the staff also have access to the computers in the University and in the Royal Scientific Society, alluded to earlier in this report.

MinAg has outlying experimental stations as follows: (1) A dryland crops station near Ramtha in the North; (2) A dryland crops station at Raba, near Kerak; (3) at Shoubak in the southern hills; (4) the Ghor Saffi Station south of the Dead Sea; (5) a pilot project for the southern Ghor near Mazra, which is close to the Dead Sea; (6) Wadi Dhulail north of Amman; and (7) two Stations in the northern portion of the Ghor. The main one in the Valley is Deir Alla, about half way between Shuneh North and Shuneh South. It consists of 880 dunums, all under irrigation. There is a training center included in the operation. The second one is a small substation, Wadi El Yabis which is located north of the Deir Alla Station. It consists of 15 dunums.

At Deir Alla there is fairly complete line of field equipment, but repairing and servicing constitute a problem. Facilities for minor repairing are available in the Valley. For major repairs the equipment is taken to the MinAg Baqua Station located about 15 km, northwest of Jubeiha,

At Deir Alla there is a store house for handling seed, chemicals and crops to be processed for research purposes. There is a soils laboratory. There is also a well equipped dairy plant with 50 Holstein-Friesian cows, used only for milk production and young stock for distribution to farmers.

The research component of the Department is organized into three divisions viz. Horticulture, Plant Protection, and Agronomy. The divisions in turn consist of the following sections: Horticulture -- Fruit Trees and Vegetables; Plant Protection -- Herbicides, Diseases and Insects; and Agronomy -- the Tobacco Project, Crops, and Soils and Irrigation.

Number of staff members are as follows (division heads are included in their respective subject matter sections); Fruit Trees -- 1; Vegetables -- 4; Herbicides -- 1; Diseases -- 3; Insects -- 3; Tobacco -- 1; Crops -- 3; Soils and Irrigation -- 7; Deir Alla Station -- 5; and Wadi El-Yabis Station -- 3. Outlying Station staff other than those in the Jordan Valley, are not included in the above summary. Of the total MinAg staff of 31, enumerated above, numbers with the highest degrees held are as follows: doctorate -- 3; masters -- 18; and baccalaureate -- 10.

Only a part of the research underway is covered by written projects. Funds are allocated to the sections with, considerable latitude at that level in expenditures.

Annual reports are required and published on a Section basis. There is a 25-year (1951-1976) report of research on all crops, published on the silver anniversary of the reign of His Majesty, King Hussein.

A roster of the staff, with highest degree held by each member along with name of the University from which secured, is presented in Appendix H. A summary of research responsibilities for each staff member is given in Appendix I. The research plan is outlined in Appendix J. Publications for the past five years are given in Appendix K.

C. EXTENSION

A very small extension staff is attached to the Department of Research and Extension in the Ministry of Agriculture. Its function is confined to providing some support services to the field extension unit such as providing printed materials, posters, and participating in a radio program. Separate from this unit is a line of authority which runs to a Director of Agriculture for the Jordan Valley and who reports to the Minister of Agriculture through the Undersecretary. Assigned to the Director of Agriculture there are 33 positions for extension agents of which 27 are presently filled. The Jordan Valley is divided into 33 development areas. It is to the farmers in these areas that the extension agents are to provide technical information and advice. In addition, the extension agents serve the needs of the Ministry of Agriculture for providing varied kinds of information and data as might be needed from time to time. Also they serve as the secretary to the membership of the local Farmers Association for their respective area. The Farmers Association, as planned will need considerable information about all the farmers in the area. It was not made clear just what role the extension agent will play in obtaining this information such as, developing a profile on each farmer, obtaining information on intentions to plant etc. One may conclude that, since many extension agents do not live in their designated areas and are also diverted from the role of extension educators, their effectiveness as demonstrators is minimal.

VII. STRENGTHENING RESEARCH STRATEGY

The first step in strengthening the agricultural research program of the Kingdom of Jordan is to make better use of present resources. Both the MinAg and FacAg conduct applied agricultural research on an extensive scale. However, there is no formalized mechanism to provide for coordination of research efforts, albeit assurance was given that there is good communication among individual staff members.

Recognizing that some efforts have been made to identify the really important agricultural problems and to get scientists from various disciplines to work together on these problems of a high priority nature, to date the efforts have not resulted in noticeable coordination of research efforts.

It is recommended that the Team approach (also known as problem-solving, multi-disciplinary, commodity, or task force approach) be adopted for the Ghor, regardless of organizational and administrative structure. The method has been enunciated by Moseman (2). It is being employed with various modifications in many different kinds of agricultural research by private, public and endowed institutions all over the world.

Briefly, the Team approach consists of bringing to bear, on a formalized cooperative basis efforts by personnel from all disciplines needed to solve the principal production and marketing problems of a commodity (although in some cases a research team may also be organized on an area basis). Jointly the team members study the problems involved and implement research programs to attempt to effect solutions. Personnel of the team are varied as certain aspects of the problem are solved and new ones arise. Finally, when the principal objectives are reached, or it is felt that significant progress can no longer be made by the coordinated effort, the research team is disbanded.

The first step is to identify the principal constraints on production and marketing of agricultural commodities (both crops and livestock and combinations thereof) which would provide the highest returns to the farmer, and which most nearly fulfill the goals of the GOJ as set forth in the 5-Year Plan, and the Ghor 7-Year Plan, as they have been or may be modified in the future. Research opportunities will be identified on the basis of economic importance, both present and future, of the crops grown and livestock produced in the Valley.

Once the enterprises on which research is to be conducted are identified, the principal constraints for each are ascertained by: agricultural research and extension staff working in the Valley, other GOJ officials, farmers, JVA, JVFA, agribusiness persons and others knowledgeable in Valley agriculture.

The commodities are listed in a priority order of economic importance with the principal constraints for each also being listed (and briefly described) in a priority order.

There will need to be an ad hoc committee established to finalize the list of commodities and constraints on production and marketing for each, on a priority basis. Principal qualifications of the committee members would be knowledge of agriculture in the Valley, reasonable educational background, and objectivity.

When the committee has finalized the list of commodities and constraints, it will have completed its task and will be discharged. This process i.e. setting up an ad hoc Committee to update priorities for research, will be repeated as is indicated in the future.

Research teams would be activated on a priority basis only as resources permit. An extremely important consideration in the plan is to produce good quality research and meaningful solutions to problems. Much more progress would be made by attempting only the volume of research which can be properly carried out. There must be no constraints on manpower, physical facilities, operating expenses, travel, library needs and ancillary services such as statistical and computer facilities. Funds must also be provided for publications, both scientific and for lay consumption.

Next, the members of the research team are selected, with representation of all needed disciplines being included. Some of the members may serve on a part-time basis.

Objectivity and good judgement, in addition to high technical competence, on the part of task force members is very important. It might be somewhat difficult for them not to be influenced by agency and or discipline loyalties but such possible biases must be avoided. Without complete objectivity the suggested approach is doomed to failure.

Where Jordanian staff is lacking or inadequately prepared to assume the responsibilities involved, expatriates should be brought in to help round out the teams, to provide technical and procedural assistance, and to train counterparts.

The team would have a leader who would be an active participant in the research program. He would be responsible for keeping the research program coordinated through frequent, joint inspections of the individual research efforts, through conferences, and other means. He would be responsible for keeping the project updated, for recommending shifts in attached staff, for preparing reports, for initiating requests for budgetary support, and for any other actions which would expedite the research program. He would provide the principal liaison with administration.

The team leader must, as the name implies, have leadership ability; he must carry respect and be able to inspire confidence of his supervisors. He must see to it that at appropriate intervals, sometimes even weekly or more frequently, the entire team assembles and reviews the progress and finding of each team member. Discussion should include suggestions and observations to each other. In as much as the results are intended to bear on a problem being attacked by all, all, in turn, will be watchful of the diligence and procedure of all others.

One of the first steps to be taken after a research team is established would be to develop a "state of arts" report. This would consist of a summary of all pertinent literature on aspects of the problem to be researched. In addition, unpublished data available in Jordan would be summarized and made available in a useable form. Technical knowledge of the Task Force members accumulated through having attended international conferences, other meetings, and through personal visits with other scientists would be included in the report. Information in related research underway in other countries could also be secured through reporting systems such as CARIS(FAO) and CRIS(U.S.A.)

The "state of the arts" would not be an undigested accumulation of annotated references but rather a well integrated summary of meaningful and useful information.

Research results would be made available promptly to farmers and others through appropriate publications. At least one extension subject - matter specialist would be a member of the research team to assure utilization of research results produced and to call attention to important constraints in production and marketing.

Using the team approach described, it is expected that in the case of Jordan Valley agriculture there might in time be as many as four or five teams working at the same time on as many identified problem subjects.

VIII. STRENGTHENING EXTENSION STRATEGY

No one denies that one of the most important keys to the use of modern technology by farmers is an information delivery system in which farmers have confidence, because when they accept the recommendations about improved practices it means additional income. Such a system begins with knowledge of a farmer's problems coupled with solutions provided by someone in whom he has confidence. Such a possible system for the Jordan Valley is outlined below:

Already planned are 33 local centers which will house the local administrator, extension agents, Farmers Association and a meeting hall. Some centers will be larger to accommodate other government services. Thus much is a "given" to whatever extension plan is considered.

The close relationship between the local extension agent and the Farmers Association should be exploited, but not abused. First, we must assume that the major responsibility of the extension agent is to mount an unquestionably high quality extension education program, based upon farmer's expressed needs for technical assistance. Once developed and approved by a small group of local farmers representing a cross section of farmer types, it then behooves the agriculture establishment to support the program. The workload planned for the extension agent is unrealistic. He should devote his time principally to the traditional type of program outlined above. Routine matters and services to the JVFA would be best served with an assistant to the extension agent (with one assigned to each of the 33 centers.) Consideration might be given to JVFA's employing the assistant directly in order to avoid conflict of interest and authority between extension education and JVFA service activities. Probably one supervisor of the extension agents should be provided for the North and one for the South. However the arrangement is finally decided, the complementary arrangement between the extension agent and the Farmers Association should be maintained.

The extension agents, through their supervisor would be responsible to a Director of Extension for the Valley. The Director of Extension would function as a counterpart, and cooperator, with the Director of Research. The Director of Extension regardless of administrative structure would participate in and support fully the plans and activities of the Committee or Council setting policy for agricultural development in the Valley. In addition he would have access to all records as they pertain to policy and programs for agriculture.

The extension agent is conceived as a dedicated well trained generalist in agriculture technology having a baccalaureate degree in agriculture, with a built-in system of training to keep him up-dated with new technology and developments. Doubtless these requirements would present some personnel problems, but the demand, as has been strongly emphasized many times, is for an effective information delivery system.

To meet the requirements for the presence of the extension agents for a full day in their areas, the argument is convincing that he work a five day week from eight to five rather than a shorter day for six days. Also, we see nothing wrong with an extra monetary allowance to compensate for the problems associated with inadequate local social services and housing in the early stages of the Valley development.

The addition of subject-matter specialists in the extension system will be the connecting link with modern technology and the farmers, usually through the local extension agent. Five to seven specialists chosen for their capability in practical application of their discipline, e.g. entomology, farm management, etc. would be the responsible persons for advising farmers on special problems, training the extension agents, planning, and to some extent, overseeing the field demonstrations, and finally they would be the link between research and application to field conditions. They would participate in the planning and evaluation of results reached by commodity research teams.

Support services for a hard-hitting advisory service are an absolute must - as much so as a hammer and saw are to a carpenter. Without such support services as mobility, demonstration and teaching aids an extension agent will be a poor investment for the capital invested.

Finally, we understand that there will be problems with a civil service system which tends to dominate on matters of personnel. And no doubt there are other problems beyond the scope of our present knowledge. Nevertheless we present this as a workable system which will suffer with nearly every attempt to comprise it. This is not to say that there is not a better extension education system, perhaps there is, but this represents our input with the knowledge we brought with us combined with what we have learned since arriving.

IX. ADMINISTRATIVE ORGANIZATION

A. SEVEN POSSIBLE ALTERNATIVES

Various organizational structures were considered to maximize research production and effectiveness of extension programs for the Ghor. At a meeting held on May 21, involving the Jordanian High Level Committee, USAID officials, and U.S. Team members, it was agreed that the Team would give principal attention to, and list advantages and disadvantages for, only the first two of the several alternatives listed below:

- 1) Retain the present MinAg and FacAg structures, utilize staff members of research teams on an ad hoc and "attached" basis, with direction and coordination provided under the aegis of a Jordan Valley Agricultural Policy Committee.
- 2) Establish a new organization for conducting agricultural research and extension in the Jordan Valley, independent of the MinAg and FacAg, to be governed by a Board of Directors, to be known as the Jordan Valley Agricultural Council.
- 3) Assign all public sector agricultural programs in the Ghor, including research and extension, to the JVA.
- 4) Retain extension in MinAg and handle research under one of the following four alternatives:
 - a) Establish an agricultural research institute as a semi-autonomous body (analogous to No. 2 above) and assign to it full responsibilities for agricultural research.
 - b) Assign all applied research responsibilities to MinAg with FacAg doing only basic research.
 - c) Assign all agricultural research, except for highly applied experimentation such as variety trials to FacAg.
 - d) Amalgamate all applied research activities of MinAg and FacAg into joint projects.

- B. Retain the present MinAg and FacAg structures, utilize staff members of research teams on an ad hoc and "attached" basis, with direction and coordination provided under the aegis of a Jordan Valley Agricultural Policy Committee.

The objective of this organizational structure is to maintain the integrity of the present MinAg and FacAg organizations and yet provide a coordinating and expediting mechanism to assure effective agricultural research and extension programs for the Jordan Valley.

The JVAPC would set agricultural policy, and generally be concerned with planning to strengthen agricultural development of the Valley. It would coordinate, stimulate and upgrade both the amount and quality of research and extension output. The five members of the Committee would be as follows:

President of the National Planning Council
Minister of Agriculture
President of the Jordan Valley Authority
Dean of the Faculty of Agriculture
Director-General of the Jordan Valley Farmers Association.

Since the five members of the Committee are also members of the proposed Jordan Higher Agricultural Development Council, there would be a direct link on all appropriate matters involving the Jordan Valley and the rest of the Kingdom on matters of agricultural development and policies.

There would be a Secretariat established to serve the JVAPC. It would consist of a staff of three principal members, viz. an agricultural economist, a biological scientist, and a physical scientist. The Secretariat would prepare position papers on various subjects, on which the Committee would act in setting agricultural policy for the Valley (in harmony with the Jordan Higher Agricultural Development Council). It would also assemble information needed by the JVAPC to carry out its responsibility of coordinating research and extension programs. The Secretariat would arrange for and send out notice of meetings, keep minutes of meetings, maintain financial records, and generally perform duties needed for continuity and maintaining a smoothly-operating organization.

Under this plan, Extension would remain administratively under the MinAg. The relationship of the JVAPC to Extension would be advisory and supportive. However, since there would be two research agencies operating in the Valley and in order to maximize the effectiveness of the multi-discipline team approach to problem solving, the JVAPC would employ a Research Director, serving parallel to the Extension Director employed by MinAg for the Valley.

The JVAPC would need to have a budget for salaries; for office rent, equipment, supplies; for operations; for travel; for supporting the secretariat; for developing and maintaining research plans, programs, and reports; for maintaining financial records; for providing supplementary funds for desired research programs; and for add-on salaries to provide incentives for research work to be done in the Valley. A special publication fund would also be desirable.

It must be emphasized that the JVAPC budget would be quite modest. The bulk of the costs required to carry out its work would be borne by the cooperating agencies concerned. For budgetary purposes only, JVAPC would be attached to some permanent agency of the Government.

The participating scientists could be headquartered either in Jubeiha or FacAg on a full or part-time basis, or at one of the Stations in the Valley, depending where the particular research could best be done. The Director of Research would have the right to terminate the services of any one in the assignment to the JVAPC research programs who was not doing satisfactory work or who was no longer needed in the Valley research program. The person's services would be terminated in the JVAPC assignment but not in his agency. Any additional staff or equipment would be provided through the cooperating agencies.

The JVAPC would utilize MinAg and FacAg staff, both on a part time and full time basis. Scientists now in MinAg and FacAg who, because of lack of interest, other pressing duties or a lack of "fit" would not participate in JVAPC research, i.e, they would continue without any change in their present assignments.

MinAg and FacAg staff would retain their present professional positions while participating in JVAPC research projects. The incentive would be that they would participate in meaningful research, and be members of a fully integrated team working on very important agricultural problems with the research properly conceived and adequately financed. One way for MinAg and FacAg staff to discharge their present research responsibilities would be to participate in JVAPC research. There would also be add-on salary incentives.

The JVAPC, like a Graduate college or a university-wide research organization in a land-grant university in the U.S., would be largely without scientists on its own immediate staff.

It cannot, however, be emphasized too strongly that the sole objective of any plan is to enhance the agriculture of the Valley. The JVAPC would have to maintain a very firm stance in promulgating its assignment. Accountability would be at the forefront of carrying out the mission. In one sense, the MinAg and FacAg scientists would participate in JVAPC research projects much as scientists do in contract or competitive grant research. They would be invited to participate in the first place only if they had a proven "track record" of research performance, and would be asked to continue only if they were making satisfactory progress in their particular assignment.

a, Advantages of the No. 1 alternative

- a.1, Provides direct linkage between its governing Committee and the proposed Jordan Higher Agricultural Development Council.
- a.2, Maintains the integrity of the present MinAg and FacAg research organizationa.
- a.3, Provides for a single, integrated agricultural research program for the Jordan Valley.
- a.4, Involves a minimum of additional administration and super-structure.

- a,5. It would be relatively inexpensive.
- a,6. Requires no new construction of laboratories.
- a,7. Could be initiated without setting up new laws.
- b. Disadvantages of the No. 1 alternative,
 - b,1. Creates a degree of dual administration.
 - b,2. Lacks the force which might be necessary to induce present agricultural scientists to conduct cooperative research in the Valley,
 - b,3. Does not provide for as close coordination of research and extension as the No, 2 alternative.

C. Establish a new organization for conducting agricultural research and extension in the Jordan Valley independent of the MinAg and FacAg, to be governed by a Board of Directors, to be known as the Jordan Valley Agricultural Council.

This alternative, suggested by His Excellency the Minister of Agriculture, would consist of setting up a completely new organization to conduct research and extension programs in the Jordan Valley. It would be governed by a Board of Directors which would report to the Prime Minister. The membership of the Board would be the same as that suggested for the JVAPC. It would have its own budget to cover all costs of research and extension programs in the Jordan Valley. A possible name for the organization would be the "Jordan Valley Agricultural Council." Serving the Board for program implementation would be a three member Executive Committee. His Excellency suggested that close liaison with MinAg could be assured by the Minister of Agriculture serving as Chairman of the Board of Directors.

The Chief Administrative officer of the JVAC would be a Director-General. He might well have a Director of Research and a Director of Extension working under him. The chairmen of the respective commodity committees would report to the Research Director.

There would be less need for research staff time in MinAg and FacAg since these agencies would no longer have research responsibilities in the Jordan Valley. Thus some present staff members could be transferred outright to the new organization, be seconded to JVAC, be placed on split appointments or do research on a contract basis.

The JVAC would carry out the functions outlined for the JVAPC, except that it would have more authority and conduct the research and extension functions directly rather than serving principally in a coordinating and advisory capacity.

The U.S. Team believes that if alternative 2 is adopted, there should be the same responsibility delegated to the JVAC for formulating plans for strengthening agricultural development and for setting agricultural policy (in harmony with the Jordan Higher Agricultural Development Council) for the Jordan Valley, as has been proposed under Alternative 1 for the JVAPC. A secretariat should be established with the same functions as proposed for alternative 1.

The JVAC would take over the present research stations and all facilities, equipment and supplies thereon, located in the Valley and presently under the MinAg. There would likely be additional facilities needed, including lands, irrigation equipment, offices, laboratories with specialized equipment, greenhouses, a library, statistical and computing services, and facilities for publishing bulletins and other printed materials.

a. Advantages of the No. 2 alternative

- a.1. Complete direction of agricultural research and extension for the Valley by a Board fully representative of Valley interests.
- a.2. Clear lines of administration.
- a.3. Close working relationships between research and extension.
- a.4. Excellent opportunity to provide for accountability.
- a.5. Appropriate salaries could be paid in order to recruit and hold highly capable people, i.e. the organization would be free of Civil Service limitations.
- a.6. Adequate funds could be secured for necessary equipment, supplies, operating expenses, travel and other research and extension needs.

b. Disadvantages of the No. 2 alternative

- b.1. Splits the research and extension programs of the MinAg into two major geographical areas of the Kingdom.
- b.2. Adds another administrative agency, i.e. it adds to the bureaucracy.
- b.3. Would be expensive, because of added administrative costs and some duplication of research facilities.

- b.4. Would result in a loss of some FacAg research talent now available to the Jordan Valley.
- b.5. Valuable research time would be lost in making the transformation.
- b.6. Would increase the difficulty of cooperating with international centers and other foreign agencies in research matters, since there would be three (instead of the present two) major agencies in Jordan doing agricultural research.
- b.7. Requires new legislation.

As pointed out by Christopher Russell, the differences between Alternatives 1 and 2 are more a matter of degree than kind. Modifications can be incorporated in either one or both which would finally result in a convergence of the two.

Issues to be considered in deciding between the proposed alternatives and in drawing up the charter for its establishment concern representation, authority and responsibility at all levels, both governing bodies and administration. Some specific examples are:

1. Who should properly chair the top governing body?
2. What are the powers of the chairman vis-a-vis the governing body as a whole?
3. Who appoints and/or discharges the permanent staff?
4. What are the responsibilities and authority of the permanent staff?
5. To whom will the permanent staff report administratively?
6. Who prepares and controls the budget?
7. Will the clientele input be adequately provided for with the governing bodies suggested or should there be additional clientele representation.
8. If alternative 2 is adopted, will the JVAC take over all functions of the Ministry of Agriculture in the Jordan Valley, or only research and extension?
9. On matters of agricultural policy, what will be the relationship of the governing body, under either alternative, with the Higher Agricultural Development Council and the Council of Ministers?

X. AGRICULTURE ECONOMICS

With an increase in agriculture production and income at the farm level as a primary objective, matters of policy, markets, tenure, credit, choice of crops and crop combinations and reliable data are important to complement the factors which directly affect the ultimate value of production. Therefore, the opportunities available to Jordan authorities for resolving the important problems need to be recognized, and evaluated,

A. AGRICULTURAL POLICY

Well formulated agricultural policy serves to guide the planning activities of farmers and the agencies whose authorities relate to agriculture. In the absence of stated policies, agencies formulate their own policies and assume jurisdictional rights which may overlap other agencies. Disputes arise which nearly always stalemates progressive action. Another devastating impact of unclear agriculture policies is uncertainty in the minds of the farm producer resulting in indecision about what to plant and what level of technical inputs to use. Still another impact is the emergence of unwritten policies, which often becomes the basis for formulation of stated policies,

Examples where clear cut and generally known and understood policies are essential include such areas as: production priorities; prices paid for locally produced agricultural products; import-export directives; relationship of consumer food prices to farm prices; the supply, distribution and prices for technical inputs; marketing practices; matters concerning land use and land tenure; information and research services; daily market news service; grades and standards for agricultural products and technical inputs; credit for agriculture production; water rationing for priority crops; manpower and labor for agriculture; productive use of low quality or damaged produce; GOJ intentions prior to planting time; and other matters which impinge directly on the planning and activity of the farm producer,

The Ministry of Agriculture is the focal point for policy-making in problem areas directly related to agriculture, as is found to be the case in most countries. As technology is introduced into agriculture, the inter-relationships of agriculture with other sectors of the economy become more complex, and thus require the addition of specialized agencies serving agriculture. Naturally, such related sectors wish to have a voice in the policy-making process. Therefore, as

broad as those listed above are, they must go to a policy committee, representative of the various involved agencies,

Policies for one region, in this instance the Jordan Valley, are difficult to separate from national policy. However, because of the importance of the Jordan Valley to the national economy, and also because of the type of production centered there, agricultural policy may be formulated with the Jordan Valley in focus, permitting any spillover to other regions to apply on an equal basis.

Since agriculture economists traditionally concern themselves with policy issues, it would be incumbent upon them to collectively evaluate the existing policies, or absence of policies, and present their conclusions in a paper for review within two months. Such a paper, or papers, could be the basis for further consideration by the Jordan Valley Agricultural Policy Committee or the Jordan Valley Agricultural Council, as the case might be.

B. THE AGRICULTURAL DEVELOPMENT PLAN

Development planning is frequently thought of as establishing specific and attainable goals for area and production for each year. Once established, procedures are set forth aimed at providing some assurance of realizing them. To accomplish such worthwhile objectives requires accurate data for varying situations coupled with knowledge for predicting the behavior of farmers, agencies and others. Granted the desirability of a somewhat specific plan of short and long-time goals, a network of well-formulated policies aimed at agriculture improvement and followed with implementation plans, which are widely publicized, might provide a more flexible framework for planning by farmers at this point in the evolution of the Valley. The logic for such a plan lies in the fact that an entirely new situation in the Valley is being created through the construction of an irrigation system, with the allocation of land to farmers for first-time tillage, and very meager knowledge about production from the land.

If such a plan is followed, the policy network then becomes the development plan. Naturally it would come into focus on the farmers and in recognition of their differences, for example, size, region, and tenure status. The priority policy categories making up the network include: a significant reduction in the element of uncertainty in the minds of farmers, the dissemination and application of up-to-date technology, and a research plan which reduces risk over the full range of farming operations. The latter two categories are discussed elsewhere, leaving uncertainties to be discussed as is done now.

Uncertainty is a state of mind which results in indecision and frustration. All indications point to an unusually high degree at the farm level in the Jordan Valley. It is most clearly expressed in a lack of confidence in government plans and action, the marketing system, the tenure system, the proposed irrigation system, the disease problems, the labor shortage and the pricing mechanism which all compound to cause a feeling of frustration and unhappiness.

To start the process of developing a network of policies the major agencies involved in agriculture and their deputies could meet together to determine what issues in the above three categories need first priority attention, or as is suggested earlier encourage the agricultural economists to produce papers analyzing the present policies and identify issues needing policy statements. Given these, initiate further research for later consideration.

C. CROP PRIORITIES

From the available data, one would conclude that the selection of priority crops for the Jordan Valley is a relatively easy task. One would conclude that the following crops should receive emphasis, tomatoes, egg plant, green peppers, potatoes, beans, squash, cucumbers, citrus and bananas.

Obviously, there are other factors which enter into consideration of how much hectarage would be planted to each crop, or whether other crops such as berseem clover, alfalfa, cereal grains, fodder, maize, or other vegetables should be included in the priority group.

Experience has proven that farmers, within a given economic, biological and resource situation and through trial and error will choose the combination that yields the greatest net monetary returns for their inputs. Government, therefore, if it wishes to emphasize certain cropping patterns should establish appropriate policies aimed at influencing the farmers choices.

If it is necessary to select crop priorities for a production plan, emphasis should be given to the development of a model which recognizes intensity of land use, net returns, water requirements under conditions of varying periods of dry weather, consumer and export demand, disease and insect problems, and maintenance or increase in soil fertility. Data to provide the information for such a model will come with further research and farmer experience.

For immediate emphasis, a production plan could include crops such as tomatoes, egg plant, green peppers, beans, squash and cucumber as they are obvious choices. In question would be those crops with high water requirements because in a cycle of dry years they would pose a serious dilemma to those responsible for rationing water. Since rainfed crops usually do not face the summer water rationing problem, the crop combination model would have about the same factors as the summer crops but the weights for determining optimum combination would be different.

Some attempts by agricultural economists to develop models (or formulae) for determining crop priorities would be an excellent exercise for this summer.

D. MARKETING

With greatly expanded production expected when Phase I and II are completed, the traditional method of marketing under conditions of small volume and low level of technology will naturally require substantial adjustment. Considerable thought has been given to this prospect and fairly comprehensive plans are already underway. With four receiving, grading, packing, auctioning and loading centers started or in the planning stage, many of the present problems may be solved, as well as creating some new ones. The Jordan Valley Farmers Association was created as one agency in cooperation with the Agricultural Marketing Organization to handle and solve the marketing problem. Time will be needed to determine whether the present plan, including the adjustments, as it is put into force, will reduce some of the difficult problems that exist at this time. As with any new and untried marketing system it is not without its skeptics. To prove them correct is to defeat the good purposes for the proposed improved marketing system. Uppermost in a successful plan will be satisfied producers and buyers at the market.

As a final point, further suggestions seem inappropriate at this time as the present plan needs to be tried, closely evaluated, and adjustments made as the need arises.

E. CREDIT

Studies are under way at the highest level of government according to information given to us. Therefore, a plan may be forthcoming soon for resolution to some of the overlapping problems of authority to provide loans to the farm sector.

F, FARM MANAGEMENT ACTIVITY

Relative to other types of agriculture studies and extension information, farm management lags very far behind in Jordan. This area of activity, as a general statement, is concerned with the optimal use of the agricultural resources to maximize returns to farmers, and at the same time equate resource use in support of national objectives. One may also say that farm management is a technical activity concerned with the applied matters of economics to farming situations,

With the public and private capital invested in the Jordan Valley and the importance of farmer satisfaction, farm management studies and farm management extension education deserve a high place as one input to attaining the stated objectives in the Jordan Valley. A farm management specialist or a basically trained agricultural economist should be an advisory or participating member of each commodity research team.

We have found only a few farm management studies in reported form, although several are in different stages of completion by members of the agricultural economics faculty. Given the range of support-type activities required by the Department of Agriculture Economics in the Ministry of Agriculture, the most desirable alternative to get the farm management activity underway in the most immediate and effective way, would be to strengthen agriculture economics in the Faculty of Agriculture with encouragement to concentrate on: cost of production studies for the individual crops under variable situations, the optimum crop combinations for income, soil productivity maintenance, utilization of available water, measures to improve farm efficiency, ways in which farmers are able to plan farming operations to minimize risk and uncertainty, impact of the tenure system on farm productivity and family income, and other areas related to marketing and credit.

At some time in the future, when more reliable data are available, an econometric model to be used for annual planning and policy-making will be desirable. An effort at development of such a planning model is being developed in the Faculty of Agriculture, using linear programming methodology. The experience here should be invaluable to the formulation of a model handling more variables and providing information on a greater range of problems.

A good collective exercise for the agricultural economists in Jordan would be to list the farm management problems of greatest importance to agriculture in the Jordan Valley, what resources exist now to handle them, and what additional resources are needed. This should be done in the next several months, leading to a comprehensive review at that time.

G. RELIABLE DATA FOR DECISION-MAKING

Since reliable data on matters directly related to agriculture are one of the cornerstones for decision-making and implementation of programs, provision must be made for collection, harmonization with related data, organization and storage of data for public use. Furthermore, it must bear the stamp of official approval.

Certain types of data are missing in the 1975 Agricultural Census which are important to the measurement of agricultural development, although indicators of progress may be found. Missing are hectares of individual crops by holdings, tenure, and geographic area. Also missing are data on yields, production and income. In the absence of these data in the 1975 census the Ministry of Agriculture and other related agencies must obtain their own. The consequence is conflicting data resulting in inconsistency in decision-making. If the above data were obtained at five or ten year intervals statistical methods could be applied annually, based upon methods to be developed, for annual estimates.

Another need is to construct historical data series on crop and livestock production, income, price, and many other items. Crop and livestock should be by individual crop and type of livestock as well by geographic area. To construct such series would require several years and searching many sources for data. When the data are collected, they must be also reconciled with other related data, that is, for example, the acreage of fodder crops should bear some relationship to the number of fodder-consuming animals, or the production of tomatoes is related to price as well as consumption, exports or imports.

Therefore, a constructed series, while not bearing the stamp of absolute accuracy, does provide an established relationship horizontally with other crops, livestock, and other factors. They also display a vertical relationship which permits trend analysis. Once established the series would be updated each year. With each year's new addition, information would be available to adjust backwards and thus improving the historical data. Such data are invaluable to policy-makers, program leaders, teachers, students and the private sector. Another important value is to provide a base for projecting production, once a method of obtaining farmer intentions has been devised.

Another need is a small crop of statisticians to advise the researcher on designing his experiments in order for his results to pass the test of confidence for reliability, which any researcher who publishes results knows is a requirement. These same statisticians would be responsible for collection of appropriate agriculture data in cooperation with the Department of Statistics, and the development of the historical data series.

We consider the evidence sufficiently convincing to suggest the expansion of the statistical unit in the Ministry of Agriculture. While the Department of Statistics has the national mandate for the Census, the statistical unit in the Ministry of Agriculture should be involved directly in the planning, and the collection of data related directly to agriculture. Subsequently, the Department of Statistics would process and present the data in a form most useable by the agriculturists. Once published or with advance computer printouts made available, the Ministry of Agriculture could use its statistical unit to process the data for more particular uses, and also use it as a base for collecting supporting or additional data.

The pay off, it is believed would be consistency and agency acceptance for decision and policy making, program and project development and implementation, plans, statements of farmer intentions, trend analysis and for the large number of reports required,

XI. PROPOSED FOLLOW-UP

A. STEP 1. IMMEDIATE - BY THE JORDANIANS

1. Research and Extension

- a. Make official decisions on the multi-discipline team approach to research as outlined in "Strengthening Research Strategy". Enumerate possible modifications.
- b. Review the recommendations listed in the Section "Strengthening Extension Strategy" and list:
 - 1) The assets.
 - 2) Problems it presents if adopted.
- c. Continue review of organizational structure alternatives. Prepare list of issues for further consideration with the U.S. Team.

2. Agricultural Economics

- a. Organize on an informal and unofficial basis a discussion group of the agricultural economists, to meet on a regular basis. One of the participants would present a paper at each meeting.

B. STEP 2. U.S. TEAM RETURNS TO JORDAN AT REQUEST OF GOJ. TEAM MEMBERS AVAILABLE AUGUST 15 TO SEPTEMBER 15. ASSISTANCE PROVIDED IN:

1. Reviewing and finalizing a plan for the multi-discipline approach to research.
2. Reviewing the response to the proposed extension strategy as suggested in A, 1 (b) above and in finalizing the plan,
3. Responding to the issues prepared in advance by the Jordanians as outlined in A, 1 (c) above. Working out details of the plan. Outlining step-wise procedure for adoption and implementation.
4. Developing a plan and procedure for evaluation of every staff member in MinAg and FacAg with research and/or extension responsibilities, giving particular attention

to how the person might fit into a strengthened strategy and perhaps restructured organization. Prepare outline for material (including vita) which the staff member would prepare in advance and have available for the evaluators when the individual review would be held. Suggesting report format for use of the review team,

5. Other matters dealing with the agricultural development of the Jordan Valley.
- C. STEP 3. DURING THE REMAINDER OF 1978 AND 1979.
 1. Jordanian conduct the individual evaluation of research and extension staff. Evaluation teams would be set up according to areas of work. Suggested review teams would be as follows:

- Crop production
- Crop protection
- Soils and irrigation
- Extension and agricultural economics.

2. Conduct a pilot operation, by setting up a commodity team, identifying the constraints on production and marketing and outlining the needed research through a series of contributing projects. Advance as far as possible in implementing the research.

An expatriate research administrator could be utilized, in an advisory capacity, as follows:

- a. Two months helping to plan the program.
- b. Additional month at some later date in counseling on implementation.

Total suggested amount of expatriate time: three months.

3. Review progress in activating extension strategy agreed upon. Could utilize one month of expatriate extension administrator's time.
4. Enact whatever legislation is necessary to implement strategies and organizational structures agreed upon.

5. Agricultural Economics

- a. Agricultural policy-list and explain the voids. In some instances there may be agriculture policy in the absence of any stated policy. Clearly, there are great gaps in direction for agriculture. Reality begins with knowing where you are going and from a public point of view that means policy.

A knowledgeable expatriate, working with the GOJ officials and with agricultural economists, for 3-6 months, could be helpful in clarifying the air and identifying voids in the policy area.

- b. Marketing System

Elaborate the present marketing system. Obtain an objective description and evaluation of the role of the commission agents. Review the import/export policies and practices, and their effects on farm prices.

An expatriate could be helpful to the GOJ in this undertaking. Suggested amount of time: two months as a minimum.

D. STEP 4. PERIOD, BEGINNING JANUARY 1, 1980.

It is assumed that all of the work outlined in Steps 1, 2, and 3 would have been completed by this time.

1. Continue to activate the planned strategies and implement the agreed upon organizational structure as rapidly as possible.
2. Develop plans for and add needed staff, facilities, equipment and operating support to accomplish the objectives and goals agreed upon.
3. Strengthen budgetary planning to meet needs outlined in (2) above.
4. Data base for agriculture. There needs to be developed a historical data series for each agricultural commodity and related factors. It is a very large job and would require someone acquainted with the original techniques for the United States. A data base and its maintenance is the

foundation of decision-making on agriculture policy. As a minimum it is a two or three year job of one man with a small staff to assist him. Recommend soliciting such a person from USDA; someone who may have worked with O.C. Stine or knows the method he used.

5. Continue updating policies and implementation plans.
Undertake sector analysis.

A resident expatriate team to be in place by January 1, 1980 could be helpful. It is suggested that the make-up of the team be as follows;

- Research and Extension Administrator
- Soils and Irrigation Specialist
- Vegetable Production Specialist
- Data Base Specialist (See D. 4. above)
- Agricultural Sector Analyst
- Marketing Specialist

XII. APPENDIX

Time did not permit getting all of the material to be presented in the Appendix typed and included in the report at this time. The material will be included in Volume II to be submitted shortly. The items in the Appendix are as follows:

- A. Scope of Work.
- B. Persons Contacted.
- C. References.
- D. Faculty Members, Lecturers and Delegates - FacAg, Jordan University.
- E. Research Projects Being Implemented by the FacAg - 1977/78.
- F. Research Plan for the FacAg.
- G. Publications of the FacAg, 1973-78.
- H. MinAg Research Staff.
- I. Research Responsibilities of Each MinAg Staff Member.
- J. Research Plan for the MinAg.
- K. Publications of the MinAg, 1973-78.
- L. Explanatory Material on Organizational Proposals which were Given Secondary Priority.