

3-3 Current Socio-economic Conditions

3-3-1 Population and its Social Characteristics

(1) Population

According to the *Population and Housing Census 1994*, population of Jordan is 4,139,458 and only 9.5% of the population live in the Southern Region, among which Karak Governorate has the biggest population of 169,770 (Table 3-3-1).

In all governorates, male population exceeds female population. Aqaba Governorate has the lowest female percentage of 43.8%, and Ma'an Governorate has the second lowest female percentage of 45.9%. This is probably because non-Jordanian workers in agriculture, construction, manufacturing industries, shops and services are predominantly males (Aqaba Governorate has the biggest percentage of non-Jordanian population). In Islamic society, males can easily go to other countries to work, but females tend to stay in the local community, and it is difficult for many females to live and work outside their home town.

The percentage of urban population is the highest in Zarqa (95.6%) and Amman (92.2%), and the lowest in Mafraq (29.8%) and Karak (35.4%). Although Karak Governorate has the biggest population in the Southern Districts, population in Karak is scattered and the population in Karak Municipality (18,587) is smaller than that of Tafila Municipality (20,850), Ma'an Municipality (22,845) or Aqaba Municipality (61,673).

The average household size in Jordan was 6.2 persons in 1994. The smallest average household size of 5.8 persons per household is observed in Amman and Aqaba Governorates, both of which have a large urban and international community.

The population structure in Jordan is characterized by a big share of young population. 41.4% of the population of Jordan is under age 15 and 2.5% is 65 or over, so a total of 43.9% of the population is either under or over working age, resulting in a high dependency ratio of 78%; that means, for every 100 workers, there are 78 non-workers who are dependent on them. This young nature of the population will increase demands for public services such as schools and health facilities and put pressure on the labor market for the medium-term future.

(2) Tribal Groups

In Jordan, a tribal group is called Ashira, and people tend to identify and organize themselves by Ashira rather than a community. When meeting with a person for the first time, they often introduce themselves by using their Ashira names. Ashira usually plays its roles in electing municipality mayors and local council members, socializing at the celebrating occasions such as Ramadan, Eid Al Fitr, Eid Al Adha and wedding, and helping each other within Ashira in finding jobs, studying abroad, trading goods, etc. Chieftdom in the tribal groups seems no longer existing, and the tribal leadership is gradually disappearing these days. So now each family can make decision by its own.

(3) Religion

The Jordan Government has never disclosed the number of people by religion, but it is estimated about 90% of population is Muslim and there is a small number of Christian families. Since Islam is the religion of the nation, Islamic holidays are observed nationwide, but all the Government institutions and some companies allow their Christian workers to come to office on 10:00 am on Sundays so that they can go to church in the early morning.

While Tafila Governorate and Ma'an Governorate consist of almost 100% Muslims, Karak Governorate has quite a significant number of Christian families, especially in Karak City (about 30% of its population), Adir (about 50%), Rabba (about 20%) and Smakia (about 100%). In Karak City, there are four churches: Roman-Greek Orthodox, Roman Orthodox, Roman Catholic, and Protestant. Christian families tend to be more interested in educating their daughters sometimes even in foreign countries than Muslim families are, and their daughters tend to participate in work force more than Muslim daughters do. Although Christians and Muslims usually do not marry each other, they usually live in harmony in the same community. In Adir, one Christian family named their son as Mohammed which illustrates the peaceful relationship between Christians and Muslims.

(4) Bedouins and their traditional culture

In the Southern Region, there are many Bedouin families, especially in Al Qatrana (Karak Governorate); Al Hasa (Tafila Governorate); Al Jafr, Al Mreiqah, Ail, Adruh, Al Husainia, Al Fardakh (Ma'an Governorate); Quairah, Al Disa and Wadi Araba (Aqaba Governorate).

Many of Bedouin families are now settled in towns and villages, living in the concrete houses and sending their children to school. But some families still maintain their traditional self-sufficient, nomadic life on desert, living in a tent, moving from a place to another place, taking care of sheep and camels, making cheese and yogurt from sheep's milk, and weaving rugs from sheep's hair. Many of settled Bedouins still feel their identities and roots in the desert life, so they sometimes go back to the tent of their relatives and spend a few days there to relax themselves. Some Bedouins in the Southern Districts have not only Jordanian passports but also Saudi Arabian passports: they cross the border easily, trade goods between Jordan and Saudi Arabia, and earn a lot of money.

Settled Bedouin families usually have some male members working in government offices, army, police or private companies.

In the nomadic Bedouin families, men are often in charge of trade, filling water in plastic tanks in a nearby town, collecting firewood from remote scattered places, etc., since men own and drive a car (typically a four-wheel-drive lorry). Women usually take care of children, take sheep for grazing, make yogurt and cheese, and weave rugs from sheep's hair (cutting of sheep's hair is men's work). Women tend to stay in the area around their tent, and rarely go to towns.

The government encourages Bedouins to settle in towns and villages by providing employment opportunities in government offices (often as drivers), army and police, and by constructing schools and health centers. Female education at school used to be undervalued by Bedouins in the past, so many old Bedouin women are illiterate. But they are now slowly accepting the idea of educating both male and female children at schools, and economic necessity encourages men and women work at the modern sector such as factories. So if educational and employment opportunities are offered in the future industrial development, there will be little difficulty in involving settled Bedouin families in the process.

Bedouin's grazing lands are often government lands. The Government does not restrict their use of land for grazing, although it often restricts their use of land for agriculture.

3-3-2 Labor Force and Employment

Jordan's employment structure is characterized by the big share of public employment. The Government employs 21% of male workers and schools (mostly public) employ 45.5% of female workers (Source: *Employment, Unemployment and Income Survey, 1994*).

The labor force was estimated at around 1,039,000 in mid-1994. Among this, only 883,000 were employed, which makes an unemployment rate of 15.0% in 1994, so unemployment is still a big problem in Jordan. Unemployment rate is the highest (25.1%) among community college graduates, and it seems that many educated persons can afford to stay unemployed and wait for a good job opportunity such as positions in the government. Governmental work is considered generous, however, since it provides a wide range of benefits (various allowances, annual leave, pensions, health insurance, discount stores for government employees, in-kind benefits, housing loans, tax advantages and educational grants) and requires shorter working hours (average 36 hours per week in the public sector compared with 48 hours per week in the private sector).

Women's participation in labor force is still low (11.9%). But among the Southern Districts, Karak Governorate has the highest female participation rate (12.2%), probably due to the large Christian communities in Karak Governorate. Female labor force participation rate increases as their educational level increases, while males' participation rate is almost similar across the various educational levels.

In Jordan, recruitment takes place through social contacts, newspapers and foreign agencies. The Labor Law prohibits private companies from providing recruitment services, and there are 16 government Labor Offices which are supposed to provide job information to job seekers. But, these offices are often seen inefficient and rarely utilized by job seekers. The functions of the Labor Offices tend to be limited to administrative tasks such as issuing work permits for foreign workers, and most of them are staffed by only one person, so they lack the capacity to provide effective placement services or conduct labor demand survey.

3-3-3 Health

During the past 30 years, health indicators in Jordan have improved significantly. Life expectancy at birth increased from 49 years in 1965 to 66 years in 1991, and infant mortality rate fell from 114 in 1965 to 34 per 1,000 live births in 1990. Maternal mortality rate (40-60 per 100,000 live births) is relatively low for a country with a high total fertility rate. Total fertility rate for women aged 15-49 fell from 7.4 in 1976 to 5.6 in 1990, mainly due to the higher age at the first marriage, lower infant mortality rate, and increased, although still limited, use of family planning methods.

Jordan has a total of 63 hospitals: 19 Ministry of Health (MOH) hospitals, 7 Royal Medical Services (RMS) hospitals, 1 Jordan University Hospital (JUH) and 36 private hospitals. Royal Medical Services hospitals are under the Ministry of Defense, and

provide free health care for the military personnel and their families. MOH hospitals and primary health care facilities provide free-of-charge treatment to civil servants with civilian insurance, poor families identified by the Ministry of Social Development, handicapped persons and blood donors, while providing charged services to all other people (service charges are subsidized by the Government). Private hospitals are mostly located in major cities such as Amman, Zarqa and Irbid, while MOH hospitals and primary health care facilities cover the whole nation.

MOH operates an extensive primary health care (PHC) network of 30 comprehensive health centers, 268 maternal and child health centers, 318 health centers and 258 village clinics. There is about one center per 5,000 people and the average travel time to the nearest clinic is about 30 minutes, which indicates a high density of primary health care facilities by international standards. But PHC centers are experiencing the shortage of qualified health staff for their primary health care operation, especially in remote areas.

3-3-4 Education and Vocational Training

Jordan's educational system consists of two-year kindergarten (private only), ten-year compulsory primary school, two-year academic or vocational secondary school or three-year vocational training center, and two-year community college or four-year university¹ (Figure 3-3-1). The Ministry of Education (MOE) is in charge of primary and secondary schools, the Ministry of Labor (MOL) is in charge of vocational training centers through the autonomous Vocational Training Corporation (VTC), and the Ministry of Higher Education (MOHE) supervises community colleges and universities.

MOE's policy is to entitle every village with ten or more school-age children to have a school. Public school fees range from JD 3 per year for primary school to JD 6 per year for secondary school, but school principals have right to waive fees for poorer students, so about 15% of students do not pay school fees. As a result, classrooms increased by 50% during the 1980s. Primary school enrollment became virtually universal and adult illiteracy rate fell from 54% in 1965 to 15% in 1994. Girl's enrollment rate in primary schools is also impressive, sometimes better than boy's rate, contributing to the fall of female illiteracy rate from 71% in 1970 to 21% in 1994.

The Southern Districts are well equipped with a good number of primary and secondary schools, and each governorate has at least one vocational training center. As with the higher education, Karak Governorate has a four-year governmental Mu'tah

¹ Some departments such as engineering in the university requires five years to complete the bachelor course.

University at Mu'tah that recently announced to open a branch at Ma'an. There are two-year governmental community colleges in Ma'an, Tafila and Shubaq.

Mu'tah University has Faculties of Science, Arts, Economics and Administration Sciences, Law, Educational Sciences, Engineering, and Agriculture. In 1994, the Faculty of Arts started to offer Tourism Specialization Program that is the first bachelor course specializing in tourism in Jordan. Students at Mu'tah University come from Karak Governorate (38%), Amman Governorate (22%), Irbid Governorate (9%), Ma'an Governorate (7%), Zarqa Governorate (6%), Tafila Governorate (6%) and other places (data on the first semester in 1994-1995)¹².

Karak Governorate also has Al Karak College that offers Academic Program (the biggest program), Educational Program, Social Work Program, Administration and Finance Program (the second biggest program), Computer Program, and Para-medical Program. Graduates from Academic Program tend to seek their jobs as teachers for primary schools (teachers for secondary schools need a bachelor degree). In Tafila, Tafila Polytechnic College offers mainly Engineering Program in addition to the ordinary Academic Program. In Ma'an, Ma'an College offers Academic Program (the biggest program), Administration and Finance Program (the second biggest program) and Computer Program, while Al Shubaq College offers mainly Academic Program and Agricultural Program, Educational Program, and Administration and Finance Program.

3-3-5 Poverty and Income

Table 3-3-2 shows abject poverty lines (the monthly income necessary to provide the minimum amount of food for the average size of family) and absolute poverty lines (the monthly income necessary to provide the minimum level of food, clothing shelter, primary health services, basic education and transportation for the average size of family) for each governorate in 1992. The percentage of families in abject poverty is the highest in Karak Governorate (10.9%), and the percentage of families in absolute poverty is the highest in Ma'raq Governorate (29.5%), followed by Karak Governorate (28.6%). The Southern Districts whose population is 9.5% of the national population, have 13.2% of families in abject poverty and 11.4% of families in absolute poverty, so both shares of the Southern Region are higher than its population share.

¹² Governorates used here are the old eight governorates which means Ma'an Governorate includes Ma'an Governorate and Aqaba Governorate; Irbid Governorate includes Irbid Governorate, Ajlun Governorate and Jarash Governorate; and Amman Governorate includes Amman Governorate and Madaba Governorate.

Table 3-3-3 gives average annual income for each governorate: the Table indicates people in Tafila Governorate has the least average annual income per capita as well as per household. Karak Governorate has the second least average annual income per capita, while Ma'raq Governorate has the second least average annual income per household.

3-3-6 NGOs and WID

There are three major non-governmental organizations (NGOs) in Jordan: Queen Alia Fund for Social Development (QAF), Noor Al-Hussein Foundation (NHF), and General Union of Voluntary Societies (GUVS). All of these NGOs are very active in the field of women in development (WID) by implementing various WID-specific programs such as literacy class, skill training, and income generation activities for women. In an Islamic society, it is often difficult for mothers to work outside their home, so these NGOs also operate kindergartens and day care centers to facilitate mothers' work outside their home.

(1) Queen Alia Fund for Social Development (QAF)

QAF was founded in 1977 as a non-profit, non-governmental, social development organization, chaired by Her Royal Highness Princess Basma Bint Talal. QAF's projects are implemented through a nationwide extensive network of 50 Princess Basma Community Development Centers (9 main centers and 41 satellite centers), which covers much wider areas than the Ministry of Social Development's 21 Social Development Centers. In the Southern Districts, QAF has 24 Princess Basma Community Development Centers (7 in Aqaba, 6 in Tafila, 6 in Karak, 5 in Ma'an).

The following is the list of QAF's activities:

- 1) program for women,
- 2) family education program,
- 3) literacy program (especially for women),
- 4) medical day,
- 5) child care program (with UNICEF),
- 6) nutrition program (with World Food Program, UNICEF and CARE),
- 7) program to support local NGOs,
- 8) income generating project,
- 9) agricultural project,
- 10) special education program for people with disabilities, and
- 11) Secretariat for The Jordanian National Committee for Women (JNCW) and The Jordanian National Committee for Population (JNCP) (both chaired by Princess Basma).

JICA is dispatching one Japanese senior volunteer on home gardening in Karak and eight JOCV volunteers on various fields such as children's program, women's program, and ceramic and pottery making. QAF also received Japanese Embassy's small grant to NGO.

(2) Noor Al-Hussein Foundation (NHF)

Noor Al-Hussein Foundation (NHF) is a non-profit, non-governmental organization established by Royal Decree on September 4, 1985 to consolidate Queen Noor's diverse and expanding development endeavors.

NHF works in the following five areas:

- 1) Family and Community Development,
- 2) Women in Development ,
- 3) Children's Welfare,
- 4) Promotion of Culture and Heritage, and
- 5) Advancement of Education.

NHF emphasizes the business approach to its income generation programs. In their carpet and handicraft production, they import quality raw materials from USA and hire an American designer to design the product in order to attract foreign tourists and overseas buyers. So the quality of their product looks good, but the price tags of the products tend to be very high and some people feel their product designs are far away from Jordanian traditional designs due to dependency on a foreign designer.

(3) General Union of Voluntary Societies (GUVS)

Jordanian non-governmental, voluntary organizations or charitable societies were given a legal basis by the enactment of the Law of Societies and Social Organizations No. 33 (first in 1936, revised in 1956, 1965, and 1966). 1956 revision of the law promoted the creation of unions of voluntary societies in each governorates, and the General Union of Voluntary Societies (GUVS) was established as a national coordinating body encompassing all governorate unions in 1959. At present, GUVS represents 12 governorate unions and 653 voluntary societies. 59 representatives elected from governorate unions (at least three representatives from each union) form the General Assembly and meet at Amman every other year. The General Assembly elects the 18-member Executive Council (at least one member from each union), including the President, Vice-President, Treasurer and Secretary. The Secretariat at Amman has 52 paid staff, including the Director General.

As an umbrella organization of all voluntary societies in Jordan, GUVS organizes, initiates, finances and supports all kinds of voluntary activities such as child care program, training, care for the disabled, income-generating projects and fund raising campaigns. Major sources of fund come from the sales of Jordanian Charitable Lottery, international aid (USAID, JICA, Dutch, UNICEF, etc.), government grant (Development and Employment Fund) and individual donations. Major facilities of GUVS include Al-Amal Cancer Center, Occupational Therapy College and the Home of Hope for the Multi-Handicapped.

(4) Income generation projects

All of NGOs' income generation projects are facing the market problem and the lack of finance to expand their activities. The prices of rugs and handicrafts they produced seem to be expensive due to the high administrative overhead cost (even though very little is paid to the producers), and finished of the products are not of first quality. So there is much need for improvement on NGOs' income generation projects in terms of quality and cost reduction.

Another problem of NGOs' activities is the lack of coordination among them. QAF, NHF and GUVS seem to duplicate their efforts in some areas such as programs for handicapped, child care and income generation. There is little opinion exchange and sharing of experiences among NGOs' and the evaluations of NGOs' programs have rarely been conducted.

3-3-7 Current Industrial Activities and Prospects

In Jordan, there is no clear definition for the small and medium industries in terms of number of employees or the paid capital although the Ministry of Industry and Trade, Amman Chamber of Industry and other institutions have their own definitions.

For the study purpose, the Study Team proposes the following definition based on consideration of existing definitions:

Subsistence industries:	Less than five employees
Small industries:	Five - 20 employees
Medium industries:	21-50 employees
Large industries:	More than 50 employees

According to this definition, only three enterprises are classified as large industries in the Southern Districts, namely, Jordan Phosphate Mines Company Ltd. (JPMC), Arab

Potash Company (APC), and Jordan Cement Factories Company (JCFC). Four enterprises are classified as medium industries based on the result of investment demand survey conducted by the Study Team. All other enterprises are in the category of small or subsistence industries.

(1) Large industries

There are three large manufacturing industries in the Southern Districts, namely a potash factory in Karak Governorate, a cement factory in Tafila Governorate and a phosphatic fertilizer complex in Aqaba Governorate. In addition to these manufacturing industries, there are phosphate mines in Karak, Tafila and Ma'an Governorates. These industries are based on the abundant mineral resources of Jordan.

The following table explains the production of fertilizer, potash, cement and phosphate rock in the Southern Districts in the past five years.

Production Volume of Large Industries in the Southern Districts					
	unit: 1,000 tons				
	1990	1991	1992	1993	1994
Phosphatic fertilizer	595.8	602.1	553.6	469.9	749.7
Potash	1,402.7	1,364.1	1,346.0	1,370.1	1,550.3
Cement (*)	550.0	390.0	1,080.0	1,590.0	1,590.0
Phosphate Rock	5,748.1	4,460.8	4,295.9	4,221.8	4,217.9

Note (*): Approximate figures

Source: Central Bank of Jordan and Jordan Cement Factories

The following table shows the development of the exports of large industries during the period 1990 - 1994 as a percentage of total exports. It is clear from the table that the export share of large industries recorded its highest value of about 56% in 1991. However, the share decreased by about 18% in 1993 as compared with 1991 figures. In 1994, the share of exports of large industries increased by about 2% as compared with 1993 figures.

Export of Large Industries

unit: 1,000 JD

	1990	1991	1992	1993	1994
Phosphatic fertilizer	79,350	86,471	72,456	55,623	89,205
Potash	88,526	96,764	86,220	86,023	92,573
Cement (*)	22,206	26,103	22,214	17,362	27,334
Phosphate Rock	138,668	123,092	122,464	97,884	100,390
Major Industry Total	328,750	332,430	303,354	256,892	309,502
(% on Total Domestic Export)	(53.7%)	(55.5%)	(47.9%)	(37.2%)	(39.0%)
Total Domestic Export	612,252	598,627	633,755	691,282	793,919

Note (*): Export amount of entire Jordan

Source: Central Bank of Jordan

1) Potash

(a) Current operation

Potash is solely produced by APC, which is a Pan-Arab company formed in 1956, with the following shareholders:

a) Jordan Government	55.4%
b) Arab Mining Co.	21.6%
c) Islamic Bank	5.4%
d) Iraqi Government	4.9%
e) Libyan Government	4.2%
f) Kuwaiti Government	4.1%
g) Other Governments	0.7%
h) Private Sector	3.6%

APC was given concession from the Government of Jordan to exploit, manufacture, and market the resource of the Dead Sea. The first APC project to produce Potassium Chloride (KCl) had begun in 1976 with a capacity of 1.2 million tons per year. Construction of the first plant started in 1979 and it was commissioned in 1982, utilizing a Hot Leach Crystallization process. Its commercial production started in 1983. Production was gradually increased until the design capacity of 1.2 million tons per year was reached in 1987, after correction and modification works were completed for the Solar Pond system and the refinery process. New modification in the carnallite decomposition process of the refinery was made during 1987 and 1989 to increase the capacity up to 1.4 million tons per year. A new refinery utilizing the cold crystallization technology was commissioned in 1994 to raise the capacity to 1.8 million tons per year.

The Solar Pond system is located south of the Dead Sea, and the refinery is located in Safi, about 30 km southwest of the Karak City.

The Solar Pond system has a total area of 100 km², and the refining plants has a total production capacity of 1.8 million tons per year. The actual potash production amounted to 1.78 million tons in 1995 and annual turn-over in the year was JD 132.8 million.

Brine of the Dead Sea has the following composition, and 200 million tons are fed to the Solar Pond system every year:

a) Water	72.5%
b) Magnesium Chloride	14.5%
c) Salt (Sodium Chloride)	7.5%
d) Calcium Chloride	3.8%
e) Potassium Chloride	1.2%
f) Magnesium Bromide	0.5%

Carnallite, a double salt of magnesium chloride and potassium chloride, is separated from brine by the Solar Pond system. Then, carnallite is sent to the refining plants to obtain potassium chloride. The refinery plants consume 8 to 8.5 million tons per year of carnallite and 9 million m³ per year of fresh water.

Almost all of the potash products are exported to more than 30 countries in 1994, namely India (23.1%), Indonesia (11.9%), Malaysia (11.5%), Europe (10.9%), Korea (9.9%), China (9.2%), Chile / Brazil / U.S.A. (8.6%), etc.

The total number of employees of the plant site is 2,166, of which 99% are Jordanian.

The company has a plan to increase its capacity to 2.0 million tons per year by the year 2000 and further to 2.2 million tons per year by the year 2003.

Mineral reserves in the Dead Sea are estimated as follows:

a) Magnesium Chloride	22 billion tons
b) Salt (Sodium Chloride)	12 billion tons
c) Calcium Chloride	6 billion tons
d) Potassium Chloride	2 billion tons
e) Magnesium Bromide	1 billion tons

Two billion tons of potassium chloride correspond to more than 900 years' consumption for a production capacity of 2.2 million tons per year.

(b) On-going projects

a) Industrial and table salt project

The construction contract for this project was awarded to a group of Italian companies for US\$ 20 million in August 1994. The plant is located in Safi and now under commissioning. Production capacity is designed to be 1.2 million tons per year of industrial salt and 31,000 tons per year of table salt.

2) Phosphatic fertilizer

(a) Current operation

Diammonium phosphate (DAP) is the only phosphatic fertilizer that is presently produced in Jordan. DAP is produced by the Industrial Complex of the Jordan Phosphate Mines Co. Ltd. (JPMC) in Aqaba. The complex consists of the following process plants:

- | | |
|-----------------------------|--|
| a) Sulfuric acid plant: | 1,800 tons / day x 2
expanded to 2,250 tons / day x 2 in 1995 |
| b) Phosphoric acid plant: | 1,250 tons / day |
| c) DAP plant: | 1,100 tons / day x 2 |
| d) Aluminum fluoride plant: | 60 tons / day |

749,650 tons of DAP and 16,615 tons of aluminum fluoride were produced in 1994. Sulfuric acid and phosphoric acid are mostly used within the complex, and only a small part of products was sold.

Raw materials used in 1994 was about 1.2 million tons of phosphate rock, about 336,000 tons of sulfur, about 173,000 tons of ammonia and about 23,000 tons of aluminum hydroxide. About 20% of phosphate rock produced in Jordan was used in the Aqaba Industrial Complex. Raw materials except phosphate rock are imported.

In 1994, 1.5% of DAP was sold to the local market and the rest was exported via the Aqaba Port to India, Thailand, Malaysia, the Philippines, New Zealand, Pakistan, Iran, Nepal, Ethiopia, etc. All of aluminum fluoride was exported to Dubai, Bahrain, Egypt, Russia, Yugoslavia, Iran, etc. in 1994.

For plant operation, 920 employees, who are all Jordanian, and 397 daily-paid laborers are working at present.

(b) On-going projects

JPMC has adopted a policy to manufacture phosphoric acid, phosphatic fertilizers and other products to utilize the abundantly available phosphate rock, to improve the marketing position of JPMC through diversification of its products, and to meet the increased requirements of phosphoric acid and phosphatic fertilizer worldwide. In order to attract and motivate concerned parties to participate in JPMC's plants, it was decided that the intended locations of the proposed projects should be designated as free zone areas in accordance with the free zones corporation law which allow profit exemptions from income tax for a period of 12 years in addition to other incentives.

a) Indo-Jordan Chemical Company (IJC)

IJC was established in February 1992 to build and manage a phosphoric acid plant near the phosphate mine at Eshidiya with a capacity of 228,000 tons per year. About 760,000 tons per year of phosphate rock will be supplied from the Eshidiya mine.

Shareholders of IJC are India's Southern Petrochemical Industries Corporation (SPIC) (52.2%), JPMC (34.8%) and Arab Investment Company (13.0%).

The plant is currently under construction and will start operation in early 1997. After the commencement of commercial operation, the phosphoric acid will be shipped to SPIC's DAP plant at Tamil Nadu in India. A free zone has already been set up for the plant area.

b) Nippon Jordan Fertilizer Company Ltd.(NJFC)

NJFC was established in 1992 with share holding of Zen-Noh (30%), Mitsubishi Chemical (10%), Asahi Kougyou (10%), Mitsubishi Corporation (10%), JPMC (20 %) and APC (20%).

A new NPK and DAP plant with a capacity of 300,000 tons per year, which is licensed by a French company, is under construction. The plant site is adjacent to the Industrial Complex of JPMC in Aqaba and to the fertilizer jetty at the Aqaba Port.

Raw materials are to be provided as follows:

- Phosphoric acid (70,000-80,000 ton/year)
from JPMC Aqaba Complex via a pipeline
- Sulfuric acid (30,000-40,000 ton/year)
from Industrial Complex of JPMC via a pipeline
- Ammonia (50,000-80,000 ton/year)
import through JPMC via sea
- Potassium Chloride (70,000-80,000 ton/year)
from APC Safi plant near the Dead Sea via trucks

The whole products will be exported to Japan from the Aqaba Port.

A construction contract on a turnkey basis was awarded to a consortium comprising Chiyoda Corporation of Japan and Krebs of France. Mechanical completion of the plant is scheduled to be December 1996. It is expected that the start-up operation will be completed in March 1997 followed by the commencement of commercial operation in April 1997.

3) Cement

In the Southern Districts, there is a cement plant that belongs to the Jordan Cement Factories Co. Ltd. (JCFC). It is located in Rashadya of Tafila, 35 km south of Tafila City.

Construction of the Rashadya plant was started in 1981 by Mitsubishi Corporation (main contractor), Kobe Steel of Japan (plant supplier), Enka-Troken of Turkey-Jordan joint venture (civil works), Hitachi of Japan (mechanical & electrical equipment erection), Fuji Electric of Japan (electrical equipment supplier), Siemens of Germany (PLC system supplier), and Nihon Cement of Japan (Operation during performance test). Performance test was done in 1984. The plant has two kilns, each having a designed capacity of 3,200 tons per day. This Rashadya plant was owned by the South Cement Company (SCC) established in 1981.

SCC merged with JCFC at the end of 1985. The current share holding is 49% by governmental firms and the rest by private firms.

Raw materials used are limestone, clay, shale and gypsum. Among these raw materials, limestone, clay and shale are supplied from JCFC's quarries which are located 5.5 km, 12.5 km and 4.5 km from the plant, respectively. Gypsum is purchased from private quarries in the northern part of Tafila Governorate and Karak

Governorate. Ordinary Portland cement and sulfated resistance cement were produced. In 1994, 1.59 million tons of cement were produced. The Rashadya plant is supplied with water from two wells that belongs to JCFC. These wells are located 24 km east of the plant.

Half of the cement products are for the domestic market and the rest is exported, mainly to Arab countries.

Number of employees is 1,001 of which 644 come from Tafila, 107 from Ma'an, 75 from Karak, 150 from other governorates, and 25 from Pakistan.

4) Phosphate mines

Phosphate mining is also a large sector in the Southern Districts. Jordan Phosphate Mines Co. Ltd. (JPMC) is the sole mining company of phosphate rock in Jordan. JPMC operates the following three mines in the Southern Districts:

Mines	Governorate	Start of Mining	Production Capacity (million tons/year)
Eshidiya	Ma'an	1988	3.35 (No. 1 mine)
		1999 *	4.20 (No. 2 mine)
Al Hasa	Tafila	1962	2.5
Al Abyad	Karak	1979	2.5

Note (*): Scheduled to be started.

Source : JPMC

Al Hasa and Al Abyad are scheduled to be closed in 2007-2010 and 2006-2010, respectively, an exact schedule depending on economics of mining activity. Eshidiya has phosphate deposits in the western area, the eastern area and other areas. In the western area, No. 1 mine is in operation and development of No. 2 mine will be started from 1999. For the eastern and other areas, JPMC has an exploration program. More than one billion tons of reserve are expected at Eshidiya.

The table below shows annual production of phosphate rock in 1995.

Mines	Al Abyad	Al Hasa	Eshidiya	Total
Production (1,000 tons / year)	1,900	1,925	1,036	4,861

Source : Annual Report of JPMC, 1995

(2) Small and medium industries

1) Current industrial activities

(a) Result of Industrial Census in 1988

According to Industrial Census in 1988, there were 743 establishments in the industrial sector including mining and quarrying and industrial services such as car repairs and maintenance in the Southern Districts. Among them, 93 establishments (12.5%) had five employees or more, which included three large enterprises: Jordan Phosphate Mines Company, Arab Potash Company and Jordan Cement Factories Company. Thus, 90 enterprises excluding three big companies are almost equivalent to small and medium industries. Other 650 establishments had less than five employees (Table 3-3-4).

Among the enterprises, the establishments with five or more employees play the dominant role in terms of number of employees, production (gross outputs) and value added as summarized below:

Share of Establishments in all Establishments
with Five or More Employees

	Number of Establishments	Number of Employees	Production (million JD)	Value Added (million JD)
Establishments with 5 or more employees	93	7,452	216.7	93.1
Establishments with less than 5 employees	650	1,364	4.7	2.5
Total	743	8,816	221.4	95.6
Share of establishments with 5 or more employees	12.5%	84.5%	97.9%	97.4%

Average production per employee of the establishments with five or more employees was JD 29,079 per annum, and average value added per employee was JD 12,493 per annum. These indicators for the smaller establishments was JD 3,418 and JD 1,839 respectively, indicating clearly the big gap of labor productivity between the larger and the small enterprises.

As for the types of industry, the number of fabricated metal factories stood first at 92 establishments, followed by food manufacturing and wood and wood

products (80 establishments for each), non-metallic mineral products (78 establishments).

(b) Result of Industrial Census in 1994

The latest available comprehensive data for local industries by governorate is Industrial Census in 1994, although there are no tabulations by size of industries in terms of number of employees by governorate.

In 1994, there were 735 establishments in the industrial sector including mining and quarrying. The establishments are distributed in Karak (297), Tafila (106), Ma'an (182) and Aqaba (150). As for types of industry, non-metallic mineral products come first with 161 establishments, which account for 22%, followed by fabricated metal products with 152 (21%), food products and beverage with 128 (17%), wearing apparel with 94 (13%), wood and wood products with 68 (9%), and other mining with 65 (9%). Dominant types of industries in the Southern Districts are almost the same as the ones shown in 1988 Census (Table 3-3-5).

(c) Result of investment demand survey by the Study Team

The latest situation of existing industries could be derived from the investment demand survey on manufacturers in the country conducted by the Study Team between December 1995 and February 1996. The survey included the basic information on the type of industry, the number of employees, and so on. The responses came from 500 enterprises.

Of the total, 152 enterprises are from the Southern Districts; their number of employees ranged from five to 25. Thus, these establishments are in the category of small and medium industries. The establishments are distributed in Karak (68), Tafila (16), Ma'an (17) and Aqaba (51). As for types of industry, non-metallic mineral products (ISIC 369) come first with 39 establishments, which account for 26%, followed by fabricated metal products (ISIC 381) with 32 establishments (21%), food products (ISIC 311) with 31 establishments (20%), and other mining (ISIC 290) with 18 establishments (12%) (Table 3-3-6).

By size of employment, 126 establishments (83%) fell in the range between five and ten employees. Establishments with 11 to 20 employees amounted to 22 (14%). Four establishments had more than 20 employees, which are classified as medium industries. By type of industry, the number of employees of mining sector was relatively large compared to other sectors (Table 3-3-7).

As for the factory size, 88 establishments (58%) out of 152 are smaller than 500 m². By Governorate, those in Aqaba were smaller compared to the average of enterprises in the Southern Districts, while those in Ma'an were larger than the average (Table 3-3-8).

On the average wage of skilled labor, the range between JD 100 and JD 199 per month had the largest share of 66%, followed by the range between JD 200 and JD 299 with a share of 16% (Table 3-3-9).

As to the average age of machines, the ranges between 1 and 4 years and between 5 and 9 years earned the largest shares of 36% each. For building age, the range between 10 and 19 years came first, followed by the range between 5 and 9 years and between 1 and 4 years (Table 3-3-10).

For 60% of the enterprises, the material cost accounted for 60% to 79% of the production cost, while the labor cost was less than 19% for 78% of the enterprises (Table 3-3-11).

(d) Problems and constraints

According to the interview survey with enterprises, Chambers of Commerce and the Governorates, the following issues were reported to be major problems and constraints of small and medium industries in the Southern Districts:

- a) Complaints from the neighbors (noise, smell, vibration and parking space),
- b) Limitation of space,
- c) Labor wage increase,
- d) Labor shortage (skilled and foreign labor in particular),
- e) Lack of technology,
- f) Rise in raw/intermediate material costs,
- g) Limitation of market and distance to the Amman market,
- h) Competition with local firms,
- i) Lack of finance,
- j) Government regulation,
- j) Shortage of water in summer, and
- k) Stoppage of electricity (in Karak Governorate).

Among these constraints, the most serious problems are: rise in raw/intermediate material costs and limitation of markets, competition with local firms and

government regulations (see Table 3-3-12). Since the cost of raw material occupies a large share of the production cost, small enterprises bear hardship of upsurge of the raw material cost. Regarding the government regulations, most of respondents claimed high income taxes and high cost of acquiring labor permits for foreign workers (mainly Egyptians).

2) Prospects of existing industries

Based on the information obtained from the interview survey, the investment demand survey, statistics and other information, the prospects of existing small and medium industries in the Southern Districts can be assessed as follows. The assessment assumed no future special projects or strong measures on industrial development.

(a) Prominent types of industries

Types of major industries in the Southern Districts will remain the same: Food manufacturing (bakeries), wearing apparel, wood and wood products (carpentry), non-metallic mineral products (tile and block manufacturing), fabricated metal products (blacksmiths) and industrial services (car repairs and maintenance). Development may be expected in the fields of manufacturing of automobile parts and accessories, machinery, and food processing based on the agricultural produce.

(b) Market

It seems that most of the products will be for local use or consumption within the same municipality and its suburbs. The quality of the products will not be able to compete with the ones from Amman or abroad.

(c) Raw materials

Even in the future, most of raw and intermediate materials for industrial production will still be brought from Amman. Prominent raw materials available within the Southern Districts are cement, sand, gravel and stones for tiles and block industries, glass sand in Ma'an and Aqaba for glass industry and agricultural produce mainly from the Ghor area in Karak for food industry. Phosphate in the Badia area and potash in the Jordan Valley do not have the linkage to the industrial activities in the districts.

(d) Manpower

Increase of population and development of educational and training facilities may enrich the region's manpower resources gradually. However, the manufacturers in the districts may face the shortage of workers, because the Government may regulate non-Jordanian workers, who play an important role in the manufacturing and mining sector at present, and some Jordanian workers are reluctant to work for small and medium manufacturers.

(e) Finance

Major financial resources for small and medium industries may not change in the future. Those are self-finance, finance from family/relatives and private sector capital (mainly traders).

(f) Sales trend

According to the investment demand survey, non-metallic mineral industries are kept in a rather better business environment, while food manufacturing, wood products and fabricated metal industry seem to be shaken compared to the average of all types of industries (Table 3-3-13).

(g) Expansion of business

Based on the investment demand survey, 32% of respondents (48 enterprises) indicated that they are willing to expand business in the future. By district, more enterprises in Ma'an and Aqaba are interested in expansion compared to the average in the Southern Districts. By sector, printing and wearing apparel show higher interest for expansion compared to the average of all types of industry (Table 3-3-14).

3) Prospects of new industries

Most reliable information on new small and medium industries in the Southern Districts is given by the Jordan Investment and Southern Development Company (JISD).

JISD was established in 1994 by equal participation of its three major share holders: the Arab Potash Company, the Jordan Phosphate Mines Company and the Jordan Cement Factories Company. This newly formed company intends to develop industrial projects in southern Jordan. The company proposed the following three

workshops in the Amman Summit. It was estimated that the overall project cost for these workshops totals US\$ 3.2 million and the workshops provide 84 permanent jobs.

- (a) a rubber lining workshop: specializing in industrial anti-corrosion coating,
- (b) an electrical motor rewinding workshop: specializing in electro-mechanical maintenance, repairs and rewinding of high- and low-voltage motors, and
- (c) a plate and welding workshop: specializing in mechanical and civil construction support services.

According to JISD, a rubber lining workshop and an electrical motor rewinding workshop are under implementation. The former workshop is located in Safi and the latter will be located in the light industrial zone for workshops, which was constructed by the Aqaba Region Authority. A plate and welding workshop is still under promotion.

Besides these workshops, the garment factory for light suits, trousers, and shirts has already started in Karak to supply three large companies. This factory hires 25 workers at present.

Industrial projects by JISD including the ones which are already discussed above are summarized in the table below:

List of the Industrial Projects by JISD

Projects	Location	Expected No. of Employees	Status
Rubber lining	Safi	40	Under implementation
Electrical motor rewinding	Aqaba	30	Under implementation
Plate and welding	-	-	Under promotion
Wearing apparel	Karak	25	Operating
Medicine for cattle/poultry	Qatrana	40	Under implementation
Glass/tableware	Ma'an	100	Under implementation
Toilet soap	Tafila	40-50	Under implementation
Detergent	Ma'an	-	Under implementation
Filter for automobiles	Ma'an	-	Under study

Source: JISD

(3) Subsistence industries

1) Current Industrial activities

(a) Result of Industrial Census in 1988 and 1994

According to the Industrial Census in 1988, there were 650 establishments with less than five employees (Table 3-3-4). These were in the category of subsistence industries. Typical types of industry were food manufacturing (bakeries), wearing apparel, wood and wood products (carpentry), non-metallic mineral products (tile and block manufacturing), fabricated metal products (blacksmiths) and industrial services (car repairs and maintenance).

The average number of employees of the establishments with less than five employees in the Southern Districts was 2.1, while the average number in the same category in the whole Kingdom was 2.2. The average production per establishment with less than five employees in the Southern Districts was JD 7,172, which was slightly higher than the national average of JD 6,649.

Since there are no tabulations by size of industries in terms of number of employee by governorate in Industrial Census 1994, it is difficult to grasp the features of subsistence industries specifically. However, it may be possible to conclude that activities in the subsistence industries were not enhanced during 1988 - 1994.

(b) Results of interview survey

Interviews were conducted by the Study Team in February 1996 mainly on subsistence and small industries. Of the 30 enterprises interviewed, 18 establishments (or 60%) were in the category of subsistence industries (Table 3-3-15).

The following features are found through the interviews:

- a) Most of the enterprises depend upon family labor and/or foreign labor (mainly Egyptians).
- b) Their production is generally carried out according to direct orders by final consumers.

- c) Most of the raw materials for carpentry and fabricated metal workshops come from Amman. Wheat for bakeries is supplied by the Ministry of Supply. Cement, sand, gravel and stones for tiles and block industries are locally available.
- d) Markets of their products are limited within the same municipality and its suburbs. Only a few enterprises sell their products to Amman or other municipalities.
- e) Some enterprises located in the residential area of the municipality receive claims from the neighbors on noises and smells.
- f) Employees who had formal training are very few. Some employers answered that foreign workers (Egyptians) already have trainings and do not need additional training.
- g) The number of enterprises that receive sub-contracts is very small.
- h) Most of respondents, except printing firms and bakeries, prefer to move to an industrial apartment or an industrial zone, if incentives are provided and the rental fee is fully affordable for them.

(c) Problem and constraints

The issues were common with those of small and medium industries discussed in the preceding section. Specifically, rise in raw/intermediate material costs is the serious problem and the burden for subsistence enterprises.

2) Prospects

The prospects for subsistence industries are mostly similar to those of small and medium industries. Specific features for subsistence industries are summarized below:

(a) Prominent types of industries

Typical types of subsistence industries may remain the same: Bakery, carpentry, printing, metal and aluminium workshops, and car repairs and maintenance.

(b) Market

The market of subsistence industries is smaller than those of small and medium industries. It is difficult to expect the expansion of the market without any promotive project or governmental measures. It should be noted that the relocation of some types of industries such as bakery or small printing shop, which are currently located in the center of municipality, may cause a loss of their markets.

(c) Manpower

Subsistence industries shall continue to depend on family labor and/or non-Jordanian workers, provided no specific measures are taken.

(d) Business behavior

At present, most subsistence enterprises do not deal with banks because the size of business or the amount of transaction is very small. When they need money as working capital, they borrow from traders. This business behavior may continue in the future unless they are involved in the existing financial scheme for the development of small industries.

3-3-8 Infrastructure

(1) Transportation

The geographical characteristic of Jordan implies significance with its unique national location in the Middle East Region. Jordan has played a major role of transport corridor between European, Asian and African countries.

In this regard, the transportation sector is considered as an important contributor to industrial development for the reason that the transport infrastructure is one of the major elements for the promotion of economic and industrial activities of regions and nations by providing an efficient transport network system.

1) Transport sector in Jordan

The transport sector absorbs over 10% of the labor force and accounts for more than 15% of total GDP in Jordan, which implies a large portion of infrastructure. The Ministry of Transport (MOT) is the authority responsible for the comprehensive transport planning. In the transport sector, major organizations include Public Transport Corporation (PTC), Hijaz Railway Corporation (HRC), Aqaba Railway

Corporation (ARC), The Ports Corporation (TPC), Civil Aviation Authority (CAA), and Royal Jordanian Airline (RJ), etc.

2) Road transport

(a) Management

The administration of the road transport system is shared by the Ministry of Transport (MOT) and the Ministry of Interior (MOI).

(b) Existing condition

The major north-south corridors in Jordan are the Desert Highway (RN 15), the King's Highway (RN 35) and the Wadi Araba Highway (RN 65). In addition, RN 5 is merged with Route 10 in El Safawi, located in the Northern Districts (Figure 3-3-2).

The Desert Highway is a major north-south national highway that runs between Syrian border and Aqaba. Out of the whole section, the section between Amman and Ras an Naqab which is located 40 km southwest of Ma'an, is a 4-lane asphalt highway with approximately 250 km long. As the section from Ras an Naqab to Aqaba, has been a two-lane road with poor condition, the section is under construction for expansion to 4-lane highway with financing of the World Bank (WB) and the European Investment Bank (EIB). The construction of the section has started in January 1996 and is expected to be completed in July 1998.

A number of undulated pavements and sharply curved road segments are observed on the King's Highway with two-lane road, due to the topographical difficulties. For this reason, this road seems to be suitable for a touristic route rather than a truck transport route.

The Wadi Araba Highway is a two-lane road which provides important transportation route for potash and mineral products from APC at Safi to the Aqaba Port. Although its pavement condition is generally fair, undulated and patched pavement spots are often observed on the road.

The section of RN 5 between Ma'an and RN 10 interchange has a quite good pavement because of its recent construction. The shoulder of the road is wide enough to accommodate emergency parking. RN 5 also extends to Saudi Arabia border via Ma'an toward the south. In this section, busy phosphate truck traffic is witnessed.

RN 50 is a two-lane road that runs east-west between the Wadi Araba Highway and the Desert Highway via Karak. The entrance section from Potash City to Karak is in poor pavement condition, while the rest of the segment to Karak has a generally good pavement. In this section, continuous curved and mountainous roads are observed up to Karak. The initial section from Karak to the Desert Highway is newly paved, while the pavement of the rest section up to the Desert Highway is generally poor. In the Qatrana-Karak section with a total 40 km length, a partial section of 5 ~ 10 km from Qatrana toward Karak is under construction for the expansion from existing 2-lane to 4-lane road with median strip.

According to the traffic survey by MPWH for consecutive two days in 1994, the traffic volume around Greater Amman ranged from about 10,000 to 30,000 vehicles excluding the traffic of west Amman on the Desert Highway where a traffic up to about 80,000 vehicles was observed, while the traffic volume in the section of Ma'an-Ras an Naqab showed approximately 3,600 vehicles during the two consecutive days. The observed traffic volume around the Aqaba area was between 2,000 and 6,000 vehicles for the two days. The traffic around Karak showed about 8,500 vehicles. This implies the traffic volume of the Southern Districts reaches approximately 20-30% of that of the Northern/Central Districts.

(c) Constraints

As the Port of Aqaba is the only seaport in Jordan, the link of inland to the Port is extremely important for the industrial development. Also, the Aqaba International Airport near the Aqaba City plays an important role in transporting tourists and commercial cargoes. Nevertheless, the existing access road infrastructure around the Aqaba area including seaport and airport seems insufficient to meet the future regional development and integration.

3) Rail transport

(a) Management

The railways sector in Jordan is operated by two organizations under the Ministry of Transport: the Hijaz Jordan Railway (HJR) and the Aqaba Railway Corporation (ARC).

- Hijaz Jordan Railway (HJR)

HJR was established between 1902-1905 to connect Damascus in Syria with Madina in Saudi Arabia via Jordan with approximately 450 km long railway. The whole section of the railway has been owned by HJR. The north section of Al Abyad up to Syrian border has been managed by HJR.

- Aqaba Railway Corporation (ARC)

ARC, which established in 1973 and began to operate in 1975, is an organization under the Ministry of Transport with administrative and financial autonomy. The section between Al Abyad mines and the Port of Aqaba is leased by ARC from HJR at present.

(b) Existing condition

Currently, the only above-mentioned railway runs in parallel with the Desert Highway from Amman to Ma'an. The railway extends to the Port of Aqaba from Ma'an via Batn El Ghul as a detour route due to stiff topography along the Desert Highway in the section of Ma'an-Aqaba as shown in Figure 3-3-3.

The rail transportation in the section between Amman and Damascus is somewhat inactive. HJR operates only one passenger train and two freight trains per week from Amman to Damascus.

The railway section of Al Abyad/Al Hasa mines-Aqaba Port is mainly for phosphate transport for export.

(c) Constraints

The railway facilities are generally insufficient and in poor condition throughout the nation except the section between Al Abyad/Al Hasa and the Aqaba Port. This is because renewal of tracks has not been made since their first installation. Moreover, the rolling stocks keep the operating speed slow due to the risk of derailment.

Both the Batn El Ghul-Saudi Arabia border and Amman-Al Abyad sections are abandoned or not in operation at present. In addition, as most rail tracks in Jordan are narrow gauge of 1,050 mm, it is difficult to link to the tracks of neighboring countries. In case of Syrian railway, some sections of track have been upgraded to a standard gauge of 1,435 mm, which does not meet with Jordanian track width.

For this reason, the gauge should be converted to the standard width to satisfy future regional demand in railway transport.

Currently, phosphate rocks are produced by JPMC at three mines: Al Abyad, Al Hasa and Eshidiya. However, the production reserves in Al Abyad and Al Hasa mines are limited and will possibly be exhausted around 2010. Based on the steady increase of phosphate production in past years, the phosphate production in the Eshidiya mine which opened in 1988 is projected to reach about 9 million tons in 2002. Since the main purpose of ARC's establishment is to convey phosphate to the Port of Aqaba, the railway should be developed to meet the future transportation demand of phosphate from the Eshidiya mine.

The railway is mainly operated and managed by the public sector. Public organization often results in ineffective maintenance and management. Management of ARC does not seem to be efficient, resulting in consecutive loss for many years. This loss is mainly due to the decrease of traffic movement and over-employment. In this regard, the Government of Jordan has encouraged the participation of private sectors in railway infrastructure by offering incentives such as amending the Investment Law and Regulations.

4) Air transport

(a) Management

Jordanian air transport is managed by the Civil Aviation Authority (CAA) under the Ministry of Transport. CAA was established in 1950 and is responsible for overall management, operation and maintenance of airport facilities.

(b) Existing condition

There are three airports in Jordan; the Queen Alia International Airport (QAIA), the Amman Civil Airport (ACA) and the Aqaba International Airport (AIA), as presented in Figure 3-3-3.

• Queen Alia International Airport (QAIA)

QAIA is the largest international airport in Jordan, located about 35 km south of Amman. QAIA started its operation in 1983 and the capacity of the airport was designed to accommodate 3 million passengers and 40,000 aircraft movements per year. Also, the airport has two parallel runways, 3,810 m long

and 60 m wide each. In 1994, the cargo traffic reached 72,077 tons and the passenger traffic was 1,669,000 persons.

- Amman Civil Airport (ACA)

ACA is located in the northeast of Amman. Since its establishment in 1950, ACA was the main international airport in Jordan until 1983. After opening of QAIA in 1983, ACA is used as the domestic airport, the emergency substitute purpose for QAIA, VIP Airport, as well as used by the Royal Air Force and the Royal Jordanian Aviation Academy. ACA has one runway of 3,286 m long and 50 m wide.

- Aqaba International Airport (AIA)

AIA is located 9 km north of Aqaba City near the Israeli border. The airport serves as a civilian international and domestic airport since its opening in 1972. The facilities of the airport include one north-south oriented runway of 3,000 m long and 45 m wide paved with asphalt concrete. The current capacity of the airport can accommodate approximately 150,000 passengers per year. In 1994, the cargo traffic reached 37,000 ton and the passenger traffic was 57,000 persons.

(c) Constraints

Since air traffic movement increases in the region, the improvement and expansion of the air transport facilities are considered as imperative one. Nevertheless, the current situation of the airports seems insufficient to meet the future traffic demand. For instance, AIA serves for both international and local purposes, however, the capacity of the existing facilities will not be able to serve as a main international airport in the future. This is mainly because Aqaba is strategically located as a regional hub in terms of industry, trading and tourism. In this regard, the airport facilities should be expanded to an international level.

5) Sea transport

(a) Management

The Aqaba Port Authority (APA) was established by the Royal Decree in 1952 and replaced by The Ports Corporation (TPC) in 1979. TPC is a government body with financial, managerial and administrative autonomy under the Ministry of

Transport. TPC is also responsible for the legal, administrative and operating procedures of the Port of Aqaba.

(b) Existing condition

The Port of Aqaba is the only port in Jordan, located at the north end of the Gulf of Aqaba as illustrated in Figure 3-3-3. Since its first operation started in 1939, the Aqaba Port has served as a trading route by offering a marine transport point in the Middle East Region, linking to the international markets in the East and the West.

The Aqaba Port has served for export, import and transshipment. In addition, it deals with general cargoes, containers, dry and liquid bulks, etc. The Port of Aqaba is composed of three ports by different land use such as Main Port, Container Port and Industrial Port. The facilities of the Aqaba Port include 18 wharves, warehouses, refrigerated stores, silos, a communication station, passenger and container terminals, a new oil jetty, and a fertilizer industrial terminal.

The traffic volume of the Aqaba Port consists of approximately 1.36 million passengers, 11.8 million tons of cargo and 2,382 ship calls in 1995, as shown in the table below. The figures of cargo traffic volume in 1995 are almost a half of the cargo volume in 1988 (20.1 million tons). This decrease is mainly due to the embargo on Iraq after the Gulf War.

Shipping Activities in the Aqaba Port (1985-1995)

Year				(Unit: Tons)
	Total Handling Goods (ton)	Exporting Goods (ton)	Importing Goods (ton)	No. of Vessels
1985	14,547,711	8,177,607	6,370,104	2,671
1986	16,850,628	9,697,388	7,153,240	2,677
1987	20,015,371	11,271,622	8,743,749	2,555
1988	20,096,138	10,952,973	9,143,165	2,583
1989	18,680,649	9,985,974	8,694,675	2,446
1990	15,036,456	8,871,857	6,164,599	2,222
1991	13,225,468	7,677,470	5,547,998	2,075
1992	13,383,501	7,361,798	6,021,703	2,433
1993	11,633,910	6,381,221	5,252,689	2,490
1994	10,562,280	6,648,377	3,923,903	2,486
1995	11,756,160	6,679,115	5,077,045	2,382

Source: The Ports Corporation (TPC)

Since nearly a half of the products through the Port of Aqaba is phosphate for export, the Aqaba Port should be recognized as an important industrial seaport.

The volume of transit goods to the neighboring countries through the Aqaba Port is given in the table below. Approximately 95% of the total transit goods were transported to Iraq during 1990-1992. However, this decreased to about 50% in 1994 mainly due to the economic sanction on Iraq. In 1995, the volume of transit goods has drastically increased due to a partial lift of embargo for medical goods for Iraq. On the other hand, the ratio of transit goods to Saudi Arabia increased to about 35% in 1994, from less than 10% until 1993.

Transit Goods through the Aqaba Port to the Neighboring Countries

(Unit: Tons)

Destination	1990	1991	1992	1993	1994	1995
Iraq	3,154,394	1,439,541	1,959,465	1,036,097	193,841	463,622
Saudi Arabia	42,564	48,538	77,695	117,183	136,473	77,934
Lebanon	1,269	3,917	4,512	2,440	6,100	3,113
Syria	1,014	287	1,535	2,232	1,239	516
Kuwait	14,785	13,732	2,9967	36,388	31,625	25,794
Yemen	1,161	203	3,441	2,225	455	41
Other countries	15,236	17,701	16,929	26,672	17,955	35,506
Total	3,230,423	1,523,919	2,093,544	1,223,237	387,688	606,526

Source: The Ports Corporation (TPC)

(c) Constraints

After the Gulf War, Iraq is laid under the embargo. Since the Port of Aqaba was the major transport point to Iraq, the sanction resulted in the decrease of cargo traffic of the Aqaba Port.

Although the political situation is uncertain in the region, the traffic cargo is expected to increase tremendously to rebuild Iraqi economy on the assumption that economic sanction on Iraq is completely lifted. In addition, the Peace Agreement between Jordan and Israel will promote economic and trade activities along with tourism industry by anticipating new investment opportunities. Based on these two political factors in this region, it seems that the present port facilities are insufficient to accommodate future demand of cargo traffic as well as tourists.

(2) Water supply

Annual water supply by Water Authority of Jordan (WAJ) for each governorate of Jordan is shown in Table 3-3-16. In the Southern Districts, water for domestic and industrial purpose is supplied by WAJ as shown in Table 3-3-17. Main wellfield locations are shown in Figure 3-1-4.

1) Karak

(a) Current water supply

The total amount of water supplied to Karak Governorate in 1994 was 7.227 million m³. Of which, only about a half, 3.623 million m³, was recorded as being sold. The water consumption per capita was 117 litres/day. During the summer season of 1995, water was available to consumers only three days a week.

(b) Water Sources

Water production from water sources operated by WAJ during the year 1994 is shown in Table 3-3-18. The wellfields at Sultani and Ghuweir, and springs at Ain Sara are the main water sources of Karak Governorate. Springs at Yarout and Shehabia provide additional sources, but only to local villages. The wellfields at Mazra'a and Safi are the sources for the Dead Sea Rift Valley area. Boreholes in the Sultani wellfield delivered 3.347 million m³/year in 1994. At Ghuweir there are two operating boreholes that deliver 0.249 and 0.463 million m³/year. Boreholes in the Qatrana wellfield provide water for irrigation and local domestic use.

(c) Conveyance system

The flows from the Ghuweir and the Sultani wellfields join at the Ghuweir pumping station. From this station, two mains supply Karak Governorate. One main runs north to supply the northern villages, and the other runs south to the Mu'tah pumping station. The Mu'tah pumping station supplies the water system in the south of Karak Governorate. The pumping station at the Ain Sara springs provides domestic water to Karak. The details of the system are shown in Figure 3-3-4.

2) Tafila

(a) Current water supply

The total amount of water supplied to Tafila Governorate in 1994 was 2.174 million m³. Of which, an amount of 1.297 million m³ was recorded as being sold. The water consumption per capita was 97 litres/day. During the summer season of 1995, water distribution was scheduled and water was available only four days a week.

(b) Water sources

Water production at each water source operated by WAJ in 1994 is shown in Table 3-3-19. The wellfield at Shubaq (Nijil wellfield), located in Ma'an Governorate, the spring at Harir, located 10 km southeast of Tafila, and Abour wellfield are the main water sources of Tafila Governorate. Al Hasa Phosphate Mines and Jordan Cement Factory in Rashadiya have their own wells and distribution systems. A borehole located 3 km west of Hasa town provides domestic water to the town.

(c) Conveyance system

Two conveyance systems supply water to Tafila Governorate. In the Shubaq system water is pumped to the Al Qadeseya reservoir. The villages adjacent to King's Highway, the villages west of Tafila and the town of Tafila are supplied with water from this reservoir. The other system is the Harir and Abour system, and the pumping stations at Harir and Abour supply water to the villages east of Tafila and to the town of Tafila. There are two minor conveyance systems in Tafila Governorate. One is located at Al Hasa and the other at Jurf D'araweesh. The details of the systems are shown in Figure 3-3-5.

3) Ma'an

(a) Current water supply

The total water volume supplied to Ma'an and Aqaba Governorates was 19.779 million m³ in 1994. Of which, the estimated supply volume for Ma'an Governorate was 6.5 million m³. The water volume sold in the two Governorates was 8.948 million m³ and the water consumption per capita was 208 litres/day in 1994. During the summer months of 1995, water was available for consumers only five days a week as a result of forced water cuts during the peak season.

(b) Water sources

Water production at each water source operated by WAJ in 1994 is shown in Table 3-3-20. The wellfields at Tahuna, Qa'a, Shubaq (Nijil), Mreigha and Fajij are the main water sources for Ma'an Governorate. The Shubaq wellfield is also the water source for Tafila Governorate. Ma'an town has only one wellfield at Tahona which is located approximately 10 km west of the town.

(c) Conveyance systems

There are four main water conveyance systems in Ma'an Governorate: the Shubaq system, the Qa'a system, the Mureigha system, and the Tahona-Ma'an system. The wellfield at Tahona is the water source for the conveyance system to Ma'an. The flow from Tahona gravitates through a 12-inch steel pipeline to Ma'an. There is an out-of-operation glass factory in Ma'an: the factory used to be supplied with water from the existing Tahona-Ma'an municipal supply system. The plant operated for 365 days per year and used 200 m³/day. The details of the systems are shown in Figure 3-3-6.

4) Aqaba

(a) Current water supply

The total water supply to Aqaba Governorate was 14.8 million m³ in 1994. Of which, 4 million m³ were used for the industrial purpose. The fertilizer factory consumers almost 4 million m³/year of this water. The resulting water consumption per capita was more than 400 litres/day. During the summer season of 1995, water rationing was applied in Aqaba Governorate for the first time, with water being available for consumers only five days a week.

(b) Water sources

The water production at each water source operated by WAJ in 1994 is shown in Table 3-3-21. The main water supply sources for Aqaba are wellfields in Qa'a Disi, Abu Dba'a and Wadi Yutum. Water supply from Disi Sandstone Aquifer to Aqaba was 12 million m³/year in 1994, while 2 million m³/year came from a shallow aquifer of Wadi Yutum to Aqaba. Disi wellfield is located 55 km east of Aqaba, and Yutum wellfield is located 10 km north east of Aqaba.

(b) Conveyance systems

A water conveyance gravity pipeline of 20 - 32-inch diameter and 65 km long with a capacity of 17.5 million m³/year is laid from the Disi wellfield to Aqaba. The pipeline supplies three reservoirs in Aqaba and another at the fertilizer factory located 15 km south of Aqaba. The flows from the wells at Yutum are pumped to a collection reservoir at Wadi Yutum from which a 12-inch gravity pipeline supplies a reservoir in Aqaba. The Quweira conveyance system is small and supplies only local villages. The details of the systems are shown in Figure 3-3-7.

5) Amman

Water sources and their productions for Amman municipal water supply are shown in Table 3-3-22.

(3) Electricity

The national grid in Jordan which is principally composed of 132 kV circuits, is laid along the north - south axis of the country, essentially in a radial system with a ring around the major load center of Amman as illustrated in Figure 3-3-8. In addition, a 400 kV transmission line from Aqaba Thermal Power Station to Amman-South Substation is currently operated at 132 kV and scheduled to be operated at 400 kV in 1997.

In 1995, a total of 5,616 GWh of electricity was generated, of which 5,201 GWh (92.6 %) was generated by the Jordan Electricity Authority (JEA) and the balance was generated by the private industries and others. The Hussein Thermal Power Station (HTPS), with a total installed capacity of 395 MW, generated 2,184 GWh in 1995, which accounts for 38.9 % of the total national capacity. In addition, the Aqaba Thermal Power Station (ATPS), with a total installed capacity of 263 MW, generated 1,886 GWh in 1995, which accounts for 33.6 % of the total national capacity. In 1992, 67 GWh of energy was exported. Also, 46 GWh of energy was exported to Syria in 1993. The single line diagram of JEA HV grid is illustrated in Figure 3-3-9.

In 1995, the system peak load was 894 MW, while the available capacity was 1,096 MW. The expansion plan of ATPS aims to construct three additional thermal generating units (by burning heavy fuel oil) of 130 MW each. By completion of the first step (two units) in 1997 and the second step (one unit) in 1998, the total installed capacity of ATPS will reach 650 MW. The electricity losses in the interconnected system network were 14.9 % in 1995.

The standard electricity tariff is 28 Fils/kWh for the first block from 1 kWh/month up to 160 kWh/month, 52 Fils/month for the second block from 161 kWh/month up to 300 kWh/month, 55 Fils/month for the third block from 301 kWh/month up to 500 kWh/month, and 70 Fils/month for over 500 kWh/month. The commercial consumer's tariff is 50 Fils/kWh, while the small industrial consumer's tariff is 30 Fils/kWh. The medium industrial consumer's tariff is 25 Fils/kWh for day energy and 20 Fils/kWh for night energy, while it is 3.05 JD/kW/month for peak load.

In the Southern Districts, electricity is supplied by 132 kV transmission lines, and 33 kV and 11 kV distribution lines which are connected to the national grid at the main

substations. The existing main substations in the Southern Districts are summarized in the table below.

Existing Substation in the Southern Districts

Governorate	Substation Name	Capacity of Main Transformer	Number of Feeder for Distribution
Karak	Qatrana	2x10 MVA (132/33kV)	2x33 kV
	Karak	2x16 MVA (132/33kV)	3x33 kV
		2x10 MVA (33/11kV)	6x11 kV
	Ghor Safi	3x40 MVA (132/33kV)	2x33 kV
Tafila	Al-Hasa	2x25 MVA (132/33kV)	7x33 kV
	Rashadya	2x40 MVA (132/33kV)	6x33 kV
Ma'an	Ma'an	2x16 MVA (132/33kV)	2x33 kV
		2x10 MVA (33/11kV)	4x11 kV
	Sheidiya	2x40 MVA (132/33kV)	8x33 kV
	Quweira	2x16 MVA (132/33kV)	4x33 kV
Aqaba	Aqaba Town A1	2x10 MVA (33/11kV)	5x33 kV, 8x11 kV
	Aqaba Town A2	2x40 MVA (132/33kV)	3x33 kV, 9x11 kV

(Source: Power System and Control Technology by JEA)

In addition, there are power plants in Karak Governorate (Karak Power Station: 1x18 MW Gas turbine + 3x1.5 MW Diesel generator) and Aqaba Governorate (ATPS: 2x130 MW and Aqaba Central Power Station: 2x3.5 MW + 3x5 MW).

The number of consumers in the Southern Districts was 67,065 in 1995, while it was 63,313 in 1994, recording an annual growth of 5.7 % as shown in the table below:

Number of Consumers in the Southern Districts

	(Thousands)						
	1990	1991	1992	1993	1994	1995	Growth 1995/1994 %
Karak & Tafila	31.1	32.3	33.9	35.3	37.9	39.9	5.3
Ma'an & Shoubak	10.0	10.5	10.9	11.5	12.1	12.8	5.8
Aqaba	11.1	11.4	12.0	12.7	13.4	14.3	6.7
Total	52.2	54.2	56.8	59.5	63.4	67.0	5.7
National Total	519.9	541.8	568.2	601.2	637.3	674.4	5.8

(Source: JEA Annual Report 1995)

The electricity consumption in the Southern Districts was 313.4 GWh in 1995, which accounts for 6.6 % of the national consumption (4777.9 GWh). The numbers of consumers classified by type of consumption and by sector in 1995 are shown in the tables below. In addition, electrical energy consumption areas supplied by the JEA are indicated below.

Number of Consumers by Type of Consumption in 1995

	Domestic	Industrial	Commercial	Water Pumping	Governmental	Others	Total
Karak	25,548	287	2,606	87	648	337	29,513
Tafila	8,747	63	1,040	26	394	133	10,403
Ma'an & Shoubak	10,378	262	1,383	94	541	174	12,832
Aqaba	11,215	165	2,497	19	349	72	14,317
Total	55,888	777	7,526	226	1,932	716	67,065
National Total	553,487	10,561	94,191	1,971	6,142	8,132	674,484

(Source: JEA Annual Report 1995)

Electrical Consumption by Sector in 1995

	Domestic	Industrial	Commercial	Water Pumping	Governmental	Others	Total (GWh)
- JEA	157.8	39.0	40.9	145.2	19.8	11.9	414.6
- EPCO	1,017.1	519.5	396.7	287.1	67.5	93.9	2,381.8
- IDECO	245.0	44.0	46.2	175.8	31.9	32.9	575.8
- Industrial companies	-	1,074.8	-	-	-	-	1,074.8
- Other companies	1.5	-	40.5	276.8	-	12.1	330.9
Total	1,421.4	1,677.3	524.3	884.9	119.2	150.8	4,777.9

(Source: JEA Annual Report 1995)

Electrical Energy Consumption in the JEA's supply area for 1995

Area	Consumption (GWh)	Consumption / National Total (%)
Karak	107.1	2.2
Tafila	18.5	0.4
Ma'an & Shoubak	52.1	1.1
Aqaba	135.7	2.8
Study area total	313.4	6.6
Other JEA's supply area	101.2	2.1
JEA's supply area total	414.6	8.7
National Total	4,777.9	-

(Source: JEA Annual Report 1995)

The number of population supplied with electricity at the end of 1995 amounted to 4,254,000, which accounts for 99.2 % of the total population in Jordan. By the end of the year 1995, the total number of electrified village was 883, inhabited by 1,459,000 persons that accounts for 98.1 % of the total rural population as given in the table below.

Rural Electrification in Jordan as end of 1995

Area	Total Village		Electrified Villages		% of Villages with Electricity	% of Village Population with Electricity
	Villages	Population (thousand)	Villages	Population (thousand)		
Amman & Balqa	333	475	274	462	82.3	97.3
Irbid & Mafraq	345	679	334	678	96.8	99.9
Jordan Valley	66	132	66	131	100.0	99.2
Karak	118	141	106	134	89.8	95.0
Tafila	38	34	38	33	100.0	97.1
Ma'an, Aqaba & Shoubak	92	80	65	73	70.7	91.3
Total	992	1,541	883	1,459	89.0	98.1

(Source: IEA Annual Report 1995)

(4) Telecommunication

Telecommunication services in Jordan are provided by the Telecommunications Corporation (TCC) and private sectors licensed by TCC. TCC has the responsibility to provide domestic telephone service, international telephone service and related services.

The Jordan Mobile Telephone Services (JMTS), which is one of the private sectors, provided a digital cellular telephone network in Amman, Madaba, Salt, Zarqa and Aqaba.

The national telecommunication network mainly depends on microwave radio system. The total capacity of telecommunication network, which includes 22 primary exchanges, 48 remote line switches and 145 manual exchanges, was 348,648 lines in 1995. The number of subscribers was more than 316,000 nationwide, and the telephone density was 77 sets per 1,000 people, as of the end of 1995. The total number of waiting applicants for telephone services was approximately 120,000 as of the end of 1995.

In the Southern Districts, three digital exchanges are located at Karak, Ma'an and Aqaba, and one analog exchange at Karak as shown in Table below. In addition, there are two manual exchanges in Tafila. The capacity of exchanges, including remote line units, was 31,054 lines, and the number of subscribers in the study area was 27,058 as of the end of 1995. Also, the telephone density was 69.4 sets per 1,000 people at the end of 1995. The number of waiting applicants for telephone services in the study area was 4,071 at the end of 1995.

Telephone Services in the Southern Districts at the end of 1995

Exchange	Type	Capacity	Subscriber	Population	Telephone Density (set per 1,000 population)	No. of Manual Exchanges	No. of Waiting Applicants
1. Karak Gov.							
1) Karak 1	Analog	2,000	1,937				
2) Karak 2	Digital	15,474	13,867				
Sub Total		17,474	15,804	169,552	93.210	0	2,691
2. Aqaba Gov.							
1) Aqaba	Digital	8,140	7,341	79,745	92.056		220
3. Ma'an Gov.							
1) Ma'an	Digital	5,440	3,913	79,401	49.281		929
4. Tafila Gov.				61,156		2	231
Total		31,054	27,058	389,854	69.405	2	4,071
National Total		348,648	316,271	4,095,579	77.223	145	119,971

(Source: TCC)

Table 3-1-1 Surface Water in Each Wadi Basin

Catchment	Catchment Area (km ²)	Precipitation (mm/year)	Evaporation (mm/year)	Base Flow (MCM/yr)	Flood Flow (MCM/yr)	Spring Flow (MCM/yr)	Total Flow (MCM/yr)
Dead Sea Wadis		—	—	120-141	50-62		184-191
Wadi Mujib(& Wala)	6596	100 ~ 350	2450 ~ 3500	40.0-38.1	42.0-45.5	16.0	82.0-83.6
Wadi Hasa	2520	50 ~ 300	2800 ~ 3900	32.0-27.4	2.0-9.4	3.9	34.0-36.4
Wadi El-Karak	190	100 ~ 350	2600 ~ 3100	15.0 54.0	0-3.0	57.6	15-18 61.2
Wadi Zerka Ma'in	272	100 ~ 350	2400 ~ 2900	20.0 54.0	3.0 7.2	57.6	23.0 61.2
Other maior Wadis	972			30.0 54.0	-	57.6	30.0 61.2
Wadi Araba				7.1-21.6	3.5-9.4		10.6-31.0
Northern Wadi Araba	2938	100 ~ 300	2800 ~ 3500	9.0 7.1	2.6 3.5	15.6	26*a 18.2
Southern Wadi Araba	1278	50 ~ 150	3300 ~ 4100	0.0 -21.6	3.2 -9.4	2.4	1*b 5.6
Wadi Yutum	4440	50 ~ 150	3400 ~ 3800	0.0	1.5		1.5
Jafr Basin Catchment	12200	30 ~ 200	3300 ~ 4000	5.0-0.0	10.0	1.9	15.0-11.3

Source : World Bank (1988), USAID (1991), Belbeisi (1992), Friedrich Ebert Stiftung (1993) and Howard Humphreys (1994)

*a : 26 mainly base flows from the eastern wadis

*b : 1 from the eastern wadis

MCM: million cubic meter

Table 3-1-2 Available Surface Water Resources in the Southern Jordan

Wadi Basin	Name of Dam	Storage Capacity (MCM/year)	Dam Yield (MCM/year)	Status	Purpose	Method	Base Flow Water Quality TDS(mg/l)
Wala	Wala	9.3	6.0	Proposed	Recharge	Recharge	500-1000
	(2nd stage)	28.95	17.0	Proposed	Recharge & Irrig.	Recharge	
Wala	Hammam	2.25	0.8	Proposed	Recharge & Irrig.	Recharge	No Base Flow
Mujib	Qatrana	4.2	3.2	Exist	Recharge	Recharge	No Base Flow
		(6.0)	(4.0)	(Raising up)			
Mujib	Sultani	1.2	0 (siltated)	Exist	Recharge	Recharge	No Base Flow
Mujib	Siwaqa	1.65	0.6	Exist	Recharge	Recharge	No Base Flow
Mujib	Khabra	9.18	2.7	Proposed	Municipal & Irrig.	Storage	-
Mujib	Nukheila	31.2	13.2	Proposed	Municipal & Irrig.	Storage	-
Mujib	Mujib	35	8	Proposed	Irrigation	Storage	1716
Hasa	Tannour	12.15	4	Proposed	Irrigation	Storage	650
Jafr	A1	3.7	5.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	A2	6.0	5.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	A3	8.5	5.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	B1	2.4	3.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	B2	4.2	3.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	B3	2.0	3.2	Proposed	Recharge	Recharge	No Base Flow
Jafr	Jurdana			Proposed	Recharge & Local	Recharge	No Base Flow

MCM: million cubic meter

TDS: Total Dissolved Solids

Table 3-1-3 Simplified Hydrogeological Units

Hydraulic Complex	Group	Formation	Symbol	Lithology	Saturated Thickness (m)	Hydrogeological Classification	Aquifer Potential
Shallow Aquifer Complex	Jordan Valley	Alluvials	Qa	Soil/sand/gravel		Aquifer	Good-Excel
		Jafer-Azraq Lisan		Conglom./sand/marl/silt/clay	100-400	Aquitard/Aquiclude	Fair-Poor
		Sirhan-Dana/Smra		Conglom./grav./marl/silt/sand		Aquitard	Fair
Upper Cretaceous Aquifer Complex	Belqa	Volcanics	Ba	Basaltic lava and tuff	5-100	Aquifer	Good
		W.Shallald	B5	Chalky & marly limestone		Aquitard	Poor
		Rijam	B4	Limestone/Chert	15-40	Aquifer	Good
	Amman-W.Sir	Muwagga	B3	Marl/marly chalk/chalk/chert	50-400	Aquiclude	Poor
			A7-B2	Limest./chert/dolom.limest.	50-350	Aquifer	Excellent
		Shueib	A5-A6	Limestone/marly limestone		Aquitard/Aquiclude	Fair-Poor
	Ajlun	Hummar	A4	Dolom./dolomitic limest./marl	40-45 120	Aquifer	Good-Fair
		Fuheis	A3	Marl/marly limest./sandstone		Aquitard	Poor
		Naur	A1-2	Limest./dolom&marly limest.	120	Aquifer(S.Jordan)	Good
	Kurnub		K2	Fine sandstone/shale/limest.	50-300	Aquifer	Poor
			K1	Sandstone/dolom./sandy limest.			Good-Fair
Deep Sandstone Aquifer Complex	Zarqa		Z2	Limestone/dolomite/sandstone	50-500	Aquifer	Good
			Z1	Shale/evapor./marl/sandst./lim.			Poor
	Khreim		Kh	Shale/siltstone/sandstone	200-1500	Aquitard/Aquiclude	Poor
	Rum (Dist)		D	Sandst./dolom./quartzite/cong.	400-3000	Aquifer	Excellent
	Saramuj		S	Epimetamorphic conglomerate		Aquifer	Poor
	Basement complex		Be	Granite/Plutonic rocks		Aquifuge	Nil

Table 3-1-4 Groundwater Potential and Use in 1993

Unit: MCM(million m3)										
Basin	Aquifer	Safe Yield	Produced by Government		Produced by Private Sector			Overdraw	Unused Water	TDS (mg/l)
			Domes. Use	Agri. Use	Domes. Use	Agri. Use	Indus. Use			
Renewable groundwater resources										
Dead Sea	B2/A7.A4.A2	57.0-60.0	29.6	2.5	45.3	16.1	93.6	33.6		400-1300
Northern Wadi Araba	Qa.B2/A7.K.D	3.5-7.0	1.6	0.2	2.6		4.4		2.6	500-700.1600
Southern Wadi Araba	Qa.D	5.5	0.1	0.2	0.8		1.1		4.4	650-700
Jafr	B4.B2/A7	9.0	7.5	4.7	8.2	18.0	38.4	29.4		540-700.>1000
Southern Desert(Disi)	D.Kh	0.0								
Azrak	Ba.B5/B4.B2/A7.BA.K	24.0	24.8		0.6	25.0	0.2	50.6		250-620.1000-20000
Sirhan	B5/B4.AB.(K)	5.0						0.0	5.0	
Yarmouk	B4.B2/A7.A2	40.0	21.2		0.2	40.5	0.0	61.9		400-1000
Side Wadis	A.K	15.0	4.6		1.2		5.8		9.2	300-450
Jordan Valley	Qa	21.0	1.2		36.8		38.0	17.0		3000
Amman-Zarqa	Ba.B2/A7.A4.A2.K	87.5	62.9	2.6	2.2	115.0	7.5	190.2		400-1000.2000-3500
Hammad	B4	8.0	0.4		0.7		1.2		6.8	800-1500.1300-3000
Nonrenewable groundwater resources										
Jafr	B2/A7.(K.D)	18.0*1								
Southern Desert(Disi)	D	125.0*2	8.8	0.1	56.2	2.5	67.5		57.5	200-300

*1 : Stored groundwater is about 16,000MCM, of which 18MCM/year are exploitable

*2 : On 50 years (depending on the time horizon of exploitation)

Source: The Water Conveyance System from Disi-Mudawara to Amman, WAJ,(1996) and author's modification

Table 3-1-5 Summary of Annual Abstraction in Jordan and Saudi Arabia

Years	Jordan	Saudi Arabia	(MCM/year)
			Both
1982	6.91	-	-
1983	10.23	18.57	28.80
1984	11.48	68.59	80.08
1985	13.62	171.19	184.81
1986	14.70	229.08	243.77
1987	38.06	286.96	325.02
1988	47.93	359.24	407.18
1989	63.12	420.78	483.90
1990	69.03	478.45	547.49
1991	68.91	536.12	605.03
1992	70.90	593.79	664.69
1993	75.15	651.47	726.62

Source: UK ODA (1994)

Table 3-1-6 Major Mineral Resources in the Southern Districts of Jordan (1/3)

Mineral Resources	Deposit or Mine Name	Location		Reserves	Quality	Mining Activity/ Annual Production Company name	Survey stage	Geological features
		Governorate	Distance from Major city					
Phosphate	(1) Al Abiad	Karak	About 225 km north to Aqaba	0.1 billion ton	TCP 47% upgraded to 72%	1,431,000 ton (94) JPMC	Exploitation of proven reserve	Upper Cretaceous Thickness 2-5.5 m
	(2) Al Hassa	Tafila	About 200 km north to Aqaba	0.1 billion ton	-	1,685,000 ton (94) JPMC	Nearly Limited	Upper Cretaceous
	(3) Eshidya	Ma'an	About 120 km north - east to Aqaba	1.5 billion ton	TCP Av. 50% upgraded 70%	972,000 ton (94) JPMC	Exploration and Exploitation	Upper Cretaceous Total Thickness (for three beds)
Oil Shale	(4) El Lajjun	Karak	20km east of Karak	1.2 billion ton	Av. 10.5 (%)	(not used)	Boring Number 135 Boring Density 6.75 (km ³)	Geologic Age: Cretaceous Av. thickness (m): 31 Av. O/B thickness (m): 29
	(5) Sultani	Karak	20km South of Qantra	0.9 billion ton	Av. 9.7 (%)	(not used)	57 0.76	Geologic Age: Cretaceous Av. thickness (m): 32 Av. O/B thickness (m): 69
	(6) Jurf -ed-Darawish	Tafila	32km east of Tarifa	8.6 billion ton	Av. 5.7 (%)	(not used)	50 0.33	Geologic Age: Cretaceous Av. thickness (m): 68 Av. O/B thickness (m): 50
	(7) Wadi Mughar	Karak Ma'an	35km South East of Qatrana	31 billion ton	Av. 6.8 (%)	(not used)	20 0.69	Geologic Age: Cretaceous Av. thickness (m): 40 Av. O/B thickness (m): 7
	(8) Rashadya L-2 area	Tafila	5.5km from Rashadya Plant	53.3 million ton	>90% Suitable for Cement	2,185,891 ton (94) JCFC	Proven. Re-estimation by NRA	Thickness :110
	(9) Rashadya A-2 area	Tafila	4.5km from Rashadya plant	9.96 million ton	Cement Suitable for cement	625,000 ton (94) JCFC	Proven. Re-estimation by NRA	
	(10) Rashadya A-4 area	Tafila	12km from Rashadya Plant	20.2 million ton	Suitable for cement	25,000 ton (94) JCFC	Proven. Re-estimation by NRA	
Limestone (for cement)	(8) Rashadya L-2 area	Tafila	5.5km from Rashadya Plant	53.3 million ton	>90% Suitable for Cement	2,185,891 ton (94) JCFC	Proven. Re-estimation by NRA	Thickness :110
Shale (for cement)	(9) Rashadya A-2 area	Tafila	4.5km from Rashadya plant	9.96 million ton	Cement Suitable for cement	625,000 ton (94) JCFC	Proven. Re-estimation by NRA	
	(10) Rashadya A-4 area	Tafila	12km from Rashadya Plant	20.2 million ton	Suitable for cement	25,000 ton (94) JCFC	Proven. Re-estimation by NRA	
Gypsum	(11) Imah	Tafila	North to Imah village	Estimated 1,400,000 ton proven 712,000	Suitable for cement	JCFC	Finished	
	(12) Rout 35	Tafila	Along the route 35	Estimated 165,000 ton Proven 162,000	Suitable for cement	Small private companies	Finished	Small Outcrops Occurs. (Av. thickness 2-3m)
	(13) Karak	Karak	About 15km north west to Karak	Estimated 562,000 ton Proven 561,000 ton	Suitable for cement	Private company	Under Survey	Small out crop (Thickness 2m)
Granite	(14) Al Quwayra	Aqaba	About 3km west to Al Quwayra	4,500 m3 (One out-crop)	Suitable for Ornament Stone	(not used)	Estimated by NRA	Pre-cambrian granitic
	(15) Qa Umm Sahib	Aqaba	About 47km north east to Aqaba	Not determined	Suitable for Ornament	(not used)	Under Survey	Pre-cambrian granitic
	(16) Wadi Sabil	Aqaba	About 3.5km Sout east to Aqaba	22,500 m3 (out crop)	Suitable for Ornament Stone	(Not used)	Under survey	Pre-cambrian granile
	(17) Wadi Al Shihah	Aqaba	About 7km north east to Alquwayra	Not determined	Gravel for building materials	200,000 m3 3 private companies	Under survey	Along the wadi
	(18) Aqaba	Aqaba	About 7km north east to Aqaba	Not determined	Gravel for building materials	82,500 m3 2 private companies	-	Along the wadi
	(19) Coast Road	Aqaba	Along the route 65	Not determined	Gravel for building materials	67,500 m3 3 private companies	-	Along the wadi
	(20) Wadi Alutom	Aqaba	About 34km north east to Aqaba	Not determined	Gravel for building materials	3,250 m3 3 private companies	-	Along the wadi

Note)*Numbers shown in this column correspond to numbers in Figure 3-1-6.
Source: Mineral Exploration Division of NRA

Table 3-1-7 Major Mineral Resources in the Southern Districts of Jordan (2/3)

Mineral Resources	Deposit or Mine Name	Location		Reserves	Quality	Mining Activity/ Annual Production Company name	Survey stage	Geological features
		Governorate	Distance from Major city					
Silica Sand	(21) Ras Al Naqab	Aqaba	About 64 km north east to Aqaba	7-8 billion ton	For glass industry	(not used)	Estimation (Under survey)	Lower Ordovician Disi Sandstone
	(22) Qa'Dici	Aqaba	About 56 km north east to Aqaba	Not determined	For glass industry	(not used)	Not surveyed	Lower Ordovician Disi Sandstone
	(23) Wadi EsSiq	Aqaba	About 60 km north east to Aqaba	(3-5 million ton)	For glass industry	(not used)	Under Survey	Lower Ordovician Disi Sandstone
	(24) Aqaba	Aqaba	About 5 km east to Aqaba	Geological 1 million ton	For glass industry	(not used)	Estimated Under Survey	Lower Cretaceous Kurnub sandstone
	(25) Dabet Hanout	Aqaba	Northern part of Ras Al Naqab	-	For industrial users	157,500 m ³ 3 private companies	-	Out crop (Quarry in '21)
	(6) Jurf -ed-Darawish	Aqaba	Southern part of Ras Al Naqab	-	For industrial users	15,000 m ³ private companies	-	Out crop (Quarry in '22)
Natural Sand	(27) Snfiha	Tafila	About 3 km east to Imah village	-	For aggregate	50,000 m ³ private companies	-	Lower Cretaceous Kurnub sandstone formation Coloured and White sand
	(28) Zahika	Tafila	About 4 km west to Al Barbayfa	-	For aggregate	37,500 m ³ private companies	-	Lower Cretaceous Kurnub sandstone formation Coloured and White sand
	(29) Bssase	Tafila	Bsarea city	-	For aggregate	37,500 m ³ private companies	-	Lower Cretaceous Kurnub sandstone formation Coloured and White sand
	(30) Arssase	Karak	About 13 km north west to Karak	Not determined	For aggregate	275,000 m ³ 6 private companies	-	Low grade limestone
Line stone (for building users)	(31) Al Eaneh	Karak	North east side of Karak	Not determined	For aggregate	247,500 m ³ 4 private companies	-	Low grade limestone
	(32) Rakeen	Karak	North east side of Karak	Not determined	For aggregate	106,250 m ³ 2 private companies	-	Low grade limestone
	(33) Snfiha	Karak	About 3 km north east to Imah	Not determined	For aggregate	135,000 m ³ 3 private companies	-	Low grade limestone
	(34) Imah	Karak	Imah village	Not determined	For aggregate	75,000 m ³ private companies	-	Low grade limestone
	(35) Brneas	Tafila	Near Tafila city	Not determined	For aggregate	87,500 m ³ private companies	-	Low grade limestone
	(36) Brneas	Ma'an	About 11 km north east to Ma'an	Not determined	For aggregate	75,000 m ³ private companies	-	Low grade linest Thickness 60-80cm Band
	(37) Brneas	Ma'an	About 11 km north east to Ma'an	Not determined	For aggregate	75,000 m ³ private companies	-	Low grade limestone
	(38) Brneas	Ma'an	About 11 km north east to Ma'an	Not determined	For building stone	675,000 m ³ 11 private companies	-	Low grade linest Thickness 60-80cm Band
	(39) Brneas	Ma'an	About 11 km north east to Ma'an	Not determined	For building stone	240,000 m ³ 4 private companies	-	Low grade linest Thickness 60-80cm Band
	(40) Brneas	Ma'an	About 6 km west to Ma'an	Not determined	For building stone	50,000 m ³ private companies	-	Low grade limestone
	(41) Brneas	Ma'an	About 6 km west to Ma'an	Not determined	For building stone	10,000 m ³ private companies	-	Low grade limestone
	(42) Brneas	Karak	About 4 km south to Al Hashimiyya	Not determined	For building stone	18,750 m ³ private companies	-	Low grade limestone
	(43) Al manseah	Karak	About 10 km north west to Karak	Not determined	For Sand (Concrete)	125,000 m ³ 2 private companies	Not estimated	Wadi al Karak
	(44) Wadhi Ebin Hamad	Karak	About 21 km north west to Karak	Not determined	For aggregate	(Not used)	Not estimated	Wadi Ebin Hamad
Pure limestone	(45) Qatrana	Karak	About 14 km south to Al Qatrana	54.3% (Cao) 28 million ton 52% (Cao) 123 million ton	For chemical uses	(Not used)	Finished	Upper Cretaceous Bashiyia Coquina formation
	(46) Al Hassa	Tafila	About 5 km west to Al Hassa	Not determined	For chemical uses	(Not used)	Under survey	Low grade (beneficiation needed)
Toripoli	(47) El-Adnanieh	Karak	About 2 km north to Mu'ta	1.3 million ton	For chemical uses	(Not used)	Finished	Low grade (beneficiation needed)
Kaoline	(48) Batn Al Ghul	Ma'an	About 70 km south east to Ma'an	4.5 million ton	For lowgrade ceramic	(Not used)	Finished	High Al 2O ₃ (12%) High Fe 2O ₃ (8%)
	(49) Mudawwara	Ma'an	About 14 km south east to Al Mudawwara	9.7 billion ton	For lowgrade ceramic	(Not used)	Finished	Granite
Feldspar	(50) Al Aqaba	Aqaba	About 6 km east to Aqaba	Not determined	For ceramic and glass factory	(Not used)	Under survey	Grade 1.37%

Note)*Numbers shown in this column correspond to numbers in Figure 3-1-6.

Source: Mineral Exploration Division of NRA

Table 3-1-8 Major Mineral Resources in the Southern Districts of Jordan (3/3)

Mineral Resources	Deposit or Mine Name	Location		Reserves	Quality	Mining Activity/ Annual Production Company name	Survey stage	Geological features
		Governorate	Distance from Major city					
Copper	(51) Finan Area	Tafila	Qrayqira city	Estimated 55 million ton Proven 19 million ton	For copper mine	(Not used)	Detailed survey and pre F/S.	Grade 1.37%
Potash	(52) Dead Sea	Karak	Safi	1.7 billion ton	1.2% of Dead Sea Water	(KCL) 1,550,000 ton APC.	Estimated by APC	Contained in Dead Sea Water
Magnesium Chloride	(53) Dead Sea	Karak	(Safi)	22.8 billion ton	14.5% of Dead Sea Water	Planning to make MgO APC.	Estimated by APC	Contained in Dead Sea Water
Salt	(54) Dead Sea	Karak	Safi	11.6 billion ton	7.5% of Dead Sea Water	Constructing Factory to make NaCl APC	Estimated by APC	Contained in Dead Sea Water
Magnesium Bromide	(55) Dead Sea	Karak	(Safi)	0.9 billion ton	0.5% of Dead Sea Water	J/V with Israel to make Br ₂ APC	Estimated by APC	Contained in Dead Sea Water

Note)*Numbers shown in this column correspond to numbers in Figure 3-1-6.

Source: Mineral Exploration Division of NRA

Table 3-1-9 Major Mineral Resources Production in 1994
in the Southern Districts by Governorates

Mineral Resources	Use	Unit	Karak	Tafila	Ma'an	Aqaba	Total
Phosphate	Fertilizer	1,000 ton	1,431	1,685	972	-	4,088
Limestone*	Cement	1,000 ton	-	2,186	-	-	2,186
Shale*	Cement	1,000 ton	-	625	-	-	625
Clay*	Cement	1,000 ton	-	205	-	-	205
Gypsum*	Cement	1,000 ton	N.A	N.A.	-	-	**
Granite	Building Materials	1,000 m ³	-	-	-	350	350
Granite	Ornament Stone	1,000 m ³	-	-	-	3	3
Glass sand	Industrial Uses	1,000 m ³	-	-	-	173	173
Natural sand	Aggregate	1,000 m ³	-	125	-	-	125
Limestone	Aggregate	1,000 m ³	629	298	150	-	1,077
(low grade)	Building Stone	1,000 m ³	-	-	1,038	-	1,038
Wadi Sediment	Sand (Concrete)	1,000 m ³	19	-	-	-	19
Wadi Sediment	Aggregate	1,000 m ³	125	-	-	-	125
Potash	Fertilizer	1,000 ton	1,550	-	-	-	1,550

Notes: * only a captive use for Jordan Cement Factories Co., Rashadya plant

** equivalent to about 3% on cement production in Jordan Cement Factories Co., Rashadya plant

Table 3-1-10 Rare and Endangered Species in Jordan

	Class	Species	Habitat locations
Fauna	Relict species	Red squirrel, <i>Sciurus anomalus syriacus</i> Common otter, <i>Lutra lutra seistanica</i> Snake, <i>Coluber ravergerri</i> or <i>Coluber nummiger</i> Sand dunes, <i>Psumophile</i> species Gekko, <i>Stenodactylus doriae</i> Lizards, <i>Sphenops sepsoides</i> or <i>Lacerta laevis</i>	
	Endangered mammals	*Leopard, <i>Panthera pardus</i> Nubian ibex, <i>Capra ibex nubiana</i> Arabian gazelle, <i>Gazella gazella</i> Wolf, <i>Canis lupus</i>	Tafila, Shobak
	Endangered reptiles	Tortoise, <i>Testudo graeca terrestris</i> Dabb, <i>Uromastyx aegypticus microlepis</i>	
	Endangered birds	Houbara bustard, <i>Chlamydotis undulata</i> Pintailed sandgrouse, <i>Petrocles alchata</i> Chukar partridge, <i>Alectrois chukar</i> Griffon vulture, <i>Gyps vulvus</i>	
	Vanished, but re-introduced	Ostrich, <i>Struthio camelus syriacus</i> Onager, <i>Equus hemionus</i> Arabian oryx, <i>Oryx leucoryx</i> Roe deer, <i>Capreolus capreolus</i>	
Flora	Endemics	* <i>Crocus moabiticus</i> * <i>Colchicum tunicatum</i> * <i>Iris petraea</i> * <i>Vervascum transjordanicum</i>	Karak, Mu'tah Karak, Madaba, Shobak Wadi Musa, Petra, Badia Tafila, Petra, Wadi Musa, Ajloun, Jerash, Irbid
	Rare species	<i>Orchis collina</i> * <i>Romulea bulbocodium</i> <i>Biarum eximium</i> * <i>Globularia arabica</i>	Ajloun, Jerash Karak, Madaba Jerash, Ajloun, Mafraq Jerash, Ajloun, Salt, Karak, Madaba
	Cutting pressure	*Wild cupressus/Funeral cypress, <i>Cupressus sempervirens</i> * <i>Pistacia atlantica</i>	Ajloun, Jerash, Allan, Amman, Dibbin, Tafila, Wadi Musa, Petra Tafila, Lahda, Shobak, Badia
	Collecting pressure	Eyed tulip, <i>Tulipa agensis</i> Spring flowering narcissi, <i>Narcissus tazetta</i> <i>Lupinus varius</i> <i>Cyclamen persicum</i>	Ramtha, Ajloun Tayba, Irbid or cultivated Kufuyruba, Soam, Kufr Asad, Tayba, Kufranja, Deir Alla, Salt, Wadi Shuaib Forest in northern Jordan

*: Species which has habitats in the Study Area

Source: National Environment Strategy for Jordan, 1992, Ministry of Municipal and Rural Affairs & the Environment

Table 3-2-1 Administrative Division in Jordan

Governorate	District	Sub-district	Nahia	Population (1994)	Governorate Population
Amman	Amman City and Suburbs	Wadi Essier City and Villages		1,300,042	1,567,908
		Sahab		131,214	
		Gizah		48,874	
		Na'our		32,398	
		Al-Mwaggar		28,923	
			Umilbasatin	18,155	
				8,302	
Irbid	Irbid City and Suburbs			379,844	745,774
	Ramtha			78,996	
	Aghwar Shamaliyyah			75,612	
	Koorah			70,812	
	Beni Kenanah			51,806	
		Mazar Tayybeh		35,241	
			Al-Wastiyyah	23,884	
			Hariema	19,447	
				10,132	
Ajlun	Ajlun City and Suburbs			73,581	94,205
			Kufranjah	20,624	
Jarash	Jarash City and Suburbs			123,195	123,195
Ma'raq	Ma'raq City and Suburbs			109,841	170,903
		Sabha Rwaished		25,857	
				10,432	
			Bal'ama	14,237	
			Sama Al-Serhan	10,536	
Zarqa	Zarqa City and Suburbs			608,626	623,943
			Azraq	7,963	
			Birain	7,354	
Balqa	Salt City and Suburbs			187,014	273,489
	Dairalla			38,906	
	Al-Shuna Al-Janubia			33,576	
			Ardah	7,236	
			Zai	6,757	
Madaba	Madaba City and Suburbs			82,512	106,308
		Thiban		23,796	
Karak	Karak City and Suburbs			59,007	169,552
	Al-Mazar Al-Janubi			42,394	
	Al-Qasr and Suburbs			16,539	
		Safi and Suburbs		15,585	
		Ayy		13,625	
			Al-Mazra'ah	12,266	
			Faqo'e	10,136	
Tafila	Tafila City and Suburbs			37,375	61,156
		Bsaira		15,409	
			Hasa	8,372	
Ma'an	Ma'an City and Suburbs			40,034	79,401
		Wadi Musa		17,236	
		Shobaq		10,289	
			Al-Husainia	6,468	
			Ail	5,374	
Aqaba	Aqaba City and Suburbs			63,735	79,745
		Quairah		12,722	
			Wadi Araba	3,288	

(Source: Population and Housing Census Preliminary Results 1994)

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

Table 3-2-2 Municipalities in Southern Jordan

Governorate	Municipality				Population (1994)
	First Class	Second Class	Third Class	Fourth Class	
Karak	Karak				18,587
		Al-Mazar Al-Janubi			7,855
		Al-Qasr			3,130
			Ghour Al-Safi		13,349
			Ghour Al-Mazra' and Al-Haditha		8,642
			Mu'ta		8,207
			Ayy		6,020
			M'oub		5,460
			Faqqo'e		4,128
				Badan and Barada	8,842
				Tayyiba	4,277
				That Ras and Al-Eina	4,088
				Al-Qatrana	3,606
				Rabba	3,470
				Sarfa	3,228
				Al-Shahabia	3,108
				Kuthruha	2,925
				Rakeen	2,877
				Al-Jadida	2,826
				Manshiat Abu Hamour	2,814
				Al-Iraq	2,702
				Adir	2,595
				Mhai	2,290
				Al-Thania	2,110
				Sool	2,092
				Talai	2,008
				Al-Jada'	2,002
Tafila	Tafila			Al-Adnania	1,976
				Jooza	1,872
				Emra	1,525
				Smakia	1,428
				Bateer	1,207
				Al-Yarout	1,097
					20,850
			Ilasa		8,515
			Ayn Al-Bayda		6,550
			Bsaira		5,901
				Al-Qadisiyya	4,958
				Erweim and Santha	2,778
				Grandal	2,572
Ma'an	Ma'an			Al-Eis	2,060
				Ima	1,811
					22,845
			Wadi Musa		11,210
			Al-Husainia		4,337
			Shubaq		1,625
			Ail		906
				Al-Tiba	3,619
				Al-Mreiqa	1,746
				Al-Jafr	1,626
				Al-Qa'	1,392
				Adruh and Al-Jarba	1,272
				Al-Manshia	1,254
				Al-Hashmia	1,138
				Basta	1,084
				Al-Rajif	985
				Al-Fardakh	959
				Al-Zubiria and Abu Makhtoob	934
Aqaba	Aqaba				61,673
			Quairah		4,930
				Al-Disa and 'Tweisa	2,107
				Al-Humima	575

(Source: Ministry of Municipalities, Rural Affairs and Environment)

Table 3-3-1 Population in Jordan

Governorate	Population (Dec. 1994)	Pop. Distribution (%)	Nationality			Sex		
			Jordanian	Non-Jordanian	% of Non-Jordanian	Male	Female	% of Female
Central Region								
Amman	1,576,238	38.1%	1,407,804	168,434	10.7%	823,914	752,324	47.7%
Sub-total	1,576,238	38.1%						
Northern Region								
Irbid	751,634	18.2%	728,117	23,517	3.1%	388,504	363,130	48.3%
Ajlun	94,548	2.3%	93,228	1,320	1.4%	48,102	46,446	49.1%
Jarash	123,190	3.0%	106,446	16,744	13.6%	64,008	59,182	48.0%
Sub-total	969,372	23.4%						
Eastern Region								
Mafraq	178,914	4.3%	169,883	9,031	5.0%	93,540	85,374	47.7%
Zarqa	639,469	15.4%	596,795	42,674	6.7%	332,661	306,808	48.0%
Sub-total	818,383	19.8%						
Western Region								
Balqa	276,082	6.7%	254,310	21,772	7.9%	144,953	131,129	47.5%
Madaba	107,321	2.6%	102,560	4,761	4.4%	55,819	51,502	48.0%
Sub-total	383,403	9.3%						
Southern Region								
Karak	169,770	4.1%	162,417	7,353	4.3%	83,598	81,172	47.8%
Tafilah	62,783	1.5%	61,264	1,519	2.4%	32,618	30,165	48.0%
Ma'an	79,670	1.9%	73,861	5,809	7.3%	43,125	36,545	45.9%
Aqaba	79,839	1.9%	67,808	12,031	15.1%	44,883	34,956	43.8%
Sub-total	392,062	9.5%						
Total	4,139,458	100.0%	3,824,493	314,965	7.6%	2,160,725	1,978,733	47.8%

(Source: Population and Housing Census 1994)

Note: Population in this table includes:

- 1) population living in Jordan (Jordanians and non-Jordanians) and
- 2) Jordanians abroad who stay abroad for less than 12 months and have families in Jordan.

Table 3-3-2 Poverty in Jordan (1992)

Governorate	Average Household Size (1992)	Abject Poverty Line (JD)	Families in Abject Poverty		Absolute Poverty Line for a Family		Families in Absolute Poverty		Relative Distribution of Abject Poverty	Absolute Poverty	Relative Distribution of Absolute Poverty
			% of Families in Abject Poverty	Abject Poverty	Not Paying Rent (JD)	Paying Rent (JD)	% of Families in Absolute Poverty	Absolute Poverty			
Central Region											
Amman*	6.5	61	4.7%		111	141	16.2%		30.0%		30.9%
Northern Region											
Irbid**	6.9	60	8.6%		87	105	26.2%		31.7%		29.2%
Eastern Region											
Mafrq	7.9	69	9.8%		95	110	29.5%		5.3%		5.4%
Zarqa	7.1	63	5.3%		109	135	19.5%		11.9%		15.0%
Western Region											
Balqa	7.5	70	9.4%		93	119	27.2%		7.9%		8.1%
Southern Region											
Karak	7.2	66	10.9%		81	95	28.6%		6.9%		5.8%
Tafila	6.7	58	7.9%		83	103	25.9%		2.1%		1.9%
Ma'an***	6.6	57	7.3%		82	97	23.5%		4.2%		3.7%
Total	6.8	61	6.6%		97	119	21.3%		100.0%		100.0%

(Source: Dr. Hussein Shakhraeh, Department of Human Development, Ministry of Planning)

Note:

- 1) This table is based on the old governorates. That is, Amman* includes Amman and Madaba; Irbid** includes Irbid, Ajlun and Jarash; and Ma'an*** includes Ma'an and Aqaba.
- 2) This table is based on the sample survey of 44,054 households, which is about 7.7% of the total number of households.
- 3) Abject poverty line is the monthly income necessary to provide the minimum amount of food for the average size of family.
- 4) Absolute poverty line is the monthly income necessary to provide for the minimum level of food, clothing shelter, primary health services, basic education and transportation for the average size of family.

Table 3-3-3 Average Annual Income in Jordan

Governorate	Average Annual Income (JD) (1994)	
	Per Capita	Per Household
Central Region		
Amman*	764.9	4566.8
Northern Region		
Irbid**	534.8	3462.8
Eastern Region		
Mafrq	529.5	3414.8
Zarqa	539.4	3441.3
Western Region		
Balqa	530.4	3474.4
Southern Region		
Karak	520.4	3464.1
Tafila	504.1	3267.1
Ma'an***	600.5	3748.9
Total	628.7	3929.8

(Source: Employment, Unemployment and Income Survey 1994)

Note:

- 1) This table is based on the old governorates. That is, Amman* includes Amman and Madaba; Irbid** includes Irbid, Ajlun and Jarash; and Ma'an*** includes Ma'an and Aqaba.
- 2) This table is based on Employment, Unemployment and Income Survey 1994, which is a sample survey of 76,023 persons (about 2% of total population).

Table 3-3-4 Results of Industrial Census in the Southern Districts

Unit: JD1,000 for Production and Value added

(1) Establishments in total									
Karak									
ISIC	Industry	Number	Employees	Production	Value added	Number	Employees	Production	Value added
290	Mining & Quarrying	12	2,007	58,186	38,532	9	3,975	96,083	55,248
311	Food manufacturing	28	97	412	124	17	63	267	77
321	Textiles	2	4	10	7	0	0	0	0
322	Wearing apparel	15	17	59	36	6	12	17	10
323	Leather	2	2	3	2	0	0	0	0
331-332	Wood & wood products	24	50	151	77	16	27	93	41
342	Printing	2	7	25	11	0	0	0	0
351-352	Industrial chemicals	0	0	0	0	0	0	0	0
362-369	Non-metallic mineral	37	130	520	217	8	19	81	43
381	Fabricated metal	38	93	470	178	8	14	93	27
382	Machinery	1	1	5	5	0	0	0	0
951	Industrial Services	90	199	370	265	26	38	72	50
Total		251	2,607	60,211	39,454	90	4,148	96,706	55,496

(2) Establishments with 5 or more employees									
Karak									
ISIC	Industry	Number	Employees	Production	Value added	Number	Employees	Production	Value added
290	Mining & Quarrying	12	2,007	58,186	38,532	7	3,968	96,059	55,237
311	Food manufacturing	7	42	207	65	5	32	172	47
321	Textiles	0	0	0	0	0	0	0	0
322	Wearing apparel	0	0	0	0	0	0	0	0
323	Leather	0	0	0	0	0	0	0	0
331-332	Wood & wood products	1	5	18	8	0	0	0	0
342	Printing	0	0	0	0	0	0	0	0
351-352	Industrial chemicals	0	0	0	0	0	0	0	0
362-369	Non-metallic mineral	6	55	171	76	0	0	0	0
381	Fabricated metal	4	23	84	23	0	0	0	0
382	Machinery	0	0	0	0	0	0	0	0
951	Industrial Services	4	27	32	30	0	0	0	0
Total		34	2,159	58,698	38,734	12	4,000	96,231	55,284

(3) Establishments with less than 5 employees									
Karak									
ISIC	Industry	Number	Employees	Production	Value added	Number	Employees	Production	Value added
290	Mining & Quarrying	0	0	0	0	2	19	65	582
311	Food manufacturing	21	55	205	59	12	31	67	316
321	Textiles	2	4	10	7	0	0	0	0
322	Wearing apparel	15	17	59	36	6	12	17	10
323	Leather	2	2	3	2	0	0	0	0
331-332	Wood & wood products	23	45	133	69	16	27	93	41
342	Printing	2	7	25	11	0	0	0	0
351-352	Industrial chemicals	0	0	0	0	0	0	0	0
362-369	Non-metallic mineral	31	75	349	141	8	19	81	43
381	Fabricated metal	34	70	386	155	8	14	93	27
382	Machinery	1	1	5	5	0	0	0	0
951	Industrial Services	86	172	338	235	26	38	72	50
Total		217	448	1,513	720	78	148	475	212

Source: Industrial Census in 1988, Department of Statistics

Table 3-3-5 Results of Industrial Census in 1994 by the Governorate

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

(1) Karak				
Economic Activity	No of Enterprises	No of Employees	Gross output	Gross Value added
Other mining and quarrying	16	2,201	103,238	63,182
Food products and beverage	49	206	1,340	534
Textiles	6	12	41	19
Wearing apparel	38	86	245	138
Wood and wood products except furniture	27	77	392	209
Publishing and printing	4	16	173	86
Other non-metallic mineral products	76	261	2,035	883
Fabricated metal products	75	198	1,080	488
Furniture	6	14	43	24
Total	297	3,071	108,587	65,563
(2) Tafila				
Economic Activity	No of Enterprises	No of Employees	Gross output	Gross Value added
Other mining and quarrying	5	4,936	111,249	55,911
Food products and beverage	28	101	525	316
Wearing apparel	16	36	88	52
Wood and wood products except furniture	10	24	152	48
Paper and paper products	1	6	31	14
Publishing and printing	1	*	*	*
Other non-metallic mineral products	14	58	488	162
Fabricated metal products	21	49	274	100
Machinery and equipment	2	20	88	40
Furniture	8	*	*	*
Total	106	5,230	112,895	56,643
(3) Ma'an				
Economic Activity	No of Enterprises	No of Employees	Gross output	Gross Value added
Other mining and quarrying	40	393	6,521	2,996
Food products and beverage	29	127	1,377	501
Textiles	2	33	88	54
Wearing apparel	18	*	*	*
Wood and wood products except furniture	14	40	266	141
Publishing and printing	1	7	37	18
Rubber and plastics products	1	*	*	*
Other non-metallic mineral products	35	155	709	319
Fabricated metal products	30	90	410	209
Furniture	12	38	121	61
Total	182	883	9,559	4,299
(4) Aqaba				
Economic Activity	No of Enterprises	No of Employees	Gross output	Gross Value added
Other mining and quarrying	4	54	394	159
Food products and beverage	22	134	1,004	381
Textiles	3	4	7	5
Wearing apparel	20	43	127	69
Wood and wood products except furniture	17	46	267	127
Publishing and printing	3	18	162	125
Chemicals and chemical products	2	1,174	260,251	22,893
Other non-metallic mineral products	34	*	*	*
Fabricated metal products	26	77	423	172
Machinery and equipment	2	28	175	86
Other transport equipment	3	*	*	*
Furniture	14	37	156	73
Total	150	1,615	262,966	24,090
(5) Total in the Southern Districts				
Economic Activity	No of Enterprises	No of Employees	Gross output	Gross Value added
Other mining and quarrying	65	7,584	221,402	122,248
Food products and beverage	128	568	4,246	1,732
Textiles	9	16	48	24
Wearing apparel 1)	94	198	518	313
Wood and wood products except furniture	68	187	1,077	525
Publishing and printing 2)	11	47	403	243
Other non-metallic mineral products 3)	161	1,648	263,483	24,257
Fabricated metal products	152	414	2,217	969
Machinery and equipment 4)	15	48	263	126
Furniture	32	89	320	158
Total	735	10,799	494,007	150,595

Source: Industrial Census 1994, Department of Statistics

* The data both activities (activity with asterisk plus activity just above asterisk) were consolidated for confidential purposes.

1) Number of employees, gross output and value added in textiles in Ma'an are included in total.

2) Number of employees, gross output and value added in paper products in Tafila and these in rubber and plastics products in Ma'an are included in total.

3) Number of employees, gross output and value added in chemicals in Aqaba are included in total.

4) Number of employees, gross output and value added in furniture in Tafila and these in other transport equipment in Aqaba are included in total.

Table 3-3-6 Distribution of Enterprises in District by Type of Industries (ISIC)

ISIC	Type of Industry	Karak	Share (%)	Tafila	Share (%)	Ma'an	Share (%)	Aqaba	Share (%)	Total	Share (%)
290	Mining	9	13.2	0	0.0	9	52.9	0	0.0	18	11.8
311	Food manufacturing	15	22.1	3	18.8	3	17.6	10	19.6	31	20.4
321	Textiles	3	4.4	0	0.0	0	0.0	0	0.0	3	2.0
322	Wearing apparel	2	2.9	2	12.5	0	0.0	4	7.8	8	5.3
331	Wood products	3	4.4	3	18.8	1	5.9	6	11.8	13	8.6
341	Paper products	1	1.5	0	0.0	0	0.0	0	0.0	1	0.7
342	Printing	0	0.0	0	0.0	0	0.0	3	5.9	3	2.0
351	Industrial chemicals	1	1.5	0	0.0	0	0.0	0	0.0	1	0.7
369	Non-metallic mineral	20	29.4	5	31.3	3	17.6	11	21.6	39	25.7
381	Fabricated metal	14	20.6	3	18.8	1	5.9	14	27.5	32	21.1
383	Electrical machinery	0	0.0	0	0.0	0	0.0	1	2.0	1	0.7
951	Repair services	0	0.0	0	0.0	0	0.0	2	3.9	2	1.3
Total		68	100.0	16	100.0	17	100.0	51	100.0	152	100.0

Source: Investment demand survey by the Study Team

Table 3-3-7 Size of Employees by Type of Industries (ISIC)

ISIC	Type of Industry	5 - 10	Share (%)	11 - 15	Share (%)	16 - 20	Share (%)	More than 20	Share (%)	Total	Share (%)
290	Mining	9	50.0	6	33.3	2	11.1	1	5.6	18	100.0
311	Food manufacturing	27	87.1	2	6.5	1	3.2	1	3.2	31	100.0
321	Textiles	2	66.7	1	33.3	0	0.0	0	0.0	3	100.0
322	Wearing apparel	6	75.0	1	12.5	0	0.0	1	12.5	8	100.0
331	Wood products	12	92.3	1	7.7	0	0.0	0	0.0	13	100.0
341	Paper products	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
342	Printing	3	100.0	0	0.0	0	0.0	0	0.0	3	100.0
351	Industrial chemicals	0	0.0	1	100.0	0	0.0	0	0.0	1	100.0
369	Non-metallic mineral	33	84.6	4	10.3	1	2.6	1	2.6	39	100.0
381	Fabricated metal	32	100.0	0	0.0	0	0.0	0	0.0	32	100.0
383	Electrical machinery	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
951	Repair services	0	0.0	2	100.0	0	0.0	0	0.0	2	100.0
Total		126	82.9	18	11.8	4	2.6	4	2.6	152	100.0

Source: Investment demand survey by the Study Team

Table 3-3-8 Factory and Building Area in the Southern Districts

(a) Karak

Classification (m2)	Factory Area		Building Area	
	Number of Enterprises	%	Number of Enterprises	%
> 1,000,000				
100,000-999,999	0	0.0%		
50,000-99,999	0	0.0%	0	0.0%
10,000-49,999	3	4.4%	0	0.0%
5,000-9,999	2	2.9%	0	0.0%
1,000-4,999	18	26.5%	0	0.0%
500-999	7	10.3%	3	4.4%
< 500	37	54.4%	64	94.1%
No Answer	1	1.5%	1	1.5%
Total	68	100.0%	68	100.0%

(b) Tafila

Classification (m2)	Factory Area		Building Area	
	Number of Enterprises	%	Number of Enterprises	%
> 1,000,000				
100,000-999,999	0	0.0%		
50,000-99,999	0	0.0%	0	0.0%
10,000-49,999	0	0.0%	0	0.0%
5,000-9,999	0	0.0%	0	0.0%
1,000-4,999	3	18.8%	0	0.0%
500-999	3	18.8%	1	6.3%
< 500	10	62.5%	15	93.8%
No Answer	0	0.0%	0	0.0%
Total	16	100.0%	16	100.0%

(c) Ma'an

Classification (m2)	Factory Area		Building Area	
	Number of Enterprises	%	Number of Enterprises	%
> 1,000,000				
100,000-999,999	0	0.0%		
50,000-99,999	0	0.0%	0	0.0%
10,000-49,999	0	0.0%	0	0.0%
5,000-9,999	2	11.8%	0	0.0%
1,000-4,999	10	58.8%	0	0.0%
500-999	1	5.9%	0	0.0%
< 500	4	23.5%	15	88.2%
No Answer	0	0.0%	2	11.8%
Total	17	100.0%	17	100.0%

(d) Aqaba

Classification (m2)	Factory Area		Building Area	
	Number of Enterprises	%	Number of Enterprises	%
> 1,000,000				
100,000-999,999	0	0.0%		
50,000-99,999	0	0.0%	0	0.0%
10,000-49,999	0	0.0%	0	0.0%
5,000-9,999	0	0.0%	0	0.0%
1,000-4,999	10	19.6%	1	2.0%
500-999	4	7.8%	4	7.8%
< 500	37	72.5%	46	90.2%
No Answer	0	0.0%	0	0.0%
Total	51	100.0%	51	100.0%

(e) Total of 4 districts

Classification (m2)	Factory Area		Building Area	
	Number of Enterprises	%	Number of Enterprises	%
> 1,000,000				
100,000-999,999	0	0.0%		
50,000-99,999	0	0.0%	0	0.0%
10,000-49,999	3	2.0%	0	0.0%
5,000-9,999	4	2.6%	0	0.0%
1,000-4,999	41	27.0%	1	0.7%
500-999	15	9.9%	8	5.3%
< 500	88	57.9%	140	92.1%
No Answer	1	0.7%	3	2.0%
Total	152	100.0%	152	100.0%

Source: Investment demand survey by the Study Team

Table 3-3-9 Average Wages of Workers

Classification (JD/month)	Skilled Worker		Semi-skilled Worker	
	Number of Enterprises	Share (%)	Number of Enterprises	Share (%)
> = 1,000				
500-999	0	0.0%		
400-499	1	0.7%		
300-399	3	2.0%	0	0.0%
200-299	25	16.4%	2	1.3%
100-199	101	66.4%	45	29.6%
50-99	19	12.5%	78	51.3%
10-49		0.0%	4	2.6%
< 10		0.0%		0.0%
No Answer	3	2.0%	23	15.1%
Total	152	100.0%	152	100.0%

Source: Investment demand survey by the Study Team

Table 3-3-10 Average Age of Facilities

Classification (years)	Machines		Building	
	Number of Enterprises	Share (%)	Number of Enterprises	Share (%)
> = 30	0	0.0%	2	1.3%
20-29	3	2.0%	12	7.9%
10-19	23	15.1%	43	28.3%
5-9	54	35.5%	42	27.6%
1-4	54	35.5%	33	21.7%
< 1	16	10.5%	10	6.6%
No Answer	2	1.3%	10	6.6%
Total	152	100.0%	152	100.0%

Source: Investment demand survey by the Study Team

Table 3-3-11 Distribution of Production Cost

Classification (%)	Material cost		Direct labor cost	
	Number of Enterprises	Share (%)	Number of Enterprises	Share (%)
80-100%	3	2.0%		
60-79%	90	59.2%	2	1.3%
40-59%	38	25.0%	2	1.3%
20-39%	7	4.6%	21	13.8%
<=19%	5	3.3%	119	78.3%
No Answer	9	5.9%	8	5.3%
Total	152	100.0%	152	100.0%

Source: Investment demand survey by the Study Team

Table 3-3-12 Major Problems by Type of Industries (ISIC)

Unit: percentage

ISIC	Type of Industry	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	Total
311	Food manufacturing	20	40	20	20	20	20	60	0	40	80	0	0	5
322	Wearing apparel	0	0	0	0	0	0	0	0	0	0	0	0	1
331	Wood products	20	20	0	100	60	100	100	80	0	80	0	20	5
342	Printing	100	50	50	50	50	100	0	50	50	50	0	0	2
369	Non-metallic mineral	33	33	0	17	0	83	33	83	50	50	17	0	6
381	Fabricated metal	50	88	13	38	50	100	63	88	25	63	0	0	8
383	Electrical machinery	100	100	100	0	0	100	100	0	0	100	0	0	1
384	Transport equipment	0	0	0	0	0	100	100	0	0	100	0	0	1
951	Repair services	100	0	0	100	0	0	0	0	0	0	0	0	1
Total		40	47	13	40	30	77	57	57	27	63	3	3	30

Source: Interview Survey by the Study Team (plural answers)

Notes: (a) Objections from the neighbors

(b) Limitation of space

(c) Wage increase

(d) Labor shortage / Difficulty in finding workers

(e) Lack of technology

(f) Rise in raw / intermediate material cost / no availability of raw materials

(g) Limitation of market / Distance to the market

(h) Competition / conflict with local firms in the small market

(i) Financial problems (lack of finance)

(j) Government regulations

(k) Water shortage

(l) shortage of electric power

* Total means the total number of enterprises interviewed. In case of food (311), for example, one enterprise (20%) out of 5 faces the problem of (a).

Table 3-3-13 Sales Trend in 1993-1994

(a) District	Increase	Share (%)	No change	Share (%)	Decrease	Share (%)	Total	Share (%)
District								
Karak	22	55.0	9	22.5	9	22.5	40	100.0
Tafila	6	75.0	0	0.0	2	25.0	8	100.0
Ma'an	7	43.8	3	18.8	6	37.5	16	100.0
Aqaba	4	30.8	6	46.2	3	23.1	13	100.0
Total	39	50.6	18	23.4	20	26.0	77	100.0

(b) Type of Industry	Increase	Share (%)	No change	Share (%)	Decrease	Share (%)	Total	Share (%)
ISIC								
290 Mining	8	57.1	1	7.1	5	35.7	14	100.0
311 Food manufacturing	8	47.1	9	52.9	0	0.0	17	100.0
321 Textiles	1	100.0	0	0.0	0	0.0	1	100.0
322 Wearing apparel	0	0.0	1	33.3	2	66.7	3	100.0
331 Wood products	2	28.6	2	28.6	3	42.9	7	100.0
341 Paper products	0	0.0	0	0.0	0	0.0	0	-
342 Printing	0	0.0	0	0.0	0	0.0	0	-
351 Industrial chemicals	0	0.0	0	0.0	0	0.0	0	-
369 Non-metallic mineral	13	68.4	2	10.5	4	21.1	19	100.0
381 Fabricated metal	6	40.0	3	20.0	6	40.0	15	100.0
383 Electrical machinery	0	0.0	0	0.0	0	0.0	0	-
951 Repair services	1	100.0	0	0.0	0	0.0	1	100.0
Total	39	50.6	18	23.4	20	26.0	77	100.0

Source: Investment demand survey by the Study Team

Note: 75 enterprises did not answer. Total number of the samples is 152.

Table 3-3-14 Intension of Expansion of Business

(a) District	District	Yes	Share (%)	No	Share (%)	Total	Share (%)
	Karak	20	29.4	48	70.6	68	100.0
	Tafila	2	12.5	14	87.5	16	100.0
	Ma'an	7	41.2	10	58.8	17	100.0
	Aqaba	19	37.3	32	62.7	51	100.0
	Total	48	31.6	104	68.4	152	100.0

(b) Type of Industry (ISIC)	ISIC	Type of Industry	Yes	Share (%)	No	Share (%)	Total	Share (%)
	290	Mining	6	33.3	12	66.7	18	100.0
	311	Food manufacturing	10	32.3	21	67.7	31	100.0
	321	Textiles	0	0.0	3	100.0	3	100.0
	322	Wearing apparel	3	37.5	5	62.5	8	100.0
	331	Wood products	1	7.7	12	92.3	13	100.0
	341	Paper products	1	100.0	0	0.0	1	100.0
	342	Printing	3	100.0	0	0.0	3	100.0
	351	Industrial chemicals	0	0.0	1	100.0	1	100.0
	369	Non-metallic mineral	11	28.2	28	71.8	39	100.0
	381	Fabricated metal	11	34.4	21	65.6	32	100.0
	383	Electrical machinery	1	100.0	0	0.0	1	100.0
	951	Repair services	1	50.0	1	50.0	2	100.0
	Total		48	31.6	104	68.4	152	100.0

Source: Investment demand survey by the Study Team

Table 3-3-15 Interviewed Enterprises in the Southern Districts

(a) District by Type of Industry (ISIC)

ISIC	Type of Industry	Karak	Share (%)	Tafila	Share (%)	Ma'an	Share (%)	Aqaba	Share (%)	Total	Share (%)
311	Food manufacturing	1	9.1	1	20.0	1	25.0	2	20.0	5	16.7
322	Wearing apparel	1	9.1	0	0.0	0	0.0	0	0.0	1	3.3
331	Wood products	2	18.2	1	20.0	1	25.0	1	10.0	5	16.7
342	Printing	1	9.1	0	0.0	0	0.0	1	10.0	2	6.7
369	Non-metallic mineral	3	27.3	1	20.0	1	25.0	1	10.0	6	20.0
381	Fabricated metal	2	18.2	2	40.0	1	25.0	3	30.0	8	26.7
383	Electrical machinery	0	0.0	0	0.0	0	0.0	1	10.0	1	3.3
384	Transport equipment	0	0.0	0	0.0	0	0.0	1	10.0	1	3.3
951	Repair services	1	9.1	0	0.0	0	0.0	0	0.0	1	3.3
Total		11	100.0	5	100.0	4	100.0	10	100.0	30	100.0

(b) Size of employees by Type of Industry (ISIC)

ISIC	Type of Industry	1 - 2	Share (%)	3 - 4	Share (%)	5 - 9	Share (%)	More than 10			Total	Share (%)
								Share (%)	Share (%)	Share (%)		
311	Food manufacturing	1	20.0	2	40.0	2	40.0	0	0.0	0.0	5	100.0
322	Wearing apparel	0	0.0	0	0.0	0	0.0	1	100.0	0.0	1	100.0
331	Wood products	1	20.0	2	40.0	2	40.0	0	0.0	0.0	5	100.0
342	Printing	0	0.0	2	100.0	0	0.0	0	0.0	0.0	2	100.0
369	Non-metallic mineral	0	0.0	2	33.3	2	33.3	2	33.3	0.0	6	100.0
381	Fabricated metal	2	25.0	4	50.0	1	12.5	1	12.5	0.0	8	100.0
383	Electrical machinery	0	0.0	0	0.0	1	100.0	0	0.0	0.0	1	100.0
384	Transport equipment	1	100.0	0	0.0	0	0.0	0	0.0	0.0	1	100.0
951	Repair services	1	100.0	0	0.0	0	0.0	0	0.0	0.0	1	100.0
Total		6	20.0	12	40.0	8	26.7	4	13.3	0.0	30	100.0

Source: Interview survey by the Study Team

Table 3-3-16 Annual Water Supply by WAJ (1990-1994)

Governorate	(million m ³ /year)				
	1990	1991	1992	1993	1994
Amman	75.176	74.765	98.310	98.564	93.668
Zarka	21.764	22.184	22.728	25.557	27.684
Irbid	30.065	30.343	31.492	34.511	35.308
Maflaq	15.140	13.748	14.243	13.298	13.627
Balqa	12.542	13.142	15.548	19.380	20.425
Karak	5.776	6.336	7.016	7.000	7.227
Tafila	2.181	2.259	2.383	2.454	2.174
Ma'an & Aqaba	10.875	10.830	16.512	17.736	19.779
Total (Jordan)	178.629	178.607	208.232	218.500	219.893

Source: Water Authority Annual Report 1994

Table 3-3-17 Annual Water Supply by WAJ in 1994

Governorate	Production	From Other Gov.	To Other Gov.	Irrigation	(m ³ /year)
					Net Supply for Domestic & Industrial Use
Karak	9,337,931	0	0	2,109,622	7,228,309
Tafila	1,186,592	985,725	0	0	2,172,317
Ma'an & Aqaba	22,318,559	0	985,725	1,553,546	19,779,288
Total	32,843,082	985,725	985,725	3,663,168	29,179,914

Source: Ministry of Water and Irrigation/WAJ, Information & Statistics Directorate's Data

Table 3-3-18 Water Production in Each Water Source Operated by WAI for Karak Governorate

(in 1994)

Source of Water Supply	Production (m ³ /year)	Source of Water Supply	Production (m ³ /year)
Sultani Wells	3,347,460	South Qatrana Well (2)	394,326
Ghweer Well (1)	249,153	Wadi Abiad (1)	346,608
Ghweer Well (2)	463,455	Wadi Abiad (2)	32,338
Ain Sara Spring	1,313,947	Mazraa Well (1)	127,652
Shehabia Spring	183,200	Mazraa Well (2)	234,287
Ain Yrout Spring	66,415	Fifa Well (2)	59,562
Qatrana Well (19)	284,700	Safi Well (2)	153,290
North Qatrana Well (1)	451,123	Safi Well (4)	1,890
North Qatrana Well (2)	197,627	Safi Well (5)	165,666
North Qatrana Well (3)	505,374	Safi Well (14)	321,435
North Qatrana Well (4)	423,509	Amraq Well (2)	14,914
		Total	9,337,931

Source: Ministry of Water and Irrigation/WAI, Information & Statistics Directorate's Data

Table 3-3-19 Water Production in Each Water Source Operated by WAJ for Tafila Governorate

(in 1994)

Source of Water Supply	Production (m ³ /year)	Source of Water Supply	Production (m ³ /year)
Harir Spring	447,233	Hassa Well	123,240
Jurf Darawish Water Station	18,921	Abour Well (7)	368,182
Abour Well (6)	0	Abour Well (8)	229,016
Twani Ianobia Well	0	Total	1,186,592

Table 3-3-20 Water Production in Each Water Source Operated by WAJ for Ma'an Governorate

(in 1994)

Source of Water Supply	Production (m ³ /year)	Source of Water Supply	Production (m ³ /year)
Tabhuna Station	2,411,322	Jafre	219,016
Qa'a Station	1,495,907	Tal Burma	700,144
Shaubak Station	1,658,780	A'rja	127,945
Mreegha Station	449,900	Qasmia	73,290
Fajij Station	324,504	Iwheda	31,324
		Total	7,492,132

* 985,725 m³/year supplied to Tafila governorate and 673,055m³/day for local use at Shaubak

Table 3-3-21 Water Production in Each Water Source Operated by WAJ for Aqaba Governorate

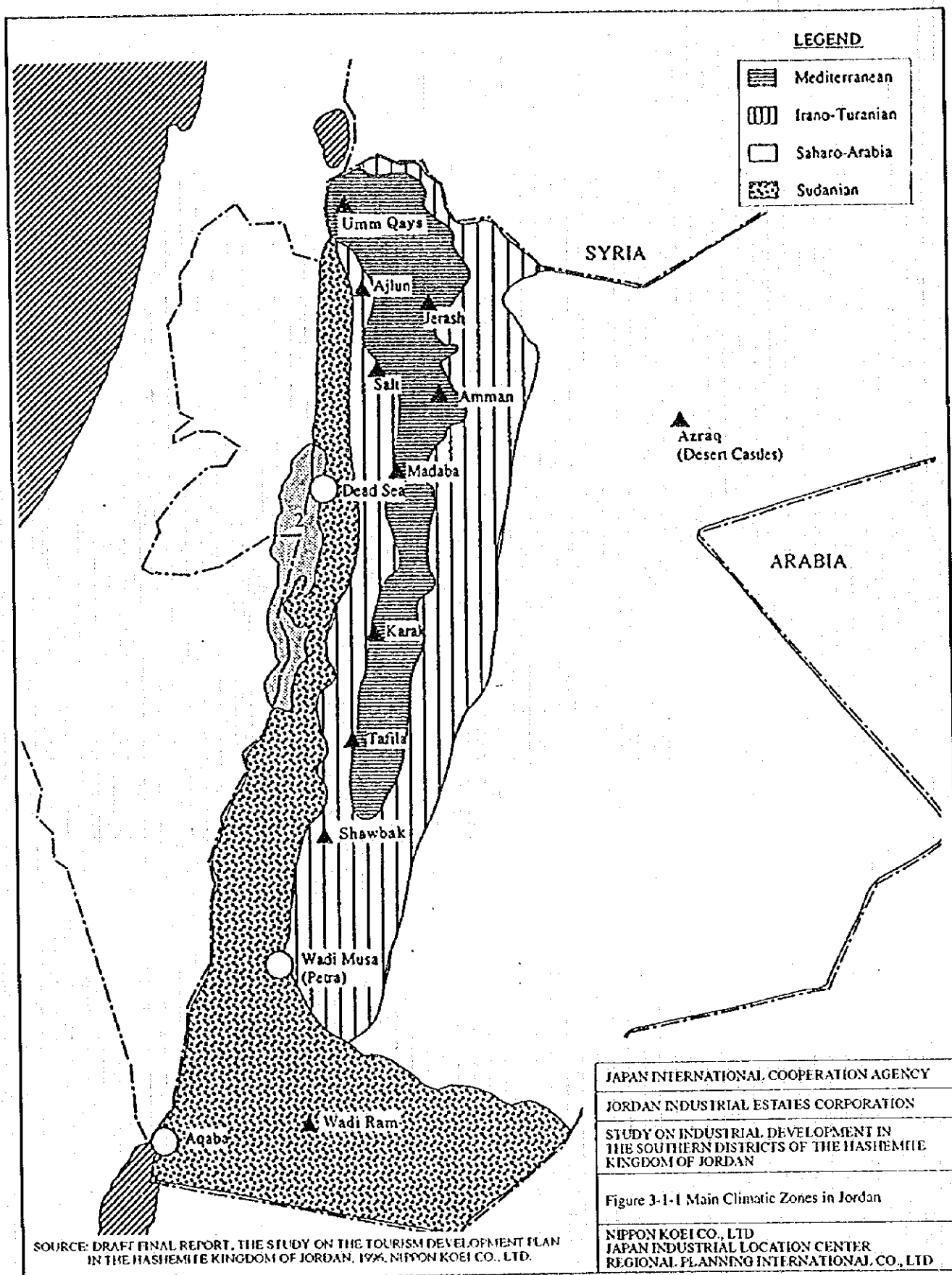
(in 1994)

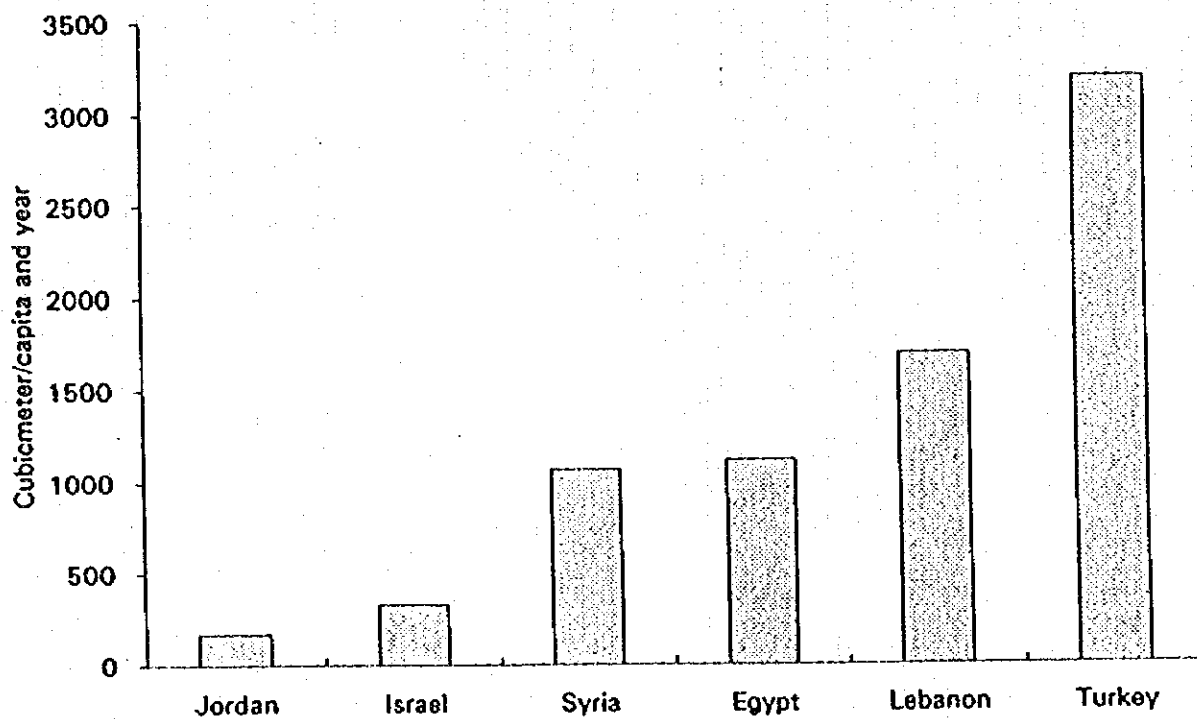
Source of Water Supply	Production (m ³ /year)	Source of Water Supply	Production (m ³ /year)
Qa'a Disi Wells	8,233,707	Mnishir Well	308,809
Abu Db'a'a Wells	2,759,999	Ghal Well	462,302
Wadi Yutuni Wells	941,814	Rahma (3)	62,147
Qwera Wells	832,721	Qa'a Saa'edin	29,214
Desch Well	679,366	Om Mathla	25,414
Twissh Well	490,933	Total	14,826,426

Table 3-3-22 Municipal Water Supply for Amman City

(in 1994)

Basin/Source		Production (MCM/year)	
Deir Alla (surface water)		20.340	
Local Springs		7.000	
Zarqa Basin	Local Wells	13.571	
	Ruseifa	6.818	
	Za'atari	5.098	29.014
	Khaldiah	1.481	
	Hlabat	2.046	
Azraq Basin	Azraq Wellfield		
Dead Sea Basin / Mujib	Qastal	0.753	
	Siwaqa	7.146	17.688
	Qatrana	5.120	
	Wala	4.669	
Total		832.208	





Source : German Development Institute (1994)

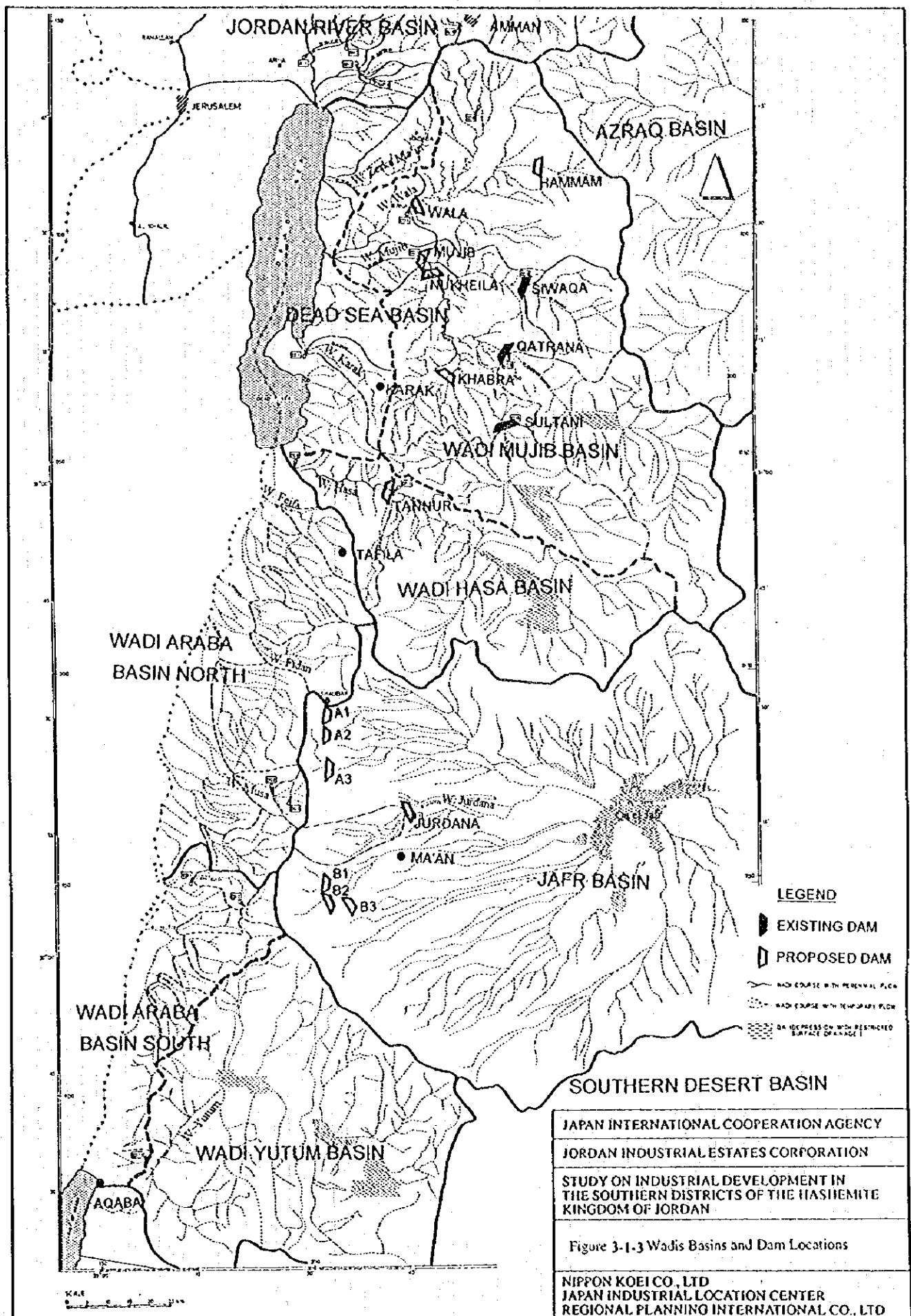
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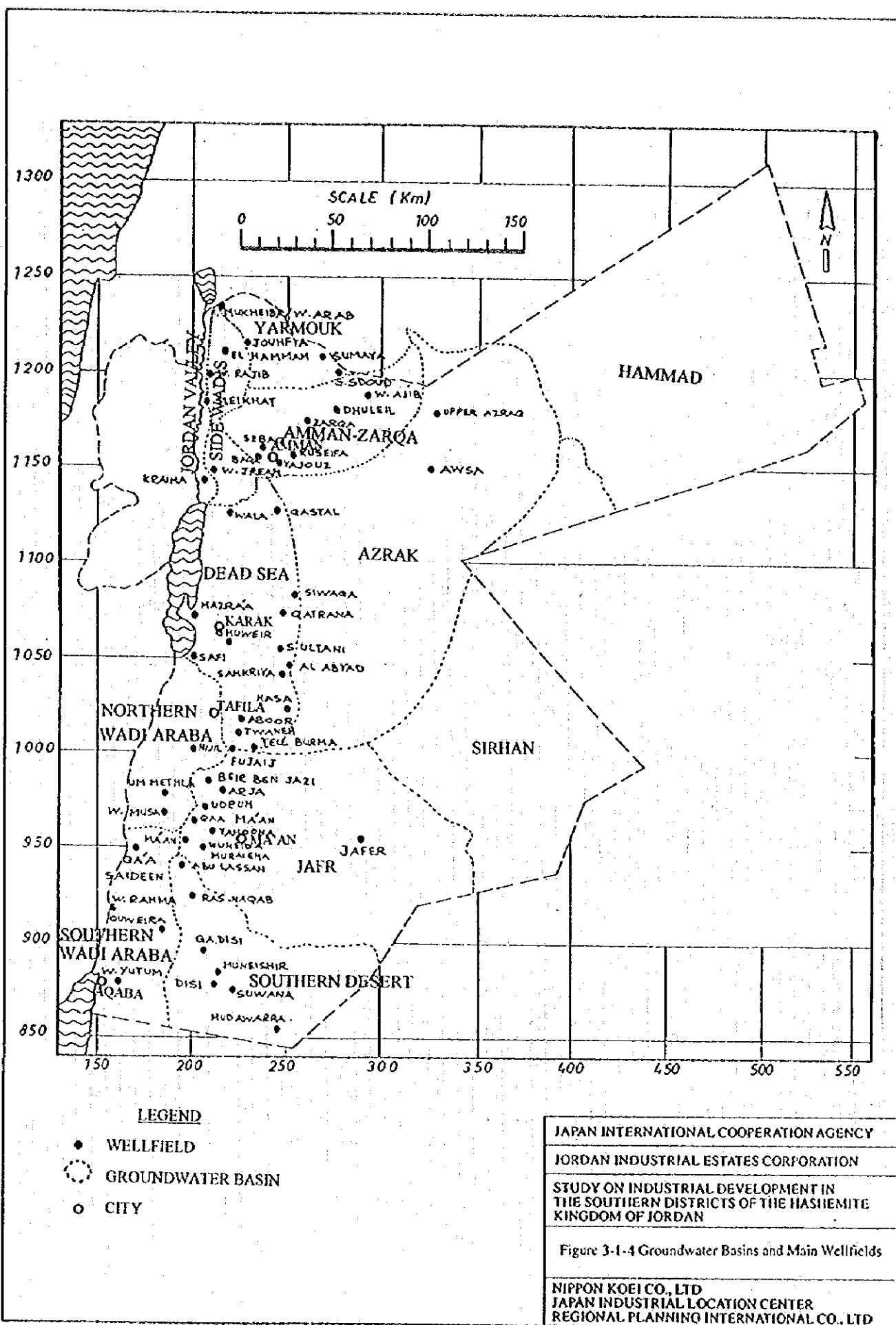
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Figure 3-1-2 Renewable Water Resources
in the Middle East in 1992

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Hydrogeological Cross-Section

Cross-Section Legend

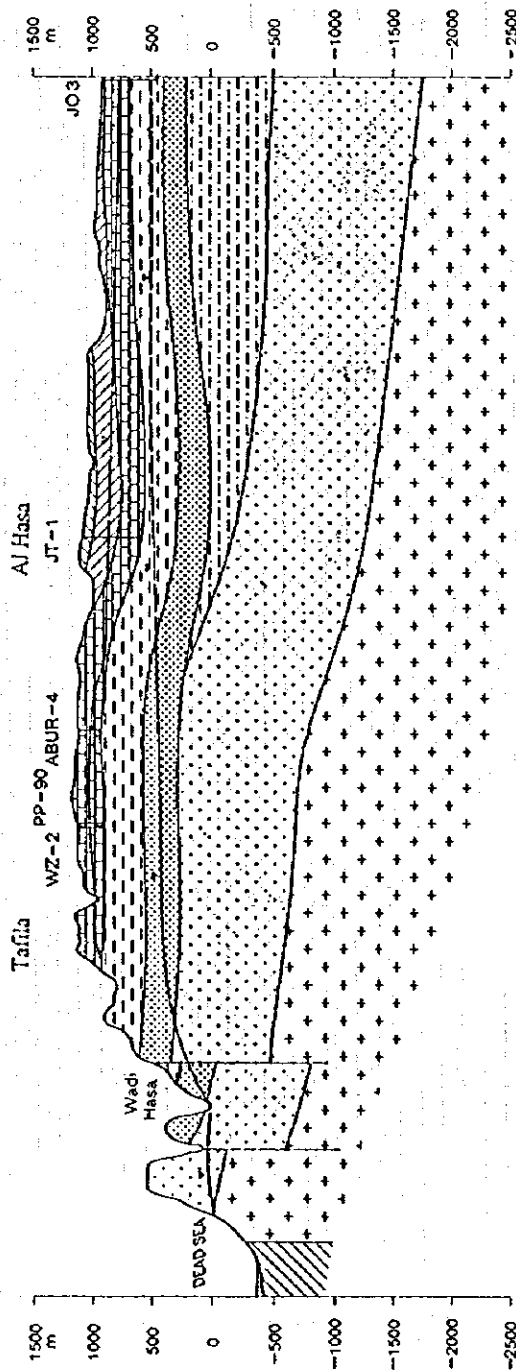
AQUIFER	AQUITARD	HYDRAULIC COMPLEX
		SHALLOW AQUIFER
0, 84-85	mu, salt	
B3	mu, salt	
A7-87	(mu, salt)	UPPER CRETACEOUS HYDRAULIC COMPLEX
A1-A5	mu, salt	
X	(shale, mud)	
Kh	(shale, mud)	DEEP MUDSTONE HYDRAULIC COMPLEX
0	(shale, mud)	
BC	grains	

Gravelled zone of the A7-87 and the sandstone aquifers

S-15

Stratigraphic number

Groundwater, unit



0 10 20 30 40 50 km

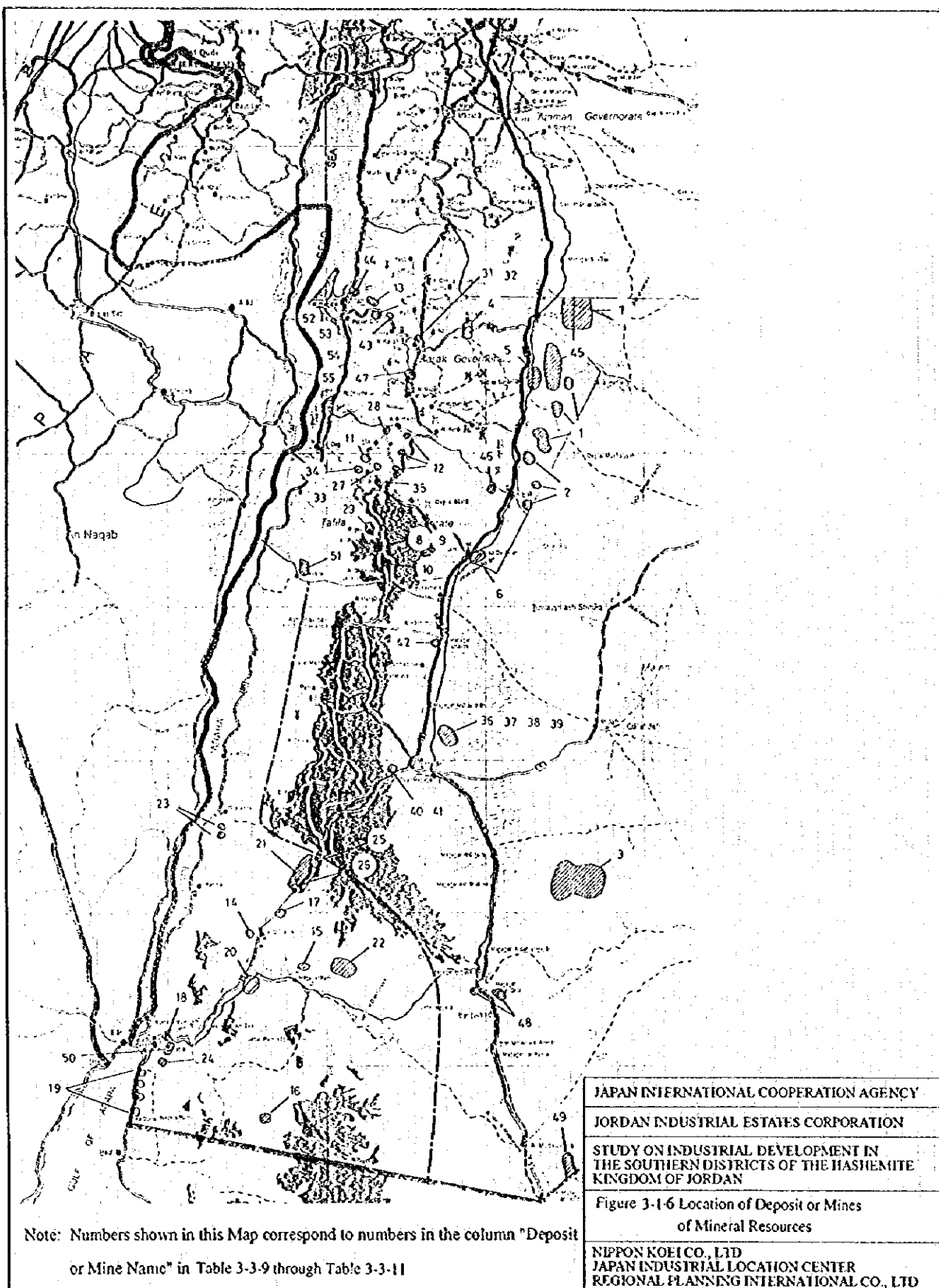
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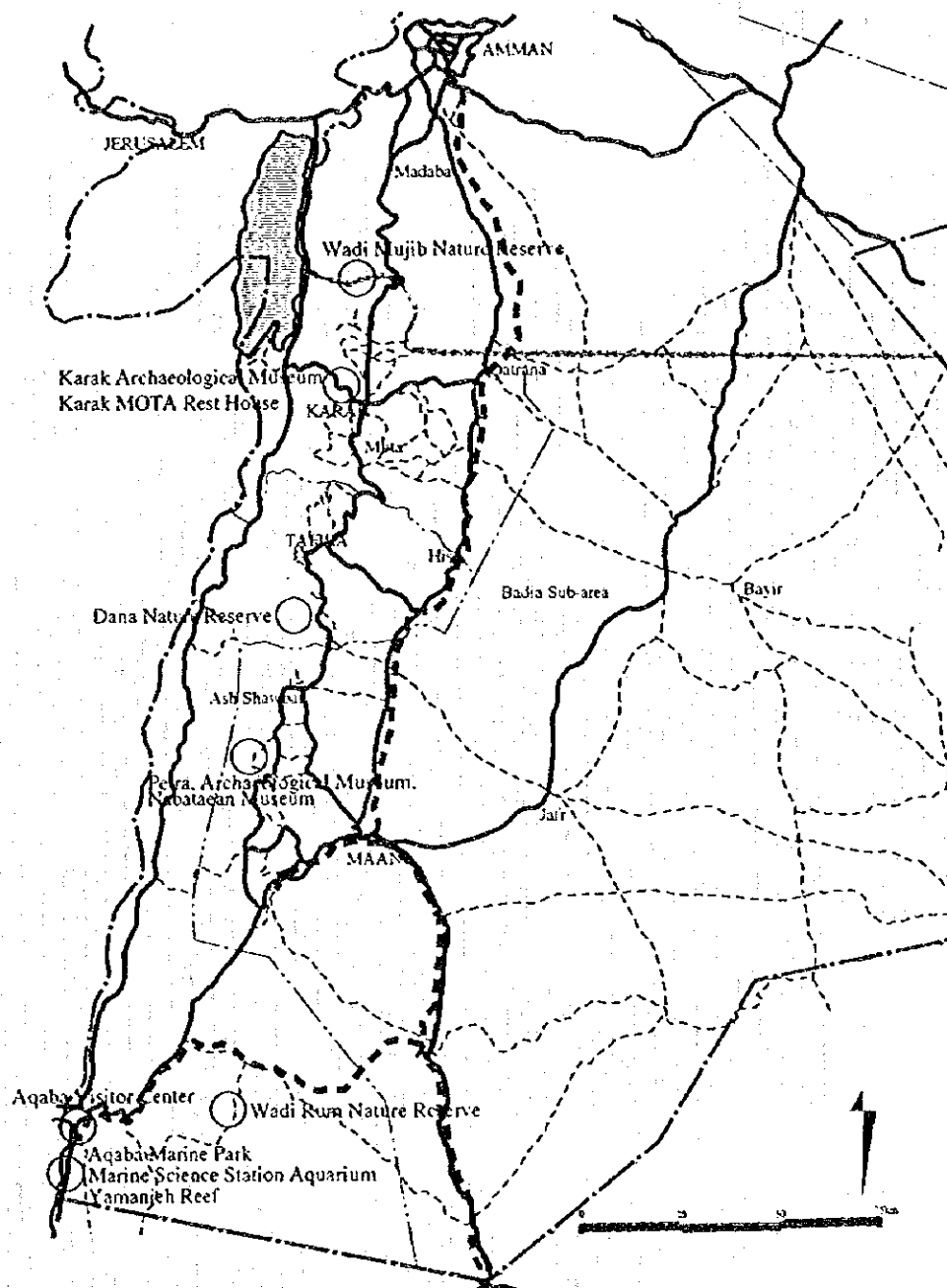
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Figure 3-1-5 Hydrogeological Cross-Section in the Dead Sea-AJ Hasa Area

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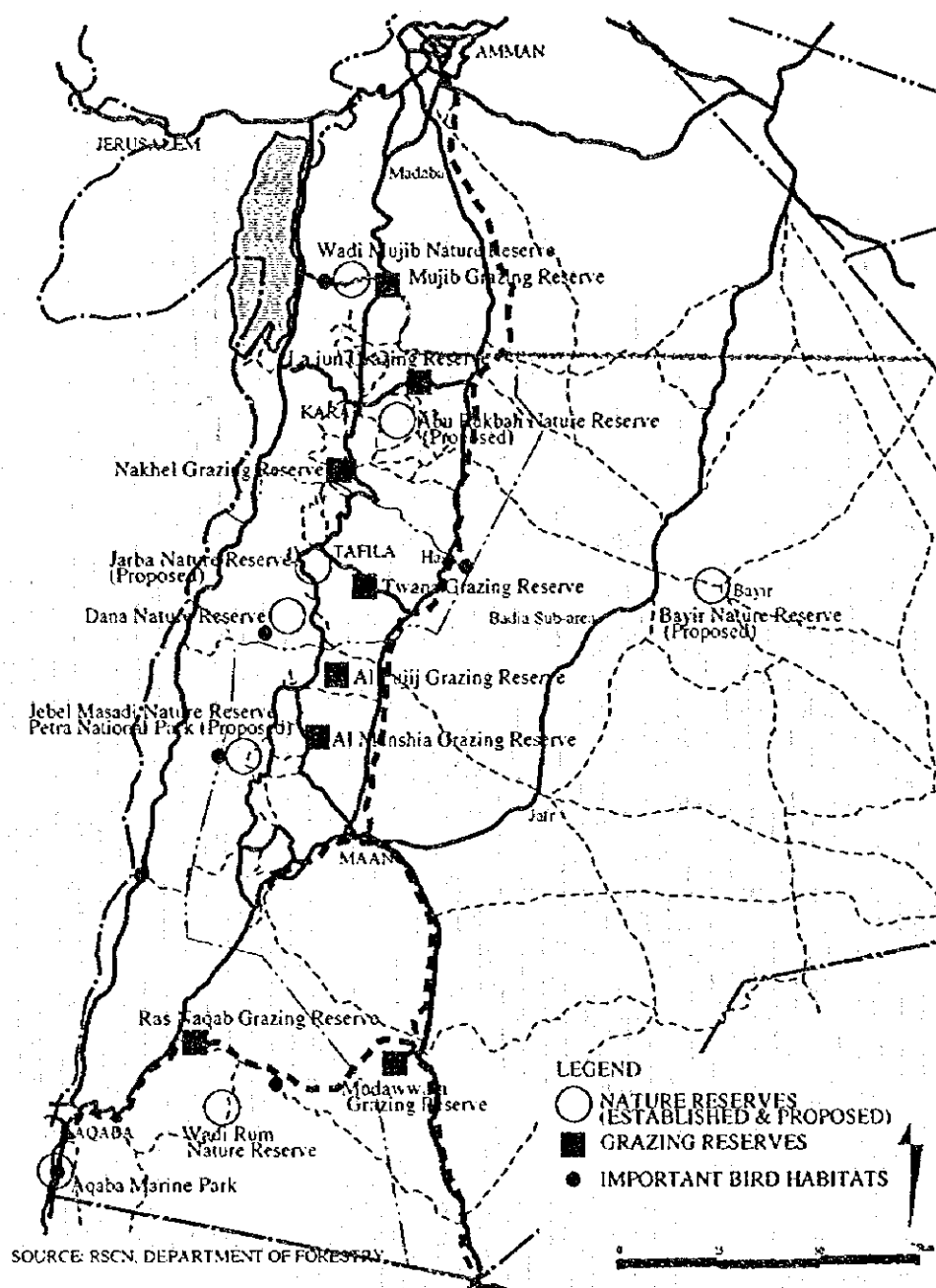
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Figure 3-1-7 Location map of Major Tourism Resources
in the Southern Districts

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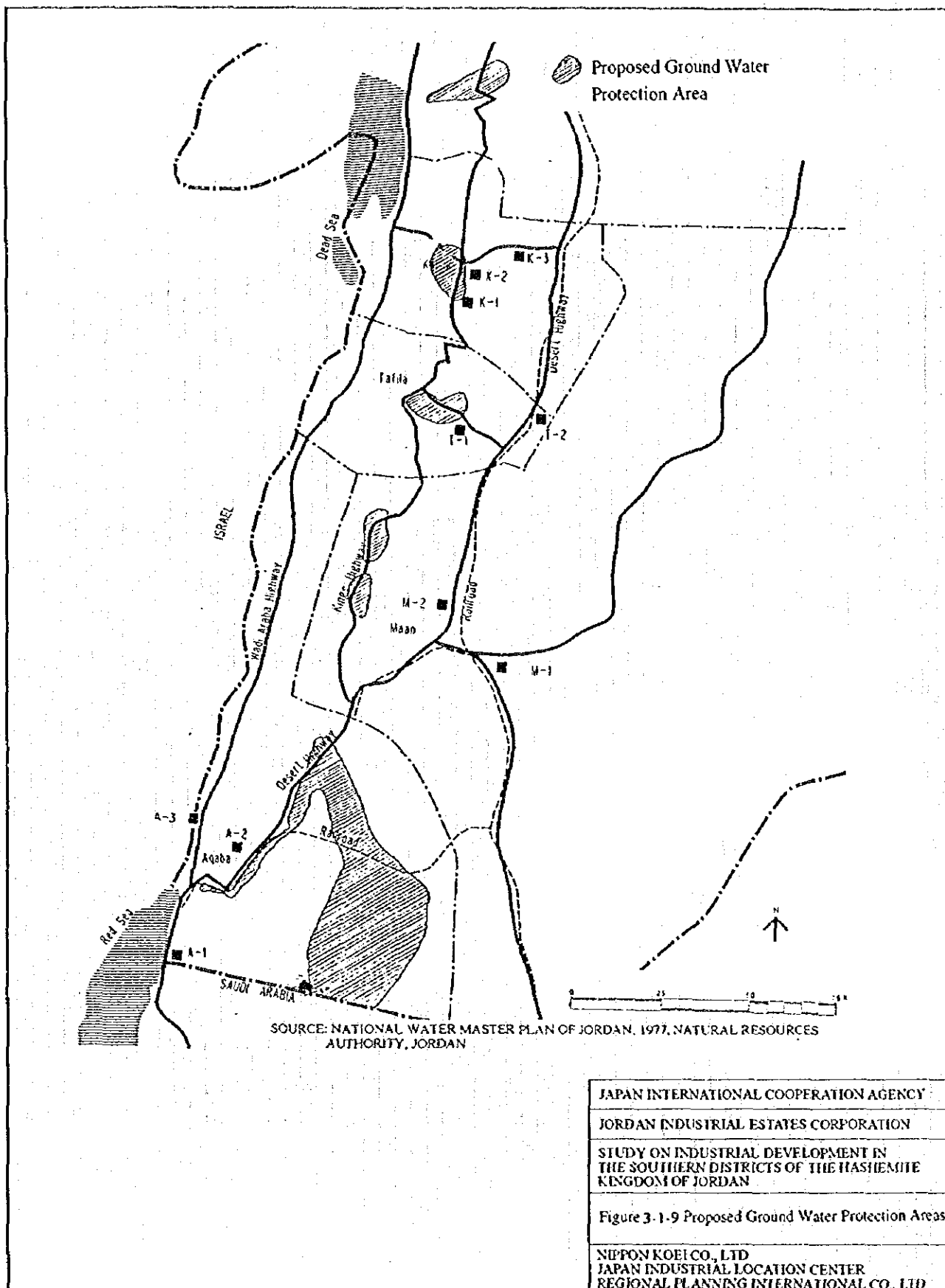
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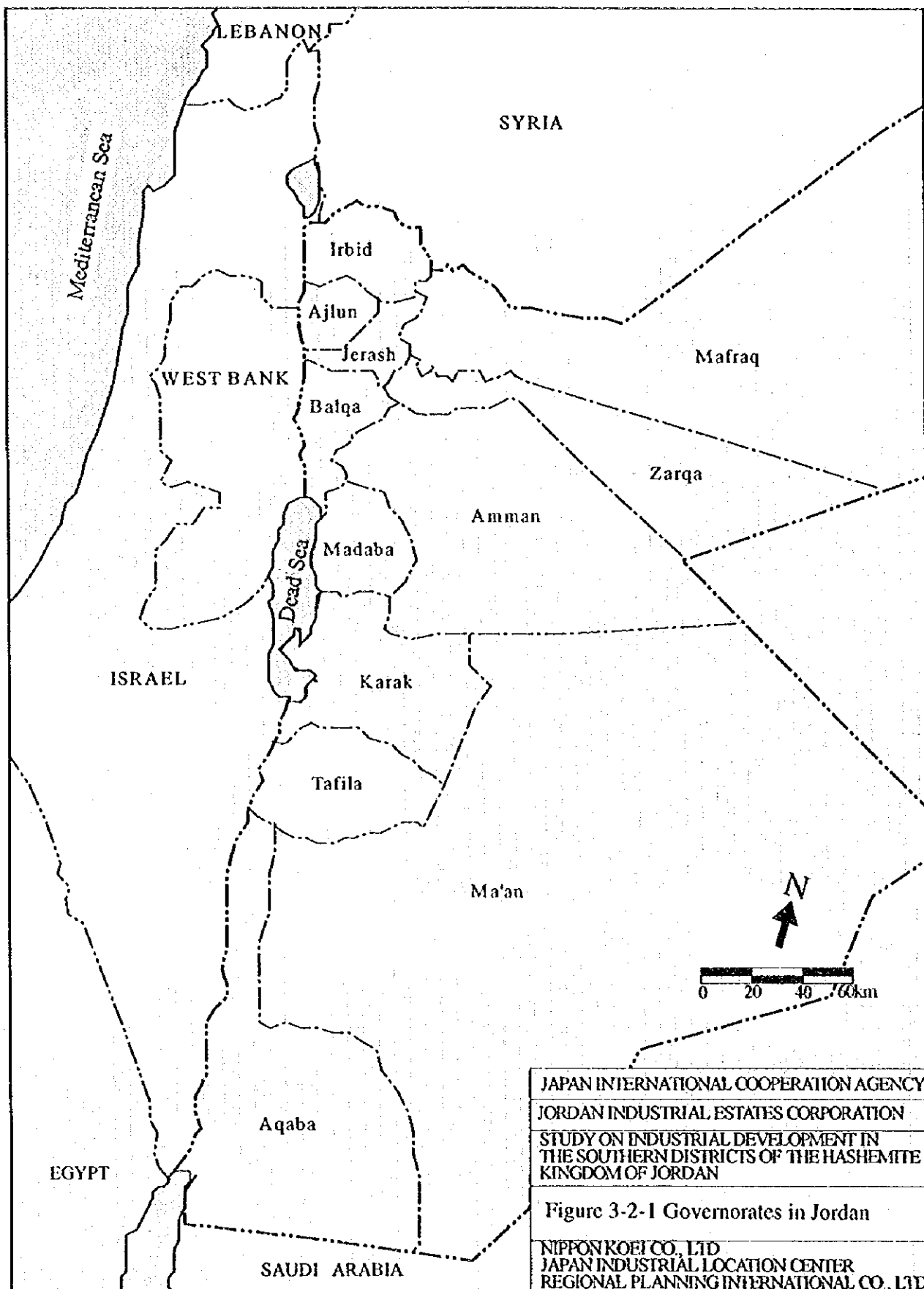
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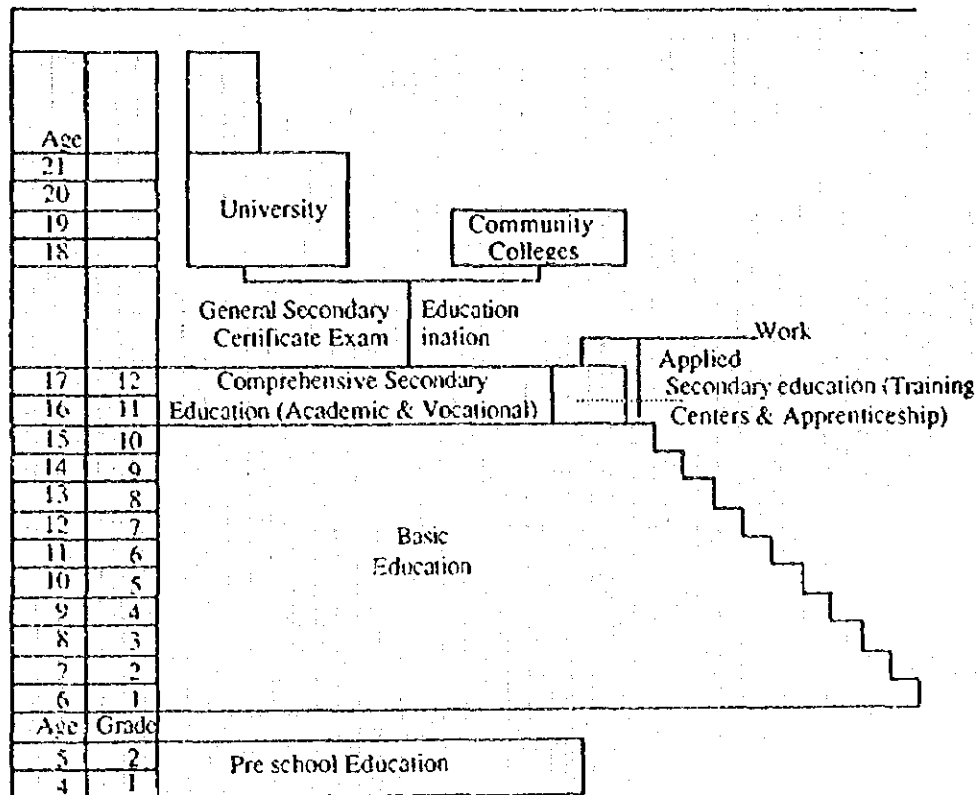
Figure 3-1-8 Areas for Conservation

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The Educational Ladder



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Figure 3-3-1 Educational Ladder

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