

2-5 Middle East Regional Economy

2-5-1 Economies of the Middle East Countries

(1) Comparison of basic conditions for industrial development

It is considered that having a minimum agricultural production capacity would be the most basic condition for industrial development of a country. The capacity of agricultural production of a country would naturally set some limitation in the number of people sustainable in the country. Larger agricultural production would support more people, which will create a larger market for products and a larger scale of society where divisions of work can work to attain more efficient production. At the same time, a large population supported by a large agricultural production would be the potential source of labor when industrialization process takes place.

Agricultural labor is characterized by continuous efforts to cultivate a land under a given climate. The continuous efforts of the agricultural labor are considered to be the basis of diligence which industrial development needs. From the point of cultivation of the moral of diligence, for industrial development, it would be appropriate to say that agricultural production is the basis of industrialization.

Factors indicating the capacity of agricultural production, such as land area, population, rainfall, agricultural land area, are compared among six countries of the Middle East (the Middle East countries) and six countries of ASEAN (the ASEAN countries) in Table 2-5-1.

1) Land area and population

The total population of the ASEAN countries is 334 million and that of the Middle East countries in comparison is 75 million. The population of the former is 4.5 times the population of the latter, while the land area of the ASEAN countries is 2.3 times that of the Middle East countries. Consequently, the density of population of the ASEAN countries is 1.9 times that of the Middle East countries.

In terms of both population and land area, Israel, Palestine, and Lebanon are rather small countries. Israel has a population of 5.32 million and a land area of 20,325 km², Palestine 1.22 million and 6,160 km², and Lebanon 2.81 million and 10,408 km². These three countries can be classified in the group of small size countries in the Region. Jordan has a rather large land area of 89,206 km². However, it would be appropriate to classify Jordan in the group of small size countries, since its population is only 4.30 million.

In contrast to these four countries, Egypt is a large country in the Region in terms of land area and population. Egypt is the only country in the Region which is comparable to the scale of the ASEAN countries. The size of population of Egypt is comparable to the size of population of Thailand and the Philippines. The land area of Egypt is much larger than that of Thailand and Malaysia, but smaller than that of Indonesia.

In terms of land area and population, Syria is much larger than other countries, except Egypt, in the Region. But it is still smaller than the ASEAN countries except Singapore and Brunei. The size of Syria is just between Egypt and each of the group of small size countries.

The size of the ASEAN countries, except for Singapore and Brunei, is, in general, much larger than that of the Middle East countries. It is considered that the difference between these two regions is due to the difference of rainfall in the areas, which is discussed in the next section.

2) Rainfall and agricultural land area

The average highest and the lowest monthly rainfalls in the capital cities are compared in Table 2-5-1. The highest monthly rainfalls of Israel, Palestine and Lebanon are 121 mm, 121 mm and 190 mm, respectively. However, the highest rainfalls of other countries are less than 100 mm. The highest rainfall of Egypt is just 5 mm, that means there is virtually no rainfall in Cairo. The lowest rainfalls of these countries are 0 mm except for Lebanon, where the lowest rainfall is 1 mm.

The highest rainfalls of the ASEAN countries range from approximately 300 mm to 450 mm, and the lowest rainfalls range from 65 mm to 150 mm, except Thailand and the Philippines where the lowest rainfall is 5 mm. The rainfalls in the Middle East countries are significantly lower than those in the ASEAN countries.

The small rainfalls in the Middle East countries limit the percentage of the agricultural land area to the total land area ("cultivated land ratio"). The cultivated land ratios of Egypt and Jordan are very low, 2.6% and 4.5% respectively. Israel, Syria and Lebanon show relatively high cultivated land ratios of 20.9%, 32.6% and 29.4% respectively. These numbers are comparable to those of Thailand (40.8%) and the Philippines (34.9%).

However, the overall average of the cultivated land ratios of the Region is 7.5% compared to 23.1% of ASEAN. The low ratio in Egypt lowers the average of the Region. The cultivated land ratios of Malaysia and Indonesia are 14.9% and 18.0% respectively.

However, these relatively low ratios must be understood by taking into consideration the fact that these two countries have vast unused cultivable lands.

3) Employment in agriculture

The ratio of employment in the agricultural sector to the total employment of the country ("agricultural employment ratio") of the Middle East countries is 30.7%, while the agricultural employment ratio of the ASEAN countries is 50.9%. The difference between these two regions is not so large as it is expected.

The relatively high agricultural employment ratio of the Middle East countries is due to the high ratio of 39.0% of Egypt. Since the population of Egypt accounts for 64% of the total population of the Region, the high ratio of Egypt raises the average ratio of the Region. In Egypt, the primary sector, consisting of agriculture and fishery, accounts for only 17% of the GDP. The productivity of the agricultural sector in Egypt is very low.

The agricultural employment ratios of the ASEAN countries are generally high. The ratio of Thailand is 60.7%, which is the highest in the ASEAN countries. Indonesia and the Philippines have the second and third highest ratios: 52.2% and 45.8% respectively. The agricultural employment ratio of Malaysia is rather low due to the structural change of the national economy toward a service-oriented society.

The relatively high agricultural employment ratios of the Middle East countries imply that people are obliged to live on agriculture under less favored conditions. This is one of the reasons for the relatively low GDP per capita in the Region as discussed later.

It can be concluded from the above analysis that the basic conditions of the Middle East countries are unfortunately not favored by nature. Although this does not imply that industrialization is not possible in this Region, it should be emphasized that more efforts should be made by the people in the Region to overcome the unfavorable conditions.

(2) Comparison of GDP

1) Distribution of GDP by sector

Distribution of GDP by industrial sector of five Middle East countries (Lebanon is not included due to unavailability of information) and three ASEAN countries (Singapore, Malaysia and Thailand) is compared in Table 2-5-2. Due to the limitation of data collected, the year of statistics is different by country as indicated in the table. It should also be noted

that mining is included in the manufacturing sector in the table, since mining is not separated from manufacturing in the GDP statistics of some countries.

Some basic economic indicators of Jordan and the neighboring countries are illustrated in Figure 2-5-1.

Singapore was included in this comparison, because of some similarity to Jordan, Israel and Lebanon, in terms of basic conditions for industrialization. Malaysia and Thailand were included in the comparison due to their similarity to Syria and Egypt.

The shares of the agriculture and fishery sector in Jordan and Israel are only 9.4% and 2.6% respectively. The shares of the service sector in Jordan and Israel are 55.3% and 65.3% respectively, which are higher than those of the other Middle East countries. This pattern of GDP distribution of these two countries indicates some similarity to that of Singapore. These three countries have rather similar basic conditions for industrialization as discussed in the preceding section.

The GDP distribution of Egypt and Syria is rather similar to that of Thailand. There is also some similarity to Malaysia. However, the share of the manufacturing sector in Malaysia is 43.1%, and this is the highest among eight countries in the comparison.

It should be noted that the large share of the service sector in GDP of the Middle East countries does not necessarily mean that their economies are mature. On the contrary, the high share of the service sector resulted from the limitation of growth of the primary sector and the manufacturing sector, due to the limited basic conditions of these countries.

2) GDP per capita

GDP per capita of Israel is \$13,411. This is the highest among the Middle East countries. GDP per capita of the West Bank of Palestine is \$1,500, and this is the second highest, in the Middle East countries. GDP per capita of the West Bank of Palestine is higher than that of the other Middle East countries due to its strong linkage with the economy of Israel. The price level, as well as the income level, of Palestine is raised by the influence of the Israeli economy. Considering this characteristic of the Palestine economy, the level of GDP per capita (\$1,500 in the West Bank and \$1,000 in Gaza) indicates that Palestine suffers from poverty and economic distress.

GDP per capita of Jordan, Egypt and Syria are \$1,083, \$635 and \$1,258, respectively. They are much lower than that of Singapore (\$16,253) and Israel (\$13,411), but the

difference from those of Malaysia (\$2,105) and Thailand (\$1,912) is not so large as it is anticipated.

(3) Comparison of current account balance structure

The structures of the current account balance are compared in Table 2-5-3. Due to the limitation of data collected, the year of statistics is different by country, as indicated in the table. The ratio of each component of the current account balance in the total of Export and Receipt of Service is shown in percentage.

1) Trade balance

One very significant feature of the trade balance structure of the Middle East countries is that the countries are recording large trade deficits except Syria. The trade deficit of Palestine is 129.4%, which is extremely high compared to the other countries. The trade deficits of Jordan, Egypt and Israel are 47.0%, 63.4% and 25.3% respectively. Syria is the only country recording a trade surplus of 3.6%.

In contrast to the large trade deficit of the Middle East countries, the trade deficit of the ASEAN countries is very limited. Trade deficits of Singapore and Thailand are just 7.9% and 8.5% respectively. Malaysia is recording a trade surplus of 2.6%.

2) Service balance

The service balance of the Middle East countries varies among the countries. Israel and Syria are recording service balance deficits. On the other hand, Jordan, Egypt and Palestine are recording service balance surpluses.

The reason for Jordan's service surplus is the remittance from Jordanian workers overseas, and receipts from tourism. They were JD 764 million and JD 406 million respectively in 1994, which accounted for 40% and 21% of service receipt of Jordan in the year. Egypt's service surplus was significantly contributed by the receipts from the Suez Canal and the receipts from tourism. The current account surplus (before transfer) of Syria turns to be deficit due to the large service imbalance.

3) Money transfer

Money transfer consists of two components, namely receipts by the Government, such as grants from foreign countries, and receipts by the private sector. The receipts of

transfer are especially important for Israel and Egypt accounting for 30.5% and 57.9% respectively of the total of Export and Receipt of Service.

The most significant feature of the current account balance structure of the Middle East countries is that the deficit caused by the trade imbalance and/or the service imbalance is made up by the transfer from overseas. This feature is, to some extent, common to all of these countries.

The dependence on the transfer from overseas implies vulnerability of the national economy of these countries. These economies are naturally very sensitive to changes in the external environment such as war, fluctuation of oil price, etc. This vulnerability is a risk, maybe a very significant risk, for foreign investors, and would be a part of the background for the lagging foreign investment in this Region.

2-5-2 Inter-relationship between the Jordanian Economy and the Middle Eastern Economies

The economic relationship between Jordan and other Middle East countries is analyzed in terms of trade relationship, immigrating and emigrating labor force and international financial cooperation.

(1) Trade relationship

1) Export and import of Jordan

Area-wise statistics of Jordan's export and import from 1989 to 1994 are shown in Table 2-5-4. As seen in this table, the Arab countries are the most significant Jordan's exporting countries, though their share in 1990, 1991 and 1992 was the second largest next to the Asian and non-Arab countries, due to the significant drop in exports to the Arab countries as a result of the Gulf War. The share of exports to the Arab countries was 42.8% in 1994.

The second largest exporting area is the Asian and non-Arab countries, whose share in the total export in 1994 was 27.4%. The third area is the EU countries, however, their share was 5.1% in 1994, which was significantly smaller than those of the two top areas.

The East European countries used to be the third largest exporting area in 1989, accounting for 8.0% of Jordan's exports. However, their share in 1994 dropped to a mere 1.7% reflecting the collapse of the COMECON economy.

As for imports of Jordan, the EU countries have always been the most significant importing area, and their share in 1994 was 33.6%. The second and the third largest importing areas were the Arab countries and the Asian and non-Arab countries, except for 1989 and 1990. The shares of these two areas in 1994 were 22.5% and 21.3% respectively.

The share of imports from the North American countries has always been above 10% in this period, though their share in exports has been approximately 1% or less in the same period.

It would be appropriate to conclude that Jordan is, to a large extent, depending on the Arab countries for its exports, and on the Western countries for its imports. This reflects some characteristics of Jordan's international trade structure. Namely, Jordan is importing consumer products and finished products from the advanced countries such as EU countries and the U.S.A., and Jordan is exporting various products to the Arab countries.

Under the above-mentioned international trade structure of Jordan, Jordan's trade deficit with the advanced countries is very significant. All of the top five countries with which Jordan had trade deficits in 1994, as shown in Table 2-5-5, were the Western countries except for Iraq. They are the U.S.A., Germany, Italy, the U.K., and the trade deficit amounts were JD 223,625,000, 180,353,000, 129,144,000 and 117,363,000 respectively. The trade deficit with Iraq (JD 193,087,000) was mainly due to the import of oil.

On the other hand, Jordan is recording the largest trading surplus with India. The trade surplus with India in 1994 was JD 49,163,000. United Arab Emirates and Indonesia were the second and third countries with which Jordan had highest trade surplus in 1994, and the trade surpluses with these two countries amounted to JD 30,697,000 and JD 3,386,000 respectively.

2) Export and import of five Middle East countries

The top five exporting and importing countries of Jordan, Israel, Egypt, Syria and Lebanon are listed in Table 2-5-6. As seen in this table, all of the top five importing countries of these five countries are advanced countries with the exception that Iraq ranked among the top five importing countries of Jordan due to oil import; Turkey ranked among those of Syria; Syria ranked among those of Lebanon.

The countries can be divided into two groups based on their exporting partners. The first group consists of Jordan, Syria and Lebanon. Most of the top five exporting countries of these three countries are the Arab countries and developing countries in Asia. On the other hand, all of the top five exporting countries of Israel and Egypt are advanced countries. These two countries are categorized in the second group. The first group has a strong linkage with the Arab countries for exporting, while the linkage of the second group with the Arab countries is very weak.

There would be two measures to develop the regional economy in the Middle East. The first measure is to industrialize each country in the Region to reduce the dependence on the advanced countries, and to develop the regional economy with larger trade within the Region.

The second measure is to increase exports of Israel and Egypt. Israel and Egypt have very unique economic characteristics in the Region. Israel has technology and Egypt has a large population. Increase of exports from these two countries will stimulate the regional economy.

(2) Immigrating and emigrating labor force

The number of Jordanian labor force in the Arab countries was 277,200 in 1987 as shown in Table 2-5-7. Saudi Arabia received the largest number of Jordanian workers, which was 160,930 in 1987, followed by Kuwait and the United Arab Emirates with 81,000 and 10,860 Jordanian workers respectively.

A considerable number of Jordanian workers returned from the Arab countries after the Gulf War, however, recent statistics of the Jordanian workers in the Arab countries are not available.

On the other hand, the Jordanian Government issued 35,287 work permits to foreign workers during 1994 as shown in Table 2-5-8. 29,320 Egyptian workers were granted work permits, which accounted for 83% of the total number of work permits issued in 1994.

Although the official number of Jordanian workers abroad is not available, the number of Jordanian workers in the Arab countries is considered to exceed the number of the Arab workers in Jordan even in recent years.

In the balance of payments of Jordan, transfer from overseas Jordanian workers is one of the most significant sources of funds which make up for the chronic trade deficit of Jordan. The transfer from overseas Jordanian workers amounted to JD 332.6 million in 1993 and JD

157.9 million in 1994, which accounted for 76% and 57% respectively of the current account deficits in the said years.

(3) International financial cooperation

From the 1970s to the early 1980s, the oil producing countries in the Gulf, such as Saudi Arabia and Kuwait, were the primary donors of the Official Development Assistance (ODA) to Jordan. ODA from these countries reduced gradually in the 1980s due to the stagnation of the economy in these countries caused by the decline of oil prices and the outbreak of the Iran-Iraq War. ODA from these oil producing countries declined further since Jordan supported Iraq in the Gulf War.

In recent years, Western countries, including Japan, are the major donors of financial cooperation to Jordan. The top five donors to Jordan in the three years from 1990 to 1992 are shown in Table 2-5-9. ODA from Japan amounted to \$ 430 million in 1991 and \$ 126 million in 1992. This is far larger than any ODA from other Western countries.

Table 2-2-1 Population, Labor and Employment (1994)

Population by age group

Age group	Male		Female		Total	
0-4	316,307	14.6%	300,609	15.2%	616,916	14.9%
5-9	289,767	13.4%	276,639	14.0%	566,406	13.7%
10-14	271,180	12.6%	257,880	13.0%	529,060	12.8%
<Working age population: 15-59>						
15-19	251,160	11.6%	232,388	11.7%	483,548	11.7%
20-24	243,622	11.3%	209,801	10.6%	453,423	11.0%
25-29	209,365	9.7%	169,587	8.6%	378,952	9.2%
30-34	145,584	6.7%	126,792	6.4%	272,376	6.6%
35-39	98,364	4.6%	90,146	4.6%	188,510	4.6%
40-44	73,128	3.4%	68,012	3.4%	141,140	3.4%
45-49	63,161	2.9%	64,239	3.2%	127,400	3.1%
50-54	61,149	2.8%	53,169	2.7%	114,318	2.8%
55-59	48,299	2.2%	43,322	2.2%	91,621	2.2%
	1,193,832	55.3%	1,057,456	53.4%	2,251,288	54.4%
60-64	35,251	1.6%	32,754	1.7%	68,005	1.6%
65+	52,255	2.4%	51,878	2.6%	104,133	2.5%
unknown	2,133	0.1%	1,517	0.1%	3,650	0.1%
Total	2,160,725	100.0%	1,978,733	100.0%	4,139,458	100.0%

Labor force estimates by the major economic activity

Agriculture	54,995	6.4%
Mining & manufacturing	91,086	10.6%
Electricity & water	6,015	0.7%
Construction	60,151	7.0%
Trade	129,754	15.1%
Transportation and communication	57,573	6.7%
Finance and insurance services	24,920	2.9%
Social and public administration	434,806	50.6%
	859,300	100.0%

Ratio to "Working age population"	38.2%
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(Sources)

Population and Housing Census 1994

Statistical Yearbook 1994, Number 45 October 1995

The Hashemite Kingdom of Jordan Department of Statistics

Table 2-2-2 Gross Domestic Product by Economic Activity

	1988	1989	1990	1991	1992	1993	1994
	at Constant 1985 Prices						(in JD million)
A. Industries							
1) Finance, Insurance, Real Estate and Business Service	367.5	363.8	335.5	369.6	386.2	440.9	458.5
2) Transport, Storage, and Communication	288.8	279.9	270.2	255.1	278.5	289.9	321.7
3) Manufacturing	164.8	204.4	224.0	220.7	253.7	261.9	286.2
4) Construction	108.3	86.1	80.7	89.2	138.6	174.1	181.2
5) Agriculture, Hunting, Forestry and Fishing	164.7	124.4	163.1	178.7	209.6	154.3	155.8
6) Wholesale and Retail Trade, Restaurants and Hotels	226.2	77.1	57.7	59.0	65.4	82.4	89
7) Electricity and Water	63.1	69.4	53.3	56.2	58.7	67.1	71.4
8) Community, Social and Personal Services	40.1	29.8	30.9	40.1	49.6	50.6	52.1
9) Mining and Quarrying	70.0	77.4	63.6	54.1	53.5	47.4	47.9
Sub-total	1,493.5	1,312.3	1,279.0	1,322.7	1,493.8	1,568.6	1,663.8
B. Producers of Government Services	405.0	388.2	386.1	392.6	415.3	451.6	469.8
C. Producers of Private Non-profit Services to Household	20.7	20.1	22.0	23.1	25.3	30.4	31.5
D. Domestic Services of Household	5.3	4.0	3.6	3.1	4.2	4.4	4.4
Total	1,924.5	1,724.6	1,690.7	1,741.5	1,938.6	2,055.0	2,169.5
Less: Imputed Bank Service Charge	-47.7	-44.1	-28.5	-36.5	-27.0	-41.6	-42.0
Gross Domestic Product at factor cost	1,876.8	1,680.5	1,662.2	1,705.0	1,911.6	2,013.4	2,127.5
Indirect Taxes Less Subsidies	306.4	209.1	245.8	237.8	343.5	373.8	399.2
Gross Domestic Product at Producer's Price	2,183.2	1,889.6	1,908.0	1,942.8	2,255.1	2,387.2	2,526.7
Growth Rate		-13.4%	1.0%	1.8%	16.1%	5.9%	5.8%
Population (In thousand)	3,001.0	3,111.0	3,431.0	3,663.0	3,804.0	3,950.0	4,139.5
Growth Rate		3.7%	10.3%	6.8%	3.8%	3.8%	4.8%
GDP per Capita (In JD)	727.5	607.4	556.1	530.4	592.8	604.4	610.4
Growth Rate		-16.5%	-8.4%	-4.6%	11.8%	1.9%	1.0%
GDP by Sector							
Manufacturing (A-3, A-4, A-7)	336.2	359.9	358.0	366.1	451.0	503.1	538.8
Primary (A-5, A-9)	234.7	201.8	226.7	232.8	263.1	201.7	203.7
Service (The rest)	1,353.6	1,162.9	1,106.0	1,142.6	1,224.5	1,350.2	1,427.0
Total	1,924.5	1,724.6	1,690.7	1,741.5	1,938.6	2,055.0	2,169.5

(Source) Monthly Statistical Bulletin (September 1995), Central Bank of Jordan

Table 2-2-4 Present Distribution of Industries by Governorate

(a) All sectors

Unit: JD 1,000 for Gross output and Gross Value added

Governorate	No of enterprises	(%)	No of employees	(%)	Gross Output	(%)	Gross Value Added	(%)
Irbid	2,014	16.1	7,326	6.7	59,359	2.2	18,354	2.1
Mafrq	394	3.2	1,544	1.4	16,905	0.6	6,478	0.7
Jarash	234	1.9	739	0.7	6,266	0.2	2,252	0.3
Ajloun	144	1.2	334	0.3	2,251	0.1	895	0.1
Northern Districts Total	2,786	22.3	9,943	9.1	84,781	3.1	27,979	3.2
Amman	6,336	50.7	59,262	54.2	1,109,620	40.4	416,017	46.9
Balqa	610	4.9	7,407	6.8	211,358	7.7	101,742	11.5
Zarqa	1,740	13.9	20,083	18.4	819,696	29.8	180,582	20.4
Madaba	283	2.3	1,867	1.7	27,249	1.0	9,685	1.1
Central Districts Total	8,969	71.8	88,619	81.0	2,167,923	78.9	708,026	79.9
Karak	297	2.4	3,071	2.8	108,586	4.0	65,564	7.4
Tafila	106	0.8	5,230	4.8	112,895	4.1	56,643	6.4
Ma'an	182	1.5	883	0.8	9,559	0.3	4,299	0.5
Aqaba	150	1.2	1,615	1.5	262,966	9.6	24,090	2.7
Southern Districts Total	735	5.9	10,799	9.9	494,006	18.0	150,596	17.0
Grand Total	12,490	100.0	109,361	100.0	2,746,710	100.0	886,601	100.0

(b) Manufacturing sector (excluding mining and electricity sectors)

Unit: JD 1,000 for Gross output and Gross Value added

Governorate	No of enterprises	(%)	No of employees	(%)	Gross Output	(%)	Gross Value Added	(%)
Irbid	1,994	16.1	6,257	6.5	54,415	2.3	15,918	2.3
Mafrq	388	3.1	1,503	1.6	16,409	0.7	6,221	0.9
Jarash	231	1.9	709	0.7	5,850	0.2	2,055	0.3
Ajloun	144	1.2	334	0.3	2,251	0.1	895	0.1
Northern Districts Total	2,757	22.3	8,803	9.2	78,925	3.3	25,089	3.6
Amman	6,309	51.0	56,750	59.2	1,077,000	45.7	391,302	56.8
Balqa	607	4.9	7,339	7.7	209,468	8.9	101,070	14.7
Zarqa	1,735	14.0	17,913	18.7	693,607	29.4	133,688	19.4
Madaba	282	2.3	1,867	1.9	27,249	1.2	9,685	1.4
Central Districts Total	8,933	72.3	83,869	87.5	2,007,324	85.1	635,745	92.2
Karak	281	2.3	870	0.9	5,348	0.2	2,382	0.3
Tafila	101	0.8	294	0.3	1,646	0.1	732	0.1
Ma'an	142	1.1	490	0.5	3,038	0.1	1,303	0.2
Aqaba	146	1.2	1,561	1.6	262,572	11.1	23,931	3.5
Southern Districts Total	670	5.4	3,215	3.4	272,604	11.6	28,348	4.1
Grand Total	12,360	100.0	95,887	100.0	2,358,853	100.0	689,182	100.0

Source: Industrial Census 1994, Department of Statistics

Table 2-2-5 Balance of Payments (Actual Basis)

	(in JD million)				
	1990	1991	1992	1993	1994
A. Current Account					
1) Goods and services					
Trade balance	-1008.6	-994.1	-1461.7	-1585.2	-1362.4
Service balance	326.4	368.9	614.0	878.7	855.6
Trade and service balance	-682.2	-625.2	-847.7	-706.5	-506.8
2) Unrequired transfer					
Private	18.9	14.6	16.1	24.3	1.3
Government	390.5	322.5	262.9	246.9	226.3
Unrequired transfer, net	409.4	337.1	279.0	271.2	227.6
Current account, net	-272.8	-288.1	-568.7	-435.3	-279.2
B. Capital Account					
1) Government	-165.2	-135.4	-362.9	-468.5	-165.0
2) Private - Long-term investment	-0.1	-9.5	-5.0	-0.2	0.0
3) Private - Short-term investment	45.8	-7.9	35.4	14.1	18.2
4) Transfer of workers' savings	74.5	549.0	491.3	332.6	157.9
Capital account, net	-45.0	396.2	158.8	-122.0	11.1
Overall balance	-317.8	108.1	-409.9	-557.3	-268.1
Financing	523.5	356.1	373.0	338.9	296.5
Overall balance	205.7	464.2	-36.9	-218.4	28.4
C. Reserves					
1) Central Bank	40.7	578.3	51.6	-46.5	152.2
2) Commercial banks	232.6	160.7	-18.3	15.5	-118.5
3) Financial institutions	-4.6	-4.9	-0.1	-3.1	0.0
Reserve, net	268.7	734.1	33.2	-34.1	33.7
Errors and omissions	63.0	269.9	70.1	184.3	5.3
<Analysis>					
Trade deficit	-1008.6	-994.1	-1461.7	-1585.2	-1362.4
Ratio to GDP	52.9%	51.2%	64.8%	66.4%	53.9%
Major source of overseas fund					
Service balance	326.4	368.9	614.0	878.7	855.6
Unrequired transfer - government	390.5	322.5	262.9	246.9	226.3
Transfer of workers' savings	74.5	549.0	491.3	332.6	157.9
	791.4	1,240.4	1,368.2	1,458.2	1,239.8
Ratio to GDP	41.5%	63.8%	60.7%	61.1%	49.1%
GDP	1,908.0	1,942.8	2,255.1	2,387.2	2,526.7

(Source) Monthly Statistical Bulletin (September 1995), Central Bank of Jordan

Table 2-2-6 Central Government Budget

(in JD million)										
	1990		1991		1992		1993		1994	
Revenue										
Domestic revenue										
Tax revenues										
Income and profit taxes	114.0	12.2%	92.8	8.3%	109.5	8.1%	118.8	8.4%	137.0	9.2%
Custom Duties	116.7	12.4%	136.1	12.2%	286.4	21.1%	237.7	16.9%	241.0	16.1%
Sales tax	90.4	9.6%	96.1	8.6%	138.4	10.2%	174.3	12.4%	211.7	14.2%
Other taxes	62.8	6.7%	76.5	6.9%	105.0	7.7%	112.6	8.0%	116.5	7.8%
	383.9	40.9%	401.5	36.1%	639.3	47.1%	643.4	45.8%	706.2	47.3%
Non-tax revenues										
Licences	36.3	3.9%	45.6	4.1%	70.5	5.2%	62.0	4.4%	65.0	4.4%
Fees	71.9	7.7%	83.4	7.5%	104.9	7.7%	113.3	8.1%	123.8	8.3%
Telgr. & Teleph.	75.0	8.0%	86.9	7.8%	120.3	8.9%	135.9	9.7%	161.1	10.8%
Interest and profits	86.4	9.2%	69.0	6.2%	67.1	4.9%	64.5	4.6%	53.0	3.6%
Other revenues	90.5	9.6%	142.4	12.8%	166.8	12.3%	172.4	12.3%	160.9	10.8%
	360.1	38.4%	427.3	38.4%	529.6	39.0%	548.1	39.0%	563.8	37.8%
Total domestic revenue	744.0	79.3%	828.8	74.5%	1,168.9	86.0%	1,191.5	84.7%	1,270.0	85.1%
External aid	164.3	17.5%	225.2	20.3%	137.4	10.1%	163.3	11.6%	167.3	11.2%
Loan repaid	29.9	3.2%	58.0	5.2%	52.4	3.9%	51.5	3.7%	55.0	3.7%
Total revenue	938.2	100.0%	1,112.0	100.0%	1,358.7	100.0%	1,406.3	100.0%	1,492.3	100.0%
Expenditure										
Current										
Civil	586.7	62.5%	634.3	57.0%	656.7	48.3%	744.8	53.0%	770.3	51.6%
Military	254.7	27.1%	269.7	24.3%	272.8	20.1%	299.5	21.3%	348.2	23.3%
Current expenditure total	841.4	89.7%	904.0	81.3%	929.5	68.4%	1,044.3	74.3%	1,118.5	75.0%
Capital	191.2	20.4%	195.6	17.6%	248.2	18.3%	292.3	20.8%	318.6	21.3%
Total expenditure	1,032.6	110.1%	1,099.6	98.9%	1,177.7	86.7%	1,336.6	95.0%	1,437.1	96.3%
Surplus (-) Deficit	-94.4	-10.1%	12.4	1.1%	181.0	13.3%	69.7	5.0%	55.2	3.7%
Surplus (-) Deficit Excluding "External aid"	-258.7	-27.6%	-212.8	-19.1%	43.6	3.2%	-93.6	-6.7%	-112.1	-7.5%
<Ratio for analysis>										
Ratio to GDP										
- Total expenditures	38.7%		38.5%		33.7%		35.1%		34.3%	
- Surplus (-) Deficit Excluding "External aid"	-9.7%		-7.5%		1.2%		-2.5%		-2.7%	
GDP- Current price	2,668.3		2,855.1		3,493.0		3,811.4		4,190.6	
Ratio of domestic revenue to current expenditure	88.4%		91.7%		125.8%		114.1%		113.5%	

Source: Monthly Statistical Bulletin (September 1995), Central Bank of Jordan

Table 2-2-7 Main Regional Data of Jordan

Governorate	Population (Persons: 1994)	No. of Enterprises (1993)	Employment (Persons: 1993)	Gross Output (1,000JD: 1993)
Central Districts				
Amman	1,567,908	10,338	213,307	263,187
Sub-total	1,567,908	10,338	213,307	263,187
(%)	(38.3)	(44.9)	(68.6)	(90.6)
North Districts				
Irbid	745,774	3,034	22,921	13,144
Ajlun	94,205	-	30,236	-
Jarash	123,195	-	-	-
Sub-total	963,174	3,034	53,157	13,144
(%)	(23.5)	(16.5)	(17.1)	(4.5)
Eastern Districts				
Mafraq	170,903	321	4,878	592
Zarqa	623,943	2,849	22,921	1,145
Sub-total	794,846	3,170	27,799	1,737
(%)	(19.4)	(17.3)	(8.9)	(0.6)
Western Districts				
Balqa	273,489	784	11,702	3,626
Madaba	196,308	-	-	-
Sub-total	379,797	784	11,702	3,626
(%)	(9.2)	(4.3)	(3.8)	(1.2)
Southern Districts				
Karak	169,552	393	8,944	4,844
Tafila	61,156	104	6,303	867
Ma'an	79,401	549	12,756	2,951
Aqaba	79,745	-	-	-
Sub-total	389,854	1,046	28,003	8,662
(%)	(9.5)	(5.7)	(9.0)	(3.0)
Total	4,095,579	18,372	311,048	290,356
	4,059,579	18,372	311,048	290,356
	(100.0)	(100.0)	(100.0)	(100.0)

Source: Statistical Yearbook 1994

Note: 1) Since Population and Housing Census 1994 has not yet disclosed the final data on urban population, the data in this table is based on preliminary results of the census.

2) Urban population is the total population at the localities of 5,000 population and over.

Table 2-3-1 Distribution of GDP by Industrial Origin in 1991 Constant Prices

	(in JD millions)		
	1992	1997	Expected Increase 1993-1997
Agriculture	192.2	234.5	42.3
Mining	129.9	179.0	49.1
Manufacturing industries	377.9	578.6	200.7
Wholesale and retail trade, restaurants and hotels	307.0	487.0	180.0
Finance, insurance and business services	92.4	124.2	31.8
Total productive sectors	1,099.4	1,603.3	504.0
Electricity and water	71.0	96.1	25.1
Construction	158.7	140.3	-18.4
Transport, storage and communications	395.5	567.3	171.8
Total infrastructure sectors	625.2	803.7	178.5
Government service	496.9	562.9	66.0
Social and personal services	70.8	94.9	24.1
Producers of non-profit private services	22.8	27.6	4.9
Domestic services of households	5.3	5.3	-
Housing and real estate	360.9	507.3	146.3
Total social sectors	956.7	1,198.0	241.3
Grand total	2,681.3	3,605.0	923.8
Imputed bank service charge	-46.2	-62.7	-16.5
GDP at factor cost	2,635.1	3,542.4	907.3
Net Indirect taxes	460.8	605.0	144.2
GDP at producers' prices	3,095.9	4,147.4	1,051.5

Source: The Third Five-Year Economic and Social Development Plan (1993-1997)

Table 2-5-1 Comparison of Basic Conditions for Industrial Development- Middle East 6 Countries and ASEAN 6 Countries

Basic conditions	Middle East 6 Countries						ASEAN 6 Countries					
	Israel	Egypt	Jordan	Syria	Palestine	Lebanon	Total	Thailand	Malaysia	Singapore	Indonesia	Philippines
Land area (km ²)	20,325	997,739	91,860	185,180	6,160	10,408	1,311,672	513,120	329,750	620	1,904,570	300,000
Population (million people)	5.32	48.20	4.30	13.39	1.22	2.81	75.24	57.76	19.05	2.87	189.13	64.80
Density of population	262	48	47	72	198	270	57	113	58	4,629	99	216
Monthly average of rainfall in capital city (mm)												
Highest	121	5	76	43	121	190		305	292	313	458	435
Lowest	0	0	0	0	0	1		5	99	149	65	5
Agricultural land area (km ²)	4,248	25,941	4,134	60,369	n.a.	3,060	97,752	209,353	49,133	10	342,823	104,700
Percentage of agricultural land area to the total land area	20.9%	2.6%	4.5%	32.6%	n.a.	29.4%	7.5%	40.8%	14.9%	1.6%	18.0%	34.9%
Population in employment	2,053	15,690	1,020	3,413	n.a.	932	23,109	32,450	7,370	1,590	80,320	24,440
Population in employment in agriculture (thousand people)	78	6,119	50	768	n.a.	69	7,084	19,697	1,577	5	41,927	11,194
Ratio of population in employment in agriculture	3.8%	39.0%	4.9%	22.5%	n.a.	7.4%	30.7%	60.7%	21.4%	0.3%	52.2%	45.8%
Population in employment total population	38.6%	32.6%	23.7%	25.5%	n.a.	33.2%	31.2%	56.2%	38.7%	55.4%	42.5%	37.7%

(Sources of information)

*1 Middle East

ASEAN

*2 Middle East

ASEAN

*3 Middle East

ASEAN

*4 Middle East

ASEAN

a) Excluding Gaza Strip and other areas occupied after the June 1967 and October 1973 wars

b) West Bank 5,800 km², Gaza 360 km²

c) West Bank 1,052,000, Gaza 717,000

d) Excluding Palestine

e) Excluding Brunei

n.a. : Information not available

Country Profile 1995/96, The Economist Intelligence Unit (Except for Lebanon)

Lebanon-World Statistics 95/96, The Tsuneta Yano Memorial Society

1995 Statistical Pocketbook-ASEAN Japan, ASEAN Center

Country Profile 1995/96, The Economist Intelligence Unit (Except for Lebanon)

Lebanon-Base Statistics of Developing Countries (Middle East) August 1995, Association for International Cooperation of

Agriculture & Forestry

International Statistics 1992/93, Statistics Bureau of Management and Coordination Agency

Country Profile 1995/96, The Economist Intelligence Unit (Except for Egypt, Jordan, Lebanon)

Egypt, Jordan, Lebanon

1995 Statistical Pocketbook- ASEAN Japan, ASEAN Center

World Statistics 95/96, The Tsuneta Yano Memorial Society

1995 Statistical Pocketbook- ASEAN Japan, ASEAN Center

Table 2-5-2 Comparison of Structure of GDP by Industrial Sector

	Middle East 5 Countries					ASEAN 3 Countries		
	Jordan (1994)	Israel (1994)	Egypt (1993)	Syria (1992)	Palestine (1993)	Singapore (1993)	Malaysia (1993)	Thailand (1992)
Agriculture and fishery	9.4%	2.6%	16.6%	19.1%	28.2%	0.2%	15.6%	11.9%
Manufacturing	35.3%	32.1%	32.8%	33.3%	23.2%	32.4%	43.1%	38.7%
Services	55.3%	65.3%	50.6%	47.6%	48.6%	67.4%	41.3%	49.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
GDP (million \$)	2,381	54,523	4,005	2,190	1,173	46,646	40,094	110,431
GDP per Capita (\$)	1,083	13,411	635	1,258	*1	16,253	2,105	1,912

*1 Gaza \$1,000
West Bank \$1,500

Table 2-5-3 Comparison of Current Account Balance Structure

	Middle East 5 Countries					ASEAN 3 Countries		
	Jordan (1994)	Israel (1994)	Egypt (1994)	Syria (1992)	Palestine (1992)	Singapore (1993)	Malaysia (1994)	Thailand (1993)
Trade balance								
Export	34.3%	66.9%	25.4%	69.7%	22.1%	70.6%	86.0%	74.7%
Import	-81.3%	-92.2%	-88.8%	-66.1%	-151.5%	-78.5%	-83.4%	-83.2%
Total	-47.0%	-25.3%	-63.4%	3.6%	-129.4%	-7.9%	2.6%	-8.5%
Service balance								
Receipt	65.7%	33.1%	74.6%	30.3%	77.9%	29.4%	14.0%	25.3%
Payment	-36.2%	-44.5%	-45.5%	-52.0%	-31.2%	-18.8%	-23.2%	-31.7%
Total	29.5%	-11.4%	29.1%	-21.7%	46.7%	10.6%	-9.2%	-6.4%
Current account balance (Before transfer)	-17.5%	-36.7%	-34.3%	-18.1%	-82.7%	2.7%	-6.6%	-14.9%
Transfer	7.8%	30.5%	57.9%	19.4%	81.5%	-0.7%	0.2%	0.6%
Current account	-9.7%	-6.2%	23.6%	1.3%	-1.2%	2.0%	-6.4%	-14.3%
Total of "Export" and "Receipt"	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-5-4 Domestic Export by Area

Countries	1989	1990	1991	1992	1993	1994	
Arab Countries	241,880.50	259,360.50	175,526.80	223,518.40	287,647.60	339,800.60	42.8%
Asian Non Arab Countries	205,542.50	275,369.70	281,240.30	248,156.80	198,961.80	217,822.10	27.4%
EU Countries	24,573.50	22,101.90	18,529.20	19,053.00	27,911.30	40,405.60	5.1%
Oceanian Countries	1,845.60	140.40	972.40	3,985.70	9,612.10	17,733.70	2.2%
Eastern Europe Countries	42,692.60	24,357.00	27,820.60	15,591.30	32,837.40	13,456.10	1.7%
North American Countries	3,408.10	3,579.60	2,365.60	4,196.70	7,385.10	9,061.00	1.1%
South American Countries	3.30	915.70	2,271.70	4,619.50	4,281.30	6,586.70	0.8%
African Non Arab Countries	13,252.20	26,139.60	11,443.00	21,151.20	4,057.50	6,578.30	0.8%
Other Western Europe Countries	73.20	288.10	176.30	294.70	401.60	508.50	0.1%
Middle American Countries	887.30	0.00	0.00	185.70	468.00	127.80	0.0%
Other Countries	0.90	0.00	78,280.80	93,001.50	117,718.00	141,838.40	17.9%
Grand Total	534,159.70	612,252.50	598,626.70	633,754.50	691,281.70	793,918.80	100.0%
Increase ratio	100.0%	114.6%	112.1%	118.6%	129.4%	148.6%	

Import by Area

Countries	1989	1990	1991	1992	1993	1994	
EU Countries	362,511.70	489,734.80	512,219.70	650,088.80	753,801.80	794,772.60	33.6%
Arab Countries	343,415.00	442,211.80	356,956.20	463,212.70	500,269.10	531,461.00	22.5%
Asian Non Arab Countries	177,505.00	259,678.30	356,641.50	526,929.20	516,546.90	502,871.10	21.3%
North American Countries	178,600.90	310,212.30	195,981.70	256,526.60	319,333.80	243,397.60	10.3%
Eastern Europe Countries	60,999.20	89,753.10	85,647.60	129,607.70	149,568.90	136,644.70	5.8%
Other Western Europe Countries	58,249.50	59,974.90	59,339.40	75,192.80	81,833.50	68,874.00	2.9%
South American Countries	15,821.40	23,886.70	29,903.30	38,000.00	50,053.60	39,313.00	1.7%
Oceanian Countries	8,641.50	24,260.50	49,295.20	29,577.80	56,765.00	33,877.90	1.4%
African Non Arab Countries	22,286.40	24,524.90	34,222.10	36,409.10	20,605.00	6,933.00	0.3%
Middle American Countries	2,063.80	1,583.60	5,609.10	1,537.60	1,976.30	2,418.70	0.1%
Other Countries	48.00	7.20	26,647.10	6,919.90	2,870.90	2,019.30	0.1%
Grand Total	1,230,142.40	1,735,828.10	1,710,462.90	2,214,002.20	2,453,624.80	2,362,582.90	100.0%
Increase ratio	100.0%	140.3%	139.0%	180.0%	199.5%	192.1%	
Trade deficit	-695,982.70	-1,113,575.60	-1,111,836.20	-1,580,247.70	-1,762,343.10	-1,568,664.10	

(Source)
Statistical Yearbook 1994

Table 2-5-5 Trade Balance by Country

(in JD thousand)

Countries	1994		
	Imports	Domestic Export	Trade Balance
India	38,894.8	88,057.8	49,163
U.A. Emirates	8,315.6	39,012.1	30,697
Indonesia	24,577.7	27,963.4	3,386
Saudi Arabia	71,517.4	72,263.1	746
Australia	20,813.9	12,476.9	-8,337
Sweden	21,216.8	172.1	-21,045
Syria	48,247.8	26,705.4	-21,542
Brazil	26,365.6	4,131.8	-22,234
Egypt	30,025.7	5,804.9	-24,221
Switzerland	24,287.7	66.8	-24,221
Romania	27,488.2	2,505.8	-24,982
Taiwan	39,164.3	9,895.0	-29,269
Spain	38,025.3	2,560.3	-35,465
South Korea	58,233.2	14,383.1	-43,850
Ukraine	49,749.1	345.8	-49,403
Turkey	62,847.1	10,302.7	-52,544
Malaysia	66,205.2	13,151.3	-53,054
China	62,518.7	8,210.0	-54,309
Belgium	69,691.9	2,348.5	-67,343
Netherland	90,074.7	11,839.8	-78,235
Japan	93,612.8	12,562.3	-81,051
France	111,085.3	1,415.8	-109,670
U.K.	120,783.2	3,420.6	-117,363
Italy	139,147.5	10,003.3	-129,144
Germany	184,348.3	3,995.1	-180,353
Iraq	298,350.8	105,264.1	-193,087
U.S.A.	232,544.7	8,919.9	-223,625
Total	2,058,133.3	497,777.7	
Other Countries	304,449.2	296,140.8	
Grand Total	2,362,582.5	793,918.5	

Source: Statistical Yearbook 1994

Table 2-5-6 Top 5 Exporting and Importing Countries (1992)

	Jordan		Israel		Egypt		Syria		Lebanon	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1	India	Iraq	USA	USA	Italy	USA	Former USSR	Germany	Saudi Arabia	Italy
2	Saudi Arabia	USA	UK	Belgium	USA	Germany	France	Japan	UAE	Syria
3	Iraq	Germany	Germany	Germany	Spain	Italy	Lebanon	Italy	Switzerland	USA
4	Switzerland	Japan	Japan	UK	France	France	Germany	Turkey	Jordan	France
5	Indonesia	Italy	Belgium	Switzerland	Greece	Japan	UAE	France	Syria	Germany

Source: Middle Eastern Economy-Trade between Middle Eastern Countries, March 11, 1994
Japanese Institute of Middle Eastern Economies

Table 2-5-7 Jordanian Labor Force in Arab States

Countries	1983	1986	1987
Saudi Arabia	160,000	160,000	160,930
Kuwait	80,000	81,000	81,000
United Arab Emirates	10,000	105,000	10,860
Qatar	7,250	8,000	8,300
Oman	5,000	6,000	6,000
Bahrain	3,000	3,000	3,000
Lybia	3,000	3,000	3,000
Other Arab Countries	950	2,000	2,110
Iraq	1,500	2,000	2,000
Total	270,700	370,000	277,200

Source: Statistical Yearbook 1994

Table 2-5-8 Number of Work Permits Issued by Country and by Occupation

Nationality Groups	Productive		Agriculture		Services		Salesmen		Clerks		Administrative		Specialists & Technicians		Total	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Egyptian	1	9,871		10,054	150	9,004		199	1	6	2	23	10	163	164	29,320
Syrian		922		110	9	187		15	2	2		7	11	47	22	1,290
Sudanese		98		130	4	146		1				7		12	4	394
Rest of Arabs		303			88	99	7	41	14	19	27	254	83	449	219	1,224
Total Arabs	1	11,194	0	10,353	251	9,436	7	256	17	27	29	291	104	671	409	32,228
Asians	3	560	13	1,554	6,055	334		23	4	8	4	81	112	103	6,191	2,663
Europeans		42		2	102	11		4	6	4	14	99	45	146	167	308
Rest of Foreigners		5		3	13	3		2	1		6	32	23	43	43	88
Total	3	11,801	13	11,912	6,421	9,784	7	285	28	39	53	503	284	963	6,810	35,287

Source: Statistical Yearbook 1994

Table 2-5-9 ODA by Donor Countries to Jordan

(In million \$)						
Rank/Year		1990		1991		1992
1	Germany	173.95	Japan	430.67	Japan	126.36
2	Japan	145.04	Germany	119.84	Germany	63.47
3	USA	58.00	USA	33.00	USA	59.00
4	Canada	17.95	Canada	25.64	France	27.56
5	UK	9.91	France	19.04	Switzerland	20.48
Total		431.18		683.80		313.01

Source: Japan's Economic Cooperation to Jordan- April 15, 1995

Note: Amount is on a disbursement basis

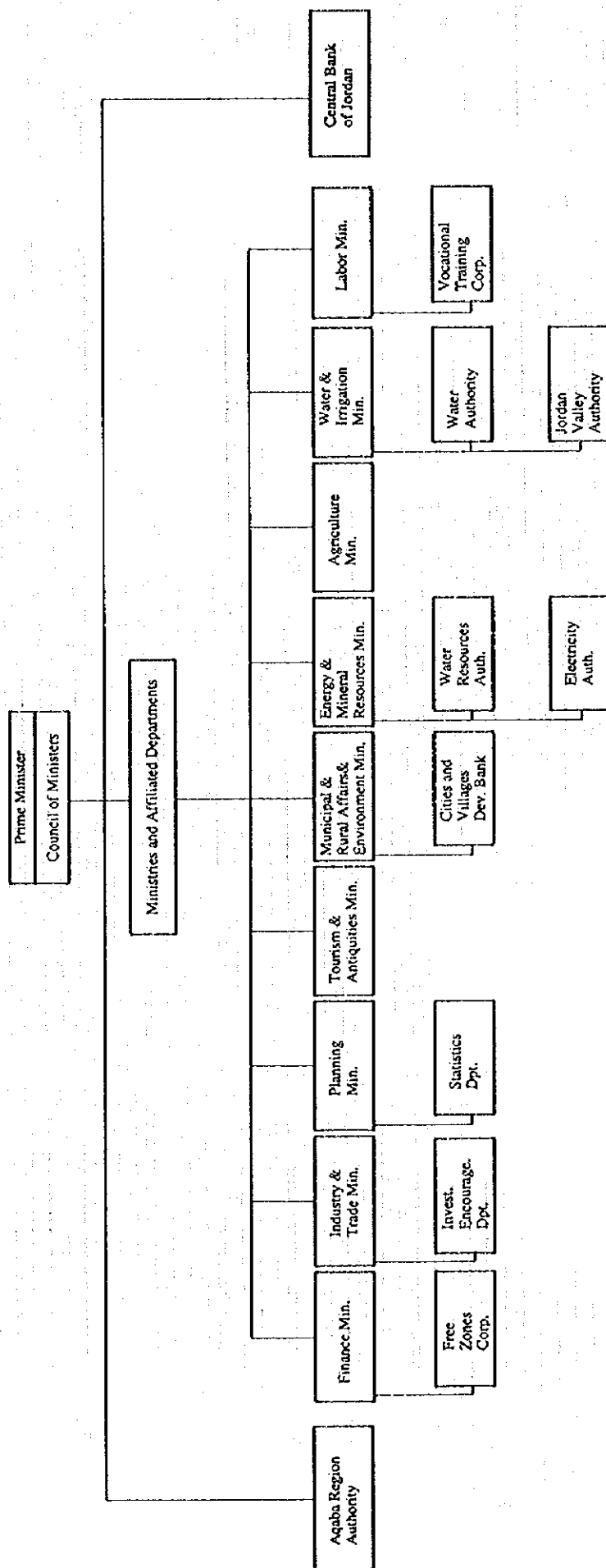


Figure 2-4-1 Government Organization Structure for Industrial Development

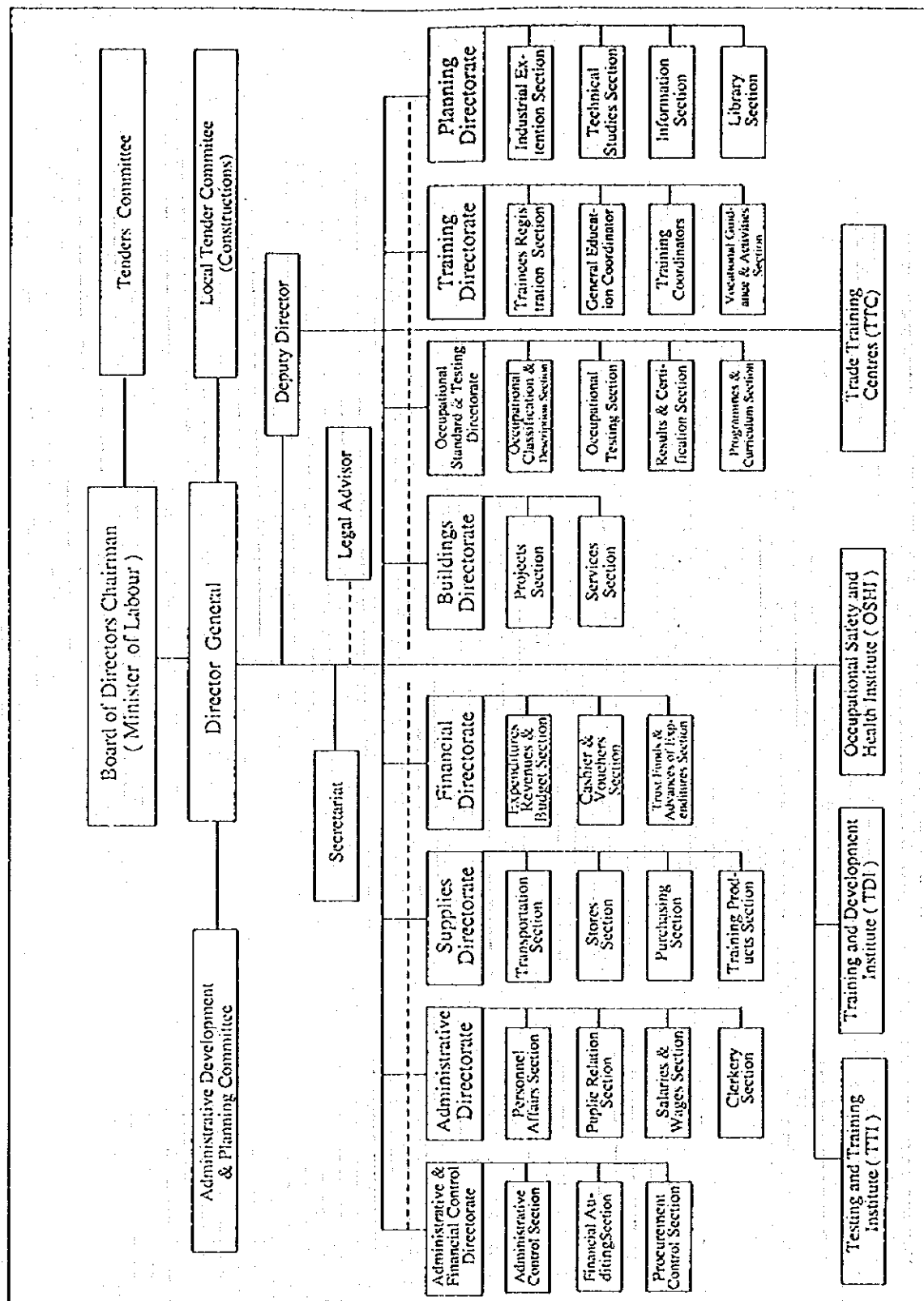


Figure 2-4-2 Organization Chart of Vocational Training Corporation

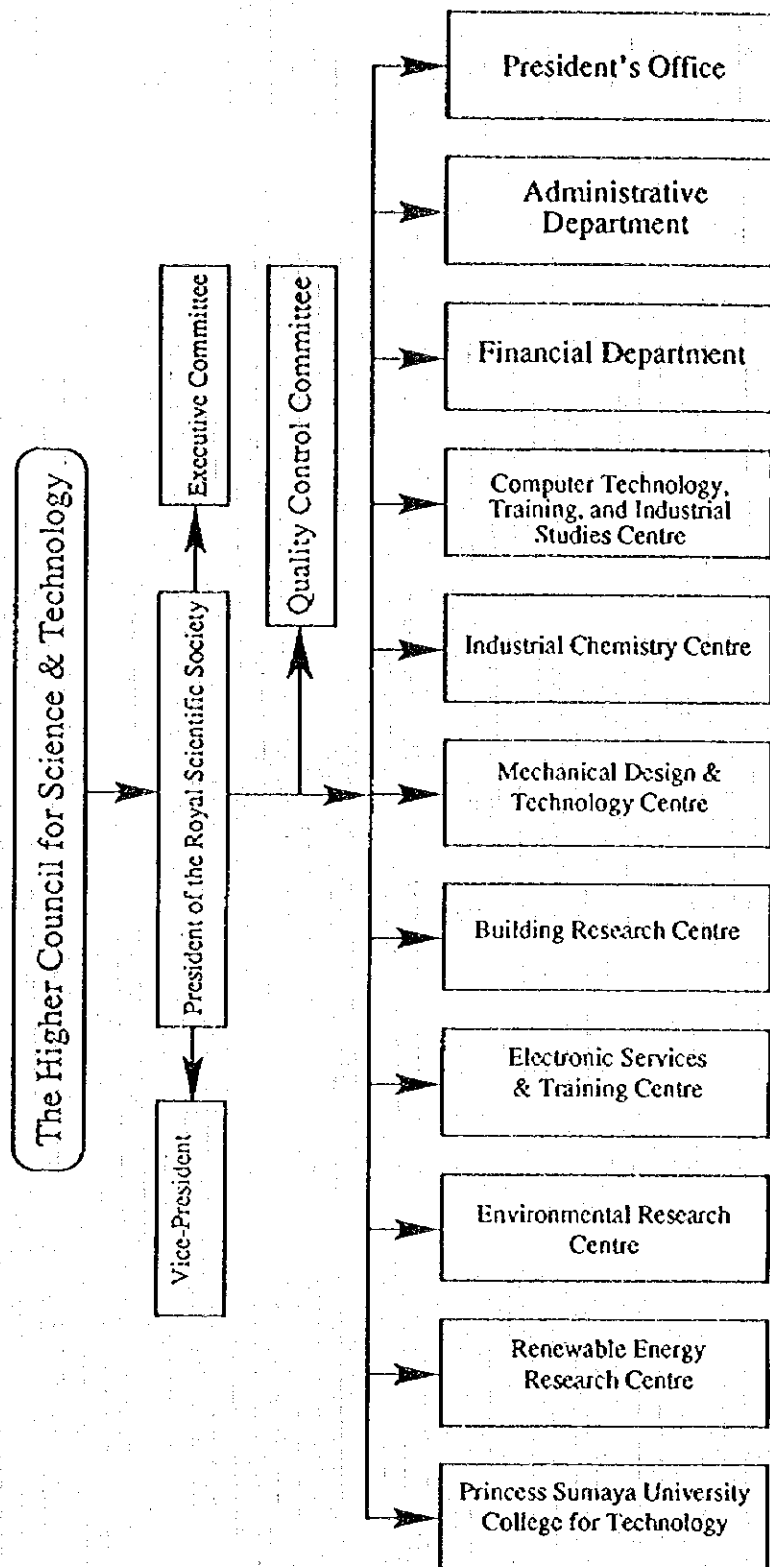
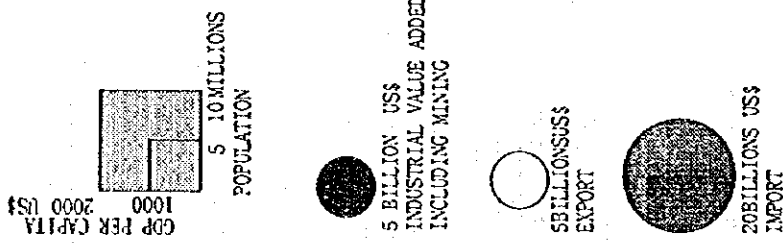
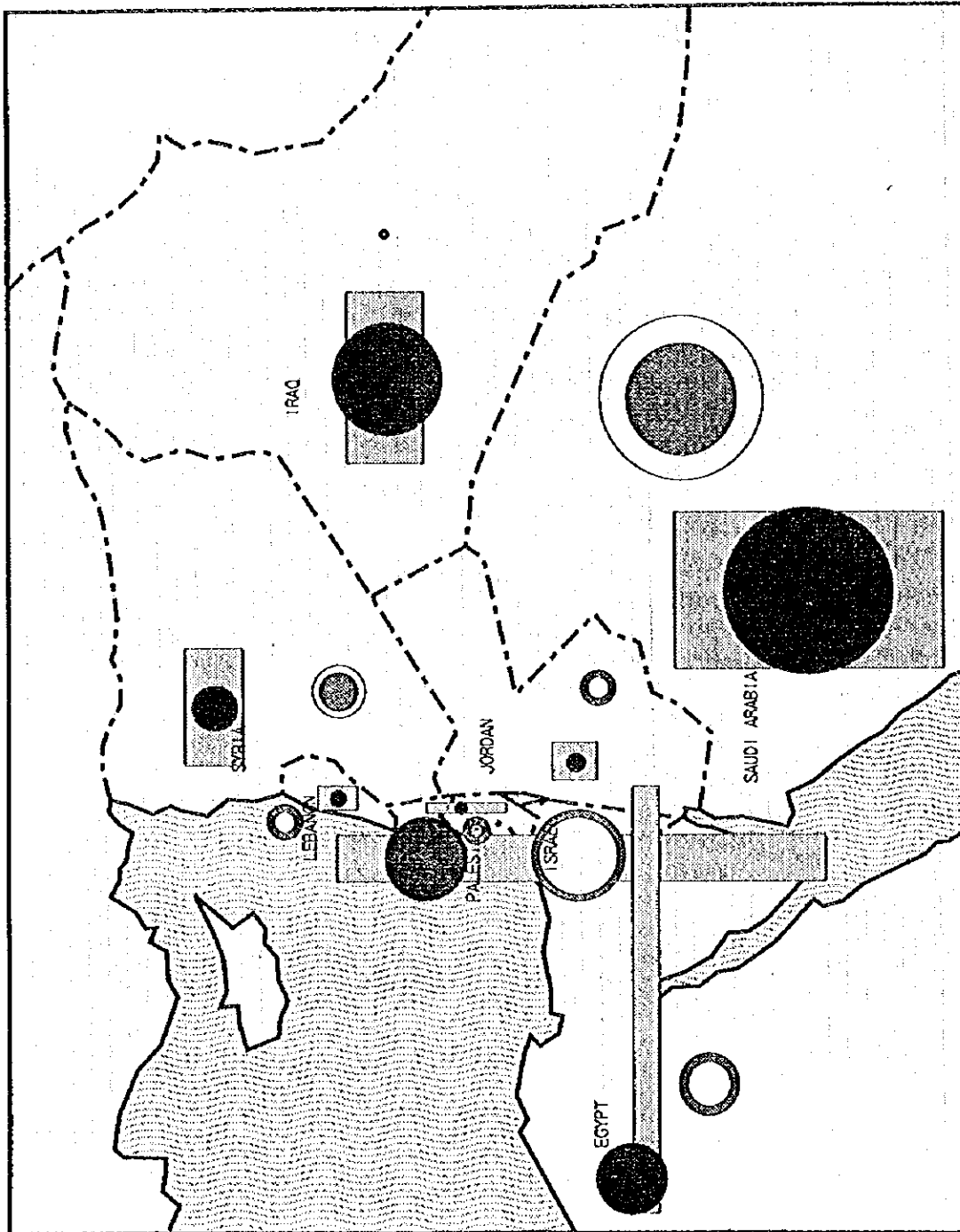


Figure 2-4-3 Organization Chart of the Royal Scientific Society



JAPAN INTERNATIONAL COOPERATION AGENCY
 JORDAN INDUSTRIAL ESTATES CORPORATION
 STUDY ON INDUSTRIAL DEVELOPMENT IN THE SOUTHERN DISTRICTS OF THE HASHEMITE KINGDOM OF JORDAN
 Figure 2-5-1
 Basic Economic Profiles of Jordan and Neighboring Countries
 NIPPON KOEI CO., LTD.
 JAPAN INDUSTRIAL LOCATION CENTER
 REGIONAL PLANNING INTERNATIONAL CO., LTD.

Source: Peace and the Jordanian Economy, World Bank 1994
 (For Iraq, World 1995, Jetro)

III. CURRENT SITUATION OF THE SOUTHERN DISTRICTS

3-1 Natural Conditions

3-1-1 Climate

The climate in the Southern Districts can largely be divided into four zones as shown in Figure 3-1-1.

The annual rainfall is the least in the Saharo-Arabia climate area: between 30 and 100 mm. The lowest minimum temperature of the year also occurs in this area. The lowest temperature of -4.2°C was observed in Ma'an in December, 1994.

The highest maximum temperature in the Southern Districts is observed in Wadi Araba. In 1994, the highest maximum temperature at Ghor Safi and the Aqaba International Airport was 45.5°C and 43.5°C respectively. The prevailing wind direction in Wadi Araba is north to northwest.

3-1-2 Open Water

(1) Dead Sea

In the last five decades, the waters from the Jordan River and the Yarmouk River have been diverted into dam reservoirs and irrigation projects implemented in the Jordan Valley. The water level has dropped about 15 m and the surface area has shrunk between 1955 and 1995. These activities resulted in the change in salinity of the water. Considering the fragility and uniqueness of the area's ecosystems, and the limited resource base, serious environmental degradation could be expected if a large population lives in the Dead Sea area.

(2) Gulf of Aqaba

The Jordanian section of the Aqaba coast is 27 km long. Within a limited coast line, the Gulf of Aqaba contains the internationally important Yamanieh coral reef and marine ecosystems. The surface layer of the gulf water flows southward, pushed by the prevailing north wind in the area. The deep current, however, slowly flows northward along the coast of Saudi Arabia.

3-1-3 Water Resources Endowment

Jordan is one of the countries with the scarcest water resources in the world, its renewable water resource being merely 170 m³ per capita per year. According to "Water Demand Management in an Arid Country, The Case of Jordan with Special Reference to Industry", German Development Institute, 1994, it is even smaller than other Middle East countries as shown in Figure 3-1-2.

(1) Surface water potential

Surface water resources in Jordan consist of the flood flows in wadis and the discharges from springs. Major surface water resources, such as the Yarmouk River and the Jordan River, are located in the northern part of the country. The total amount of surface water resources in Jordan is estimated to be between 715 million m³/year (according to "Jordan's Water Resources and the Expected Domestic Demand by the Years 2000 and 2010", Belbeishi, 1992) and 878 million m³/year (according to "Jordan Water Resources Sector Study", World Bank, 1988). The surface water resources in each wadi basin in the Southern Districts are shown in Table 3-1-1. The areas of these wadi basins are shown in Figure 3-1-3.

1) Wadis

Wadi Mujib is the largest among the Dead Sea catchments, from where water flow discharges directly into the Dead Sea at an average amount of 83 million m³/year. The water of the upper reaches of the wadi system has low salinity and it is suitable for various uses. The base flows of the lower reaches of the wadi system contain brackish groundwater issuing from a deep sandstone aquifer complex. The water at the bottom of the catchment has a total dissolved solids (TDS) of 1,720 mg/l, the water can be used only for irrigation of salt-tolerant crops.

Wadi Hasa is the second largest among the Dead Sea catchments. The average discharge from Wadi Hasa is estimated at between 34.0 and 36.4 million m³/year. The base flow has a good TDS quality of 650 mg/l and, judged from this quality, the base flow is considered to come entirely from the upper Cretaceous aquifer system. Like other catchments of the Dead Sea, the groundwater discharged along the lower reaches of Wadi Hasa partly contains mineralized thermal water.

Wadi Yutum catchment spreads out to an extensive area in southwest Jordan with a catchment area of 4,440 km². There is no groundwater discharge in this area, and the surface water comes from floods caused by heavy rains. Compared with the extent of the catchment area, however, it is very small: 1.5 million m³/year on average.

The Jafr Basin in southern Jordan is a depression without exits, with a catchment area of 12,200 km². It is a flat area bordered by the highlands to the west. The western edge of the basin receives high rainfalls, and after heavy rains, some wadi flows run eastward into the basin. The total amount of surface runoff and wadi flood flows is 10 million m³/year. Unfortunately, however, damming the water for water supply is not feasible due to the flat topography. Surface water resources are only available through harvesting techniques and surface water recharge methods.

2) Dams

Available surface water resources in southern Jordan are shown in Table 3-1-2.

There are three existing dams at Qatrana, Sultani and Siwaqa, with storage capacities of 4.2, 1.2 and 1.65 million m³ respectively, which recharge the aquifers through injection wells. All the three dams are located in the upper reaches of the tributaries of Wadi Mujib along the Desert Highway. The Sultani dam is totally filled up by the residue from the Abyad Phosphate Mine located upstream and has no effective storage anymore. The infiltration volume of the Qatrana dam and the Siwaqa dam is 3.2 and 0.6 million m³/year respectively. It is expected to raise the Qatrana dam storage capacity to 6.0 million m³ to achieve an additional yield of 0.8 million m³/year.

The construction of the Wala dam, the Mujib dam and the Tannur dam is proposed in the Southern Ghors project by the Jordan Valley Authority (JVA). It is expected that the Wala dam will be built in two stages. After finishing the first stage, the storage capacity will be 9.3 million m³ with a yield of 6.0 million m³/year, to be used only for groundwater recharge. During the second stage, the dam gross storage capacity will be raised to 28.95 million m³ with a yield of 17.0 million m³/year, providing extra water for irrigation. The Mujib dam with a storage capacity of 35 million m³, yielding 8 million m³/year, is proposed. The water is to be used for agricultural and industrial (the Arab Potash Company) use. The construction of the Tannur dam is planned in Wadi Hasa. The storage capacity is to be 12.15 million m³. The expected yield will be 4.0 million m³/year and it will release water for the Southern Ghors irrigation system.

In the Jafr Basin, a total of six recharge dams are planned to recharge the aquifers by infiltration along wadis in the Western Highlands (according to "Water Resources Study of the Jafr Basin", Japan International Cooperation Agency (JICA), 1990). Among them, the group-A dams, of which infiltration capacity is estimated at 5.2 million m³/year, will be a significant source for groundwater recharge in the northwestern part of the Western Highlands where intensive farming is practiced. The group-B dams, of which infiltration capacity is estimated at 3.2 million m³/year, are located in the southwestern part of the Western Highlands where water is taken for both irrigation and water supply to Ma'an City from the wells dug into the aquifer.

As mentioned above, both existing and planned surface water capacity has already been reserved for agricultural uses. These dam locations are shown in Figure 3-1-3.

(2) Groundwater potential

According to the regional structure and positions of the aquifer system, seven major groundwater basins were defined in the Southern Districts: the Dead Sea, the Northern Wadi Araba, Southern Wadi Araba (Red Sea Basin), Jafr Basin, Southern Desert (Disi area), Azrak Basin and Sirhan Basin. The areas of these groundwater basins are shown in Figure 3-1-4.

Most of the groundwater resources in Jordan occur in consolidated sedimentary aquifers as summarized in Table 3-1-3. Two major aquifer systems, the B2/A7 limestone aquifer and the underlying Kurnub/Disi sandstone aquifer system, are recognized in southern Jordan (Figure 3-1-5).

Estimated safe yields for each groundwater basin and groundwater use in 1993 are shown in Table 3-1-4. This table identifies the overdrawn basins and the extent of the overdraw. The groundwater resources of Jordan are estimated at a total of 275 million m³/year for the renewable resources and 143 million m³/year for the non-renewable resources.

1) The Dead Sea area

Groundwater is found in two different aquifer complexes: the upper Cretaceous limestone aquifer complex and the lower sandstone aquifer complex. Only the Amman-Wadi Sir (B2/A7) aquifer is exploited. The other aquifers have limited potential due to limited recharge and high pumping heads required. In addition, some wells are being exploited at the Quaternary deposit in the Dead Sea rift valley.

The total safe yield of the basin is assessed at 57 million m³/year. Abstraction in 1993 reached 93.6 million m³/year. This excessive abstraction of groundwater might lead to devastation of aquifers.

(a) Upper Cretaceous limestone aquifer

This is a renewable source of water that is recharged directly by rainfall at the outcrop areas of the B2/A7 in the western highland, and indirectly by the concentrated surface runoff, return irrigation flow and surface reservoirs (Siwaqa, Qatrana and Sultani). According to "Hydrological and Water Use Study of the Mujib Watershed", JICA, 1987 total recharge is estimated at 67 million m³/year.

Four wellfields at Sultani, Siwaqa-Qatrana, Rumeil and El Lajjun are proposed by JICA (1987). The sustained yields of the wellfields are 6.3 million m³/year at Sultani, 9.6 million m³/year at Siwaqa-Qatrana, 7.0 million m³/year at Rumeil and 5.0 million m³/year at El Lajjun. Among them, the El Lajjun wellfield is to be preserved for the future development of the oil shale according to the Government policy. The groundwater from the Siwaqa and Qatrana wellfields has been used to a considerable extent.

Groundwater in the B2/A7 aquifer is exploited in Al Hasa phosphate mine area also. The estimated consumption of the Al Hasa mine was 5 million m³/year in 1995. The model simulation study (JICA, 1990) proposed to utilize the South Hasa wellfield. The South Hasa wellfield, which is located 10 km south of Al Hasa town, is estimated to produce 5 to 10 million m³/year by installing 10 to 20 wells with a depth of 350 m each.

(b) Lower sandstone aquifer

No comprehensive investigation has been performed on the deep sandstone aquifer in this basin. The aquifer outcrops along the Dead Sea, but is located at a

depth of 400 to 700 m bgl (below ground level) in the east. Groundwater flows westward and comes out as important springs in the Dead Sea Wadis.

(c) Quaternary Aquifer

The alluvial fan aquifer at Ghor Safi is recharged mainly by the Wadi Hasa flood flows at a rate of about 3 million m³/year, and is exploited for local water supply.

2) Northern Wadi Araba (Alluvial Sediments)

According to "Hydrochemistry and hydrogeology of the Central part of Wadi Araba", M.Sc. Thesis, throughput of water from this area into the Dead Sea was calculated to be around 22 million m³/year. The fresh water renewable resources amount to 8 to 10 million m³/year. The safe yield of the basin is assessed at 3.5 to 7.0 million m³/year, and less than 4.5 million m³/year is presently developed for irrigation and local domestic purposes.

3) Southern Wadi Araba (Alluvial Sediments)

Throughput of the aquifer is 10 million m³/year and it is mostly brackish water. Salinity increases along the groundwater flow, from north to south. The safe yield of the basin is assessed at 5.5 million m³/year and it is currently developed for irrigation and local domestic use with a volume of less than 4 million m³/year.

4) Jafr Basin

Only two aquifers, the Rijam (B4) and Amman-Wadi Sir (B2/A7), are exploited. But there are potentials in the Amman-Wadi Sir and Ajlun formations (JICA, 1990). The exploitation of this Basin reached 38.4 million m³/year, however, the total safe yield is assessed at 9 million m³/year. The balance is mined from the economically exploitable non-renewable groundwater, of which volume was reported to be about 1,500 million m³ (according to "National Water Master Plan for Jordan", Agrar und Hydrotechnik GmbH and Bundesanstalt für Geowissenschaften und Rohstoffe, 1977) and is now considered to be 3,200 million m³.

(a) Rijam (B4) aquifer

Thickness of this aquifer is 20 to 30m and depth of water level ranges between 15 and 35 m bgl. According to "Ground Water Resources Study in the Eshidiya Area", Howard Humphreys, 1986 recharge has been estimated at less than 1

million m³/year. This shallow aquifer has been over exploited since 1964, mainly for irrigation, at a rate of approximately 1.5 million m³/year.

(b) Amman-Wadi Sir aquifer

Groundwater flows eastward from the western highlands and moves across the Arja Urweina flexure which causes a hydraulic drop of 300 m at least. According to "Water Treatment and Water Resources Planning", Thames Water International, 1988, water level is reported to be 200 m bgl at immediately east of the flexure and often artesian west of the flexure. This flexure is located approximately 5 km west of Ma'an City and runs from north to south.

Total recharge of the aquifer is estimated at 3.5 million m³/year. Humphreys (1986) estimated the volume of stored groundwater at about 16,000 million m³, of which 18 million m³/year is economically exploitable. This aquifer is exploited almost exclusively in the western highlands at a rate of about 16 million m³/year.

The model simulation study (JICA, 1990) proposed the East Ma'an wellfield. Water is planned to be supplied to the Eshidiya phosphate mine. The East Ma'an wellfield, which is to be located about 20 km north of the Eshidiya mine, is estimated to produce 5 to 10 million m³/year with installation of 10 to 20 wells with a depth of 250 m each.

(c) Lower Ajlun sandstone aquifer

The volume of stored groundwater in the Ma'an-Eshidiya area is estimated to be about 40,000 million m³, of which 1% only can be extracted economically according to "Ground Water Resources Study in the Eshidiya Area", Howard Humphreys, 1986. Thickness of this aquifer is 200m and it has been encountered at depths of more than 300 m bgl (319 m in Ma'an). Borehole yield is in the range of 10 to 20 l/s.

5) Southern desert (Disi sandstone aquifer)

In this basin, two aquifer systems are used for domestic, industrial and irrigation purposes: the Amman-Wadi Sir formation and the deep sandstone aquifer complex (Disi sandstone aquifer).

The Amman-Wadi Sir aquifer is exploited in the wellfield of Abu Lassan and Ras an Naqab, mainly for small-scale irrigation. In 1991, these two wellfield abstracted 1.19 million m³.

The Disi sandstone aquifer underlies the entire area of Jordan at different depths, generally increasing the depth towards the northerly and north-easterly direction. The aquifer crops out in southern Jordan and extends into Saudi Arabia. Groundwater movement is generally eastward or north-eastward determined by the general dip. The Disi groundwater is fresh with less than 500 mg/l of TDS.

Isotopic datings of Disi groundwater show 10,000 to 35,000 years old. It means that the groundwater is fossil and this extraction needs a mining process. According to "Aquifer Modelling of the Disi-Saq Sandstone", Howard Humphreys, 1986, it would be possible to exploit the Disi aquifer in the Disi Mudawara area at abstraction rates of up to 110 million m³/year for 100 years without unacceptable lowering of water levels.

The estimated total abstractions from the Disi aquifer in both Jordan and Saudi Arabia are summarised in Table 3-1-5. In Jordan, abstractions to supply to Aqaba and farms in Disi and Mudawara, increased from 6.91 million m³/year in 1982 to 75.15 million m³/year in 1993. In Saudi Arabia, abstraction centers are currently at Halatt Amar, Tabuk and TADCO farm complex. Abstractions in Saudi Arabia increased 18.57 million m³/year in 1983 to 651.47 million m³/year in 1993. Abstractions in Saudi Arabia have some impact on the availability of water resources in Jordan, but the issue is not under the Jordanian jurisdiction. The Disi aquifer is the last undeveloped water source in Jordan, therefore, its mining should be carefully studied, and appropriate governmental policies should be established and implemented.

3-1-4 Mineral Resources Endowment

The Southern Districts of Jordan are blessed with mineral resources which are classified into the following categories:

- Phosphate
- Oil shale
- Cement raw materials
- Building materials
- Industrial minerals
- Dead Sea water minerals
- Metal

Some mineral resources are exploited and contribute to the national economy, especially phosphate rock and potash extracted from the Dead Sea water are the most important as major export products. The rest are in the stage of geological surveys, feasibility studies or waiting for development.

Tables 3-1-6, Table 3-1-7 and Table 3-1-8 show the data of the major mineral resources and Figure 3-1-6 shows locations of deposits and mines.

(1) Phosphate

The phosphate formations cover about 60% of the total area of Jordan with expected total reserves of several billion tons or more. Phosphate occurs near the surface in the central part of the Southern Districts. Jordan Phosphate Mines Co., Ltd. (JPMC) is mining phosphate rock in three mines at Al Abyad, Al Hasa, and Eshidiya, for export as raw material and for production of phosphatic fertilizer, with a total designed mining capacity of about 8 million tons per year. JPMC plans to concentrate phosphate rock production on the Eshidiya mine because the reserves of the Al Abyad and Al Hasa mines will be depleted in near future. The phosphate formation occurs in the whole neighborhood of Eshidiya. The reserve is estimated at 1.5 billion tons and expected to increase according to further geological surveys. The phosphate rock reserve in Jordan is practically inexhaustible.

(2) Oil shale

There are four large scale oil shale deposits near surface in the Southern Districts of Jordan, at El Lajjun, Sultani, Jurf-ed-Darawish and Wadi Mughur. National Resources Authority (NRA) conducted geological exploration including boring surveys for these deposits and some studies for utilizing oil shale. The oil shale is supposed to be mined by open cut method because of their moderate stripping ratio. The total geological reserves is about 42 billion tons and the reserved area is 274 km². Jordanian oil shale has the average oil content of around 6.7% .

Among these deposits, El Lajjun is the most promising and well surveyed because of the superior geological and mining condition, including the highest average oil content of 10.5%, a 1.2 billion-ton reserve that ensures the long term commercial operation, the average thickness of 31 m, and the average overburden thickness of 29 m.

Jordan hopes for the development of oil shale because it is the only indigenous energy resource in Jordan. Discussions on the utilization of oil shale by retorting are going on between Jordanian Government and foreign countries.

(3) Cement raw materials

To manufacture cement economically and to supply it to the market competitively, it is indispensable to obtain suitable raw materials stably with a low transportation cost.

Cement raw materials consist of limestone as the main (about 70%), clay and shale as the sub-raw materials (about 30%), and gypsum as the retardant (about 3%).

At Rashadya cement plant of Jordan Cement Factories Company (JCFC) in Tafila, limestone, clay and shale are supplied to the plant from JCFC's own quarries by trucks over the transportation distance of 5.5 km, 12.5 km and 4.5 km, respectively. Gypsum is purchased from several small private quarries operated in the northern part of Tafila Governorate and Karak Governorate.

NRA is conducting a project for re-estimation of recent reserves and revising the topographical map of the present field situation.

Cement raw materials for the Rashadya plant could be considered satisfactory in both quality and quantity for the future manufacturing activity.

(4) Building materials

Building materials are produced from limestone and granite in Jordan. They are the prevailing rock and easily mined in the Southern Districts. Building materials consist of the aggregate for making concrete, the block-shaped building stone of limestone for building houses, and the ornament stone of granite.

Aggregate is produced from limestone by mining and crushing in quarries in Karak, Tafila and Ma'an Governorates. It is produced from granite in Aqaba Governorate. Aggregate is produced also from the Wadi sediment deposited at the mouth of Wadi Ebin Hamad leading to the Dead Sea in Karak.

Dimension stone of limestone is supplied all over Jordan from quarries in Ma'an Governorate. Building stone of limestone is made by cutting the dimension stone in the factories near the market.

Natural sand is excavated from the lower Cretaceous, Kurnub sandstone formation in Tafila and the Wadi sediment in Karak for the local aggregate market.

A small amount of granite boulder is obtained from the bed of wadis in Aqaba, and used for the raw ornament stone. They are transported to Amman and cut for use.

In Aqaba, several potential granite quarries are waiting to be developed to produce ornament granite stone for domestic and export uses.

(5) Industrial minerals

Industrial minerals which occur in the Southern Districts of Jordan are silica sand, pure limestone, toripoli, kaoline and feldspar.

High grade silica sand can be utilized as a raw material for glass industry and other chemical industries. Glass sand occurs in Aqaba only. Glass sand of Ras an Naqab deposit used to be mined and supplied to the glass factory in Ma'an that is closed now. The current utilization of silica sand in the Southern Districts is limited. The outcrop of high grade silica sand at Dabet Hanout and Humiemh in Ras an Naqab area is mined and supplied over Jordan for industrial uses. Huge amount and unlimited reserves of silica sand deposits in Aqaba, which are now under exploration and study by NRA, are waiting for development.

Pure limestone is the high grade limestone which can be used in the metallurgical, chemical, food, agricultural industry, etc. Pure limestone in the Southern Districts has not been developed yet. The geological survey by NRA on the Qatrana pure limestone deposit has been already finished and now the Al Hasa deposit is under survey. The Arab Potash Company (APC) holds a mining right in Qatrana, where there is a reserve of seven million tons of pure limestone. APC will produce slaked lime to be used for manufacturing magnesium oxide from pure limestone in future. Because pure limestone can be developed by the existing mining technology, pure limestone in the Southern Districts of Jordan is very promising.

There are kaoline deposits along RN 5 connecting to Saudi Arabia, and feldspar deposit near the Aqaba City, which could be developed for ceramic and other industrial uses.

(6) The Dead Sea water minerals

The Dead Sea is the lowest point on the earth and its water has 10 times higher salinity than sea water elsewhere.

The Dead Sea water is composed of 72.5% water, 14.5% magnesium chloride, 7.5% salt (sodium chloride), 3.8% calcium chloride, 1.2% potash, and 0.5% magnesium bromide. Over 43 billion tons of salts are thought to be available from the Dead Sea.

At the present APC produces about 1.8 million tons of potash annually by the solar evaporation system in Safi, and is planning to utilize salt, brine that contains magnesium bromide and magnesium chloride separated by the carnallite processing.

(7) Metal

Although there are many vestiges of ancient copper mines in the Finan area in Tafila, any exploration activity is not permitted now because the Dana Conservation Area including the Finan area is recently specified as the wildlife sanctuary.

According to the result of past explorations and studies on this area, the copper reserve is 19.1 million tons with 1.37% average copper content and 2.06 m average thickness. The underground mining with longwall and back filling method is thought to be necessary. It seems difficult to develop this copper deposit judging from the deposit scale and the geological and mining conditions.

NRA is planning another exploration project in a new promising area, north of the Finan area, to search for larger and higher content copper deposits.

Table 3-1-9 shows the production of mineral resources in 1994 by governorate of the Southern Districts.

3-1-5 Land Use

Based on the Study on Integrated Regional Development Master Plan for the Karak-Tafila Region by JICA in 1988, the land use in the two governorates is estimated as follows.

• Built-up area:	0.2%
• Field crops/irrigated vegetables/fruits trees:	3.5%
• Forest:	2.2%
• Mineral reserve/quarry:	8.8%
• Grazing/unarable area (desert):	75.9%
• Others:	9.4%

Although detailed data on land use in other two governorates (Ma'an and Aqaba) are not available, the current land use in the Southern Districts as a whole seems to be not much different from the result mentioned above. Major cities are located in highlands, and cultivated land is under the high pressure of urbanization.

3-1-6 Tourism Resources

There are 14 major tourism resources in the Study Area (Figure 3-1-7).

Major Tourism Resources in the Study Area	
Karak	Wadi Mujib Nature Reserve Karak Archaeological Museum Mazar Islamic Museum Karak MOTA Rest House Martyres Tombs
Tafila	Dana Nature Reserve / Visitor Center
Ma'an	Petra National Park (proposed) / Visitor Center Petra Archaeological Museum Petra Nabataean Museum Wadi Rum Information Center
Aqaba	Aqaba Marine Park (under construction) Aqaba Sharif Hussein's House Museum Aqaba Marine Science Station Aquarium Aqaba Visitor Center Yamanieh Reef / private diving centers

3-1-7 Environmental Conservation

(1) Areas for Conservation

1) Nature Reserves

There are three Nature Reserves already established in the Southern Districts and four more are expected in the future (Figure 3-1-8). Any extractive activities in the established Nature Reserves are prohibited and the impacts of any activities which would affect the natural environment of the Reserves will be seriously assessed by the Royal Society for the Conservation of the Nature (RSCN).

The Aqaba Marine Park is established to protect Yamanieh Reef and at the same time to promote tourism in the clear ocean water of 20 m visibility.

Nature Reserves in the Southern Districts

Name	Location	Year established	Area (ha)	Annual rainfall (mm)
Wadi Mujib	Madaba - Karak	1987	21,200	150
Dana	Tafila	1989	15,000	350
Wadi Rum	Aqaba	1989	56,000	50 - 100
Abu Rukbah	Karak	proposed		
Jarba	Tafila	proposed		
Bayir	Ma'an	proposed		
Jebel (Petra National Park)	Masadi Ma'an	proposed		

Source: Working Paper, National Environmental Action Plan Workshop, 1995

2) Grazing Reserves

The Grazing Reserves were established by the Ministry of Agriculture to study the plant sequence and afford protection to plant cover. The Ministry chooses governmental lands that are close to a large population and that have potential for recovery of natural type vegetation; then convert the lands to the Grazing Reserves. Most of those Grazing Reserves are fenced to control unauthorized grazing activities. In some Grazing Reserves, plant cover is saved for wildlife such as Arabian oryx, deer, ostrich and onager.

There are nine Grazing Reserves in the Southern Districts with a total area of about 11,000 ha (Figure 3-1-8). Controlled grazing is allowed in the Reserves for herders in spring and autumn.

Grazing Reserves in the Southern Districts

Name	Location	Year established	Area (ha)	Annual Rainfall (mm)
Lajun	Karak	1981	1,100	150
Mujib	Karak	1981	976	150
Nekhil	Karak	1987	700	180 - 200
Twaneh	Tafila	1981	2,000	150
Ac'sheyeh	Ma'an	1983	2,000	100 - 120
Al Fujij	Ma'an	1958	1,000	200
Mudawara	Ma'an	1993	2,000	
Al Manshia	Ma'an	1968	300	150
Ras Naqab	Aqaba	1986	1,200	120
Total area			11,276	

Source: Working Paper, National Environmental Action Plan Workshop, 1995
Department of Forests and Ranges

3) Important bird habitat

Among various groups of flora and fauna in Jordan, studies on birds have been accumulated relatively well to this date. In the Southern Districts, seven areas, mostly located in Wadi Araba are recognized as rich and important bird habitat (Figure 3-1-8).

In addition, the study unit for implementation of Ramsar Convention Sub-project under the Ministry of Planning has recognized three wetlands, ORE 3 Pool at Al Hasa mine, Ad Disa Pool near Disi, and Aqaba Gulf as the most important wetlands in Jordan.

4) Endangered species

There are no legally authorized list of significant species in Jordan. The National Environment Strategy for Jordan (1992), however, lists 34 species as rare and endangered (Table 3-1-10). Among the 34 species, nine important plant species could be found in the Southern Districts, considering the distribution of their habitats.

5) Groundwater protection area

National Water Master Plan of Jordan (1977) delineated five areas in the Southern Districts as groundwater protection areas. Those are Karak city area, Tafila city area, Shubaq-Abu Makhtub area, Wadi Musa area and Disi-Wadi Yutum-Aqaba area (Figure 3-1-9)

For those areas, the master plan states that:

Prohibition is necessary against:

- 1) Waste disposals,
- 2) Use of septic tanks in large communities, and
- 3) Wastewater disposal on the ground surface or into the underground,

and

Restrictions are necessary in regard to:

- 1) Industrial settlement, especially chemical industry,
- 2) Fuel stations,
- 3) Septic tanks in small villages,
- 4) Cemeteries, and
- 5) Groundwater exploitation for other than domestic use.

Besides the proposed protection areas, polluting activities must be regulated in Wadi Araba, where the aquifer is shallow and toxic substances in the soil can easily reach the Gulf of Aqaba.

(2) Pollution

1) Air

Air quality in Jordan is generally good except in the areas around industrial complexes. In the Southern Districts, seriously degraded air quality has been reported in and around the Port of Aqaba.

Sources of Existing Air Pollution in the Southern Districts

Type of Pollution Source	Location		Contaminants
Potash plant	Ghor Safi	Karak	Dust, SO ₂ , CO ₂
Cement factories	Qadisiya	Tafila	Dust
Phosphate mines	Hasa	Tafila	Dust
	Shidiyya	Ma'an	
Glass factory	Ma'an	Ma'an	SO ₂ , CO, CO ₂
Phosphate and potash loading	Aqaba	Aqaba	Dust
Fertilizer Plant	Aqaba	Aqaba	F ₂ , NH ₃ , SO ₂
Loading and discharging at crop silos	Aqaba	Aqaba	Dust
Crude oil loading	Aqaba	Aqaba	Hydrocarbons
Treatment plants	general		Odor, H ₂ S, NH ₃ , CH ₄
Power plants	general		CO, CO ₂ , SO ₂
Plants for iron and steel, tanning leather, chemical detergents, and batteries	general		Cl ₂ , F ₂ , Pb, SO ₂ , CO
Quarries and asphalt mixing	general		Dust, CO, CO ₂ , SiO ₂

Source: Working Paper, National Environmental Action Plan Workshop, 1995, World Bank

2) Water

Jordan's water resources suffer mainly from salinization and pollution.

Levels of salinity in groundwater usually exceed potable standards in all the main basins. Naturally saline springs and saline intrusion from over-extraction contribute to the salinization of groundwater.

Other sources of groundwater contamination include hazardous industrial wastes, agricultural runoff and pollution from under-treated municipal sewage and inadequate landfills. Industries regarded as the most polluting in Jordan are oil refinery, chemical and textile plants, electroplating and tanning, slaughter houses, and dairy products.

Monitoring activities of water quality, however, is now concentrated on Amman-Zarqa basin. Few data are available on the water quality in the Southern Districts.

At the Port of Aqaba and company-owned jetties, materials such as phosphate, potash, fertilizer and crops fall into the water. The warm cooling water from the power plants is released just off the coast. Such industrial pollution is causing algae blooms in March and April: degradation of ecosystems and tourism resource is expected. The Yamanieh reef is also suffering destruction from anchors of fishing and diving boats.

3-2 Local Administration

The administration system of Jordan is divided into five levels: 1) central government (ministries), 2) governorate, 3) district, 4) sub-district, and 5) nahia (which means "center" in Arabic). Table 3-2-1 shows the names of governorates, districts, sub-districts and nahias, as used in the *Population and Housing Census 1994* carried out between December 10 and 15, 1994. The number of governorates increased from eight to twelve in June 1994 when the Cabinet decided to upgrade four districts to governorates. The new governorates are Jarash, Ajlun (both formerly in Irbid Governorate), Madaba (formerly in Amman Governorate) and Aqaba (formerly in Ma'an Governorate). New boundaries of 12 governorates are drawn in Figure 3-2-1. Each governorate is under the control of a centrally appointed Governor who reports to the Ministry of Interior.

But this administrative division is not always clear on the ground. First of all, boundaries between governorates are not always well defined. Second, some nahias have not yet been formally established and still do not have any government office, due to oppositions from neighboring villages.

The functions of local government were performed by 214 municipalities and 382 village councils as of 1994. Table 3-2-2 shows all municipalities in the Southern Districts. A municipality is a financially separate local government and is managed by a Mayor and a local council. Present mayors and local council members were elected through municipal elections held in July 1995. While governorates conduct advisory and service delivery functions, functions of municipal councils include street paving and maintenance, street lighting, garbage collection, provision of libraries and parks, building public facilities, and entering into revenue generating projects (often through leasing public space) such as shopping centers, workshops, car parking, offices, vegetable markets and industrial zones. But municipalities do not have independent revenue sources, because all local revenues such as property tax, fuel tax, handling fees and service charges are tightly controlled by the central government. Municipal councils can propose projects based on local needs to the Ministry of Municipalities, Rural Affairs and Environment, but it is often found difficult to get finance timely for the projects.