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AGRICULTURE SECTOR ASSESSMENT

JORDAN

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AGRICULTURE SECTOR ASSESSMENT - JORDAN

In doing this sector review the USAID felt it important to have a major Jordanian input. Given the fact that the new Five-Year Plan is still in the preparatory stage it was not possible to draw from the new plan on agricultural needs and plans. In order to get a Jordanian input the USAID asked the Faculty of Agriculture at the University of Jordan (UOJ) if they would be willing to prepare a paper summarizing their thinking on the agricultural sector. The Faculty agreed.

We believe the paper prepared by the UOJ represents an excellent piece of work and significantly expands on what could have been done with the USAID's small agricultural staff. We have for this reason reproduced the paper in its entirety as Part I. We have, however, taken the liberty of inserting occasional comments clearly identifying them as USAID inputs.

Part II of this paper contains the USAID's development of constraints and proposed strategy. This section is derived from the background work done by the University: but was developed in-house.

PART I BACKGROUND (Prepared by the Faculty of Agriculture. University of Jordan)

A. OVERALL PRODUCTION

In spite of several advances made in certain production areas of food commodities in Jordan, agricultural domestic production continued to fall short of meeting the consumptive need of the population. During the five year period 1974-1978, the value of net imports of food commodities ranged from 52 to 62% of the total value of consumption (Table 1).

Table (1) Gross domestic production, agriucltural domestic production, imports, and exports of agricultural commodities and total consumption of food in Jordan for the period 1974 - 1978

Source: Compiled from Dept. of general statistics report 1974-1978. Amman. Jordan.

Title	Value in millions J.D. 1974	1975	1976	1977	1978
Gross domestic prod. GDP	242.4	269.4	358.5	403.3	430.6
Agricultural domestic prod. ADP.	30.3	26.0	37.3	41.7	51.0
Percentage of ADP from GDP	12.5%	9.7%	10.4%	10.3%	10.6%
Total imports of food commodities	43.9	50.7	84.5	79.0	91.7
Total exports of food commodities	10.9	11.6	22.6	27.4	26.9
Net imports of food commodities	33.0	39.1	61.9	51.6	64.8
Total value of consumption of food commod. (ADP + Net imports).	63.3	65.1	99.2	93.3	115.8
Percentage of Net imports from total consumption	52%	60%	62%	55%	60%

Topping the list of imported food commodities were wheat, sugar, dairy products and red meat. Although the imports of Jordan from fruits and vegetables were the highest in value among imported commodities (about 20% of the total agricultural imports for the period 1974-1978), yet the value of domestic exports from these commodities were about the same as such imports. Furthermore fruit and vegetables were a major part of re-exported food commodities which shows that Jordan became a net exporter of fruits and vegetables in 1977-1978 (see Tables 2 and 3).

Table (2) Major imports of food commodities and total imports of food commodities in Jordan for the period 1974-1978 in million J.D.

Source: Compiled from Dept. of General Statistics report 1974-1978.

Food Commodity	Value of imports in million J.D. for the year 1974	1975	1976	1977	1978	Total
Fruits, Vegetables, and Nuts	8.67	9.57	15.92	15.69	16.68	66.53
Wheat and Flour	7.14	6.82	14.80	13.87	14.58	57.21
Sugar	6.76	11.53	20.20	6.56	8.37	53.42
Dairy products and Eggs	3.88	4.82	6.47	7.43	8.25	30.85
Coffee, Tea and Spices	2.35	2.92	2.99	5.30	6.52	20.08
Rice	4.28	1.87	4.54	2.75	3.46	16.88
Live animals	2.37	3.18	2.14	2.56	3.95	14.20
Animal and Veget. Oil	1.15	1.26	3.11	3.07	4.14	12.73
Others	6.29	7.71	14.32	21.76	25.76	75.84
Total	43.89	50.68	84.49	78.99	91.71	349.74

Table (3) Domestic exports and re-exported food commodities in Jordan for the period 1974 - 1978, in million JD.

Source: Compiled from Dept. of General Statistics reports 1974-1978.

Title	Value of exports in million J.D. for the year 1974	1975	1976	1977	1978
A. Domestic Exports:					
Fruits	4.27	6.38	9.23	10.40	6.55
Vegetables	4.89	3.24	5.34	6.70	8.15
Fats and oil	0.47	0.41	0.71	0.36	0.79
Others	0.37	0.53	1.81	3.54	1.63
Total Domestic Exports	10.04	10.61	17.09	21.00	17.12
B. Re-Exported Food Commodities:					
Fruits & Vegetables	0.05	0.13	0.50	0.66	3.17
Spices	0.50	0.70	1.16	2.89	3.80
Grains (mostly maize)	0.10	0.08	2.04	0.98	0.95
Others	0.22	0.23	1.80	1.87	1.83
Total Re-Exported Comm.	0.87	1.14	5.50	6.40	9.75
Export Grand Total	10.91	11.75	22.59	27.40	26.87

The value of total agricultural domestic production (ADP) increased from 30.3 million J.D. in 1974 to 51 million J.D. in 1978. However, ADP continued to constitute about 10% of the gross domestic production throughout the period 1974-1978 (see Table 1). Although per capita income has increased on the national level, the income per capita in the agricultural sector continued to be much lower than the national average and about 40 to 50% of the income in other sectors (see below).

Per capita income distribution in Jordan for the period 1974-1978. Compiled and calculated from figures of Department of Statistics

Population Sector	Annual per capita income in J.D. for the year 1974	1975	1976	1977	1978
Total population	122	134	174	190	220
Agricultural Sector	70	60	90	90	110
Other Sectors	130	146	195	210	240

The quantitative pattern of production of various agricultural commodities flunctuated greatly during the five year period 1974-1978 (see Table 4).

Table (4) Total Production of major agricultural commodities in Jordan for the period 1974-1978

Source: Compiled from Dept. of General Statistics reports 1974-1978.

Commodity	Production in ('000) tons. 1974	1975	1976	1977	1978	Total
Wheat	245	50	67	62	53	477
Barley	40	12	13	12	15	92
Legumes	53	9	16	17	23	118
Tomatoes	133	145	88	86	209	661
Other vegetables	144	167	137	147	241	836
Fruit trees	68	33	37	67	91	296
Olives	40	5	23	8	37	113
Eggs (1)	68	124	182	185	260	819
Broilers	11	13	21	22	24	91
Livestock (1)	4	4	8	8	-	

(1) Eggs: In millions of eggs. Livestock includes (goats, sheep and cattle) and in million JD.

Wheat production for example continued to decline throughout the five year period, and in 1979 reached the lowest quantity ever produced in Jordan which was 16 thousand tons. Production of tomatoes, vegetables and fruits fluctuated slightly during the four year period 1974-1977 but became a record high in 1978. Perhaps the most outstanding steady increase in the production of any food commodity in Jordan was that of eggs followed by chicken broilers. In 1978, production of eggs was 380% that of the production in 1974, while broiler meat production was 220% (Table 4). The number of cattle raised in Jordan continued to decrease and reached about 25 thousand heads in 1977 while it was about 47 thousand in 1974. The number of sheep and goats fluctuated during the same period as shown here under:

Number of sheep, goats, cattle and camels raised in Jordan in ('000) heads

	1974	1975	1976	1977
Sheep	792	723	565	857
Goats	399	481	381	387
Cattle	47	41	39	25
Camels	16	18	14	18

In 1975, the labor force working in agriculture constituted about 42% of the total labor force in Jordan and about 22% of the agricultural population. According to the general agricultural census of 1975, labor force in agriculture was reported to be 92.8 thousand individuals. 63% of this force is hired labor. This force was working on about 50 thousand land holdings across the country making a total area of about four million dunums (one million acres). Based on the total agricultural domestic production for that year (26 million J.D.) the per labor productivity of such force comes to 291 J.D. per year. Such productivity is below production levels in other sectors. Although there are no available statistics on the general picture of labor force working in the various sectors in Jordan for the years 1976 to 1978, yet several reports indicated mass migration of hired labor from the agricultural sector to other sectors of the economy and particularly to construction projects. In a recent questionnaire carried out by the Faculty of Agriculture, it was estimated that the hired labour in the Jordan Valley which was 100% Jordanian in 1975 has decreased to 20% Jordanian in 1978. The other 80% of the hired labor working in the Jordan Valley is mostly Egyptian.

USAID COMMENT

We believe the figure for 1975, of 42% of the labor force in agriculture, is too high. As is noted above there is a lack of reliable data on the current structure of the labor force. What can be said with considerable reliability is that there has been a large outflow of Jordanian labor from agriculture. A conservative estimate would be that no more than 19 to 20% of the domestic labor force works in agriculture and many of these likely have other important sources of income.

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B. UPLAND AGRICULTURE

1. The Land and Rainfall:

The total cultivable area in Jordan (East Bank) comes to 4.083 million dunums[1] (1.04 million acres). About 92% of this area receives its water from rainfall only, while the other 8% receives additional water from various irrigation schemes. All of the cultivable area lies in the uplands except for 360 thousand dunums which make up present and future cultivable land in the Jordan Valley (310 thousand dunums) and in the "Ghors" (low land) south of the Dead Sea (50 thousand dunums).

The amount of rainfall received in the agricultural areas varies from one area to another and fluctuates greatly from year to year (see Tables 5 and 6).

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(1) The area is based on the results of the General Agricultural Census 1975, which reported the area as 3.9 million dunums. It is also based on recent analysis of areas made by study teams from AOAD (Arab Organization for Agricultural Development), Khartoum, Sudan.

Table (5) Cultivated areas in Jordan distributed over regions and rainfall averages (1)

Source: Compiled from: Economic and Technical Feasibility Studies for the development of rainfed areas in the Governorate of I Amman II Balqa & Irbid III Karak of the HKJ. (Hashemite Kingdom of Jordan).

Average annual Rainfall in mm	Area in each region in ('000) Dunums: Irbid	Amman	Balqa	Karak	Jordan Valley	Total
400 and above	1070	143	365	-	-	[illegible]
300 to 399	380	332	130	375	150	1367
250 to 299	283	340	060	250	080	1023
Total*	1733	815	555	625	230	3958

* The cultivable areas also include about 45 thousand irrigated dunums in areas with rainfall less than 250 mm in the uplands and Ghor Safi and 80 thousand dunums in Jordan Valley which partially receive irrigation water.

Table (6) Annual average rainfall and flunctuation in rainfall in selected stations located in major agricultural areas of Jordan. Records are for forty years 1937-1977.

Station	Average Rainfall 40 Years in mm.	Range in mm.	No. of Years at average or above out of 40 Years	No. of Years below 300mm out of 40 Years	% of Years below 300mm	No. of below 2 out of Years
Ajlun	647	292-1024	22	2	5	-
Salt	626	287-1038	26	I	2	-
Kufranjah (Irbid)	615	338-0918	21	-	-	-
Jubeiha(near* Amman)	470	202-0725	18	4	10	2
Irbid	423	172-0816	17	11	28	-
Huwara (Irbid)	360	165-0605	19	11	28	7
Karak	352	102-0521	21	15	38	9
Madaba	346	136-0640	20	15	38	II
Rabba*	333	152-0537	11	11	44	8
Shubak	318	076-0702	20	19	48	13
Ramtha	287	116-0488	24	19	48	13
Tafila	278	083-0731	20	21	53	15
Amman (airport)	277	104-0451	20	25	63	17
Deir Alla*	268	118-510	12	10	40	13

* Record for Rabba and Deir Alla are for 25 years only. for Jubeiha 37 years.

Furthermore, the distribution of rainfall during the growing season is not uniform in all years and does not always coincide with the time when cultivated crops need water. About 1.6 million dunums (400 thousand acres) receive an annual average of rainfall reaching 400mm and above (Table 5). Under the conditions of the Mediterranean climate under which Jordan is included, this amount of water is considered satisfactory to raise a good and sure crop of winter cereal or legume, a summer vegetable or productive orchards of olives, grapes or stone fruits. About 30% of this area has a slope of 9 to 25% which makes such lands suitable only for the production of fruit trees. The other 70% has a slope of 0 to 8% which makes it suitable for the cultivation of either field crops, summer vegetables or fruit trees. Based on all the recorded rainfall in these areas, the flunctuation of rainfall was such that it was satisfactory to produce a good crop in 90% or more of the recorded years.

The second rainfall area which comes to about 1.2 million dunums receives an average annual rainfall of 300 to 399 mm. This amount of water is satisfactory to raise a crop of winter cereal or legume, a summer vegetable or an orchards of olives, grapes or stone fruits. Previous rainfall records of these areas show a fluctuation in the amount received in which 28 to 43% of the years were not satisfactory to raise a winter legume, wheat crop or a summer vegetable. About 25% of this area has a slope of 9 to 25% which makes them suitable only for the production of fruit trees while the rest of the area (75%) has a slope of 0 to 8% which makes it suitable for the cultivation of field crops, summer vegetables or fruit trees.

The third and last area of cultivable land which receives an average annual rainfall of 250 to 300 mm., comes to an area of about one million dunums. The amount of water received by these lands makes them suitable only for barley or winter legume cultivation on the basis of biennial rotation of one year cropping followed by a year of fallow.

In addition to these cultivable areas, the uplands include an area of one million dunums which receive an annual average rainfall of 100 to 249 mm. Most of these areas have a good potential to be developed into productive range land.

2. Crop Distribution:

The pattern of crop cultivation of the rainfed uplands during the period 1974-1978 is shown in Table (7).

Table (7) Areas of crops cultivated in the uplands of Jordan during the period 1974-1978.

Crop	Area in ('000) dunums in the Year:					
	1974	1975	1976	1977	1978	Average %
Wheat	2355	1111	1307	1212	1303	53.3
Barley	623	512	515	446	506	19.0
Lentils	216	148	229	133	143	6.4
Other field crops	264	118	104	88	98	5.0
Tomatoes	52	48	21	29	38	1.4
Other vegetables	104	78	61	66	42	2.6
Olives	221	251	256	338	319	10.1
Grapes	44	66	31	26	42	1.5
Stone fruits	10	14	5	6	9	0.3
Other fruit trees	6	14	6	5	7	0.3
Total	3895	2360	2535	2349	2538	
% of cropped to cultivated	105	63	68	63	68	

Note: In years of good rainfall farmers crop areas with average rainfall of less than 250. Areas less than 250mm. rainfall were not included in the cultivable area in this paper. That is why in good rainy years like in 1974 cropped area increases because of cropped area not included in the figures of cultivable area.

The total area cropped in 1974 was close to the total cultivable area in the country, while in the following four years, the cropped area was about 65% of the cultivable area. This was due mainly to low rainfall. In 1974 rainfall was high throughout the country while in the other four years, several rainfed areas across the country were subjected to drought conditions as a result of low rainfall (see below).

Annual rainfall in major areas of agriculture in Jordan

Area	1974	1975	1976	1977	1978	Average 1937-1977
Irbid	517	348	443	307	426	423
Ramtha	376	191	241	190	199	287
Amman (Jubeiha)	718	403	345	439	544	470
Amman (Airport)	451	242	203	175	248	277
Madaba	339	190	195	284	259	346
Karak	509	337	201	255	299	352
Rabba	537	314	260	276	258	333

In addition to low rainfall there are several factors which contributed to the decrease in total cultivated area in the rainfed uplands among which are:

1. The ownership of large areas of agricultural land around the cities and major towns of the country was transferred to new owners who look at the purchased land as a speculative investment rather than as a resource for crop cultivation. The bounderies of several cities has already expanded at the expense of agricultural land especially in Amman the capital.

2. Prices of agricultural land around cities and major towns have increased many folds during the last five years. This made many owners think of their land as a commodity for trade rather than to cultivate it to produce an income which is much lower than the increase in prices in each year.

3. Hired labor migrated from the agricultural activities to other sectors of the economy.

The above comments have not been documented by quantitative studies. However they are qualitatively documented in the reports of the Department of land, Ministry of Labor, and City Planning Departments.

USAID COMMENT

Expanding on point 3, the pull of relatively high wages for even unskilled labor in the construction sector must have contributed to the reduction of cultivation of at least the marginal lands. Returns from 40 to 50 dunums (median sized farms) of wheat during average rainfall years would be no more than could be earned from 6 to 8 weeks in the construction sector.

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The trends in cropping pattern in the uplands during the period 1974-1978 can be summarized as follows:

1. Wheat and barley occupied about 72% of the cultivated area throughout the period.

2. Areas cultivated with vegetables decreased year after year and occupied an average of 4% of the cropped area.

3. Areas planted with orchards increased year after year. In 1974 the total area planted with fruit trees (including olives) was 281 thousand dunums and increased to 387 thousand dunums in 1978. The fruit trees occupied an average of 12% of the cropped area.

USAID COMMENT

These and the following data on production, area and yields are derived from small sample surveys. Trends indicated by the data must be treated cautiously; however, USAID believes the trends cited above to be accurate.

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3. Production and Returns:

Total production of various crop cultivated in the uplands during the period 1974-1978 as follows:

Crop	Total Production in (000) tons (1) 1974	1975	1976	1977	1978
Wheat	227	42	54	58	47
Barley	37	10	7	10	13
Lentils	31	5	9	6	8
Other field crops	12	6	9	11	16
Tomatoes	38	44	19	19	44
Other vegetables	56	63	34	40	56
Olives	40	5	23	8	37
Grapes	18	10	14	22	30
Stone fruits	4	1	1	1	1
Others (figs, nuts and pomegrants)	7	3	6	4	10

The average yield per dunum of selected crops were as follows:

Crop	Average yield Kg/dunum. (1) 1974	1975	1976	1977	1978	Average 1974/78
Wheat	96	38	41	48	36	52
Barley	59	20	13	22	25	28
Lentils	143	33	39	45	55	63
Tomatoes	730	916	904	655	1157	872
Olives (Bearing trees)	180	22	104	36	167	101
Grapes	409	151	451	846	714	514
Stone fruits	100	71	400	333	222	225

(1) Source: Department of Statistics Yearbooks. Amman, Jordan.

As can be seen from the above, the levels of production in the uplands are very low indeed. Compared to other levels of production as shown below they reflect a situation which warrants greater attention.

Comparison of level of production average for selected crops grown in Jordan (figures are average of 1974-1978) (All figures are from FAO Yearbooks of production)

	Kg / dunum				
	Wheat	Barley	Lentils	Grapes	Tomatoes
World	170	192	62	576	1999
Jordan	59	40	61	576	1423
Syria	100	69	79	349	1461
Turkey	164	169	108	411	3186
Australia	136	276	-	1095	2047
U. S. A.	203	235	115	1480	4[illegible]
Mexico	358	158	72	966	1[illegible]

The following observation may throw light on why yields in Jordan are so low:

1. Perhaps the most significant factor which contributed to low yields was the low rainfall received in many of the agricultural areas during the period 1975-1978. The effect of rainfall on yields can be seen when production levels of 1974 which was a good rainfall year are compared with levels in other following years.

2. Crops like wheat, barley lentils and vegetables are often planted in sloping areas which are not suitable for the cultivation of such crops. The yields of such areas are added together with the yields of better producing areas for the same crop and reported as average by the concerned departments.

3. There are farmers who use good inputs for production as well as modern methods and hence obtain high yields. These farmers, however, are not very many and the majority of farmers use meager inputs, do not follow proper methods of cultivation and hence obtain very low yields.

The higher yields of progressive farmers which reflect more accurately the potential of the agricultural land productivity are lumped together with low yields again and reported as one figure for the whole country. There are cases where production levels such as 250 kg/dunum of wheat, 2500 kg/durum of tomatoes and one ton of peaches/dunum are reported.

It is apparent that the returns of farmers in the rainfed areas are very difficult to assess. However the general picture suggests that the returns are very low especially for farmers who plant annual crops only. The returns from wheat for example as calculated from reported levels of production range from 12 to 2 J.D. net (1) with an average of 3 J.D. for the period 1974-1978.

4. Land Holdings:

Agricultural land in Jordan (excluding the Jordan Valley) is owned according to the "Meeri" land ownership laws which give the owner freedom of action in whatever land he obtains title for within the limits of the prevailing laws. The land is also subjected to the laws of inheritance and practiced tradition which calls for distributing and dividing the inherited land among the heirs. This system has produced a situation where land holdings in rainfed areas are in the majority small and fragmented. The results of the 1975 agricultural census indicate that the upland agricultural area is divided into about 45 thousand holdings and 110 thousand pieces. The average size of each holding comes to 80.4 dunums and average pieces of land in each holding is 2.44 dunums. The land area per holding ranged from 1.2 to 14867 dunums. About 17% of the agricultural area was owned by 450 (1% of land holding number) owners while the other 83% was distributed over the other 44550 owners. Furthermore, about

(1) Calculated from reported results of agricultural production sample survey and current domestic prices.

63% of all land holdings had an area of 50 dunums or less. Based on the records of the department of land and survey, the situation of fragmentation worsened after 1975, leading to a greater number of holding with small areas and to a greater number of pieces.

USAID COMMENT

The following table giving distribution of farm holdings by size is taken from the 1978 Department of Statistics Survey.

Farm Size (Dunums)	Percent of Farms
000-020	37.9
021-050	23.3
051-100	17.4
101-200	11.7
201-500	7.3
over 500	2.3

Median size 33 dunums.

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Several studies, which have been carried out to determine the economic and technical feasibility of developing the rainfed areas, have indicated that fragmentation of land holdings is a major constraint facing any development. Based on the national average of per capita income in 1978 which comes to about 208 J.D. per year and based also on the average net productivity per dunum of rainfed areas which comes to 5 J.D. a farmer family of five members should cultivate about 200 dunums each year in order to gain an income equal to the national average (1). The number of holdings with 200 or more dunums were reported in 1975 to constitute about 9% of the total. This shows clearly the magnitude and complexity of the problem present in rainfed agriculture.

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(1) The 5 J.D. net income per dunum was calculated on basis of 5 year average productivity of rainfed areas.

USAID COMMENT

5. Livestock in the Uplands:

Almost all livestock is produced in the uplands. The poultry industry accounts for almost 50% of Jordan's livestock production. The poultry industry (eggs and meat) is private, large, relatively dynamic and modern and meets domestic needs. The industry has the resources to obtain needed technical and capital inputs.

The only other significant livestock production is of sheep and goats. Together sheep and goats account for perhaps 40 to 45% of livestock value added. Production is largely by extensive grazing of natural forage in a system derived from pastoral nomadism. Relatively little supplemental feeding is done, reportedly because of the very high costs of feeds which must be largely imported.

From an analysis of aggregate statistics, livestock production is rather risky given a situation of uncertain rainfall. For example using the 1975 agricultural census, an FAO team computed the following ratios of gross value of production to gross costs of production. These costs apparently excluded labor costs.

	Ratio of Gross Value of Production to Gross Costs
Crop production	5.16
Livestock production	2.02

That is, while costs of crop production average less than 20% of the value of the final product, for livestock costs are one half of gross value. These calculations are for average rainfall years. With a 30 to 35% chance of significantly below average rainfall for any year it is seen that the chances are good that the return on livestock will be very low, even excluding labor costs.

Jordan now imports four million dinars worth of meat (excluding poultry) each year. Despite this domestic market, a recent British consulting firm study of livestock potential in Jordan concluded, given the costs of imported feed, that there were few, if any, prospects for financially viable projects to increase production.

It appears that the current pattern of livestock production derived from the pastoral nomadic heritage is not one on which it is possible to build a future more efficient livestock production sector. Rather, as in upland crop production fundamental changes such as land consolidation will have to take place first.

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6. Assessment of Rainfed Agriculture and its Potential:

With the objective of optimizing productivity in rainfed agriculture, teams from the Arab Organization for Agricultural development (AOAD) have produced a three volume study covering all rainfed areas. The study teams recommended a comprehensive and integrated development plan to be a carried out over a period of twenty year. The following is a summary of the measures and main recommendations of the studies:

1. Land holdings:

Small land holdings, so common in rainfed agricultural lands, should be reorganized so that new holdings which constitute economically productive units are found. This may be achieved through laws similar to those enacted for the Jordan Valley or, through cooperatives where small land holdings are grouped together in larger units of production. Only a few of the owners of such holdings will farm the new units.

2. Land use:

The present status is reported to be totally unsatisfactory and should be changed to a pattern which is more appropriate. Crops are often planted in unsuitable agro-climatic regions as well as in the wrong topographic areas. These are 780 thousand dunums which are suitable only for the cultivation of fruit trees because of their sloping nature (9 to 25% slope). It was estimated that 450 thousand dunums of these lands are at present without trees. The present land use pattern of these areas, which is cultivation with annual crops, does not only deteriorate this resource further but constitutes the least productive method of lands use. Furthermore, wheat as an example of annual crops, is often planted in areas with an annual average rainfall of less than 300 mm. Such

an amount is considered, under the condition of Jordan. to be below the minimum amount of rainfall required to raise a productive crop of wheat. The new proposed plan recommended in the studies calls for the expansion of fruit trees to reach a total of 900 thousand dunums while cultivating the rest of the area with annual crops to be distributed according to agroclimatic conditions among other recommended factors.

3. Agricultural services:

The present status of various agriucltural services are below the needed levels. Such services which include credit, availability of production inputs at the proper time and with moderate prices, research, extension and marketing should all be improved to help attain production levels which are closer to potential.

4. Soil and water conservation:

Present measure taken to conserve soil and water through terracing and contouring of sloping lands are not satisfactory. Furthermore present methods of soil preparation, crop rotation and ploughing are to a large extent not compatable with the nature of land resources and the limited rainfall. All of these activities should be improved and expanded according to the proposed detailed plans related to these activities.

In response to the recommendation of these studies the Government of the HKJ (Hashemite Kingdom of Jordan) has asked a team from the World Bank to study the feasibility of executing an integrated plan to develop rainfed areas. A team from the Bank has already started the study and the findings will soon be submitted to the Government.

USAID COMMENT

In summary upland agriuclture in Jordan has, in the past, been subsistence and traditional, predominantly either wheat or pastoral grazing of livestock. Such agriculture survives only

when there are no alternative income/employment opportunities. Since 1973 it is fair to say that virtually any able bodied person desiring employment in the non-agricultural sector can find a job. That is, the economic condition necessary for the pre-1973 agricultural patterns in the upland areas no longer holds true.

Tradition holds some into past patterns (especially older persons) despite what may be the economic inconsistency of these patterns. But, a period of radical change is occuring -- land is going out of production or out of wheat to tree crops. Farmers are leaving agriculture. But, there is still a limited understanding of what the new patterns of upland agriculture will be. There has not yet been the detailed analyses nor the empirical experiments to determine what will fit the new economic environment. The conclusion that, at least for field crops, farm land must be aggregated into considerably larger units than is now the case, if economic incentives are to be present, does appear certain.

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USAID COMMENT

7. A Special Upland Case -- Watershed Protection and Development:

Protection and development of the watershed is not only an agricultural question. Rather it relates to the total water sector. Because of the USAID's interest in the overall water sector particular attention must be given to understanding the effect of the state of the watershed on water availabilities.

The inhabited area of Jordan is largely very hilly. And although the climate is rather arid the rains which do occur take place during a short period in the winter and are often quite heavy. At one time many of the steeper slopes in Jordan were forested; today, however, mature forests exist only in a few isolated areas. Some reforestation has taken place. but in recent years reforestation efforts seem to have slowed. Rapid urbanization and extensive construction have further disturbed the watershed.

Today, heavy rains are followed by very rapid run-off. Extensive erosion is threatened and water storage facilities are faced with heavy silting problems. In some cases agricultural lands and infrastructure in the Jordan Valley, which receives most of the run-off, is threatened from flash floods

and deposition of large quantities of water carried silt, rock and gravel.

Water is a very scarce resource in Jordan. Rapid run-off of the limited rains and the silting of water reservoirs which accompanies the rapid run-off threaten Jordan's efforts to fully utilize its limited available rainfalls. However, there is not available a current and thorough study of the relationship between the watershed and the long range availabilities of capturable water in Jordan. Greater attention needs to be given to what should be done to maximize water capture.

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C. JORDAN VALLEY AGRICULTURE

USAID COMMENT

Introduction:

The average return per dunum cropped in the Valley is many times as high as is the case in the uplands. This results from at least three factors -- reliable irrigation water supplies which give higher yields, the production of higher valued crops and producing during the off-season with the resulting higher prices. Thus in contrast to the uplands with its low total value of production even given the small farm units agriuclture in the Valley is very lucrative. While field crops dominate area planted in the uplands, they constitute a minor part of plantings in the Valley. In 1978 about 15% of land was planted to wheat, about 6% to barley and only about 22% of land to all field crops including wheat and barley. Moreover, by value the contribution of wheat is even less at not more than 4%.

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The Jordan Valley, often refered to as the agricultural gift to Jordan, is well known for its mild winters during which vegetables and semi-tropical fruit trees can be grown. Because of the low rainfall (1) received in the Valley and of the high rate of evapotranspiration, the cultivation of crops particularly vegetables and fruit trees is not possible without additional water. The potential cultivable area in the Valley comes to 360 thousand dunums but only 263 thousand dunums were

cropped in 1978 because of the limited amount of water available for irrigation. In the last twenty five years, several developmental projects were executed by the Government of Jordan aided by several grants and loans from other countries. Such plans included redistribution of land ownership, reorganizing and consolidation of farm sizes, the establishment of several irrigation schemes and more recently, the implementation of an integrated and comprehensive social and economic developmental plan. The land area which received additional water from irrigation schemes has increased over the years and reached a total of 240 thousand dunums in 1978. The irrigation water that was made available however, is not sufficient to irrigate present areas all year around. Furthermore, the Jordan Valley Authority (JVA) the institution responsible for the development of water resources and for water delivery and distribution has been facing difficulties in supplying enough water to meet the expanding demand of farmers for irrigation water. To expand and develop water resources JVA has proposed an extensive plan to increase water resources through building the Maqarin Dam, extending the East Ghor canal further south to the Dead Sea, and improving water delivery systems and irrigation methods. The proposed plan will increase areas which will receive water all year around and will expand the cultivated area to 310 thousand dunums.

1. Land Holdings in the Valley:

Ownership and farm sizes in the Jordan Valley are regulated by laws which were specially enacted in the late fifties and early sixties. The laws called for consolidating fragmented land holdings and for putting a minimum area of 30 dunums on any farm receiving water from new irrigation schemes (with a maximum size limit of 200 dunums). The laws were applied on the irrigated areas of the northern part of the Valley and will be applied to other areas once regular water distribution starts from new irrigation schemes.

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(1) Average annual rainfall is 350 mm in the northern part of the Valley, 260mm in the middle and 100 mm in the south around the Dead Sea.

The land holding distribution both in areas receiving water from irrigation schemes and in those irrigated privately were surveyed in 1978 by the Dept. of General Statistics and the results were as follows:

Distribution of land holdings in the Jordan Valley in 1978.

Size of land holding in dunums	North of Valley		Middle of Valley		Total			
	No. of holdings	Area in dunums	No. of holdings	Area in dunums	No. of holdings	Per-cent	Area in dunums	Per cen
30 and below	1393	19676	1643	23394	3036	52.5	43070	18.
30-50	919	33852	615	21506	1534	26.5	55358	23.
50-100	470	34165	370	24604	840	14.5	58788	24.
100-200	157	21484	104	13433	261	4.5	34917	14.
200-500	51	16501	41	10798	92	1.6	27299	11.
500 and above	6	6870	10	10929	16	0.3	17799	7.
Total	2996	132568	2783	104663	5779	100%	237231	100
Average area		44.3		37.6			43.0	
Median area		33.2		26.5			28.2	

As can be seen from the figures above, about 40% of the farm sizes are between 30 to 100 dunums. The small farm sizes in the north (below 30 dunums) are a carry over of special social and economic conditions of owners, prevailing when the new laws were implemented. Present and future plans call for reassessing the small farm sizes with the view of minimizing the number of such farms. It is worth while mentioning here that the laws of land ownership in the Valley were based on the principle that the farm size of 30 dunums is an economically viable unit of cultivation under irrigated conditions of the Jordan Valley. Furthermore, expected returns from such a minimum size will be high enough to secure an equitable income to the farmer. Perhaps the most important aspect of the law is the prevention of further fragmentation of new units. Once the unit size and location has been determined by the law no change is allowed under the law. These conditions are not applicable in the rainfed uplands as has been mentioned previously.

USAID COMMENT

In terms of area, farms in the Valley are rather small with the median size being about 28 dunums. However, a 30 dunum farm of tomatoes using high yielding production techniques can constitute a large business with production costs totaling $ 15,000 or more and net income approaching, or even exceeding $ 30,000. In contrast 40 dunums of wheat will yield a very marginal income using traditional cultivation techniques. 30 dunums of Spring Season tomatoes, will only produce a modest income by Jordanian standards (perhaps $1,800 to $2,500). Because of these variations in costs and returns even on farms small in area, the convention of using land area to represent the "small farmer" can be highly misleading. Some farmers cultivating quite small areas can be prosperous, medium sized businessmen.

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2. Crop Distribution:

Although plans of the Jordan Valley Authority call for regulating crop distribution and cultivation in the Valley through specified cropping pattern, as yet decisions of what crop to plant and where abouts are still in the hands of the farmers (except for banana and citrus in the north). The crops cultivated in the Valley and their areas for the period 1974-1978 were as follows:

Cropping pattern in the Jordan Valley during 1974-1978

	(---------- tons of production						---------
Crops	1974	1975	1976	1977	1978	Average	Per cen
Tomatoes	57	38	47	52	59	51	1
Eggplant	37	18	24	19	26	25	
Cucumber	3	7	9	6	11	7	
Squash	6	10	23	23	24	17	
Potatoes	1	3	7	10	6	5	
Cauliflower & Cabbage	8	2	2	3	10	5	
Other Vegetables	42	53	32	32	32	38	1
TOTAL Vegetables	154	132	145	146	168	148	5
Citrus	30	17	19	20	23	22	
Bananas	4	3	2	2	7	4	
Other Fruits	3	2	2	2	2	2	
TOTAL Fruits	37	26	23	24	32	27	1
Wheat	104	70	62	51	43	66	2
Other field crops	25	23	27	24	20	24	
TOTAL Field Crops	129	94	89	75	63	90	3
GRAND TOTAL	320	252	257	245	263	267	10

Over the last five year period the average areas cropped with the three major crop types were 56% vegetables 10% fruit trees and 34% field crops. The cropped area averaged 267 thousand dunums during 1974-1978. The largest cultivated area was in 1974 when rainfall was high and larger areas were planted with wheat. Such areas do not normally receive additional water for irrigation. The pattern of areas planted with various crops varied from year to year but the main trends were the following:

1. Areas planted with tomatoes were high throughout the five year period and made up 19% of the total average area planted with vegetable.

2. Areas planted with squash increased steadily from year to year. Squash was the third most widly cultivated vegetable crop after tomatoes and eggplants. The average area was 6%.

3. Areas planted with fruit trees increased somewhat but continued to be limited.

4. Except for 1974 in which field crops were widely cultivated, the area planted with field crops decreased steadily during the period 1975-1978.

5. In 1978 vegetables in the Valley occupied 62% of the total cropped areas, fruit trees 11% and field crop 27%.

USAID COMMENT

Field crops, in economic terms, are much less important than indicated by the percent of area cultivated. Field crops constitute around 4% to 5% of gross value of production in the Valley.

The data on productivity in the Valley are derived from very small sample surveys. One must be very cautious in drawing conclusions especially about time trends, for this reason. In particular, the pattern in the data used in this section, which shows across the board sharp increases in yield in 1978 for crops grown in the Jordan Valley does not, to our knowledge, reflect either changes in weather nor widespread changes in cultivation practices. We cannot explain this apparent upsurge and therefore suggest that it not be viewed as a trend until further data are in.

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3. Production:

Upon the examination of available statistics on production of various crops in the Jordan Valley, and in comparing these production levels with yields in other countries with somewhat similar conditions, the general conclusion is that the levels obtained in the Jordan Valley are quite low. Inspite of this, the total production value of crops produced in the Jordan Valley, in 1975 for example, constituted 40% of all total plant production in Jordan and more than 80% of agricultural exports.(1) The production totals for the main crops during 1974-1978 were as follows:

Crop	Total production in ('000) tons 1974	1975	1976	1977	1978
Tomatoes	52	67	51	51	144
Eggplants	28	33	40	22	60
Cucumber	1	10	9	6	17
Squash	5	4	15	23	41
Cauliflower & Cabbage	10	5	2	5	24
Potato	3	4	11	12	8
Citrus	31	11	13	33	70
Wheat	17	8	6	5	6

The levels of production were as follows:

Crop	Average yield per kg/dunum 1974	1975	1976	1977	1978	Average 74-1978
Tomatoes	912	1763	1085	980	2440	1436
Eggplants	957	1833	1666	1158	2307	1544
Cucumber	333	1428	1000	1000	1545	1061
Squash	833	400	652	1000	1708	919
Potato	3000	1333	1571	1200	1333	1627
Cauliflower & Cabbage	1250	2500	1000	1366	2400	1763
Citrus	1033	647	1440	1650	2043	1363
Bananas	1000	2000	500	1500	2900	1580
Wheat	163	114	96	98	139	122

(1) Alternative Strategies of Agriculture in East Jordan, ECWA/FAO, 1977.

Yields of various crops flunctuated from one farm to another and from one area to another. The range of the average levels of production reported for selected crops in the two parts of the Valley were as follows:

Range of average yields reported in Kg/Dunum

Crop	1974	1975	1976	1977	1978
Tomatoes	0859-1030	1734-1796	0930-1252	0903-1036	2431-246
Eggplants	0610-0878	1740-1862	1510-1850	1001-1240	2123-214
Cucumber	0409-0436	1270-1444	0868-1092	0821-1061	1242-180
Squash	0521-1190	1128-1199	0611-0684	0931-1253	1563-194
Cauliflower & Cabbage	2451-2868	2877-3407	1561-1666	1215-2933	2900-475
Citrus	1032-1342	0932-1147	1394-1450	1569-2142	1844-214

The following observations may be made on production and production levels of various crops in the Jordan Valley.

1. Levels of production reported above are usually compiled from averages of production in the two main areas of the Jordan Valley, the north and the middle and south. The range of levels shown above which represent the production levels for the two main areas of the Jordan Valley show great flunctuations in yield averages for the same crop and even in the same year. In addition. yield averages flunctuated from year to year with no particular trend. This is perhaps the most outstanding feature of production in the Jordan Valley. Farmers in the same vicinity attain quite different levels of production in the same season and under similar soil and environmental conditions. Among the factors contributing to this unequal distribution of production as reported by a study made by the Faculty of Agriculture (1) are the following:

(1) Akram Steitieh and others. A manual for the main Vegetable crops grown in the Jordan Valley, Faculty of Agriculture, University of Jordan, 1978.

a) Different farmers use different production inputs in both quality and quantity. This is usually linked with their financial capabilities and credit services available to them.

b) Some farmers follow modern methods of production while many do not.

c) Some of the high levels of production particularly for tomatoes and cucumber in 1978, are a reflection of plastic agriculture which became widely spread in the middle Valley.

d) Farmers face many economic and technical production problems and are not helped satisfactorily to overcome them.

2. Many of the measures taken by the Government and other institutions did not show their impact on improving conditions and productivity as yet. Such measures include the formation of the Jordan Valley Farmers union association, the establishment of packing and grading centers, the new irrigation schemes which include sprinkler systems and the research activities of the Faculty of Agriculture.

3. The level of technical services is not satisfactory. This includes soil testing, pest diagnosis and extension.

4. Production Returns:

Farmers' returns in irrigated areas in the Jordan Valley were considerably higher than in the uplands. In 1975, the average net return per cropped dunum in the Jordan Valley was 29 J.D. The return from different sizes of farms will be on the average as follows:

Farm size in dunums	Average net return JD for whole farm	Per capita income of farmer family with seven members/JD
10	290	41
20	580	82
30	870	124
32	925	133*
40	1160	165
50	1450	207
100	2900	414

The average national per capita income in 1975 was 134 J.D. A farmer having a family size of seven members should have cultivated a farm size of 32 dunums on the average in order to attain an income equal to the national per capita income. At that time about 20% of the Jordan Valley farmers had a farm size of less than 30 dunums. They all have attained a per capita income lower than the national average if their family sizes were seven members and above. All of the previous calculations are based on averages of total production of crops. However, farmers cultivating different crops attain different income. In analyzing farm gate prices of various commodities for the years 1974-1977, the return from these commodities per kg. produced, flunctuated greatly from year to year and from one season to another within a year. The farm gate prices for the various products produced in the Jordan Valley in the period 1974-1977 were from high to low as follows: Bananas, Cucumber, Citrus, Potatoes, Tomatoes, Squash, Eggplants, Cauliflower, Cabbage. The average production per dunum of these crops during 1974-1978 were from high to low as follows: Cabbage, Cauliflower, Potatoes, Bananas, Citrus, Eggplants, Tomatoes, Cucumber, Squash. The pricing procedures of vegetables and fruits followed in Jordan are set by the Ministry of Supply. These procedures always put a ceiling on consumer prices of these commodities without specifying a minimum return for the farmer. This has tended to create a "political market" rather than an "economic market" for vegetables and fruits. This interference, although justified by certain consideration, has been responsible for limiting the returns to the farmer and in particular to smaller farmers. In recent years and especially in 1979, the only measure taken by the Government to stabilize minimum prices of any vegetable was taken in 1979 in the case of tomatoes. The Government supported tomato paste factory offered a minimum factory gate price of 50 J.D. a ton of tomatoes. This is a very positive step in promoting tomato production which is considered in Jordan as a commodity for all people. Fresh tomtoes in Jordan unlike many other countries, are used quite commonly in the diet of all the people especially the low income classes.

USAID COMMENT

The above data presented by the Faculty of Agriculture are very useful in indicating average returns. However, as noted there is large variation in production methods, with a resulting large

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Production costs vary enormously. Traditional practices may involve production costs of 30 to 40 J.D. per dunum. At the other end of the spectrum highly sophisticated production techniques using staking, plastic houses or mulching, drip irrigation and so forth could entail production costs of 150 J.D. or more per dunum. Depending on season, yield and productions a dunum of tomatoes can produce net returns from 30 to 40 J.D. to as high as 200 J.D.

These data can only be considered as illustrative. But they do show that for the low technology case farmers obtain a rather good return even though they may be producing for a market where prices are relatively low because of plentiful supply. Input costs are rather high for the highest technology production package perhaps reducing the financial attractiveness of such approaches for use during the peak production season when expected prices are lowest, but for off-season production the financial return from the use of the high technology packages is very attractive.

Off-season, with efficient employment of a high technology production package the tomato farmer could readily clear some $ 700 per dunum or $ 7000 per hectare. It is these economics which undoubtedly account for the willingness, of at least the larger farmers, to adopt innovations which it appears will improve yields.

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5. Changes in the Agricultural Scene in the Jordan Valley:

1. Plastic agriculture:

Growing vegetables, mainly cucumber and some tomatoes, under plastic tunnels and houses has expanded year after year in the middle part of the Jordan Valley. In 1975 plastic agriculture was used only by few farmers and did not exceed a few dunums. In 1978, the plastic tunnels occupied six

thousand dunums and plastic houses 741 dunums[1]. Figures obtained from trade companies indicated that additional plastic houses covering about 600 dunums were sold to farmers in 1979. This type of cultivation is capital and labor intensive but, at the same time, has proven thus far to be very productive and highly profitable (it enhances production in the cooler months when prices are highest.) In addition it does save water when compared to open field cultivation (2). The cost of production and returns of open field and plastic house cultivation in 1978 were as follows:

Type of cultivation	Investment Costs JD/Dunum	Net Income JD/Dunum	Crop Cultivated
Open field, surface irrigation	-	35 to 45	General
Plastic tunnels	87	163	Cucumber
Drip irrigation	180	209	Tomatoes
Plastic houses and drip	1900	673	Tomatoes

2. Plastic mulching and drip irrigation:

Covering the soil with black plastic mulch under plastic houses and in open field is a widely spread practice in the Jordan Valley. This practice is often combined with drip irrigation systems. In 1978, the total area irrigated with drip irrigation reached 3514 dunums of which 85% was planted with either tomatoes or a mixed culture of tomatoes and cucurbits.

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(1) Akram Steitieh and others, Faculty of Agriculture reports 1978.

(2) Othman Judeh, comparative consumption of water of various methods under plastics. Faculty of Agriculture reports 1978.

3. Structure of farmers:

There is an increasing number of BS or MSc degree holders in agriculture who are becoming fully or partly engaged in vegetable cultivation in the Valley. This is especially so in the cultivation under plastic houses. Some of these new "farmers" own land in the Valley, but many rent land for several years. There are no published figures on the numbers of these new "farmers" in the Valley but their increasing number constitutes quite a positive development.

6. Assessment of Potential, in View of:

1. The new changes that are taking place in the Valley, which were discussed here above.

2. The new measures taken and the facilities which have been or are being established in the Valley which include the following: New wide road crossing the Valley from north to south, electrification of the whole Valley which is near completion, the completion of the packing and grading center in the middle of the Valley, the establishment of several housing schemes for public sector employees, the establishment of schools and health clinics, the increased Government support to the Jordan Valley Farmers Association, the establishment of several government supported plants to manufacture containers for marketing Jordan Valley products and the increased support of the Government and public sector institutions to improve farmers credit sources.

3. The establishment of the Agricultural Council in 1979 which is the first agricultural policy making body to be formed in Jordan (see agricultural institutions).

4. The increasing evidence of high production levels obtained by many farmers especially when modern methods are practiced, and

5. The new irrigation schemes which are about to be completed in the various parts of the Valley during 1979-1980.

In view of all the above developments, which set a better stage for the reorganization of agricultural services in the Valley, and which also create a better environment for more

efficient impact of efforts aimed at removing constraints, the opportunity of increasing productivity and maximizing the potential of the resources in the Jordan Valley is very probable and quite promising. It is difficult to either quantify the increased productivity or to put a ceiling to the potential, but efforts must concentrate in increasing equity among farmers with the objective of helping those who at present obtain low levels of production to obtain higher ones. Such high levels of production are already there in the Valley even though they do not constitute the optimal potential. What is needed are measures which will bolster the activities of the aggressive and capable farmers but more so will enable the small and less capable ones to overcome the constraints facing them in attaining higher returns from their agricultural activities. Among the needed measures to minimize the effects of major constraints facing farmers in the Jordan Valley are the following:

1. Strengthening the research activities which are oriented to produce answers to questions such as control of virus diseases of tomatoes which have been very destructive in the last four years, contol of soil pest disease complex. proper pesticide application schedules, proper fertilizer application practices, optimal water application methods, and optimal packages of horticultural production methods.

2. Stengthening the extension and adult education programs with the objective of dessiminating already present information and future findings and to improve the know-how of the less developed farmers.

3. Stengthening of efforts to improve marketing procedures and facilities.

4. Minimizing the dependency of small income farmers on middle men through creating alternative options for them to secure production inputs and credit on better terms.

D. AGRICULTURAL INSTITUTIONS SERVING AGRICULTURE

There are nine bodies and/or institutions which are directly concerned with one or more of the functions involved in the development and services of the agricultural sector in Jordan. These are:

1. The Ministry of Agriculture
2. Jordan Valley Authority
3. University of Jordan, Faculty of Agriculture
4. Agricultural Credit Corporation
5. Jordan Cooperative Organization
6. Jordan Valley Farmers Association
7. Agricultural Marketing Corporation
8. Natural Resources Authority
9. The Agricultural Council

In addition, the private sector, represented by several agricultural trade companies. several manufacturing companies of agricultural inputs and a powerful group of commission merchants (middlemen) play an important and active role in providing farmers with production inputs, marketing facilities and, to a great extent, in influencing the decisions of farmers in carrying out their agricultural activities.

The following is a brief presentation of the nine bodies and/or institutions with a focus on their functions:

1. Ministry of Agriculture (MOA):

The MOA is the oldest of the institutions established in Jordan to serve agriculture. The main activities of the MOA in recent years have focused on the following:

a) All regulatory matters related to the export and import of agricultural commodities and agricultural production inputs. In several areas, the Ministry of Supply, the Ministry of Economy and Industry, and the Agricultural Marketing Corporation coordinate with MOA in taking some decisions.

b) Distribution of fruit tree seedlings at subsidized prices. This activity is linked with a cooperative program which the MOA is implementing with the World Food Program (WFP). In 1978, MOA signed an agreement with WFP through which the latter offered 12 million US dollars to be spent over four years to promote the development of sloping rainfed uplands. The program includes offering subsidies to farmers who engage in soil and water conservation activities (build terraces) on their land and plant it with fruit trees.

c) Implementation of the forestation and range management program. About one to three million seedlings of forest trees are planted each year. The total area allocated to forestation in Jordan (sloping land of 25% and above) comes to about 1.3 million dunums. There are 300 thousand dunums which have been naturally forested, 200 thousand dunums which have forested, mostly since 1952. This leaves 800 thousand dunums to be forested in the future. The UNDP is preparing a program aimed at developing and managing the range lands. Once this program is approved the MOA will be the implementing agency. The program will be financed cooperatively with the UN Development Fund (UNDP).

d) Providing veterinary services, extension and research services. There are few complaints from all concerned about the veterinary services. However extension and research services suffer from inefficiency and need reorganization, reorientation of scope and more clarity of mission (1). The British Overseas Development Ministry plus the German Government offered grants to the MOA to strengthen the veterinary services.

e) As a result of a recent decision by the Agricultural Council the MOA will be responsible to propagate and provide a major part of the improved wheat seed needed by the farmers. The Government has proceeded already to buy two pieces of land (about 5 thousand dunums) in high rainfall areas for seed production.

2. Jordan Valley Authority (JVA):

JVA is the institution which is primarily responsible for the development of water and land resources in the Jordan Valley. Recently, the scope of JVA's responsibility has been widened to include the Southern Ghors and the development of the Wadi Araba in the South. In the last four years, JVA has been administering a comprehensive social and economic plan for the development of the Jordan Valley. Although their mandate to carry out most activities is clear by law, yet the mandate for carrying out agricultural services in the Valley has not been so clear and proved to be a painful experience. There have been some positive developments in that direction. Perhaps the most important, provided it gets continued Government support, is the establishment of the Jordan Valley Farmers Association (see JVFA). In addition JVA has embarked on a cooperative effort with the University of Jordan (Faculty of Agriculture) to implement a problem solving research plan in the Valley. The plan will be carried out on a contractual basis in which the responsibility of each institution is clear.

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(1) Thabet, Kamal, Agricultural Research in Jordan. FAO.

3. The Faculty of Agriculture, University of Jordan (FOA):

The FOA was established in 1972 by the University of Jordan with the objective of leading a program of teaching, training, research and information aimed at serving the agricultural sector in Jordan. The Faculty has implemented a program of facility building which will serve its objectives with the help of several agencies, including USAID. The program is 90% completed and includes the main laboratory and classroom building on the UOJ campus, a greenhouse unit, a machinery unit, a poultry unit, sheep unit and a training center in the Jordan Valley. Manned by about 40 Ph.D. holders, 30 MSc assistants and 40 technicians, the FOA is presently implementing an educational program leading to BSc and MSc degrees in three major disciplines of agriculture, namely plant production and protection, soil and irrigation, and animal production and health. In the last three years, the research activities of the Faculty have increased and in 1978 included 54 research projects of which 35 were implemented in the Jordan Valley. Immediate future plans of the Faculty include a BSc program in agricultural economics, expansion of research activities in the Jordan Valley and the engagement in an information and field demonstration program in the Valley. The budget of the Faculty which ranges from $ 1.5 to 2 million a year is divided into 65% for research and 35% for teaching.

4. Agricultural Credit Corporation (ACC):

ACC is at present the main institution responsible for providing credit to farmers. Financed by loans mainly from outside and supported by the Government, ACC provides short and long term loans to farmers on a banking system basis. The activities of ACC in the period 1974-1979 included issuing almost 7500 loans to more than 5000 farmers accross the country. The value of the loans came to about 13 million J.D. for the period 74 to 78. The activities supported by ACC were as follows:

Credit provided to farmers by ACC during the period 1974-1978

Source: ACC Annual Reports 1974-1978.

Activity Supported	Total sum credited in ('000) J.D for the years 1974	1975	1976	1977	1978
Development of rainfed areas	262	135	89	102	1[illegible]
Development of irrigation activity	355	290	282	406	10[illegible]
Development of poultry & Animal prod.	401	968	996	998	11[illegible]
Agricultural Machinery	380	629	658	220	186
Seasonal Loans	219	288	353	388	553
Others	571	180	443	253	109
Total No. of farmer credited	2122	1617	1412	1166	1078

5. Jordan Cooperative Organization (JCO):

JCO is primarily responsible for promoting cooperative work accross the country with major emphasis on rainfed rural areas. The work of JCO includes providing member farmers with agricultural inputs at prices lower than the open market. Such inputs include machinery, seeds, fertilizers and pesticides. Recently JCO organized vegetable marketing cooperative in the Southern Ghors (South of the Dead Sea). In 1979-1980 the budget of JCO has been increased through loans from Iraq and the United Kingdom (about 10 million J.D.) and through Government support. The work of JCO will concentrate more in providing short term credit to farmers, promotion of agricultural cooperatives in the rainfed areas with the objective of consolidating land holdings of small farmers into larger production units, and in providing agricultural production inputs at a larger scale and with competitive prices. The work of JCO during 1975-1978 can be summerized as follows:

	1974	1975	1976	1977	1978
Number of cooperatives	124	123	115	131	142
Number of members	4494	6224	9109	10435	nry*
Total sum of loans in ('000) J.D.	809	2182	2337	1922	2818

* nry: not reported yet.

6. Jordan Valley Farmers Association (JVFA):

JVFA is a Government sponsored, but non-governmental association, which was established by a special regulation to organize the farmers of the Jordan Valley. JVFA at present is not an effective institution but has the support of the Government to play a major role in improving social and economic conditions of the farmers in the Jordan Valley. Among present and future responsibilities of JVFA are:

a) Extending credit to the farmers as well as providing farmers with production inputs in competitive prices.

b) Administering packing and grading centers which are planned to receive all Jordan Valley agricultural products.

c) Providing direct services to farmers on the basis of competitive fees. Such services include use of machinery used in implementing various agricultural practices and distribution of seedlings.

d) Representing farmers in all concerned circles in matters which will improve conditions of the farmers.

7. Agricultural Marketing Corporation (AMC):

This organization has gone through several changes in functions and administration. Its original function was to improve and administer marketing procedures and facilities of agricultural products. Its present status is not clear and its role was limited to a few attempts of exporting certain agricultural commodities, importation of seed potatoes and seeking outside markets for Jordanian vegetables and fruits. Its functions overlap with JVFA, JCO, MOA and Ministry of Supply.

8. Natural Resources Authority (NRA):

The function of this Governmental institution has also gone through many changes. At present, NRA is responsible among other things for the regulation and development of underground water in the uplands. Its work is becoming more and more related with the Water and Sewage Authority and is currently

focusing on the development of the mineral resources of the country. Since water for household and industry is exhausting all available water resources in the uplands, NRA is abandoning little by little its original activities in developing agricultural irrigation schemes in the uplands. All of the activities of NRA in the Jordan Valley in the Southern Ghors, and in Wadi Araba have recently been taken over by JVA.

9. The Agricultural Council:

This Council was established in 1979 through a special bylaw to address policy issues in the development and service of the agricultural sector. The Council is formed as follows:

Prime Minister as Chairman, Minister of Agriculture as Vice Chairman with 15 other members, who are:

Minister of Supply, Minister of Economy and Industry, President of JVA. President of National Planning Council, Director of ACC, Director of JCO, Dean of the Faculty of Agriculture (UOJ), President of NRA, President of JVFA, Director of AMC, Head of Agricultural Engineers Syndicate, two members from the farmers, two members from the MOA. The objectives of the Agricultural Council as outlined in the by-law are as follows:

a) To decide agricultural policy within the framework and general objectives of the country's development. The agricultural policy should address the following issues:

1) Policies concerning plant and animal production.
2) Policies concerning marketing, production inputs and prices.
3) Policy related to the use of agricultural resources which include agricultural land, water, capital, manpower, and know-how.
4) Policy related to tax exemption, custom and duty exemption of agricultural products and agricultural production inputs.

b) To decide upon developmental projects and plans in the light of the general objectives of development.

c) To coordinate the activities and functions of the various institutions which are directly connected with the agricultural sector with the objective of consolidating efforts and avoiding duplication.

d) Suggest any new laws and bylaws or changes in the existing ones which are related to the development of the agricultural sector.

The Council, which should meet by law at least once a month has been meeting twice a month since its formation in April 1979. Almost all the meetings have been chaired by the Prime Minister. The Council has decided on a plan of work with priorities and has been handling several issues. The first priority issue which was systematically dealt with by the Council was the policy for marketing. Among the more important decisions taken by the Council thus far were aimed at the following:

a) Reduction of marginal costs of marketing with the objective of increasing farmers' net returns.

b) Strengthening grading and packing centers for vegetables and fruits in the Jordan Valley.

c) Promotion of wheat production through several measures, most important of which were the setting of a minimum price for locally produced wheat and production of improved seeds. The minimum price of wheat set by the Government for next season, 1980, was 90 JD ($297).

d) Strengthening coordination between agencies concerned in exporting and importing agricultural commodities.

e) No subsidy to production inputs, but support of any measure which will increase productivity.

f) Support JVFA and JCO in securing production inputs to provide to farmers at competitive prices.

The Agricultural Council may not solve all the institutional issues in the agricultural sector and may not also remove all constraints facing agricultural development and services as a

result of lack of coordination among institutions, but it is certainly the proper forum where such issues and constraints are to be tackled.

E. MANPOWER DEVELOPMENT IN AGRICULTURE

1. Present Activities:

There are two places at present where manpower development in agriculture is taking place in Jordan. These are namely the Faculty of Agriculture at the University of Jordan and the Ministry of Education.

a) Faculty of Agriculture:

There are two formal programs which are implemented by the Faculty of Agriculture, the first leads to a BSc degree in one of the following disciplines: Plant production and protection. animal production and health, soil and irrigation and nutrition. The program which extends to full four years concentrates on practical training and on the development of positive attitudes to field work in agricultural production. Students enrolled for the BSc degree spend one semester in the Jordan Valley University farm. They eat, sleep, learn and practice agriculture on the farm. The second program leads to an MSc degree in one of three disciplines: Plant production, plant protection and soils and irrigation. Students enrolled spend at least two years during which they take course work and carry out research which is often published in a thesis. Future plans call for expanding the BSc program to include agricultural economic and extension and the MSc program to include animal production (poultry), nutrition, agricultural economics and extension. Three BSc classes have graduated from the Faculty with an average of 30 in each class in the two disciplines. In the four coming years the graduating class will reach 100 in four disciplines. About 12 MSc students have graduated in 1979 and 15 will graduate in 1980. Sixteen of these are employees of the Ministry of Agriculture. The average intake, at present, of MSc candidates is 24 students in all the three disciplines.

b) Ministry of Education (MOE):

The MOE runs two agricultural schools at a high school level located in Rabba and Shubak in the South. Students finishing their 9th grade at the age of 15 join the schools in which they are taught science, humanities and agricultural subjects. At the end of the three year period, they set for a general certificate examination. Those who succeed are given the General Agricultural High School Certificate. The intake of the two schools totals 110 students a year but the schools do not attract good students. Although the training, is aimed at producing technicians for agricultural practices, still the performance of the graduates has not been satisfactory to the employers. There are only rare cases where the graduates from these two schools have actually gone back to farming. The graduates seek white collar and Government jobs and many of them are currently employed by the Ministry of Agriculture.

The MOE is currently reviewing the programs of the two schools with the objectives of changing the type and scope of training to better fit the needs of the agricultural sector.

2. Future Plans:

a) The University of Yarmouk in Irbid. The plans of the University call for the establishment of a Faculty of Agriculture due to start in 1982. The Faculty will concentrate on fields not covered by the Faculty of Agriculture at the University of Jordan. Such fields include veterinary science, forestry, range management, food technology, and home economic.

b) The Ministry of Education, JVA, and other concerned agencies have finally agreed that JVA will be responsible for the administration of the training center proposed to be established in Wadi Yabis in the Northern part of the Jordan Valley. The center will run inservice training programs for skilled laborers in the various fields needed in the Jordan Valley. It is expected that training in the center will start sometime in 1980.

c) The Ministry of Labor has recently started vocational training centers to train skilled labor in the various fields of industry and construction. Present plans do not include agriculture labor.

d) The employees of the various governmental institutions serving agriculture including the Ministry of Agriculture do not receive any inservice training in Jordan at present. Furthermore, there are no training programs available for farmers in the country. Several attempts have been made in the past but they all have been terminated. These included an FAO sponsored six month training course for the new BSc degree holders employed by the Ministry of Agriculture. The course was implemented at the Deir Alla station in the Jordan Valley for two years but was discontinued after 1976.

Several institutions and in particular the Ministry of Agriuclture are reviewing their inservice manpower development needs and there is a possibility that the Ministry and the Faculty of Agriculture will engage in a cooperative program to train Ministry employees in various needed fields. Priority will be given to training of extension agents.

PART II CONSTRAINTS, OPPORTUNITIES AND USAID RESPONSE

A. JORDAN AGRICULTURAL SECTOR IN PERSPECTIVE

Implicit in the synopsis presented in Part I is the nearly unique economic situation in Jordan. While Jordan is a developing country with many of the characteristics associated with that condition, in certain important respects the situation in Jordan is quite unlike that normally thought of as associated with developing countries. Certain of these conditions have an important impact on any agricultural strategy and therefore need to be made explicit.

The enormous economic changes which Jordan has undergone as a result of the employment surge in the Gulf during the 1970's have had and are having major effects on the agricultural sector. In the 1960's Jordan had a relatively large subsistence agricultural sector and a condition of extensive unemployment/ under-employment. Pastoral nomadism was then an important way of life. Capital was rather expensive. That is, conditions in Jordan resembled those in many developing countries.

Recently Jordan's wealth has increased dramatically to a middle income level. Much of that wealth increase derives from remittances from workers abroad. Because of workers migrating abroad and economic activity generated from their remittances there is now a labor shortage. Seemingly, unlimited agricultural markets exist because of the new markets in the Gulf. Subsistance farming and pastoral nomadism are rapidly disappearing. Commercial farming is increasing; but marginal land is being removed from production as alternative income opportunities are being explored.

These changes which might normally be thought of as taking place over decades have largely occured in a span of less than 10 years. Not surprisingly the changes have created considerable confusion as to the direction in which agriculture should move. Some trends are already apparent. For example, the

marginal lands (mainly upland grain land) have been taken out of crop production; rapid technical innovation (drip and plastic) is taking place in off-season vegetable production; and imported workers (mainly Egyptians) are replacing Jordanian labor on the farms, particularly in the Jordan Valley.

Another very important characteristic of Jordan, differentiating Jordan from most developing countries, is the relatively lesser importance of agriculture in economic output and employment. When equity and human needs are at issue, it must be remembered that there are many times more poor urban consumers of agricultural products than there are poor producers of agricultural products. Unlike most developing countries it appears that to benefit the greatest number of poor per dollar input in agriculture, the focus must be on gross production and distribution to benefit the poor majority consumer rather than the more usual case of concern with greater income for poor producers. Thus, where choices must be made between increased production or assistance focusing benefits on lower income farmers, priority must be given to production and distribution since there are at least a 100 urban poor families to each poor farm family. That is, for Jordan a focus on overall agricultural production is a focus on the needs of the poor majority for more and cheaper foods and for more foreign exchange to import food requirements beyond those produceable in Jordan. Nonetheless agricultural production efforts must be so designed that small as well as large farmers have equal access to support services and technology.

This orientation aside there is no definitive analysis available as to what should be the development directions of Jordanian agriculture. In fact such analysis would be exceptionally difficult to do since the usual approach is extrapolation of trends based on empirical facts. In Jordan any data a few years old is typically of only limited relevance as an indicator of current trends. Stable patterns or trends, fully reflecting the current economic factors, have not as yet emerged. This lack of trends due to rapid change is further compounded by a pattern of low rainfall which has existed during the same time since 1974. In some cases it is not known whether changes would be related to the low rainfall conditions, to the economic changes, or to both.

Thus, we are in a period of rapid change in which it is exceptionally difficult to judge either where developments are going or, for that matter, should go. This is particularly true in the upland area where subsistance agriculture formerly predominated and where conditions, either, or both, of weather and land fragmentation, in much of the traditionally farmed areas are not very favorable for efficient agriculture.

Two conclusions derive from these conditions: One there is an unusually high degree of uncertainty in both data and understanding of desired future directions for agriculture and second; although still a relatively underdeveloped country in several aspects, Jordan does not have the processes usually associated with underdevelopment in the employment area and in agricultural markets. Prima facie there are then reasons to assume that conventional solutions may not fit the Jordan case.

B. USAID STRATEGY - GEOGRAPHIC CONCENTRATION

We shall follow a two step process in defining the USAID strategy in the agriculture sector. In this section we will discuss the rationale for a geographic component of that strategy -- emphasis on the Jordan Valley.1/

1. GOJ Preference:

USAID/J controls only a limited fraction of the resources which go into agricultural development in Jordan. Even in terms of Donor assistance USAID is only one among several. Often in such circumstances a geographic division of responsibilities is made as a convenient way to "coordinate disparate inputs". In Jordan such a geographic separation is particularly sensible since the substance of agriculture varies sharply geographically. That is agriculture in the Jordan Valley is quite unlike that in the uplands. Therefore, separating donor inputs into the uplands and the Valley provides few problems of duplication of effort or of competing approaches given the relative uniqueness of production techniques between the two areas. Additionally, host institutional responsibilities are in many cases clearly defined as upland or Valley making the division one easily handled institutionally.

1/ Recently the Government has extended the charters of the JVA and the JVFA to include the Southern Ghors as well as what has been considered the traditional Jordan Valley north of the Dead Sea. In this paper we will consider the term Jordan Valley to cover the Southern Ghor area as well.

The Government is receiving assistance from the UN, ICARDA, the Arab States and perhaps the World Bank in upland agriculture. The Government knows USAID is familiar with the Valley and its needs and that USAID has a long established working relationship with the JVA. For at least these reasons, the GOJ wishes to have the USAID concentrate its agricultural assistance in the Jordan Valley.

2. USAID Interests:

The USAID has provided extensive assistance to the Valley especially in terms of investments in physical infrastructure, as a consequence there is a vested interest in promoting the most efficient use possible of those infrastructural components. More productive farming techniques are part of the process of assuring that the infrastructural investments in the Valley will produce the largest feasible benefits for the economy and people.

A major component in the USAID's judgement that the Valley is a good, if not optimum, place to put USAID's agricultural investments relates to the potential, given known technology, for increased agricultural productivity with attractive financial returns. That is, for the Valley there appear to be known production packages which will sharply increase yield and improve income; moreover, there is an existing receptivity to innovation given existing social structure. Thus, the potential for significant production increases seems far superior to that in the uplands, where, based on the prior analysis, there may be need for fundamental social revisions before improved agricultural production is feasible, either in crop or livestock production.

The USAID has a limited staff and believes that a concentration of the efforts of that staff into a limited range of activities will help insure that those activities undertaken will be as effective and efficient as possible. Because the uplands and the Valley are disparate physically, institutionally and in terms of farming technicques and crops, a geographic concentration in one or the other of the regions is attractive from a staff utilization point of view. The Valley, as a quite compact area, is particularly attractive from a management view.

At the same time, given the Government's social programs, the efforts of other donors and the Jordanian job market, upland residents are able to find sources of income. Thus, there is not a major requirement to upgrade agriculture in the uplands as a means of providing the basic human need of an income source.

A major objective in the USAID's overall strategy is to assist Jordan to the maximum extent possible to reduce its dependance on foreign subsidies. Jordan must import much of what it will consume. Agriculture now provides a major share of exports, mainly from the Jordan Valley. And it is in the Jordan Valley that the major opportunities exist for further increasing foreign exchange earnings.

Finally in water short Jordan it appears particularly important to get the most efficient possible use of irrigation water and the large majority of irrigation occurs in the Valley. In the irrigated sector, there is considerable room for improved water management to the benefit of the entire country.

These reasons seem good and sufficient to justify primary attention to Valley agriculture. With one exception, the remainder of this paper will focus on the situation in the Valley. Related to the Valley, as well as to the overall water sector, is an interest in the watershed which ultimately will mean concern with the areas of the country outside of the Valley.

C. OPPORTUNITIES FOR AND CONSTRAINTS ON AGRICULTURAL CHANGE

The statistics on comparative yields and examinations of estimated financial return under improved farming techniques both suggest a considerable potential in the Valley for increased agricultural productivity and income. This section attempts to provide a discussion of what appear to be the more important constraints on productivity and the more important opportunities for stimulating productivity and agricultural income. We shall first enumerate the opportunities before examining the constraints.

1. Aggressive Farmers:

As cited in Part I, farmers in the Jordan Valley are currently aggressively pursuing production innovations. In contrast, the situation in a typical developing country is

that of farmers reluctant to adopt new farming techniques until thoroughly proven. Also in the Jordan Valley, again in contrast to most developing countries, farmers will visit demonstrations at their own initiative or go some distance to observe what other farmers are doing.

Thus, given this unusual opportunity for disseminating technical information to the farmers, it is not necessary, as is often described to be the case, to laboriously contact farmers one-by-one, in their fields with a strong effort at pursuasion to get them to adopt better techniques. Rather, a relatively few (the Valley is quite compact) demonstration sites can be set-up with a high expectation that valid techniques will be rapidly adopted by farmers. A real opportunity therefore exists for dissemination of improved farming techniques short of developing a large expensive and well trained extension service.

2. Capital Availability:

Money is cheap in Jordan, interest rates are low and there is considerable money looking for investment opportunities. In the Valley there are fairly good public sector credit institutions (perhaps excepting institutions to serve the poorest farmers) and extensive private credit available from middlemen. For many farmers there are funds accumulated from the remittances of family members working abroad or from the windfall profits of selling land which appreciated in price manyfold. The money is not uniformly available, nonetheless as is true throughout Jordan many families have access to relatively large amounts of potential investment capital.

There is no doubt but that this factor is related to the point above regarding aggressive farmers. Capital is available to permit investments in improved technology and money is cheap enough to allow risk-taking innovations.

There is a major opportunity to increase investment in improved agricultural production technology because of this plentiful supply of risk capital.

3. Inefficient Farming Techniques:

Although Valley farmers are now adopting high productivity farming techniques at a good rate, the use of these techniques is rather inefficient. Drip, plasticulture and fertilizer are all used extensively, but, from all available information yields are not commensurate with the type and magnitude of inputs.

This might be considered both an opportunity and a constraint. A constraint on existing production, but an opportunity in the sense that the investments in inputs are already being made; the motivation is already there; and the input supply systems are at least partially in place. Thus, there is a real opportunity to get a near term increase in production by focusing on doing what is already being done, but doing it better.

4. Prices/Market:

The upsurge in wealth and population in the Middle East has created a large demand for fresh agricultural products even at rather high prices. There is limited competition from other producing areas during the Valley's winter production season. Thus, the farmer can expect, with some confidence, that whatever he produces can be sold at attractive prices.

5. Water Quantity Limitations:

On the constraint side, the most pervasive consideration in Jordan is that of water supply. There is land suitable for second crops and land which is not now cultivated at all which could be cropped if water were available. This constraint exists both due to limits on total available water supplies; but also because of inefficient use of water in terms of crop selection and water application. Particularly, traditional surface irrigation techniques result in considerable water wastage. Growth in agriculture ultimately will depend on increased and reliable water supplies.

Given the expected sharp growth in urban demand for water, major efforts will have to be made to maximize the utilization of remaining water for agricultural purposes. As discussed in the water sector paper such maximization will have to include recycling, increased storage facilities, watershed management and demand management among others.

6. Agricultural Services:

The intensive agricultural activities now evolving in the Valley are of very recent origin. The agricultural service system, not surprisingly, is still weak or marginal in several respects. Basic inputs such as seeds and fertilizer are too often very high priced; repair services for machinery are often not readily available in the Valley, the extension function is weakly performed; and, to a degree, cheap production credit is not available to all classes of farmers.

The burden of these inadequate services fall unequally on the farmers, with the larger farmers able to gain considerably better access to the services. The weak service sector is to a degree a constraint to productivity and to a large extent a constraint on producers' equity.

7. Farming Technology Dissemination:

Innovations are taking place, but mainly at farmer initiative or private suppliers' initiative. This results in uneven and slow dissemination of new farming technology. There is no overview of Valley agriculture with attendent development of a plan for introduction of desirable and complimentary new farming technology.

The rate and efficiency of adoption of new technology will be constrained until there is an improved system for disseminating to farmers new production technology.

8. Quality Control:

Currently it is estimated that no more than a half to two thirds of the tomato crop in the Valley is of sufficient quality to be sold to a discriminating market. The quality of the product in the field is poor and further damage is caused in the harvesting, transporting, and packing processes. Somewhat similar situations exist for other crops though perhaps not to the same degree.

Part of the cause of the poor quality rests with production processes such as pest control, fertilizer application and for tomatoes, lack of staking. Another part of the problem results from the harvesting and post harvesting handling of the fruit. There are also traditional attitudes operating here with the farmer believing he can and should sell any fruit which he harvests no matter how misshapened or damaged. There further is little market price response to quality, with a consequent lack of motivation to improve quality.

This production of and passing through to the retailer of fruit and vegetables of highly mixed quality, some good and a lot bad is an important constraint especially in the export area.

9. Longer-Term Constraints:

There is probably a need, especially as production increases, to more nearly optimize the cropping pattern in the Valley. For example, currently there is a very heavy emphasis on tomato production despite important disease problems. Crop rotation schemes are generally being ignored and some review of possible longarun consequences needs to be conducted. Or, another example, significant improvements in the yields for tomatoes appears to be taking place with an attendant increase in total production. However, little, if any attention, has been given to the effects of increased supplies on market prices. Similarly not much attention is being devoted to developing new crops. Thus, to some extent there is a need to consider whether a plan for overall production to improve returns is desirable.

The marketing area is said by many to be a constraint on production. Observers argue that, at least seasonally, farmers do not get a fair price, thus providing a disincentive to production. However, the interaction in the marketing area, with farmers also performing as commission agents and exporters are of extreme complexity. We have only a weak understanding of the degree to which the marketing structure constrains production, if at all. Currently, it appears that farmers are obtaining rather good returns at least in the off-season. It is nonetheless not easy to ignore the very widespread belief that the marketing system needs to be

improved if productivity is to be accelerated. Our proposed support for a marketing policy study from the Technical Services Project reflectsour concern and desire to gain a better understanding. It also seems likely that the current marketing process, highly influenced as it is by a few persons who farm and also operate as middlemen as well as exporters, does not produce equal benefits for all farmers. It is the apparent intent of the Government to have a more equitable marketing process implemented by the JVFA using the recently constructed marketing centers.

D. OTHER DONOR ACTIVITIES IN THE JORDAN VALLEY

The USAID's strategy must reflect other planned development activities in the Valley. Therefore we will briefly review other donor activities. The JVA's demonstrated ability to design and implement projects continues to attract a growing list of donors not only in expanding the infrastructure in the northern Jordan Valley but in the development of the Southern Ghor as well. The most significant are:

1. Netherlands

The Dutch financed marketing center (completed in late 1979) in the Central Jordan Valley will be expanded to include a box factory. This facility may become operational during the first quarter of 1980. In addition, the Netherlands has agreed to finance a soil, water and plant analysis laboratory and an agriculture training institution in the Jordan Valley.

2. United Kingdom

The U.K. is financing a second marketing center in the northern end of the Valley which is planned to be operational by the first quarter of 1981. In support of this project they are also financing 24 man-months of technical services of a marketing advisor. The U.K. is also providing limited advisory support to the Jordan Cooperative Organization (JCO).

3. Federal German Republic (FGR)

The FGR has been and will continue to be a major donor for agricultural projects in the Jordan Valley. With the completion of major projects in the Northern Valley the FGR will

make more than U.S. $ 20 million available for feasibility studies and still undefined projects in the Southern Ghor. In addition they will provide more than U.S. $ 5 million capital support for the Agriculture Credit Corporation (ACC) for medium and long term loans to farmers.

4. Japan

The Government of Japan is providing U.S. $ 35 million to support the design and construction of a dam at Wadi Arab in the Northern Jordan Valley.

5. European Economic Community (EEC)

The EEC will make available about U.S. $ 2 million to the JVFA for the development of a major greenhouse and nursery complex to produce vegetable seedling transplants for Jordan Valley farmers.

E. STRATEGY

1. General Objectives:

The agricultural strategy proposed in this paper focuses on the opportunities and constraints discussed previously. Most observers agree that food self-sufficiency is not a reasonable objective for Jordan. Rather, the limited agricultural resources (land and water) should be employed to produce the highest value possible crops with a focus of exports to earn the foreign exchange needed to pay for required food imports. The USAID strategy aims to help enhance agricultural production in Jordan as a means to best serve the Mission's primary purposes of:

1) Reducing Jordan's dependance on foreign subsidies.

2) Fostering maximum equity to the poor majority who are largely urban consumers.

A secondary consideration, in so far as it does not conflict seriously with the above purposes, is to serve, as feasible, agricultural producer equity as well.

The Primary purposes are best served by increasing as possible, total agricultural production. That is, increased production will allow more exports to enable earning of foreign exchange. Secondly increased production will contribute to lower prices for urban consumers, especially as

requirements for high priced imports can be reduced for some items and seasonal scarcity, with the attendant soaring prices, can be reduced.

2. Strategy Element 1:

It is believed that the opportunity for increased production can be served by encouraging the adoption of higher productivity technology and the more efficient utilization of technology already in use. Given high market demand, the presence of capital and of innovative farmers and the already partially adopted improved technologies, there is adequate reason to believe that significantly improved productivity and overall production can be achieved if just one key element, that of better technology dissemination, is implemented. Thus, technology dissemination is given top priority in the strategy.

Before going on further a brief digression on institutional responsibilities is needed to explain the approach taken. As of now, there are still uncertainties as to responsibilities and authorities for agricultural development of the Valley. Until these responsibilities are more clearly defined, longer term institutional development assistance especially for the extension area is not attractive. Rather the approach advocated here is to provide assistance utilizing existing capabilities with the counterpart forming task forces from several agencies. Institutional authorities are left unresolved and the focus is on actions possible within the task force context.

3. Strategy Element 2:

In the immediate future the concern is with getting more and better information to farmers quickly. The strategy envisions a near term focus on interim arrangements involving existing capabilities and institutional charters on a task force basis to enable immediate action. Over the full time frame of this strategy paper assistance in devising more permanent means of effective technology transfer to farmers may be feasible. Another component (long term in nature) of the strategy is to continue to encourage the discovery and adoption of such permanent means to have the extension/technology dissemination function effectively performed.

4. Strategy Element 3:

Again at the primary level, the purpose of increased production can also be served if strengthened agricultural services are made available to Valley farmers. Consequently, an important element of the strategy, complementary to improved technology dissmenation is continuation of the USAID's focus on improved farmer services in the areas of input-supply, and marketing and perhaps credit. Correlated is a concern for improved farmer leverage in determining the distribution of benefits in the agricultural services activities. Thus, continued support for the eventual development of an effective farmer interest group (JVFA) is part of the strategy. Both the improved services and ultimately the strengthened interest group should contribute to the secondary concern with farmer equity.

5. Relating the Strategy to Constraints and Opportunities:

The constraints and opportunities are listed below followed by a listing of the strategy elements meant to exploit the opportunity or to overcome the constraint.

a. Aggressive Farmers, Capital Availability, Weak Technology Dissemination, Inefficient Technology Utilization:

The first element of the strategy better technology dissemination is focused on this complex of opportunities and constraints. The intent is to, as rapidly as possible, have an improved technology flow to Valley farmers to overcome the technology constraint and to exploit the opportunity given by farmers with capital and the willingness to innovate.

b. Weak Agricultural Services:

If technology is to change rapidly, an agricultural service system responsive to this change and charging reasonable prices to farmers is necessary. The strategy focus on strengthened agricultural services is adopted with the intent of encouraging the evolution of an agricultural service system allowing increased production. An improved service capability will, as well, contribute to producer equity.

c. Quality Control, Marketing:

A special case of agricultural services are those which occur after produce leaves the farm. A complex of issues related to prices, encouraging of grading and quality and necessary processing are lumped under the general term marketing. A long term objective in the strategy is that of assisting in instituting a more effective and equitable marketing process. This effort will build on the recently provided marketing consulting services.

d. Water Quantity:

The concern with the quantity of water supplied to Valley farms requires attention to areas beyond the Valley proper to the watersheds of North Jordan. In addition, concern with this watershed is complementary to the concerns regarding water supply evinced in the water sector strategy.

A special element in the strategy is to encourage as soon as possible a thorough review of the status of affairs in watershed protection and development to determine if there are feasible programs which would enhance capturable water supplies and to determine if there is an appropriate role for AID in this area.

F. STRATEGY IMPLEMENTATION AND SPECIFIC OBJECTIVE

The purposes underlying this strategy with respect to agriculture in the Valley are to increase total agricultural product added and to assist, to the degree it does not conflict with increased product added, in getting the best possible deal for Valley farmers, especially the smaller farmers.

The increased agricultural production will occur because farmers change their cultivation/cropping practices. The assistance we envision is a step removed from the farmers. The assistance will be to Valley organizations to help them in mounting improved demonstration programs and in providing improved farmer-support services. In the log frame sense of the term, it is assumed that the Valley farmers will adopt the demonstrated technology and use the better services.

In this section we address counterpart organizations for strategy implementation and the listing of specific intermediate objectives the attainment of which are assumed to relate to the achievement of the ultimate purposes of the strategy.

1. Improved Technology Dissemination:

The current "Best Tomato Practices" demonstration, being implemented with the JVA, is by our estimates proving quite successful. The Faculty of Agriculture has suggested that follow-up activities could be made more useful if there were a better local adaptive research base and has expressed a willingness to undertake a cooperative demonstration activity with the JVA. We are encouraged by this prospect and believe a good and sharply expanded demonstration program can be undertaken with the joint involvement of JVA and the Faculty without further delineation of institutional charters.

USAID, thus, intends to support an expanded demonstration program for the immediate dissemination of currently known technology as well as an effort to expand the technology base. During the implementation of that demonstration program every effort will be made on our part to encourage an evolution of strengthened institutional arrangements to carry on beyond the immediate demonstration program. However, first priority will be given to getting known improved technology out into farmer fields at convenient locations so that producers may observe that technology. At the same time, attention will be given to providing improved information to farmers on the efficient utilization of that technology.

For current planning we envision by 1984 the demonstration of improved technology for at least five major Valley crops for at least three crop seasons each. There will be a minimum of twelve demonstration sites per crop per season.

Under a task force arrangement involving JVA and the Faculty (and perhaps ultimately the MOA) a team will be assembled for each crop which team will be available for consultations with farmers as to technology implementation.

A basic assumption is made that if adequate services are available farmers will observe the demonstration sites and adopt the technology which appears economically attractive thereby increasing production.

2. Improved Agricultural Services:

USAID has for the past year provided assistance to the Jordan Valley Farmers Association (JVFA) in its initial effort to become operational. The JVFA is to represent the interests of its farmer members and to provide a range of agricultural services to those members. The JVFA is a very young organization with an ultimately broad range of complex responsibilities. For the immediate future it appears JVFA will focus its activities on providing competitvely priced production inputs, improved seedlings, better agricultural machinery services and limited farm management advice.

The USAID envisions the continuation of assistance to the JVFA as the best means of strengthening these agricultural services to Valley farmers. Primary immediate focus will be on the supply of inputs, provision of necessary seedlings for the improved farming practices and cooperation in technology dissemination and farmer guidance. Another major but longer time frame concern will be to provide assistance as feasible to helping the JVFA become an institution effectively representing the interests of the majority of its members.

By 1983 we envision:

a. Sales levels of at least 50% (by value) of agricultural input sales with markups no more than 25% above purchase price.

b. Production of seedling requirements per year.

c. A farm guidance capability to provide consultation at least two or three times per year for each farmer member.

d. A JVFA financially self sufficient, managed and staffed to allow it to effectively perform its role in the Valley.

3. Quality Control/Marketing:

JVFA has had responsibilities in this area of agricultural services as well. It is broken out separately in this discussion because of the complexity, the multitude of powerful vested interests and the probable deferral of JVFA action in this area. For these reasons the USAID strategy in this area must be less specific than in the above cases.

Our interests are to assist in developing a system of quality production and of sales; and to assist in evolving a marketing process which will be efficient, low cost and result in incentives to farmers for production. Between now and 1981 the Mission will undertake an effort to develop an appropriate role for itself in assisting to achieve these interests.

4. Local Adaptive Research:

To back up the technology dissemination effort, encouragement will be given to relating local research to farmers' problems. A longer range view will be taken in encouraging programs to increase water utilization efficiency to include the uses of water of poorer quality.

5. An Integrated View:

The above assistance program involves several agencies, but there is a single objective at the primary level. USAID intends, if at all practical, to develop a single agricultural sector project to incorporate all of the proposed assistance. In this way we hope to maximize the output of the USAID staff and to also contribute to an integrate view on the GOJ's part.

6. A Special Interest:

Watershed Development and Protection:

Recently the Mission has become concerned about the relationship between the state of the watershed and the share of rainfall which can be captured for controlled use. As more information develops on impending water-short falls as Jordan's population grows and the economy expands, it seems important to better understand the options for increasing water capture through work on the watershed.

In 1980, USAID will explore with the Government possible actions in the watershed area. These explorations will require the assistance of consultants and will form the basis for determining if there are desirable areas for AID assistance in the watershed area in the time period 1982-1986.

7. Southern Ghors:

Finally, we expect that, as GOJ plans mature, that particular attention may be given to the deprived Southern Ghor area. After 1982 the USAID believes a small additional effort focused on this area could be added to the agricultural portfolio.