

b. Present Condition of Irrigation

05.027 Irrigated agriculture in the high land of the Study Area has an aggregated ^{4/} area of 4,800 ha, or only 13 percent of the national total of 38,600 ha, and is of relatively minor importance in the national agricultural production. As shown in Table 5.6, it utilizes approximately 70 MCM per year or 40 m³ per hectare per day. However, the sources of ground water for irrigation in these areas are limited and deteriorating in quality year by year. Therefore, the future for the irrigated agriculture in the Study Area is rather pessimistic, as advocated in the documents of the NWMP and STRATEGY. Table 5.6 shows the details of irrigated agriculture and water production in 1975. There are no major changes in irrigated areas in the Region after 1975.

Table 5.6 Irrigated Area and Water Production in 1975

Area	Irrigated Acreage (ha)	Water Production (MCM/year)	Water Consumption (m ³ /ha/day)
Dhuleil	2,910	45.6	43
Mafraq	353	5.4	42
Jerash	1,253	16.6	36
Ajlun	240	2.1	24
Total	4,756	69.7	

Source: NWMP

5.5 Projection of Water Demand in the Study Area

05.028 As far as the Study Area (or the Northern District Water Supply System) is concerned, the water demand in the next Five Year Plan period will primarily come from domestic consumption. Therefore the Study concentrates on the estimation of water demand for domestic use in the Northern District.

05.029 Usually a future demand for water can be extrapolated from the past growth trend of production, as long as no demand-supply gap exists. But everywhere in the Kingdom, the gap is enormous so that we can not use this approach. The NWMP states that the potential demand for water is about twice as much as the present water production. In this situation, the projection is made on the basis of the projected population and their unit water demand which varies from person to person and from time to time. The unit water demand in the Area is discussed in several reports so far.

^{4/} Completely or partially irrigated area.

05.030 Our Study reviewed the demand projections from several reports, namely, the NWMP, the STRATEGY, and the feasibility Study of Yarmouk River Development; Irbid Water Supply Project.^{5/} among these, this Study employs that of the STRATEGY as a target for supply source development. The Table 5.7 and Figure 5.5 show these projections with other related figures.

Table 5.7 Water Demand Projection in Northern District, 1975 to 2000

(Unit: MCM/year)

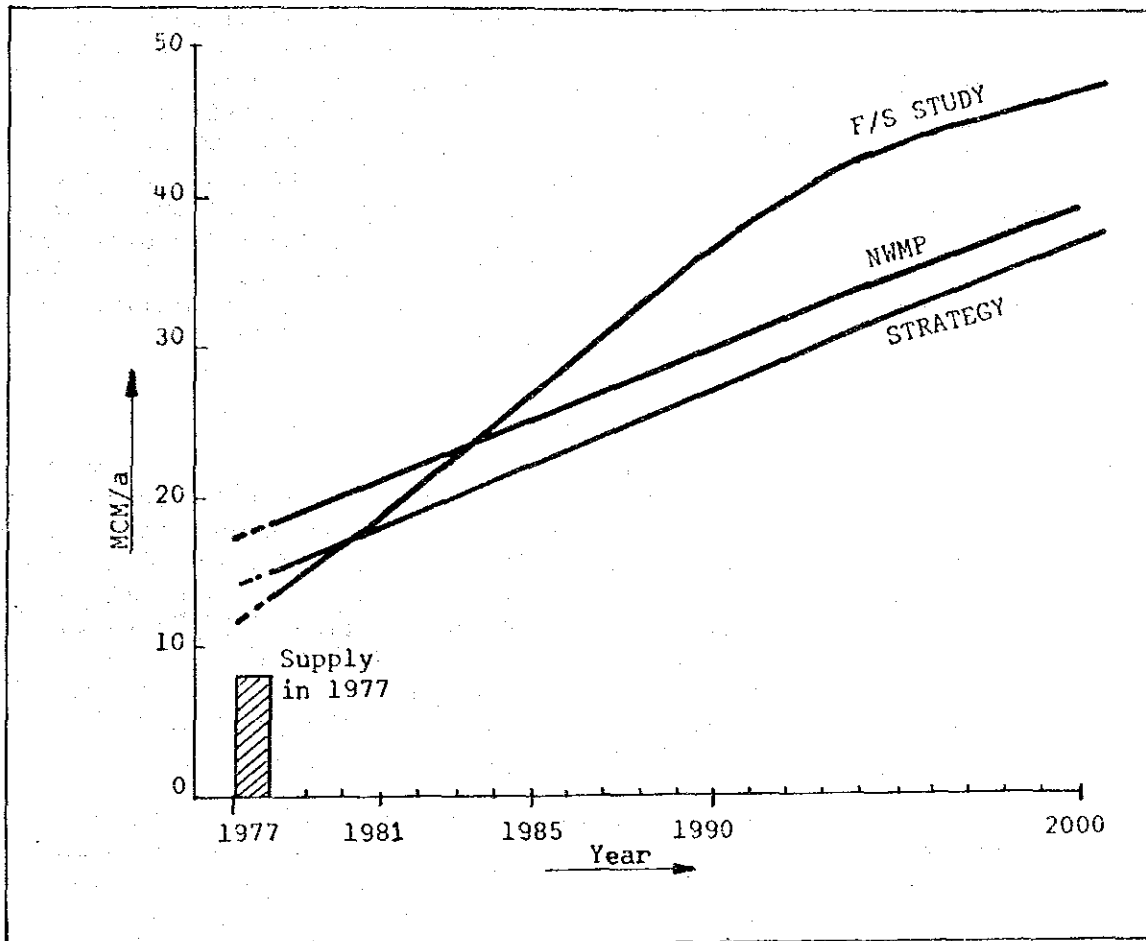
	1975	1981	1985	1990	2000
Total Population of the Governorate (1,000 Persons)	563	670	752	872	1,172
Population Served by the System ^{1/} (1,000 Persons)	367	469	564	698	996
(%)	65	70	75	80	85
Estimation by Feasibility Report of Yarmouk-Irbid W.S. Project (MCM/year)		18	27	37	47
Estimation by the NWMP (MCM/year)		21	25	30	39
Estimation by the STRATEGY (MCM/year)		18	22	27	37

Source: NWMP, STRATEGY and Feasibility Report of Yarmouk-Irbid Water Supply Project.

Note: ^{1/} The figures are estimated by the data in NWMP and the current Five Year Plan.

^{5/} Yarmouk - Irbid Water Supply Project, by Crown Agents, 1976.

Figure 5.5 Demand Projection in Northern District



Source: Same as in Table 5.7

5.6 Allocation Criteria for Different Uses

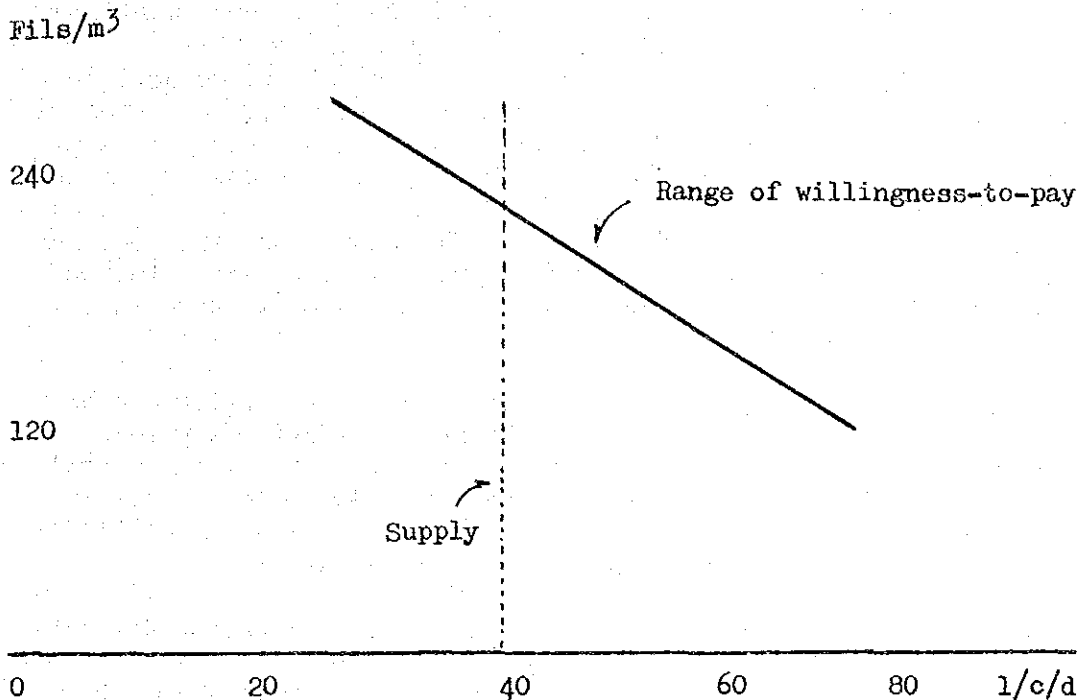
05.031 Water is competitively used for different purposes, namely, domestic, agricultural and industrial consumption. When planners consider the future development for these sectors, they need some criteria to weigh priority among these different uses. Water is final consumers' good for domestic users, but is a factor of production for agricultural and industrial users. Water in the Study Area and also in the Kingdom is obviously so limited that the competition among different sectors is severe. Therefore we need criteria for allocating the limited water resources to different sectors. In theory, an appropriate criterion is the marginal value of water, which means how much value per additional unit of water can create. The calculation of the marginal value of water is, however, a very complicated process and requires more information than is now available. Therefore, the average value of output per cubic meter of water is employed, instead to evaluate the different sectoral uses. This short-cut approximation seems appropriate for our purpose at the present stage of this Study. The tentative guidelines for allocation can be obtained in the following way.

5.6.1 Valuation of Domestic Water Consumption

05.032 The value of domestic water is inferred by observing the willingness-to-pay of the consumers, or that is called a demand curve in economics. The demand for water mainly depends upon consumers' income level and the price at which water is sold. The NWMP reports that the demand for water is about twice as much as the present consumption (30-40 l/c/d) at the prevailing price of about 125 Fils/m³. It is found during our field survey in Irbid that even if the price soars two times, domestic consumption would not change much, ranging 30-40 l/c/d, but if the price rises three times, consumers would try to restrain water consumption.

05.033 From the above observation, it is possible to delineate a rough demand curve (willingness-to-pay) for water in the Study Area as shown in Figure 5.6. The result indicates that the value of domestic water at present is approximately 200 Fils/m³.

Figure 5.6 Willingness-to-Pay of the People to Water, Study Area, 1978



Source: Hearing by Study Team

5.6.2 Valuation of Irrigation Water

05.034 The STRATEGY indicates that the value added of irrigation water in the Jordan Valley is about 70-100 Fils/m³ at present. Also, a cubic meter of irrigation water is estimate to create about 75 Fils of agricultural products in the Wadi Arab Project. Our investigation at a private irrigation farm in the highland area (Mafraq) found that the value-added of irrigation water is about 45 Fils/m³. But this farm could produce twice as much in value if a better irrigation system is installed. The average value of irrigation water would probably range from 45-90 Fils/m³ in highland areas.

5.6.3 Valuation of Industrial Water

05.035 The STRATEGY estimates that the average value added per unit of water in the industrial sector ranges from 1000 Fils/m³ to more than 3000 Fils/m³. The NWMP surveyed several big factories proposed in the Kingdom, and found that the value ranged between 210 Fils/m³ and 6,500 Fils/m³. In one of the factories in Irbid, the value added per cubic meter is 450 Fils/m³. Therefore, the industrial use of water can create more value of output than the agricultural use.

5.7 Project Formulation and Priority

5.7.1 Formulation of Projects

05.036 In the preceding sections, water resource endowment and the projected demand for water in the Study Area are identified. It is clear that the Area is suffering from the shortage of domestic water sources as well as the inappropriate distribution system. Average water consumption per capita per day (l/c/d) in the Kingdom as a whole amounts to about 50 to 60 l/c/d in 1975. The daily consumption in the outskirts of the Irbid Municipality and rural highland areas is only 30 to 40 l/c/d in 1977. The situation will continue or even get worse, unless additional water resource exploitation and improvement of water distribution systems are executed in the Study Area in the future.

05.037 The intensity of demand for more domestic water can be seen in consumers' willingness-to-pay for water privately sold by water-tank trucks in the Study Area. Our field survey shows that their expenditure on water exceeds 500 Fils per cubic meter. In some rural areas, people spend about 625 Fils/m³ and one of the hotels in Irbid pays 1000 Fils/m³ for domestic water.

05.038 It was indicated in the Section 5.6 (Allocation Criteria for Different Uses) that the average value-added of unit water for irrigation is less than that of domestic water consumption. Our estimation shows that the approximate value added of highland irrigation ranges from 45 Fils/m³ to 90 Fils/m³. Furthermore, the value added of irrigation water in the Jordan Valley lies between 70 Fils/m³ and 100 Fils/m³.

05.039 As to industrial water supply, the Study Area has only small-scale industries at present and it appears that the situation will remain largely unchanged in the years to come, excluding the industries planned for Yarmouk University, Free Trade Zone and other industrial estates.

05.040 Small industries in the Area may not become bulk consumers of water in the immediate future. An important thing for small industries is that water supply should be stable. The efficiency of production in most factories depend much on reliable and continuous water supply. If reliable and sufficient domestic water supply is accomplished in the Area, there will be no problem to small industries and commercial establishments. It is estimated that the value added of industrial water in the Study Area could be more than 400 Fils/m³.

05.041 The interpretation presented above leads naturally to the conclusion that major development efforts should be placed upon municipal water supply in the Area with lesser consideration of agriculture and industry.

05.042 An overview on the ongoing projects indicates that almost all the projects listed in the current Five Year Plan are behind the stipulated schedule, for about two or three years. The major reasons for the delay seem to have been 1) shortages of engineering staff which delayed the designing and planning of water resources development for the Area, and 2) shortfalls of financing, especially of foreign financing.

05.043 Domestic water supply to the Northern District Water Supply System can be obtained from either ground water or surface water in and near the Area. As to ground water resources, the rechargeable ground water in Dhuleil is being pumped up more than it's safe abstraction level so that there would be little room for further development. As far as Azraq is concerned, it seems that additional 20 MCM/year is exploitable. But this source is very far, about 93 km, from the major demand area of Irbid, so that the unit cost of water in Irbid is estimated to rise to about 130 Fils/m³.^{6/} Possible projects are new wells in Samasdoud (Samaya) near Mafraq, where about 4-6 MCM/year^{7/} is additionally exploitable, from the depth of approximately 120 m.

05.044 Another possible water resources near the Area lie in the Muzeirib area just 15 km northwest from Dera'a in the Syrian territory. Many springs and well fields there are located about 25 km northeast from Irbid. The topography in the area allows construction of a pipeline from the spring-well fields in Muzeirib to Irbid. There are no reports available on the exploitable quantity and quality of ground water in the Muzeirib area, but a field survey and some informed suggestions in the area indicate that more than 5 MCM/year would be additionally exploitable. This scheme obviously needs some preparation for agreements between Jordanian and Syrian governments, and a feasibility study should be carried out.

05.045 With regard to the exploitation of rivers, surface water in Wadi Arab and Wadi Ziglab in the Jordan Valley left side are very difficult to be harnessed for domestic use in the Irbid area. These proposed dam sites are in a considerable distance from Irbid and would require larger static pump lifts than the Yarmouk River. It is clear, from the above facts, that the cost of water pumped from the Yarmouk River would be cheaper than that from either Wadi Arab or Wadi Ziglab. Therefore, water supply from the Yarmouk River, which is called the Yarmouk-Irbid Water Supply project in the current Five Year Plan, is most attractive among surface water development possibilities in the Area. On the other hand, the STRATEGY proposes plans to divert water retained in the Maqarin

^{6/} STRATEGY

^{7/} allowing for recharge from irrigated water.

Reservoir to the Amman-Zarqa conurbation. These plans are strategically of such national importance that; when it is approved the water supply project to Irbid from the Yarmouk River will be much affected or redesigned in accordance with the requirements of these plans. The water of the Yarmouk River has a decisive role in the development of the Kingdom as a whole. Therefore, the Yarmouk-Irbid Water Supply project should be designed in line with the framework of the STRATEGY.

05.046 In accordance with the development of water sources for the Northern District, it is necessary to provide an adequate distribution system. The present distribution and reticulation systems in Irbid were designed in 1964. It is said that the present capacity of the system is about 2.2 MCM/year. ^{8/} Obviously, the system is too small to distribute all the water from various sources. Therefore, improvement and extension of the distribution system in the Irbid Municipality should be done in line with the development of sources of water. For this purpose, it is necessary to carry out a feasibility study of water distribution of the Irbid Municipality.

05.047 All the projects discussed so far relate to the municipal water supply and the immediate problems in the Study Area. But here we recommend one project that concerns the development of wadis in the highland, especially to the west of Mafraq, where fertile soil is available for agriculture. There are some dams on wadis in the Study Area which were constructed for the purpose of flood retention, but it seems that they are not well maintained or utilized. We propose experimental wadi dams on Wadi Warren, aiming at creating and extending green zones in the highland between Irbid and Ramtha. The project consists of two small dams in tandem, the upstream dam will be used for retention of sand and gravel so that the down-stream dam can store spring flood to its full capacity. There might be other possible dam sites on Wadis Warren and Shalalla, which will need a further feasibility study in the future.

05.048 As to the water resources development in the Study Area from a long-term viewpoint, the study recommends a project concerning waste-water treatment in the Irbid Municipality. At present and in the immediate future, the emphasis will have to be placed on improving the water supply in the area, but this does not mean to neglect sewerage works in the Irbid Municipality. The study proposes that a sewerage system should be in operation in the Irbid Area by around 1985. The treated water can be recycled for irrigation in the highland area between Irbid and Ramtha, and the remainder can be conveyed through Wadi Shallala into the Yarmouk River.

8/ Yarmouk River Development, Irbid Water Supply Feasibility Study
by Crown Agents, 1977.

5.7.2 Description of Recommended Projects

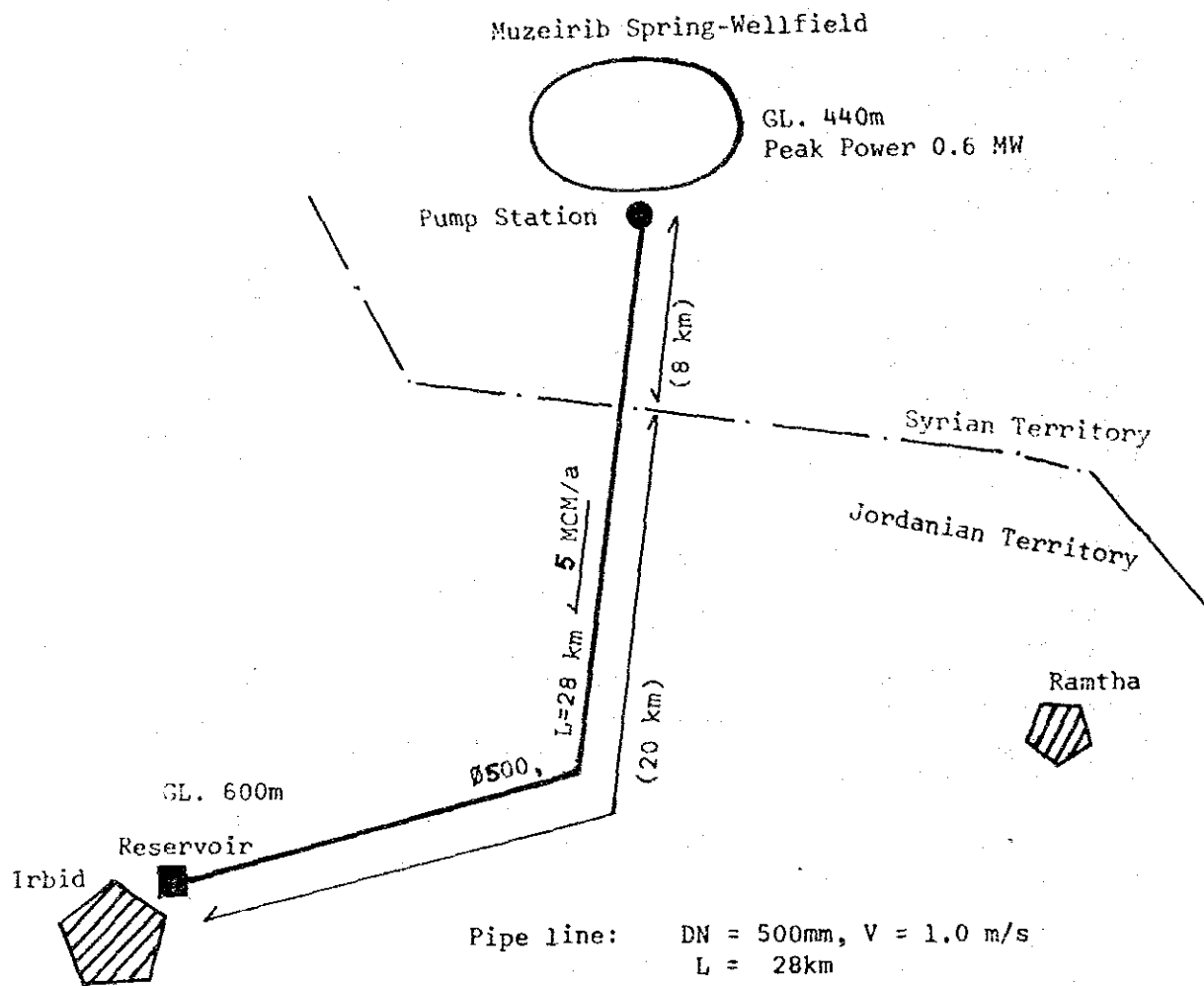
a. Samasdoud Well-Field Project

05.049 This project is proposed in the STRATEGY as "Samasdoud Scheme A (Volume 5, page 73). The Scheme plans to develop 6 MCM/year of ground water in the area. The initial capital cost is JD 3.7 million and the unit cost is estimated at 55 Fils/m³. However, this cost is estimated at the site of Zaatari Pumping Station, and therefore, an additional cost of transporting the water to Irbid should be taken into account. The present capacity of the pipelines (50 km) between Zaatari Pumping Station and Haufa Reservoir is able to transfer the additional 6 MCM/year of water from Zaatari to Haufa and also the already installed capacity at Zaatari Pumping Station is sufficient for additional pumping. For this reason, the initial capital cost is negligible, with unit cost of transferring water from Zaatari to Haufa coming to only 18 Fils/m³. As a result, the unit cost of Samasdoud ground water at Irbid is estimated to be 73 Fils/m³.

b. Muzeirib (Syria) Water Import Project

05.050 The project aims at importing water (5 MCM/year) from Muzeirib spring-well fields in the Syrian territory to Irbid. A 28 km pipeline of 500 mm diameter for conveying 15,000 m³/day of water will be laid from Muzeirib (ground level: 445 m) to Irbid (ground level: 600 m). The initial cost for the project amounts to JD 2.4 million and the cost of power consumption per year is estimated at some JD 0.1 million. The unit cost of water will be only 60 Fils/m³. The implementation of this scheme requires sufficient time for preparing necessary agreements between the two countries. The project assumes that the technical feasibility study and political arrangement can be carried out within 3 or 4 years. It is said that social basic needs like water can not be imported from other countries. But at present, many joint or cooperative activities with Syria are going on, such as over the Industrial Free Zone and the purchase of electricity. And socio-economic integration with other Arab countries is one of the objectives in the development of the Kingdom. Therefore, it is worthwhile to promote this project. The following figure 5.7 shows the outline of the project.

Figure 5.7 Muzeirib Water Import Project



Pipe line: DN = 500mm, V = 1.0 m/s
L = 28km

Borehole Pumps: 20 Nos, rated 10 L/S
head = 10m, 2.0 L/S

Pumping Station: (Muzirib)
2 Nos, 100 L/S each
Total head 250 m
Power 0.6 MW

Initial Cost: 2.4 MJD

Power Cost: 0.1 MJD/a

Unit Cost: 60 fils/m³



c. Irbid Town Distribution Project

05.051 In conjunction with the new water source development, it will be necessary to improve and extend the existing distribution and reticulation system in the Irbid Municipality. The reticulation system of the Municipality was designed in 1964 and intended to distribute an average flow of 6,000 m³/day (2.2 MCM/year). At present, the area to be served is about four times greater than the designed area, so that a new reticulation plan and design are urgently needed and implemented as soon as possible. The Water Supply Corporation is about to employ consultants for this feasibility study. Therefore, the cost of the project is not known. However, the informed suggestions from relevant officials and the feasibility report of "Aqaba Water Distribution and Sewerage" ^{9/} indicate that the renewal and extension of the water distribution system of Irbid Town would cost approximately JD 8 million. The project will be implemented in the next Five Year Plan in conjunction with the development projects of new water sources.

d. Experimental Dams on Wadi Warren

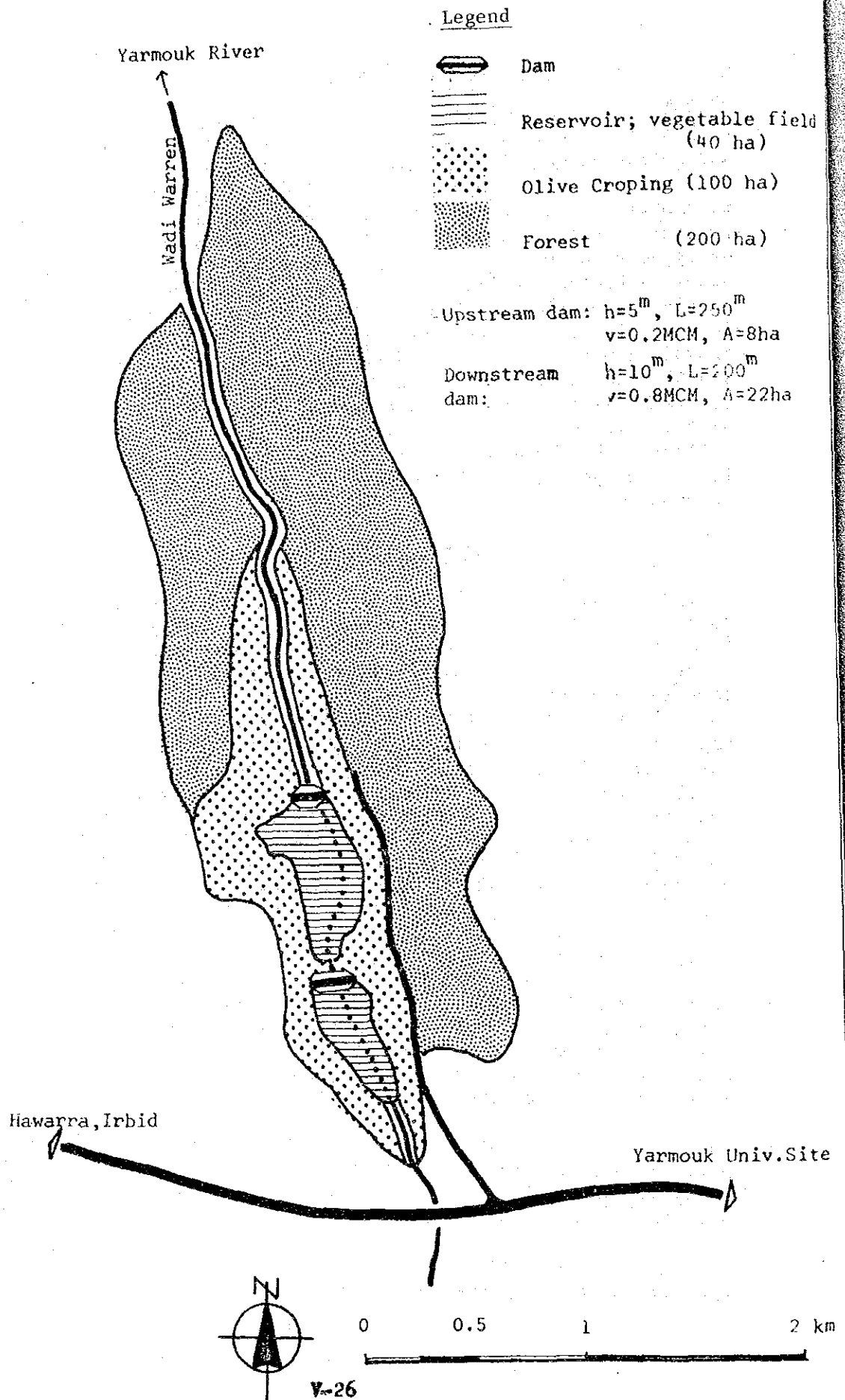
05.052 The project aims at creating a green zone (340 ha) by a construction of two small dams located between Irbid and Ramtha (see Fig. 5.8). The two concrete dams on Wadi Warren can retain about 1 MCM of spring flood. The drainage area for the proposed dams is approximately 160 km², with an estimated annual average run-off of 5 - 8 MCM/year. An upperstream dam (0.2 MCM storage capacity) will be soon deposited by sand and gravel, but the downstream dam (0.8 MCM storage capacity) will be able to store water to its full capacity. During the wet season, the reservoirs are full of water, and water content of soil around the reservoirs is expected to increase to such an extent that cultivation of vegetables (40 ha) will become possible. The area surrounding the reservoirs can be used for olive plantation (100 ha) and reforestation (200 ha) where a recreation zone will be set up.

05.053 The project costs about JD 0.3 million including concrete dams, plantation expenses and 5 km asphalt paved road. The direct benefit would be additional production of vegetables and olive, amounting to about JD 0.02 million per annum. In the long-run, the area of olive trees and forest can be extended to the surrounding area. The indirect benefit of the project is to provide people nearby with a green park for recreation.

05.054 This project has an experimental nature and helps to examine possibilities and effectiveness of a series of small dams along wadis, and it will provide valuable information for future development in the highland area of the Study Area.

^{9/} Draft Report, by Howard Humphreys Ltd., 1978.

Figure 5.8 Wadi Warren Experimental Dams



e. Yarmouk-Irbid Water Supply Project

05.055 This project is suggested in the "Yarmouk River Development: Irbid Water Supply Feasibility Study" in 1977, and also is mentioned in the current Five Year Plan. The project aims at pumping water of 10 MCM/year from Maqarin Reservoir to the Irbid Municipality. It includes installing and equipping an intake structure, pumping stations, water treatment stations, a 19 km steel pipe-line of a 600 mm diameter, and concrete reservoirs. The detail design of the project will have to be done in line with Maqarin project of Jordan Valley Authority. The estimated initial capital cost would be JD 5 million excluding the allocation cost of Maqarin project.

f. Irbid Sewerage System Project

05.056 Although the Phase I Draft Final Report recommended this project for the period from 1985 to 1988, this project was conceived to be of vital necessity by the Jordanian officials, was given to an USA consultant for study and is expected to be implemented during the next Five-Year Plan period. Thus, we accept the decision and expectation by the Jordanian officials and incorporate this project into the program for the period ending in 1985.

5.7.3 Long-Term Development Projects

05.057 It is useful here to compare the Study Area with the Amman-Zarqa area with regard to water sources from a long-term viewpoint. As shown in the project description, the unit costs of water from Samasdaud and Muzeirib is estimated to be around 70 Fils/m³, and that of the Yarmouk-Irbid Project is about 125 Fils/m³. On the other hand, water supply from the King Talal to Amman would cost about 100 Fils/m³. After the water from the King Talal Dam is fully utilized, the Amman-Zarqa area would be confronted with another serious water supply problem in 1990 - 2000. If water of the Maqarin Reservoir is transported to Amman for its municipal water supply, it will cost about 165 Fils/m³. The triangle recycling system (King Talal - Amman - the Zarqa River - King Talal) in this area will eventually give rise to a serious problem of pollution. Therefore, it is obvious that the Study Area has a comparative advantage to the Amman-Zarqa area in respect of water resources.

05.058 As mentioned in the last section, there are six projects recommended for the next Five Year Plan. Water sources from Samasdaud, Muzeirib and Yarmouk will be able to satisfy the demand of the Northern District up to 1990 years. However, there are other aspects to be considered from a long-term viewpoint. One is the agricultural development in the highland area. This issue can be tackled in the following way. After an appropriate treatment, waste water from Irbid City could be used for irrigation in the highland area located between Irbid and Ramtha where a hydrological cycle of Yarmouk (Maqarin) - Irbid - Wadi Shajara - Maqarin lies.

05.059 In other highland areas, shortage of water constrains, the expansion of cattle raising and the new planting of permanent and arable crops. Because the development of rural areas depends much on sufficient domestic water supply, we recommend an overall rural water supply project in the Area after the completion of the municipal water supply project in the Irbid area.

05.060 The proposed Maqarin project, as mentioned earlier, will have considerable impacts on the development of the Study Area. The Maqarin project is one of components of Jordan Valley Irrigation Project: Stage II which is supervised by Jordan Valley Authority (JVA hereinafter). The feasibility study has already been finished early 1978.^{10/} The total construction cost of the Stage II is estimated to be JD 144 million, of which JD 63 million will be spent for the construction of the Maqarin project consisting of dam, spillway, powerplant and outlet works. The construction is expected to start in 1979 and to end by 1984. But, it is likely that the required works for implementation such as funding, design, award of construction and equipment supply contracts, and project construction need more time than this schedule. The salient features of the Maqarin project are as follows:

<u>Reservoir</u>	
Drainage Area	5,950 km ²
Normal Maximum Water Level	El. 150 m
Surface Area at El. 150 m	7 km ²
Live Storage	275 MCM
<u>Dam</u>	
Type of Dam:	Zone Earth & Rockfill
Crest Elevation	El. 158 m
Height	128 m
Fill Volume	14.3 MCM

Source: Jordan Valley Irrigation Project, Stage II, Feasibility Study, 1978.

5.8 Summary and Recommendation

05.061 This sector study recognizes that the water supply in the Irbid Municipality area is most urgently needed. The issue can be resolved in two steps, i.e., exploiting additional water sources, and improving and extending the water distribution system in the Irbid Municipality area.

^{10/} Jordan Valley Irrigation Project: Stage II, Feasibility Study, 1978, Harza Overseas Engineering Company.

05.062 The former would be carried out by implementing the following three projects:

- (1) The Samasdaud Well-Field project that produces 6 MCM/year at an initial capital cost of JD 3.7 million, unit cost of which amounts to 73 Fils/m³;
- (2) The Muzeirib Water Import project that conveys 5 MCM/year at an initial investment cost of JD 2.4 million, unit cost of which is 60 Fils/m³. But this project requires a technical feasibility study and institutional and political arrangement between the Syrian and Jordanian Governments; and
- (3) Yarmouk - Irbid Water Supply project which is listed in the current Five Year Plan. But this has not been implemented yet, because the project requires a further coordination with the Maqarin Dam project and an overall framework of Yarmouk River development. The project cannot and should not be developed by itself and will have to be considered in the framework of the National Water Strategy proposed in the STRATEGY. An approximate unit cost of the project is estimated to be some 125 Fils/m³, including the cost allocation from the Maqarin Dam construction. For these reasons, the Study recommends that the Yarmouk-Irbid project is implemented after the aforementioned two projects, with proper coordination with Maqarin project. The project cost would be JD 5 million excluding the allocation cost of the Maqarin Dam project.

05.063 Concerning the extension of the water distribution system in the Irbid Municipality area, a feasibility study will be required in the first place. The feasibility study will have to be carried out by the end of 1979, so that the construction may start in 1981 at a cost of around JD 8 million. In conjunction with the feasibility study of the water distribution system, a future sewerage system will have to be examined for the area.

05.064 The Study proposes another project which attempts at experimenting development of wadi dams in the highland area. The project constructs two small (5 m and 10 m height each) dams in tandem on Wadi Warren between Irbid and Ramtha at a construction cost of JD 0.3 million, the reservoirs retain flood water and contribute to producing vegetables, olives and trees where green parks or resthouses will be established in the future. If it proves successful, other wadis in the highland areas will be developed for agriculture and forestation.

05.065 As to immediate policy arrangement, drastic measures are required for preventing the deterioration of dependable water resources in Wadi Duleil area caused by the overdraft. Adequate policy measures or regulation on water-draft in the area can be made through social and economic investigation of the water consumption which asks for a new study and through a negotiation which should be held between various consumers of the water.

05.066 In the long-term development, the Study recommends three projects:

- (1) a waste-water irrigation project;
- (2) a rural water supply project; and
- (3) the Yarmouk-Irbid Water Supply, Stage II.

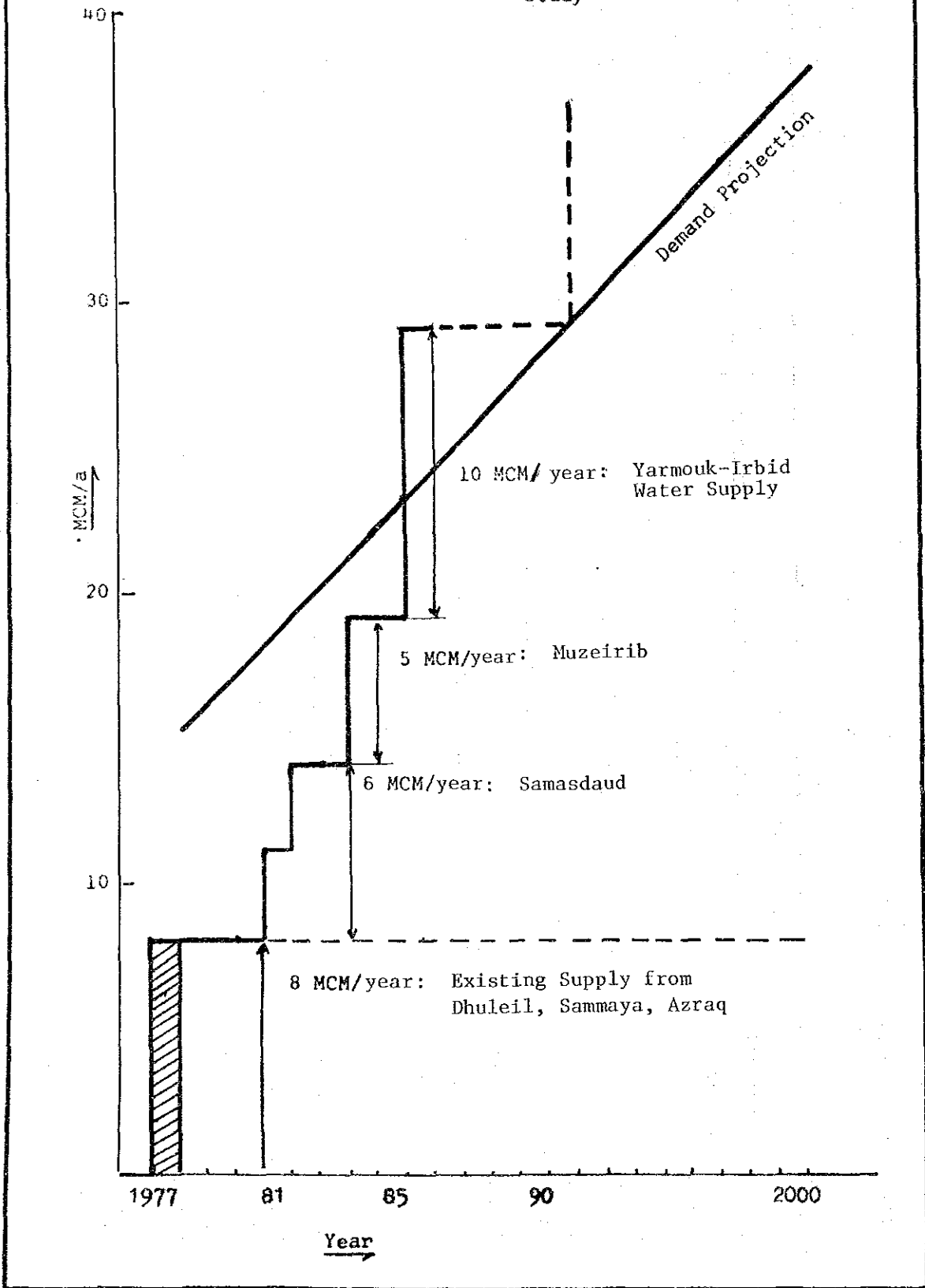
05.067 As a conclusion of this sector study, the following Table 5.8 and Figure 5.9 give an overall idea of water resources development in the Study Area.

Table 5.8 Investment Program

Projects	Cost (MJD)	1978	81	85	90	2000
Samasoud Wellfield Project	3.7	D/D				
Muzeirib Water Import Project	2.4	R	F/S	D/D		
Yarmouk-Irbid Water Supply Project	5.0		D/D			
Irbid Town Water Supply Project	8.0	F/S	D/D	D/D		
Experimental Dam Project	0.3	F/S				
Maqarin Dam Project	63.0	D/D				
Irbid Sewerage Project			F/S	D/D		
Waste-Water Irrigation Project					R	F/S
Rural Water Supply Project					F/S	D/D
Yarmouk Irbid Water Supply: Stage II						D/D

Note: D/D: detail design, R: Research, F/S: Feasibility Study, ---: Period of Construction

Figure 5.9 Demand-Supply Condition of the Study Area



CHAPTER VI

AGRICULTURE, LIVESTOCK AND FISHERY

CHAPTER VI

AGRICULTURE, LIVESTOCK AND FISHERY

6.1 General Characteristics of the Study Area

06.001 Table 6.1 shows the distribution of agricultural holdings and a rough picture of land use in the Irbid Governorate and the Study Area according to the Agricultural Census conducted in 1975. That agriculture plays a far more important role in the economy of the Governorate than in the East Bank as a whole can be seen in the fact that nearly 60 percent of the holdings exist there, compared to the Governorate's share of 30 percent in the total East Bank population.

06.002 The agriculture in the Study Area, which excludes the Ghor area, is predominantly rain-fed and only 2.3 percent of the total used area is provided with irrigation facilities. This is in striking contrast with the Aghwar Shamaliya Mutserfieh where well over three-fourths of the area is irrigated. The percentage of the irrigated area for the Study Area is even lower than the National average, which points to the fact that the Area is relatively better endowed with rainfalls than elsewhere in the Country. This is partly reflected in the larger percentage of land under permanent crops in the Study Area compared to the East Bank total.

06.003 Compared to the Aghwar Shamaliya District, and even to the East Bank total, the level of utilization in the land for arable crops is appreciably lower in the Study Area, amounting to 80 percent relative to 86 and 85 percent respectively for the former two. The lower land utilization is especially found in Ajlun, Jerash and Bani Kinana where 35 - 45 percent is uncultivated. But nearly 60 percent of the unutilized arable land of the Area is located in Mafraq and Irbid, where crops are often made subject to the vagary of unstable rainfalls.

06.004 The Study Area's specialization among temporary crops is by far in cereals (especially wheat) grown largely in the rainfed condition. The area planted to cereals accounts for four-fifths of the total planted area in the Study Area, and for two-fifths of the total area under cereals in East Bank Jordan (Table 6.2). Corresponding to the extensive method of cultivation, the average size of

Table 6.1 Number of Holdings and Average Area in Use Per Holding in the Study Area, 1975

(Unit: ha)

Holding	Land for Arable Crops		Land for Permanent Crops		Total Used Area (ha)	Used Area Per Holding Total(ha) % of A.Crops	Area with irrigation facilities	
	Total	Used Area	Total	Used Area				
Irbid	10,064	25,101	22,823	4,561	29,662	2.9	84.6	313
(% of utilization)		(77.6)		(20.0)				
Kura	2,371	4,009	5,200	1,213	5,222	2.2	76.8	246
(% of utilization)		(69.1)		(23.3)				
Bani Kinana	1,824	4,914	7,734	2,058	6,972	3.8	70.5	479
(% of utilization)		(59.9)		(26.6)				
Jerash	3,624	7,553	12,471	5,122	12,675	3.5	59.6	1,282
(% of utilization)		(65.8)		(41.1)				
Mafrqa	4,578	70,056	26,627	1,035	71,091	15.5	98.5	474
(% of Utilization)		(84.5)		(3.9)				
Ramtha	2,237	21,780	7,959	663	22,443	10.0	97.0	186
(% of utilization)		(92.5)		(8.3)				
Ajlun	3,680	4,414	9,741	3,496	7,910	2.1	55.8	636
(% of utilization)		(55.8)		(35.9)				
Study Area	28,378	137,829	92,557	18,148	155,977	5.5	88.4	3,616
(% of utilization)		(80.1)		(19.6)				
Aghwar Shamaliya	3,400	10,882	5,840	1,977	12,859	3.8	84.6	9,984
(% of Irbid Gov)	(10.7)	(7.3)	(5.9)	(9.8)	(7.6)			(73.4)
Irbid Governorate	31,778	148,711	98,397	20,125	168,836	5.3	88.1	13,600
(% of East Bank)	(57.2)	(47.0)	(59.9)	(66.5)	(48.7)			(41.2)
Total East Bank	55,548	316,459	164,338	30,267	346,726	6.2	91.3	33,113

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

Table 6.2 Distribution of Irrigated Area (Temporary Crops) in the Study Area, 1975

(Unit: ha)

	Total Planted Area (Temporary Crops)	Total Irrigated Area	Cereals			Vegetables			Other Crops			
			%	Total Area Irrigated	%	Total Area Irrigated	%	Total Area Irrigated	%	Total Area Irrigated		
Irbid	17,066	89	0.5	8,806	27	0.3	3,567	47	1.3	4,693	15	0.3
Kura	3,287	28	0.8	1,813	16	0.9	611	13	2.1	863	0	0
Bani Kinana	4,434	416	9.4	2,090	24	1.1	986	379	38.4	1,358	13	0.9
Jerash	5,092	571	11.2	3,398	37	1.1	897	518	57.7	797	15	2.0
Mafrag	43,240	379	0.9	42,032	69	0.2	565	303	53.6	643	6	0.9
Ramtha	9,223	61	0.7	7,722	16	0.2	474	37	7.8	1,027	8	0.8
Ajlun	3,376	252	7.5	2,354	80	3.4	504	166	32.9	518	6	1.2
Study Area	85,719	1,797	2.1	68,215	269	0.4	7,604	1,462	19.2	9,900	66	0.7
Aghwar Shamaliya	11,153	8,476	76.0	5,100	2,832	55.5	5,460	5,233	95.8	593	411	69.3
(% of Irbid Gov.)	(11.5)	(82.5)		(7.0)	(91.3)		(41.8)	(78.2)				
Irbid Gov:	96,872	10,273	10.6	73,315	3,101	4.2	13,064	6,695	51.2	10,493	477	4.5
(% of East Bank)	(42.8)	(41.1)		(42.4)	(42.3)		(50.2)	(39.9)				
Total East Bank	226,079	25,010	11.1	172,927	7,333	4.2	26,011	16,793	64.6	27,141	884	3.3

Source: Ibid

holding in areas where cereals predominate, such as in Ramtha and Mafraq, is larger than the Study Area average, ranging from 10 to 15 ha.

06.005 In the Study Area, irrigation is mostly for growing vegetables among the arable crops, with a little over 80 percent of the total irrigated area devoted to a variety of vegetables. The similar tendency is found in the Aghwar Shamaliya and in the East Bank total, but the Area relies, or has to rely, less on irrigation. While the Study Area has only 20 percent of the total area planted to vegetables under irrigation, the same figure goes up to 96 and 65 percent for the Aghwar Shamaliya District and the East Bank total. In terms of the total planted area, the area accounts for 30 percent of the East Bank total under vegetables, but its share declines to a mere 9 percent in terms of the irrigated area under vegetables. Within the Area, the relative importance of vegetables is higher in those districts where the average size of holding is smaller from 2 to 4 ha, that is, Irbid, Kura, Bani Kinana, Jerash and Ajlun, reflected the higher profitability of vegetables per unit of land.

06.006 The Study Area has a higher percentage of agricultural land used for growing permanent crops, amounting to 12 percent of the total used area, compared to 9 percent of the East Bank total. As is the case with arable crops, however, the level of utilization is low at 20 percent, compared to 34 percent in the Aghwar Shamaliya District. As shown on Table 6.1, approximately three-fifths of the total area under permanent crops is located in Irbid, Jerash and Ajlun. Especially in the latter two districts, 40 - 45 percent of the total used area is planted to olive and various fruit trees.

06.007 The percentage of the land under permanent crops is even higher in the Aghwar Shamaliya District, but the major crops grown are different from the Study Area, reflecting the different climatic and natural conditions. As shown on Table 6.3, olives, grapes and figs, which are not infrequently interplanted, make up 93 percent of the total area (compact plantation only) in the Study Area, while citrus fruits account for 82 percent in the northern Chor area. The average size of holding is generally small at a little less than 1 ha, although Jerash, Ajlun and Bani Kinana show slightly larger sizes.

06.008 Table 6.4 shows the distribution of major livestock and poultry in the Study Area. The Study Area with its more favourable climatic conditions has a larger share of large ruminants, accounting for 60 percent of the East Bank total, whereas for chickens the Area makes up only 26 percent, reflecting larger-scale commercial undertakings are found elsewhere in the Country. For sheep and goats, the Area accounts for about 40 percent of the East Bank total.

Table 6.3 Area under Permanent Crops (Compact Plantation) in the Study Area, 1975

	No. of Holdings	Olives, Grapes & Figs		Citrus Trees		Pome Fruit Trees		Others		Total Area	Average size of Holding.
		Area (ha)	Holdings	Area	Holdings	Area	Holdings	Area	Holdings		
Irbid	6,943	4,678	145	31	141	17	541	157	4,883	0.6	
Kura	1,833	1,145	18	4	52	10	306	720	1,232	0.6	
Bani Kinana	1,472	1,969	92	29	28	7	280	75	2,081	1.1	
Jerash	3,755	5,883	141	110	152	76	385	220	6,288	1.4	
Maftaq	1,358	1,036	9	3	44	14	252	90	1,143	0.7	
Ramtha	980	648	14	8	20	2	43	45	704	0.7	
Ajlun	3,968	4,221	12	6	376	289	237	108	4,624	1.0	
Study Area	20,309	19,580	431	191	813	415	2,044	1,415	20,955	0.9	
Aghwar Shamaliya	256	130	1,635	1,542	20	4	203	207	1,883	0.9	
Irbid Gov.	20,565	19,710	2,066	1,733	833	419	2,247	1,622	22,838	0.9	

Source: Ibid

Table 6.4 Number of Livestocks and Poultry Per Holding in the Study Area, 1975

	Average No. per Holding			Total No. of Livestocks & Poultry					Permanent Pastures and Meadows	
	Cattle	Sheep	Goats	Chickens	Cattle	Sheep	Goats	Chickens	Total Area	% of Cultivated Pastures
Irbid	3.1	29.0	11.5	21.4	7,316	25,639	20,088	150,188	24	21.2
Kura	4.0	17.7	14.8	14.3	2,997	2,772	10,323	21,089	1	100.0
Bani Kiana	3.7	26.5	18.2	25.8	2,495	3,394	8,347	29,987	5	100.0
Jerash	3.0	23.3	18.7	23.4	1,647	9,009	19,610	55,783	4	100.0
Mafraq	3.3	67.6	19.7	78.5	278	147,691	48,551	278,622	4	100.0
Ramtha	2.7	71.1	11.8	39.4	604	41,793	5,447	61,202	5	0
Ajlun	3.8	15.0	18.0	13.4	3,184	1,739	21,492	26,373	5	100.0
<u>Study Area</u>	3.4	52.2	16.6	35.4	18,521	232,037	133,858	623,244	47	48.6
Aghwar	4.3	34.4	14.2	13.2	3,421	19,860	17,902	28,765	4	100.0
Shamaliya										
(% of Irbid Gov.)					(15.6)	(7.9)	(11.8)	(4.4)	(7.8)	
Irbid Gov.	3.5	50.2	16.3	32.9	21,942	251,897	151,760	652,009	51	52.7
(% of East Bank)					(70.6)	(44.2)	(46.5)	(27.5)	(3.3)	
Total East Bank	3.7	51.5	17.3	73.6	31,078	569,479	326,309	2,370,585	1,559	14.4

Source: Ibid.

06.009 Within the Study Area, cattle are found in those districts with more temperate climate and thus with richer vegetational cover, such as Irbid, Ajlun and Kura, whereas sheep and, to a lesser extent, goats are found in more arid western parts like Mafraq and Ramtha. Nearly 70 percent of chickens are kept in Mafraq and Irbid where small- to medium-scale commercial undertakings have been expanding rapidly. Generally speaking, the average size of holding is small in the Study Area as well as elsewhere in the Country. Only in Mafraq and Ramtha, the average numbers per household is appreciably larger than the Study Area average or the East Bank average with regard to sheep and chickens.

6.2 Farming Household Income in the Study Area

6.2.1 General

06.010 In order to obtain first-hand information on how rain-fed agriculture is managed in the Study Area, a field survey was undertaken from July to August of 1978. This section summarized the results of the survey which covered 100 farming households in various parts of the Study Area.

06.011 It has to be pointed out first that the interviewed households may not be strictly representative of some 30,000 holdings enumerated in the agricultural Census of 1975 referred to in the preceding section. For, they were selected somewhat arbitrarily, given the limited time available for the survey. However, general care was taken to choose those households whose farming pattern more or less conformed to the local pattern of land use. Besides, the data are shown in aggregate terms by district in order to make them more representative of local farming practices, and if circumstances do not allow such aggregation, some adjustments of the data are made to give a more representative picture of the situation.

06.012 Another point which has to be made is that questions on production and cost were phrased in money terms. The primary reason was that the interviewees had better memory of cash flows than of physical sizes of agricultural input and output. This approach resulted, on the one hand, in understating the size of outputs of those crops which were consumed by the respective households. On the other hand, the value of family labour was totally excluded. This omission is perhaps excusable, because data on labour input can only be obtained from a much longer period of observation than was available to this survey. On the whole, it is believed that the data gathered during the survey can be a reasonable pointer of the major characteristics of the farming in the largely rain-fed Study Area.

6.2.2 District Summaries

a. Ramtha Mutserfieh

06.013 As shown already on Table 6.2, 84 percent of the area planted to temporary crops in the Mutserfieh (District) was under cereals and only 3 percent of the total used area was planted with permanent crops. The surveyed households show a much lower percentage of the area under wheat (Table 6.5). This is partly due to the recently increased area planted to olives which are largely young, including even "mature" trees on the table (the net income per ha from mature trees could be much higher, judging from the data for Jerash and Ajlun). Another reason is that the rainfall was very poor in 1978 with a result that more land was planted to pulses (lentils and vetches), which were, however, also affected by the drier weather. The bad weather affected the harvest of water-melons which were cultivated on the unirrigated land.

06.014 The aggregate net income from crops amounts to JD 4,091, or JD 57 per household per month. The profitability of wheat might have been higher than the figure of JD 57 per ha shown on the table under more favourable weather, since two of the surveyed households whose crops did not fail under rainfed conditions netted JD 159 per ha. Judging from the level of income per ha elsewhere in the Study Area, olives will become an important source of stable income in the District where the fluctuations of precipitation affect the level of agricultural output year by year.

06.015 Another supplementary source of income is sheep and goats, which brought in JD 32 per month per household. Income from non-agricultural sources is also considerable at JD 54, but this was due to the existence of one household which netted JD 2,500 per year from trading of trucks. When this household is excluded, the average monthly household income would be about JD 100, instead of JD 142 shown on the table.

b. Mafraq Mutserfieh

06.016 In terms of the district-wise land use, Mafraq is similar to Ramtha, with its predominance of rainfed arable crops, especially cereals, and lower percentage of the area planted to permanent crops. The surveyed households show these characteristics to the extent that about two-thirds of the total area was planted to wheat and a little over 6 percent was under olives (Table 6.6).

06.017 However, they are unusual in that nearly 15 percent of the aggregate used area was under irrigation, which pushed up the level of income accruing from crops, especially vegetables. Virtually all of the irrigated area belongs to three households, each of which also possesses an unirrigated land of considerable size (339 ha in aggregate). One of them, whose unirrigated land is the smallest of the three, raises a flock of sheep numbering 2,000 heads

Table 6.5 Farming Household Income in Ramtha Mutserfieh

Table No. of Households 6
 Average Size of Household 8.7 persons
 Total Used Area 229.0 ha
 Used Area/Household 37.5 ha

Crops	Planted Area ha	Gross Sales JD	Prod. Cost JD	Net Income		Net Income/ha JD
				JD	JD	
Wheat	53.0	5,232.0	2,190.5	3,041.5	57.4	
Pulses	46.5	1,674.0	1,625.0	49.0	1.1	
Melons	1.6	130.0	236.0	- 106.0	-66.2	
Olives	23.5	2,217.0	1,110.0	1,107.0	47.1	
(Newly planted & Immature)	(10.0)	(469.0)	(522.0)	(-53.0)		
(Mature)	(13.5)	(1,748.0)	(588.0)	(1,160.0)	(85.3)	
Aggregate Income from Crops				4,091.5		
Aggregate Income from Livestocks and Poultry				2,280.0		
Aggregate Income from Non-agricultural Sources				3,880.0		
Total				10,251.5		
Average Monthly Household Income				56.8		
From Crops				31.7		
From Livestocks and Poultry				53.9		
From Non-agricultural Sources				142.4		
Total						

Table 6.6 Farming Household Income in Mafrag Mutserfieh

Total No. of Households 16
 Average size of Household 8.5 persons
 Total Used Area 637.5 ha (93.0 ha irrigated)
 Used Area/Household 39.6 ha

Crops	Planted Area ha	Gross Sales		Prod. Cost		Net Income		Net Income/ha	
		JD	JD	JD	JD	JD	JD	JD	JD
Wheat	372.5	2,006.0	4,478.0	- 2,472.0	- 6.6				
Barley	75.5	142.0	909.5	- 767.5	-10.2				
Vegetables	82.0	140,250.0	48,160.0	92,090.0	1,123.0				
Olives	36.7	2,140.0	1,861.0	279.0	7.6				
(Newly planted)	(18.2)	(-)	(1,561.0)	(-1,561.0)					
(Mature)	(18.5)	(2,140.0)	(300.0)	(1,840.0)	(99.5)				
Aggregate Income from Crops				89,129.5	(939.5)				
Aggregate Income from Livestocks and Poultry				24,760.0	(3,260.0)				
Aggregate Income from Non-agricultural Sources				8,230.0	(7,510.0)				
Total				122,119.5	(11,709.5)				
Average Monthly Household Income				464.2	(6.0)				
From Crops				129.0	(20.9)				
From Livestocks and Poultry				42.9	(48.1)				
From Non-agricultural Sources				636.1	(75.0)				
Total									

Note: Income figures in parentheses exclude three households which practice mechanized irrigated farming in a larger scale.

and accounted for 80 percent of the aggregate net income from livestock. As a result, the average monthly household income reaches a surprising level of JD 636, of which 73 percent comes from crops, despite the fact that most of the area planted to wheat failed due to the dry weather (four-fifths of the gross sales of wheat accrued from the irrigated farm which belonged to one of the three households above).

06.018 If the three successful farmers are excluded, the average used area per household becomes 16 ha, a figure very close to the average size of holding shown on Table 6.1. The average monthly income per household then decreases to JD 75, and the income from crops accounts for only a fraction (8 percent) which came partly from small-scale vegetable growing and partly from young olive trees. For average farmers, the income from unstable rainfed cereal cultivation apparently has to be supplemented by non-agricultural activities and also by planting olive trees where conditions favour it.

c. Jerash Mutserfieh

06.019 The characteristics of the District is its higher percentage of the area under permanent crops and of the area under irrigation (Tables 6.1 and 6.2). The surveyed households have, as shown on Table 6.7, these characteristics, though the percentage of the irrigated area as well as the average size of farm are larger than the district average shown on Table 6.1.

06.020 As was the case in Mafraq, vegetables grown on irrigated land is highly profitable, although the cost of production is also very high compared to the rain-fed cultivation. The net income from vegetables made up nearly three-fifths of the aggregate income from crops, and amounted to about JD 440 per ha. The profitability is, however, much lower than in Mafraq. The difference largely comes from the smaller-scale operation in Jerash (average 1.8 ha) than in Mafraq (average 16 ha) where the farming is partly mechanized. Following vegetables, permanent crops accounted for one-fourth of the aggregate income from crops. Compared to Ramtha and Mafraq where immature and young trees are dominant, the profitability of olives are high, reaching about JD 100 per ha. The total income from crops was therefore high, at JD 105 per household per month.

06.021 As shown on the table, the aggregate net income from livestock in Jerash is very high, and accounts for two-thirds of the total income. This is due to the presence of two households which specialize in livestock and poultry raising. One of them keeps 149 heads of Holsteins (86 adults) and earns about JD 27,000 a year from sales of milk and milk products and calves. The other keeps 10,000 layers and nets about JD 24,000 per year from sales of eggs. If these households are excluded, the income from livestock

Table 6.7 Farming Household Income in Jerash Mutserfieh

Total No. of Households 13
 Average size of Household 7.2 persons
 Total Used Area 106.5 ha (38.4 ha irrigated)
 Used Area/Household 8.2 ha

Crops	Planted Area ha	Gross Sales		Prod. Cost		Net Income		Net Income/ha	
		JD	JD	JD	JD	JD	JD	JD	JD
Wheat	8.2	328.0	258.0	70.0	8.5				
Barley	1.0	30.0	20.0	10.0	10.0				
Vegetables	26.8	19,225.0	7,484.0	11,741.0	438.1				
Olives	35.9	6,630.0	3,023.5	3,606.5	100.5				
(Newly planted)	(7.3)	(-)	(245.0)	(-245.0)					
(Mature)	(28.6)	(6,630.0)	(2,778.5)	(3,851.5)	(134.7)				
Fruits	-	2,080.0	1,490.0	590.0					
Aggregate Income from Crops				16,017.5					(16,002.5)
Aggregate Income from Livestocks and Poultry				52,330.0					(1,080.0)
Aggregate Income from Non-agricultural Sources				10,572.0					(8,772.0)
Total				78,919.5					(25,854.5)
Average Monthly Household Income				105.4					(121.2)
From Crops				335.4					(8.2)
From Livestocks and Poultry				69.5					(66.5)
From Non-agricultural Sources				510.3					(195.9)
Total									

Note: Income figures in parentheses exclude two large households who grow cows and chickens.

will decline to JD 8 per month per household instead of JD 335. Together with income from non-agricultural sources, the average monthly household income comes to JD 196 rather than JD 510.

d. Ajlun Mutserfieh

06.022 The characteristics of the District as a whole is similar to Jerash (Table 6.1 and 6.2). The surveyed households might be closer to the district characteristics than was the case with those in Jerash in that the proportion of the rainfed area under cereal crops is larger, with a smaller percentage of the area under irrigation (Table 6.8). The major source of income is permanent crops, which made up three-fourths of the total income from crops. The profitability of irrigated vegetables per ha is just as high as in Jerash, but does not contribute much due to its much reduced area. Coupled with the failure of cereal crops, the average monthly income from crops per household was JD 38, or only 36 percent of the level in Jerash. With much lower income from livestock and non-agricultural sources, the total monthly income per household was JD 93, less than a half of the income in Jerash.

e. Irbid Gatha

06.023 The characteristics of the Gatha (sub-district) can be perhaps described as intermediate between Mafraq and Ramtha, on the one hand, and Jerash and Ajlun, on the other. The District has a low percentage of the area under irrigation, while the total used area includes a substantial area planted to permanent crops (Table 6.1). What is characteristic of the District is that it has a more diverse cropping pattern, as seen from the higher percentage of "other crops" on Table 6.2. The surveyed households exhibit these characteristics to a great extent. The average size of holding is considerably larger among the surveyed households than the district-wise figure on Table 6.9. If two households using more than 50 ha (196 ha in aggregate) are excluded, the average size reduces to 9 ha, though it is still larger than the district average in Table 6.1.

06.024 As already mentioned in relation to other districts, rainfed crops did not fare well in the Study Area in 1978. Cereal crops were most affected by the dry spell in the District, although all the crops grown by the surveyed households were unirrigated. The reason is that more profitable cash crops which require more intensive care, such as vegetables, melons and tobacco, are usually planted on the land with better water-retaining capacity. The profitability of wheat in fact varied in the District, amounting to JD 97 per ha in the northwestern parts (Taiyiba and Samma), compared to minus JD 6 in the southeastern parts less favored by precipitation even in normal years (Nu'eima and Kittim). Because of the generally poor harvests of arable crops, a little over 50 percent of the total income from crops accrued from olives and fruits.

Table 6.8 Farming Household Income in Ajlun Mutserfieh

Total No. of Households 16
 Average Size of Households 7.6 persons
 Total Used Area 130.2 ha (8.6 ha irrigated)
 Used Area/Household 8.6 ha

Crops	Planted Area ha	Gross Sales JD	Prod. Cost JD	Net Income	
				JD	Net Income/ha JD
Wheat	31.3	1,041.0	1,081.5	- 40.5	- 1.3
Barley	2.7	57.0	108.0	- 51.0	- 18.8
Vegetables	4.0	2,450.0	481.0	1,969.0	492.2
Olives	28.7	6,270.0	1,749.0	4,521.0	157.5
(Newly planted)	(3.2)	(-)	(200.0)	(-200.0)	
(Mature)	(25.5)	(6,270.0)	(1,549.0)	(4,721.0)	(185.1)
Fruits	-	1,685.0	808.0	877.0	
(Grapes)	-	(1,165.0)	(573.0)	(592.0)	
(Others)	-	(520.0)	(235.0)	(285.0)	
Aggregate Income from Crops				7,275.5	
Aggregate Income from Livestocks and Poultry				2,160.0	
Aggregate Income from Non-agricultural Sources				8,452.0	
Total				17,887.5	
Average Monthly Household Income					
From Crops					37.9
Livestocks and Poultry					11.2
Non-agricultural Sources					44.0
Total					93.1

Table 6.9 Farming Household Income in Irbid Gatha

No. of Households 26
 Average Size of Household 9.2 persons
 Total Used Area 411.2 (215.9) ^{1/}
 Used Area/Household 15.8 ha (9.0 ha) ^{1/}

Crops	Planted Area ha	Gross Sales		Prod. Cost		Net Income	
		JD	JD	JD	JD	JD	JD
Wheat	202.7	7,590.0	4,881.8	2,708.2	13.4		
Barley	3.0	253.0	178.2	74.8	24.9		
Pulses	49.3	5,308.0	2,824.5	2,483.5	50.4		
Melon	20.8	3,730.0	970.0	2,760.0	132.7		
Vegetables	1.4	150.0	28.0	122.0	87.1		
Tobacco	4.5	340.0	- 2/	340.0	75.5		
Olives	60.7	11,916.0	3,761.6	8,154.4	134.3		
(Newly planted)	(10.6)	(118.0)	(537.0)				
(Mature)	(50.1)	(11,798.0)	(3,224.6)	(8,573.4)	(171.1)		
Fruits	-	1,795.0	1,385.5	409.5			
Aggregate Income from Crops				17,052.4			(16,965.4) ^{3/}
Aggregate Income from Livestocks and Poultry				30,170.0			(1,420.0) ^{3/}
Aggregate Income from Non-agricultural				32,432.0			(30,432.0) ^{3/}
Total				79,654.4			(48,817.4) ^{3/}
Average Monthly Household Income				54.7			(56.6) ^{3/}
From Crops				96.7			(4.7) ^{3/}
From Livestocks and Poultry				130.9			(101.4) ^{3/}
From Non-agricultural Sources				255.3			(162.7) ^{3/}
Total							

Notes: ^{1/} Figures in parentheses excludes two households which cultivate more than 50 ha.

^{2/} The cost is all provided by the Jordanian Tobacco Co.

^{3/} Excludes one household which specializes in poultry and cattle raising.

06.025 The higher income from livestock in due to the presence of a household which produces 32,500 broilers a year and keeps 10 milch cows and nets approximately JD 29,000 per year. If this household is excluded, the monthly income from livestock per household decreases to JD 5. The total monthly household income then comes to about JD 163 instead of JD 255 as shown on the table.

06.026 What has to be mentioned in addition is that the non-agricultural income becomes higher than the combined income from crops and livestock among the surveyed households, when the successful livestock farmer is excluded. Almost 90 percent of them have other jobs or sources of income in addition to agriculture. The corresponding figures for Jerash and Mafraq, for instance, are 56 and 38 percent. The higher non-agricultural income might be related to the urbanization of the Irbid District where more employment opportunities are available than elsewhere in the Study Area.

f. Bani Kinana Gatha

06.027 The Gatha Sub-district as a whole has a pattern of land use similar to the Irbid Gatha, although the percentages of the area under permanent crops and of the area provided with irrigation facilities are appreciably higher than the latter (Table 6.1). The surveyed households have proportionately more land planted to permanent crops (Table 6.10). The irrigated area, though small, is all devoted to the permanent crops.

06.028 As shown on Table 6.10, wheat did well enough in the Sub-district, netting a little more than JD 100 per ha. As long as the weather is favorable, wheat could be just as profitable as olives, sometimes reaching more than JD 150 per ha as already mentioned in relation to the Ramtha District. Helped by generally better harvests of arable crops, the monthly household income from crops amounted to JD 77, which is substantially higher than among the households in Irbid Gatha.

06.029 The monthly income from livestock and poultry is also higher at JD 36 than the adjusted figure for Irbid. This is because there are three households who specialize in poultry (broilers) or put more stress on sheep raising (100 heads) than farming. But their operation is much smaller than the entrepreneurial farmers in Irbid and Jerash, netting from JD 80 to 200 per month. The average household income from non-agricultural activities is just as high as among the households in Irbid, and ten out of thirteen hold other jobs. The total monthly household income thus comes to JD 222.

g. Kura Gatha

06.030 The Sub-district as a whole is similar to Bani Kinana in that it has appreciably higher percentages of land under irrigation

Table 6.10 Farming Household Income in Bani Kinana Gatha

Total No. of Households 13
 Average size of Household 10.2 persons
 Total Used Area 136.7 ha (2.6 ha irrigated)
 Used Area/Household 10.5 ha

Crops	Planted Area ha	Gross Sales JD	Prod. Cost JD	Net Income	
				JD	Net Income/ha JD
Wheat	30.7	4,225.0	1,106.5	3,118.5	101.6
Barley	0.8	115.0	52.0	63.0	78.7
Pulses	12.4	1,528.0	697.0	831.0	67.0
Melons	5.5	550.0	247.5	302.5	55.0
Olives	62.5	10,688.0	4,445.0	6,223.0	99.6
Fruits	-	1,645.0	165.0	1,480.0	
Aggregate income from crops				22,018.0	
Aggregate income from livestock and Poultry				5,690.0	
Aggregate income from Non-agricultural sources				15,720.0	
Total				<u>33,428.0</u>	
Average Monthly Household Income					
From Crops					77.0
From Livestocks and Poultry					36.5
From Non-agricultural Sources					100.8
Total					222.0

and of land planted to permanent crops compared to the Irbid Gatha (Table 6.1) The surveyed households, however, do not have irrigated land. What makes the Sub-district different from Bani Kinana is that the scale of farming operation is considerably smaller than the latter (Table 6.11).

06.031 As seen from the high percentage of newly planted olive trees, the surveyed households have recently started to increase the area under this crop in response to the Government-subsidized promotional campaign. Due to the poor harvests of arable crops and the large share of immature olive trees, the net income from crops is very small at JD 9 a month per household. Coupled with the even smaller income from livestock, the households are dependent on non-agricultural earnings which make up over 80 percent of the monthly average household income of JD 77.

6.2.3 General Findings and Implications

06.032 According to the Agricultural Census mentioned in the beginning of this chapter, the farm population numbered some 400,000 in 1975, accounting for 20 percent of the total East Bank population. The percentage goes up to 41 percent in the Irbid Governorate where 55 percent of the total East Bank farm population, or 233,000, reside. As for the Study Area, the farm population numbered 209,000, making up 40 percent of the total inhabitants.

06.033 The field survey has revealed that the average farming households do not support their families solely on the income from agricultural operation, with only a few exceptions. The average income from non-agricultural sources amounted to some JD 40 - 100 per month, excluding those farmers with exceptional entrepreneurship. Such non-agricultural earnings, largely from the public sector employment and remittances from abroad, made up from around 35 to well over 80 percent of the total household income.

06.034 The reliance on non-agricultural sources of income is largely necessitated by the high risk involved in the rain-fed agricultural operation. As mentioned in the preceding section, the profitability of rain-fed wheat ranges from deficits to as much as JD 150 per ha. In the livestock sector, the income also fluctuates year by year, as long as the traditional grazing method of sheep and goats is concerned, because natural pastures will be severely depleted in dry weather.

06.035 The point must be stressed that the surveyed households generally have larger holdings on average than the average size indicated in the Agricultural Census. The monthly income from crops alone that ranged from JD 40 - 100 among the surveyed households may not be exceptionally low by itself, because a substantial number of urban households are believed to be living on the income in that

Table 6.11 Farming Household Income in Kura Gatha

Total No. of Households 10
 Average Size of Household 7.8 persons
 Total Used Area 54.8 ha
 Used Area/Household 5.5 ha

Crops	Planted Area ha	Gross Sales JD	Prod. Cost JD	Net Income/ha	
				JD	JD
Wheat	13.4	849.0	594.0	255.0	19.0
Barley	4.6	172.0	116.0	56.0	12.0
Pulses	10.9	254.0	264.0	- 10.0	- 0.9
Melons	2.0	300.0	145.0	155.0	77.5
Vegetables	0.9	33.0	25.5	75.0	83.3
Olives	18.7	1,750.0	1,197.0	553.0	29.6
(Newly planted)	(9.7)	(50.0)	(561.0)		
(Mature)	(9.0)	(1,700.0)	(636.0)	(1,064.0)	(118.2)
Fruits	-	210.0	30.0	180.0	
Aggregate Income from Crops				1,084.0	
Aggregate Income from Livestocks and Poultry				450.0	
Aggregate Income from Non-agricultural Sources				7,770.0	
Total				9,304.0	
Average Monthly Household Income					9.0
From Crops					3.7
From Livestocks and Poultry					64.7
From Non-agricultural Sources					77.4
Total					

range in the Study Area. ^{1/} However, the agricultural income would be much reduced, when the size of holding is between 2 to 4 ha, instead of 10 ha and up. Indeed, it was found in the Kura Sub-district, where the average size of holding was smallest at 5.5 ha, that the mean household income from crops was only JD 9 per month due to the failure of rainfed arable crops and the immaturity of tree crops. Without non-agricultural earnings, these households could not tide over the fluctuations of the agricultural income. Basically the same thing would apply to many other farming households with small holdings in the Study Area.

06.036 The future agricultural development depends, therefore, on the degree to which the farming income can be made more stable so that the agricultural operations be more remunerative on the steady basis rather than being profitable only when the weather is favorable. The general direction at which development efforts should be aimed is already partly clear from the foregoing descriptions of the interviewed households.

06.037 The cultivation of vegetables is profitable, in fact could be very profitable when it is carried out on irrigated land. Even though it is a source of high and stable income, however, it is not expected to have great impact on the agricultural development in the Study Area as a whole, because the availability of water resources in the Area is rather limited. Nonetheless, it will be necessary to promote the irrigated cultivation of vegetables where availability of water is assured and at the same time to diffuse more efficient ways of utilizing limited water and higher-yielding varieties of crops. In addition, possibilities of harnessing the seasonal surface water run-offs should be tested, not primarily for the expansion of vegetable cultivation on a grand scale, but for providing opportunities for small-scale operation in areas where irrigated or semi-irrigated farming has been hitherto virtually non-existent (for this point, see Chapter V).

06.038 Another stable and profitable source of income is permanent crops, especially olive trees. The large-scale expansion program has been launched by the current Five Year Plan, and the farmers are generally highly receptive to the encouragement given by the Government in the forms of subsidies given in kind and land allotment. During the course of the field survey, however, it was found that a little more push, or assistance from the public sector would help expedite the planting of olive trees. In some of the northern and western parts of the Study Area where rainfalls are generally more favorable for olive planting than elsewhere, the extensive removal

^{1/} Of 50 households interviewed in the Municipality of Irbid, 17 or one-third were found to earn JD 100 or less per month.

of gravels and boulders is necessary before expanding the area planted to olive trees. Due to the heavy and time-consuming work required for land preparation, the pace of expansion is slower than the farmers involved in the operation wish it to be. Public assistance in this respect will greatly help raise the speed of expansion and thus shorten the waiting period necessary before all the planted area starts producing fruits. It goes without saying that the scale of public assistance in the form of distribution of seedlings and water should be enlarged to increase the number of beneficiaries.

06.039 Another important source of income is livestock and poultry. The high profitability of commercial poultry or dairy farming started by some individual households in the Study Area have been already mentioned in the preceding section. According to the information obtained during the field survey, the cost of raising broiler chickens is 650 Fils per broiler and the profit is 100 Fils. Supposing that a farm turns out broilers six times a year, a farm of 2,000 chickens could earn JD 100 per month. On the other hand, a female dairy calf is said to cost about JD 100 and after maturity can produce JD 320 worth of milk per year in net terms. In theory, at least, 4 heads of cows can bring in a monthly income of approximately JD 100. Of the two types of undertakings, poultry farming is probably easier for ordinary farmers to start either individually or collectively, in view of its smaller or lesser requirements of space, initial investment and technical knowhow. More intensified extension works and better provisions of veterinary services are desired to promote poultry and dairy farming in the Study Area.

06.040 Another finding with regard to the livestock sub-sector is that the traditional method of sheep raising is just as profitable. A farmer could net about JD 1,000 from the sale of 100 sheep, after subtracting the initial purchase price of JD 3 per hogling and the wage of JD 700 - 800 per year paid to a commissioned shepherd. In terms of the efforts expended by the owner himself, sheep raising is likely to be more profitable than poultry and dairy farming which will demand more intensive daily care.

06.041 It is inadvisable, however, to conclude easily from the above finding that traditional sheep raising should be expanded. For, uncontrolled sheep grazing in a grander scale will be very harmful to the natural environment, and the traditional method depends precisely on the availability of natural pastures free of charge. Nonetheless, controlled promotion of sheep raising should be considered in order to diversify sources of livelihood for the farmers whose fortune fluctuates in accordance with weather conditions.

06.042 In addition to the promotion of the cash crops and livestock which are already established in the Study Area, it is advisable to introduce new crops or new sources of income to diversify productive activities of the agricultural sector in the Study Area.

Specifically, it is proposed to experiment on the cultivation of Jerusalem artichoke and the fish farming.

06.043 Jerusalem artichoke (*Helianthus tuberosus*) is a tuber crop which yields sugar (fructose 85 percent and glucose 15 percent) normally at an extraction rate of 12 percent. Its cultivation was tested under rainfed conditions in Thailand, Indonesia and the Mariana Islands, and the crop nearing harvest has been found susceptible to blight where the moisture content of the soil is high. The drier climate in the northern Jordan appears suitable in this respect. The yield per hectare is tentatively expected to be around 30 tons on rainfed conditions and 100 tons under irrigation. As the crop matures in four months, double cropping is possible, avoiding the winter when the frost might damage the crop. Simply calculated, 5,000 ha planted to Jerusalem artichoke could yield 18,000 tons of sugar on rainfed conditions, and, when irrigated, the amount would be more than treble to 60,000 tons. Tubers can be stored relatively easily when dried, which suits the continuous operation of an extraction factory or exportation. The meals after sugar extraction can be used as animal feeds.

06.044 Due to the high percentage of fructose, sugar extracted from Jerusalem artichoke is in liquid state, the condition which is probably unfamiliar to Jordanian consumers and thus might discourage their immediate and wide adoption. However, liquid sugar will be readily used for manufacturing, for instance, canned juices and soft drinks, and can be granulated if the supply of tubers are sufficiently large and constant to warrant the construction of a conversion plant. If the introduction of this crop is successful, Jordan will be able to reduce its total dependence on imported sugar.

06.045 Many varieties of fish and aqualine fauna can thrive well in fresh waters, when the water temperature remains above 20 degrees Centigrade the year round. The area along the Yarmouk River appears suitable to introduce fish farming in this respect. Suggested species are carp, tilapia, eel, snapping turtle and frog, of which the last three are exportable to Europe. Except for the fries which will have to be imported because hatching requires special facilities and trained management, fish culture could do with Jordan's domestic resources. Composts made of cattle droppings can be used to raise earthworms which are the best feedstuffs for younglings of aqualine fauna. As a commercial undertaking, therefore, the integration with dairy farming is possible and promising.

6.3 Project Recommendations for 1981 to 1985

6.3.1 Land Reclamation Mainly for the Expansion of Olive Production

06.046 The Study Area as a whole shows a low level of land utilisation according to the Agricultural Census of 1975. The

project is to reclaim private farmers' unutilized land by removing gravels and boulders by bulldozers. The proposed areas are Kura, Taiyiba and Ajlun. Assuming 5,000 hectares to be reclaimed, the estimated cost is JD 0.2 million. The unit cost used for this estimation is JD 40 per hectare.

6.3.2 Construction of Agricultural Service Roads

06.047 In connection with the reclamation project, construction of service roads will be necessary to provide better access to the newly opened land. Assuming an aggregate extension of 100 km, the cost is estimated to be JD 2 million.

6.3.3 Olive Promotion

06.048 The project is to expand the Government assistance program for olive planting in various locations mainly in Bani Kinana, Irbid, Taiyiba and Kura. Assuming the distribution of seedlings and water necessary for rooting for 5,000 hectares, the project cost is estimated to be JD 1 million. Marketing activities on the future market for the olive produced however will be necessary to secure the earnings of olive producers. The breakdown of the total cost is shown on the following table:

Breakdown of Total Cost

Seedling	$0.3(\text{JD/plant}) \times 100(\text{plants/ha})$ $\times 5,000(\text{ha})$	150,000
Water	$600(\text{drum cans/ha/2 years}) \times$ $0.16(\text{JD/drum can}) \times 5,000(\text{ha})$	480,000
Land Preparation	$5(\text{JD/ha}) \times 5,000(\text{ha})$	25,000
Fertilizer	$1(\text{t/ha/2 years}) \times 35(\text{JD/t})$ $\times 5,000(\text{ha})$	175,000
Labor and Others	$34(\text{JD/ha}) \times 5,000(\text{ha})$	170,000
Total		1,000,000

6.3.4 Jerusalem Artichoke Experimentation

06.049 The project is to establish an experimental field with a total area of 2 hectares in or around the agricultural station in Mafraq. If cultivation is proved successful, the field will function as the initial seed-tuber multiplication center. The cost of the project is estimated to be JD 0.3 million, excluding the land cost.

6.3.5 Construction of a Sugar Extraction Factory

06.050 If the experimental cultivation of Jerusalem artichoke is successful, 45 tons of seed tubers will be able to be produced from the above experimental field of 1.5 hectares, at the seeding rate of 1 ton per hectare. These seed tubers could be further multiplied in successive stages with cooperation from some farmers with irrigated land in the vicinity (in fact, one of the interviewed farmers during the field survey showed interest). When the production of 50,000 tons of tubers is judged to be feasible, the construction of an extraction factory will be necessary somewhere near the Municipality of Irbid. The estimated cost will be JD 2.2 million. For the conversion into granulated sugar, an estimated cost of JD 0.5 million will be required to install additional facilities and equipment.

06.051 During the process of experimentation and the earlier phase of multiplication, part of the produces can be processed experimentally at the vocational training center which is expected to be relocated to Sal (see the section on project recommendations in Chapter IV on Human Resources).

6.3.6 Fish Culture Experimentation Center

06.052 Fries usually require feeds 15 times more than their weight at maturity. To produce one ton of fish or other aqualine fauna, 15 tons of earthworms are therefore needed. It is tentatively estimated that 0.025 hectare of land spread with compost from cattle droppings can produce 15 tons of earthworms. To test the commercial viability of fish culture in integration with dairy farming, it is proposed to set up an experimental fish farm near Hemma. The estimated cost is JD 1 million.

6.3.7 Livestock Promotion

06.053 The project is to promote sheep raising in such areas as Ajlun, Jerash, Kura and Taiyiba with relatively high rainfalls. Assuming 1,000 heads of sheep per village (100 heads per farmer and ten farmers per village), it is necessary to construct a rain collecting well with a capacity of 500 tons for keeping sheep for nine months and to secure 60 hectares of improved pasture which is

assumed to produce 600 tons of grass for feeding them. The pasturage could be secured on the unused Government-owned land in the vicinity of a village. Appropriate care and arrangement will be necessary, however, to keep the grazing sheep from wandering into the surrounding areas and thus damaging the natural or cultivated vegetation. Assuming that 50 villages receive assistance, the total cost is estimated to be JD 3.5 million.^{2/}

2/ Expansion of Grazing Land for Sheep

General:

- (1) In the course of the field survey, it was found that traditional sheep raising was a more profitable source of income compared to other modes of agricultural undertakings and that it could be expanded to supplement, to a substantial degree, the farm income which is subject to vagaries of weather.
- (2) In the hilly area extending from Jerash to Taiyiba, it is reported that 20 to 30 percent of the newly planted trees in orchards and forest conservation areas are annually eaten up by nomadic flocks of sheep and goats. Some of the agricultural officers in charge of the area suggested that pastures could be provided in the government-owned afforestation areas to protect forest trees and at the same time to accommodate for the grazing needs of sheep and goats.
- (3) The area in question has an annual precipitation of about 500 mm, and farmers have a traditional technique of storing rainfalls in small collection reservoirs. These reservoirs, when constructed in adequate number, will be able to supply water for sheep and goats as well.

Project Description:

- (1) To provide pastures at 50 locations, each accommodating for approximately 1,000 sheep. A location should be selected to be accessible to 50 villages, from which, it is tentatively assumed, 10 farming families each with 100 heads of sheep will utilize the respective pasture.

Assumptions:

(1) Water supply:

500 tons per year at each location
(1.8 l/day/head for nine months)
A reservoir (5m x 10m x 10m) in each village

(2) Demand for pasture foliage:

600 tons per year at each location (600 kg/head
per year)
60 hectares of pasture at each location (estimated
foliage production at 10 ton/ha/year)

Cost of the Project:

(1) Reservoir:

JD 60 - 70 thousand/village = JD 60 - 70 thousand

(2) Pasture:

45 JD/ha x 60 ha/village = JD 2.7 thousand

(3) Sheep:

3 JD/head x 100 heads x 10 farmers = JD 3 thousand

Sub Total = JD 65-75 thousand/village

Grand Total = JD 3,250-3,750 thousand/50 villages

CHAPTER VII

MANUFACTURING AND MINING

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MANUFACTURING AND MINING

7.1 Industrial Development in the Past and Present Situation

7.1.1 Industrial Development in the East Bank

a. Industrial Development in the Past

07.001 The manufacturing and mining sector in the Kingdom has achieved a steady growth in the recent years. Between the two Industrial Census years of 1959 and 1974, the number of establishments increased by three fold from 2,506 to 7,476 and the number of persons engaged in the sector by 2.5 times as much from 10,928 to 26,928. 1/ These figures include the small scale industries and handicraft (those employing 4 persons or less) and refer to the East Bank only. The sector, together with the electricity and water sector, grew in terms of value added at the average of 16 percent per annum in the period from 1959 through June 1967. 2/ Having experienced inevitable stagnation in the aftermath of the June War, the growth rate of production in the sector resumed to the level as high as 32.5 percent under the Three Year Plan (1973-1975), increasing the contribution of the sector to GDP from 11.1 percent in 1972 to 14.8 percent in 1975. Employment in the sector increased from about 19 thousand to 27 thousand during the same period. 3/

1/ Department of Statistics, Manufacturing Industry in Jordan, Report on Industrial Census of 1959 and Industrial Census 1974. According to the Ministry of Industry and Trade, the numbers of industrial establishments were 6,448 in 1974, 6,712 in 1975, 7,168 in 1976 and estimated 7,300 in 1977.

2/ NPC, Three Year Development Plan, 1973-1975, p. 106

3/ NPC, Five Year Plan, 1976-1980, p.166. According to MIT, contribution of the mining and manufacturing sector was 12.1% in 1972 and 18.1% in 1975.

07.002 Such statistical information alone does not describe the achievement of the sector in full, unless due considerations are given to great difficulties the Nation had to face since the very beginning of her history. Before 1948, manufacturing activities were hardly seen in the East Bank (then Trans-Jordan). The 1948 events, resulted in the unification of the more developed and more agriculturally productive West Bank with Trans-Jordan. But the Israeli occupation of Palestine disrupted the country's line of transport and communication which previously directed to the Mediterranean coast. Moreover, the influx of refugees increased Jordan's population almost threefold within a few months. Considerable amount of the government's resources had to be diverted to relief of these people instead of investing them in productive undertakings. When the economy was about to gain development momentum, the June war of 1967 broke out. The country lost control of the West Bank and had subsequently to suffer from internal warfare. The closure of the border between Syria coupled with the closure of the Suez canal completely disrupted the country's access to Mediterranean Sea. The world-wide inflation which followed the sudden increase of petroleum price in 1973 brought forth some benefits to the Jordanian economy through increases in phosphate prices. But it was far from enough to improve the chronic trade imbalance of the Country. The economy had to undergo another wave of inflation due to the unrest in Lebanon in 1976 and after. If we add to these factors which handicapped industrial development, the meager endowments of natural resources except for phosphates and the Dead Sea Potash, heavy burden of military expenditures, the small size of the domestic market high cost of electricity and water as well as continued emigration of skilled manpower, we would get a clearer picture of bottlenecks which impede industrial development in Jordan.

b. Industries in the East Bank in 1974

07.003 The Industrial Census 1974 enumerated 6,448 mining and manufacturing enterprises in the East Bank, in which a total of 23,580 persons were engaged and which altogether generated value added amounting to JD 45 million in 1974. The sector was dominated, in terms of value added, by the two relatively large-scale companies, Jordan Petroleum Refinery Company and Jordan Phosphate Mines Company, which jointly accounted for 36.8 percent of the total value added from the entire mining and manufacturing sector. These two companies' contribution to the government revenues through indirect tax was also large, amounting to about JD 14 million and accounting for 68.5 percent of the total indirect tax levied on goods produced by the sector.

07.004 If the two largest enterprises are excluded, we get an industrial structure similar to that of many developing economies in which the two sub-sectors, food and textile, account for 68 percent of the total number of enterprises, 51.6 percent of the total employment and 45.3 percent of the total value added. The number of workers per establishments excluding the two largest companies averaged at a little over 3 persons. If the cement factory is excluded which has over 1,000 workers, the figure becomes even

smaller. Thus, the mining and manufacturing sector of Jordan is characterized by the dominance of few large enterprises especially that of the 'big two' in the income generation while most of other enterprises are operating in very small scale.

7.1.2 Industrial Development in the Study Area

a. Industrial Development in the Past

07.005 According to the Industrial Census of 1959, the number of industrial establishments in the Irbid Governorate then called Ajelou, was 848 which employed a total of 1,794 persons. ^{4/} The Governorate accounted for 33.8% of the total number of industrial establishments and 17.7% of the total industrial employment in the East Bank. Further details of these establishments are not available.

07.006 The Industrial Census of 1967 enumerated in Irbid Governorate 23 mining and manufacturing establishments in which 10 or more persons were engaged and a total of 358 persons. In addition, there were 587 small-scale mining and manufacturing establishments engaging not more than 10 persons each. Total number of persons engaged in these small establishments is not available. Table 7.1 gives other information concerning above mentioned establishments in the Governorate. According to this Census there existed in the Governorate only 5 establishments in which 20 or more persons were engaged. These were 4 stone crushing establishments engaging a total of 109 persons and one olive mill which had 31 persons in its work force. Value added from these 5 establishments in the year amounted to JD 29 thousand, of which JD 28 thousand was contributed by the 4 stone crushing establishments. These 5 establishments in the Governorate accounted for 0.3% of the total value added generated by all mining and manufacturing establishments of the above-mentioned size category in the East Bank.

07.007 Information according to the two Industrial Censuses of 1959 and 1967 quoted above refers to the Governorate of Irbid. The Northern Region under study hereinafter called the Study Area excludes Al-aghwar Ashamalia Mutserfieh (Ghor). Boundary of the Governorate in 1959 was somewhat different from the existing one. The discrepancy of the geo-graphical coverage, however, will result only negligible difference as far as the mining and manufacturing sector is concerned.

^{4/} The industrial sector in the 1959 Census included home industries as well as electricity, water and repair services. "Persons engaged" refers to all persons working in the establishment on 30 June 1959 or who were on the payroll of the establishments on that day. It included working proprietors and family workers. Family workers are those who worked more than 10 days during June and who were at work on 30 June. The 1967 Census follows same definition of the work force.

Table 7.1 Industries in Irbid Governorate, 1967

(Unit: JD 1,000)

	Establishments engaging 10 or More Persons			Establishments engaging 9 or Less Persons	
	Number of Establishments	Value of Machines	Labour Force	Number of Establishments	Value of Machines
<u>Mining and Quarrying</u>					
Stone Crushing	12	23	297	5	7
<u>Manufacturing</u>					
Grain Mills	1	39	15	86	112
Bakeries	1	1	9	76	8
Confectionaries	2	3	22	8	7
Olive Oil	1	6	31	28	36
Other Foods	-	-	-	19	2
Beverages	-	-	-	1	6
Clothing	-	-	-	77	11
Footwares	-	-	-	45	3
Furnitures	1	2	12	58	22
Printing and Publishing	-	-	-	4	7
Rubber Products	-	-	-	18	3
Floor Tiles	3	2	42	6	2
Other Building Materials	1	-	9	4	-
Basic Metal Prods:	1	2	11	105	127
Electric Machines	-	-	-	17	1
Transport Equipment	-	-	-	12	9
Miscellaneous	-	-	-	18	2
Total	23	78	358	587	365

Source: Department of Statistics, Industrial Census 1967,
Table 2.6, 3.6 and 5.6

b. Industries in the Study Area in 1974

07.008 Preliminary results of the Industrial Census of 1974 has revealed that mining and manufacturing establishments in the Study Area employed a total of 2,960 persons turned out in the year value added amounting to JD 1,106 thousand. The Region accounted for a meager share of 2.45% of the total value added generated in the East Bank. See Table 7.2.

07.009 Intra-regional geographical distribution of these establishments is characterized by the heavy concentration in Irbid Municipality (Baladieh), which accounts for 73% of the total value added and 71% of the total employment in the Governorate. Among other towns, Jerash ranks second followed by Ramtha with a small margin and by far less industrialized towns of Mafraq and Ajlun.

07.010 By sub-sector, structure of industries in the Study Area is also shown in the Tables 7.3 and 7.4. In terms of value added, 'food, beverages and tobacco' industries account for the largest category with 37% of the total. The second is the 'textile, wearing apparels and leather' industries which account for 24 percent of the total. This is typical structure found in many developing countries. Sub-sectors of 'paper, paper products, printing and publishing' industries, 'chemicals' industries and 'basic metal' industries are almost non-existent in the Study Area. Concentration of industries in Irbid Municipality does not show a different picture even at the level of sub-sectors. Large proportion of production in all sub-sectors is generated from the town. Contribution of the Study Area to the National total at the sub-sector level may reflect the economic characteristics of the Study Area as compared to that of other regions. While the Study Area accounts for only 1.8 percent of the National total of value added at the sector level, the sub-sector 'others' contributes 24 percent of the National total of this sub-sector. Similarly, 'wood and wood products' and machinery' sub-sectors account for 7 percent and 6 percent of the National total of the respective sub-sector. The 'food, beverages and tobacco' and textile, wearing apparels and leather' industries of the Study Area contribute a little more than 3 percent of production of the Country's respective sub-sector total.

c. Industrial Development Between 1959 and 1974

07.011 According to the Industrial Censuses of 1959 and 1974, the number of mining and manufacturing establishments in the Irbid Governorate increased 1.77 times from 848 in 1959 to 1,498 in 1974 and the number of persons engaged in these establishments increased 1.65 times from 1,794 persons in 1959 to 2,960 persons in 1974. During the period, the growth rate of the population in the Governorate was very high as it was so in other parts of the country due largely to the massive influx refugees. The population of the Governorate increased from the census population of 273,296 in 1961 to estimated 563,490 in 1975 (See Chapter IV of this Volume), or at the rate of 5.3 percent per annum that is, the population increased 2.06 times between these two years. The figures quoted above may be interpreted that the growth of industrial activities in the Governorate could not catch up with that of the population. It did

Table 7.2 By-governorate Statistics of the Manufacturing and Mining Sector, 1974

(Unit: JD 1,000)

Governorate	Number of Establishments	Number of Employees	Value of Production	Intermediate Consumption	Depreciation	Value Added	Indirect Tax	Wages & Salaries
Amman	5,368	22,990	74,250	27,681	3,030	43,554	20,464	8,234
Irbid	1,498	2,960	2,994	1,742	151	1,106	1	444
Barqa	326	458	348	173	2	155	-	29
Karak	149	290	287	135	5	154	-	44
Ma'an	133	216	239	106	3	127	-	24
Total	7,474	26,914	78,118	29,837	3,191	45,096	20,465	8,775

Source: Department of Statistics, unpublished data.

- Notes: 1. Figures in the table are results of the 1974 Industrial Census and include small as well as large-scale establishments.
2. Establishments are classified according to the location of the Head Office. Thus, the figures in the table tend to over-estimate the Amman Governorate.

Table 7.3 Value Added by Industry and by Town, Study Area, 1974

(Unit: JD 1,000)

	Mining and Quarrying	Food, Beverage & Tobacco	Textile, Cloth- ing	Wood and Wood Products	Paper, Paper Products	Chemicals and Chemical Products	Non-Metal Mineral Products	Basic Metal Machinery	Other Metal Manu- facturing	Total
Irbid	37	185	138	54	3	0	48	-	79	559
Ramtha	-	10	16	11	-	-	11	-	4	52
Jerash	-	32	16	4	-	-	4	-	6	62
Ajlun	-	18	4	1	-	-	0	-	5	28
Samer	-	10	2	-	-	-	-	-	-	12
Deir Abu Sa'id	-	19	2	0	-	-	1	-	0	22
Mafraq	1	9	6	5	-	-	-	-	9	29
Total of Region	38	283	184	75	3	0	64	-	102	764
(% of category)	(4.971)	(37.04)	(24.08)	(9.82)	(0.39)	(0)	(8.38)	(-)	(13.35)	(100)
National Total	11,203	7,880	5,450	1,085	986	6,989	3,265	3,979	1,709	42,603
(% of Region)	(0.34)	(3.59)	(3.38)	(6.91)	(0.30)	(-)	(1.96)	(-)	(5.97)	(23.80)

Source: NRA, National Water Master Plan of Jordan, 1977, Volume VII, Annex 2, Table 2.

Notes: Figures for the 'national total' do not agree with those quoted in the main text and other tables. Towns include surrounding villages.

Table 7.4 Employment by Industry and by Town, Study Area, 1974

(Unit: JD 1,000)

	Mining and Quarrying	Food and Beverage & Tobacco	Textile, Clothing & Leather	Textile, Wood and Wood Products	Paper, Paper Products & Printing	Chemicals and Chemical Products	Non-Metal Mineral Products	Basic Metal Machinery	Other Manufacturing	Total	
Irbid	102	439	468	150	12	2	104	-	163	17	1,457
Ramtha	-	35	70	22	-	-	23	-	9	-	159
Jerash	-	75	55	11	-	-	8	-	20	-	169
Ajlun	-	37	16	4	-	-	1	-	14	-	72
Samer	-	18	10	-	-	-	-	-	-	-	28
Deir Abu Sa'id	-	32	19	2	-	-	5	-	3	-	61
Mafrag	4	29	36	17	-	-	-	-	16	-	102
Total of Region	106	665	674	206	12	2	141	-	225	17	2,048
National Total	2,405	4,436	6,721	2,032	1,109	2,290	2,136	299	2,081	95	23,604
% of the Region in the National Total	4.41	14.99	10.03	10.14	1.08	0.09	6.60	-	10.81	17.89	8.68

Notes and Source: See Table 7.3.

not seem, however, to have caused serious unemployment or under-employment problems, as is indicated by the low unemployment rate of 1.0 percent in the Governorate and 2.7 percent in the East Bank as a whole. Underemployment seems to have been also low given the fact that 85 percent of the persons employed in all economic sectors in the East Bank worked more than 35 hours a week (regional figures are not available), according to a sample survey conducted in January-April 1976. It must be taken into account, however, that the survey was undertaken in the peak agricultural season and that agricultural households were under-represented in the sample. Thus, employment in other sectors and seasonal migration seem to have absorbed a large part of increased labour force. As the consequence of the low rate of industrial development, the Governorate's importance in the industrial scene in the country decreased. While the Governorate accounted for 16.4 percent of the National total of industrial labour force in 1959, the percentage went down to as low as 11 percent in 1974.

7.1.3 Development of the Sector Under the Current Five-Year Plan

a. Industrial Development Goals

07.012 It may be unnecessary to quote the details of the Plan in this report. For the purpose of this Study, it suffice to point out that the Plan sets following targets for the mining and manufacturing sector:

- (1) Threefold increase of value added from JD 45 million in 1975 to JD 144 million in 1980 by sustaining a high growth rate of 26.2 percent per annum. Thus, the sector is expected to contribute to nearly half of the increase in GDP envisaged by the Plan during the 5-year period.
- (2) Achieving a better geographical distribution of industries. This is understood to refer to attracting new and existing industries to outside of the Amman-Zarqa area.
- (3) Developing food industries with particular emphasis on the processing of local agricultural products. The Irbid Governorate has a high development potential in agriculture relative to other parts of the Country.
- (4) Achieving a higher degree of Arab-industrial coordination. This has particular bearings to the Study Area since a series of industrial projects is being prepared jointly by the governments of Jordan and Syria for which sites will be chosen in the Study Area.

- (5) Fivefold increase in domestic exports of industrial and mining products from JD 33 million in 1975 to JD 150 million in 1980. This increase will represent almost all of increase in the total volume of export anticipated by the Plan. A large portion (about two thirds) of such increase is envisaged to be generated from the mining sub-sector, more specifically by expanding exports of phosphate rocks. Development of the manufacturing sub-sectors, in many cases, is anticipated to assume export orientation in view of the limited size of the domestic market and alleviating the problem of the chronic trade imbalance.

07.013 Measures to achieve such goals proposed in the Plan include (1) provision of incentives aimed at export-oriented industries, (2) development of industrial estates and zones (one already existing in Irbid) and (3) Government's initiative with regard to setting up industrial ventures and participating in their capital.

b. Investment Plan

07.014 The Plan anticipates that a sum of JD 229 million will be invested in the sector. Of this amount, JD 186.3 million, or 81.3 percent of the total, is proposed to be spent for 8 large-scale productive projects, that is (1) expansion of the phosphate mines, the petroleum refinery and the cement factory as well as (2) implementation of new projects for chemical fertilizer production potash extraction, cement production (the Country's second cement factory), textile spinning and weaving and copper production. By the final year of the Plan period, the three expansion projects and the textile project are expected to have come on stream. These projects are estimated to contribute about 82 percent of the increase in value added from the sector as a whole.

07.015 The plan expects the private sector to invest in productive projects other than the above by a total of JD 35 million, representing 15.3 percent of the total investments in the sector during the five years. Such investments would contribute about 18 percent of the total increase in value added from the sector under the Plan.

07.016 In addition, the plan earmarks JD 7,820 thousand, or 3.4 percent of the total planned investments, for oil exploration, general prospecting, investigation of under ground thermal energy, the Natural Resources Authority workshops, industrial estates and standardization.

c. Industrial Development in the East Bank Under the Five Year Plan

07.017 The Central Bank of Jordan (CBJ) estimates that value added at 1975 prices from the mining and manufacturing sector increased from JD 49 million in 1975 to JD 61 million in 1976 and JD 70 million in 1977, or at an annual rate of 25.3 percent in 1976 and 10.8 percent in 1977, whereas the rate was 7.4 percent

between 1974 and 1975. 5/ This growth came as a result of production expansion in most of the principal industries such as phosphate, petroleum products and cigarettes. The growth would have been larger had there been no fall in the production of cement, which was caused by technical problems in the factory while the demand for cement was in excess of the factory's production and the country had to import 135 thousand tons of cement in 1976 and 418 thousand tons in 1977.

07.018 Implementation of the projects to expand the phosphate mines, the petroleum refinery and the cement factory as well as construction of the fertilizer factory and textile mill has made a good progress although a delay of 6 to 8 months is reported. Construction work for the potash project has been started. The second cement factory and the copper production are, however, still undergoing further studies.

07.019 In order to establish an industrial venture in Jordan, if it involves capital outlay of JD 1,000 or more, a licence has to be obtained from the Ministry of Industry and Trade. Trends of issuance of the licences are indicative of the investment trends in the private mining and manufacturing sector, characterized in the past by investments of small and medium scale.

07.020 As is seen from Table 7.5, the number of projects licenced in 1976 was 196 and that in 1977 was 128. Proposed investment of these projects totaled to JD 18 million in 1976 and JD 23 million in 1977. These figures compare favourably against 184 projects licenced with a total investment of JD 26 million during the Three Year Plan period (1973-1975).

07.021 Table 7.5 also shows by sub-sector breakdown of these projects. It is evident from the table that investment licenced in 1976 concentrated heavily in building material industries, chemical industries as well as metallic and electrical industries.

d. Dispersal of Industries Away from the Amman-Zarqa Area

07.022 The Current Five Year Plan emphasizes, as one of its goals, to aim at a better geographical distribution of new industrial sites in order to achieve more balanced development among regions.

5/ CBJ, Annual Report of 1976, p.21 (English version) and that of 1977, p.13 (Arabic version). The value added figures are estimated from the industrial production index which is based on volume of production of 14 major industries including electricity and weighted by 1970 prices and quantities.

Table 7.5 Licensed Projects by Industrial Classification, 1976 and 1977

	Mining and Quarrying	Food, Beverage & Tobacco	Textile, Clothing	Wood and Wood Products	Paper, Paper Products	Chemicals and Chemical Products	Non-Metal Mineral Products	Basic Metal	Fabricated Metal & Machinery	Total
1976										
No. of licences	3	20	12	6	7	37	68	7	36	196
Capital	343	2,661	803	434	658	3,652	4,430	654	4,247	17,882
Employment	54	813	440	157	288	762 ^{2/}	1,677 ^{1/}	214	1,526	5,931
1977										
No. of licences	3	25	5	7	5	38	19	9	17	128
Capital	430	5,450	154	4,292	718	5,058	3,650	1,819	1,376	22,947
Employment	46	654 ^{2/}	77	607 ^{1/}	157	860	1,017	454	406	4,278

Source: Original data is from the Ministry of Industry and Trade. The data was re-arranged according to the ISIC by the Study Team.

Notes: ^{1/} Including one project for which data is not available.
^{2/} Including two projects for which data is not available.
^{3/} The original data includes five other projects which do not seem to be classified as mining and manufacturing activities.

07.023 As mentioned in the preceding sections, the current Five Year Plan envisages the mining and manufacturing sector to grow in terms of value added by about JD 100 million during the Plan period and 82 percent of such growth to be achieved by the four large-scale projects, expansion of the phosphate mines, the petroleum refinery and the cement factory as well as the construction of a textile mill. The sites for these projects have been chosen primarily on the economic grounds such as (1) Existence of operating production and related facilities which would make it more economical to expand them than constructing new factories in other locations, (2) Existence of raw materials such as phosphate and lime stone and (3) The easy access to the main market and necessary services, especially in the case of the textile project. From the viewpoint of balanced regional development, however, income to accrue from these projects is concentrated in a limited number of locations. Expected increase in value added from the four projects will be shared by Amman, Karak and Ma'an governorates.

07.024 The Plan aims at dispersal of investments for other projects, most of which are likely to be small and medium-scale, by providing generous fiscal incentives. The Plan estimates that such investments would amount to JD 35 million and generate an additional income of about JD 18 million. Table 7.6 shows the regional distribution of industrial projects licenced by the MIT in 1976 and 1977. This statistics is deemed indicative of response of the private sector to the above estimate of the Plan. It is evident from the table that the past trend of industries concentrating in the Amman-Zarqa area has continued in the recent years. Of the total investment of projects licenced in 1975, about 78 percent was accounted for by the Amman-Zarqa axis, similarly 98 percent in 1976 and 96 percent in 1977. If the surrounding areas such as Naour, Sweileh and Khirbat Al-Sook are included, the figures go up even higher.

07.025 Additional provision of investment incentives is the exempts from income tax for 9 years when a project is located outside of Amman, while the exemption period will be 6 years for projects in the Amman Governorate. This provision however, does not seem to have influenced very much the choice of the location of factories by investors, as is seen from Table 7.6. Table 7.7 shows the geographical distribution of industrial projects to which the IDB extended loans. Here again, geographical dispersal of industries is yet to be seen.

e. Industrial Development in Irbid Governorate
Under the Current Five-Year Plan

07.026 We have already seen that none of the large-scale investment projects earmarked by the Plan will contribute directly to the increase in the industrial production in the Governorate and that other private sector investments have continued to concentrate in the Amman area.

Table 7.6 Licensed Projects by Location, 1976 and 1977

(Unit: JD 1,000)

	Amman	Irbid	Aqaba	Salt	West Bank	Total
1976						
No. of Licences ³⁾	186	7	-	1	2	196
Capital ³⁾	17,401	241	-	150	90	17,882
Employment ³⁾	5,726	131 ¹⁾	-	27	47	5,931
1977						
No. of Licences	120	3	1	-	4	128
Capital	19,688	77	832	-	2,350	22,947
Employment	4,163	46	- ¹⁾	-	69 ¹⁾	4,278

Notes and Source: See Table 7.5.

Table 7.7 Geographical Distribution of IDB Loans, 1974 to 1977

(Unit: JD)

	1974		1975		1976		1977	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount
Amman	21	513,500	24	883,600	46	1,458,000	32	1,835,000
Salt	1	1,500	2	240,000	2	270,000	5	865,000
Irbid	-	-	2	170,000	2	323,000	4	120,000
Suwelah	1	200,000	1	20,000	2	53,000	-	-
Mafrag	-	-	-	-	-	-	-	-
Madaba	1	40,000	-	-	-	-	2	9,000
Karak	-	-	-	-	2	27,000	2	32,800
Aqaba	-	-	-	-	-	-	1	8,000
Total	24	755,000	29	1,313,600	54	2,131,000	46	2,869,800

Source: IDB

Note: Loans for tourism projects are excluded.

07.027 New industrial investments in the Governorate which obtained licences from the MIT in 1976 and 1977 are as follows:

Year	Amount of Investment	Number of workers	Products
1976	JD 50,000	n.a.	Bricks, stone for buildings and cement pipe
	50,000	11	Metal wood
	12,000	12	Tile and marble
	30,000	23	Pipe and box for electric wiring
	9,000	10	Tile and cement tube
	12,000	8	Development and printing of colour films
	30,000	22	Metal pins and nails
	60,000	53	Metal furnitures
1977	40,000	25	Biscuits
	27,000	10	Plastic electric lampstand, cover, boxes

The above proposed establishments are mainly characterized by market orientation, i.e., many of them produce heavy outputs per value and therefore will be marketed within the Governorate.

07.028 The amount of investments licenced in 1976 compares favourably with those of previous years (see table 7.7). But 1977 saw a sharp decrease as is seen from the above.

7.1.4 Policy Framework for Industrial Development

07.029 Throughout her history, Jordan has pursued policies basically characterized by the free enterprise system leaving the ownership and management of industries largely in the hands of the private sector. The role played by the Government was, however, substantial in accelerating the industrial development.

07.030 In the early 1950s, the government made a decision to subscribe a part of share capital of a cement factory which had been proposed by the private sector and to give it concessional rights. This was instrumental to the successful implementation of the project. Such success gave emerging industrialists confidence in investing in industrial ventures who had been typically merchants with little experiences in initiating and managing industrial projects. Later in 1956, a petroleum refinery company was established in a similar

manner. This was followed by a number of other projects implemented by the private sector's initiative with Government's support and equity participation. These projects make up almost all of the existing relatively large-scale industrial plants in the Country. At present, the Government holds shares in 21 industrial corporations, and the total face value of which amounts to about JD 12 million.

07.031 In order to encourage investments in industries, the government enacted the Law No.27 of 1955 'Encouragement and Guidance of Industry' and the Law No.28 of 1955, 'Encouragement of Foreign Investment'. Provisions of these laws included exempting eligible industries from income and other seven taxes for four years and from customs duties on imported machinery. These laws were replaced by the 'Encouragement of Investment Law' in 1967, which was further revised to become the 'Encouragement of Investment Law' No.53 of 1972. These revisions were designed to provide industries with more generous facilities. In addition, the 1972 law incorporated additional incentives to industries established outside the Amman Governorate in order to alleviate the heavy concentration of industries in the Capital region. Provisions of the law and industries which enjoyed the incentives will be dealt with later in this section.

07.032 The Industrial Development Bank (the IDB) was established in 1965 in order to provide industries with medium and long term loans and to participate in the equity of major public share-holding companies. Subsequent development of IDB operation includes, beside expansion of loans and equity financing, the establishment of the 'small scale industry and handicraft program' in 1975. Further accounts will be made to the operations of the bank later in this section.

07.033 While the Government adopted a policy of protecting domestic industries through import banning and tariff manipulation in the earlier years, the formation of the Arab Common Market in 1976 resulted in the reduction of customs tariff rates, exposing industries in Jordan to the competition with commodities imported free of duties from the member countries. In order to help the domestic industries cope with the competition, the Government announced in March 1977 the reduction of import duties on a number of raw materials and on all imports of machinery and equipment needed by the industries. Partial deviation from the protectionist policy is also witnessed in the field of the domestic competition. The current Five Year Plan proposes a policy of allowing, in principle, industries to be established regardless of duplication. Perhaps in the similar line of thinking, the Plan proposes the modification of the industrial licencing procedures, to issue licences to smaller scale projects, those involving less than JD 25 thousand in machinery, without requiring feasibility studies and to simplify the licencing procedures and requirements in general.

07.034 Other important points in the evolution of the industrial policies include:

- (1) growing concerns in environmental protection and in the best possible land use, which led to the demarcation of industrial zones in a number of towns coupled with the prohibition of new industries establishing outside such zones;
- (2) enhanced emphasis in the promotion of export oriented industries in view of the limited size of the domestic market and chronic imbalance of trade;
- (3) decreased emphasis in employment creation as the industries face acute labour shortage caused by the massive emigration of labour force to the Gulf countries in the recent years;
- (4) added importance to vocational and technical training, as is seen in the current Five Year Plan scheduling an expansion of training programs; and
- (5) devoted advocacy of industrial coordination and cooperation among the Arab nations which is witnessed in the promotion of joint industrial projects with the Syrian Arab Republic.

07.035 In accordance with the provisions of the Encouragement of Investment Law, No. 53 of 1972, industrial projects which are eligible can be granted exemptions, in full or in part, from:

- (1) income and other taxes for six years (nine years if they are located outside the Amman Governorate.
- (2) customs duties and other charges on imported machinery and equipment including prescribed amount of spare parts during the period of project implementation; and
- (3) building and land taxes for five years (seven years if outside the capital region).

07.036 Projects located outside the Amman Governorate may be given tracts of government land free of charge. Requirements to qualify for these incentives are minimal, that: value of fixed assets excluding land is at least JD 5,000 and the proportion of value added to the amount of production is over 20 percent.

07.037 Some projects are given all the benefits mentioned above in full, that is (1), (2) and (3). These projects are called 'approved economic projects'. All others are exempted only from customs duties and other charges on imported machinery and equipment, and called 'economic projects'. General criteria to classify a project to be an 'approved economic project' are:

- (1) amount of investment is in excess of JD 25 thousand, and
- (2) there are no existing companies producing similar products.

From 16 October 1972 to 31 May 1978, 254 mining and manufacturing projects were approved, of which 149 were classified as 'approved economic projects' and granted all the benefits in full.

07.038 In spite of the provisions to exempt from taxes for longer period for projects located outside the Amman Governorate over 90 percent of projects were concentrated in the Amman area. In the Irbid Governorate only 10 projects out of 254 were approved for such incentives. These projects are listed in Table 7.8.

Table 7.8 Projects in Irbid to which Investment Incentives were Approved

	Nature of Projects (Products)	AEP or EP	Year of Approval
1	Steel Wood	EP	1976
2	Plastic Pipe and Box for Electric Wiring	EP	1976
3	Ball-point-pen	AEP	1974
4	Lampstand, Boxes and Containers(Plastics)	EP	1978
5	Animal Feed	AEP	1978
6	Diary Products	AEP	1978
7	Olive Oil	EP	1976
8	Poultry and Eggs	AEP	1974
9	Poultry and Eggs	AEP	1974
10	Tricot	EP	1975

Source: Department of Industry and Trade, Unpublished data.

Note: AEP stands for Approved Economic Project and EP for Economic Project.

7.2 Projection of Industrial Growth and Likely Changes of Industrial Scenes

7.2.1 Projection of the Industrial Growth Between 1981 and 1985

07.039 The following relatively large-scale projects are either under construction or under preparation within the Kingdom and are expected to start their operation during the period between 1981 and 1985:

- (1) Further expansion of phosphate production by expanding the existing mines and opening a new mine in El-Shaddiya;
- (2) Potash extraction from the Dead Sea water (plant site in Safi area);
- (3) Chemical fertilizer production (in Aqaba);
- (4) Sheet glass production (in Ras en Naqb);
- (5) Expansion of cement production through installing the 6th kiln in the existing plant in Fuheis and constructing the second cement factory in Rashadiya;
- (6) White cement production as a joint project between Jordan and Syria (in Ajlun or somewhere around there);
- (7) Integrated timber complex (in Aqaba); and
- (8) Pilot production of copper (in Finan).

07.040 In addition, the following projects may be taken up, although none of them are expected to come on stream during the next Five Year Plan period;

- (1) Pharmaceuticals production (in Aqaba);
- (2) Soda ash production (in Safi area); and
- (3) Expansion of petroleum refining either through expanding the Zarqa refinery or constructing the second refinery (in Aqaba or elsewhere).

07.041 The two sets of projects listed above are projects to construct a factory or to exploit mineral resources. Beside these, several industrial estates and free zones will be constructed in order to promote industrial investments, they are:

- (1) The Syrian - Jordanian joint Industrial Free Zone across the border of the two countries in the vicinity of Jabir village near Ramtha;

- (2) Expanding the existing free zone in Aqaba for industrial activities;
- (3) Sahab industrial estate;
- (4) Zarqa industrial and free trade zone;
- (5) Ma'an industrial zone;
- (6) Expansion of Irbid industrial estate; and
- (7) Possibly some more industrial estates near cities such as Mafraq, Madaba and Salt.

07.042 Assuming most of these projects will make good progress and recent investment trends will continue, it seems to be reasonable to expect that the mining and manufacturing sector will sustain the growth rate of at least 20 percent per annum during the five years (1981-85), that is, value added from the sector will increase from JD 121 million in 1980 to about JD 300 million in 1985 at 1975 prices. Of all the projects mentioned above, the following will be located in the Irbid Governorate:

- (1) Expansion of the Irbid industrial estate, and
- (2) Industrial Free Zone on the Syrian border.

07.043 Let us assume that value added from the "other private investments" sub-sector in the Irbid Governorate will grow at 20 percent per annum in the period between 1981 and 1985, a sizable improvement over the current FYP period, considering that electricity and other services will be much improved by around 1980 and also substantial building material production will take place in connection with the construction of the Yarmouk University. Then, industrial value added from the Governorate will amount to JD 5.2 million in 1985 at 1975 prices. With this growth the Governorate will account for 1.7 percent of the national total of industrial value added.

07.044 If we assume that the border Industrial Free Zone will be in operation in its planned 400 hectares and a half of it is utilized by industries, the value added expected from the Jordanian portion of the Free Zone is JD 5 million annually with the industrial employment of 5,000 persons.^{6/} Then, the industrial value added in the Governorate will be JD 10.2 million. Then, the share of the Governorate in the Nation in industrial value added will increase to about 5 percent. The total industrial employment in the Governorate would be around 12,000 in 1985 including those in the Industrial Free Zone.

^{6/} It is assumed that out of 200 hectares used for industry (the other half is used for distribution), 100 hectares is in the Jordanian portion, 50 persons will be working per hectare and the value added per employee per year is JD 1,000.

07.045 Table below summarizes calculations made in the preceding paragraphs (value added figures are at 1975 prices).

	Value Added in 1985 or Generated Annually (JD million)
'Other Private Investments'	5.2
Border Industrial Free Zone	5.0
Total	10.2

7.2.2 Industrial Free Zone at the Syrian Border

a. Background

07.046 In the context of promoting friendly relationship and cooperation between the Kingdom of Jordan and the Syria Arab Republic, a board line of cooperative programs particularly in the field of economy and culture have been discussed between them and some joint projects were implemented. This project is also one of those implemented projects to date. The former has decided to establish 3 free zones in the country, one in the south which is located in Aqaba and is now in operation primarily for trade in transit, one in Zarqa and the last one in the north to promote industry and international trade. While the latter has also developed several free zones in the area to north of Damascus but there were none to the south of Damascus. Syria has experienced difficulties in inviting foreign investors to those existing free zones due to its unfamiliar political systems to the Western industrialists and investors and found it more advantageous to work together with Jordan to overcome the problems of hesitancy of the foreign investors in addition to the combined advantages of geographical location that provide full access to the markets of three continents - Asia, Europe and Africa by way of sea and land transport. On the other hand, Syria can provide those industrial inputs as water, electricity, manpower and some of raw materials which are not favourably endowed in Jordan.

b. Outline of the Project

07.047 The zone is situated on the Syrian Jordanian borders, half of which covers Syrian land while the other half is located in the Jordanian land at a point where the Hijaz Railway crosses the border between Mafraq and Derra. Total area of the Zone is 400 hectares with an additional 200 hectares for a community development for the workers adjacent to the Zone. There had been two candidate sites for

this joint project, that had been (1) Derra-Ramtha and (2) present site of Nasib-Jabir. In careful considerations of the topography, land use, availability of water resources, access to the Hijaz Railway and future connection of Autostrada (International Highway connecting Beirut - Damascus - Amman which will be further extended to Medina), the present site was selected.

07.048 As the sole executing and managing body of the project, the Syrian - Jordanian Industrial Free Zone Company was established in 1975 between the two Governments. The company is a Syrian Corporation headquartered at Derra. During our Study, site survey by approaching from the both sides of the countries was made as well as interviews with the officials of the Company.

07.049 The Company's achievements to date are as follows:

- (1) acquisition of land;
- (2) exploitation of water resources on site, and found 8,000 tons/16 hours of water from the 6 wells;
- (3) construction of the access roads from the both sides, which has to be further improved;
- (4) connection of electricity and telephone from the Syrian side which is still underway;
- (5) preparation of the development master plan which is planned to be reviewed by a consultant; and
- (6) preparation of promotional materials.

07.050 The Company established a criteria for the priority industries, which are as follows:

- (1) Export oriented industries;
- (2) Industries which utilize raw materials available in Syria and Jordan;
- (3) Industries for which processed components are available locally in Syria and Jordan, or industries which can integrate with domestic industries; and
- (4) Industries which can enhance the technical level of the domestic labour force.

07.051 The privileges and incentives offered by the Company are:

(1) Legal privileges:

- 1) The buildings related to the project of the Free Zone are not subject to distraint or mortgage. They are not entered with the investors constant property.
- 2) The investor is permitted to assign others to the right to occupy the grounds, the buildings therein established and attachments, in the light of the terms laid out by the board of directors.
- 3) Maximum period for occupying the grounds is 25 years, after the expiry of which the possession of the buildings goes back to the Syrian - Jordanian Industrial Free Zone Company.

(2) Exemptions:

- 1) Goods that enter the Free Zone whether for being used in industry or for being used in the construction of buildings therein are exempted from import regulations or other restrictions as well as customs duties and any other fees or taxes.
- 2) The goods manufactured in the Zone exported to countries other than Syria or Jordan are exempted from customs and other duties in addition to import-export restrictions in both countries.
- 3) Products of the industrial projects established in the Free Zone are exempted, when permitted to be imported either to Syria or to Jordan, from customs duties within the limit of the value of the goods specified in the schedules of regulations of the Free Zone.
- 4) All business operations which take place inside the Free Zone, including contracts and related documents between investors and the Company or among the investors themselves, are exempted from stamps duties and the like.
- 5) All projects established inside the Free Zone are exempted from the income tax on profits for a period of fifteen years starting from the date of signing the occupation contract.

- 6) Buildings, constructions, equipments and machinery that have to do with the projects are not subject to any taxes or duties that arise from landed property.
- 7) Industrial projects in the Free Zone are not subject to the decrees that restrict freedom of employing, dismissal or part-time working, and are instead subject to the stipulations of the contracts regulating the same subjects.
- 8) The investor has the right to employ 25 percent maximum of workers having nationalities other than Syrian or Jordanian.
- 9) Up to 25 percent of the products manufactured in the Free Zone and which are normally prohibited from being imported to the local markets of Syria and Jordan are permitted to be imported to both markets.

(3) Banking privileges:

- 1) Arab, foreign or joint banking establishments or branches thereof are permitted to be set within the grounds of the Free Zone in accordance with the terms specified within the investment system.
- 2) Banking operations within the grounds of the Free Zone are not subject to any sort of taxes, duties or interest on deposits.
- 3) The bringing in or out or use of foreign currency within the Free Zone is not subject to any restrictions or conditions.
- 4) Those who have business transactions in the Free Zone are allowed to open accounts in the banks therein established with money coming from abroad by any means of payment. They are free to dispose or refund the money abroad without any restrictions or stipulations.
- 5) All conventional measures of secrecy are applied in the banks established in the Free Zone.

c. Comments on the Project

07.052 As mentioned earlier the Government is planning to have three Free Zones in the Country which will be geographically distributed in the three different regions. Aqaba Free Zone which is now in operation has direct sea access at Red Sea but other two are located in inland and will have competing situation between each other from the investor's point of view as both are big in size ranging from 400 ha to 500 ha. The project in question is already going to be partially operative in the near future and the Government will pay out in full of its capital share of approximately JD 2.5 million to the Company during the next Five Year Plan period. It is also said that Zarqa Free Zone is likely to be implemented during the same period. Therefore, it is most necessary to have well coordinations among the two so that investors may not be confused and be guided properly. For this reason, we recommend to study the role, function and character of each Free Zone in the Country and to determine the optimum scale of development by 1985.

07.053 The Free Zone at the border has a significant value from the regional point of view of both countries because the area is one of the least developed ones. However, it is felt that the big investor would not come until the proposed Autostrada becomes ready. On the other hand, Zarqa Free Zone is located in the population center of the Country and there are already necessary facilities to serve for the industries to be located. The major constraint is the capacity of water supply, though large water consuming industries are not suitable for the both sites.

7.2.3 Likely Changes of the Industrial Scenes

a. Changes Until 1985

07.054 Reasons for the low level of industrial activities in the Irbid Governorate vis-a-vis other governorates, Amman in particular, are summarized below:

- (1) Inadequate supply of electricity. Industrial establishments in the Irbid Governorate complain about frequent power failures as well as fluctuation and drop of voltage.
- (2) Shortage of Water.
- (3) Poor supply of telephone and telex services.
- (4) Being far from the main market of the Country in Amman, and the limited size of the local markets.
- (5) Difficulty to obtain parts, materials and repair services.

In addition to the above, several persons, particularly industrialists in Amman, pointed out that skilled labour is not readily available in the Irbid area and that people in the Area do not have industrial orientation. But industrialists operating in the Study Area generally seem to regard them trainable and prepared to live with industrial discipline. Some people question whether potential entrepreneurs are existent in the Area. The Study Team came across, however, with a number of factory owners with high entrepreneurship.

07.055 As far as infrastructural facilities are concerned, the situation will be much improved by 1980 or early 1980s. (See Chapter V Water Resources of Part II, and Chapter X Transportation, and Chapter XI Power and Telecommunication of Part III).

07.056 With the growth of industrial value added estimated in the previous section 7.2.1, new employment opportunities will be created for about 3,800 persons, not counting the employment in the Free Zone. The Free Zone, if it comes to the full swing operation, will be able to employ as many as 5,000 workers in the Jordanian side of the Free Zone. Assuming that the age and sex structure and the gross labour participation of the Study Area population will be the same in the earlier half of 1980s as in mid-1970s, a net addition of the labour force is estimated to be 13,600 between 1980 and 1985. The supply of labour force may be construed as falling short of the total demand in view of other sectors which will also absorb additional labour. However, the potential supply of labour force is higher than the estimate, judging by the current size of youthful population in the Study Area. The male children aged 5 - 14 in the Irbid Governorate are estimated to have numbered 95,000 in 1975. If slightly higher enrollment ratios of 70 and 25 percent are assumed for the age groups of 15 - 19 and 20 - 24, the current age groups of 5 - 14 are expected to release about 35,000 to the labour market between 1980 - 1985. Whether they will choose to remain in the Study Area or not depends on the employment opportunities available in the Area and their relative attractiveness. Therefore, the potential labour supply by itself will not be a constraint on industrial development envisaged for the first half of 1980s.

07.057 As construction works of the Yarmouk University, Maqarin Dam and new highways progress, people will feel that development is taking place and favourable investment climate will be created.

07.058 Industries will likely grow faster than before, but others will not be very much different from existing ones, considering the rather short span of time. Especially, industries manufacturing building materials including quarry will continue to enjoy a relatively high growth since the number of houses to be constructed between 1981 and 1985 is expected to grow continuously (see Housing Demand Projection in Chapter VIII of Part II). Industries producing furnitures,

pipng and wiring materials will show similar growth from the same reason. The current expansion programs of olive trees which will begin to be harvested in the latter part of the period will give some investment opportunities to the oil extraction industry, and that the growth of poultry farms to the feed industry. Increasing population, that of younger generation in particular, will prompt a number of the garment and footwear industries to substitute imports from Syria and Amman with local production. The number of industrialists will increase who realize the advantage of the Irbid Governorate due to comparatively lower costs of land and labour as well as its location in the hub of transportation network in the Middle East. They will seize the opportunities to produce certain commodities such as suitcases and similar goods, toys and other recreational items, paper products for the National as well as the other Arab markets.

b. Changes by the Year 2000

07.059 The year 2000 is more than twenty years ahead and any projection or conjecture cannot be guaranteed to be reliable. In order to get an idea of long term prospects, however, let us draw a likely picture of the future industrial scenes in the Area, assuming that no significant disturbances would occur.

07.060 Industries with higher technologies will have been firmly established in the Syrian - Jordanian Industrial Free Zone and their contribution to transfer of technology will have spread to as far as the greater Irbid and the vicinity of the Yarmouk University. The Yarmouk University will have been giving the industries in the Area intellectual orientations through its own research and development activities as well as its guidance and advice services.

07.061 Thus, the Irbid Governorate will have become one of the three major centers of industrial production almost comparable to the Amman and Aqaba areas. Each of these centers will tend to specialize in industries of different types. Aqaba will enjoy the advantageous position of being close to the port and lowest costs of water and electricity services among three centers (See Chapters V & XI). It will accommodate heavy industries which require much water and electricity and which are based on the mineral resources of the Country for export. Amman, still being the largest city in Jordan, will tend to limit industrial activities to those which serve urban population and will have started to spill out some industries to other areas, to Irbid in particular. Irbid, under the influence of the Yarmouk University and the Free Zone on the border and taking the advantage of being the center of over-land transport system in the Middle East, will have taken the orientation toward the knowledge based and technology oriented industries. Assembling and parts production of motor-cars, land operated small

tractors, electric and electronic goods and scientific instruments will have been favourably established. Industries for repairing sophisticated machines and for consulting engineering service will have been based in the Area. Most of these industries will serve for the Middle East markets.

7.3 Project and Program Recommendations

7.3.1 Long-Term Strategy and Projects

S

07.062 In formulating long term strategies for industrial development in the Study Area, following factors are assumed to materialize, which will have a far reaching impact on the industrial activities in the Area.

- (1) Construction of the Yarmouk University will proceed according to the schedule.
- (2) The Syrian-Jordanian Industrial Free Zone (hereinafter the Border Free Zone) will accomodate a sizable number of industries which are characterized with high technology.
- (3) The proposed international highway which passes the Border Free Zone will be completed in 1980s.
- (4) Inter-Arab coordination and cooperation in industrial activities will be promoted.
- (5) Water will be made adequately available from the Maqarin Dam for the consumption of industries which do not require much water.

07.063 Under such assumptions, a likely picture of the future industrial scenes of the Area has been described in the previous section 7.2.3. With such background, development strategy for the industrial sector of the Area should emphasize following orientations:

- (1) Promotion of knowledge intensive industries making the best use of the possible impacts of the Yarmouk University to the industries in the Area.
- (2) Promotion of technology oriented industries especially in the Border Free Zone. This will require closed industrial coordination and cooperation among Arab countries and aggressive promotion of foreign (Arab and non-Arab) investments.
- (3) Promotion of industries related to the function of the Border Free Zone as the international distribution center.

07.064 In line with the long term strategy described above, following projects are recommended to be implemented sometimes in the later half of 1980s or in the early 1990s.

- (1) The Yarmouk University's own factory, if it is established this way, will be converted to two components as the construction works of the campus come close to completion. One as a technology centre for building materials and furnitures, and the other as factories for commercial production. Functions of the technology centre include providing industries with technical advice, training of workers proto-type production services, beside offering course of practical exercises to students as well as repair and maintenance services to the University as a whole. The metal and machine workshops of the Faculty of Engineering will be converted to an independent entity with functions similar to the above mentioned technology centre or at least it will have such functions while remaining as the University's own facilities.
- (2) A research and development centre will be established for applied research activities and developing products and production technologies at its own initiatives as well as at the request of industries. Emphasis will be laid on electric and electronics as well as machinery.
- (3) Expansion of Husn Polytechnic and establishment of an affiliated vocational training school. This project will specifically aim at fulfilling skill requirements of the Border Free Zone.
- (4) Establishment of a management development and training centre. This project will also be mainly to serve for the industries in the Free Zone.
- (5) Industrial estates and zones will be constructed or demarcated according to a plan which aims at making the best use of agglomeration of related industries.

7.3.2 Recommended Policies, Projects and Studies for the Period till 1985

07.065 Industrial development policies for the period till 1985 would be based on the long term strategy described in previous section 7.3.1. Besides, following two orientations should not be ignored for the sake of well-being of the population in the area, at least for a medium time span.

- (1) To promote industries which cater for daily requirements of the population in the Irbid Governorate, which will reach somewhere around 1.14 million in the year 2000.
- (2) To promote industries which utilize off-season agricultural labour force in locations within easy reach from their home or in their houses.

07.066 Considering the long and medium term orientations described in foregone sections and taking accounts of the present situation of the mining and manufacturing sector in the Area, following components will be important in the industrial policies for the first half of the next decade. At the National level:

- (1) Promotion of inter-Arab cooperation and coordination;
- (2) Expanding the activities of organizations such as the Industrial Development Bank. Expansion of (a) its Small-Scale Industry and Handicraft Program and (b) the Management Institute as well as (c) loans and equity participation operations and (d) Vocational Training Institute.
- (3) Establishing a long term policy for the regional distribution of industries, defining the extent of growth allowed for Amman in particular.
- (4) Establishment of the Jordan Industrial Development Authority, to be called JIDA. This was proposed as a one-stop agency for industrialization promotion by a Singapore-based consultant in 1978. This agency will particularly commendable for the planning and administration of industrial estates in the Study Area. However, as the consultant pointed out, this agency will require, before its operation, overall coordination and close cooperation with the Industrial Development Bank, the Ministry of Industry and Trade, and the National Planning Council. Thus, the establishment of this one-stop agency will not be in quite near future.

07.067 And at the Governorate and municipality levels:

- (1) Promoting publicity activities to attract investors into the Area, Industrialists outside the Area do not know much about the Area and tend to regard the Area as a remote place with sparsely spreaded markets of small scale and with population which has little industrial experiences. In fact, Irbid is not so far as people tend to think, and electricity, water, telecommunication and other services are being improved. And actually there are several industries in

operation which require relatively high skills and technologies. It is therefore recommended that the Governorate and the Municipality of Irbid will promote activities which aim at making industrialists realize the potentiality of the Area as a major industrial centre.

- (2) Giving guidance and assistance to existing and emerging industries by mobilizing institutional services which are readily available. During the field survey by the Study Team, several industrialists expressed their needs for guidance and assistance which can be readily available. Some of them even know the availability of such services but there seem to lie some psychological hindrance to approach them. It is recommended, therefore, the Governorate and municipality of Irbid to inform local industries of guidance and assistance available and to provide them with match-making services.
- (3) Making clear to the industrial circle that the industrial estates are not only for town beautification but, to a greater extent, for effective promotion of industrial activities. Accordingly, higher priority should be given to industries in the estates in providing electricity, water, telecommunication and transportation facilities. Service facilities such as water tanks, stand-by-generators for common use, and government offices (the office to get import licenses for an example), banks, commercial agents, material suppliers, etc., should also be accommodated inside the estates or nearby. Rent of ready-made-factory, space of land, or price of land if it were to be sold, will be set at a level attractive to industries.

07.068 Projects and studies recommended to be implemented in period include followings:

- (1) Construction of the Border Free Zone. Budget requirements for this project is estimated at about JD 10 million to be shared equally between the Jordanian and Syrian governments. This amount includes costs for constructing the 100 ha in the first stage in two years starting early 1979 and the rest of the proposed 300 ha in the later stages. Assuming the Jordanian Government will undertake the construction of 100 ha within the next Five Year Plan period, JD 2.5 million will be invested. Studies should be undertaken for identifying potential industries and promotion activities should be conducted to individual firms with investment likelihood. Inter-Arab arrangements should be sought for opening the markets to tenant industries as is found necessary.

- (2) Expansion of the existing industrial estate in the Irbid Municipality by 20 ha with improved internal road, electricity and other services. This will cost about JD 0.2 million for construction and JD 0.6 million for purchasing the land. A study will be undertaken to plan the necessary facilities. This project may grow up to the 100 ha after 1985, and an additional industrial estate might be necessary by the year 2000. The study will cost about JD 30,000. The municipality is not expected to afford the costs of construction. The Central Government development budget will have to be allocated to cover a large portion of the costs of development. It can be justified in view of widening income disparity between the Study Area and other areas.
- (3) Municipalities such as Ramtha which has a plan to construct an industrial estate are advised to seek for technical assistance from the MMRA, and other ministries. Industrial estates would be worth undertaking, at first, even in a small scale. Small scale industrial estates should be provided in other cities such as Ramtha, Jerash and Mafraq. Assuming 5 ha for each, 15 ha in total will cost about JD 0.6 million.
- (4) Organizing evening courses for owners, managers, and senior staff of industries on subjects pertaining to management and technology development. Municipalities should take the initiatives in collaboration with other organizations.
- (5) Yarmouk Industrial Estate.
The Yarmouk University has a plan to establish factories to supply construction materials, furnitures and equipments necessary for construction and establishment of the University at its new campus. As is discussed in Chapter VIII Housing Construction, this plan has a good reason in terms of efficiency for the University alone. However, this plan will give no incentives within the Study Area. Construction of the University with such large scale can have significant effects on the industries within the Area. Hence, the construction should be utilized fully to encourage and grow the industries in the Area. So, it is recommended for the University to take the policy to utilize and encourage the participation of private industries to its construction of new campus. This policy will create large demand for construction industries, furniture industries, machine industries and so on. At the same time, the University can induce knowledge intensive and technology intensive industries around

it. Furthermore, distribution activities such as a truck terminal can take place near the University, since the area to the east and south of the University is located at the center of the international and National highway network. To accommodate these industries and to encourage more development of industries into general manufacturing, it is proposed to establish a new industrial estate near the University, which might be called a Yarmouk industrial estate. This project is estimated to cost about JD 3.8 million, assuming 150 ha of site.

(6) Other projects and studies which are worthy of implementation are as follows:

- 1) Petroleum exploration. Jordan may not be able to finance high costs of drilling and will have to continue to depend on interested international petroleum companies.
- 2) Studies to identify and utilize other mineral resources such as oil shale, sand for metal casting, rocks for building materials etc..

7.3.3 Budgetary Program

07.069 A budget program of the projects proposed is as follows:

(Unit: JD 1,000 at 1977 prices)

	1980	1981	1982	1983	1984	1985	Total
1. Expansion of Irbid Industrial Estate <u>1/</u>	300	500					800
2. Small Scale Industrial Estates in Three Cities			300	300			600
3. Syrian-Jordanian Industrial Free Zone		1,100	1,400				2,500
4. Yarmouk Industrial Estate					1,800	2,000	3,800

Note: 1/ Temporarily 20 ha is assumed.

CHAPTER VIII

HOUSING CONSTRUCTION

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HOUSING CONSTRUCTION

8.1 Introduction

08.001 This part of the Study deals with (1) the evaluation of the present housing situation in the Study Area in terms of the housing needs, demands, construction and the Government's role; (2) the examination of the potentials of housing construction from the economic development viewpoint; and (3) the formulation of the development policy and programs to modernize and establish the related industries.

08.002 Due to the time constraints of this Study, field surveys as well as hearing from officials at the various localities were not sufficiently made to make up fully the information gap caused by lack of existing statistics on the vital information such as the existing inventory, occupancy and ownership situation and the building industry in the Study Area. Accordingly, proposals for the policy and projects are crude and might require further examinations. It is much desired that these ideas and concepts be further studied by both the authorities and experts concerned.

08.003 The Team wishes to record its appreciation and thanks to the officials of the Jordan Housing Corporation for its full cooperation. It is also greatly indebted to the officials of the Housing Bank, and the Industrial Development Bank.

8.2 General Characteristics and Present Situation in Jordan

8.2.1 General

08.004 The Department of Statistics has estimated the population of the East Bank at the end of 1976 to be 2,018,407. It is said that this estimate does not reflect the true figure due to the absence of a census since 1961. The above estimate is based on the assumption of annual population growth rate of 3.4 percent derived from the past fertility and mortality rates and this 3.4 percent is questionable. On top of this, there was the influx of refugees from the West Bank in 1967. Like other developing countries, the population structure of Jordan is characterized by the large volume

of its young generation, which are to form new families in the coming years. This population growth implies a great amount of housing needs. Also the current socio-economic developments of the Country tends to accelerate growth of the urban population which can be easily witnessed at the marked progress of the Amman metropolitan area. This urban transmigration implies another demand for housing. For these reasons, it is one of the imperative issues to find a solution to meet the ever increasing need for housing.

a. Urban Housing Situation

08.005 Urban housing problems originate basically from factors as the inflow of the youth into the cities, the division of family, and the natural increase of population. Along with these phenomena, the inflow of the war refugees from the West Bank is also noted in this Country. Furthermore, due to the continuing inflation, the increase rate of the housing cost exceeds that of the average income of the citizens. For a family with low income, to own a decent residence is thus becoming increasingly difficult. Hence they live in rental houses in the cities with an average of six persons per room, while the average number of persons per room is 2.5 in Jordan. (Housing Corporation, Five-Year Plan May 1976). The land cost is increasing considerably because of land speculation. Even if those in the lower brackets of income could buy some land, it would be in the suburbs where public services are not adequate. There are problems of over population, and inadequate hygiene concerning housing. These problems are particularly serious among the families with lower incomes.

b. Housing Needs

08.006 The housing situation in Jordan is characterized by a huge latent demand for such dwellings that correspond to people's incomes, especially the latent demand by those belonging to low income groups. According to the study recently made by the Housing Corporation (hereinafter the H.C.) the housing needs for the coming 10 years from 1977 to 1986 is estimated at a total of 161,420 units considering the needs from (1) population growth, (2) structural charge of a family and (3) replacement of the deteriorated buildings as shown below.

<u>Annual Housing Needs</u>	
<u>Year</u>	<u>Units Needed</u>
1977	14,398
1978	14,451
1979	15,117
1980	15,495
1981	15,886
1982	16,290

(To Continue)

Annual Housing Needs (Continued)

Year	Units Needed
1983	16,708
1984	17,140
1985	17,587
1986	18,048
Total	161,420
Average	16,142 units a year

Distribution of these units needed by the income group is as follows:

Low Income Group ^{1/}	8,480 Units	53%
Middle Income Group ^{1/}	4,000 Units	25%
Higher Income Group ^{1/}	2,400 Units	15%
High Income Group ^{1/}	1,120 Units	7%

Source: The Housing Corporation, The Housing Problem in Jordan.

Note: ^{1/} Income groups are defined as follows:

- (1) Low Income Group
Under JD 600/household/year
- (2) Middle Income Group
JD 600 - JD 1,300/household/year
- (3) Higher Income Group
JD 1,300 - JD 1,800/household/year
- (4) High Income Group
More than JD 1,800/household/year

The Housing Regulation No.26 for 1970 has defined the income groups for housing purposes as follows:

- (1) Low-Limited Income Group
Under JD 400/household/year
- (2) Middle-Limited Income Group
JD 400 - JD 1,000/household/year
- (3) High-Limited Income Group
JD 1,000 - JD 1,500/household/year

08.007 However it should be noted that the above estimated housing needs does not include those units to alleviate the existing shortage because there is virtually no information about the housing stock itself. There is no doubt that a substantial shortage exists particularly in Amman/Zarqa area, which is common to other population centers in the developing countries. Assuming that over 50 percent of the population in the East Bank concentrates in Amman/Zarqa region, and that 10 percent of it is deprived of housing in 1977, roughly 17,000 housing units are needed in addition to 14,000 units in 1977.

08.008 On the other hand, speaking of the effective demands of housing, it looks quite pessimistic due to the over widening gap between the income growth and rising costs of building and land. The cost of land is the biggest obstacle. It was told by a local specialist in this field that the price of developed land in the Municipality of Amman has sky-rocketed at the incredible rate of 800% between 1974 and 1976 so that in many cases the cost of land alone becomes equal to the intended construction cost or more. The following Table 8.1 shows price fluctuations of some building materials since 1975. As you can see in the table, construction materials cost went up, but not as much as land did. Because of this high price in land cost, the effective demand for housing was not so high and seems not to be high even in the future.

Table 8.1 Wholesale Prices of Building Materials

(Unit: JD at Current)

Material	1975	1976	1977	Fluctuation Percentage Between 1975 - 1977
Cement	11.6	18.0	18.0	55.2 +
Iron Bars, 8 mm	110.0	155.0	125.0	13.6 +
Iron Bars, 10mm	110.0	123.0	113.0	13.0 +
Iron Angles and Squares	127.0	135.0	135.0	6.3 +
Iron Sheets, 8mm	140.0	150.0	135.0	3.5 -
Zinc Sheets	140.0	200.0	200.0	42.9 +
White Timber, m ³	57.0	072.0	070.0	22.8 +
Swedish Timber, m ³	70.0	75.0	84.0	20 +
Canadian Timber, m ³	127.0	125.0	130.0	2.4 +
Beech Wood, m ³	85.0	85.0	98.0	15.3 +
Plywood, m ³	135.0	140.0	160.0	18.5 +
Window Glass Sheets, 3mm. sq.m.	0.8	1.0	2.0	150.0 +
Galvanized Tubes, ½"/m	0.2	0.3	2.0	900.0 +
Galvanized Tubes, 1"/m	0.4	0.6	0.5	25.0 +
Cast Iron Drainage Tubes, m	1.6	4.5	2.8	75.0 +
Clay Drainage Tubes, m	0.4	0.6	1.0	150.0 +

Source: Department of Statistics, Publication.

c. Inflation in Construction and Land Costs

08.009 Table 8.2 demonstrates the rise in rents or installment against income for low-income families benefitting from the H.C. projects over different periods:

Table 8.2: Installment - Income Ratio of Beneficiary Families from the H.C. Low-Income Housing Projects

Execution Year	Average Monthly Income (JD)	Average Monthly Installment (JD)	Installment/Income Ratio(%)
1971	35.160	5.418	15.410
1972	42.101	7.551	17.935
1973	51.961	9.960	19.168
1974	55.360	14.415	26.390

Source: Housing Corporation

08.010 As you can see in the table, the installment - income ratio has risen from 15 percent in 1971 to 26 percent in 1974, and 26 percent is generally considered to be the limit at which a household can pay for a housing unit.

d. Housing Supply and Its Geographical Distribution

i. Housing Supply Data

08.011 Due to limited information and statistical data, an analysis made as to the housing supply situation in the whole Country may not reflect the actual situations, but may help in giving a crude picture of it. At first data situation is discussed here. Reliable information is only available as to the public housing supply. Public housing's share is considered roughly below 30% of the total supply. Statistical data compiled by the Department of Statistics is based on the report from each administrative unit which issued the building licenses. Though the information of the major population centers are covered by this data, it is said that a number of the rural units are not recorded. Furthermore, it is said that there are a sizable number of illegal constructions, particularly in the rural area.

ii. Housing Supply by the Three-Year Plan

08.012 The target number of the housing supply of the Three Year Development Plan (1973-1975) was 21,000 units which were composed of 10,850 units by public sector and 10,150 by private sector. However the rate of achieved projects by the public in the Plan was 68%,^{1/}

^{1/} Statement of the Director-General Housing Corp., Achievements of the Three Year Plan 1973-1975.

although the rate is considered fair if compared with other sectors of the Plan. Since the geographic priority of housing supply by the public was given to the production centers in industry, agriculture, mining and where it is necessary to face population growth, its achievements closely interlinked to that of those productive sectors. On the other hand the achievements made by the private were 112% and 212% respectively of the targets in terms of the number and the amount invested. These two percentage figures of the private implies that the market of the private housing supply is found in the higher income group of the society.

iii. Housing Supply by the Current Five-Year Plan

08.013 The housing goals within the current Five Year Plan (1976-1980) is as follows:

- (1) The construction of 31,000 housing units at the total cost of JD 83 million, giving priority to housing projects for Government employees and the limited income group in general. Of the total, the H.C. should construct 7,500 units (which was later increased to 7,708 units) for the low and middle income groups, while the balance is to be constructed by other parties concerned and the private sector.
- (2) The construction of housing in production centers and in areas outside the limits of Amman and Zarqa where community facilities are available.
- (3) The reduction of construction costs through development and processing of local building materials. The adoption of industrialized systems and standardized specifications and the production of their materials in economic quantities.
- (4) Increase in the contribution of the housing sector to the GDP from JD 17 million in 1975 to JD 30 million in 1980.

08.014 The target number of units under the current FYP indicates decrease in number on annual basis from 7,000 units in the Three Year Plan to 6,200 units in the current FYP which represents only 39% of the needs discussed in Section 8.2.1a. Though there may be justifiable reasons for this, no clear explanations were obtained. However, judging from the primary objectives of the current FYP, the following may be the major reasons:

- (1) Higher allocation of such resources as water, power, capital, materials, equipment and manpower to the productive sectors and its related technical and economic infrastructure is essential to attain higher economic growth as Japan did in the post war economic development up to the 1960s;

- (2) Jordanian talents are in high demand in the neighbouring oil-producing Arab countries and it is said that about 300,000 are working in those areas, which is roughly 50% of the national work force. Therefore, all of those working outside the country may not necessarily need to have dwellings in Jordan for the time being; and
- (3) There may be substantial number of extension and improvements for the intermediate solution which do not require a new building license.

iv: Regional Comparison

08.015 Table 8.3 shows the regional comparison of new housing construction from 1972 to 1976. As mentioned earlier, these statistics cover the major municipalities in each region. Accordingly the actual National as well as regional total must be bigger than these figures. Regional share of housing construction varies slightly by year but reflects that of population. The characteristics of each region in terms of the past housing construction are:

(1) Amman region:

The shares of new housing construction in terms of number and floor-area constructed are 60% and 70% of the national total as against the population share of 56.5%. ^{2/} Judging from Table 8.3 it can be said that the region's housing situation in terms of quantity and quality (floor area/unit) of new housing is outstandingly better than the other regions.

Within the region, Amman and Zarqa districts occupy 80% of the shares in terms of the floor area constructed which corresponds about 55% of the National total. Oligo-polistic position of Amman and Zarqa in the Country's economic activities is also well understood from the trend of the housing construction.

However, the amount of new construction in Amman-Zarqa has tended to remain at the same level or to decline gradually and a rapid growth tendency is found in Suweileh and El-Queismeh districts. Those housings in Wadi-Seer and El-Juheida have almost three times larger floor area per unit than the national average.

Also it must be noted that new housing construction in the region particularly in Amman-Zarqa includes many of the dual purpose buildings such as a residence with commercial store or a residence with office.

^{2/} Estimate of the Department of Statistics.

Table 8.3 Regional Comparison of New Housing Construction

(Unit: Buildings & m²)

REGION	1972		1973		1974	
	Nos.	Floor Area (m ²)	Nos.	Floor Area (m ²)	Nos.	Floor Area (m ²)
AMMAN	3,919 (56.8%) 11	341,100 (67.9%)	5,293 (67.8%) 12	479,200 (79.4%)	3,238 (61.0%) 11	365,700 (74.4%)
IRBID	1,435 (20.8) 12	108,000 (21.5%)	1,438 (18.4%) 13	78,500 (13.0%)	1,162 (21.9%) 13	71,000 (14.4%)
BALQA	390 (5.7) 2	16,800 (3.3)	229 (2.9%) 3	11,100 (1.8%)	61 (1.1%) 2	1,600 (0.3%)
KARAK	763 (1.1) 4	13,400 (2.7)	284 (3.6%) 4	8,300 (1.4%)	107 (2.0%) 3	4,300 (0.9%)
MA'AN	38 (0.5%) 1	3,400 (0.7)	28 (0.4%) 1	2,100 (0.3%)	6 (0.1%) 1	500 (0.1%)
OTHERS	352 (5.1)	19,300 (3.9)	534 (6.9%)	23,700 (4.1)	734 (13.9%)	48,600 (9.9%)
TOTAL	6,897 (100.0)	502,000 (100.0)	7,806 (100.0)	602,900 (100.0)	5,308 (100.0)	491,700 (100.0)

(To continue)

Table 8.3 (Continued)

(Unit: Buildings & m²)

REGION	1975		1976	
	Nos.	Floor Area (m ²)	Nos.	Floor Area (m ²)
AMMAN	4,406 (55.2%) 11	485,300 (70.6%)		
Nos. 1/				
IRBID	2,089 (26.2%) 15	127,200 (18.5%)	1685	102,978
Nos.			15	
BALQA	531 (6.7%) 4	27,500 (4.0%)	399	9,590
Nos.			4	
KARAK	332 (4.2%) 4	10,400 (1.5%)	246	9,359
Nos.			5	
MA'AN	47 (0.1%) 2	4700 (0.6%)	90 (0.7%) 2	11,600
Nos.				
OTHERS	571 (6.5%)	34,000 (4.7%)	668	39,484
TOTAL	7,976 (100.0)	687,100 (100.0)		

Source: Statistical Yearbook, 1972, 1973, 1974, 1975, and 1976

Note: 1/ Nos. indicated at the bottom box show the number of municipality reported.

(2) Irbid region:

Though there has been notable fluctuation year by year, the average shares of the region in terms of new housing construction and floor area constructed in the National total is 21% and 17% respectively as being contrasted to its population share of 28.8%. The average floor area and rooms per unit is about 70% of that of Amman. As to the type of construction, reinforced concrete buildings represent approximately 80%, which is followed by concrete block buildings of 20%. Generally, dressed stone is not used as much as it is in Amman. It may be obvious that economic differentials between Amman and Irbid regions is tending to be widened if no control is made on the growth of Amman region.

(3) Balqa region:

The population share of the region is 6.6%. Both shares of new housing construction number and floor area constructed are below the population share, which are 5% and 3% respectively. Because of the geographical proximity to Amman, their population seems to be pulled by Amman. The dominant type of construction is of reinforced concrete and most of them are not fixed with dressed stone as in Irbid. The average floor area per unit is about 65% of that of Amman.

(4) Karak region:

The population share of the region is 5.6%. Both share of new housing construction number and floor area constructed are about 3% and 1.5%, which are worse than Balqa's situation. The dominant type of construction is of reinforced concrete.

(5) Ma'an region:

The population share of the region is 2.6% which is lowest among the five regions. The average shares of new housing construction number and floor area constructed are 0.3% and 0.5% respectively. However the average floor area per unit in the region is about at the National average. In connection with the projects planned under the current FYP such as port development and fertilizer plant, a large scale of housing construction is underway. Therefore, the region will be expected to grow rapidly in terms of housing supply.

e. Level of Housing

08.016 As mentioned earlier, there is no data about the housing stock in Jordan. But by utilizing the rule of thumb, the H.C. tried to estimate the housing stock, and the following breakdown of the

type of dwelling was the result as of the end of 1976 assuming that there were some 306,000 households. 3/

Housing Stock in Jordan, 1976	(Unit: Household)
In Permanent Dwellings	213,000
In Tents	28,000
In Caves	1,000
In Huts	24,000
In Refugee Shelters	40,000
Total	306,000

The permanent dwellings are composed of mud-brick, cement brick, concrete, undressed stone and dressed stone houses which are about 70% of the total dwellings. The remaining 30% are temporary shelters such as tents, caves and shacks which need to be improved.

08.017 Housing design pattern in Jordan can be divided into the following four categories: 4/

- (1) Traditional rural housing mostly built by self-help efforts (40 - 60m²):
The house has a rectangular shape with one or two rooms, mostly without utility facilities such as water supply, sanitation and electricity. It is usually built with mud-bricks or undressed stone.
- (2) Low-cost urban and rural housing subsidized by the Government (60 - 80m²):
The standard is higher than that of the rural traditional, self-help housing, but still very modest. The house is rectangular having a maximum of three rooms. The main building materials are concrete blocks. Some facilities such as water supply and electricity are provided by the communal services.

3/ According to the Five Year Plan by the Housing Corporation, there are about 265,000 houses in the East Bank, out of which 60,000 are shacks and refugee shelteres.

4/ Henrik Ramic, Technical Report on Housing Pilot Projects.

- (3) Middle-income urban (80 - 120m²):
Also subsidized to some extent by the Government, this type of housing approaches to the standard of developed countries. Main structural building materials are almost invariably concrete blocks.
- (4) High income housing (120m² and up):
A variety of designs and building materials are used according to the cost which the builder can afford. Dressed stone is widely used in this type of housing.

08.018 From trips to the several sites of the current housing project for the low income groups in Amman, Marqa and Zarqa undertaken by the H.C., it is found that there are substantial improvements in design, building materials, building system and sanitation which is largely due to the timeless efforts of both the H.C. and the local contractors.

f. Building Systems

i. General

08.019 Traditional building system is the so called block building system using either stone, concrete blocks or bricks. The currently dominant construction method is the frame system of reinforced concrete columns and beams, which uses stone, concrete blocks and bricks for external walls and partitions. However, the H.C. recently adopted the following three new building systems in addition to the traditional system, in order to cope with the rising cost of building and to reduce the construction period. Their results were found to be quite successful.

ii. Panelized on Site Construction

08.020 By using aluminium panel shuttering and by pouring the concrete through pump, this system constructs wall panels on site. The shuttering gives the wall a similar appearance to rough brick masonry with a wall thickness of 10 cms of reinforced concrete, requiring no need for any plastering. Electrical and plumbing extensions are simultaneously installed while concrete is poured. Curing time requirement is said to be 24 hours using the additive for hardening, which allow to use the aluminium shutterings for next day's casting except for roof slabs. According to the contractor of Al-Hashimiyeh projects (1,012 units), the four sets of the aluminium shuttering could produce an average of three units per day. Because of the continuous repetition of the shuttering fabrication system, their workers could easily master the technology. Building cost is estimated to be JD 26/m² for a semi-detached 60m² and 86m² unit.