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SECTOR REVIEW AND
PROPOSED STRATEGY FOR
USAID SUPPORT FOR
JORDAN'S AGRICULTURAL SECTOR

AMMAN, JORDAN
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JORDAN'S AGRICULTURAL SECTOR

I. OVERVIEW

Agriculture is estimated to account for approximately 11 percent of Jordan's gross domestic product (1978). In 1975 approximately 83.5 thousand persons, or 28 percent of total employment, were in agriculture. Today this figure is believed to be far lower although many foreign workers now perform agricultural tasks. Agricultural products make up 30 percent of Jordan's commodity exports and 21 percent of the country's imports (1974-77 average). However, Jordan has a large negative balance of commodity trade in agricultural products. The country is deficit in most major agricultural commodity groups, although it is nearly self-sufficient in several fruits and vegetables. Including those under PL 480, imports of wheat and flour, basic food especially for poorer persons, accounted for 15 percent of Jordan's agricultural commodity imports during 1974-77, and imports regularly make up one-half to three quarters of total domestic wheat consumption.

Within agriculture the estimated percentage contribution to GNP by water regime and product group is shown in table 1.

TABLE 1. Estimated Percent Contribution to Total Agriculture GNP in East Jordan.

<u>Product Group</u>	<u>Irrigated Agriculture Including Jordan Valley</u>	<u>Rainfed Farming and Range</u>	<u>Total</u>
Field Crops (Wheat)	7 (2)	23 (18)	30 (20)
Vegetables & fruits	32	8	40
Livestock includ- ing poultry	3	27	30
TOTAL	42	58	100

Source: FAO. Report of FAO/UNDP Programming Mission to Jordan.
FAO Sector Programming Mission Series No. 8. June 1975.

A. DRYLAND

Field crops, of which wheat is by far the most important, dominate the cultivable area of about 8.2 million dunums (du.)^{1/} in the highlands east of the Jordan Valley. Here, rainfed crops are produced with low technology, traditional agronomic methods, and production is dependent upon sparse and highly variable rainfall. Wheat yields, for example, averaged just over 80 kg/du (9 bu/acre) in the six years 1971-76, and ranged from a high of 227 kg/du in 1974 to a low of 42 kg/du in 1973 and 1975.^{2/} With Jordan's increasingly short labor supply it is believed that much land formerly planted to wheat now lies fallow since the returns are rather low and the risks quite high.

Farms in rainfed areas are small when considered in light of the land's low productivity. Those in the major cereals producing regions average just over 100 du. in size and produce an annual net income, estimated from budgeting studies, of about JD 350 (1977 estimate). Quite apart from the high risk element, these farms cannot offer to operators the incomes possible from non-farming activities.

B. IRRIGATED LAND

There are currently about 190 thousand du. irrigated or partially irrigated in the Jordan Valley or almost 30% of all irrigated land. In addition there are 40-50 thousand du. irrigated in the uplands. However, the land in the Jordan Valley is considerably more productive.

Fruits and annual vegetables are the principal crop groups grown on the 230-240 thousand du. which are fully or partially

^{1/} One dunum is 0.1 hectare.

^{2/} For comparative purposes 1975-77 average wheat yields in some other Middle East countries are:

Syria	0.95	t/du.
Turkey	1.72	t/du.
Tunisia	0.71	t/du.

irrigated. The Jordan Valley, where generally frost-free winter-time temperatures give Jordan an early market advantage over other producing countries, produces 80-90% of all irrigated product.

Irrigation in the Valley is from both public and private sources. The East Ghor Canal currently supplies water for about 140 thousand du. in the Valley, while some 50,000 dunams are irrigated from private sources. Public projects just completed or nearly so, including an 18 km. extension of the Canal, will add an additional 86 thousand (some replacement of private systems). Additional capital projects now being planned are intended to extend full irrigation to the entire 350 thousand du. irrigable in the Valley.

Farms in the Valley average about 40 du. in size. Farm budgeting studies estimate that owner-operated, surface irrigated farms of this size in the Valley yield a net income of JD 1400 - JD 1800 annually (1975-76 prices). About 60 percent of Valley farms are operated by tenants on 50-50 shares for both output and most expenses other than labor. Labor is traditionally 100% supplied by the tenant.

II. RATIONALE FOR JORDAN VALLEY AGRICULTURAL DEVELOPMENT

Jordan's 1976-80 Five Year Plan puts major emphasis for agricultural development on the expansion of irrigation in the Jordan Valley, and this has been consistently followed in the two years since the Plan's publication.

Excluding livestock and poultry, Jordan Valley production accounts for about one-half of agriculture's contribution to Jordan's GNP. Fruits and vegetables, mainly from the Valley, form the vast majority of Jordan's agricultural exports and constitute over 25 percent of total commodity exports.^{1/} Moreover in terms of economically feasible changes the Jordan

^{1/} Including some West Bank production which is not separated in the trade statistics.

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Valley offers the most promising options for expanding agriculture's contribution to GNP.

With major investments in the expansion of the Valley's irrigation system along with the application of new production technologies, the net value of Valley agricultural production has been projected to increase from approximately JD 9.4 million in 1975/76 to almost JD 54.0 million (at constant prices) in 1992.

AID's awareness of the agricultural potential of the Jordan Valley dates back to its assistance with the original East Ghor Main Canal in the 1950's. More recently, AID has continued its participation with more than \$ 28 million in loans for extending and improving the irrigation system and for agricultural credit and \$ 2.5 million (life-of-project) in technical assistance grants.

USAID is deliberately focusing its agricultural assistance efforts in projects aimed at more fully exploiting the large infrastructural investments underway or planned for irrigation in the Jordan Valley. This is being done in recognition of the agricultural development potential there and of the limited staff available for developing and managing an agricultural assistance program.

Some promise probably exists for upgrading agriculture outside the Valley, but returns on investment are likely to be relatively low. Given the necessity to undertake a range of activities manageable within Mission staff resources, it is our judgement that attention should be focused on the Valley.

Beyond this, given Jordan's labor short situation, the difficulty of finding low cost production technologies using labor intensive approaches with high cost labor and the difficulty of providing "poor" farmers with an income competitive with urban wages, it is our judgement that the focus of AID assistance in the Jordan Valley should be on maximizing agricultural production with distribution concerns vis-a-vis the producers being secondary in nature. The focus on agricultural production is derived in part because of equity concerns for the predominating urban consumer, in part because of a concern to increase producer's incomes and in part from the overall benefits to the

nation of minimizing Jordan's agricultural trade deficit. That is, the value of Valley production already equals that of the rest of the country. For the upland areas there are no apparent opportunities for even approximating the increases in production (referred to above) which are suggested as possible in the Valley. Given the predominance of the urban population in Jordan, it appears that the greatest benefits for society will be obtained if concentration is given to increasing the total available agricultural product in this food deficit country. USAID, thus, has decided to concentrate its limited resources on upgrading agricultural production within the confines of the Jordan Valley and the lower Rift Valley.

III. IRRIGATED AGRICULTURE IN THE JORDAN VALLEY

A. GENERAL

Lying 200-400 meters below sea level and having a moderate winter climate, the Jordan Valley is Jordan's most productive agricultural region. With irrigation, it dominates in the production of fruits and vegetables, much of it in the winter with less competition from other producing areas than would be the case for areas producing summer crops.

The total land area in the East Jordan Valley is 600,000 du.; of this total 350,000 du. have been classified as potentially arable land. The introduction of sprinkler and drip irrigation in the Valley will make it feasible to reach this potential, given Jordan's known water resources, by taking in land not considered arable using surface irrigation.^{1/}

B. CROP PRODUCTION AND INCOME UNDER IRRIGATION

1. Irrigated Area

The East Ghor Canal now provides irrigation water for approximately 140 thousand du. in the Jordan Valley. Projects just completed or nearly so add an additional 56 thousand du. to this total. A further 50 thousand are fully or partially irrigated from free running streams and wells.

Current plans call for the extension of the East Ghor Canal to the Dead Sea which, with increased water supply, will allow an

^{1/} Depending on population growth rates it is likely that in the next 2-3 decades the agricultural sector will be deprived of water because of burgeoning urban demands.

irrigated area of 360,000 du. by 1992. By that time, the system is to be entirely pressurized, providing year around irrigation using sprinkler, drip or other modern irrigation techniques.

2. Crops and Yields

Cropping intensity on land presently irrigated by the Main Canal is estimated at 106 percent. That on land irrigated from walls and side wadis is estimated at 89 percent.

With some double cropping on the lands irrigated by the present Main Canal, vegetable production currently occupies approximately 44 percent of the land, field crops (largely wheat and barley) 42 percent, and citrus fruits and bananas about 14 percent. Water supply is the main constraint to increasing either the cropping intensity or the area under cultivation.

Water use efficiency in the Main Canal area with surface irrigation is estimated at about 40 percent. Sprinkler irrigation is estimated to provide a water use efficiency of 70 percent. This increase in efficiency of water use, plus the additional water to be made available from current and planned projects, will enable year-around irrigation and increase the cropping intensity to a projected Valley-wide average of 128 percent for some years. However, within the lifetime of most residents of Jordan it appears that the growing and developing urban areas' demand for water will be such as to force diversion of water from agricultural use in the Valley or the cities.

Total crop production in the Valley has increased with the expansion of the irrigated area. Crop yields increased dramatically with the completion of the original East Ghor Canal in the mid-1960's but probably only slightly since (table 2). This is based on Department of Statistics data. Some small surveys, however, seem to indicate the possibility that yields have actually increased somewhat in recent years.

TABLE 2. Reported Crop Yields in the Northern Part of the Jordan Valley. Numbers in Parentheses are the Ranges within which the Average Yield More Likely Lies.

<u>Crop^{a/}</u>	<u>1960</u>	<u>Average 1965/66</u>	<u>Average 1971/72</u>	<u>Average 1973/74</u>	<u>Census 1975</u>	<u>Average 1976/77</u>
Tomato	0.55	1.47 (1.1-1.5)	1.48 (1.1-1.6)	0.87 (1.6-1.7)	1.73	0.92 (1.6-1.9)
Eggplant	0.96	1.55 (1.2-1.6)	1.41 (1.4-1.6)	0.91 (1.6-1.8)	1.74	1.39 (1.6-1.9)
Squash/ Cucumber	0.35 ^{b/}	0.64 (0.3-0.6)	0.77 (0.7-0.9)	0.65 (0.6-1.0)	1.21	0.87 (0.9-1.0)
Melons	0.40 ^{c/}	1.37 ^{b/} (0.5-1.5)	0.85 (0.8-1.5)	1.45 (0.8-1.5)	1.13	1.05 (0.6-1.5)
Cabbage/ Cauliflower	1.56 ^{d/}	1.54 (1.3-1.7)	1.14 (1.1-1.7)	1.30 (1.3-1.5)	1.76	1.29 (1.1-1.7)
Peppers	0.42	0.82 (0.6-1.0)	0.90 (0.6-1.0)	0.51 (0.6-1.0)	1.09	0.66 (0.6-1.1)

a/ Crops listed account for about 90 percent of Jordan Valley land in vegetables.

b/ Cucumber only.

c/ Watermelon only.

d/ Cauliflower only.

- Sources:
1. Reported for 1960 and 1965/66: Awwad A.J. "Agricultural Production and Income in the East Ghor Irrigation Project: Pre- and Post-Canal" USAID, Amman, 1967.
 2. Reported for 1971/72, 1973/74 and 1975/77: Department of Statistics. The Agricultural Sample Survey in the Ghors.
 3. Reported for 1975: Department of Statistics. Results of the Agricultural Census in the Ghors, 1975.
 4. Judgements on likely yield ranges were based on survey results from Awwad (op.cit) and a number of other special studies in the Jordan Valley between 1966 and 1974.

3. Income Estimates

The 1975 Agricultural Census reported 6007 agricultural holdings (farms) in the Jordan Valley. They averaged about 40 du. in size in both the irrigated and non-irrigated area. (Table 3).

TABLE 3. Agricultural Holdings and Average Farm Size in the Jordan Valley, 1975.

	<u>Area</u> (dunums)	<u>Number of</u> <u>Holdings</u>	<u>Mean Size</u> (dunums)
North	192,566	3,162	41.9
Middle	58,305	1,720	33.9
South	<u>46,359</u>	<u>1,125</u>	<u>41.9</u>
TOTAL	297,230	6,007	39.5

Source: Department of Statistics. General Results of the Agricultural Census, 1975. April 1977.

Farm budgeting studies estimate that owner-operated, surface irrigated vegetable farms, of the sizes shown in Table 3 yield net family incomes of JD 1400 - JD 1800 annually. With average family sizes in the Jordan Valley of about 5.5 persons, the resulting per capita income is in the JD 215-290 range, about the same as the average per capita disposable income of East Bank residents and four to five times greater than incomes from cereals production. Increased labor costs in the past three years may be eroding the owners net income.

About 60 percent of the farms in the Jordan Valley are operated by tenants on 50-50 shares for output and expenses. Thus the per capita income for somewhat more than half the farmers

in the Valley is JD 110-140 per year. Again, these figures do not reflect the recent changes in the cost of labor.

On non-irrigated farms, or those for which irrigation water is limited and/or uncertain, incomes would be considerably lower. On irrigated fruit farms (citrus or bananas) in their bearing stage they would be higher.

C. PRODUCTION TECHNOLOGY

1. Typical

Though Valley farmers are highly commercial, the rate of technological advance has been mixed. In some areas (plastic tents for example) new technology is being rapidly adopted. Tillage and on-farm water use are reasonably sophisticated, but other practices which are rather primitive hold back yields:

- a. Disease resistant, high yielding varieties are not typically used. Many farmers use seed from their previous crops.
- b. Chemical fertilizers are universally used, but not necessarily in optimum amounts and ways. Data from the 1975 Agricultural Census shows that in 1975 the average application rate of irrigated land was no more than 87 kg per dunum -- 16 kg in terms of plant nutrients. This is one-fourth or less the rate of fertilizer use on irrigated vegetables in the U.S., and it is well below the rate recommended by Ministry of Agriculture technicians -- about 130 kg of superphosphate and 50 kg of ammonium sulphate per dunum. There is, however, much variation about this average.
- c. Serious incidences of a number of fungus, virus, and bacterial diseases have been observed in the Jordan Valley. Although pesticides and fungicides are used, their effectiveness is weak due to poor application and perhaps because the compounds used are not the most effective. Ministry of Agriculture specialists have tested more effective compounds, but they have not been widely adopted, probably because of weak extension efforts.

2. Some Advances

The use of drip irrigation and of plastic houses and tunnels (often in combination with drip) is expanding rapidly. First appearing in 1972, plastic houses and tunnels were estimated to cover 4100 du. in early 1978. Preliminary estimates indicate an additional 40 percent expansion during 1978. The spread of drip irrigation is more remarkable -- from nothing in 1974 to over 10,000 du. in 1978.

Despite their relatively high capital cost, these innovations yield incomes in the short-run which are potentially several times those achieved with traditional methods. The data on investment costs and incomes for drip and plastic in Table 4, below, are based on a selected sample and do not reflect average return from these innovations.

TABLE 4. Estimated Investment Costs and Net Income for Different Production Methods.

<u>Item</u>	<u>Invest- ment Cost</u> (--- JD/Dunam--)	<u>Net Income</u>	<u>Crop</u>
Open field, surface irrigation	-	35-45	General
Plastic Tunnels	87	163	Cucumber
Drip Irrigation	180	209	Tomato
Plastic House/Drip Combination	1900	673 995	Tomato Cucumber

Sources: Open field, surface irrigation from Harza Study. Other from Steitieh, A and M.F. Abbas, "A Preliminary Economic Analysis of Returns from Producing Cucumbers and Tomatoes Under Plastic Covers and Drip Irrigation System," Faculty of Agriculture, November 1978.

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It is reported that these innovations have also occurred on tenant-operated farms, with adjustments in the rental arrangements to reflect the owner's greater investment.

Some observers are pointing out that the rapid expansion of these types of innovations is resulting in reduced incremental efficiency as adoption spreads to less skilled farmers and the capability of private firms to provide post-sale service is being over-taxed.

D. CONSTRAINTS TO DEVELOPMENT OF JORDAN VALLEY AGRICULTURE

A variety of factors are believed to be contributing to the relatively limited overall yield increases which have occurred. It is not easy to determine which of these are the more important, but these constraints must be overcome if there is to be an increased agricultural product from the Valley.

1. Input Supplies and Commercial Services

Virtually all material inputs to Jordan Valley agriculture must be imported. Once imported they are distributed from the upland cities of Amman, Irbid, or Salt, either by the farmer or for him by his landlord or by the commission agent who handles his produce. Retail outlets for these inputs in the Valley are few in number.

Multi-purpose agricultural cooperative societies, dealing in seasonal inputs and offering credit in-kind, are growing in number but are still of limited impact. In 1975 there were ten local cooperative societies in the Valley with about 900 members. By 1977 their number had increased to 24, with almost 1900 members.

The recently organized Jordan Valley Farmers Association (JVFA) is mandated to offer a wide variety of technical and agribusiness services to its members. Membership, obligatory for all farmers receiving irrigation water from government sponsored projects, has reached 3700 since JVFA's inception in 1975.

JVFA's agribusiness activities are limited, at present, to seasonal credit and the marketing of production inputs. Sales volume for the spring and fall planting seasons of 1978 was

JD 110 thousand in fertilizers and agricultural chemicals. In its credit operations, begun in August 1978, it has extended 337 loans totalling JD 171 thousand. JVFA will continue to expand its operations but it will be several years in doing so.

Most agricultural operations use hand labor. Machinery use is limited primarily to initial land preparations. Sixty-five to 70-horsepower tractors with a disk or mold-board plow are quite common. Smaller 25 horsepower tractors of European manufacture are being introduced by some farmers, primarily for citrus orchard use. Increased mechanization beyond that of land preparation will have to flow from Jordan's situation of labor shortage, and it will be necessary to sharply improve repair and maintenance facilities.

2. Production Credit

Institutional credit, from the Agricultural Credit Corporation (ACC), JVFA, or cooperatives, has been a relatively minor portion of lending to Valley farmers, particularly tenants. Major sources have been commission agents, landlords, and relatives and friends. A 1975 Royal Scientific Society (RSS) study found that, for tenant farmers receiving credit, commission agents were the major source followed by landlords, relatives or friends, and last by cooperatives and ACC.

Currently, institutional sources charge seven percent for seasonal loans while non-institutional sources may charge up to 30 percent, although that from relatives and friends is likely to be of much lower cost.

Until recently credit policies have not been such as to encourage lending to the smaller farmers. To an undetermined extent, it has been concluded that limited and expensive credit has restricted the purchase and use of an appropriate level of production inputs at least among smaller farmers. Thus, productivity is judged to have been retarded because of this credit situation.

The situation is undergoing a process of change with the recently activated credit program of the JVFA. Demand for credit appears to be high and, assuming successful growth of the JVFA, in time this constraint should be slackened.

3. Tenancy Issues

For the estimated 60 percent of Valley farms operated by share tenants, the overall method of paying rent (usually 50-60 on both expenses and produce) has not been grossly inefficient in terms of production incentives. However, tenants often supply 100% of labor costs, and with the recent rapidly increasing costs of labor this pattern probably now limits inputs and thereby productivity. Other features of the tenancy system are:

- a. Most leases are oral.
- b. The 1975 RSS survey found that 99 percent of all leases are for one year or one season. Many leases are not renewed at the end of the season.
- c. Land ownership has been a criterion for access to adequate amounts of credit from the major institutional sources.

Although probably not a major constraint on productivity, the tenancy situation is not the ideal one to encourage adoption of long-term programs to increase productivity.

4. Technical Services

Reflected in part in the slow rate of adoption of high yielding technology, standard government services to agriculture are weak. The Ministry of Agriculture's Research and Extension Directorate suffers from a lack of direction and from low incentives to the technicians. This has been compounded in recent months by a jurisdictional dispute between the Ministry and JVA over authority for these services in the Valley.^{1/} There has not been the required flow of new technologies in the form of new crop varieties, disease and pest control measures, soil and water management practices, etc. The innovations that have occurred, such as drip irrigation and the use of plastic structures, have come principally from the private sector and not from the official research and extension establishment.

The University of Jordan's Faculty of Agriculture, in existence only since 1972, is better managed, staffed, and budgeted than

^{1/} Recently there have been steps taken to give JVA full responsibility in this area. However, the decisions as to institutional responsibility and how to increase effectiveness of extension remain to be taken.

the Ministry. But, it has not yet committed itself to undertake significant research work in Jordan Valley agriculture.

In summary the Government has provided very little information to the farmers about improved production practices. Private sources of such information have been very much hit or miss with the result that there are large gaps in techniques used.

5. Produce Marketing

- a. **PHYSICAL EFFICIENCY.** Physical marketing functions -- grading, packing, storage and transport -- are poorly performed. Produce leaves the Valley essentially ungraded, and little care is taken to prevent damage during transport. Whatever grading and sorting is done is performed by traders at the wholesale and retail markets on the plateau. Observers assert that post-harvest losses are large, perhaps one-quarter to one-third of total production.
- b. **ECONOMIC EFFICIENCY.** Economic efficiency is related to the structure of the market -- how close it conforms to textbook competition. Here a few commission agents, about 13, handle perhaps 80 percent of the produce coming from the Valley.

Some of these agents trade on their own account, acting as both wholesalers and exporters in addition to their commission agent functions. Their position is enhanced by the rule that all produce must pass through the wholesale market places in Amman or one of the other major cities. Market fees assessed by the municipality are an important source of its revenues. These commission agents maintain their relationship to the farmer by serving as his outlet, his source of credit, and his supplier of inputs. He is also the major source of market information. No reliable market news service, giving daily price and other market data, is provided as a public service. Thus, although good direct data are not available it appears probable that farm gate prices may be low enough to discourage, to some degree, innovation.

6. Agricultural Policy

The Government's agricultural policy, in typical developing country fashion, is frankly consumer oriented. The Ministry of Supply, formed in 1974, is charged with assuring adequate supplies of consumer goods, including food items. Among the devices it employs are:

- a. DIRECT IMPORT. Fresh frozen meat and poultry and eggs are imported, primarily from Eastern Europe, on the Ministry's account for distribution through consumer's cooperatives and private retailers. The Ministry is also the sole importer of wheat for domestic milling.
- b. PRICE CONTROLS. Bread prices are controlled at JD 0.60 per kilo. Retail prices for fresh fruits and vegetables are partially controlled by imposing a 20 percent mark-up between wholesale and retail. Retail margins for milk, sugar and canned goods are also fixed.
- c. EXPORT CONTROLS. Embargoes on the export of fruits and vegetables have frequently been imposed, affecting primarily Jordan Valley producers. The Ministry of Agriculture has been Supply's reluctant partner in the management of export controls, providing the analysis of wholesale price signals which trigger each embargo decision, but consistently advising against the imposition of them.

Government action in support of agriculture has generally been through subsidy:

- a. TAXATION. Incomes from agriculture are not subject to tax, agricultural land is only nominally taxed, and agricultural inputs and machinery pay no import duties, though spare parts pay a 38 percent duty, reducing incentives for good maintenance.
- b. CREDIT. Interest rates on loans from government sponsored lending institutions are six or seven percent, depending on their term. Capital is provided these agencies at low rates from the Government budget, the Central Bank, or foreign donors.
- c. INPUT SUPPLIES. Small amounts of purchased inputs, notably fertilizer, have been sold below cost. Irrigation water is supplied at JD 0.006 per cubic meter (approximately \$22.50 per acre-foot) to farmers in the East Ghor Canal project area. The estimated cost of its delivery is JD 0.01 per cubic meter or more. Fruit and olive tree seedlings are sold to farmers by the Ministry of Agriculture at about half the price charged by commercial nurseries.

Price incentives are not prominent features of agricultural policy. A total ban on imports of citrus, except from Gaza or the West Bank, and seasonal controls on the importation of bananas provide some incentive to Jordan Valley producers of these products.

The Government provides a price floor for wheat, currently JD 70-75 per metric ton. Its purchases at the floor price have been small -- 1,200 tons in 1975 and nothing in 1976, 1977 or 1978 -- primarily because poor harvests in those years have driven prices to JD 90-100 per ton in village markets. As is well realized, agricultural policy is a very complex matter. It would appear, without having thorough analysis available, that the agricultural policies have not been such as to encourage maximum production efficiency. This an area which needs to be better understood.

IV. CURRENT JORDAN VALLEY AGRICULTURAL DEVELOPMENT ACTIVITIES

Responsibility for the economic development of the Jordan Valley is vested in the Jordan Valley Authority (JVA). JVA's primary concern is the provision of capital infrastructure for both agricultural production and social services. It has in the past worked with line ministries and other agencies for the provision of technical services, and in agriculture its relations are with the Ministry of Agriculture and Faculty of Agriculture. It appears likely that in the near future JVA will be given line responsibility for agricultural services in the Valley.

A. MAJOR CAPITAL PROJECTS

Projects just completed or nearly so will provide irrigation water to an additional 56 thousand du. in the Jordan Valley. The system being installed is pressurized and is designed for sprinkler irrigation. It is also well suited for drip irrigation, and can be readily adapted to less costly surface irrigation methods. An additional 18 thousand du. in the original East Ghor Canal surface irrigation area are being converted to a pressurized system as are about 20 thousand du. now irrigated from streams and private wells. JVA has purchased sprinkler equipment to cover the total 94 thousand du. The equipment for these project areas is for resale to farmers on easy credit terms. A primary objective is to increase the efficiency of water utilization,

thereby stretching the supply of this scarce resource.

The total cost of these projects, excluding the King Talal Dam, is estimated at JD 15.2 million (\$ 50 million, approximately).

Current plans, in the Jordan Valley Irrigation Project, Stage II, call for extending the irrigated area under a pressurized delivery system to the Dead Sea and converting all areas to pressure by 1992. The total irrigated area will then be approximately 360 thousand du. To supply the additional water required to cover this area, a major dam and reservoir in the Yarmouk River and a smaller dam and reservoir on the Wadi Araba nearby are planned. Total cost of the Stage II project is now estimated to be in excess of JD 165 million.

Feasibility and design studies for this project are underway at an estimated cost of JD 3.8 million. The internal rate of return for the irrigation portions of the project is estimated at 14 percent. Benefits are, however, dependent on both the infrastructure and upon better farm management, production incentives, and improved technical and agribusiness services.

AID has thus far supported the expansion of the irrigation system with loans totalling \$ 19 million for the Zarqa Triangle, 18 km Canal Extension and sprinkler equipment projects. A loan of \$ 150 million, in three equal annual tranches, for the construction of the Maqarin Dam on the Yarmouk is being planned.

B. OTHER ACTIVITIES

1. Land Tenure

Jordan's land redistribution law will be applied to new areas in the Valley as irrigation projects are completed.

Under the law, ownership units of land irrigated from publicly financed projects are restricted to the size range 40-200 du., depending upon the amount already owned. Land will be purchased by the recipients at price set by an arbitration committee, with mortgage financing provided by the Government. Once redistribution has been affected, any subsequent transfer of redistributed land will be subject to JVA approval.

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1. Land Tenure

Jordan's land redistribution law will be applied to new areas in the Valley as irrigation projects are completed.

Under the law, ownership units of land irrigated from publicly financed projects are restricted to the size range 40-200 du., depending upon the amount already owned. Land will be purchased by the recipients at price set by an arbitration committee, with mortgage financing provided by the Government. Once redistribution has been affected, any subsequent transfer of redistributed land will be subject to JVA approval.

A modest approach to tenancy reform is also planned, in that all leases will be required to be in writing and be for a period of not less than three years. All leases must be approved by JVA.

2. Agribusiness Services (JVFA)

Aside from the Government's continuing support of the cooperative movement, a major effort to expand agribusiness services in the Jordan Valley is underway. The Jordan Valley Farmers Association (JVFA) was authorized by law in 1974 to provide a wide variety of agribusiness services to farmers in the Valley and to act as a focal point for farmer involvement in agricultural policy formation. Membership is obligatory for all farmers in the irrigated areas of the Valley, and current membership is about 3700 farmers. Potential membership is 7000-9000.

JVFA's planned agribusiness involvement will be in produce marketing, seasonal credit, and input supplies; USAID believes that its produce marketing and seasonal credit operations will be of greatest long-run significance.

Construction is underway on one of three produce grading, packing, and merchandizing centers to be operated by JVFA in the Valley (Dutch financing). Initially, the centers will provide auction facilities for sales of produce to wholesalers and exporters. JVFA intends to eventually act as a wholesaler and exporter.

Technical services will be provided to members through JVFA's Farm Management Department and 33 Ministry of Agriculture extension agents assigned to work with the Association. Advice and assistance in farm planning and management, credit use, and production techniques will be offered.

With a grant of \$ 1,161 thousand (life-of-project), AID is now assisting JVFA in general management, input supply marketing, credit and farm management. A \$ 1.5 million AID loan is providing financial support to JVFA's credit operations.

3. Irrigation Research and Training

Just getting underway is technical support for the expansion of the irrigation system through farmer training and applied

research. The Ministry of Agriculture and the Faculty of Agriculture are cooperating with JVA in executing the program. It was initially conceived as focusing exclusively on sprinkler irrigation, but the program's scope has been broadened in recognition of the spread of drip irrigation and that farmers will attempt to convert the pressurized system to surface irrigation.

USAID is assisting this activity through the \$ 1,320 thousand (life-of-project) Water Management Technology (WMT) project.

4. Faculty of Agriculture Development

This project, ending in FY 1980 is assisting the development of the young Faculty of Agriculture of the University of Jordan with grant assistance of \$ 2.26 million. The project is not aimed specifically at Jordan Valley agriculture, but AID's inputs are supporting work done there. Contractor staff are assisting in the Faculty's cooperation with JVA in the WMT project.

C. OTHER DONOR ACTIVITY

1. Irrigation

In addition to the AID-financed projects, the current program of expanding the irrigated area of the Jordan Valley is being financed, in part, by Kuwait Fund and Abu Dhabi Fund loans totalling JD 6.8 million for the King Talal Dam, by IDA credit of JD 1.7 million for the North East Ghor project, and by loan from the German KfW of JD 1.6 million for the Hisban-Kafrein project.

2. Jordan Valley Farmers Association

The Netherlands have provided designs and grant funds of about JD 650 thousand for the construction of one of JVFA's planned produce grading, packing, and marketing centers. Discussions have been held with the Danish Government for financing a second center, and the U.K. has had a team in Jordan study the possibility of financing a third.

The U.K. also looked at the full range of marketing problems for Jordan Valley produce with the view toward possible technical assistance to JVFA in marketing. Though no firm decisions

have so far been taken, USAID considers it highly likely that JVFA and the U.K. will agree on a technical assistance project whose main objectives will be to enhance the Association's management capabilities in marketing, at both the packing plant and overall marketing levels.

FAO has provided material assistance to JVFA through a grant of 500 tons of fertilizer for sale to members at low prices.

V. PROPOSED ASSISTANCE ACTIVITIES

There is not a consensus in Jordan on what actions are desirable to increase agricultural efficiency in the Valley. USAID/J is interested, ultimately, in assisting the Government with an integrated approach to agricultural change in the Valley. However, a number of factors mitigate against an integrated approach at this time, not the least of which is the lack of reliable and discriminating information on the existing agricultural practices and constraints in the Valley.

Thus, although the desire and the intent is to move toward an integrated project, at this time that which is practical is a piecemeal approach. The elements of the piecemeal are determined by an admixture of need, of GOJ interest and USAID staff ability. The following paragraphs describe proposed activities within categories of the constraints to be lessened by the projects.

A. AGRIBUSINESS SERVICES

A noted major constraint to agricultural progress in the Jordan Valley is the availability and application of agribusiness services. The JVFA has been established by the government to provide improved agribusiness services.

Two USAID projects with JVFA are aimed at partially overcoming these constraints. Jordan Valley Farmers Association II will continue the management assistance to the Association begun in FY 1978 under JVFA I. A loan has been made under project 278-0207 to provide an initial input toward the capital required by the JVFA to perform its function of making production credit available to the farmers of the Valley.

In terms of the most immediate priority of production credit, JVFA made its first loans to farmers, largely farmers operating units of 40 dunums or less, in the fall of 1978. By January 1979 337 loans had been extended to JVFA members. The USAID input of \$ 1.5 million when combined with the GOJ contribution JD 576,000 should provide the funds required for the JVFA to assist a significant number of farmers and to develop and test its operational procedures. It is highly likely that a second capital input will be required by 1980.

The JVFA is just beginning to develop procedures and gain operating experience. The USAID is funding a management advisory team to assist the JVFA in (1) its initial credit operations, (2) defining its long-term organizational structure, (3) developing operational procedures in supplying production inputs, and (4) developing a budget and accounting system.

While JVFA is experiencing the problems and frustrations attendant to making the transition from paper organization to actual operation at the field level, progress has been much better than may have been expected. The law creating JVFA and establishing its mandate clearly envisions the Association as the principal vehicle to be employed in the delivery of a comprehensive, fully integrated package of agriculture services. Its commercial orientation on the one hand and the active involvement of its farmer members on the other, if properly managed, can convey many of the advantages and benefits of the private entrepreneurial approach while protecting members' interest through their voice in the Association. It is not possible to accrue these benefits without monetary cost. The funding for capital costs of acquisition and operation of physical facilities, the support of staff and operating capital to support inventories and credit activities, at the outset, has had its source in GOJ subsidies and donor organization loans and grants. While the funding so acquired has been significant, it remains insufficient for the continuing support of the expanding activities of the Association.

Although it is not possible to determine with a high degree of accuracy what the actual capital need will be, the AID level of effort to support the capital requirement including the credit program is planned at a level of \$ 15 million over a five year period. This level will allow the JVFA to become firmly established if the management input is sufficient.

The new sprinkler irrigation system design to lessen the water constraint in the Valley is physically ready to operate. However, Valley farmers have little experience with sprinklers, nor does the JVA. Under project 278-0192 USAID is assisting in putting into operation the sprinkler system and in getting limited applied testing (research) underway on the use of sprinklers on crops in the Jordan Valley environment. This is a project with limited objectives but in an area of immediate need.

B. RESEARCH AND EXTENSION

Another area of major constraint on increasing agricultural productivity is that of the research/extension complex. Only very limited field research is being done and even less advice/information is being supplied to farmers regarding improved farming practices. As a whole, obtaining improvement in this area is proving singularly intractable.

One can look at the constraint of research and extension in the Valley from either of two views. First one can argue the Government does not provide much in the line of advice on best agricultural production practices. Alternatively the optic can be that the farmers in the Jordan Valley are producing crops using rather inefficient practices. It is the latter optic that we find of greater potential utility. It suggests an operational rather than institutional approach.

From the first view, that is the services side, the institutional changes which must take place to change the government's provision of advice are very extensive and involve difficult questions of the allocation of bureaucratic responsibility. Ultimately change does need to take place at the institutional level, but if current evidence is considered, it can be expected to be slow in coming. Even when the institutional responsibilities are determined, to build an extension service, to develop an operating research capacity, and so forth, if undertaken as projects themselves, will not do much for actual production practices for a number of years.

Yet again returning to the farmer's optic, the Jordan Valley Farmers are adopting innovations constantly despite the lack of government services (see the earlier discussions on drip, plastic

tunnels, etc.) The market is, patently, receptive to better ideas. Rather than institutional development, we suggest starting in this area with a more action oriented approach. Why not provide better information to the farmers without institutional revolution? With this thought in mind, we are attempting to work out with the government a joint effort to upgrade tomato production. Ad hoc approaches will be adopted as necessary to get upgraded production.

Tomato is the primary crop in the Valley. At this time it is judged the joint effort will involve the following steps:

1. A survey to determine typical current practices and the farmer's basis for selecting his practice.
2. Literature survey to determine probable best agronomic practices for the Jordan Valley.
3. A detailed examination of the economics of application of "best agronomic practices" in Jordan.
4. Development of demonstration plots with cooperating farmers using "best agronomic practice" as adjusted for Jordan.
5. Development of program for determination of means to address the constraint of "tomato leaf curl" virus.
6. Examination of marketing of tomatoes to determine if economic incentives will be maintained.

Current average tomato yields are about 1.75 tons/du. Yields of more than four tons/du. appear clearly feasible in the Jordan Valley. If such an increase in yield were achieved, the value of the Valley's tomato crop would increase by more than JD 13 million.

In undertaking this project, tasks will be defined and organizations asked to undertake them. We expect the JVA to be the primary counterpart organization with contracts let for specific tasks. This approach in the preliminary stages looks promising. The long-run organizational needs will become more apparent as the effort to upgrade tomato production moves forward. Perhaps within a year or two the time will be ripe to address the general

problem of agricultural services. If not, a second crop production effort (perhaps cucumbers) will be launched.

The AID level of support for this effort for planning purposes is \$ 2.5 million during the five year period.

C. OTHER CONSTRAINTS

Two other important constraints are felt to exist. These are marketing and policy/planning. Marketing issues will have to be attacked in the crop production schemes at least to the point of assuring adequate economic incentives to producers. However, marketing is also a JVFA responsibility and will come under the JVFA assistance project. We will resolve at a future time how to best address the marketing area.

With respect to policy/planning, there is not an appropriate GOJ entity with which to broach the problem in the Valley at the present time. We have an objective of developing a way of approaching the policy/planning issue by 1980.

The AID level of support for this activity is planned at \$ 2.5 million for the five year period.