

Accordingly, the following improvement plans are proposed:

- (A) Reorganization of operation and management
- (B) Rerouting
- (C) Improvement of the existing Karak Bus Terminal and construction of a new bus terminal in Tafila

Organization of the public passenger transport system for bus services is proposed as follows:

- President - Secretariat
 - Publicity Section
 - General Affairs Dept.
 - Personnel Dept.
 - Financial Affairs Dept.
 - Work Dept. - Planning Section
 - Driver and Operation Section
 - Complete Equipment Section
 - Sightseeing Bus Section
 - Engineering Works Section
 - Administrative Section

2.5.4 Improvement Plan of Cargo Transport and Distribution System

To fulfill the increasing demands for transport which will be created by the proposed development of agriculture and industry as well as urbanization, establishment of a distribution network of goods will be needed as described below.

Functions of the cargo transport system in the Study Area is classified in a similar way to that of the bus service system; intra-regional and inter-regional transportation. Accordingly, measures of cargo transport will be as follows:

- (A) Inter-regional transportation: mainly by large-sized trucks and partly by railways
- (B) Intra-regional transportation: mainly by small-sized trucks

A distribution centre should be established at a terminal which connects intra-regional and inter-regional transportation. As the terminal site, such an area along the Desert Highway as located in the central part of the Study Area and close to a railway station is considered ideal. Small-sized trucks will be used for the cargo delivery and collection between the distribution centre and each household or company. At the distribution centre, a truck terminal, a wholesale market, warehouses and related facilities will be constructed. This arrangement will facilitate an inventory control and cargo handling as well as cargo delivery and collection. Thus, the efficiency of transport by trucks will be improved and growth of the traffic volume will slow down compared to the case without the centre.

The proposed cargo transport system with the distribution centre is shown in Fig. F-13. Reorganization of intra-regional cargo transport services will be required. The distribution centre should be justified through a feasibility study.

2.5.5 Railways

When cargo transport from Aqaba to Jweideh comes into operation again, necessary facilities should be arranged at a railway station near the proposed distribution centre to handle those railway cargoes destined for or sent from the Study Area.

2.5.6 Accessibility of Karak and Tafila

Accessibility between the Study Area and the principal regions outside was assessed for three implementation stages of the proposed expansion plan of the transportation system. Road networks for each stage are shown in Fig. F-14. Table F-21 shows accessibility between Karak and principal cities. Table F-22 shows that between Tafila and principal cities.

In the target year 2005, a high degree of accessibility will be secured by the route via the Desert Highway in all areas in Karak Region except a section between Karak and King Abudallah Bridge. However, a transportation cost to Amman, Zarqa, Irbid and Aqaba is somewhat higher than that for the route via the King's Highway. Accessibility between Karak and King Abudallah Bridge is greater if Route-65 is selected.

Also in Tafilah Region, a great degree of accessibility will be secured via the Desert Highway in all areas excluding a section between the King Abudallah Bridge and Aqaba. However, a transportation cost to Amman, Zarqa, Irbid and Ma'an is somewhat higher than that of the route via the King's Highway.

3. COMMUNICATIONS

3.1 National Communications System

Historically, the Ministry of Communications (MOC) started telecommunications services since 1951. While the international radio communications services were commissioned to Cable and Wireless Public Limited Company, which continued the operation till 1966. MOC built its first earth satellite station in Baqa'a in 1971. In 1971 the Telecommunications Corporation (TCC) was established to offer both domestic and international telecommunications services. In 1984 TCC started mobile telephone services in Greater Amman. Old step-by-step exchange equipment was totally replaced with Stored Program Control (SPC) exchange equipment by March 1985 to start automated dialing services.

3.1.1 National Telephone System

In recent years, the number of telephone subscribers rocketed from 86,074 in 1982 to 147,873 in 1985. In 1985 telephone spread to 5.4 per cent of inhabitants in Jordan. Total available lines of telephone exchanges were about 240,000 lines in 1985.

(1) Telephone exchange: There are 46 automatic switching nodes in Jordan. This provides automatic telephone service to 190 towns and villages. The percentage of population having automatic services is about 84 per cent of the total population of Jordan. In addition, there are about 360 manual exchanges ranging in size from a few lines to 200 lines in rural areas.

Interconnection between the large exchanges is mostly made via cables, and radio (microwave) transmission systems. While in the rural areas, manual exchanges are extended via openwire circuits.

(2) System configuration

National Switching Centre (NSC): For new national Direct Distance Dialing (DDD) services, NSC was established at Abdali exchange in Amman.

The DDD services were started in December 1982.

International Switching Centre (ISC): For International Subscriber Dialing (ISD) services, ISC was established also at Abdali exchange in Amman. This services were started in December 1982.

Manual switchboard: Manual switchboards with semiautomatic operation were installed at Amman central exchange, and Irbid, Karak, and Aqaba exchanges to handle domestic and international calls with operators.

Exchange hierarchy: The exchange hierarchy in the national telephone network is classified into the following 4 levels (Fig. F-15):

- (A) Secondary centre: NSC in Amman
- (B) Primary centre: Amman, Irbid, Karak, Ma'an
- (C) Local exchange
- (D) Remote Switching Units

Transmission facilities: In between Amman and principal cities, coaxial cable systems are used. In addition, microwave systems are available centering around Amman. In part, carrier cable systems of Pulse Coded Modulation (PCM) have been introduced. International communications depend on microwave systems and coaxial systems as well as a satellite system.

Mobile telephone services: The service areas are limited to those within a 30 km radius centred on Amman. In 1985, total operating lines were 637 out of the capacity of 2,000 lines.

3.1.2 Other Telecommunications Services

(1) Telex services: There were 300 telex lines in the beginning of 1976. In 1980, all electromechanical exchanges in Amman, Irbid, Aqaba, and Zarqa with total operating lines of 890 were replaced with a centralized electronic exchange in Amman to offer telex services to the whole Kingdom. Present total operating lines are 2,543 out of 4,000 lines capacity. The utility time of domestic telex was 4.2 million minutes in

1982 and 4.1 million minutes in 1985.

(2) Telegraph services: Telegraphs can be sent from and received by all post offices in Jordan.

(3) Public telephone services: At present a public telephone project is under implementation to provide all those communities in Jordan having population of more than 500 with one or two public telephone sets.

3.2 Present Conditions of Communications Systems in the Study Area

3.2.1 Telephone System

There are two automatic exchanges in the Study Area; one in Karak and the other in Tafila. Each exchange has capacity of 2,000 lines. In addition, there are 62 manual exchanges with total operating lines of 8,200. Manual exchanges are installed at post-offices.

As the Study Area is rural in general, small scale telephone demands are scattered widely ranging from 20 to 2,000 lines. In the old Karak Governorate, the number of telephone subscribers was 5,900 in 1985 which was about 1.5 times of 4,100 in 1981. This number of subscribers is ranked next to Amman and Irbid Governorates as shown in Table F-23.

3.2.2 Mail System

Postal services in the Study Area is provided by MOC with a mail box system as part of the national mail system. There are two central post-offices in the Study Area; one each in Karak and Tafila Cities. Under the central post-offices, there are the following sub-offices to cover rural areas:

- Post-offices in large size villages having population of more than 2,000
- Village post-offices in medium size villages having population of more than 700
- Postal agencies in small size villages having population of more than 300

The number of post offices in the Kingdom was 770 in 1985, of which 99 and 35 were in Karak and Tafila Governorates respectively (see Table F-24). The number of mail boxes in the Kingdom was 82,736 in 1985, having increased by 8 per cent from 1984. Of them 29,986 (36 per cent) was located in Amman (see Table F-25). In Karak Governorate there were only 2,360 mail boxes (3 per cent) and in Tafila Governorate 1,035 (1 per cent).

3.3 Existing Expansion Plans of Communications System

3.3.1 Telephone Network Expansion Project for the Karak Area

This project is under implementation with financial assistance by Japan to cover the Study Area excluding those part belonging to Amman Governorate, and will be completed by the end of 1987. This project is focused on those villages having future population of 500 or more in 2000, which is forecasted based on a statistic survey conducted in 1985. Expansion of telephone services to small villages of less than 500 in population needs to be considered in future.

The project facilities are designed on the basis of a forecast of telephone requirements, which was conducted in 1985. When the project is completed, all telephone exchanges will be automated. TCC estimated a number of telephone subscriber in the year 2000 at 30,700 lines. A rate of subscriber lines per household was assumed at 0.87 in 2000 and 1.00 in 2005.

Since the project will cover most of the Study Area, an outline of the project is introduced below in rather detail:

(1) Number of exchanges: One trunk exchange and 22 automatic local exchanges are envisaged for the Karak primary area. 22 digital remote switching units (RSU) will be established under this project. In addition 4 digital remote line multiplexers (RLM) will also be provided. Location of exchanges in the Karak primary area is as shown in Fig. F-16. The total capacity of the project is 10,352 DEL's.

(2) Type of switching system

Remote switching unit (RSU) contains both a subscriber switching unit and a route switching unit to complete own exchange calls, and has a limited capability for connecting calls to neighbouring exchanges. All control functions will be exercised by the parent exchange. Under emergency conditions such as loss of communications with the parent exchange, calls will be routed to specified emergency destinations (police, fire and ambulance stations). As an optional function, stand-alone facilities will also be provided and will enable to complete own exchange calls even under emergency conditions.

Remote line multiplexer (RLM) is a subscriber PCM carrier system with line test facilities. RLM will be connected to either parent exchange or RSU with 30-channel PCM link.

(3) Traffic routing: Homing arrangement for the Karak primary area is shown in Fig. F-17. Traffic within this area except own exchange traffic will be concentrated to the Karak primary centre and be routed to terminal exchanges. Traffic to and from other primary areas will also be concentrated to the Karak primary centre and be routed to other primary centres or local exchanges.

(4) Transmission route is shown in Fig. F-18.

3.3.2 Telephone Network Expansion Project for the Dhiban Area

Those part of Amman Governorate included in the Study Area will be covered by another telephone project with assistance by France. An exchange station will be completed in Dhiban by the year 2000. This exchange station will be a Local Switch of the Madaba Main Station.

3.3.3 Five-Year Plan Projects

(1) Telephone

(A) Regional Transmission Project (Syria - Jordan - Saudi Arabia): This project (microwave and cable) is the backbone of the national and regional telecommunications networks. It aims at interconnecting major cities and selected sites (Irbid, Yarmouk University,

Ramtha, Mafraq, Zarqa, Amman, Queen Alia International Airport, Karak, Ma'an and Aqaba), and will provide links with the Syrian, Saudi Arabian and Egyptian networks. The microwave network will improve television reception in Karak.

- (B) Expansion of semi-electronic exchanges: This project aims at establishing 3 semi-electronic exchanges in Lajjun, Sad al-Sultan and Wadi Abiad. It also aims at increasing the existing capacity of exchanges in various locations.

(2) Mail: The Third Five-Year Plan envisages to establish a complete postal services system to serve all towns and villages in Jordan.

(A) Postal Services Centres: This project aims at upgrading the existing joint offices, postal-windows and providing new post offices for postal services.

(B) Upgrading Postal Services: This project aims at developing and upgrading postal services to cope with the increase in mail volume. An electronic mail operation system will be introduced with equipment needed for high-speed mail operations.

3.4 Telephone Demand Projection

3.4.1 Methodology

Future telephone demand in the Study Area in 1990 and 2005 is projected based on the population framework of this study (Scenario 3) with a subscriber rate per household, which is estimated by TCC and is presented in Table F-26. The number of person per household is assumed at 6.0 for the year 1990, and 5.8 from 1995 through 2005.

3.4.2 Projected Telephone Demand

A rate of subscriber per household in Karak and Tafila Governorates is estimated at 1.0 in 2005 (TCC). Telephone demands are projected in this study for years 1990, 1995, 2000 and 2005 on the basis of the population forecast of this study. Telephone demand projection in the Study Area is shown in Table F-27.

3.5 Expansion Plan of Communications System

3.5.1 Basic Concept

(1) Telephone system: The ongoing Telephone Network Expansion Project will automate telephone exchange for those villages of which projected population in 2000 are more than 500. This criteria are practical and reasonable and are therefore generally adopted in this study for the plan until year 2005. However, public telephone services should be expanded to those villages having population of less than 500, and emergency telephone sets should be installed along principal roads.

(2) Mail system: Presently mail services are undertaken by mail box system. For prompt and convenient mail services, early implementation of the postal services is advised.

3.5.2 Telephone Network Reinforcing Plan

Among small villages which will not be covered by the ongoing telephone network expansion projects, 6 villages would have populations of more than 500 by the year 2005. Automatic telephone requirements of these village are forecasted as shown in Table F-28. The junction network configuration for the year 2005 is proposed as shown in Fig. F-19.

An installation of public telephones will be necessary for those villages which will not have telephone services even by the above expansion.

Such a telephone service system as provided along the Desert Highway should be expanded to other principal roads for a report and rescue in case of traffic accidents. This telephone services should also be provided for secondary roads which have large traffic volume. These emergency telephone lines will be connected to police stations and fire stations.

3.5.3 Improvement Plan of Mail System

To improve the quality of the existing mail system, the postal service system envisaged in the Third Five-Year Plan should be implemented.

Functions of existing central post offices in Karak and Tafila should be expanded to control and supervise postal services in the respective regions. In rural areas, mails will be delivered from post offices in principal villages to each household and organizations. This system is shown in Fig. F-20. Location of proposed central post offices and branch offices are shown in Fig. F-21.

4. CONCLUSIONS AND RECOMMENDATIONS

(1) Transportation: It is recommended that an expansion plan of transportation system be prepared in accordance with the basic concept proposed in Sub-section in 2.5.1.

The Road Network Expansion Plan should include:

- (A) Upgrading of the Huseineyyeh-Abiad road to a secondary road
- (B) Establishment of a village road network for the rural transportation
- (C) Improvement of road safety measures on primary and secondary roads

The Improvement Plan of Bus Service System should include:

- (A) Reorganization of operation and management
- (B) Rerouting to separate the intra-regional passenger transport using mini-buses and the inter-regional passenger transport using large buses
- (C) Improvement of the existing Karak Bus Terminal and construction of a new bus terminal in Tafila

The Improvement Plan of Cargo Transport and Distribution System should include:

- (A) Establishment of a distribution centre along the Desert Highway
- (B) Reorganization of intra-regional cargo transport services

(2) Communications: It is recommended that an expansion plan of the communications system be prepared in accordance with the basic concept recommended in Sub-section 3.5.1.

The Telephone Network Reinforcing Plan should include:

- (A) To increase exchanges to cover sites in Ayy, Mazar, Tafila, Hasa, Jada, Iraq, Aima, and Jurf
- (B) Installation of automatic telephones for those villages which are not covered by the Telephone Network Expansion Project. These villages are Sadd Essoltan, Harier, Rhab, Washiyyeh, Zahra and

Swawah.

- (C) Installation of public telephones for villages having population of less than 500
- (D) Installation of emergency telephones on those secondary roads which have large traffic volume

(3) Mail system

- (A) The existing central post office and branch offices should be reinforced to cover villages with population of 3,000 or more.
- (B) The mail service system should be improved in such a way as mails will be delivered from post offices to each household and organizations in principal villages.

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T A B L E S

Table F-1 TOTAL LENGTH OF NATIONAL ROADS IN JORDAN (1985)

Classification	Length		Paved (km)	Unpaved (km)
	(km)	(%)		
Primary	2,436	30	2,156	280
Secondary	1,035	13	867	168
Village	2,532	32	2,382	150
Agriculture	2,000	25	-	2,000
Total	8,003	100	5,405	2,598

Source: MPW

Table F-2 VEHICLES REGISTERED DURING 1981-1985

Year	No. of Vehicle	Annual Percentage Increase
1981	156,924	-
1982	177,849	13.3
1983	197,783	11.2
1984	211,657	7.0
1985	221,454	4.6

Source: Statistical Yearbook, 1985

Table F-3 REGISTRATION OF PASSENGER VEHICLES IN JORDAN

Year	Large and Small Buses			Taxi
	Private	Public	Total	
1985	1,380	2,253	3,633	12,699
1981	744	1,382	2,126	11,661
1985/1981	1.85	1.63	1.71	1.09

Source: Statistical Yearbook, 1985

Table F-4 REGISTRATION OF FREIGHT VEHICLES IN JORDAN

Year	Public	Private	Total
1985	20,338	32,028	52,366
1981	17,195	18,597	35,792
1985/1981	1.18	1.72	1.46

Source: Compiled by the Study Team based on Statistical Yearbook, 1985

Table F-5 ROLLING STOCK IN ACTIVE WORK 1981-1985

Year	Locomotives	Passenger Carriages	Freight Cars	Mazut Tankers	Water Tankers	Trollies
1981	37	12	574	29	11	2
1982	36	9	583	29	11	2
1983	47	11	561	32	11	2
1984	45	9	651	32	20	2
1985	37	8	508	26	20	2

Source: Statistical Yearbook, 1985

Table F-6 SHIPPING ACTIVITY IN AQABA PORT 1981-1985

(tonnes)

Year	Total Goods Handled	Number of Vessels
1981	9,426,367	1,744
1982	11,672,703	2,599
1983	11,162,863	2,454
1984	13,606,451	2,329
1985	14,547,711	2,671

Source: Statistical Yearbook, 1985

Table F-7 CARGOES THROUGH AQABA PORT 1981-1985

(tonnes)

Year	Export	Import	Transit
1981	3,621,681	2,773,922	3,030,764
1982	3,835,459	3,671,003	4,166,241
1983	5,059,108	3,166,856	2,936,899
1984	7,158,108	3,228,139	3,220,204
1985	8,177,607	2,362,434	4,007,670

Source: Statistical Yearbook, 1985

Table F-8 KINDS OF TRANSIT CARGOES THROUGH AQABA PORT
DURING 1981-1985

(1,000 tonnes)

Kind	1981		1982		1983		1984		1985	
		(%)		(%)		(%)		(%)		(%)
Iraq	3,022.0	99.7	4,130.9	99.2	2,869.2	97.7	3,181.8	98.8	3,969.2	99.0
Saudi	6.9	0.2	27.5	0.7	50.7	1.7	23.7	0.7	24.4	0.6
Kuwait	0.6	-	5.3	0.1	5.9	0.2	9.0	0.3	6.8	0.2
Other	1.3	0.1	2.5	-	11.1	0.4	5.7	0.1	7.3	0.2
Total	3,030.8	100	4,166.2	100	2,936.9	100	3,220.2	100	4,007.7	100

Source: Statistical Yearbook, 1985

Table F-9 TOTAL LENGTH OF NATIONAL ROADS IN THE STUDY AREA (1985)

Classification	Length		Pavement length	
	(km)	(%)	(km)	(%)
Primary Roads	110.0	15	110.0	100
Secondary Roads	305.0	40	305.0	100
Village Roads	344.7	45	281.7	82
Total	759.7	100	696.7	92

Source: MMRAE

Table F-10 NUMBER OF LOCOMOTIVES

Type	Number of owned	Number of used	Kind of used	Remark
U20C	18	15	main line	
U18C	10	10	main line	Except one which is used for shunting only
U10C	5	5	main line and shunting	
CEM	6	1	track repair work	
U17C	3	-		
Total	43	27		

Source: National Transport Study, As of September 1982

Table F-11 VOLUME OF GOODS TRAFFIC BY RAILWAY DURING 1981-1985

Year	Volume of Goods Traffic (ton)	Annual Percentage Increase
1981	1,636,861	-
1982	2,153,591	31.6
1983	2,592,219	20.4
1984	3,152,663	21.6
1985	2,473,736	-21.5

Source: Statistical Yearbook, 1985

Table F-12 POPULATION BY ZONES IN 2005

Zone	Population of the year 2005 (persons)	Share of Population by Zone (percentage)
1. Dhiban	10,300	3.8
2. Um Rsas	4,600	1.7
3. Um Rabba	38,800	14.4
4. Qatrana	4,700	1.7
5. Karak	46,600	17.2
6. Adir	7,800	2.9
7. Mazar	59,300	21.9
8. Moab	11,500	4.3
9. Abiad	1,300	0.5
10. Tafila	35,900	13.3
11. Hasa	25,000	9.2
12. Abur	1,100	0.4
13. Bsaira	23,500	8.7
Total	270,400	100.0

Source: The Study Team

Table F-13 GROWTH RATE OF PASSENGER CAR TRAFFIC
(During the Period Between 1990 and 2000)

		(%)				
		Car	Taxi	Minibus	Bus	Pick-up
Desert Highway	To Amman	6.1	5.5	1.5	1.6	-0.7
	To Aqaba	7.4	5.8	0.2	1.1	1.9
King's Highway	To Amman	0.9	0.7	0.2	-	0.9
	To Aqaba	1.3	2.9	5.7	-	1.4
Route 80	Karak - Dead Sea	1.7	4.8	0	-	1.7
	Karak - Qatrana	3.8	2.7	1.4	3.0	3.2
Route 84	Tafila - Darawish	10.5	9.0	2.9	4.0	7.0

Source: National Transport Study

Table F-14 GROWTH RATE OF CARGO TRUCK TRAFFIC
(During the Period Between 1990 and 2000)

		(%)	
		Pick-up	Truck
Desert Highway	To Amman	7.8	2.7
	To Aqaba	26.1	2.8
King's Highway	To Amman	1.1	1.3
	To Aqaba	1.1	2.2
Route 80	Karak - Dead Sea	1.7	7.1
	Karak - Qatrana	2.1	12.6
Route 84	Tafila - Darawish	10.5	3.3

Source: National Transport Study

Table F-15 PROJECTED TRAFFIC VOLUME OF AGRICULTURAL SECTOR (2005)

	Average Under Cultivation (ha)	Annual Crops (ton/ha/yr)	Average Annual Transport Volume (ton/day)
Drip Irrigation	1100	4	12.1
Fruit	2300	3.25	20.5
Wheat/Sorghum	4200	1.5	17.3
Livestock Fertilizer (75 head /farmhouse)			1517.4
Meat			37.8
Total			1605.1

Source: The Study Team

Table F-16 PROJECTED TRAFFIC VOLUME OF INDUSTRIAL SECTOR (2005)

Location	Average Transport Volume (ton/day)	Location	Average Transport Volume (ton/day)
Mu'tah	1,600	Rabba	73
New Karak	130	Ayy	73
Old Karak	11	Moab	73
Outer Tafila	1,000	Ain Al Beida	73
Tafila	435	Gharandal	73
Hasa Darawish	2,973	Qatrana	73
Dhiban	73		
Qasr	73	Total	6,736

Source: The Study Team

Table F-17 PROJECTED TRAFFIC VOLUME OF MINING SECTOR (2005)

Location		Average Transport Volume (t/day)	Destination
Hasa, Abiad	(Phosphate) ^{1/}	4,795	Aqaba
Rashadiya	(Cement)	5,480	Aqaba
Lajjun	(Oil Shale)	770	Zarqa
Total		11,045	

Source: The Study Team

^{1/}: Phosphate of 4,500,000 t/yr by railway transport is not included.

Note: The average transport volume per truck is estimated as follows:

- Agriculture: 5.0 t/truck
- Industry : 5.0 t/truck
- Mining : 20.0 t/truck

Table F-18 POPULATION SHARE BY ZONE IN JORDAN

Zone	Share of Population in 1985 (%)
Amman	83
Jordan Valley and Salt	6
Aqaba	3
Ma'an	1
Safi	1
Study Area	6

Source: MOP

Table F-19 TRAFFIC VOLUME AND CAPACITY

Road	Section	Traffic Volume V (vehicle/day)	Traffic Capacity C (vehicle/day)	V/C
Desert Highway	Jiza - Qatrana	21,400	29,000	0.74
King's Highway	Idir - Karak	8,900	12,800	0.70
Route 78	Jiza - Dhiban	1,100	12,800	0.09
Route 80	Qatrana - Adir	7,100	12,800	0.55
Route 84	Tafila - Darawish	2,600	12,800	0.20

Sources: Traffic volume by The Study Team

Traffic capacity by National Transport Study

Table F-20 EXPANSION PLAN OF VILLAGE ROADS

Area	Section	Kind	
Dhiban	Falha	- Qbaibeh	Construction
	Salyeh	- Ramah	Construction
	Um Shajarah	- King's Highway	Improvement
	Um Shajarah Shargiyyeh	- Elayyan	Improvement
	Ara'er	- Route 78	Improvement
	Ara'er	- Yahoom	Improvement
	Thrayya	- Salyeh	Improvement
Karak	Thrayya	- Msaitbeh	Improvement
	Faqu	- Shihan	Construction
	Sirfa	- Zahra	Construction
	Um Rummanah	- Zugheiriya	Construction
	Sul	- Moab	Construction
	El Rabba	- El Yarut	Improvement
	Wadi Ben Hammad	- Eddimna	Improvement
	Saahoor	- Wasiiyyeh	Improvement
	Saahoor	- Badhdhan	Improvement
	Lajjun	- Route 80	Improvement
	Lajjun	- Judaiyida	Improvement
	Samra	- El Baqei	Improvement
	Gmuweir	- Mraighah	Improvement
	Mraighah	- Route 80	Improvement
	Middein	- Mirwid	Improvement
	El Iraq	- Edabbaka + Isawiya	Improvement
	Hamdiyyeh	- Mazar - Abiad Road	Improvement
	Hamdiyyeh	- Shuqaira	Improvement
	El Hashimiya El Janubiya	- Um El Ghozlan	Improvement
	Dabbeh	- Um El Ghozlan	Improvement
Dabbeh	- El Baqa	Improvement	
El Baqa	- Um Al Yanabee	Improvement	
Um El Khanazir	- Um Al Yanabee	Improvement	
Tafila	Shaedham	- Swaimie	Construction
	Dhana	- Lahdahah - Kings-Highway Road	Construction
	Majadil	- Abu Banna	Improvement
	Abur	- El Harir	Improvement
	Essile	- Al Mitan	Improvement
	Al Mitan	- Kings-Highway	Improvement
	Um Essarab	- Sail Ria	Improvement
	Bsaira	- Lahdhah	Improvement

Source: The Study Team

Table F-21 ACCESSIBILITY BETWEEN KARAK AND PRINCIPAL CITIES (1/2)

From Karak		Via Desert Highway			Via King's Highway			Via Route 65		
		1990	1995	2005	1990	1995	2005	1990	1995	2005
To Amman	(A)	124	124	124	117	117	117	-	-	-
	(B)	1.84	1.74	1.74	2.08	2.08	2.01	-	-	-
	(C)	67.4	71.3	71.3	56.3	56.3	58.2	-	-	-
	(D)	0.543	0.575	0.575	0.481	0.481	0.498	-	-	-
	(E1)	6.2	6.2	6.2	5.9	5.9	5.9	-	-	-
	(E2)	26.4	26.4	26.4	25.0	25.0	25.0	-	-	-
	(E3)	26.6	26.6	26.6	25.1	25.1	25.1	-	-	-
	(E4)	33.4	33.4	33.4	31.5	31.5	31.5	-	-	-
To Zarqa	(A)	147	147	147	140	140	140	-	-	-
	(B)	2.20	2.10	2.10	2.44	2.44	2.37	-	-	-
	(C)	66.8	70.0	70.0	57.4	57.4	59.1	-	-	-
	(D)	0.455	0.476	0.476	0.410	0.410	0.422	-	-	-
	(E1)	7.4	7.4	7.4	7.0	7.0	7.0	-	-	-
	(E2)	31.4	31.4	31.4	29.9	29.9	29.9	-	-	-
	(E3)	31.6	31.6	31.6	30.1	30.1	30.1	-	-	-
	(E4)	39.5	39.5	39.5	37.7	37.7	37.7	-	-	-
To Syria	(A)	213	202	186	191	191	191	-	212	212
	(B)	3.30	2.76	2.66	3.25	3.13	3.13	-	3.31	3.31
	(C)	64.5	73.2	69.9	58.8	61.0	61.0	-	64.0	64.0
	(D)	0.303	0.362	0.376	0.308	0.319	0.319	-	0.302	0.302
	(E1)	10.7	10.1	9.3	9.6	9.6	9.6	-	10.6	10.6
	(E2)	45.4	43.1	39.7	40.7	40.7	40.7	-	45.2	45.2
	(E3)	45.8	43.4	40.0	41.0	41.0	41.0	-	45.6	45.6
	(E4)	57.3	54.3	50.0	51.4	51.4	51.4	-	57.0	57.0
To Irbid	(A)	213	213	213	191	191	191	-	212	212
	(B)	3.30	3.03	3.03	3.25	3.18	3.18	-	3.35	3.35
	(C)	64.5	70.3	70.3	58.8	60.1	60.1	-	63.3	63.3
	(D)	0.303	0.330	0.330	0.308	0.314	0.314	-	0.299	0.299
	(E1)	10.7	10.7	10.7	9.6	9.6	9.6	-	10.6	10.6
	(E2)	45.4	45.4	45.4	40.7	40.7	40.7	-	45.2	45.2
	(E3)	45.8	45.8	45.8	41.0	41.0	41.0	-	45.6	45.6
	(E4)	57.3	57.3	57.3	51.4	51.4	51.4	-	57.0	57.0

- (A) Distance (km)
- (B) Time (h)
- (C) Average Running speed (km/h) ((A)/(B))
- (D) Accessibility (1/(B))
- (E) Economic Vehicle Operating Costs (National Transport Study)
- (E1) Passenger Car (50.1 fils/km)
- (E2) Bus (213.3 fils/km)
- (E3) Light Truck (214.9 fils/km)
- (E4) Medium Truck (269.0 fils/km)

Table F-21 ACCESSIBILITY BETWEEN KARAK AND PRINCIPAL CITIES (2/2)

From Karak		Via Desert Highway			Via King's Highway			Via Route 65		
		1990	1995	2005	1990	1995	2005	1990	1995	2005
To King Abudallah Bridge	(A)	160	160	160	138	138	138	-	101	101
	(B)	2.68	2.31	2.31	2.57	2.40	2.40	-	1.77	1.77
	(C)	59.7	69.3	69.3	53.7	57.5	57.5	-	57.1	57.1
	(D)	0.373	0.433	0.433	0.389	0.417	0.417	-	0.565	0.565
	(E1)	8.1	8.1	8.1	6.9	6.9	6.9	-	5.1	5.1
	(E2)	34.3	34.3	34.3	29.4	29.4	29.4	-	21.5	21.5
	(E3)	34.4	34.4	34.4	29.7	29.7	29.7	-	21.7	21.7
	(E4)	43.0	43.0	43.0	37.1	37.1	37.1	-	27.2	27.2
To Azraq	(A)	203	203	185	196	196	196	-	-	-
	(B)	3.12	3.02	2.85	3.36	3.36	3.29	-	-	-
	(C)	65.1	67.2	64.9	58.3	58.3	59.6	-	-	-
	(D)	0.321	0.331	0.351	0.298	0.298	0.304	-	-	-
	(E1)	10.2	10.2	9.3	9.8	9.8	9.8	-	-	-
	(E2)	43.3	43.3	39.5	41.8	41.8	41.8	-	-	-
	(E3)	43.6	43.6	39.8	42.1	42.1	42.1	-	-	-
	(E4)	54.6	54.6	49.8	52.7	52.7	52.7	-	-	-
To Ma'an	(A)	166	166	166	171	171	171	-	-	-
	(B)	2.24	2.24	2.24	2.75	2.75	2.75	-	-	-
	(C)	7.41	7.41	7.41	62.2	62.2	62.2	-	-	-
	(D)	0.446	0.446	0.446	0.364	0.364	0.364	-	-	-
	(E1)	8.3	8.3	8.3	10.8	10.8	10.8	-	-	-
	(E2)	35.4	53.4	53.4	36.5	36.5	36.5	-	-	-
	(E3)	35.7	35.7	35.7	36.7	36.7	36.7	-	-	-
	(E4)	44.7	44.7	44.7	46.0	46.0	46.0	-	-	-
To Aqaba	(A)	287	287	287	258	258	258	237	237	237
	(B)	4.05	3.91	3.91	4.25	4.18	4.18	4.04	4.04	4.04
	(C)	70.9	73.4	73.4	60.7	61.7	61.7	58.7	58.7	58.7
	(D)	0.247	0.256	0.256	0.235	0.239	0.239	0.248	0.248	0.248
	(E1)	14.4	14.4	14.4	12.9	12.9	12.9	11.9	11.9	11.9
	(E2)	61.2	61.2	61.2	55.0	55.0	55.0	50.6	50.6	50.6
	(E3)	61.7	61.7	61.7	55.4	55.4	55.4	50.9	50.9	50.9
	(E4)	77.2	77.2	77.2	69.4	69.4	69.4	63.8	63.8	63.8

- (A) Distance (km)
 (B) Time (h)
 (C) Average Running Speed (km/h) ((A)/(B))
 (D) Accessibility (1/(B))
 (E) Economic Vehicle Operating Costs (National Transport Study)
 (E1) Passenger Car (50.1 fils/km)
 (E2) Bus (213.3 fils/km)
 (E3) Light Truck (214.9 fils/km)
 (E4) Medium Truck (269.0 fils/km)

Source: The Study Team

Table F-22 ACCESSIBILITY BETWEEN TAFILA AND PRINCIPAL CITIES (1/2)

From Tafilal		Via Desert Highway			Via King's Highway			Via Route 65		
		1990	1995	2005	1990	1995	2005	1990	1995	2005
To Amman	(A)	183	183	183	182	182	182	-	-	-
	(B)	2.55	2.45	2.45	3.33	3.33	3.27	-	-	-
	(C)	71.8	74.7	74.7	54.7	54.7	55.7	-	-	-
	(D)	0.392	0.408	0.408	0.300	0.300	0.306	-	-	-
	(E1)	9.2	9.2	9.2	9.1	9.1	9.1	-	-	-
	(E2)	39.0	39.0	39.0	38.8	38.8	38.8	-	-	-
	(E3)	39.3	39.3	39.3	39.1	39.1	39.1	-	-	-
	(E4)	49.2	49.2	49.2	49.0	49.0	49.0	-	-	-
To Zarqa	(A)	206	206	206	205	205	205	-	-	-
	(B)	2.91	2.81	2.81	3.69	3.69	3.62	-	-	-
	(C)	70.8	73.3	73.3	55.6	55.6	56.6	-	-	-
	(D)	0.344	0.356	0.356	0.271	0.271	0.276	-	-	-
	(E1)	10.3	10.3	10.3	10.3	10.3	10.3	-	-	-
	(E2)	43.9	43.9	43.9	43.7	43.7	43.7	-	-	-
	(E3)	44.3	44.3	44.3	44.1	44.1	44.1	-	-	-
	(E4)	55.4	55.4	55.4	55.1	55.1	55.1	-	-	-
To Syria	(A)	275	261	245	256	256	256	-	248	248
	(B)	3.92	3.47	3.37	4.49	4.37	4.37	-	3.82	3.82
	(C)	70.2	75.2	72.7	57.0	58.6	58.6	-	64.9	64.9
	(D)	0.255	0.288	0.297	0.233	0.229	0.229	-	0.262	0.262
	(E1)	13.8	13.1	12.3	12.8	12.8	12.8	-	12.4	12.4
	(E2)	58.7	55.7	52.3	54.6	54.6	54.6	-	52.9	52.9
	(E3)	59.1	56.1	52.7	55.0	55.0	55.0	-	53.3	53.3
	(E4)	74.0	70.2	65.9	68.9	68.9	68.9	-	66.7	66.7
To Irbid	(A)	275	275	275	256	256	256	-	248	248
	(B)	3.91	3.81	3.81	4.49	4.37	4.37	-	3.82	3.82
	(C)	70.3	72.2	72.2	57.0	58.6	58.6	-	64.9	64.9
	(D)	0.256	0.262	0.262	0.223	0.229	0.229	-	0.262	0.262
	(E1)	13.8	13.8	13.8	12.8	12.8	12.8	-	12.4	12.4
	(E2)	58.7	58.7	58.7	54.6	54.6	54.6	-	52.9	52.9
	(E3)	59.1	59.1	59.1	55.0	55.0	55.0	-	53.3	53.3
	(E4)	74.0	74.0	74.0	68.9	68.9	68.9	-	66.7	66.7

- (A) Distance (km)
 (B) Time (h)
 (C) Average Running speed (km/h) ((A)/(B))
 (D) Accessibility (1/(B))
 (E) Economic Vehicle Operating Costs (National Transport Study)
 (E1) Passenger Car (50.1 fils/km)
 (E2) Bus (213.3 fils/km)
 (E3) Light Truck (214.9 fils/km)
 (E4) Medium Truck (269.0 fils/km)

Table F-22 ACCESSIBILITY BETWEEN TAFILA AND PRINCIPAL CITIES (2/2)

From Tafila		Via Desert Highway			Via King's Highway			Via Route 65		
		1990	1995	2005	1990	1995	2005	1990	1995	2005
To Abudallah Bridge	(A)	219	219	219	203	203	203	-	137	137
	(B)	3.29	3.02	3.02	3.82	3.65	3.65	-	2.28	2.28
	(C)	66.6	72.5	72.5	53.1	55.6	55.6	-	60.1	60.1
	(D)	0.303	0.331	0.331	0.262	0.274	0.274	-	0.439	0.439
	(E1)	11.0	11.0	11.0	10.2	10.2	10.2	-	6.9	6.9
	(E2)	46.7	46.7	46.7	43.3	43.3	43.3	-	29.2	29.2
	(E3)	47.1	47.1	47.1	43.6	43.6	43.6	-	29.4	29.4
	(E4)	58.9	58.9	58.9	54.6	54.6	54.6	-	36.9	36.9
To Azraq	(A)	262	262	244	261	261	261	-	-	-
	(B)	3.83	3.73	3.56	4.61	4.61	4.54	-	-	-
	(C)	68.4	70.2	68.5	56.6	56.6	57.5	-	-	-
	(D)	0.261	0.268	0.281	0.217	0.217	0.220	-	-	-
	(E1)	13.1	13.1	12.2	13.1	13.1	13.1	-	-	-
	(E2)	55.9	55.9	52.0	55.7	55.7	55.7	-	-	-
	(E3)	56.3	56.3	52.4	56.1	56.1	56.1	-	-	-
	(E4)	70.5	70.5	65.6	70.2	70.2	70.2	-	-	-
To Ma'an	(A)	91	91	91	81	81	81	-	-	-
	(B)	1.27	1.27	1.27	1.50	1.50	1.50	-	-	-
	(C)	71.7	71.7	71.7	54.0	54.0	54.0	-	-	-
	(D)	0.787	0.787	0.787	0.667	0.667	0.667	-	-	-
	(E1)	4.6	4.6	4.6	4.0	4.0	4.0	-	-	-
	(E2)	19.4	19.4	19.4	17.3	17.3	17.3	-	-	-
	(E3)	19.6	19.6	19.6	17.4	17.4	17.4	-	-	-
	(E4)	24.5	24.5	24.5	21.8	21.8	21.8	-	-	-
To Aqaba	(A)	212	212	212	193	193	193	-	193	193
	(B)	3.08	2.94	2.94	3.0	2.93	2.93	-	3.22	3.22
	(C)	68.8	72.1	72.1	64.3	65.9	65.9	-	59.9	59.9
	(D)	0.325	0.340	0.340	0.333	0.341	0.341	-	0.311	0.311
	(E1)	10.6	10.6	10.6	9.7	9.7	9.7	-	9.7	9.7
	(E2)	45.2	45.2	45.2	41.2	41.2	41.2	-	41.2	41.2
	(E3)	45.6	45.6	45.6	41.5	41.5	41.5	-	41.5	41.5
	(E4)	57.0	57.0	57.0	51.9	51.9	51.9	-	51.9	51.9

- (A) Distance (km)
- (B) Time (h)
- (C) Average Running speed (km/h) ((A)/(B))
- (D) Accessibility (1/(B))
- (E) Economic Vehicle Operating Costs (National Transport Study)
- (E1) Passenger Car (50.1 fils/km)
- (E2) Bus (213.3 fils/km)
- (E3) Light Truck (214.9 fils/km)
- (E4) Medium Truck (269.0 fils/km)

Source: The Study Team

Table F-23 TELEPHONE SUBSCRIBERS BY GOVERNORATE (1980-1985)

Year	Total	Ma'an	Karak	Balqa	Irbid	Amman
1980	62,006	2,510	3,266	4,295	9,164	42,771
1981	73,298	3,000	4,066	4,969	12,839	48,424
1982	84,483	3,286	4,746	5,426	14,859	56,166
1983	95,048	3,771	5,308	5,858	16,139	63,972
1984	113,663	3,938	5,445	5,509	17,784	80,987
1985	144,972	4,133	5,925	4,316	21,187	109,411

Source: Statistical Yearbook, 1985

Table F-24 NUMBER OF POST OFFICES IN 1985

Location	Combined Office	Post office	Village Office	Tel. Office	Post Window	Post Agent	Total
Amman	-	26	-	-	-	9	35
Suburbs	-	23	8	1	1	35	68
Madaba	5	17	6	-	-	57	85
Sub-total	5	66	14	1	1	101	188
Irbid	-	64	11	-	-	40	115
Ajloon	1	10	3	-	1	12	27
Jerash	-	13	5	-	1	15	34
North Qoor	-	6	1	-	-	12	19
Ramtha	1	5	1	-	-	3	10
Sub-total	2	98	21	-	2	82	205
Balqa	-	12	7	1	2	29	51
Middle Qoor	-	6	2	3	-	17	28
Sub-total	-	18	9	4	2	46	79
Karak	5	26	9	-	1	58	99
Ma'an	1	11	5	2	3	32	54
Zarqa	-	21	4	-	-	22	47
Mafraq	-	19	10	-	-	34	63
Tafila	-	9	2	-	-	24	35
Sub-total	6	86	30	2	4	170	298
Total	13	268	74	7	9	399	770

Source: Ref. F-5

Table F-25 NUMBER OF MAIL BOXES

Location	1984	1985
Amman	29,116	29,986
Irbid	7,180	8,980
Karak	2,360	2,360
Balqa	3,800	3,980
Ma'an	3,400	3,400
Zarqa	9,175	10,135
Jerash	1,070	1,070
Tafila	1,035	1,035
Ajloon	920	920
North Qoor	355	355
Mafraq	2,340	2,340
Madaba	2,295	3,315
Suburbs	10,520	11,900
Rantha	1,800	1,800
Middle Qoor	1,160	1,160
Total	76,526	82,736

Source: Ref. F-5

Table F-26 SUBSCRIBER RATE FOR TELEPHONE NETWORK DEVELOPMENT
IN THE STUDY AREA

(subscriber/household)

Population of 1985	1990	1995	2000
Village under 1,100 persons	0.55	0.65	0.75
Village over 1,100 persons and under 5,000 persons	0.70	0.80	0.85
Village over 5,000 persons	0.75	0.90	1.00
Karak (14,425 persons)	0.90	0.95	1.00
Tafila (14,917 persons)	0.75	0.85	1.00
Average	0.70	0.79	0.87

Source: Telecommunications Corporation (TCC)

Table F-27 TELEPHONE DEMAND PROJECTION IN THE STUDY AREA (1/4)

Exchange Name	Village Name	(subscriber)			
		1990	1995	2000	2005
Karak	Karak	2577	3294	4321	6193
	Shehabiyyeh	274	362	436	580
	Total	2851	3657	4757	6773
Thaniyyeh	Thaniyyeh	161	213	256	341
	Ghwair	166	220	265	352
	Zahhoom	55	76	99	127
	Total	382	509	619	820
Manshiyyet Abu Hammoor	Manshiyyet Abu Hammoor	263	348	418	557
	Rashadiyyeh	82	113	147	188
	Ader	333	441	530	705
	Total	678	901	1095	1451
Batteir	Batteir	81	110	144	185
	Rakeen	249	329	396	527
	Wadi Ben Hammad	56	76	99	127
	Total	385	516	640	839
Rabbah	Rabbah	371	491	591	786
	Total	371	491	591	786
Qaser	Qaser	255	338	406	541
	Yaroot	98	135	176	226
	Demna	46	63	83	106
	Jada	167	221	266	354
	Mghayyer	37	51	67	86
	Ariha	79	109	142	182
	Abu Trabah				
	Moojeb	84	116	151	194
	Sihan	34	47	61	78
	Mes'ar	29	40	52	66
Total	831	1120	1404	1833	
Emri	Emri	87	120	156	200
	Serfa	282	374	449	598
	Faqqoo	377	500	601	800
	Total	747	993	1206	1598

Source: The Study Team

Table F-27 TELEPHONE DEMAND PROJECTION IN THE STUDY AREA (2/4)

		(subscriber)			
Exchange Name	Village Name	1990	1995	2000	2005
Hmood	Hmood	40	54	71	91
	Smakiyyeh	167	221	265	353
	Jdiedeh	244	324	389	518
	Total	451	599	725	962
Qetranneh	Qetranneh	284	376	498	730
Adnaniyyeh	Adnaniyyeh	154	204	246	327
	Ainoon	53	73	95	122
	Median	65	89	116	149
	Merwed	73	100	131	168
Total	346	467	589	767	
Ayy	Ayy	716	997	1296	1669
	Joza	185	246	295	393
	Katharbba	273	362	435	579
	Total	1175	1604	2027	2641
Mazar Jannobiyyeh	Mazar Jannobiyyeh	664	897	1275	2008
	Mo'tah	471	636	904	1424
	Sool	187	248	298	397
	Majra	29	40	52	66
	Eraq	253	335	403	536
	Dabakeh + Iswaiyyeh	10	14	18	23
	JozeH	12	16	21	27
	Manshiyyeh	50	69	90	116
	Rojom Ennawayseh	23	32	41	53
	Wadi Ennawayseh	10	14	18	24
	El Amaqa	12	17	22	28
	Jawir	5	7	9	12
	Juhra	34	47	61	78
	Dabbeh	22	30	40	51
	Srarah	20	27	36	46
	Umel'yanabie	5	7	10	12
	Bvqie Srarah	5	6	8	11
Um El-Ghozlan	17	23	30	38	
Total	1830	2465	3336	4949	
Mo'ab	Mo'ab	798	1110	1396	1737
	Hashemiyyeh	74	102	133	170
	Total	873	1212	1529	1908

Table F-27. TELEPHONE DEMAND PROJECTION IN THE STUDY AREA (3/4)
(subscriber)

Exchange Name	Village Name	1990	1995	2000	2005
Shuquira	Thatras	347	459	552	735
	Mhiyy	169	224	269	358
	Noaymeh	17	23	30	38
	Total	532	706	851	1131
Tayybeh	Tayybeh	415	549	660	879
Tafileh	Tafileh	2162	2938	4308	6173
	Ies	44	61	79	101
	Rwayyem	82	112	146	187
	Sanfahah	93	127	166	213
	Abu Banna	25	35	45	58
	Aimeh	153	203	244	325
Total	2559	3476	4989	7059	
Ain El Baidha	Ain El Baidha	359	476	572	762
	Sele	68	93	121	155
	Arafan	33	45	59	76
	Mi'tan	7	10	13	16
Total	467	624	765	1009	
Bsaira	Bsaira	451	598	744	1024
	Chgarandal	191	253	304	405
Total	642	851	1048	1429	
Kadiesyyeh	Kadiesyyeh	362	479	576	766
	Dhana	49	67	87	111
	Lahdhan	5	6	8	11
Total	415	552	671	889	
Hesa	Hesa	500	662	1870	4145
	Jorof	63	87	113	145
Total	563	749	1984	4290	
Karak-Host	Samara	52	71	93	119
	Moomia	38	52	68	87
	Badhdhan	89	122	159	204
	Sakka	44	61	80	102
	Abdaliyyeh	13	18	24	30
	Baqieel - Aghwat	42	58	75	96
Total	278	381	498	638	

Table F-27 TELEPHONE DEMAND PROJECTION IN THE STUDY AREA (4/4)

(subscriber)

Village Name	1990	1995	2000	2005
Azra	6	8	11	14
Mamoomniyyeh	23	32	41	53
Roudhah	26	35	46	59
Abyadh	28	38	50	64
Saddessoltan	47	64	93	131
Swaimie	2	3	4	5
Harier	39	53	70	89
Aboor	10	14	18	23
Barbietah	16	21	28	36
Li'ban	28	39	50	65
Majadel	0	0	0	0
Abel	28	38	50	64
Namteh	21	28	37	48
Rhab	40	55	72	92
Afra	10	14	18	23
Um Essarab	8	11	14	18
Rashadiyyeh	1	1	1	1
Sail Rib'a	9	12	15	20
Hamediyeh	15	21	27	35
Um Rommaneh	7	10	13	16
Maraighan	5	7	10	12
Houyeh	14	19	25	32
Washiyyeh	51	70	92	118
Kamnah	3	4	6	7
Lajjoon	20	27	35	45
Sahhoor	4	5	7	9
Bawwab	2	3	3	4
Qraifleh	4	5	7	9
Zahra	45	61	80	102
Majdoline	10	14	18	24
Um El- Khnazeer	3	4	5	7
Shariefeh	2	3	4	5
Hadebeh	4	5	7	9
Khokha	1	1	1	1
Amashiyyeh	9	12	15	20
Mshairfeh	27	37	48	62
Swaqah	32	44	64	90
Shaidham	6	8	11	14
Hanien	3	4	5	7
Zhaiqah	11	15	20	26
Dhba'ah	11	15	19	24
Qarqoor	2	3	4	5
Alyeh	9	12	15	20
Zugheiriya	5	6	8	11
Total	645	883	1167	1517

Table F-28 AUTOMATIC TELEPHONE REQUIRED FOR VILLAGES NOT COVERED
BY TELEPHONE NETWORK EXPANSION PROJECT

Village	Exchange to be connected	Switching System type	Target
Sadd Essoltan	Qatrana	RSU	Mid-term
Harier	Tafila	RSU	Long-term
Rhab	Tafila	RSU	Long-term
Washiyyeh	Battier	RSU	Mid-term
Zahra	Imra	RSU	Long-term
Swaqah	Qatrana	RSU	Long-term

Source: The Study Team



F I G U R E S

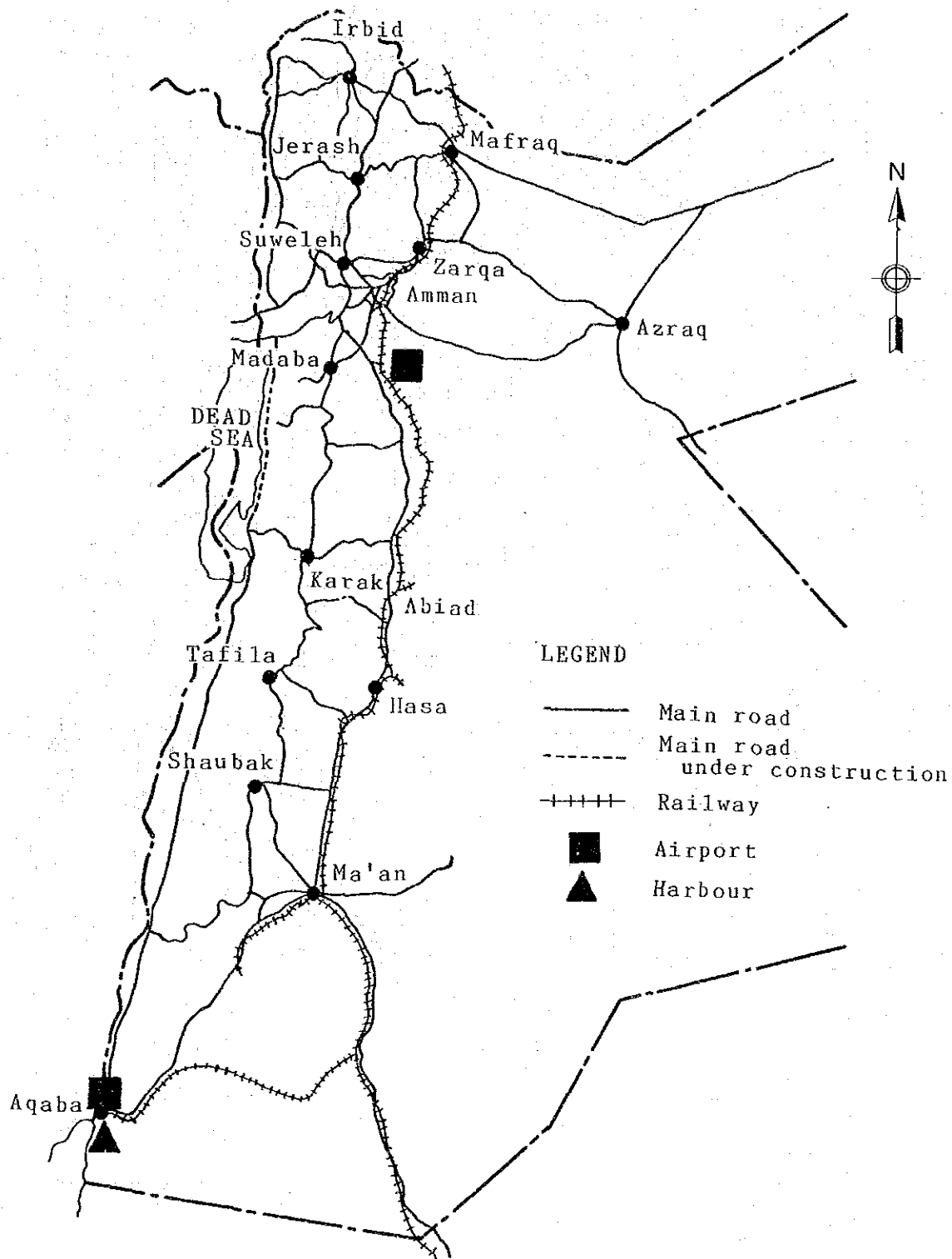
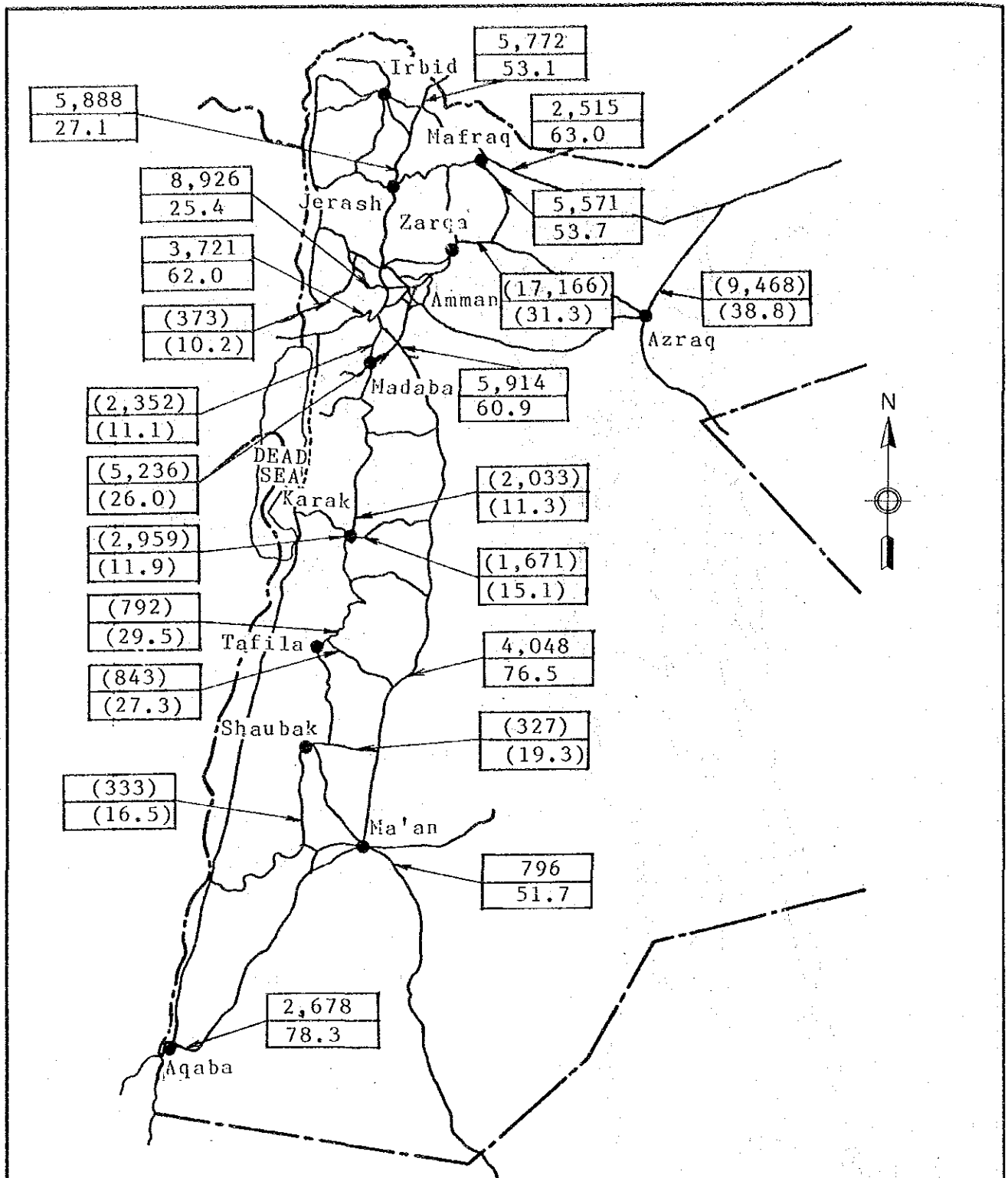


Fig. F-1 National Road Network in Jordan

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER
 PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION
 JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

Traffic volume (Vehicle / day)
Rate of freight vehicle (%)

8,669 : NATIONAL TRANSPORT STUDY TEAM COUNTS JUN. 1982
 (1,972) : MINISTRY OF PUBLIC WORK COUNTS SEP. 1981

Fig. F-2 Traffic Volume in Jordan (1981/1982)

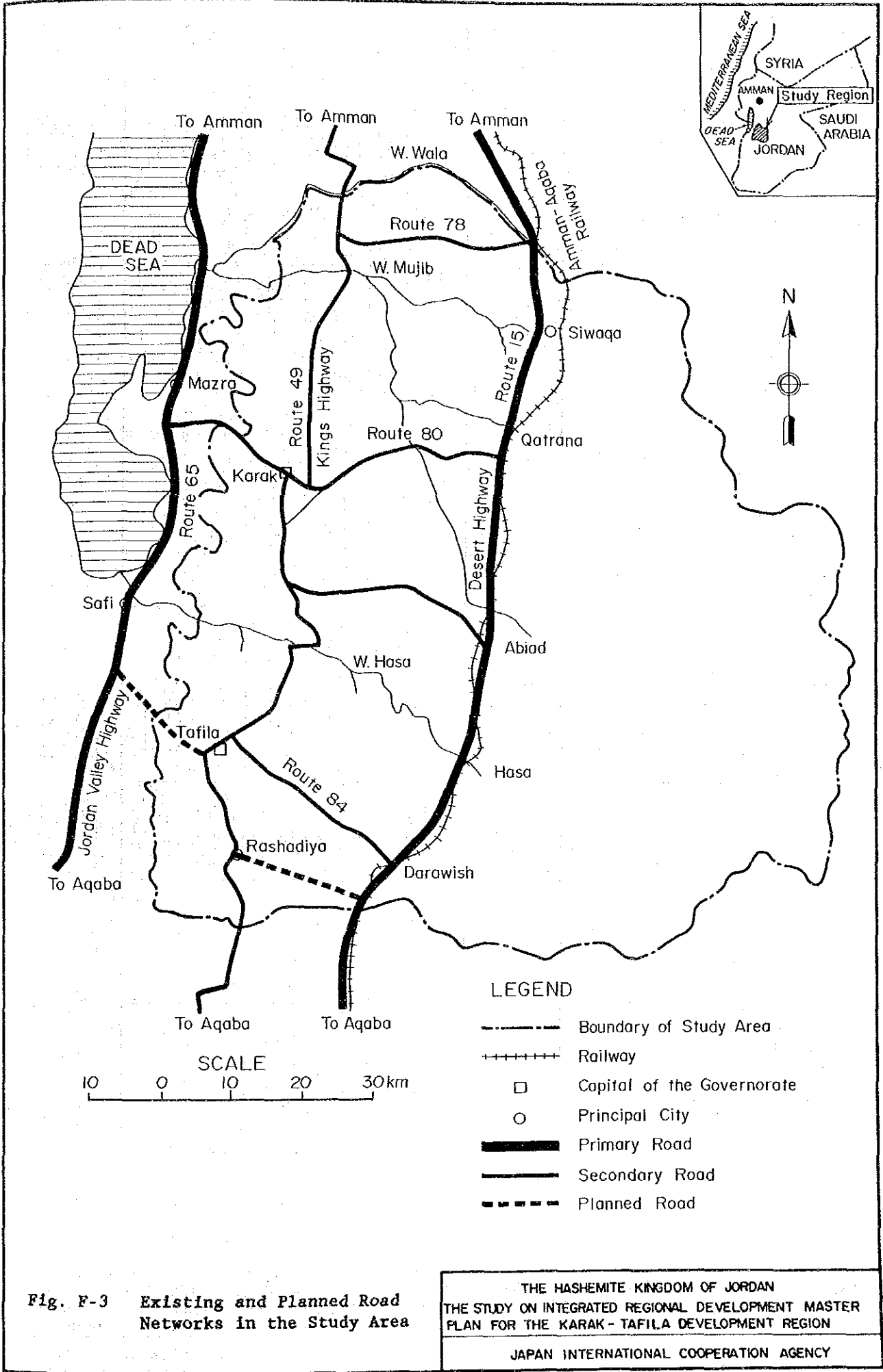


Fig. F-3 Existing and Planned Road Networks in the Study Area

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION
 JAPAN INTERNATIONAL COOPERATION AGENCY

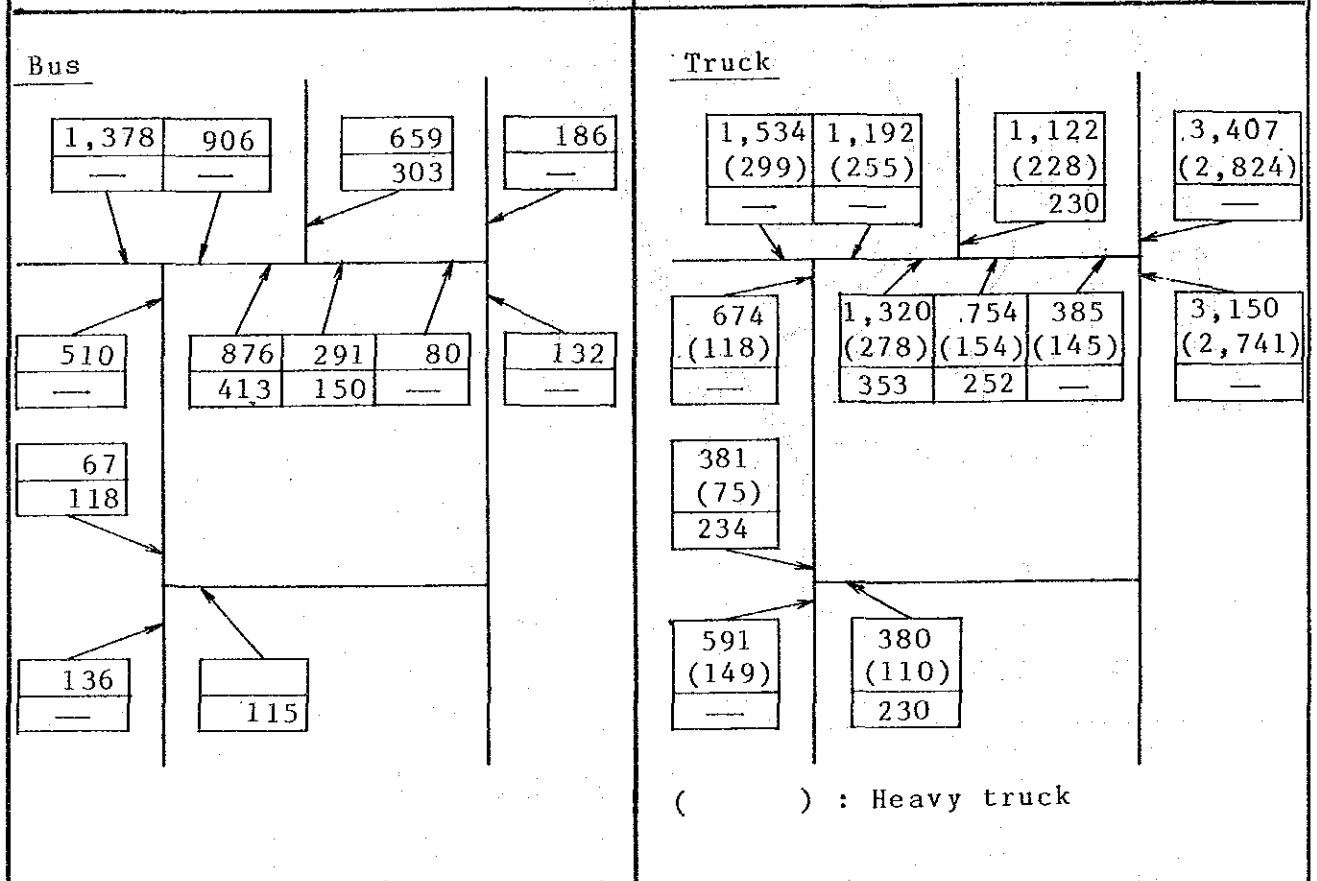
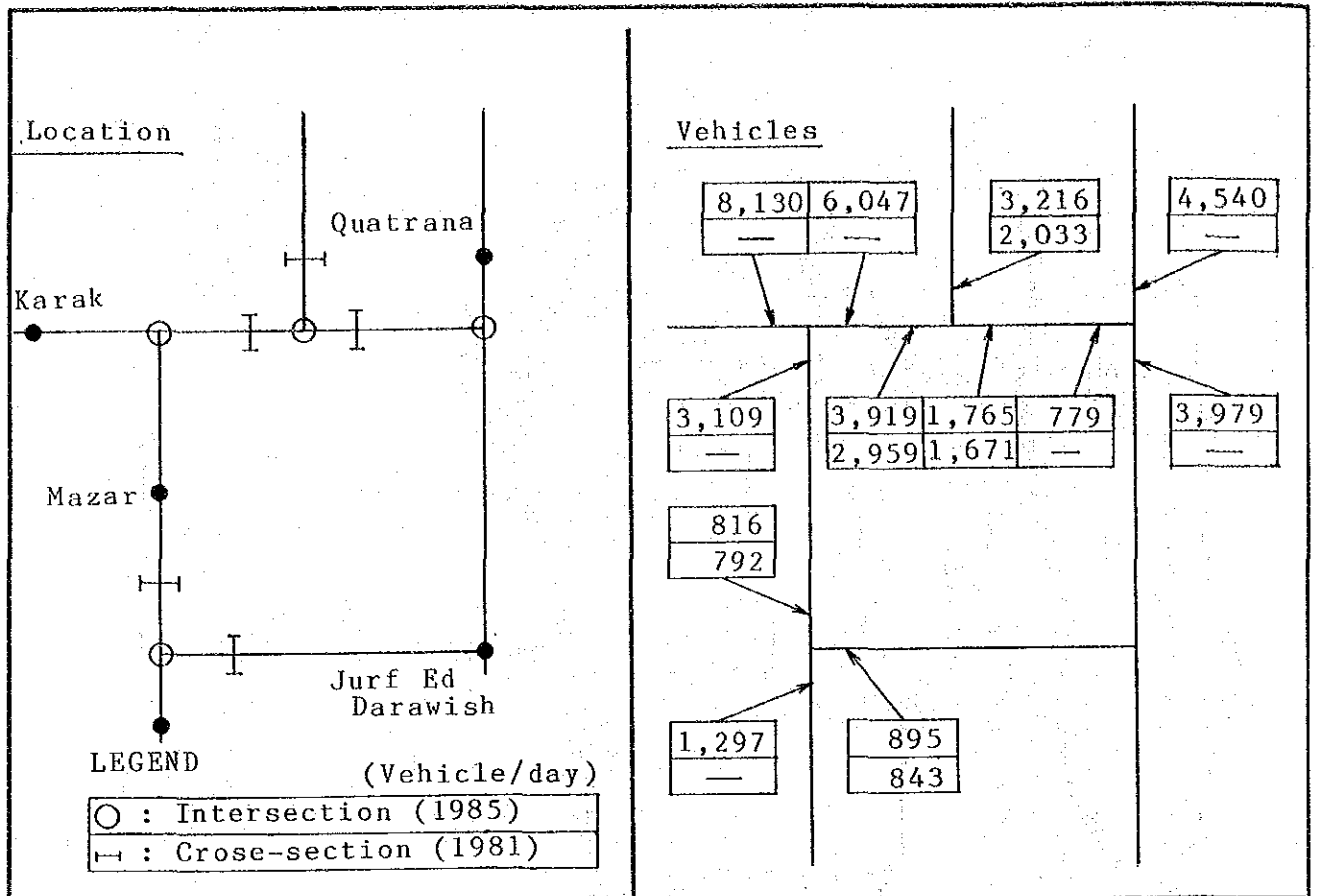


Fig. F-4 Traffic Volume around Karak and Tafila (1981/1985)

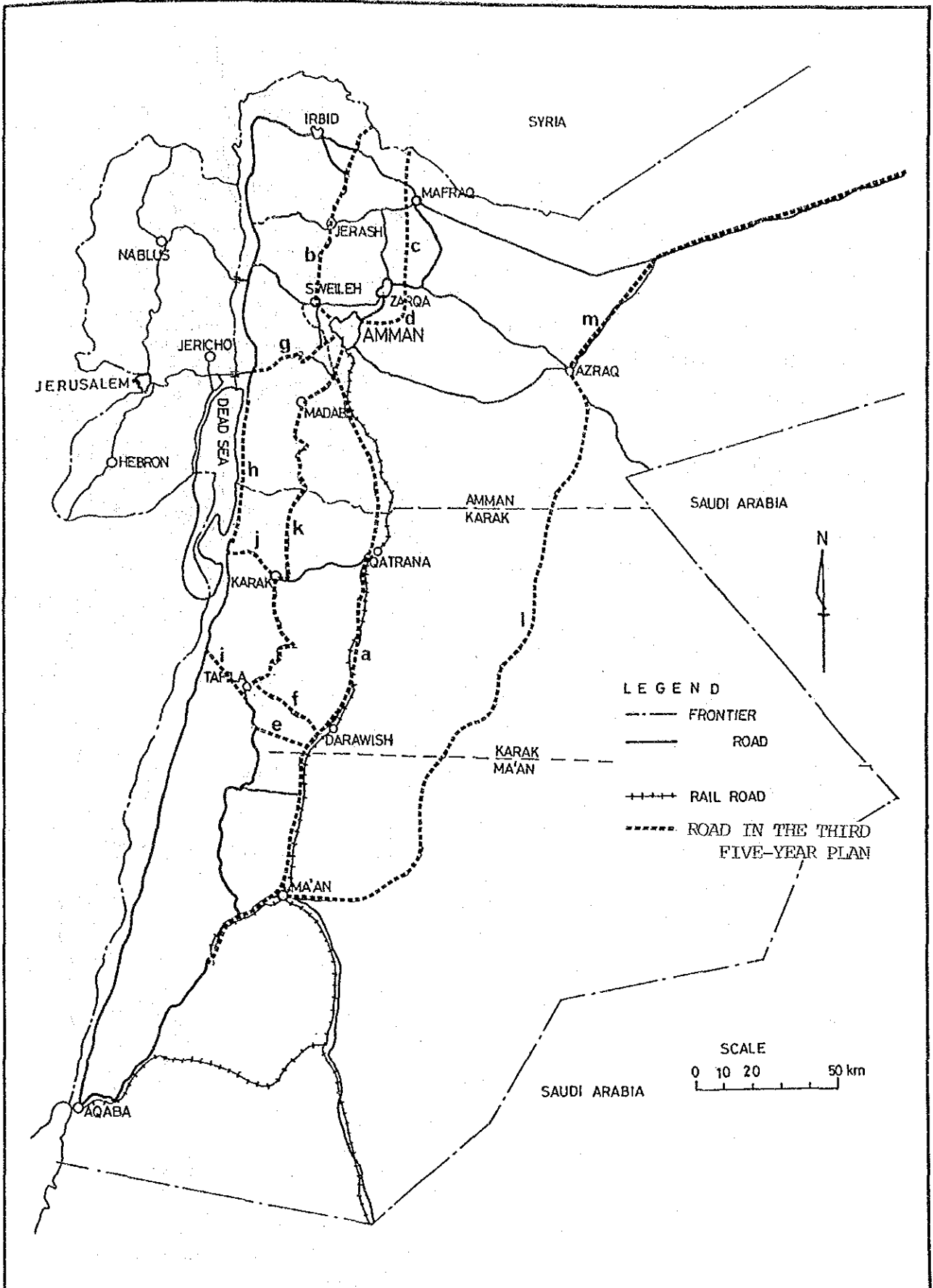


Fig. F-5 Road Projects under the Third Five-Year Plan

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER
 PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

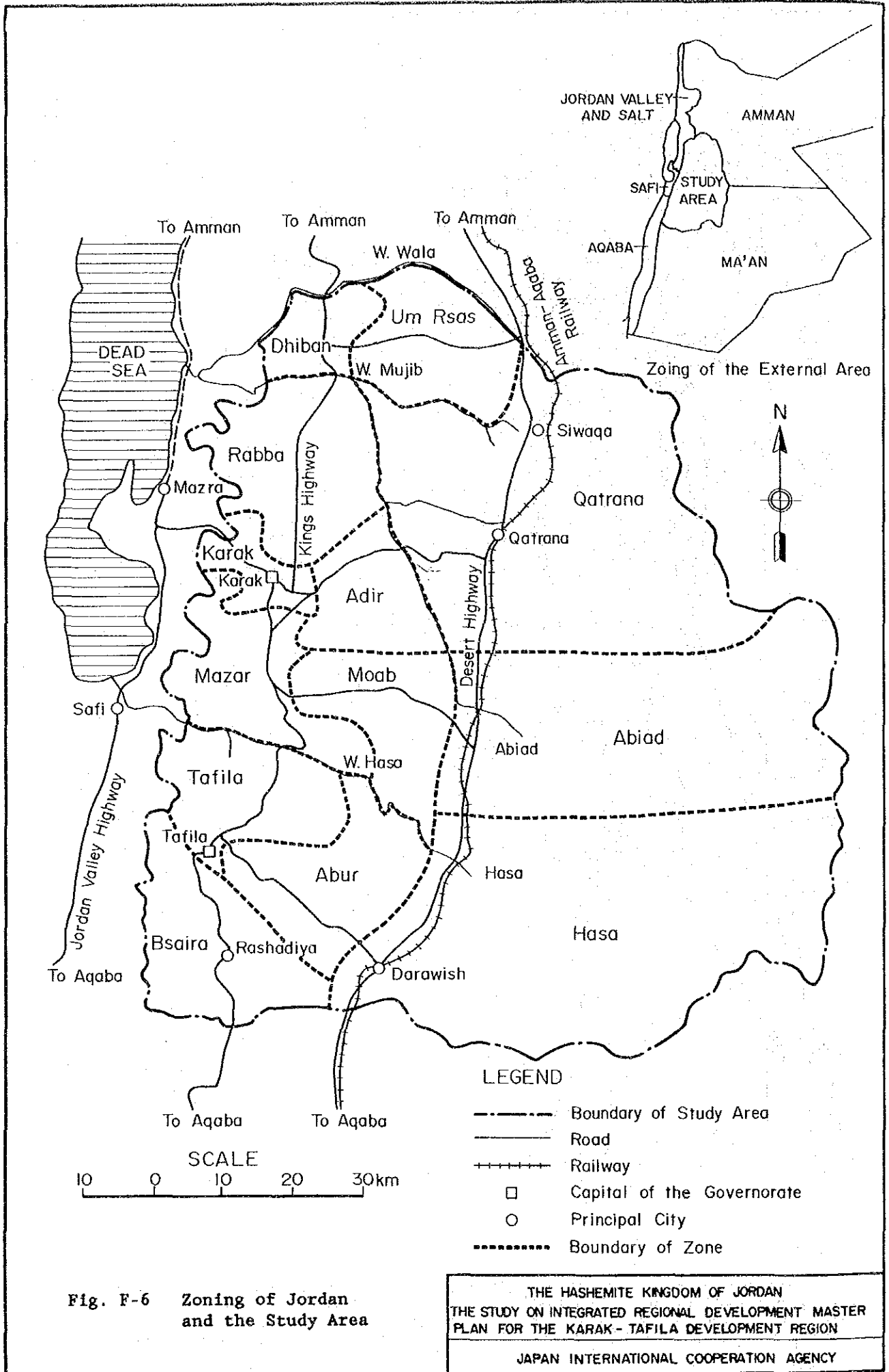


Fig. F-6 Zoning of Jordan and the Study Area

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

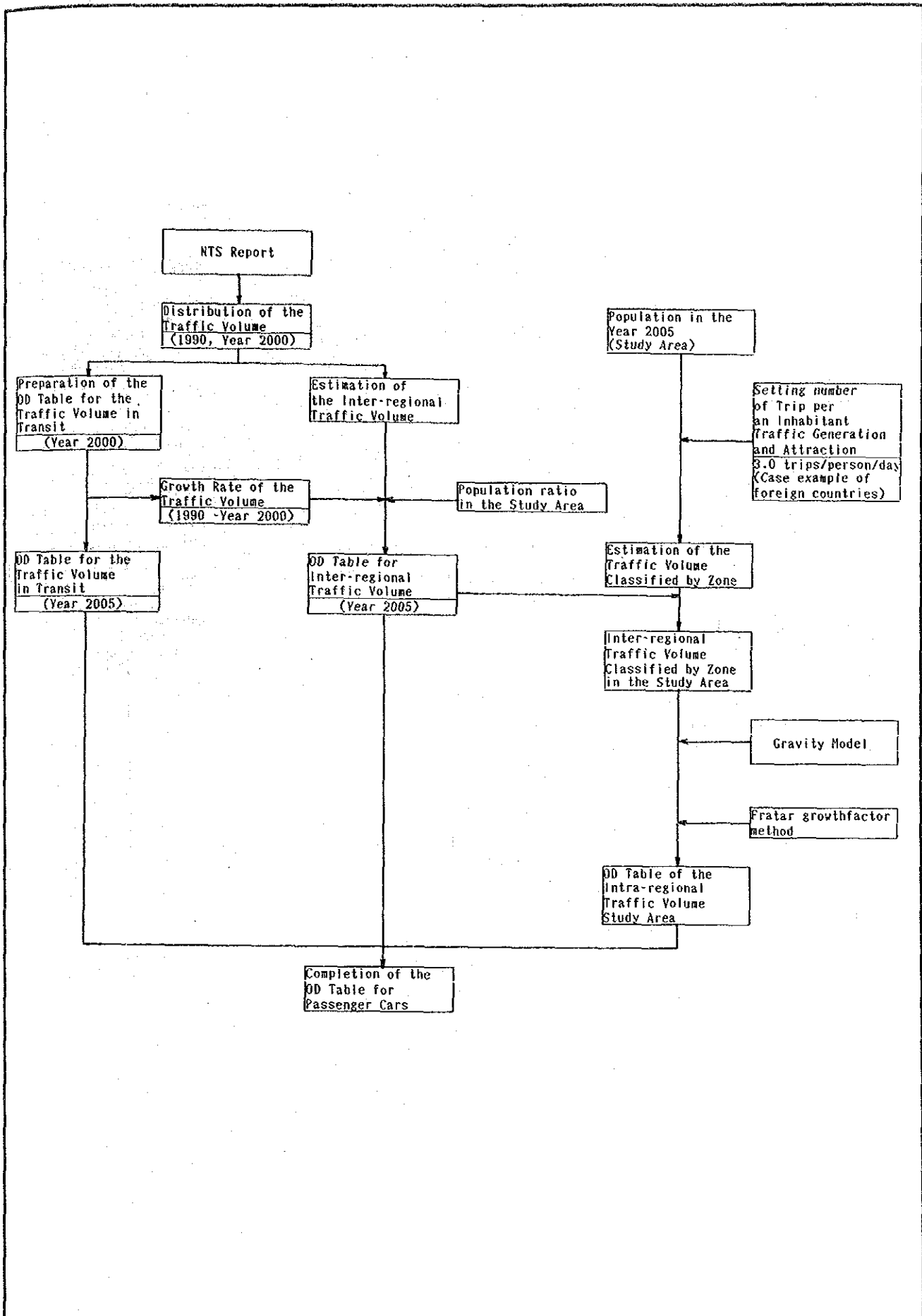


Fig. F-7 Work Flow for Preparation of OD Table for Passenger Cars

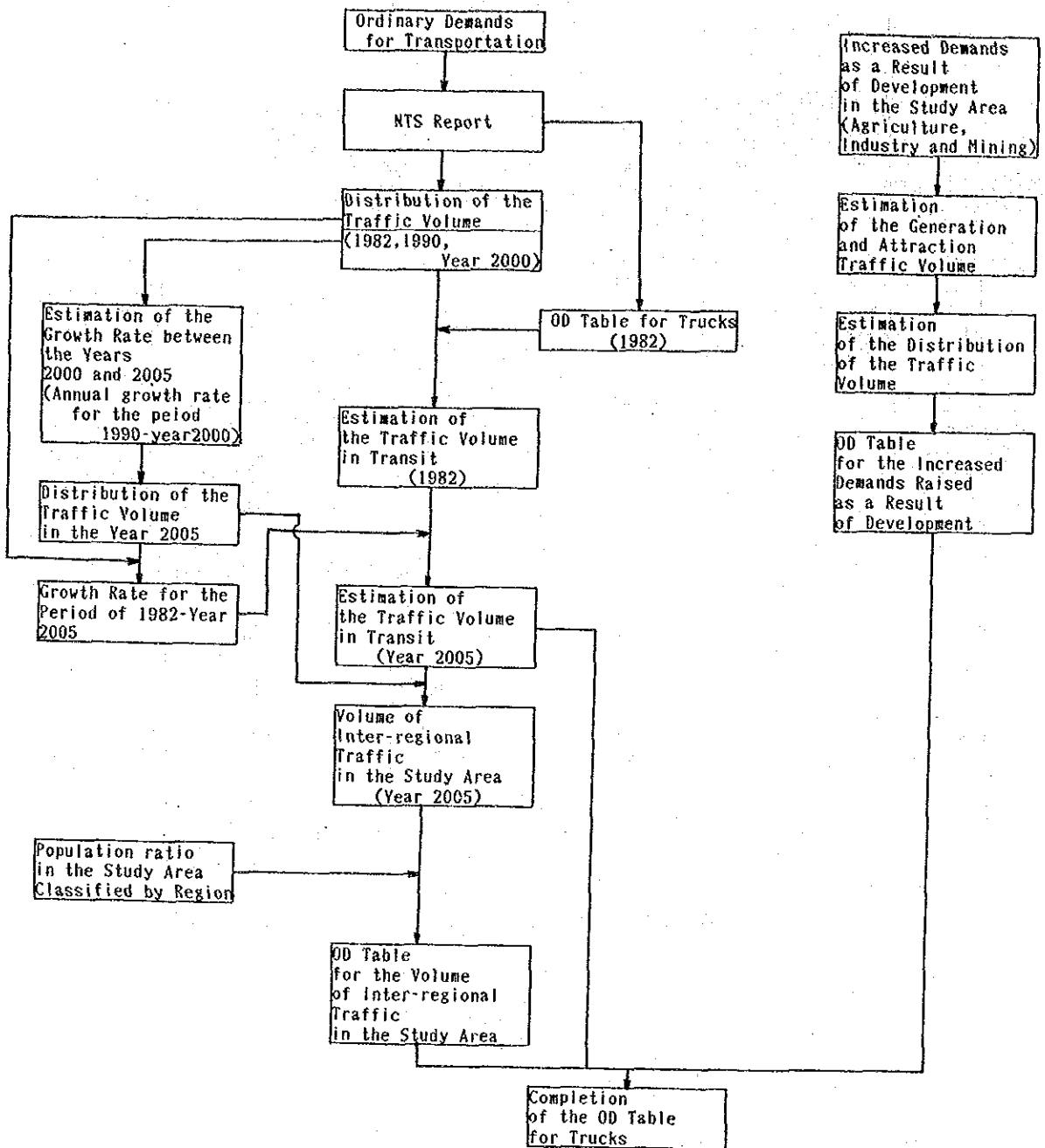
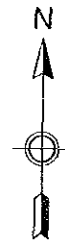
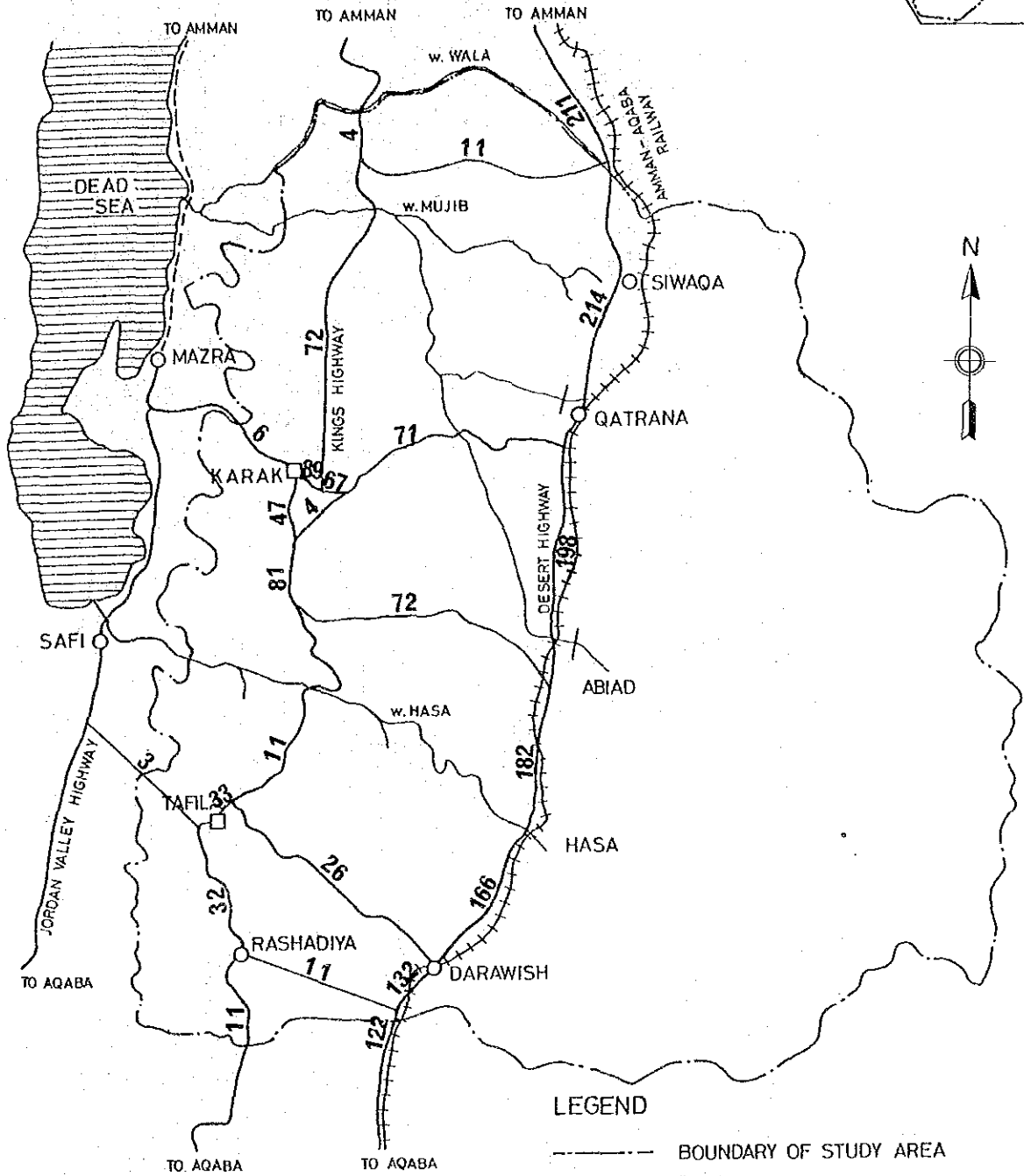
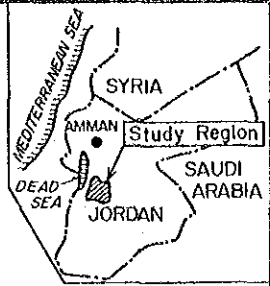


Fig. F-8 Work Flow for Preparation of OD Table for Trucks



LEGEND

- BOUNDARY OF STUDY AREA
- ROAD
- ++++ RAILWAY
- CAPITAL OF THE GOVERNORATE
- PRINCIPAL CITY
- 123 Traffic Volume (100 Vehicle/day)

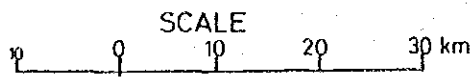


Fig. F-9 Projected Traffic Volume in the Study Area (2005)

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER PLAN FOR THE KARAK-TAFILA DEVELOPMENT REGION
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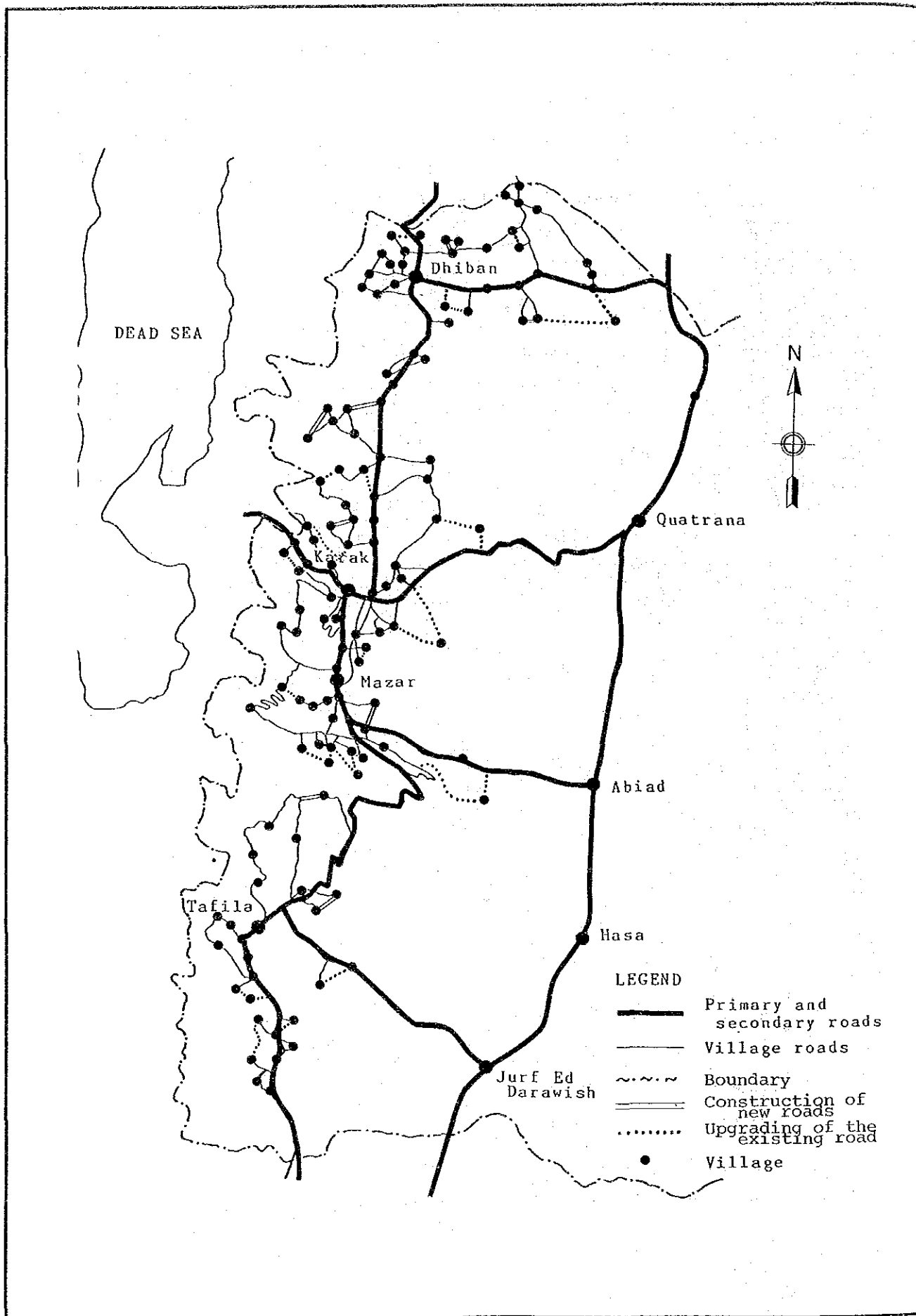


Fig. F-10 Proposed Expansion Plan for Village Roads

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION
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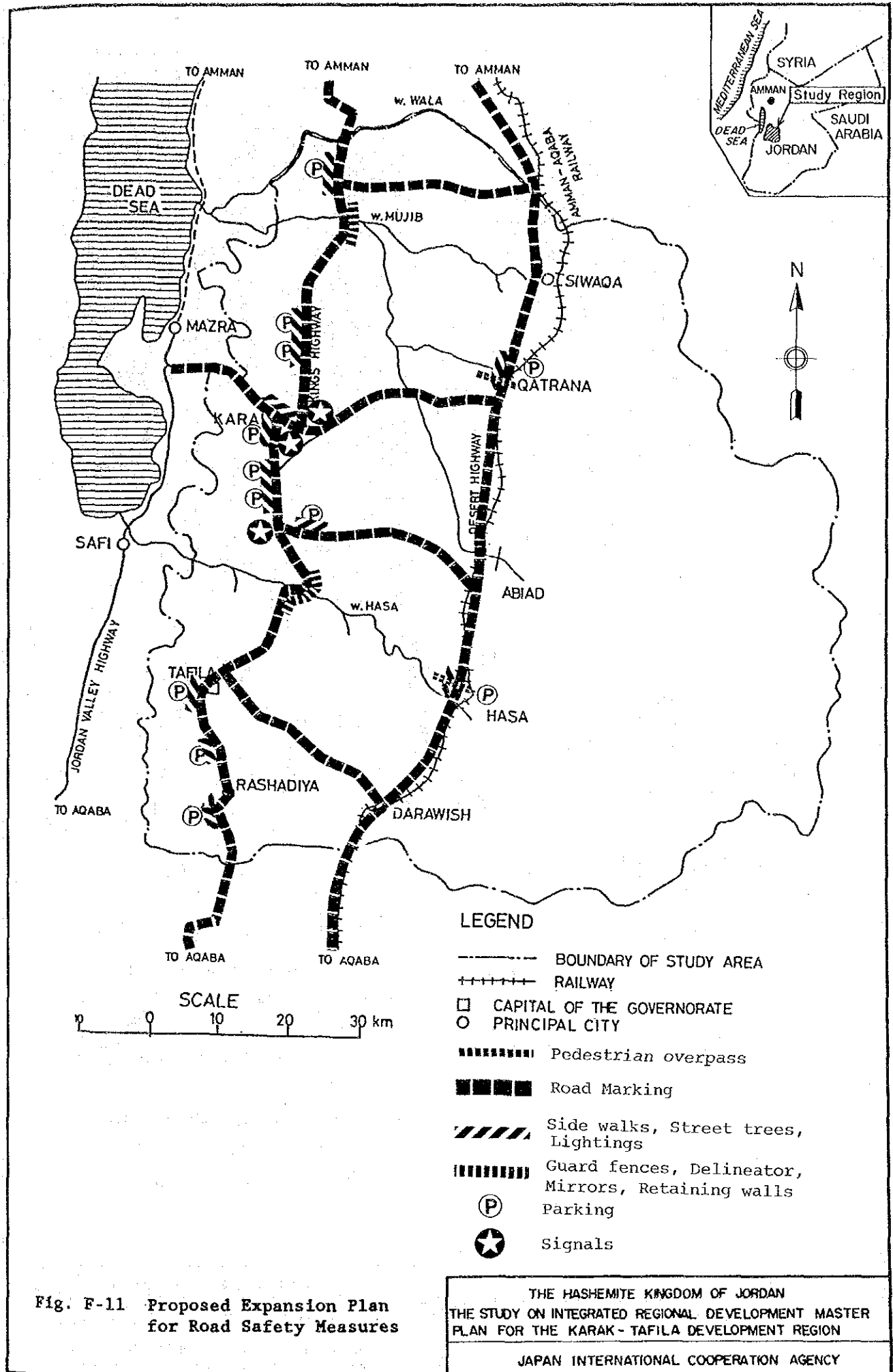


Fig. F-11 Proposed Expansion Plan for Road Safety Measures

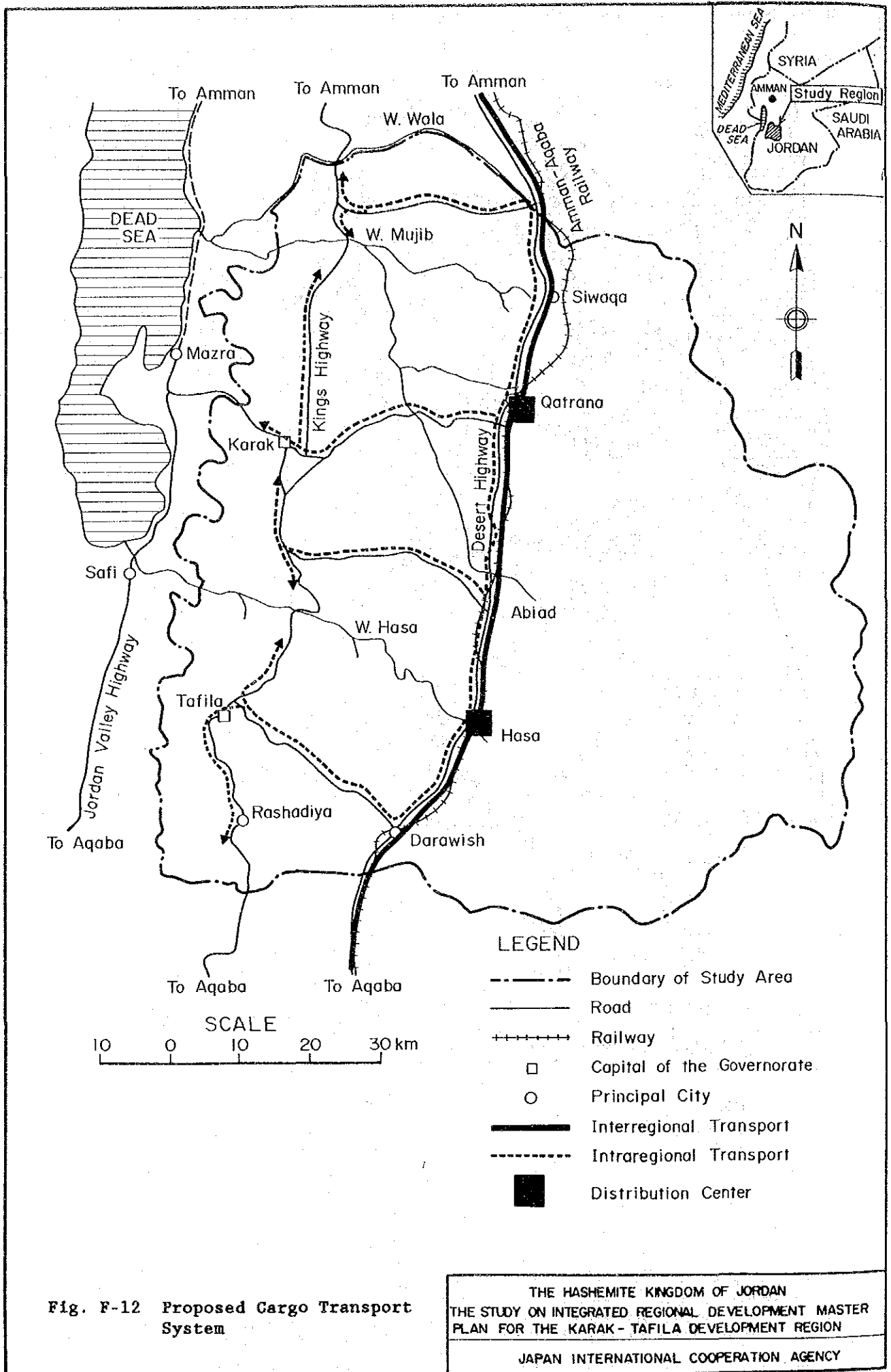


Fig. F-12 Proposed Cargo Transport System

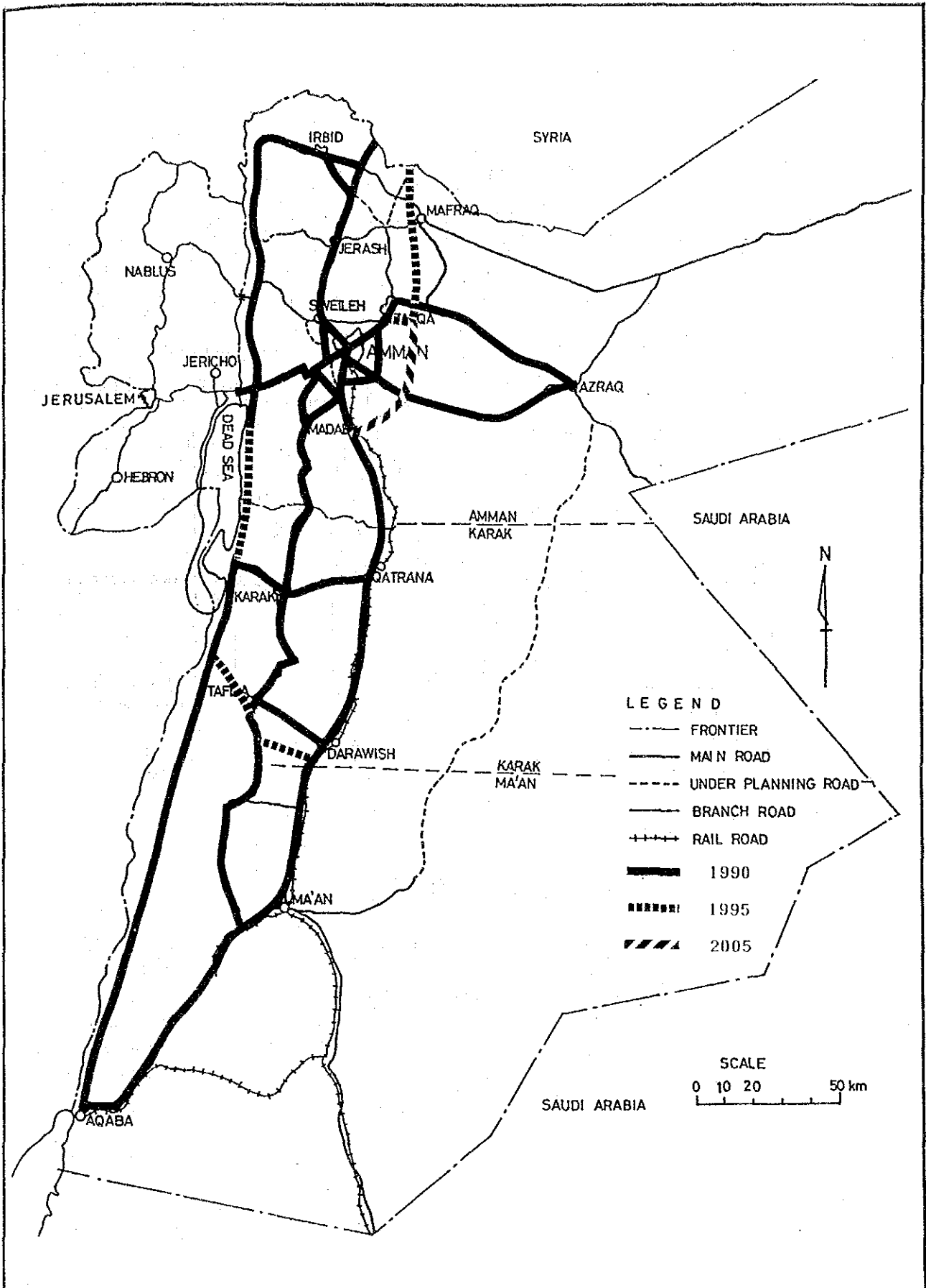
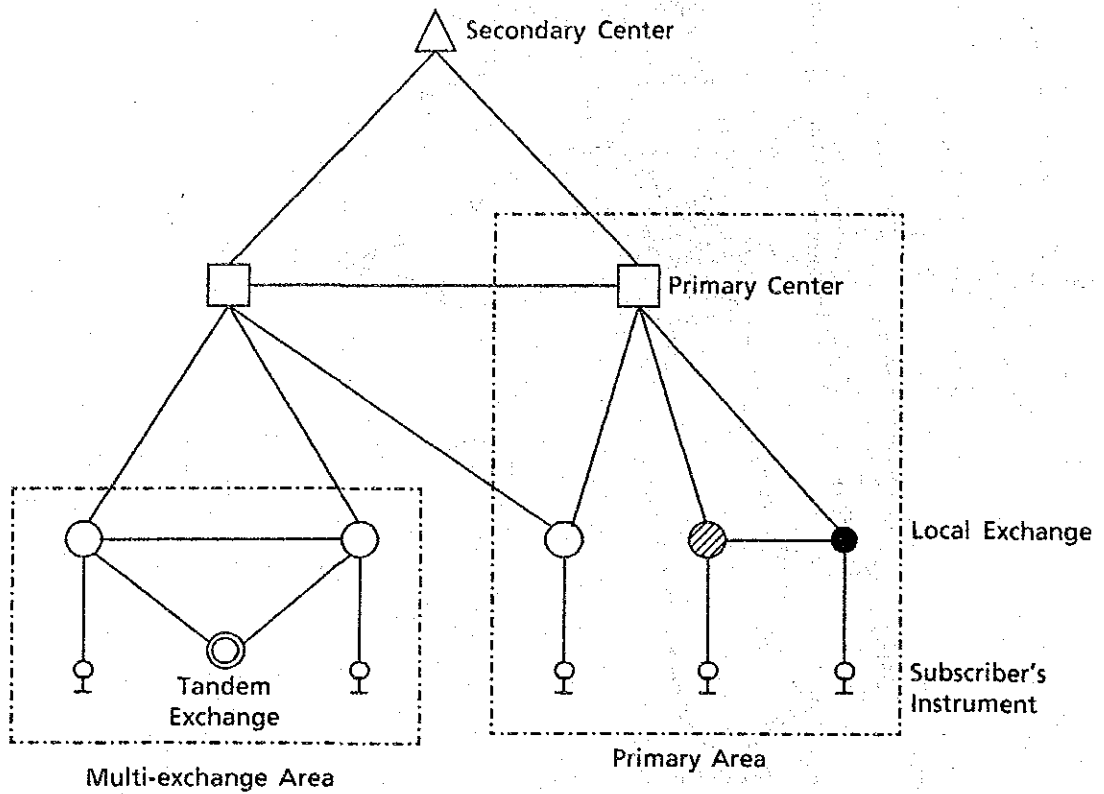


Fig. F-13 Implementation Stages of Existing Road Expansion Plan

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER PLAN FOR THE KARAK-TAFILA DEVELOPMENT REGION
 JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- Independent Local Exchange
- ▨ Remote Switching Unit (RSU)
- Remote Line Multiplexer (RLM)

Source : Ref. F - 4

Fig. F-14 Exchange Hierarchy in Jordan

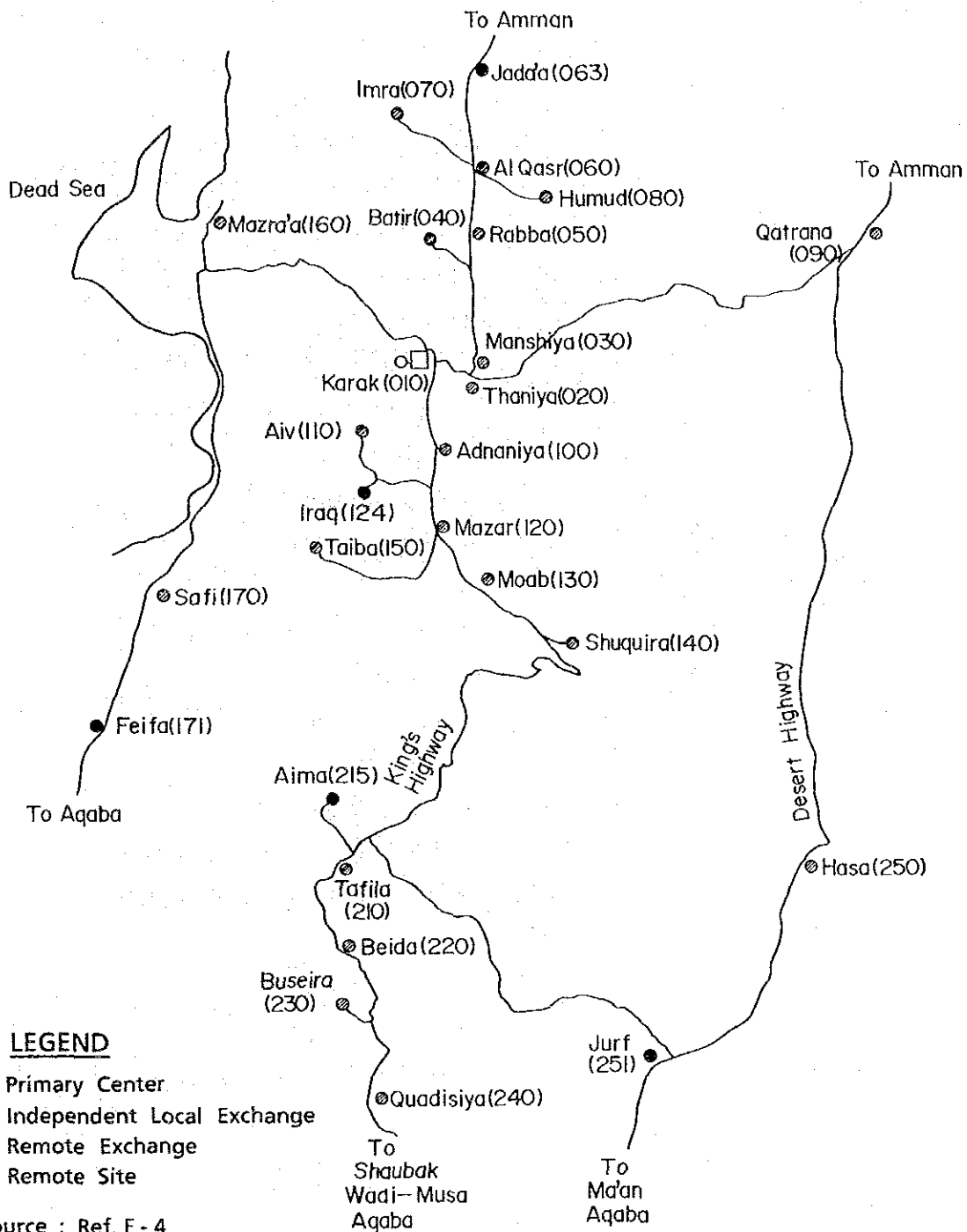
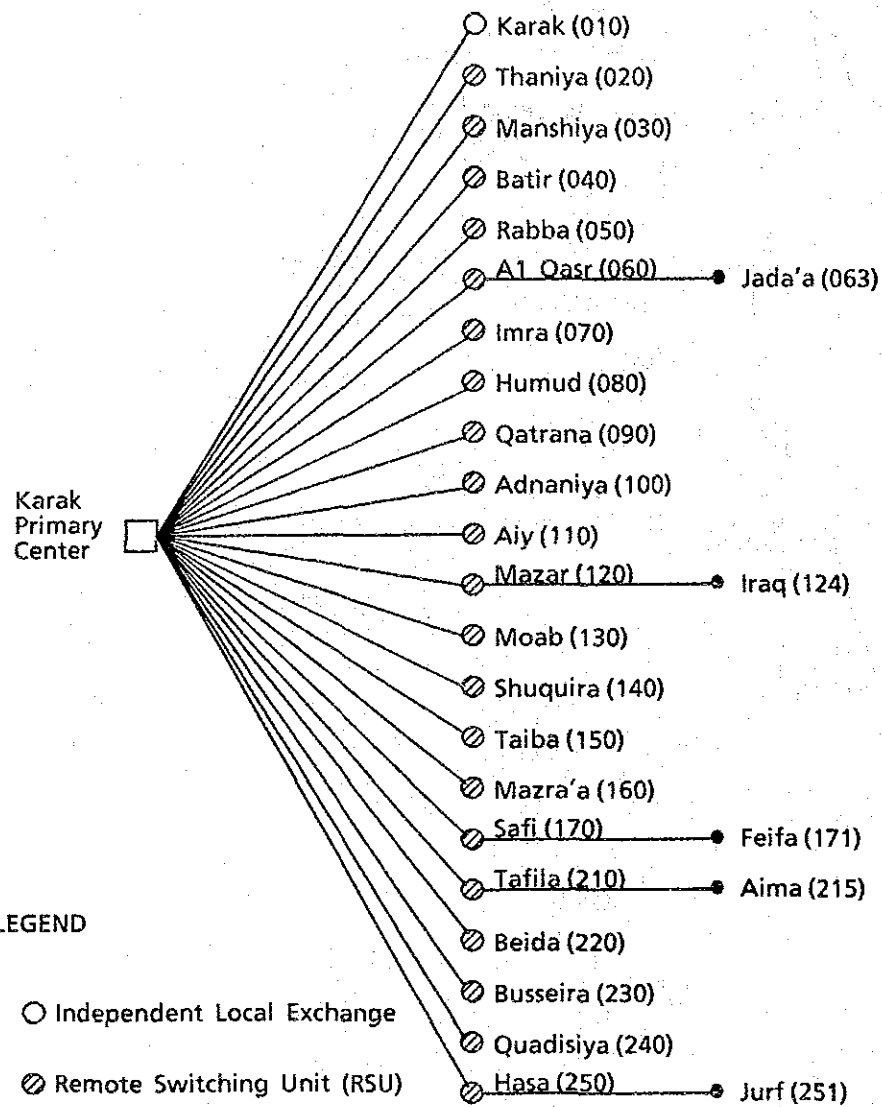


Fig. F-15 Location of Exchanges in Karak Primary Area



LEGEND

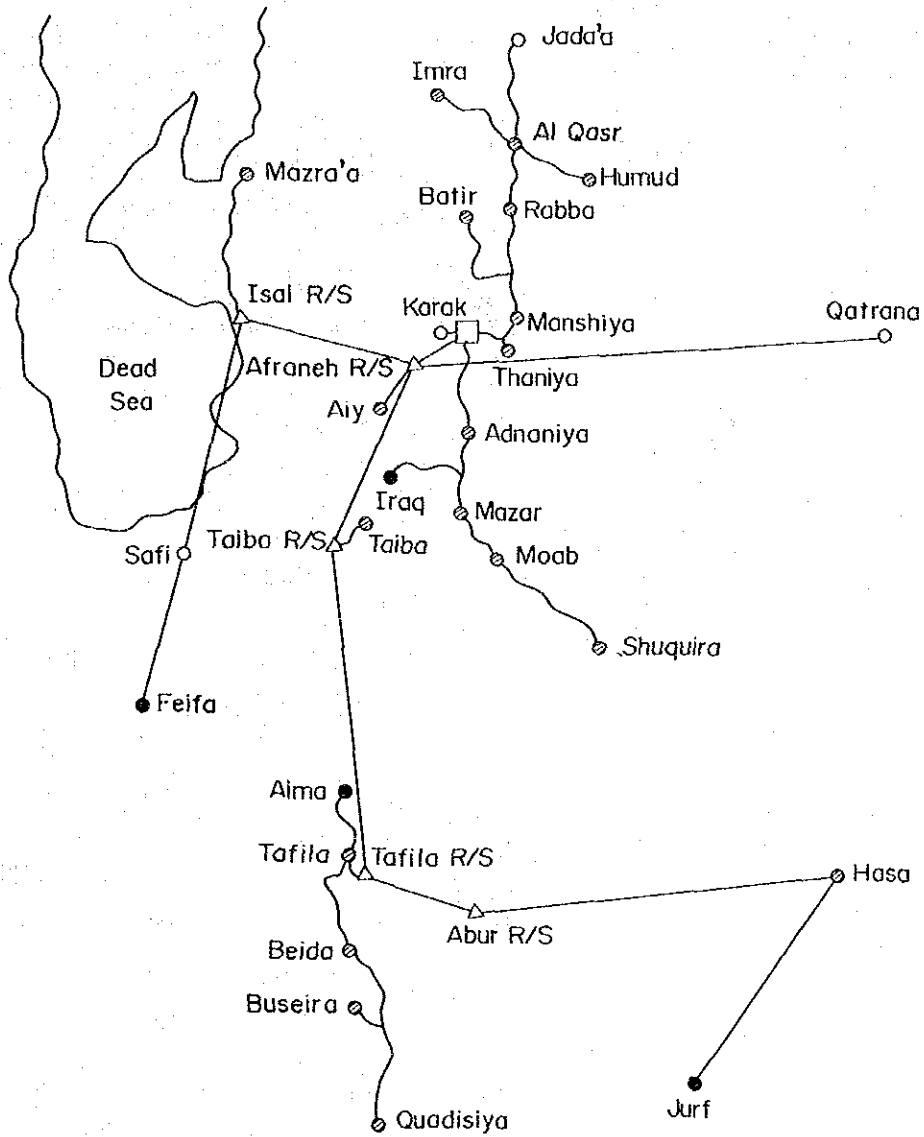
- Independent Local Exchange
- ⊗ Remote Switching Unit (RSU)
- Remote Line Multiplexer (RLM)

Source : Ref. F-4

Fig. F-16 Homing Arrangement for Karak Primary Area

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 PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION

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LEGEND

- | | |
|---------------------------------|--------------------------|
| □ Host Exchange | △ Radio Repeater Station |
| ○ Independent Local Exchange | — Digital Radio Route |
| ⊙ Remote Switching Unit (RSU) | ~ PCM Cable Route |
| ● Remote Line Multiplexer (RLM) | |

Source : Ref. F - 4

Fig. F-17 Transmission Route Plan

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 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER
 PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION
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LEGEND

- Host Exchange
- Independent Local Exchange (Fetex-100, Pentex)
- ⊗ Remote Switching Unit (RSU)
- Remote Line Multiplexer (RLM)
- ⊙ Community to be covered
- Community out of this Project
- ↔ Radio Repeater Station
- PCM Junction Cable Route
- Feeder Cable Route
- Open Wire Line Route (Existing)

Source : Ref. F - 4

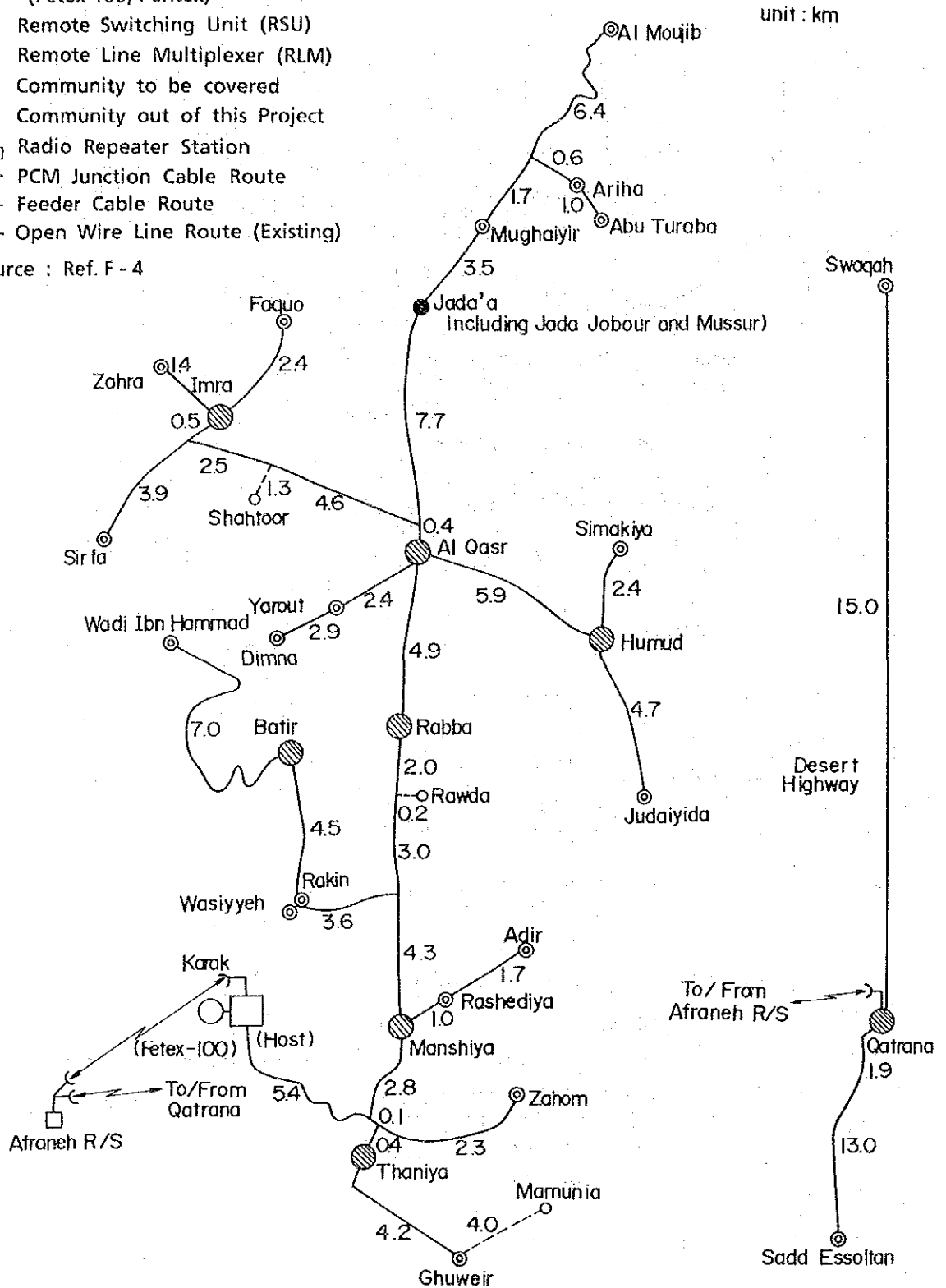


Fig. F-18 Configuration of Telephone Junction Network in 2005(1/3)

LEGEND

- Host Exchange
- Independent Local Exchange (Fetex-100, Pentex)
- ⊗ Remote Switching Unit (RSU)
- Remote Line Multiplexer (RLM)
- ⊙ Community to be covered
- Community out of this Project
- ↔ Radio Repeater Station
- PCM Junction Cable Route
- Feeder Cable Route
- Open Wire Line Route (Existing)

Source : Ref. F - 4

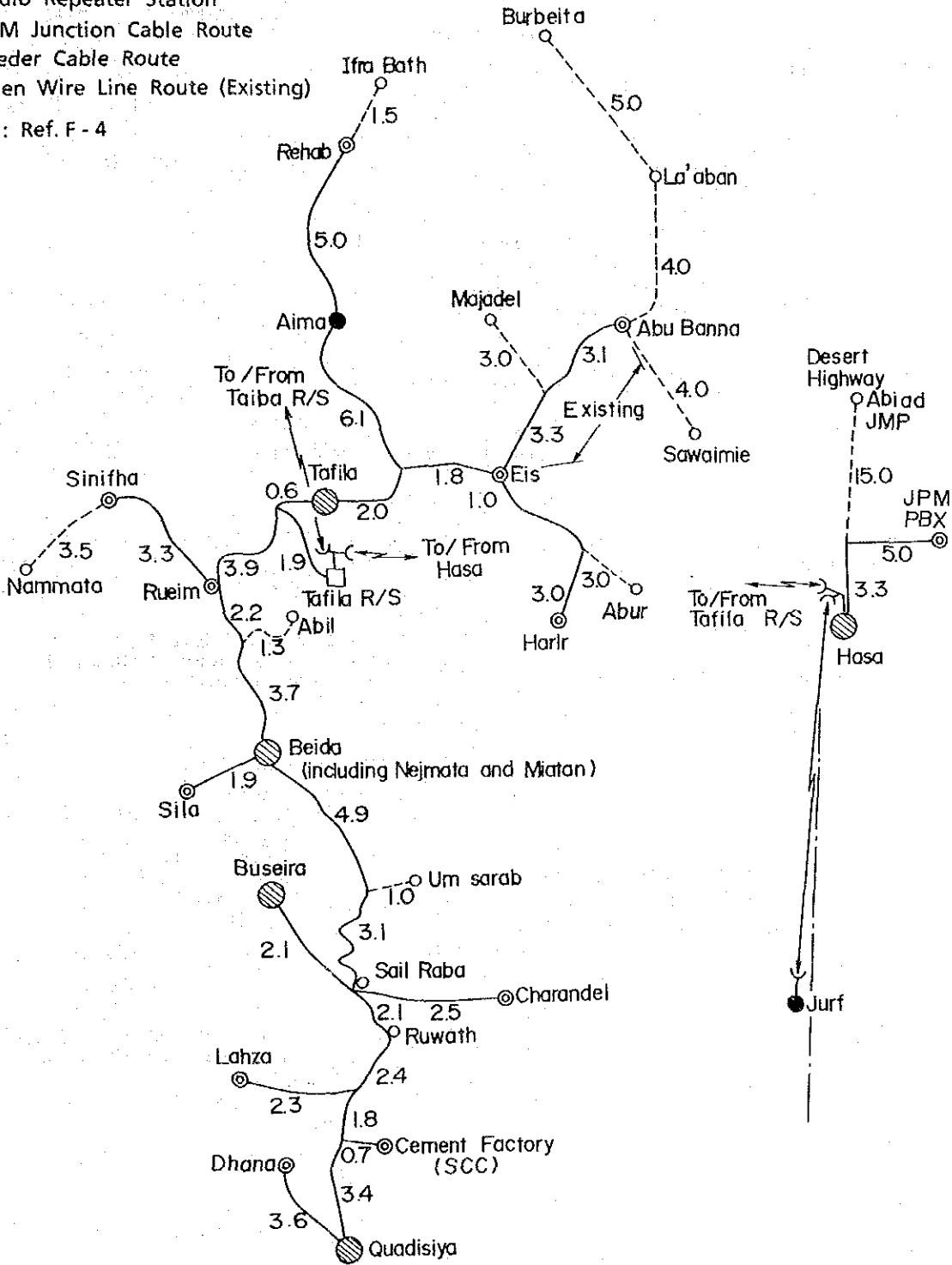


Fig. F-18 Configuration of Telephone Junction Network in 2005(2/3)

THE HASHEMITE KINGDOM OF JORDAN
 THE STUDY ON INTEGRATED REGIONAL DEVELOPMENT MASTER
 PLAN FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND

- Host Exchange
- Independent Local Exchange (Fetex-100, Pentex)
- ⊙ Remote Switching Unit (RSU)
- Remote Line Multiplexer (RLM)
- ⊙ Community to be covered
- Community out of this Project
- ↔ Radio Repeater Station
- PCM Junction Cable Route
- Feeder Cable Route
- Open Wire Line Route (Existing)

Source : Ref. F - 4

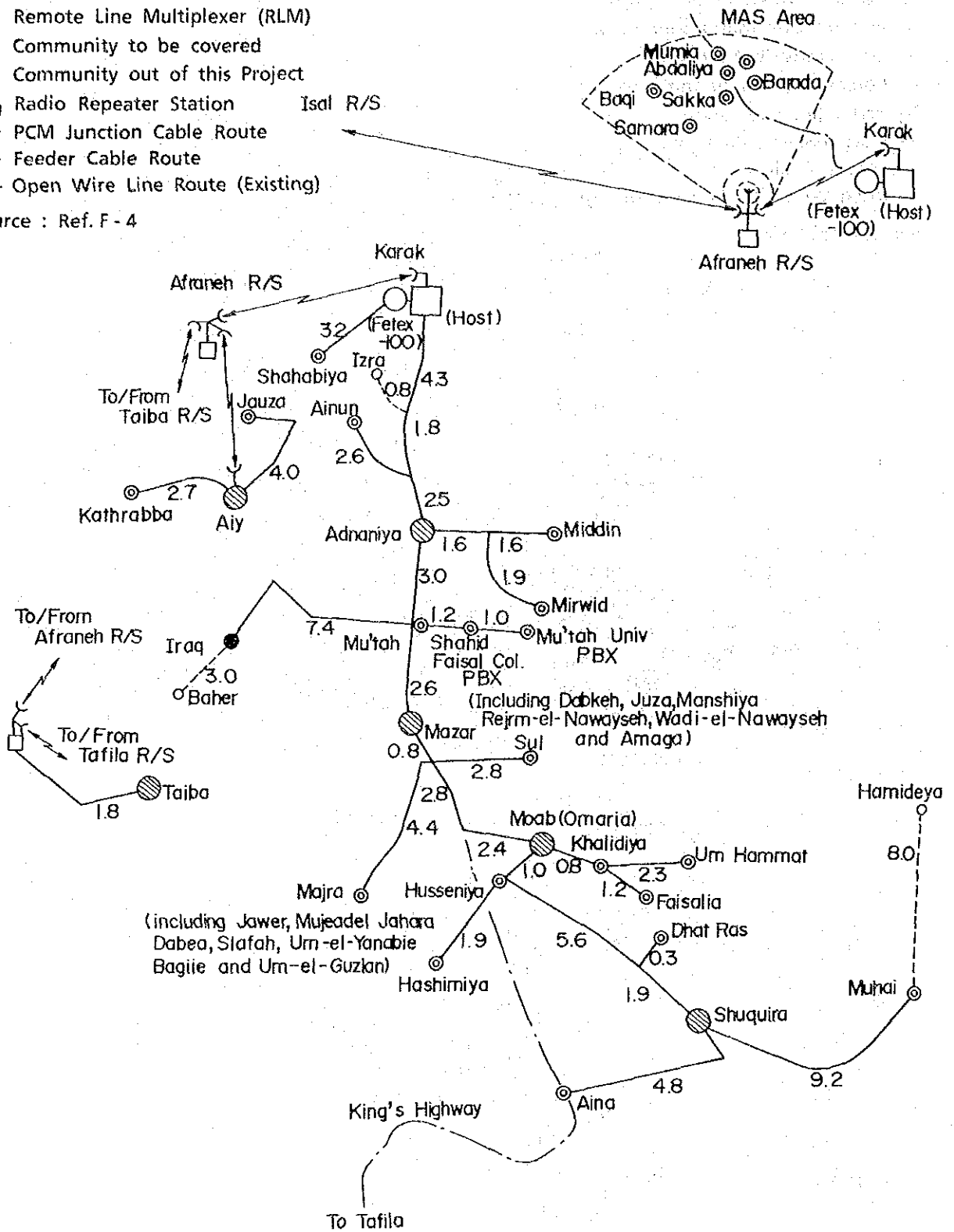
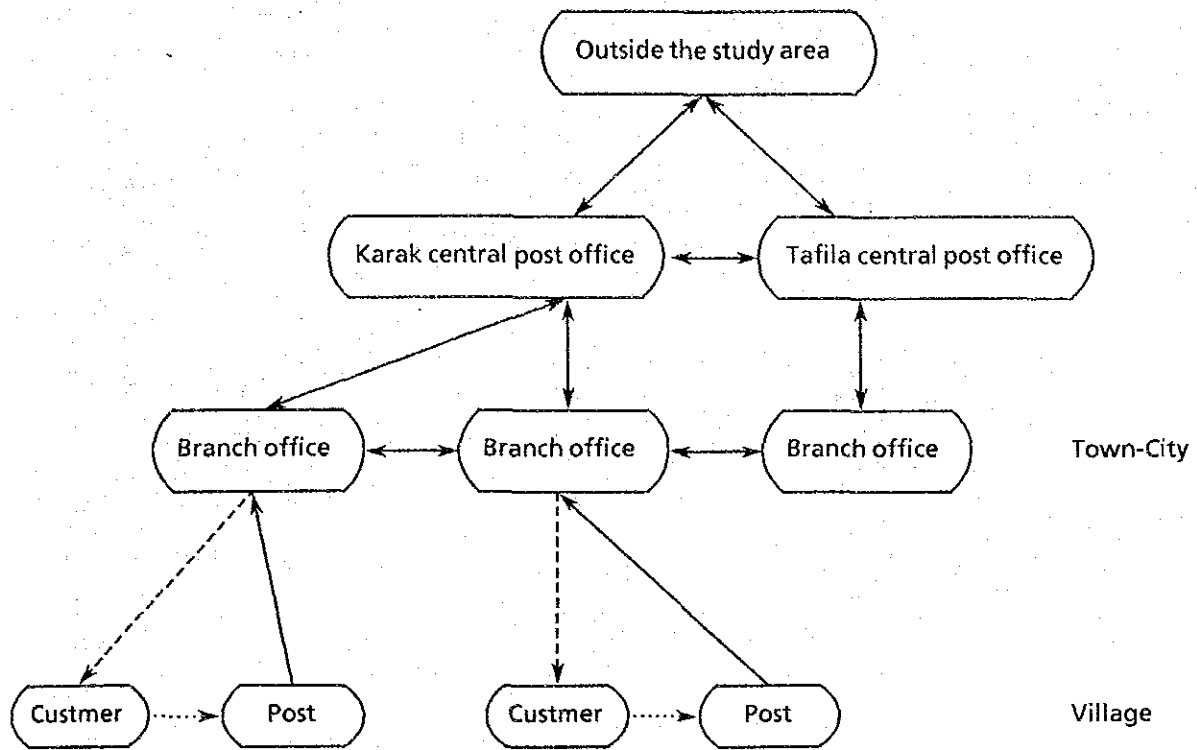


Fig. F-18 Configuration of Telephone Junction Network in 2005(3/3)



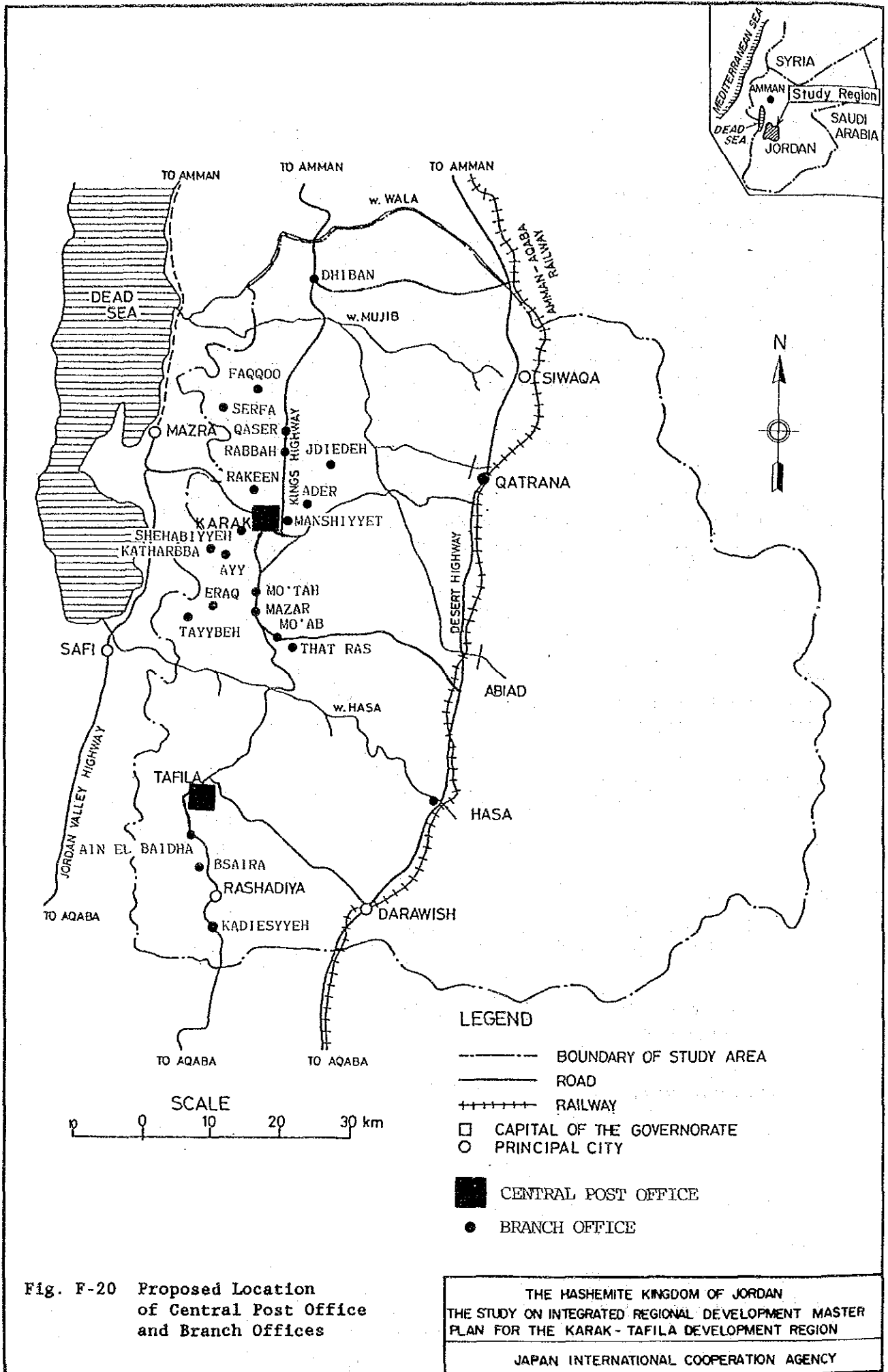
- ↔ Collection and delivery
- ← Collection
- ←- - - Delivery
- ←..... Post

Central post office - Branch office } Light truck
 Branch office - Branch office }

Branch office - Village } Pick-up truck

Central post office zone } Motorbike
 Branch office zone }

Fig. F-19 Proposed Mail Service System



ANNEX-G HUMAN RESOURCES

THE STUDY ON
INTEGRATED DEVELOPMENT MASTER PLAN
FOR THE KARAK - TAFILA DEVELOPMENT REGION

VOLUME 4: SUPPORTING REPORTS

ANNEX-G HUMAN RESOURCES

TABLE OF CONTENTS

	<u>PAGE</u>
1. INTRODUCTION	G-1
2. POPULATION	G-2
2.1 Population in Jordan	G-2
2.2 Population in the Study Area	G-3
2.3 Migration Movement	G-4
2.4 Population Prospects	G-6
3. LABOUR	G-7
3.1 Employment in Jordan	G-7
3.2 Employment in the Study Area	G-8
3.3 Labour Prospects	G-8
3.3.1 Labour Demand	G-8
3.3.2 Labour Supply	G-10
3.3.3 Labour Balance	G-10
3.3.4 Quality of Labour	G-11
4. EDUCATION	G-12
4.1 Present Situation	G-12
4.1.1 Present Situation of Education in Jordan	G-12
4.1.2 Present Situation of Education in the Study Area	G-13
4.2 Needs to Education Sector	G-15
4.3 Goals and Strategies of Education Sector	G-15
4.4 Expansion Plan of Education Sector.....	G-16
5. PUBLIC HEALTH	G-18
5.1 Present Situation	G-18
5.1.1 Present Situation of Health in Jordan	G-18
5.1.2 Present Situation of Health in the Study Area ...	G-19
5.2 Goals and Strategies of Health Sector	G-20
5.3 Expansion Plan of Health Sector	G-20
6. CONCLUSIONS AND RECOMMENDATIONS	G-22
References	G-23
Tables	G-24

LIST OF TABLES

		<u>PAGE</u>
Table G-1	ESTIMATED POPULATION BY GOVERNORATES IN 1979-1985	G-24
Table G-2	ESTIMATED POPULATION IN THE STUDY AREA	G-25
Table G-3	PROJECTED POPULATION IN THE STUDY AREA	G-25
Table G-4	NUMBER OF JORDANIAN EMPLOYMENT BY ECONOMIC ACTIVITY	G-26
Table G-5	SECTORAL EMPLOYMENT OF OLD KARAK GOVERNORATE IN 1979	G-26
Table G-6	PROJECTED LABOUR DEMAND IN THE STUDY AREA	G-27
Table G-7	NUMBER OF ENROLLMENTS BY SEX, EDUCATIONAL STAGES AND REGION FOR 1985/1986	G-28

1. INTRODUCTION

This supporting report analyzes the situation of human resources in the Study Area and formulates the development plan. In this report, the Study Team takes up population, labour force (employment), education, and public health as human resources.

This sector had originally not been included in the Scope of Work but it was added as a result of discussions of the inception report.

Development plan of human resources should be understood as part of integral and overall development in the Study Area.

Therefore, the structure of this supporting report may be different from those of other reports especially which directly relate to the priority projects.

2. POPULATION

2.1 Population in Jordan ^{1/}

According to the 1979 census, the total population of Jordan amounted to 2.1 million. The majority of the population was concentrated in Amman and Irbid regions. In particular Amman Governorate, now divided into two governorates - Amman and Zarqa, shared 55 percent of the total population in 1979.

Table G-1 shows estimated population and population growth rate by the Ministry of Planning for the period 1979-1985. It should be noted that the concentration in Amman is still obvious. Its dominant share represented 57 percent of the total population in 1985. The share of the population of each governorate in the whole Jordan has not changed drastically between 1979 and 1985, although the share of Irbid Governorate has slightly decreased.

In terms of annual growth rate, Amman and Zarqa Governorates exceeded 4 per cent. Ma'an Governorate increased at the rate of 3.7 per cent annually, which was equal to the average annual growth rate of the whole Jordan. Other governorates were in the range of 3 per cent or less. Tafila Governorate showed the lowest annual growth rate of 2.7 per cent, which was below the national growth by 1 point. Karak Governorate was also in the low level at 2.9 per cent. Besides the data by MOP, the Ministry of Labour estimates national growth rate of 3.9 per cent per annum for the period 1980-85. Also, the United Nations estimates 3.66 per cent annual growth rate for the same period.

As for the urban-rural population distribution, urban population, viz., the number of residents who live in a municipality with the population of 5,000 or more, shared nearly 70 per cent of the total population in 1985.

^{1/} Data for East Bank, unless otherwise noted

Especially in Zarqa Governorate, the urbanization ratio reached 90 per cent in 1985. Amman Governorate represents 84 per cent. In contrast, Karak Governorate was in the lowest level of urbanization - less than 20 per cent. Tafila Governorate showed a low level of urbanization either.

URBANIZATION RATIO OF GOVERNORATES IN 1985

<u>Governorate</u>	<u>Urbanization ratio (%)</u>
Amman	84.3
Zarqa	90.3
Irbid	54.1
Mafraq	28.3
Balqa	55.4
Karak	19.8
Tafila	38.9
<u>Ma'an</u>	<u>53.1</u>
Average in Jordan	69.3

Source: Statistical Year Book in 1985

2.2 Population in the Study Area

Population in the Study Area is estimated at 143 thousand, comprising 96,000 of Karak Governorate except Safi sub-region, 37,000 of Tafila Governorate, and 9,000 of the area belonging to Madaba sub-region of Amman Governorate in 1985 (Table G-2).

The annual growth rate of population in the Study Area was 2.8 per cent compared with 3.7 per cent of the average growth rate of the whole Jordan in the period 1979-1985. The growth rate of Karak sub-region is the highest at 3.5 per cent, and Tafila sub-region is ranked the second at 2.8 per cent in the Study Area.

There were 180 settlements in the Study Area under the National Village Survey by MOP in 1984, comprising 112 settlements in Karak Governorate, 36 in the Tafila and 32 in the Madaba sub-region of Amman Governorate. The average size of population per settlement was about 800.

There were three municipalities with the estimated population of 5,000 or more, viz., Karak (14,400), Tafila (14,900) and Ayy (5,100) in 1985. Thus, the urbanization ratio in the Study Area is about 24 per cent in accordance with the definition by the Department of Statistics. This ratio is far below the national average. Of the 180 settlements, 120 settlements (67 per cent) have the small population of 500 or less. Their share of total population is only 14 per cent.

POPULATION DISTRIBUTION BY THE SIZE OF SETTLEMENTS
IN THE STUDY AREA IN 1985

	No. of Settlements		Population	
Less than 500	121	(67.2)	20746	(14.5)
501 - 1,000	23	(12.7)	16505	(11.6)
1,001 - 2,000	16	(8.9)	22639	(15.8)
2,001 - 3,000	11	(6.1)	26548	(18.6)
3,001 - 5,000	6	(3.3)	21985	(15.4)
More than 5,000	3	(1.7)	34458	(24.1)
Total	180	(100.0)	142,881	(100.0)

Source: Ministry of Planning, National Village Survey.

Most of the settlements are scattered along the King's Highway- a north-south axis of socio-economy in the Study Area. Nearly 95 per cent of the total population is found in this area, while in the Badia area along the Desert Highway there are only two major settlements - Qatrana and Hasa. The total population of the Badia was about 7,200 in 1985.

Karak and Tafila Municipalities are the capital city of the respective governorates. In terms of population and other functions, both cities are outstanding compared with such secondary towns as Ayy, Mazar, Moab (newly combined town), Mu'tah and so on.

2.3 Migration Movement

The information which directly deals with intra- or inter- regional migration is not available. However, as mentioned in the preceding section, relatively low population growth rate in the Study Area shows explicit out-migration from the region. Only the labour Force Sample

Survey (1982/83) indicates a pattern of movement among governorates. According to the Survey, 689 people who live in Amman at the time of Survey were from Karak, and 113 people who live in Ma'an came from Karak. These figures represent 14 per cent and 2 per cent respectively of total sample number for Karak.

POPULATION 15 YEARS OF AGE AND OVER PLACE OF USUAL RESIDENCES
WHICH CAME FROM KARAK GOVERNORATE

Amman	Irbid	Balqa	Karak	Ma'an	Other	Total
689	42	12	3,972	113	47	4,875
(14.1)	(0.9)	(0.2)	(81.5)	(2.3)	(1.0)	(100.0)

Source: Department of Statistics, Labour Force Survey 1982/83

As for intra-regional migration, there is a movement from small settlements to urban centres such as Karak and Tafila according to reconnaissance survey. Also, the Ministry of Planning changes the estimated population growth rate by the size of municipalities in the National Village Survey because of intra-regional migration.

Regarding international migration, the trend can be guessed from the external travel statistics prepared by the Department of Statistics. The excess departures over arrivals of Jordanians numbered 69,000, 24,000 and 3,000 in 1982, 1983 and 1984 respectively. In 1985, the number of arrivals was exceptionally larger than that of departures. This is mainly because Jordanian workers are coming back from the Gulf countries due to their recession. On the other hand, the number of arrivals of other Arab nationals has exceeded that of departures since 1982. The annual average of this balance for the period 1982-1985 amounted to 60,000.

In terms of international migration in the Study Area, there is no available data. However, the direct movement from the Study Area to other countries were not found according to the discussion with the people in the Study Area.

2.4 Population Prospects

The growth of population is determined by three factors-viz., birth rate, death rate and migration. In view of the scarcity of data in Jordan on these factors as well as on the actual number of population, the population projection for the Study Area can not use the methods based on above-mentioned factors. Therefore, in this study, population projections are mainly derived from the trend projections by MOP based on the population growth rates and adjusted in the scope of development frameworks and with influences of proposed projects by 2005.

Population projections are based on three population scenarios. The average population growth rate in the period 1986-2005 will be 2.2 per cent per annum for Scenario 1, 2.8 per cent for Scenario 2, and 3.2 per cent for Scenario 3. As shown in the Main Report (Volume 2), Scenario 3 has been selected as socioeconomic frameworks for this Master Plan.

The population projection in Scenario 3 by sub-region is shown in Table G-3. According to this projection, the population of the Study Area would nearly double from 143 thousand to 270 thousand. In the Study Area, the population of Karak, Mazar, Tafila and Hasa sub-region will increase at high growth rate corresponding to their development plans or priority projects. The estimated population of major municipalities are analyzed in ANNEX-H: HOUSING AND URBAN PLANNING.

3. LABOUR

3.1 Employment in Jordan

According to the Third Five-Year Plan, the number of Jordanian workers was estimated at 502,000 in 1985 (Table G-4). The share of service sectors was predominant at 70 per cent. In service sectors, share of worker's for social services and public administration was outstanding. As to productive sectors, the share of agricultural sector has sharply decreased from 33.5 per cent in 1961 to 7.8 per cent in 1985. The mining and manufacturing sectors keep almost the same share at around 10 per cent over 20 years although the number of workers has increased. The construction sector increased its share by over sixty per cent for the period 1975-1979, however, it turned to decrease its share in the period 1979-1985.

The Third Five-Year Plan indicates the sectoral targets for new job opportunities as follows:

Agriculture	16,700	Transportation	11,200
Mining	1,600	Trade	7,600
Manufacturing.....	11,000	Public Services	33,500
Electricity and Water.....	1,500	Other Services	1,900
Construction	12,300	<u>Total</u>	<u>97,300</u>

The influx of foreign labour occurred in the early stages of the first Five-Year Plan (1976-1980), mainly as a result of the out-migration of Jordanian workers to the Gulf countries and the growth of investment opportunities in Jordan. Arab and foreign registered labour has increased from 8,000 in 1976 to 41,000 in 1979, then to 143,000 in 1985. On the one hand, the number of Jordanian workers abroad is estimated at close to 339 thousand in 1985.

The unemployment rate in Jordan fluctuated from 2 per cent to 8 per cent in the period 1973-1985. In 1973, the ratio was about 8 per cent. The rate continued to fall thereafter, as a result of the 1973-1975 development programmes and increased labour migration. In 1976, it

stood at about 2 per cent. However, in 1985, unemployment was estimated at about 8 per cent largely because of the domestic and international recession.

3.2 Employment in the Study Area

Data about employment in the Study Area are scarce. The latest available ones come from the census in 1979. Employment of old Karak Governorate in 1979 amounted to 25,000 or 6.2 per cent of total employment in the whole Jordan (Table G-5).

Among the sectors, public services and other services were predominant and accounted for 46 per cent of total employment in Old Karak Governorate. The agricultural sector was ranked the second at the share of 24 per cent. This share was double compared to the average share of the whole Jordan (12 per cent) in 1979. The mining sector represented 9 per cent of total employment. This ratio was around six fold of the national average. This is because major phosphate and cement plants are in the region. The percentages of trade, transportation and communications, and financial services were so small as compared with those of these sectors in the Kingdom. Moreover, the share of manufacturing sector was far below as compared with that of the sector in Jordan, or only one fifth of the national average.

Most of female labour force joined the public and social services sector. Their share of total labour force in old Karak Governorate was only 6 per cent in 1979. According to Labour Force Survey in 1982/1983, unemployment ratio was estimated at 2.2 per cent in the region.

3.3 Labour Prospects

3.3.1 Labour Demand

In order to project the labour demand (required labour force) for the Study Area in 2005, the numbers of the employed by sector in 1985 (base year) is calculated as follows: (1) Calculate the growth rate of labour force by economic sector from 1979 to 1985, based on the national trend in the Third Five-Year Plan; (2) Apply these growth rates to

numbers of employment in old Karak Governorate in 1979; (3) Adjust numbers of employment for mining and manufacturing sectors in 1985, based on data from interviews with companies and from Industrial Survey (1984/85); (4) Adjust numbers of employment based on the prorated population between the Study Area and old Karak Governorate.

At the next stage, numbers of required labour force in 2005 for Agriculture, mining and manufacturing sectors are estimated by the analyses of the current situations and proposed projects, based on the numbers in 1985. Other economic sectors' employment is derived from labour productivity, which is defined as the value-added per person employed, and its growth rate. The growth rate draws heavily on the research in the World Bank (Ref. G-2). Thus, the demand side of the manpower projection is based on one possible scenario of future economic growth. All figures in this section are, therefore, based on the selected frameworks for Scenario 3.

The projections of labour demand are shown in Table G-6. Labour demand would increase from 29,000 in 1985 to 62,000 in 2005. This could create 33,000 new job opportunities with an annual growth rate of 3.9 per cent over twenty years. 62,000 represents 22.9 per cent of the projected population in the Study Area compared with 20.2 per cent in 1985. In terms of economic activities, employment of commodity-producing sectors amounts to 28,000, while that of service sectors is 34,000.

In this analysis, the foreign labour force is not dealt with because this subject is highly related to the policies of the central government. Also, since the volume of labour demand is derived from the targeted gross domestic production which comprises Jordanian's contributions, the number of foreign workers is out of the scope. According to the annual report in 1985 by the Ministry of Labour, the numbers of labour permits issued for the Arab and foreign workers in bureaus of Karak and Tafila were 3,206 and 850 respectively during 1985.

3.3.2 Labour Supply

In general, labour supply is projected on the basis of the existing stock of labour and the likely output of the education/training system. Although this way of projection faces difficulties because of change of age-group structure in association with development and uncertainty of labour participation ratio in the future, only a rough estimation is done in the following procedures: (1) Set an annual output of education system in the Study Area (About 1,100 students who seek jobs come from secondary schools, a vocational training centre, and a community college per annum, according to the data from the Departments of the Ministry of Education in Karak, Tafila and Madaba). The Graduates from Mu'tah University and Polytechnic Institute are not included in this figure; (2) Assume that the number of students from secondary schools will increase at 6.3 per cent per annum and the number from other educational institutions will increase at 3.1 per cent per annum over 20 years. These growth rates are based on the projections in the Third Five-Year Plan.

As a result, approximately 38,000 graduates would seek job opportunities for the planned period. In addition, graduates from Mu'tah University, Polytechnic Institute and under secondary levels and drop-outs from the education/training system should be taken into account.

3.3.3 Labour Balance

The rough projections of labour demand and supply as presented in the preceding sub-sections reveal some potential imbalances in the Study Area. It should be stressed, however, that this projected imbalance did not take full account of the dynamics of the labour market. Thus, in reality, there are attrition and substitution possibilities while a variety of other factors may provide partial adjustment (education enrollments, labour force participation, changes in real wages, migration, etc.). Furthermore, this prospect is quantitative in that it leaves out the labour quality aspect.

Although it is difficult to conclude the balance between labour demand and supply at this stage, the balance would be kept within an

acceptable range.

According to the Third Five-Year Plan and the World Bank Report (Ref. G-2), the imbalance - especially large excess supply of semi-skilled non-manual workers is indicated at the national level in 1990. The Ministry of Labour and the Ministry of Education are tackling this problem through wide range of programmes.

3.3.4 Quality of Labour

From the point of labour quality, the focus is on the establishment of a training and education system which will generate the human resources matching with community's needs. In the context of the Master Plan for the Study Area, the needs for industrial technicians and agricultural engineers would be raised. Therefore, it is necessary to improve and expand the vocational training programmes for such prospective demand especially in the secondary school and college levels.

4. EDUCATION

4.1 Present Situation

4.1.1 Present Situation of Education in Jordan

A well educated and trained labour force is one of the most valuable national wealth and remains as a key to Jordan's development. Public education is based on a three level system comprising primary or elementary (grades 1-6), preparatory (grades 7-9) and secondary (grades 10-12) schools.

During the past few decades, Jordan witnessed substantial progress in the field of education. According to the Third Five-Year Plan, the number of student rose from 240 thousand in 1955 to 920 thousand in 1986/1987, while teachers increased from 6,800 to 39,600. In 1986, the enrollment rate in the primary cycle was about 97 per cent, in the preparatory cycle about 89 per cent, in the secondary cycle about 68 per cent and in higher education about 22 per cent of the given age groups. Government schools accommodate about 80 per cent of students and the balance is met by private schools and the United Nations Relief and Works Agency (UNRWA). During the period 1976-1984, the student/teacher ratio fell from 35.1 to 32.1 in primary schools, and from 23.1 to 20.1 in secondary schools, while remaining almost constant (at 21.1) in preparatory schools.

With regard to higher education, there are three types, namely, community college, polytechnic institute and university. Community colleges are popular, found in every governorate, and are managed by both the public and private sectors. University education in the past largely depended on universities abroad because of lack of facilities and capacities in the first state-run university, Jordan University located in Amman. In addition to scaling up Jordan University, however, Yarmouk University in Irbid and Mu'tah University in Karak were established in 1976 and 1984 respectively. Furthermore in 1986, Yarmouk University was reorganized and divided into two universities, i.e.

Yarmouk University based in the old campus and Science and Technology University based in the new campus. Thus, higher education shows significant progress and reduces dependency on foreign universities. Polytechnic institute ranks between university and college with three year curricula.

The Third Five-Year Plan aims to further expand and elevate educational standard by investing about 7.9 per cent of the total national development expenditures into the education and higher education sectors.

4.1.2 Present Situation of Education in the Study Area

According to the report by the Education Sector Committee in 1987, enrollments of students in elementary (primary), preparatory and secondary schools in the Study Area in 1985/1986 were approximately 34,900, 12,300 and 6,400 respectively (Table G-7). The number of enrollments was distributed to Karak Governorate (37,400), Tafila Governorate (12,900) and Dhiban district in Amman Governorate (3,300) respectively. The number of female students was less than that of male in elementary and preparatory levels, but was more in the secondary level.

The number of schools in Karak Governorate is 187, of which 169 are owned by the Ministry of Education including rented school buildings. Some of these schools offer only elementary education, some offer both elementary and preparatory education, and some offer the three levels of education together.

As for Tafila Governorate, the number of schools is 79. The number of schools in Dhiban district is 24.

Problems of school buildings in the Study Area are almost common. One quarter of the total schools are characterized by old buildings, wrong design and under-furnished. The number of schools that contain modern educational facilities in Karak Governorate is only ten. Private schools, exist in Karak Governorate, but are rather rare in the Study Area. There are 1,255 students in these private schools.

There are 2,046 teachers in Karak Governorate, and 730 in Tafila Governorate. In the secondary schools, most of teachers hold Bachelor's degree. On the other hand, in the compulsory level, a small portion of them hold B.A., and most of them have community college diploma only. Teachers confront educational disqualification and lack of training programmes. In addition, because most of the teachers in the secondary level are not from the region, their settlement is temporary.

Only one community college is located in the eastern part of Karak. 963 students are distributed according to their major fields of specialization such as Islamic education, Arabic language, Elementary education, Business administration and so on. The fields of study in this college do not necessarily meet the needs of community. Therefore, this has led to the increase of unemployment among the graduates especially females of this institution.

In Tafila, there is Polytechnic Institute, which is expected to commence functioning in September 1987. This institution will concentrate on both professional and academic education. It will have several laboratories and workshops.

Mu'tah University is the only university located in the southern governorates of Jordan. The University opened its doors to students in October 1984. The University is divided into two campuses--military and civilian. For the academic year 1986/1987 the number of enrollments on military campus (1038) were distributed over the following fields; Mechanical engineering, Electrical engineering, Computer science, Mathematics, Physics, Chemistry, Law, Administration, Arabic language and literature, and English language and literature.

The civilian campus started to admit students in 1986/87. The number of students enrolled on this campus is 300. Their majors are distributed as follows: Arabic language and literature, English language and literature, Law, Administration and education.

The future plan of Mu'tah University is to accommodate 5,000 students in its civilian campus and 2,000 in its military campus during the coming two decades.

In the Third Five-Year Plan, JD 14 million, which represents 9.3 per cent of the whole Jordan, is allocated to the general education sector in the Study Area. JD 29 million or 31 per cent of the investment for higher education in the Kingdom, is allocated to the higher education in the Study Area.

4.2. Needs to Education Sector

It was pointed out at the Education Sector Committee that there were the following major problems faced in the Study Area, although there was no remarkable regional disparity in educational indicators compared with the national average:

- (1) Lack of qualified teachers particularly in the secondary school level
- (2) Inappropriate special distribution of schools
- (3) High percentage of unsuitable rented school buildings
- (4) Two-shift system in some schools
- (5) Poor educational facilities
- (6) Difficulty in land acquisition for school buildings
- (7) Shortage of well-educated and vocationally-trained labour

4.3 Goals and Strategies of Education Sector

(1) Goals: In consideration of the current situation, problems and the expected role of the sector in the regional development context, the following goals are set:

- (A) Eradication of illiteracy
- (B) Supply of well-qualified teachers
- (C) Achievement of higher enrollment rate in compulsory education
- (D) Better distribution of school buildings with proper facilities
- (E) Completion of Mu'tah University as the centre of education, research, technology and culture
- (F) Supply of well-educated and trained labour

(2) Strategies: To achieve the goals above, the following development strategies are set up:

- (A) Promotion of adult education programs at urban and rural levels
- (B) Provision of retraining programs for under-qualified teachers to be established by Mu'tah University
- (C) Reorganization of sparsely-populated rural settlements into New Villages which will be provided with better public services including education
- (D) Improvement and expansion of professional and vocational training
- (E) Creation of a Techno-Highland Scholarship Fund for gifted students at the secondary school level
- (F) Creation of a Techno-Highland Research Fund

4.4 Expansion Plan of Education Sector

In the education sector it is not an objective of the Study to formulate individual educational projects, but a general expansion plan is set forth including requirements of the education sector for realizing the Master Plan.

(1) Utilization of Mu'tah University: Mu'tah University is positioned as nucleus of Mu'tah-Mazar urban centre for regional development. From the view point of coordination and harmony to be maintained between the manufacturing industry and Highlands agriculture, assistance of the University in development of the proposed agro-industry is prerequisite. Therefore, the University had better contain the faculty and research institute for agriculture. Also, since the supply of skilled labour force is one of the most important tasks of the University, education in professional fields which is highly needed by the community should be promoted. This point comes from the lesson of community college in Karak, where there is increasing unemployment of graduates. Furthermore, the University should provide retraining programmes for under-qualified teachers in the Study Area.

(2) Encouragement of the private sector: It is necessary to encourage the private sector to participate more in the education sector. In order to promote the private sector activities. The Study Team

recommends that a Private School Promotion Subsidy Law and its implementation organization be studied for establishment. Under these systems, the central and/or local governments should provide private institutions with subsidies to promote educational activities and to ensure their quality.

(3) Appropriate distribution of educational facilities: In the short-term, creation and improvement of school-bus system for students from remote area are important. In the long-term, it is recommended that location of educational facilities be re-examined in conjunction with the New Village Project, which will reorganize distribution pattern of settlements. ANNEX-H enters into details.

5. PUBLIC HEALTH

5.1 Present Situation

5.1.1 Present Situation of Health in Jordan

In the Second Five-Year Plan (1981-1985), this sector had budgetary allocation equivalent to 3.1 per cent of the total development budget which was more than double of 1.2 per cent for the First Five-Year Plan (1976-1980). As a result, geographical scope of preventive and curative services in the Kingdom has been expanded and infant mortality rate has been largely reduced from 151 per 1,000 in 1961 to 60 per 1,000 in 1984. While life expectancy has extended from 46 years to 67 years for male, and from 47 years to 71 years for female during the same period. These indicators explain substantial improvements achieved in the past over 20 years. In the Third Five-Year Plan, 2.0 per cent of the total investment are allocated to this sector.

(1) Health facilities: There are general hospitals, specialized hospitals, health centres, clinics, dental clinics and sanatoriums for tuberculosis in Jordan. As shown below, these facilities have been improved to provide more people with easy access to health services:

	<u>1952</u>	<u>1985</u>
(A) Health centre/rural clinic	46	420
(B) Mother and child care centre	1	101
(C) Hospital	29	53

(2) Health staff: The number of health staff has been increased substantially since 1952.

	<u>1952</u>	<u>1985</u>
(A) Physician	180	3,219
Physician per 10,000 pop.	1.5	11.9
(B) Dentist	43	539
(C) Pharmaceutist	89	972
(D) Nurse	474	1,705

As to supply of these health staff, both Jordan University and Yarmouk University have the faculty of medicine to educate physicians, pharmacutists, dentists and nurses. 49 community colleges have courses for nurses and paramedical staff. The Third Five-Year Plan aims to reduce percentage of the villages without health staff from current 8.8 per cent to 3.0 per cent by the year 2000. Also the plan puts emphasis on health education and preventive medicine as well.

5.1.2 Present Situation of Health in the Study Area

The second Five-Year Plan (1981-1985) included a hospital renovation project with 200 beds in Karak and a new hospital project with 100 beds in Tafila. Budgets allocated were about 10 per cent of the developmental budgets of the Ministry of Health, which were much higher than the population share in the Study Area. However, they had been achieved about 50 per cent at the time MMRAE surveyed in 1985. The Third Five-Year Plan increased the share to 13 per cent probably due to addition of the unused amount in the previous plan. The numbers of health facilities and health staff in the Study Area in 1985 were as shown below:

(1) Health facilities

(A) Health centres	28
(B) Rural clinic	53
(C) Mother & child care centre	20
(D) Dental clinics	7
(E) Hospital (public owned 170 beds)	3
(F) Hospital (private 58 beds)	1
(G) Italian hospital (private)	1
(H) Sanatorium for tuberculosis	3
(I) School health centre	3

(2) Health staff

		<u>Share in the whole Jordan</u>
(A) Specialist/physician	34	3.5 %
(B) General physician	79	
(C) Dentist	11	2.0 %
(D) Pharmaceutist	26	2.7 %
(E) Nurse	280	
(F) Midwife	22	
(G) Others	774	

The above figures show that the present level of health services in the Study Area is not prorated in terms of the population share (5.3 per cent).

5.2 Goals and Strategies of Health Sector

(1) Goals: Considering the present situations and objectives of the Third Five-Year Plan for the health sector, the goals for the Study Area are set up as follows:

- (A) Making the health services generally available to all communities in the Study Area
- (B) Upgrading the level of health services with modern equipment and female physicians and nurses who are required for mother and child cares especially in the rural areas.

(2) Strategies: To achieve above mentioned goals, the following strategies are set up:

- (A) Balanced distribution of medical and health facilities for community health services
- (B) Improvement of the current health facilities and enhancement of health staff
- (C) Establishment of new medical hierarchical and information systems

5.3 Expansion Plan of Health Sector

The following expansion plans are recommended for health development in the Study Area:

(1) Reorganization of health facility hierarchy: It is recommended to construct a new general hospital in Mu'tah-Mazar area in the long-term as the principal hospital in the Study Area. This hospital should be hierarchically placed on the top of existing hospitals, comprehensive health centres, primary health centres and rural clinics.

By 2005 comprehensive health centres should be established in all the secondary urban communities with population of 5,000 or more, while primary health centres should be established in the municipalities with population of less than 5,000. In every rural community, one rural clinic should be provided in conjunction with the New Village Project. All the medical centres and clinics will be supported by a remote diagnosing information system through a telecommunications system linked with the principal hospital.

(2) Appropriate balance of health institutions: Public (the Ministry of Health and the Royal Medical Services) and private health institutions should be arranged without duplication and discrepancies in the level of care, costs, insurance and so forth. In order to attain the balance, it is recommended to set up an ad-hoc committee at the regional level consisting of representatives from the local government, municipalities, and private and public health institutions.

6. CONCLUSIONS AND RECOMMENDATIONS

(1) Human resources are important for integrated development of the Study Area. The careful coordination with other sectors development committees and councils is highly recommended.

(2) The projected population in the Study Area is approximately 270 thousand in 2005 with an annual growth rate of 3.2 per cent in the period 1986-2005.

(3) The projected labour demand is about 62,000 in 2005, implying 33,000 new job opportunities. The balance of labour demand/supply would be within an acceptable range.

(4) The education system should improve and expand vocational training which will meet the requirements of the community.

(5) Mu'tah University should participate in development of the region as the centre of education, research, technology and culture.

(6) In conjunction with the New Village Project, the health system should be hierarchically reorganized in the long-term.

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- G-5 Ministry of Labour, Annual Report, 1985

T A B L E S

Table G-1 ESTIMATED POPULATION BY GOVERNORATES IN 1979-1985

Governorates	1979	1980	1981	1982	1983	1984	1985	Annual growth rate (percentage)
Amman	854,576 (39.8)	890,519 (40.0)	928,006 (40.3)	967,102 (40.5)	1,007,886 (40.8)	1,050,437 (41.0)	1,098,460 (41.1)	4.3
Zarqa	330,060 (15.5)	346,029 (15.5)	359,511 (15.6)	373,524 (15.7)	388,092 (15.7)	403,235 (15.8)	424,924 (15.9)	4.1
Irbid	530,620 (24.7)	545,903 (24.5)	516,670 (24.4)	577,913 (24.2)	594,632 (24.1)	611,876 (23.9)	631,944 (23.7)	3.0
Ma'raq	78,119 (3.6)	80,075 (3.6)	82,082 (3.6)	84,138 (3.5)	86,245 (3.5)	88,423 (3.5)	93,458 (3.5)	3.0
Balqa	152,056 (7.1)	156,398 (7.0)	160,866 (7.0)	265,469 (6.9)	170,206 (6.9)	175,082 (6.8)	180,099 (6.7)	2.9
Karak	94,193 (4.4)	96,641 (4.3)	99,147 (4.3)	101,729 (4.3)	104,379 (4.2)	107,097 (4.2)	111,786 (4.2)	2.9
Tafila	31,921 (1.5)	32,770 (1.5)	33,642 (1.5)	34,535 (1.4)	34,454 (1.4)	36,403 (1.4)	37,371 (1.4)	2.7
Ma'an	74,814 (3.5)	77,211 (3.5)	79,683 (3.5)	82,254 (3.4)	84,905 (3.4)	87,653 (3.4)	92,960 (3.5)	3.7
Total	2,149,359 (100.0)	2,225,551 (100.0)	2,304,607 (100.0)	2,386,664 (100.0)	2,471,799 (100.0)	2,560,206 (100.0)	2,671,002 (100.0)	3.7

Source: Ministry of Planning

NB. The figures in 1979 are based on the result of the census in 1979, while figures of other years are estimation. Estimated population by Department of Statistics is 2,694,000 in 1985. The difference between MOP estimation and DOS estimation is around 23,000, less than 1 per cent of total population. In order to break down the population analysis to regional level, the Study Team adopted the MOP data.

Table G-2 ESTIMATED POPULATION IN THE STUDY AREA

Sub-region	1979	1985	Annual Growth Rate (1979-1985)
Karak Governorate ^{1/}			
Karak	30,853	37,838	3.5
Qasr	15,909	18,439	2.5
Mazar	22,729	26,729	2.7
Ayy	9,159	10,560	2.4
Badia	2,380	2,744	2.4
Total	81,030	96,310	2.9
Tafila Governorate			
Tafila	20,663	24,391	2.8
Bseira	7,334	8,456	2.4
Hasa	3,924	4,524	2.4
Total	31,921	37,371	2.7
Amman Governorate ^{2/}	7,748	9,200	2.9
Grand Total	120,699	142,881	2.8

Source: Ministry of Planning

^{1/} Safi Sub-region is excluded. ^{2/} Parts of Madaba/Dhiban Sub-Region

Table G-3 PROJECTED POPULATION IN THE STUDY AREA

Govern.	Sub-region	1985	1995	2005
Karak	Karak	37,800	49,200	68,300
	Qasr	18,500	23,100	29,600
	Mazar	26,700	34,000	49,200
	Ayy	10,600	13,300	17,500
	Badia	2,700	3,400	5,400
Total		96,300	123,000	170,000
Tafila	Tafila	24,400	31,900	46,400
	Bseira	8,500	10,600	14,000
	Hasa	4,500	5,700	25,100
Total		37,400	48,200	85,500
Amman	Dhiban	9,200	11,400	14,900
Grand Total		142,900	182,600	270,400

Source: The Study Team

Table G-4 NUMBER OF JORDANIAN EMPLOYMENT BY ECONOMIC ACTIVITY

Economic Activity	1961	1975	1979	1985
Agriculture	72,977 (33.5)	49,640 (13.3)	46,728 (11.5)	39,237 (7.8)
Mining and Manufacturing	22,278 (10.2)	37,980 (10.2)	34,935 (8.6)	53,053 (10.6)
Electricity and Water	925 (0.4)	2,170 (0.6)	2,472 (0.6)	5,526 (1.1)
Construction	22,187 (10.2)	30,240 (8.1)	52,645 (13.0)	55,263 (11.0)
Trade	17,452 (8.0)	63,700 (17.0)	41,541 (10.3)	50,239 (10.0)
Transportation and communications	7,624 (3.5)	27,630 (7.4)	28,977 (7.2)	47,225 (9.4)
Financial Services	- ^{1/}	6,650 (1.8)	8,673 (2.1)	17,132 (3.4)
Social Services, Public Administration and Other Services	74,397 (34.2)	155,800 (41.7)	189,303 (46.7)	234,718 (46.7)
Total	217,840 (100.0)	373,810 (100.0)	405,274 (100.0)	502,393 (100.0)

Sources: The Third Five-Year Plan (for 1961, 1979 and 1985)
Multi-Purpose Household Sample Survey for 1975

^{1/} Included in Social Services

Table G-5 SECTORAL EMPLOYMENT OF OLD KARAK GOVERNORATE IN 1979

Economic Sector	Male	Female	Total	Share (%)
Agriculture	5956	7	5963	23.6
Mining	2262	1	2263	8.9
Manufacturing	302	77	379	1.5
Electricity and Water	21	-	21	0.1
Construction	2747	2	2749	10.9
Trade	1214	4	1218	4.8
Transportation and Communication	969	-	969	3.8
Financial Service	101	6	107	0.4
Public Services & Other Services	10528	1385	11643	46.0
Grand Total	23830	1482	25312	100.0

Source: Housing and Population Census 1979

Table G-6 PROJECTED LABOUR DEMAND IN THE STUDY AREA

(Unit: Person)

	1985	1995	2005
Productive Sectors	11,200	17,000	27,800
- Agriculture <u>1/</u>	4,800	5,400	6,100
- Mining <u>2/</u>	2,900	3,000	5,000
- Manufacturing	500	4,500	10,000
- Others	3,000	4,100	6,700
Services Sectors	17,600	24,800	34,200
- Trade	1,500	2,000	2,900
- Transportation & Communication	1,600	2,200	3,000
- Public Services & others	14,500	20,600	28,300
Total	28,800	41,800	62,000
Ratio for the employed in total population (%)	20.2	22.8	22.9

Source: The Study Team

1/ Based on the definition by DOS

2/ Contractors of mines are not included.

Table G-7 NUMBER OF ENROLLMENTS BY SEX, EDUCATIONAL STAGES
AND REGION FOR 1985/1986

	Elementary (Primary)	Preparatory	Secondary	Vocational Training Centers	Total
Karak ^{1/}					
Male	12,491	4,678	2,364	67	19,600
Female	11,213	4,074	2,490	63	17,840
Total	23,704	8,752	4,854	130	37,440
Tafila					
Male	4,825	1,628	569	-	7,022
Female	4,026	1,200	652	-	5,878
Total	8,851	2,828	1,221	-	12,900
Amman (Dhiban)					
Male	1,249	500	140	-	1,889
Female	1,064	236	148	-	1,448
Total	2,313	736	288	-	3,337
Grand Total	34,868	12,316	6,363	130	53,677

Sources: Preliminary Report on the Situation of Education in the Study
Area by the Education Sector Committee in 1987
Ministry of Education/Madaba District Directorate

^{1/} Safi Sub-Region is included.

ANNEX-H HOUSING AND URBAN PLANNING

THE STUDY ON
INTEGRATED DEVELOPMENT MASTER PLAN
FOR THE KARAK-TAFILA DEVELOPMENT REGION

VOLUME 4: SUPPORTING REPORTS

ANNEX-H HOUSING AND URBAN PLANNING

TABLE OF CONTENTS

	<u>PAGE</u>
1. INTRODUCTION	H-1
2. PRESENT CONDITIONS	H-2
2.1 Overview of the Housing Development.....	H-2
2.2 Present Conditions of Housing	H-4
2.3 Housing Development Plan (1986-1990)	H-6
2.4 Urban Areas	H-7
3. HOUSING DEMAND	H-12
3.1 Assumptions for Demand Projection	H-12
3.2 Demand Projection	H-14
4. URBAN DEVELOPMENT PLAN	H-16
4.1 Basic Concepts for Urbanization	H-16
4.2 Strategic Urban Centers	H-18
4.2.1 City of Karak	H-18
4.2.2 Mu'tah-Mazar City	H-19
4.2.3 City of Tafila	H-20
4.2.4 Hasa City	H-21
4.3 Secondary Urban Centres	H-22
4.4 New Village Network	H-23
5. CONCLUSIONS AND RECOMMENDATIONS	H-26
References	H-27
Tables	H-28
Figures	

LIST OF TABLES

		<u>PAGE</u>
Table H-1	EAST BANK HOUSING STOCK FOR 1961, 1979 AND 1986	H-28
Table H-2	SIZE OF HOUSING UNIT	H-29
Table H-3	HOUSING STOCK BY TYPE OF BUILDING	H-29
Table H-4	TENURE OF HOUSING UNITS BY REGION	H-29
Table H-5	TENURE HOUSING UNITS BY HOUSEHOLD INCOME	H-30
Table H-6	NUMBER OF HABITABLE ROOMS	H-30
Table H-7	HOUSING UNIT CONSTRUCTION BY YEAR	H-31
Table H-8	INVESTMENT SCHEDULE OF HOUSING PROJECTS UNDER THE THIRD FIVE-YEAR PLAN	H-31
Table H-9	INVESTMENT SCHEDULE OF URBAN DEVELOPMENT PROJECTS UNDER THE THIRD FIVE-YEAR PLAN	H-32
Table H-10	SUMMARY OF HOUSING PROJECT UNDER THE THIRD FIVE-YEAR PLAN	H-33
Table H-11	POPULATION OF MAJOR MUNICIPALITIES AND VILLAGES	H-34
Table H-12	SETTLEMENT DISTRIBUTION BY SIZE OF POPULATION AND DISTRICT	H-35

LIST OF FIGURES

Fig. H-1	Present Distribution of Major Settlements (1985)
Fig. H-2	Planning Area of Karak Municipality
Fig. H-3	Tafila Municipality
Fig. H-4	Planned Distribution of Major Settlements (2005)
Fig. H-5	Typical Patterns for Village Consolidation

1. INTRODUCTION

This sector had originally not been included in the Scope of Work but was added together with the health and education sectors as a result of discussions on the inception report.

The Ministry of Planning conducted the National Housing Survey in 1986 for a study on National Housing Strategy (the NHS study) which is in progress parallel with this study. The Survey provided comprehensive and latest information on housing in the Kingdom, covering six localities in the Study Area: Karak, Qatrana, Adnaniyyeh, Mazar, Janoubieh and Tafila with about 25 samples each.

Karak, Mazar Janoubieh and Tafila represent urban housing, and Qatrana and Adnaniyyeh rural housing. Following the Survey, MOP prepared three technical memoranda: Revised Housing Needs and Associated Investment in Jordan 1986-2006; Private Sector Housing Suppliers Survey; and Existing Housing Situation in Jordan.

While the Urban Development Department (UDD) of MMRAE prepared a Programme Feasibility Study in December 1986 covering 10 secondary cities in the Kingdom including Tafila and Karak (UDP3). The Study covers backgrounds, institutional aspects, project identification, site evaluation and social survey on the five selected cities, one of which is Tafila.

This annex discusses on the present conditions of housing in the Kingdom and in the Study Area based on the information taken by the above-mentioned studies. As to the development plan, the remarks made by the Housing and Urban Planning Committee in March 1987 were considered.

2. PRESENT CONDITIONS

2.1 Overview of the Housing Development

(1) East Bank: Principal problems of the sector are high percentage of vacant housing units, their shortage particularly for low and limited income groups, over crowding situation in the refugee camps and large unutilized serviced land in Greater Amman. These mainly arise from economic, urban and regional problems.

The housing sector achieved great development during the past three decades. Between 1951 and 1985, housing units increased from 37,264 to 456,253 at an average annual growth rate of 7.6 per cent. Also the population censuses of 1961 and 1979 showed significant quality improvement in building materials. Housing units built with reinforced concrete increased from 15.6 per cent to 45.1 per cent and cement-block houses increased from 8 per cent to 30.9 per cent. Despite an increase in average family size from 5.6 to 6.6, the number of person per room dropped from 2.8 in 1961 to 2.7 in 1979, showing an increase in the number of rooms per house.

According to the definitions of acceptable housing quality in both dwelling unit and infrastructure, it was estimated by MOP that 86 per cent of the occupied housing stock were of acceptable quality, and 6.5 per cent were below the quality but repairable. 7.5 per cent were deemed to be economically unusable. Some 69 per cent of all households owned their homes. Multi-unit type buildings were dominant, with 42 per cent of all the housing units.

As for public utilities and services, the proportion of families supplied with piped-water rose from 30.3 per cent in 1961 to 69.6 per cent in 1979, and that supplied with electricity from 20.4 per cent to 71.5 per cent.

The establishment of institutional frameworks gave great impacts on this sector. The Housing Corporation was established in 1966 to provide

housing to limited and low income groups, and the Housing Bank was set up in 1974 to supply housing loans to the public. In addition several housing cooperatives and specialized housing funds were established, and the Military Housing Corporation and the Urban Development Department of MMRAE as well.

The actual investment in this sector far exceeded the amount planned in the previous two five-year plan (1975-1980, 1981-1985) by 267 per cent and 169 per cent respectively, and corresponded to about 9 per cent of GNP in the recent years. This is primarily due to brisk investment by the private sector. The share of the private sector reached almost 90 per cent while the planned share was around 60 per cent.

The trend of this investment was related to the rising needs of the middle and higher income groups, and led eventually to an imbalanced investment: while there have been significant number of vacant units in Greater Amman, the supply of houses for low and limited income groups failed to meet the demand.

Over the last five years there have been many housing programmes implemented by public agencies. Although only 29 per cent of their targets were achieved, the Housing Corporation built and delivered 5,100 housing units at a cost of JD 44.5 million. Also 4,269 housing units are under construction with total expenditure of JD 61.5 million by the end of 1985, of which Abu Nuseir City project occupies about 86 per cent in number of unit and 90 per cent in terms of expenditure. Stage I of this project is nearly completed and a great number of housing units have recently been sold to government employees with financial arrangements to encourage acquisition of an owner-house on one hand and not to increase vacant stock on the other.

The Urban Development Department has been in operation since 1980 and so far developed and improved 1,357 housing units and constructed 3,000 low income housing units at a cost of JD 20 million. Of the other two public sector agencies, the Military Housing Corporation extended 8,578 housing loans to army personnel amounting to JD 35 million, and

constructed 832 housing units at a cost of JD 14 million. The number of housing cooperative societies reached 86 by the end of 1985 and constructed 2,050 housing units. Of these 658 housing units are currently under construction. On the other hand, the total number of housing units built by the private sector during the period was 30,748 which included 14,207 loans by the Housing Bank totaling JD 193.6 million.

(2) Study Area: The Study Area is the least urbanized area in the Kingdom and there is high percentage of unoccupied units probably due to the out-migration problem. Major housing projects are employment-related housing such as for the Phosphate Mine Company, the South Cement Company and Mu'tah University. A total of 1,160 housing units was earmarked for urban housing, and 250 for rural housing with planned total investment of JD 6.4 million. This amount would be exceeded by the actual investments.

2.2 Present Conditions of Housing

(1) Housing stock and type of building materials: Table H-1 shows housing stock in the East Bank by type of building materials and by area (Greater Amman, other urban, and rural areas). There is no outstanding difference in the percentage of the type of building materials among the three areas. The housing stock in the Study Area was estimated to be around 24,000 housing units.

(2) Size of housing unit: Table H-2 shows sizes of housing unit in the three classified areas plus the East Bank as a whole. Key aspects are as follows:

(A) The largest share of small housing units (under 60 m²) is found in Other Urban Areas (37.4 per cent) compared to 31.9 per cent in Greater Amman and 35.8 per cent in Rural Areas.

(B) In the middle size housing units (61-100 m²), there is a higher share in Greater Amman (42.6) compared to 38 per cent in Other Urban Areas and only 31.5 per cent in Rural Areas.

(C) The share of large housing units, (over 100 m²) is almost equal between Greater Amman and Other Urban Areas at some 24.5 per cent, but higher in Rural Areas at 32.4 per cent. Samples of the five

localities in the Study Area which comprises three Other Urban Areas and two Rural Areas show that the share of large housing units (over 100 m²) is high at 36 per cent.

(3) Type of building: Table H-3 shows the occupied housing stock by type of building, and tells that there has been a significant increase in the share of apartments in the total housing stock, concentrated mainly in Greater Amman. Marginal and mobile housing has become an insignificant part of the total housing stock. While the samples of the Study Area show that 69 per cent are the detached house due to the high share in Other Urban Areas and Rural Areas.

(4) Tenure of housing unit: Table H-4 shows the present tenure of household units in each area and tells that the proportion of ownership category increased by 4 per cent in the period of 1979-1986 in the East Bank as a whole. While the samples of the Study Area indicate 71.2 per cent for the same category.

(5) Tenure status by average household income: Table H-5 shows that there are no remarkable differences in percentage share among the income groups in each category of tenure except high percentage of "Free" in low income groups. JD 101-150 income group is the largest at 28.8 per cent, followed by JD 51-100 at 18.4 per cent. Accordingly it can be said that approximately 50 per cent of the household belong to the low income group.

(6) Number of rooms: Table H-6 shows the number of habitable rooms per housing unit, excluding kitchen and bathrooms. While the samples of the Study Area indicate 2 rooms and 3 rooms at 27.2 and 26.4 per cent respectively which are similar to the figures for Rural Areas. Housing units in Rural Areas have more rooms on an average.

(7) Age of housing units: Table H-7 shows that 31.3 per cent of housing stock in Greater Amman were constructed after 1975, 37.8 per cent in Other Urban Areas, and 55.1 in Rural Areas.

In fact, 35.6 per cent of housing units in Rural Areas were constructed in the period 1980-86. While the samples of the Study Area reveal that 56.8 per cent were built by 1969 and housing units built during the period of 1982-1986 are only 3.2 per cent, though there is no answer of 20.8 per cent. The differences between Rural Areas in the whole East Bank and the Study Area are wide, indicating slow development of the Study Area.

2.3 Housing Development Plan (1986-1990)

(1) Principal issues and goals: As mentioned in Section 2.1, housing demand of the low and limited income groups has not been properly met, and there exists substantial shortage in this type of housing. Accordingly principal goals of the housing development plan are directed towards solution of this issue as follows:

- (A) Increased investments in low and limited income housing, being balanced with investments for other housings
- (B) Further reduction of construction costs of serviced land and buildings, through introduction of new construction technology etc., to be reached by low and limited income groups
- (C) Administrative and organizational innovation for effective management of the issues
- (D) Promotion of housing construction industry to create new job opportunities
- (E) Provision of incentives for the private sector to invest in housing for low and limited income groups in particular
- (F) Encouragement to establish and develop the building materials industry particularly those to utilize local raw materials
- (G) Development of new building systems which meet the needs of low and limited income groups

(2) Organizational measures: To cope with the above issues and goals, 19 organizational measures were adopted by the Government, covering all aspects of the housing such as establishment of a comprehensive statistical information system, institutional improvement in financing, licensing and legislative matters, technological research and development.

Tables H-8 and H-9 show the summary of the projects of Housing Corporation and Urban Development Department. Table H-10 is the summary of the total housing projects and shows that housing units of about 13,000 should be constructed annually on an average and share of the public sector be about 60 per cent.

(3) Housing projects in the Study Area

(A) Karak

- Urban Housing (public assisted)	240 units	JD 2.84 million
- Rural Housing (public assisted)	100 units	JD 0.6 million
- UDD projects (new construction and upgrading)		JD 4.09 million
- Teachers' Housing	29 units	JD 0.1 million
- Private Sector Housing	2000 units ^{1/}	JD 16.2 million

(B) Tafila

- Urban & Rural Housing (Housing Corp.)	90 units	JD 0.7 million
- UDD projects	500 units	JD 3.0 million
- Teachers Housing	17 units	JD 0.06 million
- Private Sector Housing	900 units ^{1/}	JD 7.3 million

^{1/}: Estimation by the Study Team

2.4 Urban Areas

On the basis of the criteria established by DOS, there were three municipalities in the Study Area in 1985; Karak, Tafila and Ayy.

From the viewpoint of urban development, it may be assumed that Mu'tah-Mazar is one combined urban municipality because of their proximity. Furthermore Moab, newly combined municipality with more than 5,000 population, may be regarded as another urban centre.

These five municipalities share about 50 thousand urban population in total in the total population of 143 thousand in the Study Area. The

urbanization ratio is 35 per cent which is half the national average. Fig H-1 shows the distribution of the major settlements in 1985 which have nearly 2,000 population or more. As noticed from the map, both Karak and Tafila Municipalities are dominant in population size in the Study Area. These are situated on the key nodal points of the national road network along the King's Highway, and have been servicing for the surrounding rural hinterlands as administrative, business and cultural centre of each region. A profile of each capital city is as follows:

(1) Karak: The city is located in the centre of the Kingdom and has been functioning as the main urban centre in the southern agricultural region. The area called Old Karak is the citadel of an ancient crusade and is important as a tourist centre. Because of the location on a steeply-sided plateau, population and building densities are high and there is little possibility of expansion of the existing town. Karak is the capital city of the Governorate, and is thriving in commercial activities with extensive hinterlands from the Ghor to the Badia and from Wadi Mujib to Wadi Hasa. Prospects of getting job opportunities in the town attracted immigrants from the surrounding rural areas.

(A) City planning area of Karak Municipality is divided into two parts: Old Karak; and New Karak. New Karak is further divided into three districts, Marge, Thallaja and Abu Hamur as shown in Fig. H-2. The total planning area by MMRAE is about 600 hectares.

(B) Population

<u>1979 (census)</u>	<u>1985 ^{1/}</u>
12,913 ^{2/}	15,655 ^{2/}

^{1/}: National Village Survey, MOP ^{2/}: Including Thanniya
Population growth rate is 3.3 per cent per annum which is 0.5 points higher than the average growth rate of the Study Area.

(C) Infrastructure

Water: The water distribution system is in operation with the water supply from Ain Sara and the Sultani well field.

Sewerage: A new sewerage system is under construction.

Roads & footpaths: Most of the roads are asphalted and footpaths are paved.

(D) Urban facilities

Health:

Hospital	2 (111 beds)
Health centre	1
Village clinic	1 (Thanniya)
Mother and child centre	1
Private pharmacy	6
Private clinic	6
Dental clinic	3
Medical laboratory	2

Education:

Community college	1
Vocational training centre	1
Secondary school (boy)	4
Secondary school (girl)	2
Preparatory school (boy)	2
Preparatory school (girl)	4
Primary school (boy)	1
Primary school (girl)	7

Others:

Slaughter house	1
Vegetable market	1
Sport stadium	1
Public parks	Several
Cemetery	1

(2) Tafila: The city is located southeast of the Dead Sea, 200 km from Amman and isolated from Jordan's other urban areas. It has been developed on the northwest slopes of Salama Mountain with lush olive trees. Its inhabitants have been known as mountain people because of the city's location. Dominant economic activities in the area are agriculture and livestock farming, and the income level is lower than those of other major municipalities.

(A) City planning area by MMRAE is about 680 ha. Fig H-3 shows a general setting of the city on the steep slopes. Ruin of a castle similar to those of Shaubak and Karak exists at the old part of the

city on the western edge. About 18 hectares of the old quarter is now identified as an area for upgrading of infrastructure under UDP3 Project.

(B) Population

<u>1979 (census)</u>	<u>1985 ^{1/}</u>
12,493	14,917

^{1/}: National Village Survey, MOP
Population growth rate is 3 per cent annum which is 0.2 points higher than the average growth rate of the Study Area.

(C) Infrastructure

Water: The water distribution system is in operation with water transmitted from Shaubak, Ma'an.

Sewerage: Currently the first stage of a central sewage network is under construction including a sewage treatment plant. Upon completion of the project, all houses in Tafila will be serviced.

Solid wastes: These are collected regularly and are disposed at dumping site (10 dunums) located 35 km away from the city centre to the east.

Roads: In about 30 per cent of the built up and zoned areas, footpaths are not paved and roads are not asphalted. As the city is built on the slopes, a lot of stairs connect roads. Also retaining walls were built to protect these sloped areas.

(D) Urban facilities

Health

- Hospital	1 (42 beds)
- Health centre	1
- Mother and child centre	1
- Private clinic	1
- Dental clinic	1
- Medical laboratory	1

Education:

- Secondary school (boy)	1
- Secondary school (girl)	2
- Preparatory school (boy)	2
- Preparatory school (girl)	2
- Primary school (boy)	5

- Primary school (girl) 11

Others:

- Vegetable market 1

- Industrial area (60 dunum) 1

- Commercial market & office
(under construction) 1

- Slaughter house 1

3. HOUSING DEMAND

The objective of the housing demand projection is to estimate an order of housing investments required in 1995 and 2005 in the Study Area, for these investments will give substantial impact on the regional economies and industries such as building materials manufacturing, construction, banking and insurance, and real estate in terms of their sales and employment.

3.1 Assumptions for Demand Projection

Housing demand arises mainly from three factors: (1) increase in population through natural growth and migration; (2) increase in size of household; (3) replacement of demolished substandard units. There are other factors such as amelioration of the over-crowded room situation and second house for recreational purpose. However as the demand from these factors is not large and there is difficulty in analysis due to insufficient data, the study will deal with the first three factors.

A set of assumptions used for projection is as follows:

(1) Annual population growth rate (%)

<u>Period</u>	<u>Nation</u>	<u>Study Area</u>
1986-1990	3.6	2.5
<u>1991-2005</u>	<u>3.1</u>	<u>3.5</u>
1986-2005	3.2	3.2

The national growth rate was estimated by MOP in the Third Five-Year Plan. The growth rate of the Study Area from 1986-1990 is also based on the MOP estimate. The growth rate after 1991 was set in accordance with Scenario 3 in the Master Plan. The low growth rate during the period of 1986-1990 would become higher in the 1990s in accordance with development of the area towards the year 2005. As a result, the average annual growth rate of 3.2 per cent over the 20 year planning period would become the same as the national average.

(2) Household size: The NHS Study indicates that no reduction was found in the size of household between the survey results in 1979 and 1986, and explains that this is due to the high housing costs and limited migration from the West Bank in the early 1980s. Though it may not be an universal law, socioeconomic development invites change in people's life style and tends to guide to reduction of household size. Accordingly it is assumed that the size will decrease by about one per cent per year over the plan period which is the same rate with that adopted in the NHS Study, and that each newly-formed household demands one housing unit.

	<u>Greater Amman</u>	<u>Other Urban</u>	<u>Rural</u>	<u>Study Area</u>
1986	6.9	7.0	7.6	7.4
1995	6.3	6.4	6.9	6.7
2005	5.6	5.7	6.2	5.9

Source: The NHS study, and the Study Team for the Study Area

(3) Replacement: As no accurate data are available on the present housing stock in the Study Area, it is assumed that the population share of the Study Area of 5.3 per cent will be applicable to the share of the national housing stock of 458,700 housing units in mid-1986. The result is about 24,000 housing units. However household number is estimated at about 20,000 in 1985 based on the above household size of 7.4 persons. The difference of 4,000 between the two estimates of the housing stock and the household number might be explained as vacant housing units partly due to the out-migration from the rural areas, and partly by deterioration of buildings. According to the NHS Study, the percentage of deteriorated units which need to be replaced is 7.5 per cent of the existing stock. Applying the same percentage to the Study Area, the total number of units to be replaced is estimated at about 1,800, which constitute 45 per cent of the estimated number of vacant units in the Study Area. It is assumed that these 1,800 housing units should be replaced within 20 years.

3.2 Demand Projection

(1) New housing demand

	<u>Population</u>	<u>Household</u>	<u>Net Household Increase</u>	<u>Replacement</u>	<u>New Housing Demand</u>
1985	143,000	20,000			
1995	183,000	27,300	7,300	900	8,200
2005	270,000	45,800	18,500	900	19,400
			25,800	1,800	27,600

Based on the above assumptions, an average annual new housing demand is estimated at 820 housing units in the first planning decade, and at 1,940 housing units in the second planning decade.

(2) Housing investment required: An average annual investment is estimated as follows:

$$1986-1995 \text{ period } 820 \text{ units} \times \text{JD } 14,000 \frac{1/}{=} = \text{JD } 11,500 \times 10^3$$

$$1996-2005 \text{ period } 1,940 \text{ units} \times \text{JD } 15,000 \frac{2/}{=} = \text{JD } 29,100 \times 10^3$$

<u>1/</u> : Building space per capita	10 m ²
Unit construction cost	JD 80/m ²
Building cost	JD 5,600
Building cost/land cost	2:3
Land cost	JD 8,400
<u>2/</u> : Building space per capita	12 m ²
Building cost	JD 6,000
Land cost	JD 9,000

The above figures are based on an estimated unit price in 1987. As noted above, the increased per capita building space in the second decade gives only slight increase in the total building space per housing unit due to decrease in the household size.

In the NHS Study, levels of household income are given as follows:

	<u>Greater Amman</u>	<u>Other Urban</u>	<u>Rural</u>
- Monthly income	JD 375	JD 283	JD 223
- Annual income	JD 4,500	JD 3,400	JD 2,800

An annual average household income is estimated at around JD 3,100 based upon the above figures and taking into consideration the current urbanization in the Study Area. The ratio of the equity (estimated housing costs in the above) to the annual household income ranges from 4.5 to 4.8. These figures are considered high and required to be reduced to a level around 3 in order to make the potential housing needs to the actual demands. Job creation and increase of household income will be the key to meet the future housing needs in the Study Area.

4. URBAN DEVELOPMENT PLAN

4.1 Basic Concepts for Urbanization

As discussed in Section 2.4, there are two regional centres in the Study Area: Karak and Tafila. These are the capital city of each governorate and each has approximately 15,000 population. Their size is still much smaller than that of other capital cities and secondary cities in Jordan such as Salt, Mafraq, Sweilah, Wadi Essir, Madaba, Aqaba and Ramtha, of which population ranges from about 26,000 to 40,000. The current urban agglomeration in the Study Area is too weak to counter the large magnet of Amman. Under these circumstances and in line with the national decentralization policy, an urbanization strategy is targeted.

The strategy is to enhance the selected cities by targeted investment so that they will have a self-sustainable growing power and will be equipped with more diversified urban functions to encourage people to stay and further to attract people and investment from other regions. Karak, Mu'tah-Mazar and Tafila are considered as focal points for the targeted urbanization along the King's Highway urban corridor due to their resources endowment of such urban facilities as housing, school, colleges, institute, university, clinics, health centres and hospitals. Furthermore agricultural resources in the Ghor and Highlands, technical resources from the colleges and university and the geographical location will offer opportunities for industrialization which will induce new investments and employment of the related tertiary industry. Tourism resources are also available in Karak, Tafila and Mu'tah-Mazar.

This approach is not to neglect the Badia areas along the Desert Highway. Hasa is located in the strategic point and endowed with such resources as phosphate, comparatively large amount of water (groundwater, flood water, and wastewater from the mine), ruins of Hasa Castle and extensive governmental land. With these potentials in mind, Hasa should be designated as a growth pole along the Desert Highway with Qatrana as sub-centre so that the Study Area will have spatially more

balanced structure by the year 2005.

However, the present natural environment of the Badia needs to be improved by creation of greenbelts along the Desert Highway prior to the full scale development for large human settlements as proposed in the Green Badia Project. An initial development effort in the Badia should be concentrated on greenbelts and other greenery, to allow targeted investment in the strategic urban centres along the King's Highway in the first decade. Thus, the benefits of development will emerge earlier. Investment to the Badia development will be increased when its environment becomes ready for socioeconomic development.

Fig. H-4 shows a conceptual urban hierarchical network in 2005 with the total planned population of 270 thousand as discussed in Section 3.1. Table H-11 shows a planned urbanization ratio of 66 per cent in 2005 which is projected based on the following assumptions:

Role	Population Centre	Growth Rate (86-2005) (%)
Regional Centre	Karak (Including Thanniya)	4.2
Regional Centre	Tafila	4.0
District Centre	Hasa	9.8
District Centre	Mu'tah-Mazar	6.5
District Centre	Dhiban	3.2
District Centre	Moab, Ayy, Tayybeh Faqqoo, Rabba, Ader Qadisyyeh, Ain Al-Baida	3.0
District Centre	Bsaira	2.8
District Sub Centre	Qatrana	3.6
District Sub Centre	Qasr	3.0
District Sub Centre	Serfa, Jdiedah	2.8

4.2 Strategic Urban Centres

4.2.1 City of Karak

The City has enjoyed the position of the administrative and commercial centre in Southern Jordan. It still keeps a touch of medieval town located on a saddle of the mountain and has the famous crusade castle on its top. At present about 10 thousand or 80 per cent of the population live in this old quarter and there is practically no more room for physical expansion. Therefore new development has to take place either to the east or to the south across a valley. Marge and Thallaja are the new districts of the city which accommodate the rest of the population. Yet these areas are not enough to accommodate future growth of the population, the Government recently approved that Abu Hamur district be merged to the city to be developed as one administrative and residential area.

The targeted population of the City in 2005 is 36 thousand with about 9 thousand work force. Abu Hamur district is located at the junction of the King's Highway and the University Road. Since the gravity of the population will move to the east, the district is considered to be the suitable area for relocation of the administrative function from the old quarter. This relocation will allow redevelopment of the old quarter to be more specialized in commercial and tourism activities.

The Karak, expanded to the east up to Abu Hamur district which is about 4 km away from Old Karak and situated in the nodal point of regional transport network, will give a new spatial dimension for the future role of the city. Within 6 km radius from the junction of Abu Hamur, the following 13 settlements will be covered and their combined population in 1985 is estimated to be nearly equal to that of Karak.

Shehabiyyeh, Azra, Ez Zut, Thanniya, Ainoon, Sail El-Karak, Ghuweir, Houyeh, Manshiyyet Abu Hamur, Ader, Zahhoom, Rashadiya, Rakeen

In fact such urban facilities as the industrial zone, community college, slaughter house and sport stadium are located to the south and east outside the city due to lack of space within the existing city boundary. Main strategies for Karak urban development are:

- Redevelopment of Old Karak as the regional commercial and tourism centre
- Restoration of Karak Castle for tourist attraction
- Relocation of administrative facilities to New Karak (Abu Hamur) for convenience of visitors and for use of the evacuated land as the Castle Square for tourists attraction and community activities

4.2.2 Mu'tah-Mazar City

Mu'tah-Mazar Municipalities are located about 10 km south of Karak along the King's Highway having about 5,000 and 3,500 population respectively in 1985. These are two independent towns at present being about 4 km apart to each other, but urbanization of vacant land between the two towns is progressing to consolidate these into one township.

The two municipalities are important in the Islamic history. There are a monument of the battle between the Islam and Byzantine in Mu'tah and a tomb of the martyrs in Mazar. Furthermore Mu'tah University is the only university in Southern Jordan (Karak, Tafila and Ma'an). The University opened its doors to students in October 1984. The University is divided into two campuses: military and civilian campuses. The civilian campus started to admit students in the 1986/1987 academic year and is now using the community college campus in Karak as their own facilities are under construction.

The future plan of Mu'tah University is to accommodate 5,000 students in the civilian campus and 2,000 students in the military campus during the coming two decades. Mu'tah University has plans to participate in the development of the region.

The establishment of Mu'tah University in the region is a clear evidence of the government commitment to promote regional development in

this less developed area in the Kingdom. Population of Mu'tah has increased sharply since Mu'tah University project started. In order to sustain this development momentum, it is proposed to form new strategic urban centre based on the linkage among Mazar, Mu'tah and the University.

According to the existing master plans prepared by MMRAE, the total planning areas are about 850 ha. Urban facilities available now are:

Health

- Health centre 2
- Mother and child care centre 2

Education

- Vocational school 1
- Secondary school (boy) 2
- Secondary school (girl) 2
- Preparatory school (boy) 2
- Preparatory school (girl) 1
- Primary school (girl) 4

Main strategies for Mu'tah-Mazar urban development with targeted population of 30,000 in 2005 are:

- Introduction of industrial estate to accommodate clean, light and technology oriented types of industry
- Introduction of modern shopping complex
- Introduction of hospital equipped with a computer assisted remote medical diagnosing information system and attached with an advanced nursing school

4.2.3 City of Tafila

Though the population growth rate of the city is slightly less than that in Karak, it is growing higher than any other towns and villages Tafila Governorate. Its size of population is almost the same with that of Karak but population share in the Governorate is outstandingly high at about 40 per cent. Although topography of the city limits the direction of development, Tafila Governorate has a plan to build two new government complexes there. At Eys, the branch offices from the central

governments and new governorate offices, which do not have daily needs for local people, are planned to relocate. Polytechnic Institute is constructed at the junction of the road to Jurf Darawish and the King's Highway. On the other hand, another complex at Wadi Zayd covers daily required offices such as education department, communications department, postal and telecommunications offices, and so on.

In the Third Five-Year Plan, a new trunk road connecting Tafila with the Ghor was planned mainly for development of tourism resources and agriculture. Upon completion, the role of city will further be enhanced.

Targeted population of the city in 2005 is 33,000. Agriculture is expected to remain as the important productive sector. Cottage industries and transportation and tourism industries are expected to increase their respective share in production and employment.

Main strategies for Tafila urban development are:

- Development of transportation and tourism industries
- Development of small scale industries (handicraft industry related to tourism)
- Beautification of town scape including restoration of the Castle and its environs

4.2.4 Hasa City

Hasa is located in the Badia about 180 km south of Amman along the Desert Highway, and had the largest population of about 4,000 in 1985. It is characterized as a mining town of the Jordan Phosphate Mines Co. (JPMC) which operate the phosphate mines at Al Abiad and Al Hasa. Though there is no accurate data about the population of either JPMC's housing complex or the eastern settlement (Old Hasa), it is roughly estimated that the population is distributed at 3:1 ratio.

The JPMC's housing complex is located to the west of the Desert Highway and isolated from the existing eastern settlement. It is equipped with complete community facilities such as shopping centre, school,

sport field, clinic, mosque within its premises.

The existing eastern settlement is located southeast of the JPMC's housing complex across the Desert Highway and bounded by the railroad to the east. Urban facilities available now are:

Health

- Health centre 1

Education

- Secondary school (boy) 1
- Secondary school (girl) 1
- Primary school (girl) 2

The Badia seems to have large potential for development if appropriate technologies and resources are exploited. Hasa is a frontier town of the southern Badia and is strategically located at the point which forms south eastern keystone of the square shaped spatial structure of the Study Area (Karak-Tafila-Hasa-Qatrana link).

In addition to its strategic location, availability of large amount of wastewater from the mines, groundwater, flood flow, unutilized extensive governmental land give Hasa a good prospects to grow as an important urban centre in the Badia.

Main strategies for Hasa urban centre development with planned population of 25,000 in 2005 are:

- Development of water resources
- Afforestation and grass planting
- Development of artificial oasis for human settlement and tourism promotion
- Development of recreational facilities
- Development of industrial estate
- Development of soft energy

4.3 Secondary Urban Centres

In addition to the above 4 strategic urban centres, there will be 10 urban district centres and 3 sub-centres as stated in Section 4.1.

These centres will be more closely linked in future with the surrounding villages to provide necessary daily services to their inhabitants.

It is required to investigate further the indigenous materials and technologies in their hinterlands in order to promote handicraft industries in these centres and to form a basis to subcontract manufacturing activities from mother factories located in the strategic urban centre. Creation of non-farm income opportunities to the surrounding villagers is important for the economic growth of these district centres and sub-centres.

Qatrana is situated in the strategic point on the Desert Highway and is suited for such function as transit for passenger and cargo traffic along the Highway. A free zone may be considered.

4.4 New Village Network

Table H-12 was prepared based on the data of the National Village Survey (NVS), 1984. There had been 180 settlements but which were reduced to 157 due to the merges taken place afterward.

As noted from the table, the groups of small village with less than 250 population occupies almost half of the total number of the settlements. The number of small villages with population less than 250 in Karak Governorate is 43 per cent of the governorate total, Tafila 47 per cent, and Amman 75 per cent. There are 124 settlements with less than 1,000 population, which are about 80 per cent in number of settlements but represent only 26 per cent of the total population.

Under these circumstances, quality of life at these scattered small villages is inferior to that of larger villages and towns. It is estimated that most of these small villages are suffering from out-migration. There exist strong needs for better and easier access to education and health care services. Ratio between the number of student and population in Karak and Tafila is as follows:

School Category	Karak Gov.	Tafila Gov.
	(%)	(%)
Primary	18.8	20.7
Preparatory	7.8	6.7
Secondary	3.9	3.1

For assessment of the minimal population scale of village required to provide social services efficiently, the following assumptions were made.

(1) Student/population ratio

- (A) Primary 20 %
- (B) Preparatory 8 %
- (C) Secondary 4 %

(2) Student per class: 30 - 40 students/class average 35

(3) Others

- (A) One village will have two schools (one for boy, the other for girl)
- (B) Boy/girl ratio 1:1
- (C) Minimum number of class per grade :1

Based on the above assumptions, the required size of population in terms of education is estimated as shown below for each school category:

- (1) Primary 2,100 persons (for two schools)
- (2) Preparatory 2,600 persons (for two schools)
- (3) Secondary 5,300 persons (for two schools)

As stated earlier, there are 20 settlements in the Study Area that have population more than 2,000 which is about the size to have two standard primary schools. 157 settlements are required to be reorganized to larger units so that the standard educational facilities are provided and qualified teaching staff are secured. These population sizes are also appropriate for having 2-3 physician for health care.

From Fig. H-1, it appears that there will be several patterns of village consolidation as shown in Fig. H-5. The King's Highway is func-

tioning as collector road and small rural settlements are mostly located along the feeder road in cluster, ring and comb patterns. These examples of consolidation plan are mainly based on physical conditions. However, it seems not easy to plan and implement these village reorganization due to differences in history of each settlement and its social and cultural characteristics. A long-term planning is required until a consensus of villagers will be obtained under the general framework.

5. CONCLUSIONS AND RECOMMENDATIONS

(1) The housing sector is important not only in the social aspects but also in the economic aspects of the region as it is closely linked to local materials and building industries and their employment.

(2) There will be an average annual demand of about 800 units in the period of 1986-1995, and 1,900 units in the period of 1996-2005.

(3) The housing investment will give great impact on the national and regional economies.

(4) Roles of the public sector should be expanded more in supply of housing to the low and limited income groups in particular.

(5) Encouragement measures of the private sector to invest in development of quality housing estate should be taken to attract people from outside the study area.

(6) Activities of all the housing and industrial sectors institutions should be coordinated for creation of better urban amenity coupled with industrialization.

(7) Four strategic urban centres should be developed: Karak, Mu'tah-Mazar, Tafila and Hasa.

(8) The village consolidation (New Village Project) should be studied and examined with public participation and be implemented gradually but continuously.

REFERENCES

- H-1 National Village Survey, 1984, MOP
- H-2 Technical Memorandum No. 7: Existing Housing Situation in Jordan, March, 1987, MOP
- H-3 Technical Memorandum: Revised Housing Needs and Associated Investment in Jordan, 1986-2005, January 1987, MOP
- H-4 Technical Memorandum No. 9: Private Sector Housing Suppliers Survey March, 1987, MOP
- H-5 Jordan Urban Sector Review, World Bank, 1983
- H-6 UDP3 Programme Feasibility Study, Research Paper 1.2.4, Supporting Paper A, B, C

T A B L E S



Table H-1 EAST BANK HOUSING STOCK FOR 1961, 1979 AND 1986

Distribution of the housing stock by types of building materials	Year 1961 (from census data)		Year 1979 (from census data)		Year Mid-1986 (estimated)	
	Number	%	Number	%	Number	%
Permanent						
- Greater Amman	38182	23.73	129642	34.40	157144	34.26
- Other Urban	12492	7.76	75673	20.08	163033	35.54
- Rural	47722	29.66	124888	33.14	111167	24.24
Total	98396	61.15	330203	87.63	431344	94.04
Mud/Rubble Stone						
- Greater Amman	2457	1.53	1732	0.46	917	0.20
- Other Urban	10574	6.57	8870	2.35	7906	1.72
- Rural	21226	13.19	22055	5.85	9108	1.99
Marginal/Mobile						
- Greater Amman	1506	0.94	744	0.20	1583	0.35
- Other Urban	1038	0.65	1228	0.33	3369	0.73
- Rural	25721	15.98	11990	3.18	4492	0.98
Total	28265	17.56	13962	3.71	9443	2.06
Total Conventional						
- Greater Amman	40639	25.25	131374	34.86	158061	34.46
- Other Urban	23066	14.33	84543	22.44	170939	37.27
- Rural	68948	42.85	146943	39.00	120275	26.22
Total	132653	82.44	353865	93.91	449275	97.95
Total Housing						
- Greater Amman	42145	26.19	132118	35.06	158252	34.50
- Other Urban	24104	14.98	85771	22.76	175682	38.30
- Rural	94669	58.83	158933	42.18	124766	27.20
Total	160918	100.00	376822	100.00	458700	100.00

Sources: National Household Survey, 1986, MOP
Census of Population and Housing, 1961 and 1979

Notes:

- A permanent housing unit is one which is built of solid materials such as cut stone, reinforced concrete or cement block. (Census definition)
- A marginal housing unit is either a barracks building, hut or cave. (Census definition)
- A mobile housing unit is a tent, hairtent, ship or caravan. (Census definition)
- A conventional housing unit is a villa, apartment unit or dar made of permanent materials, rubble stone or mud block. (Census definition)
- Numbers in the table reflect the change in the Department of Statistics' definition for urban and rural areas that occurred between 1979 and 1986.

Table H-2 SIZE OF HOUSING UNIT

(%)

Area (m ²)	Percent				Cumulative percent			
	Greater Amman	Other Urban	Rural	East Bank	Greater Amman	Other Urban	Rural	East Bank
0- 40	12.6	14.7	15.5	14.2	12.6	14.7	15.5	14.2
41- 60	19.3	22.7	20.3	20.8	31.9	37.4	35.8	35.0
61- 80	22.5	19.2	14.9	19.1	54.4	56.6	50.7	54.1
81-100	20.1	18.8	16.6	18.6	74.5	75.4	67.3	72.7
101-130	8.0	10.2	11.3	9.8	82.5	85.6	78.6	82.5
131-160	8.7	8.2	10.8	9.2	91.2	93.8	89.4	91.7
161+	8.1	6.0	10.3	8.0	99.3	99.8	99.7	99.7
No answer	0.7	0.1	0.3	0.3	100.0	100.0	100.0	100.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: National Household Survey, 1986, MOP

Table H-3 HOUSING STOCK BY TYPE OF BUILDING

(%)

Area	Detached	Apartment	Villa	Marginal House/stock	Total
Greater Amman	35.8	61.5	2.5	0.1	100.0
Other Urban	61.7	34.3	0.7	3.3	100.0
Rural	87.5	8.6	1.7	2.2	100.0
East Bank	60.4	36.1	1.6	1.7	100.0
East Bank 1979	66.8	29.1	0.2	3.9	100.0

Sources: National Household Survey, 1986, MOP
Shelter Unit of MOP

Table H-4 TENURE OF HOUSING UNITS BY REGION

(%)

Type of Tenure	Greater Amman	Other Urban	Rural	East Bank 1986	East Bank 1979
Owner	56.7	67.1	88.2	69.6	65.6
Renter	37.2	24.7	3.9	22.9	28.4
Free	4.8	7.4	7.1	4.6	4.7
Other	1.3	0.8	0.8	2.9	1.3
Total	100.0	100.0	100.0	100.0	100.0

Source: National Household Survey, 1986, MOP

Table H-5 TENURE OF HOUSING UNITS BY HOUSEHOLD INCOME

(%)

H. hold Income	Greater Amman				Other Urban				Rural			
	Owner	Renter	Free	Other	Owner	Renter	Free	Other	Owner	Renter	Free	Other
0-50	43.3	37.5	12.5	6.3	71.1	18.4	10.5	-	66.7	0.3	20.8	4.2
51-100	52.0	37.3	9.3	1.3	66.7	22.2	10.4	0.7	86.1	5.5	7.3	1.2
101-150	40.3	42.5	6.8	1.4	66.0	23.9	8.6	1.5	87.6	4.1	7.3	1.0
151-200	54.1	39.3	5.2	1.5	60.0	33.1	6.2	0.8	93.4	1.1	5.5	--
201-300	56.8	37.7	4.1	1.4	67.9	27.7	4.5	--	90.0	2.9	7.1	--
301-500	73.0	26.0	--	1.0	76.5	20.6	1.5	1.5	96.4	3.6	--	--
+500	61.7	36.7	1.7	--	79.3	17.2	3.4	--	93.3	--	6.7	--

Source: National Household Survey, 1986, MOP

Note: Household income in JD per month

Table H-6 NUMBER OF HABITABLE ROOMS

No. of Habitable Rooms	Greater Amman		Other Urban		Rural		East Bank 1986		East Bank 1979	
	%	Cum.%	%	Cum.%	%	Cum%	%	Cum%	%	Cum.%
1	8.3	8.3	8.1	8.1	9.3	9.3	8.5	8.5	19.1	19.1
2	28.3	36.6	32.2	40.3	27.2	36.5	29.4	37.9	37.5	56.6
3	30.0	66.6	30.5	70.8	27.4	63.9	29.4	67.3	24.9	81.5
4	19.5	86.1	17.6	88.4	21.6	85.5	19.4	86.7	11.6	93.1
5	8.7	94.8	8.2	96.6	8.8	94.3	8.5	95.2	4.2	97.3
6	3.2	98.0	2.5	99.1	3.4	97.7	3.0	98.2	1.7	99.0
7	0.7	98.7	0.4	99.5	0.8	98.5	0.7	98.9		
8	1.2	99.9	0.1	99.6	0.8	99.3	0.7	99.6	0.9	100.0
9+	0.1	100.0	0.3	100.0	0.7	100.0	0.4	100.0		
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: National Household Survey, 1986, MOP

Table H-7 HOUSING UNIT CONSTRUCTION BY YEAR

Year	Percent			Cumulative Percent		
	Greater Amman	Other Urban	Rural	Greater Amman	Other Urban	Rural
pre-1951	9.1	5.5	3.9	9.1	5.5	3.9
1951-60	24.4	13.5	7.2	33.5	19.0	11.1
1961-67	11.7	13.8	11.1	45.2	32.8	22.2
1968-74	23.5	29.4	22.7	68.7	62.2	44.9
1975-79	13.8	18.9	19.5	82.5	81.1	64.4
1980-86	17.5	18.9	35.6	100.0	100.0	100.0
All	100.0	100.0	100.0	100.0	100.0	100.0

Source: National Household Survey, 1986, MOP

Table H-8 INVESTMENT SCHEDULE OF HOUSING PROJECTS UNDER THE THIRD FIVE-YEAR PLAN

(JD 1,000)

Investment Project	1986	1987	1988	1989	1990	Total
1. Abu Nuseir Project	19000	-	-	-	-	19000
2. Completion of Marka Housing Project	1200	-	-	-	-	1200
3. Completion of Ruseifa Housing Project	400	-	-	-	-	400
4. Completion of Um Qais Housing Project	700	-	-	-	-	700
5. Completion Ma'an Housing Project	700	-	-	-	-	700
6. Satellite Town of Queen Alia International Airport	110	5000	7150	4535	7205	24000
7. Zabdat Farkouh Housing II Stage	500	700	804	1500	2619	6123
8. Al Batrawi Housing Project	1000	1000	1000	1000	2000	6000
9. Housing Project of City Aqaba	-	300	-	750	750	1800
10. Urban Housing	1800	6290	5556	8645	14636	36927
11. Rural Housing	1200	1910	3040	4070	4180	14400
12. Services Project	1550	-	-	-	-	1550
Total	28160	15200	17550	20500	31390	112800

Source: The Third Five-Year Plan, (1986-90)

Table H-9 INVESTMENT SCHEDULE OF URBAN DEVELOPMENT PROJECTS
UNDER THE THIRD FIVE-YEAR PLAN

(JD 1,000)

Investment Projects	1986	1987	1988	1989	1990	Total
1. First Project	6520	-	-	-	-	6520
2. Second Project	2350	10010	8700	8420	6830	36310
3. Third & Fourth Project	-	-	13300	17980	27300	58580
Total	8870	10010	22000	26400	34130	101410

Source: The Third-Five Year Plan, (1986-1990)

Table H-10 SUMMARY OF HOUSING PROJECTS UNDER THE THIRD FIVE-YEAR PLAN

(JD 1,000)

Investment Project	1986		1987		1988		1989		1990		Total	
	No. of Units	Dis-burse-ment	No. of Units	Dis-burse-ment	No. of Units	Dis-burse-ment	No. of Units	Dis-burse-ment	No. of Units	Dis-burse-ment	No. of Units	Dis-burse-ment
1. Housing Corporation	2510	28160	1350	15200	1560	17550	1825	20500	2795	31390	10040	112800
2. Urban Development Department	1990	8870	1770	10010	4100	22000	4400	26400	5615	34130	17875	101410
3. Private Sector	1943	19620	2655	26558	3924	39244	8103	81024	8581	85805	25206	252251
4. Military Housing Corporation	2000	9000	2000	9000	2000	9000	2000	9000	2000	9000	10000	45000
5. Ministry of Education	92	323	92	323	92	323	-	-	-	-	276	969
6. Yarmouk University	52	317	121	750	133	825	174	1076	120	749	600	3717
7. Jordan Valley Authority	-	-	200	673	200	675	200	675	-	-	600	2023
Grand Total	8587	66290	8188	62514	12009	89617	16702	138675	19111	161074	64597	518170

Source: The Third Five-Year Plan (1986-1990)

Table H-11 POPULATION OF MAJOR MUNICIPALITIES AND VILLAGES

	1985	1995	2005
Karak	o 15,655	o 24,000	o 36,000
Mu'tah-Mazar	o 8,515	o 18,000	o 30,000
Moab	o 5,701	o 8,000	o 10,000
Ayy	o 5,116	o 7,000	o 9,000
Tayybeh	3,174	4,000	o 6,000
Faqoo	2,886	4,000	o 5,000
Rabba	2,838	4,000	o 5,000
Ader	2,546	3,000	o 5,000
Qatrana	2,172	3,000	4,000
Serfa	2,159	3,000	4,000
Idiedeh	1,869	2,000	3,000
Qasr	1,841	2,000	3,000
Tafila	o 14,917	o 22,000	o 33,000
Hasa	3,824	o 6,000	o 25,000
Bsaira	3,453	o 5,000	o 6,000
Qadisyeh	2,766	4,000	o 5,000
Ain Al-Baida	2,749	4,000	o 5,000
Dhiban	3,020	4,000	o 5,000
A. Pop. who live in Municipalities with 5000 or more	49,904	86,000	178,000
B. Pop. in the Study Area	143,000	183,000	270,000
C. Urbanization ratio (%)	35	47	66

Sources: National Village Survey, MOP, 1984
The Study Team Estimation

Note: o denotes urban population

Table H-12 SETTLEMENT DISTRIBUTION BY SIZE OF POPULATION AND DISTRICT

Governorate	District MOP code	Population							Total
		less 250	251 500	501 1000	1001 2000	2001 3000	3001 5000	5000+	
<u>Karak</u>	Karak (401)	15	7	8	5	3	-	1	39
	Qasr (402)	5	8	3	3	3	-	-	22
	Mazar (403)	26	3	4	5	1	3	-	42
	Ayy (404)	1	1	1	1	1	-	1	6
	Badia (407)	1	1	-	-	1	-	-	3
	Sub Total	48	20	16	14	9	3	2	112
<u>Tafila</u>	Tafila (801)	11	6	3	1	1	-	1	23
	Bsaira (802)	5	1	1	1	1	1	-	10
	Hasa (803)	1	-	1	-	-	1	-	3
	Sub Total	17	7	5	2	2	2	1	36
<u>Amman</u>	Dhiban	24	5	2			1		32
	G. Total	89	32	23	16	11	6	3	180
	1986 1/	72	30	22	13	11	6	3	157

Source: MOP National Village Survey 1984
 1/: MMRAE Regional Planning Department

F I G U R E S

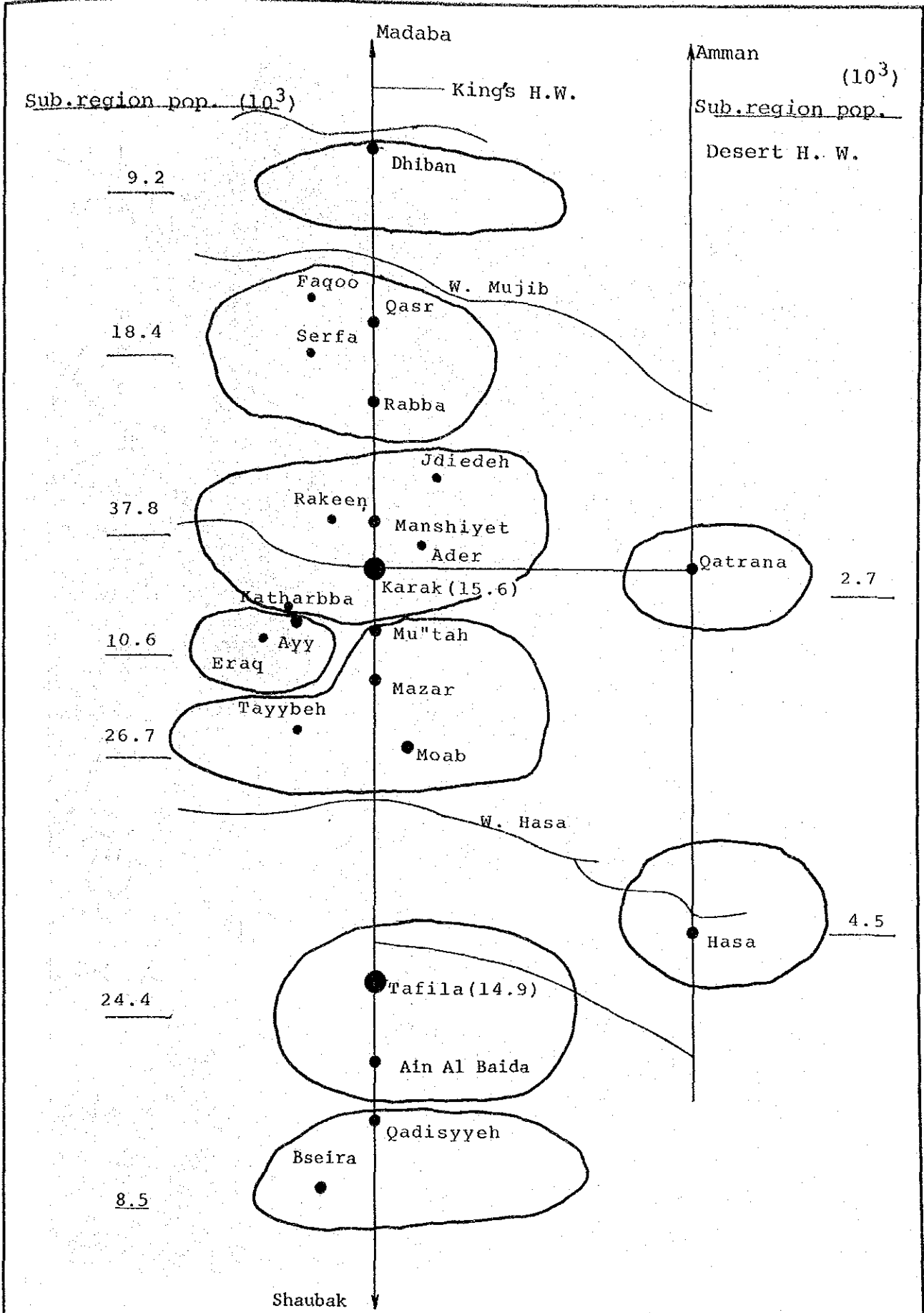


Fig. H-1 Present Distribution of Major Settlements (1985)