

6.3.2 Urban Development Plan

(1) Objectives: The Urban Development Plan will aim to develop Karak, Tafila and Mu'tah-Mazar Municipalities as nucleus urban centres of the Techno-Highland, acting as prime movers of the regional socio-economy.

(2) Development Strategies

(A) Karak Municipality (target population 36 thousand)

Karak should be developed as a primary urban centre by promoting tourism and commerce. Historical resources and urban infrastructure of Old Karak should be renovated to revive the bustle of city life. Various attractions and event programmes should be introduced through restoration of Karak Castle, matching high technologies with the medieval and Islamic cultures.

Administrative facilities scattered in Old Karak should be relocated to New Karak for tourism promotion in Old Karak as well as for efficient and functional development of New Karak. Urban functions other than tourism and commerce should be concentrated in New Karak to accommodate future socioeconomic growth of Karak.

(B) Mu'tah-Mazar (target population 30 thousand)

Mu'tah-Mazar should be developed as another strategic urban centre, functionally linked with its mother city, Karak. Two townships of Mu'tah and Mazar should be reorganized to form a single academic town, integrating industry, academy and housing.

Mu'tah University is already the focus of the town. It should aim to provide new facilities and systems for joint research and development activities with the industrial sector. The Mu'tah Industrial Estate and a pleasant living environment of Mu'tah-Mazar should attract investment by reputable domestic and international enterprises and encourage settlement of researchers and entrepreneurs in the town. Research- and development-oriented industries should be targeted to take advantage of the research facilities and functions of Mu'tah University.

(C) Tafila (target population 33 thousand)

Tafila should be developed as a nucleus urban centre in the southern Techno-Highland. The urban development should include improvement of transport facilities, improvement of the townscape,

development of commercial and tourism facilities, and establishment of an Outer Tafila Industrial Estate, Tafila Industrial Zone, and Tafila Handicraft Centre.

(3) Projects: The Urban Development Plan should include four projects described below:

UDP-1--Karak Urban Development Project consists of three components; Old Karak Museum City Programme, Karak Handicraft Centre Programme, and New Karak Urban Development Programme.

The Old Karak Museum City Programme would aim to develop whole of the town as a *Museum City*. It would include restoration of Karak Castle and remodeling of its interior space for commercial and tourism use, restoration of the City Wall, Towers and Historic Quarters, improvement of the townscape, and provision of festive event programmes.

The Karak Handicraft Centre Programme would aim to promote local handicraft industry as well as to be a tourist attraction. As an integral part of the Historic Quarter of the town, the Centre would have such functions as manufacturing, display, demonstration and sales of tourism related products; and training, improvement and promotion of traditional handicraft and art.

The New Karak Urban Development Programme would aim to expand New Karak for the future growth of Karak. It would include development of urban infrastructures for administrative, residential and business functions.

UDP-2--Mu'tah Mazar Urban Development Project would have two components; Mu'tah Industrial Estate Programme, and Mu'tah-Mazar Urban Development Programme.

The Mu'tah Industrial Estate Programme has been planned to be the principal productive sector of the Mu'tah-Mazar Urban Centre, taking advantage of such functions of Mu'tah University as the supply of quali-

fied workers and technology research as well as easy access to Aqaba, QAIA and Amman. The location at Mu'tah will also benefit from investment efficiency, being combined with the urban development of Mu'tah-Mazar.

The Estate would include an industrial estate with industrial apartments, and an industrial incubation and development centre. The Estate would aim to create job opportunities for 2,500 by the year 2005. It would require about 33 ha of land, and water of 0.5 to 0.8 MCM/yr. Prospective types of the industry may be as shown in Table 12.

The Mu'tah-Mazar Urban Development Programme would provide urban infrastructures for sustaining the industrial development and a comfortable urban life. A sewerage system would be provided (see Chapter 5 of Volume 3: Main Report - Part 2 for details of this project).

UDP-3--Mu'tah University Related Projects would aim to enhance and expand the functions of the University, the brain centre of the Study Area. They would include a *Badia Research Institute (BRI)* and an *Arab Medieval History Institute (AMHI)*. BRI would aim to study and research rehabilitation of the Badia environment, utilization of such soft energy as sunshine and wind, and the related technologies. AMHI aims to study the history of Crusades and Islam in the medieval age. Faculties of *Arid Agriculture* and *Information Engineering* would also be introduced. These institutes and faculties require interdisciplinary approaches, and joint research would be made with private industries for commercial utilization of the technologies developed.

UDP-4--Tafila Urban Development Project would consist of four components; Tafila urban development, Outer Tafila Industrial Estate, Tafila Industrial Zone, and Tafila Handicraft Centre.

Tafila urban development would aim to expand the existing urban infrastructures to provide for the future growth of the city. Directions for expansion are twofold. One is the area around Al Eys junction, the other is Wadi Zayd. 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 be relocated. The other complex at Wadi Zayd accommodates daily-required offices such as education department, communications department, postal and telecommunications, passports and civilian affairs department, and so forth.

The Outer Tafila Industrial Estate would be located to the east of the city, and would create job opportunities for 1,000 by the year 2005. It would require about 14 ha of land, and water at 0.3 MCM/yr. The Estate would attract mainly domestic investors including Tafila industrialists residing in Amman. Prospective types of the industry may be as shown in Table 12.

The Tafila Industrial Zone would be established on the outskirts of the town to accommodate existing establishments, which would be relocated from the town centre, and some small scale industries to be newly introduced. The Zone would have job opportunities for 1,000 by the year 1990. It would require about 6 ha of land, and water at 0.1 MCM/yr. Prospective types of the industry may be as shown in Table 12.

The Tafila Handicraft Centre would be established as a component of the regional tourism network, and would have the similar functions to the Karak Handicraft Centre.

6.3.3 Green Badia Plan

(1) Objectives of the Green Badia Plan: The Arabic term Badia historically means managed semidesert. The Green Badia Plan aims at rehabilitation of the environment in the Badia especially along the Desert Highway on the one hand, and at the establishment of a growth point on the other hand for full-swing development of the Badia in the 21st century, by harnessing the abundant sunshine and extensive land resources. During the plan period, the population in the Badia sub-area would increase from 7,200 at present to 30,000 in 2005, contributing to rectifying the present imbalanced spatial structure of the socio-economy in the Study Area.

(2) Development strategies of the Green Badia Plan: To realize the Badia development, the following strategies are proposed:

- (A) First the environment must be rehabilitated by management of land-use to recreate the Badia with an *Artificial Oasis* for human settlement and wildlife conservation, and green belts along the Desert Highway.
- (B) Secondly, in the *Artificial Oasis* a sports land park will be constructed as an artificial tourism resource and to provide amenities not only for the local people but also for family tourists from Amman as well as foreign tourists and residents.
- (C) Within the ambiance of this *Artificial Oasis*, appropriate urban infrastructures and housing will be constructed to encourage the development of light industry in the long run.
- (D) The most important resources of the Badia are solar and wind energy and the traditional stock raising culture of the Bedou. Mean solar radiation amounts to 4,900 kcal/m²/day at Rabba (3,300 kcal/m²/day at Tokyo). Long-term development of the Badia will be continued with these new energy sources providing electric power and with the traditional culture of Bedou as the basic life style.

(3) Projects of the Green Badia Plan: Within the strategies above, nine projects are proposed as briefly described below:

GBP-1--Sustaining the Production Level of the Existing Phosphate Mines will be required to maintain the economic base in the Badia.

GBP-2--The Local Materials Utilizing Project would be proceeded to develop adequate utilization technology of unused minerals existing in the Study Area, including the phosphate slimes which have a potential as materials for some pottery like water pot for pitcher irrigation, brick and so forth.

GBP-3--The Green Badia Project consists of four sub-programmes; Water Programme, Environment and Tourism Programmes, Hasa New Town Programme, and New Energy Utilization Programme.

Under the Water Programme, groundwater in the proposed Darawish well field would be developed and piped to the site of the *Artificial Oasis*. Tailings dams would be constructed for the phosphate mines for proper disposal of the voluminous solid waste as well as for recovering water for reuse. A water pipeline would be constructed to transmit municipal and environmental water of about 3.2 MCM/yr to Hasa from the proposed Darawish well field.

The Environment and Tourism Programmes would first start with greenbelt works to be provided along both sides of the Desert Highway to soften the landscape. Next, the *Artificial Oasis* would be constructed; a pond of about 15 ha with boats and a solar-driven fountain, green parks and forest of about 280 ha, and sports and lodging facilities surrounding the pond. The water pond will impound brackish water to be made available by the tailings dams. The sports land may include a golf course, tennis courts, a camping ground with Bedou tents, a horse/camel riding ground, and so forth as attractions for tourists.

The golf course, which would be constructed with the desilted slimes water and some fresh water, would be a unique facility in Jordan, attracting domestic and foreign resident players mainly from Amman. The other facilities of the *Artificial Oasis* would draw family tourists from Amman as well as foreign tourists breaking their journey when visiting Petra and Aqaba.

For promoting tourism and local employment in the Badia, manufacture of Bedou traditional handicrafts and tourist shops will be needed. In addition, the possibility of a fishery using the water pond and solar energy should also be studied. Lodging facilities may be a well appointed resort type hotel with chalet accommodation in Bedou style to attract international tourists.

The Hasa New Town Programme would be required to sustaining the above construction and tourism activities. The Hasa New Town would be provided with such facilities as electricity, water supply and sewerage, communications, and a solid waste management system, to achieve living

standards comparable to Greater Amman. All the houses would be provided with solar hot water systems. Public facilities would be provided including a health centre, schools, a community hall, a shopping centre and so forth.

Under the New Energy Utilization Programme, a pilot plant would be established for developing appropriate systems of solar and wind energy utilization in the Badia. The plant may include a solar power plant, a solar heat utilization system, and some demonstration equipment to be installed in the *Artificial Oasis*. The plant would be a symbol of the Badia development.

GBP-4--Desert Dam Project would construct two new desert dams (Siwaqa and Hasa). The existing Sultani dam presently has only a nominal storage capacity due to past sedimentation mainly of phosphate slimes. The possibility of rehabilitating it by dredging in combination with construction of the proposed tailings dams should be studied. Drainage improvement works should be studied and implemented for Qa El Hafila and Qa El Hasa to increase flood inflow to the existing Qatrana Dam and the proposed Hasa Dam.

GBP-5--Housing and Urban Facilities Project would aim to provide infrastructures and housing to accommodate the projected population of 30,000 in the Badia development sub-area by the year 2005 in combination with the Hasa New Town Programme. Assuming a future family size of five per household, about 5,400 additional houses will be required.

GBP-6--Hasa Industrial Estate Project would play an important role to lead the future Badia development in the 21st century. An industrial estate of 60 ha in land area would be established with the public investment to invite manufacturing industries. The Estate would create 3,000 job opportunities by the year 2005. It would require water of about 1.0 MCM/yr. Prospective types of industries may be as shown in Table 12.

GBP-7--Traffic Terminal Project would include a truck terminal, a bus terminal, storehouses and workshops for transportation equipment.

GBP-8--Sultani Oil Shale Power Plant Project: In Sultani area, there are oil shale ore reserves, and the idea of a pilot power plant of the direct combustion type (5 MW x 3 units) is conceived by the Government with approaches from a several countries. There are enough potential reserves, and the job creation effect of oil shale development is remarkable. However, since the oil related projects are affected by oil price trends on the international market, the oil shale development in the plan period would be limited to a pilot project. Cooling water demand for the plant is around 2.0 MCM/yr. Use of the heat energy in its cooling water needs a study for possible use in the Badia development such as for greenhouses, fishponds and so forth.

GBP-9--Environmental Assessment of the Sultani Oil Shale Power Plant Project should be made preceding implementation of the Sultani Oil Shale Power Plant Project (GBP-8) to seek the optimum way of the environmental conservation.

(4) Future image of the Badia: The Badia consists of two administrative sub-regions; Desert Sub-Region of Karak Governorate and Hasa Sub-Region of Tafila Governorate. The future image of the Badia and its role in regional development are proposed by sub-region as follows:

In Desert Sub-region, the principal economic activities at present are phosphate mining at El Abiad Mine with a total of about 900 workers, irrigation farming around Qatrana (30 ha by 270 farm households), live-stock farming and drivers' restaurants, sustaining a present population of 2,700. With the advantageous location of Qatrana in the road and railway traffic system in the Study Area as well as easy access to Lajjun (20 km west) and Sultani (20 km south), a traffic terminal would be constructed there. The town of Qatrana would grow as a commercial town in the Badia. In the southern part of the Desert Sub-region, El Abiad Phosphate Mine will continue its operation, and a pilot oil shale power plant would be constructed. In the suburbs of Qatrana, production

of flowers, horticulture and vegetables would be promoted.

Hasa Sub-region has at present similar economic activities to Desert Sub-region. The present population is 4,500, engaging in phosphate mining (about 2,200), rainfed agriculture (520 ha by 340 households), irrigation (20 ha), and in livestock farming. With the relatively high groundwater potential in this area and its geographic location in the centre between Aqaba and Amman, an *Artificial Oasis* should be constructed around Hasa for environmental rehabilitation and tourism promotion. The town of Hasa should also be a strategic frontier town for future Badia development. The *Artificial Oasis* should be constructed after the development of groundwater in the proposed Darawish well field. An industrial estate should then be constructed to promote new energy and Bedou handicraft oriented industries.

7. IMPACTS AND REQUIREMENTS OF MASTER PLAN

7.1 Impacts of Master Plan on National Socio-economy

Most of the development objectives and targets of this Master Plan are closely related to national and other regions' socioeconomic performance in the future. The Study Area is neither self-contained nor independent of other regions. Thus on a multi-regional or national base, the growth of the Study Area should be generative, not competitive.

Generative development of the Study Area can promote national prosperity. In other words the Study Area has efficiency gains. A progress of agglomeration economies or a change in settlement pattern (a more efficient regional urban hierarchy) would improve productive efficiency. Efficiency will also be improved through many projects proposed in the Master Plan. These efforts will cumulatively upgrade the human and other resources and public services, protecting and improving amenities, stimulating entrepreneurship and innovation, and fostering cooperation among various social elements.

Competitive development between the Study Area and other regions, on the other hand, could be in a large part self-defeating, or a zero-sum game, contributing nothing to the national welfare.

In a qualitative sense, growth of the Study Area with the Master Plan would have the following impacts on other regions and on the nation as a whole:

Increase of the food security: Through implementation of the proposed agricultural projects, agricultural produce will increase. Consequently, by substituting domestic food produce for imported food, food security could be improved at the national level.

Contribution to the national industrialization: According to the frameworks of Master Plan, the gross production of the manufacturing

sector will grow to JD 63 million with 10,000 employment by 2005. The Mu'tah and Hasa Industrial Estates and other industrial zones would play important roles in the national economy in terms of efficient and high-quality production of a wide range of products. Also, the export-oriented manufacturing sector of the Study Area will contribute to the gains of foreign currency.

Enhancement of technological basis: In line with the industrialization, the technological basis in the Study Area has already been potentially enhanced by the presence of Mu'tah University. Its technology in agriculture, industry, energy, education and other fields will contribute to regional technological development and will spread to other regions.

Activation of inter-regional flows: All kinds of flows - commodity, minerals, services, tourism, labour force and information would be activated inter- as well as intra-regionally through construction activities on the proposed Master Plan Projects. The Study Area - especially Karak - Mu'tah-Mazar - Tafila Urban Corridor and Hasa would become the centres in the South Jordan. With improvement of the transportation system, agricultural produce, manufacturing products and minerals will be moving smoothly to other regions. The improved tourist destinations in the Study Area combined with improved transportation facilities will increase tourist arrivals in Jordan and benefit other regions proportionally.

Establishment of the basis for self-sustained growth: Although Amman is the main nucleus in Jordan, and will continue to affect the Study Area by 2005, the Study Area will establish its own basis for self-sustained growth by introduction and promotion of productive sectors as well as by further development of its abundant mineral resources. Indeed the Study Area should become in a position to commence further development without special assistance and protection by the Government.

The Study does not go into analysis of quantitative impacts of growth of the Study Area on the national economy because of data scarcity and difficulties in projection. The impacts could be analyzed through a regional input-output table although this is not available at present. The essence of the input-output schema would be a set of accounts representing transactions between the following major economic sectors: (A) Intermediate--private business activities within the region -- the sector being broken down into individual industries such as mining or construction; (B) Households--individuals and families residing or employed in the region; (C) Government--local and national public authorities, both within and outside the region; (D) Outside world--activities (other than government) and individuals located outside the region; (E) Capital--the region's stock of private capital, including both fixed capital and inventories.

7.2 Requirements for Implementation

The following requirements and conditions for development for the Government and local governorates to achieve the targets of the selected Scenario 3 now need consideration:

7.2.1 Investment

In the period 1986-1990, the planned investment for the Study Area amounts to JD 227 million, or 8.4 per cent of the planned gross investment of the Kingdom as a whole at 1985 prices.

DISTRIBUTION OF INVESTMENT BY YEAR FOR THE STUDY AREA

(JD million at 1985 prices)

<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Total</u>
40.2	45.7	45.9	45.0	50.3	227.1

Note: These figures were calculated and adjusted for the Study Area based on the planned investment for Karak and Tafila Governorates in the Third Five-Year Plan, and also deflated to 1985 prices.

In order to achieve the targeted GRDP of approximately JD 250 million, which is set for the selected Scenario 3, a gross investment of JD 1,210 to 1,520 million, the accumulative total in the period from 1986

to 2005, will be required on the assumption that the ICOR of the Study Area should be within the range of 8.0 to 10.0 over 20 years. This amount is about 9.0 to 11.3 per cent of the estimated gross investment in the whole of Jordan in the same period. The volume of the gross investment in the whole of Jordan is derived from the assumptions that GDP will increase at an annual growth rate of 5 per cent and that the ICOR will be constantly equal to 6.0 throughout 1986-2005. The difference in ICOR between the Study Area and the whole of Jordan is caused by the present inadequacies of infrastructures in the Study Area.

The allocation of investment required will be disproportionately large as compared with the population share. This large investment share would be justified as follows:

The Third Five-Year Plan places special emphasis on the issues of narrowing disparities by reducing the concentration of economic activities in and the consequent demographic gravitation to the Amman-Zarqa belt (the decentralization policy for population and industry).

Scenario 3 has been prepared in accordance with this policy of the Government. The disproportionately larger allocation will be required because the Study Area is one of the least developed regions in the Kingdom and therefore the efficiency of the investment would be low in the Study Area. Moreover, intensive investment is necessary to create an adequate impact to reverse the ongoing out-migration trend.

Again, the Study Team recommends that the Government should realize the need for intensive efforts for development of the Study Area.

Meanwhile, public investment will account for about half of the gross investment in the Study Area in the Third Five-Year Plan. If this share is constant over 20 years, the total amount of public investment over 20 years is estimated at JD 610-760 million.

As much private investment will be required as of the public investment. In other words, a large part of the burden and responsi-

bility for development of the Study Area will rest on the shoulders of the private sector. Fortunately a Regional Fund has already been established at the national level by MOP. Therefore, use should be made of this fund through the establishment of a branch in the Study Area in order to stimulate private investment. This fund should cooperate with existing public banks such as IDB and CVDB.

Investment for priority projects: The total construction cost of six priority projects, which have been selected and studied in Steps 5 and 6 of this study (see Volume 3), is estimated at about JD 172 million or at 23 to 28 per cent of the overall investment mentioned above. Of this, JD 21 million is for development of the Highlands; JD 64 million for Karak Governorate; and JD 87 million for Tafila Governorate including JD 82 million for the Badia.

7.2.2 Conditions for Industrial Location

The following are recent general determinants for industrial location. Most of these have been considered within the context of the Master Plan. However, the Government or local government is required to take further steps to improve transportation and communications systems, and governmental services. Also, to attract private industries to the Study Area, public bodies will need to give new institutional incentives such as subsidies, which are different from the incentives of the existing Investment Promotion Law.

Speedy and flexible transportation and communications: In terms of linkages between industries and their sources of materials and markets, the cost of physical transportation of heavy and bulky goods is less important than good communications and the speedy and flexible transportation of high-value goods.

Access to markets has increased in importance for most industries compared to access to sources of raw materials and energy sources. This trend reflects the increased variety and complexity of products.

Amenity factors: More importance is now being attached than before to amenity factors such as housing, community facilities, and access to recreational and cultural opportunities.

Various services locally supplied: For some industries, there has been an increasing degree of dependence on various services locally supplied by other industries, institutions and public bodies.

7.2.3 Labour Force

Labour is one of the most important requirements for regional development in terms of quantity and quality.

According to the socioeconomic frameworks of Scenario 3, the labour demand (volume of required labour force) is estimated at 62,000 in 2005 with 33,000 new job opportunities over 20 years. This amount represents 22.9 per cent of the projected population in the Study Area. Compared with its 20.2 per cent share in 1985, the share will increase more than two points. Employment of the commodity-producing sectors including agriculture amounts to 28,000, while that of the services sector is 34,000.

Although the projection of labour supply faces difficulties largely because of the change of age-group structure in association with development and uncertainty over the labour participation ratio, only a rough estimation is done (see Annex-G for details). According to this estimation, more than 38,000 graduates from the school system and others will seek job opportunities over 20 years. These projections of labour demand and supply show some potential imbalances in the Study Area. The projected imbalances, however, do not take full account of the dynamics of the labour market. In reality, there are attrition, substitution possibilities and other factors. Thus, the balance would be kept within an acceptable range.

As to the quality of labour, the focus will be on the establishment of education and training systems which will generate the human resources needed to sustain the regional development. Therefore, it is

important to improve and expand the resources of professional and vocational training institutions.

7.2.4 Institutional and Incentive Measures

In addition to the requirements of the preceding sub-sections intensive institutional and incentive measures by the Government will be needed to promote private sector investment in the Study Area as follows:

- (1) Sustained cooperation among related ministries and authorities (Setting up the seven Sector Committees was the first step.)
- (2) Establishment of a monitoring team (follow-up unit) in MMRAE/MOP in cooperation with Development Councils of Karak and Tafila Governorates and Mu'tah University
- (3) Continued close relationships with other related long-term plans such as the Greater Amman Development Plan
- (4) Reinforcement of mutual collaboration between the Government and local governorates
- (5) Reinforcement of functions of branch offices of the Government
- (6) To encourage the role of residents' spontaneous and autonomous participation and activities in the regional development

7.2.5 Requirements for Sector Development

As for sector development, the following requirements are specifically underscored:

- (1) Agriculture
 - (A) Establishment of farmer's associations with functions of purchasing, marketing and financing as well as technical assistance
 - (B) Enactment of a new land law to save farmlands from vertical fragmentation through equitable inheritance among heirs
 - (C) Improvement of financing for petty farmers
 - (D) Improvement of livestock marketing and a system for gathering statistical data
 - (E) Reinforcement of information services (weather forecast etc.) for farmers

(2) Mining

- (A) Incentives to increase domestic demand for cement
- (B) Organizing research teams on utilization of oil shale and unused mineral resources such as phosphate slimes etc. including assessment of resulting environment

(3) Small and medium scale industries

- (A) Incentives for organizing cooperatives of local establishments
- (B) Reinforcement of chambers of commerce and establishment of chambers of industry
- (C) Encouragement measures to promote investment and participation of the private sector including foreign investors in the proposed industrial estates and zones
- (D) Giving a higher priority to local establishments in supply of their products to local projects
- (E) Establishment of branch offices of IDB, especially for wider services of the Small Scale Industries and Handicraft Fund
- (F) Granting extra credit facilities from commercial banks for investment in less developed regions such as the Study Area

(4) Tourism

- (A) Establishment of tourism related laws and regulations for ruins, construction, licenses, taxation and so forth
- (B) Introduction of a guided market system for free competition and private investment by multiple enterprises for bus, rest houses and so forth
- (C) Encouragement of foreign investments
- (D) Establishment of a gathering system of tourism statistics for helping the adequate marketing strategy and investment
- (E) Civil and social education to the local inhabitants to accept foreign tourists who may have different cultural basis
- (F) Regulation of replacement and modification of the existing houses in the proposed Historic Quarter and around the Castle Square in Old Karak in terms of front design, height, materials, colour, sign boards, electric wiring and so forth to keep the traditional

appearance as a tourist attraction

(5) Water

- (A) Re-examination and modification of the water allocation plan for attaining consensus among the agencies and people concerned
- (B) Detailed study on the groundwater potentials of the proposed Darawish and Lajjun well fields
- (C) Monitoring of the groundwater table especially in the north bank of Wadi Wala
- (D) Further exploration and study of groundwater resources in the Kurnub-Disi sandstone aquifer
- (E) Stream gauging especially in small basins on the Highlands as well as in the Desert basins for obtaining basic data necessary for detailed studies, design and operation of the flood flow development projects
- (F) A campaign on saving water
- (G) Integration of fresh and brackish water usage for municipal as well as agricultural purposes
- (H) Study on the establishment of Watershed Development Fund (see Section 6.2 of Annex-A for details)

(6) Transportation

- (A) Study on the proposed Village Road Expansion Project
- (B) Study on the proposed Traffic Terminal Project
- (C) Early installation of the road safety measures

(7) Communications

- (A) Study on Telephone Network Reinforcement
- (B) Study on the Mail Distribution System at the national level

(8) Energy

- (A) Study and experiment on the proposed new energy application systems
- (B) Environmental assessment of the oil shale projects

(9) Education

- (A) Provision of guidelines for channeling students from the secondary stage to higher education in general and university education in particular
- (B) Setting up a study group at Mu'tah University to participate in and back up the development of the region
- (C) Study on Private School Promotion Subsidy Law

(10) Health

- (A) Provision of incentives for medical workers to settle in the Study Area, especially in rural areas
- (B) Civil and social education and provision of incentive measures to increase the number of female physicians and nurses to take care of mother and child in particular

(11) Housing and urban planning

- (A) Inclusion of the expansion plan of Mu'tah University in the Mu'tah-Mazar Urban Development Master Plan to have an open relationship between the town and the University
- (B) Participation of the Jordan Phosphate Mining Company in construction of the proposed tailings dam and in the development of the Hasa New Town
- (C) Improvement of public housing loan system for low and limited income group
- (D) Study on the private housing sector for its activation
- (E) Subsidy for development of industrialized housing and for its use

8. CONCLUSIONS AND RECOMMENDATIONS

The Study Area has become left behind in the socioeconomic development of the Kingdom: the per capita GRDP in 1985 was JD 381 (equivalent to US\$ 1,120 excluding the contribution of the mining sector), which was only 75 per cent of the national average at JD 509 (US\$ 1,497), while the population growth rate was 2.8 per cent per annum during the period 1979-1985 which was lower than the national average of 3.7 per cent per annum, and probably signifying out-migration during this period.

Among the regions in the Kingdom, only the Study Area has no master plan for regional socioeconomic development. Past development of large scale mines in the region has had no substantial impact on the regional economy except for some increase in employment. The young but well-educated labour force in the region appear to have out-migrated towards Greater Amman seeking job opportunities and higher incomes. An intensive development plan for the region is therefore desired by the local government and the people.

This Master Plan has been prepared by identifying the development potentials and assessing the regional resources of the Study Area. The principal target of the development is set at raising the per capita GRDP to JD 720 (US\$ 2,100) by 2005, which is the projected national average. It is also targeted to raise the share of population from the present 5.3 per cent to 5.4 per cent of the national population by the year 2005. The total labour force would be 62,000 being 22.9 per cent of the projected population of 270,000 in the year 2005.

The GRDP should reach JD 250 million (US\$ 735 million) by 2005, of which a 8.5 per cent should be produced by the agricultural sector, 58.0 per cent by the mining and industrial sector, and the remaining 33.6 per cent by the services sector.

In this Master Plan, the average population growth rate is targeted at 3.2 per cent per annum on an average during the plan period of 20

years in conjunction with the overall economic growth rate targeted at 4.8 per cent per annum.

This Master Plan has been prepared for three development sub-areas: Rural Development Sub-area; Urban Development Sub-area; and the Badia Development Sub-area. The Plan includes 40 Master Plan Projects. Furthermore, an urban hierarchy system is proposed for efficient provision of urban services not only to urban residents but also to the people in the surrounding rural areas and the Badia as well. It consists of four Strategic Urban Centres (Karak, Tafila, Mu'tah-Mazar and Hasa), nine Secondary Urban Centres (Ayy, Tayybeh, Faqqoo, Rabba, Moab, Bseira, Ain Al Bida, Dhiban and Qatrana), and 80 New Villages.

The Rural Development Sub-area would have a population of 140,000 by the year 2005, or 52 per cent of the whole region. The Sub-area includes eight Secondary Urban Centres and most of the New Villages. As the principal economic activity, Highlands agriculture is proposed to be promoted by the Water Harvesting Project for fruit trees and fodder shrubs, which would be planted on 67,400 ha of land in total gross area. The other agricultural projects are also proposed for promoting animal husbandry. Accelerated afforestation works are proposed to attain a total forest area of 74,900 ha. At the same time, the New Village Project is proposed to improve living standards in the rural areas with an improved quality supply of basic human needs such as education and public health.

The population in the Urban Development Sub-area would be doubled to 100,000 by the year 2005. As a first step for promoting urban development, physical and social infrastructures and urban facilities should be expanded including the supply of the quality housing. As principal productive sectors in the urban centres, tourism and small to medium scale industries including transportation and communication services are recommended to be promoted.

The Badia Development Sub-area needs socioeconomic development including rehabilitation of the natural environment with greenery, as

development in the past has been limited to mining activities. The Green Badia Project is proposed to establish Hasa New Town (Hasa Urban Centre) as a growth point in the Badia. The principal economic activities proposed in the Badia will be animal husbandry, tourism and transportation in the short-term, and small and medium scale industries in the long-term. Ordinary agriculture is not recommended due to shortage of water except for small scale farming to supply of fresh vegetables and flowers to be planted around urban centres. Instead, establishment of a productive green park and reafforestation are recommended in conjunction with tourism development and environmental rehabilitation for the human settlement.

The water requirements for the proposed Master Plan Projects could be satisfied although utmost efforts will be required to expedite implementation of various water supply projects conceived for municipal water supply to Greater Amman and to re-examine the water requirement of the Dead Sea Chemical Complex planned in the Southern Ghor. The overall water demand of the Mujib-Hasa basin in the year 2005 was projected to be about 203.4 MCM consisting of the regional demand of 59.3 MCM/yr, the demands of existing irrigated agriculture in the north bank of Wadi Wala (21.0 MCM/yr), the irrigation and industrial demands of the Southern Ghor (87.1 MCM/yr), and the municipal demand of Greater Amman (36.0 MCM/yr), while the overall potential of the water supply was assessed to be about 184.9 MCM/yr, suggesting a water shortage of about 18.5 MCM/yr in future.

The proposed development of groundwater resources will be within the natural recharge capacity of the aquifer in general, but it has to be pointed that all water development in the Study Area will inevitably contribute to the further lowering of the level of the Dead Sea which is already having adverse effects on the Arab Potash Company's operations.

Realization of the proposed Master Plan would contribute not only to regional development but also to national food security mainly in fruits and red meat, balanced spatial structure of the socio-economy in the Kingdom (decentralization of population and socioeconomic activi-

ties), social stability through absorbing unemployment, and the quality of life in the Kingdom generally.

To achieve the above targets, a total investment of JD 1,210 to 1,520 million is required over the plan period of 20 years. This means that about JD 60.5 to 76.0 million per annum (equivalent to US\$ 178 to 224 million) should be invested in the region or the equivalent of 9.0 to 11.3 per cent of total national investment. This share is about double the region's population share. To stimulate private investment, branches of the new regional development fund should be established particularly for three governorates in the South Jordan.

Until the socio-economy of the region gains momentum for sustainable development, the public sector should lead the development. Cooperation between the related ministries, authorities and local governments is also required. For monitoring implementation of the Master Plan Projects as well as for updating the Master Plan continuously, a monitoring team is recommended to be established with the necessary rights, funds and staff.

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TABLES

Table 1 RECORDS OF COUNCILS, COMMITTEES AND WORKSHOPS (1/3)

Date	Committees	Agenda
22/12/86	Karak Development Council	- Five-Year Plan - Progress Report
24/12/86	Tafila Development Council	- Five-Year Plan - Progress Report
08/01/87	5th Workshop	- Development objectives
13/01/87	1st Agriculture SC	- Progress Report
18/01/87	2nd Transportation, Communi- cation & Energy SC	- Progress Report
20/01/87	2nd Agriculture SC	- Progress Report
20/01/87	1st Water SC	- Progress Report
21/01/87	3rd Transportation, Communi- cation & Energy SC	- Progress Report
27/01/87	2nd Water SC	- SC's comments on PR - water allocation
29/01/87	6th Workshop	- develop. scenario & framework
31/01/87	4th Transportation, Communi- cation & Energy SC	- Progress Report - Transport. develop. plan - Telecom. develop. plan
02/02/87	3rd Water SC	- SC's comments on PR - water allocation policy
02/02/87	2nd Industry, Mining & Tourism SC	- Progress Report - Industry develop. plan - Mining develop. plan - Tourism develop. plan
02/02/87	1st Labor SC	- Progress Report
07/02/87	2nd Labor SC	- Progress Report
10/02/87	1st Education SC in Karak	- preparatory works
15/02/87	1st Housing and Urban Planning SC in Karak	- preparatory works
16/02/87	3rd Labor SC	- drafting SC's comments

Table 1 RECORDS OF COUNCILS, COMMITTEES AND WORKSHOPS (2/3)

Date	Committees	Agenda
17/02/87	7th Workshop	- contents of interim report - landuse plan
04/03/87 (Wed)	8th Workshop	- Draft master plan
07/03/87 (Sat)	Meeting with MOP (Director General/Under-Secretary)	- Frameworks & requirements - Interim Report
07/03/87 (Sat)	3rd Industry, Mining & Tourism Sector Committee	- Sector development plan
08/03/87 (Sun)	4th Water Sector Committee	- Water balance - Water resources development plan
08/03/87 (Sun)	5th Energy, Communication & Transportation Sector Com.	- Draft Master Plan - Sector plan
09/03/87 (Mon)	3rd Agriculture Sector Com.	- Landuse plan - Agricultural projects
09/03/87 (Mon)	4th Labor Sector Committee	- Draft Master Plan - Framework for employment
10/03/87 (Tue)	Education, Housing & Urban Planning Sector Committee *	- Draft Master Plan - Sector plan
10/03/87 (Tue)	5th Water Sector Committee	- Water balance - Water resources development plan
16/03/87 (Mon)	Joint Sector Committee	- Official presentation of Interim Report
11/07/87	9th Workshop	- Reply on Comments - Work schedule
28/07/87	10th Workshop	- Solar/wind energy - Fish culture
18/08/87	11th Workshop	-
23/08/87	Meeting with MCTA	- Tourism develop. plan
05/09/87	6th Water SC	- Interim report of study

Table 1 RECORDS OF COUNCILS, COMMITTEES AND WORKSHOPS (3/3)

Date	Committees	Agenda
07/09/87	12th Workshop	- Urban planning
17/09/87	Meeting with Town Planning Dept. of MMRAE	- Urban planning
20/09/87	4th Agriculture SC	- Pilot scheme
22/09/87	Housing & Urban Planning SC	- Urban planning
08/10/87	5th Labour SC	- Annex-G
11/10/87	4th Housing and Urban Planning SC in Karak	- Annex-H
12/10/87	6th Labour SC	- Annex-G
13/10/87	3rd Education SC	- Annex-G
17/10/87	7th Water SC	- Annex-A Water related projects
	6th Transportation, Communi- cations and Energy SC	- Annex-F - Annex-I
18/10/87	4th Industry, Mining and Tourism SC	- Annex-C - Annex-D - Annex-E
19/10/87	5th Agriculture SC	- Annex-B - Annex-J
20/10/87	8th Water SC	- Water allocation plan
25/10/87	Karak Regional Development Council	- Part 2
26/10/87	Tafila Regional Development Council	- Part 2
27/10/87	Joint Committee	- Presentation of Draft Final Report
28/12/87	Joint Committee	- Final comments on Draft Final Report

SC: Sector Committee

Table 2 REGION'S PRESENT POSITION IN JORDAN (1/2)

Aspects	Unit	Figure		Share of Study Area (%)
		Jordan	Study Area	
1. <u>Land area</u>	km ²	89,206 ^{1/}	8,100	9.1
2. <u>Population</u>				
(1) Population	1000	2,700	143	5.3
(2) Pop. density	p/km ²	30	18	-
(3) Pop. growth rate (1979-1985)	%/yr	3.7	2.8	-
(4) Urban pop. ratio ^{2/}	%	70	24	-
3. <u>Employment</u>	1000			
(1) Agriculture sector		39.2	4.8	12.2
(2) Mining & manuf'g sector		53.1	3.4	6.4
(3) Other productive sector		60.8	2.9	4.8
(4) Services sector		114.6	3.3	2.9
(5) Public services sector		234.7	14.4	6.1
(6) Total		<u>502.4</u>	<u>28.8</u>	<u>5.7</u>
4. <u>GDP/GRDP</u>	JD 10 ⁶			
(1) Agriculture sector		112.1	9.3	8.3
(2) Mining & manuf'g sector		223.2	47.2	21.1
(3) Other productive sector		159.2	5.6	3.5
(4) Services sector		538.9	15.0	2.8
(5) Public services sector		325.2	21.1	6.5
(6) Total GDP/GRDP		<u>1,358.6</u>	<u>98.2</u>	<u>7.2</u>
(7) Per capita GDP/GRDP	JD	509	687 (381) ^{3/}	-
(8) Per capita household income (1980)	JD	641	495 ^{4/}	-
5. <u>Total planned investment (1986-1990)</u>	JD 10 ⁶	2,706	227	8.4

Note: Basic data year 1985

^{1/}: Land area of the East Bank

^{2/}: Population ratio who live in urban with more than 5,000 population

^{3/}: Per capita GRDP excluding mining sector contribution

^{4/}: Old Karak Governorate

Table 2 REGION'S PRESENT POSITION IN JORDAN (2/2)

Aspects	Unit	Figure		Share of Study Area (%)
		Jordan	Study Area	
6. Infrastructure				
(1) School enrollment ratio	%	30	30	-
(2) Higher education institute	nos.	n.a.	3	-
(3) Hospital beds	nos.	n.a.	190	-
(4) Number of physician per 10,000		11.3	5.6	-
(5) Electrification ratio	%	90.8	87.1	-
(6) Electric power consumption	GWh/yr	2,151	174.7 ^{1/}	8.1
7. Water				
	MCM/yr			
(1) Mean rainfall		6,000	1,240	20.7
(2) Surface water potential		480 ^{2/}	80	16.7
(3) Groundwater recharge		220	46	20.9
(4) Total renewable water		<u>700</u> ^{2/}	<u>126</u>	<u>18.0</u>
(5) Municipal water supply		68	3.5	5.1
(6) Industrial water supply		41	10.1	24.6
(7) Irrigation water supply		409	11.0	2.7
8. Agriculture				
(1) Arable land	1000 ha	364	124.7	34.3
(2) Irrigated land	1000 ha	56	3.2	5.7
(3) Farm household	1000	58	13	22.4
(4) Holding size of arable land	ha/farm household	6.3	4.8	-
(5) Wheat production	1000 ton/y	120 ^{3/}	10.7	8.9
(6) Yield of cereal crops	ton/ha	1.03 ^{3/}	0.62	-
(7) Number of sheep	1000	1,000 ^{3/}	185	18.5
(8) Number of goats	1000	500 ^{3/}	158	31.6
9. Mineral resources				
(1) Phosphate production	10 ⁶ ton/yr	5.92	5.33	90.0
(2) Cement production	10 ⁶ ton/yr	2.07	0.54	26.1

^{1/}: Karak, Tafila and Shaubak areas

^{2/}: excluding runoff of the Yarmouk river of 400 MCM/yr since it includes ones from the Syrian part of its basin.

^{3/}: data in 1983

Source: Compiled by the Study Team

Table 3 SOCIO-ECONOMY BY SUB-REGION

Governorate	Sub-region	Population	No. of Settlements	Major Cities	Characteristic of socio-economy
Karak	Karak	37,800 (26.5)	39 (21.7)	Karak, Ader	- Capital City of the Governorate (Karak Municipality) - Centre of administrative, industrial and commercial activities
	Qasr	18,500 (12.9)	22 (12.2)	Qasr, Rabba	- Tourism resources such as Karak Castle - Agriculture-based area with the plantation of trees, cereals and fodders as well as sheep breeding
	Mazar	26,700 (18.7)	42 (23.3)	Faggoon, Selfa, Mazar, Mu'tah, Tayybeh, Hussiniyyeh, Mo'ab	- Higher density of population - Flat agriculture land - Historical remains as tourism resources - Small scale industrial and commercial activities
	Ayy	10,600 (7.4)	6 (3.3)	Ayy	- Mu'tah University - Agriculture by fruit tree plantation and poultry farms
	Badia	2,700 (1.9)	3 (1.7)	Qatrana	- Transportation node of the Desert Highway - El Abiad Phosphate Mine
Tafila	Tafila	24,400 (17.1)	23 (12.8)	Tafila	- Capital City of the Governorate (Tafila Municipality) - Centre of all activities in the Governorate
	Bsaira	8,500 (5.9)	10 (5.6)	Ain El Baida, Bsaira, Qadisyyeh	- Natural resources such as limestone, mineral water and forests - Good agricultural land
	Hasa	4,500 (3.1)	3 (1.7)	Hasa	- Cement Factory at Rashadiya - Phosphate mine at Hasa and other mineral resources - Good access to the transportation along the Desert Highway
Amman	Madaba/ Dhiban	9,200 (6.4)	32 (17.8)	Dhiban	- Agriculture by vegetables

Source: MOP, National Village Survey

Note: (1) Numbers in parentheses show the share of each sub-region in total of the Study Area

(2) Population is estimation in 1985

Table 4 INDUSTRIAL ORIGIN OF TARGETED GDP IN JORDAN

(JD million at 1985 prices)

	1985		1990		Annual growth rate (%)
Agriculture	112	(8.2)	163	(9.4)	7.8
Mining	57	(4.2)	83	(4.8)	7.8
Manufacturing	167	(12.3)	233	(13.4)	6.9
Electricity and Water	35	(2.6)	44	(2.5)	4.7
Construction	124	(9.1)	151	(8.7)	4.0
Total Commodity Producing sectors	495	(36.4)	674	(38.8)	6.4
Trade	256	(18.8)	311	(17.9)	4.0
Transport and Communication	152	(11.2)	200	(11.5)	5.6
Government services	257	(18.9)	317	(18.3)	4.3
Other Services	199	(14.6)	237	(13.6)	3.6
Total Services sectors	864	(63.6)	1065	(61.2)	4.3
GDP at Factor Cost	1359	(100.0)	1739	(100.0)	5.1
GDP at Market Prices	1581		2083		5.7
CNP at Market Prices	1856		2367		5.0

Source: MOP, The Third Five-Year Plan

Note: Total planned investment by the plan amounts to JD 3,115 million at current prices and JD 2,706 million at 1985 prices in the period 1986-1990.

Table 5 FUTURE IMAGE OF THE STUDY AREA (2005) (1/2)

Factors	Scenario 1	Scenario 2	Scenario 3
1. Social Aspects			
1.1 Population trend	Out-migration continues	Out-migration will cease	Net gain in migration
1.2 Settlement distribution pattern	Little agglomeration. Increased role of Mu'tah-Mazar	Agglomeration in Karak, Mu'tah-Mazar & Tafila	Agglomeration also in Hasa & Qatrania
Nos. of strategic urban centres	3	3	4

Source: The Study Area

Table 5 FUTURE IMAGE OF THE STUDY AREA (2005) (2/2)

Factors	Scenario 1	Scenario 2	Scenario 3
1.3 Living Environment	Diversified urban services	Same as Scenario 1	Improvement of environment in the Badia
2. Economic Aspects			
2.1 Principal productive industries			
<u>Agriculture:</u>	Water harvesting, livestock farming, spring irrigation, fish culture, horticulture	Same as Scenario 1	Same as Scenario 1
<u>Mining:</u>	Phosphate and cement Oil shale	Same as Scenario 1	Same as Scenario 1
<u>Manufacturing:</u>	Promotion of handicraft industry	Promotion of transportation-related manuf'g industry	Strategic development of modern manufacturing industries
<u>Construction:</u>	Housing projects Water projects Handicraft centre Oil shale project	Housing projects Water projects Tourism projects Industrial zone Oil shale project	Urban projects Water projects Tourism projects Industrial estate Oil shale project
<u>Infra-structure:</u>	Expansion of roads, communications, health, school, sewerage and solid management systems	Same as Scenario 1	Same as Scenario 1 but at larger scales and in wider areas
2.2 GRDP per capita	Attain national average level	Same as Scenario 1	Same as Scenario 1
2.3 Employment	Agriculture & mining oriented structure	Balanced structure with agro-industry	Secondary industries oriented structure
3. Physical Aspects			
3.1 Water	Fully met but limited new irrigation projects	Same as Scenario 1	Same as Scenario 1
3.2 Urban land (in 2005)	2,600 ha	3,100 ha	3,600 ha

Table 6 SOCIOECONOMIC FRAMEWORKS

	Unit	1985	2005		
			Scenarios		
			(1)	(2)	(3)
Population	1000	143	220	248	270
Population share in Jordan	%	5.3	4.4	4.9	5.4
Average population growth rate	%/yr	-	2.2	2.8	3.2
Per capita GRDP excl. mining	JD	381	720	720	720
GRDP excl. mining	Mil.JD	52	153	173	190
GRDP	Mil.JD	<u>98</u>	<u>214</u>	<u>233</u>	<u>250</u>
Agriculture	Mil.JD	9	21	21	21
Industry	Mil.JD	53	112	130	145
Services	Mil.JD	36	81	82	84
Employment	1000	29	56	59	62
No. of new job creation	1000	-	27	30	33
Required investment (1986-2005)	Mil.JD	-	930- 1,160	1,080- 1,350	1,210- 1,520
Share of required investment in Jordan (1986-2005)	%	-	6.9- 8.6	8.0- 10.0	9.0- 11.3

Source: The Study Team

Table 7 PROJECTED POPULATION (SCENARIO 1)

Govern.	Sub-Region	1985	1995	2005
Karak	Karak	37800	48300	60500
	Qasr	18500	22700	27400
	Mazar	26700	33200	40100
	Ayy	10600	13000	15700
	Badia	2700	3400	4100
Total		96300	120600	147800
Tafila	Tafila	24400	31500	39500
	Bseira	8500	10400	12500
	Hasa	4500	5600	6700
Total		37400	47500	58700
Amman	Dhiban	9200	11200	13500
Grand Total		142900	179300	220000

Source: The Study Team

Table 8 PROJECTED POPULATION (SCENARIO 2)

Govern.	Sub-Region	1985	1995	2005
Karak	Karak	37800	49200	65200
	Qasr	18500	23100	28800
	Mazar	26700	34000	44900
	Ayy	10600	13300	17000
	Badia	2700	3400	5100
Total		96300	123000	161000
Tafila	Tafila	24400	31900	43900
	Bseira	8500	10600	13500
	Hasa	4500	5700	15000
Total		37400	48200	72400
Amman	Dhiban	9200	11400	14400
Grand Total		142900	182600	247800

NB: In this projection, Hasa is selected as a growth point along the Desert Highway.

Source: The Study Team

Table 9 PROJECTED POPULATION (SCENARIO 3)

Govern.	Sub-Region	1985	1995	2005
Karak	Karak	37800	49200	68300
	Qasr	18500	23100	29600
	Mazar	26700	34000	49200
	Ayy	10600	13300	17500
	Badia	2700	3400	5400
Total		96300	123000	170000
Tafila	Tafila	24400	31900	46400
	Bseira	8500	10600	14000
	Hasa	4500	5700	25100
Total		37400	48200	85500
Amman	Dhiban	9200	11400	14900
Grand Total		142900	182600	270400

NB: In this projection, Hasa is selected as a growth point along the Desert Highway.

Source: The Study Team

Table 10 PRESENT LANDUSE AND FUTURE PLAN

Landuse Category	Present		Future	
	Area (ha)	(%)	Area (ha)	(%)
Fallow	75,800	1/ 9.3	-	-
Field crops	24,400	3.0	43,000	5.3
Irrigated vegetables	900	0.1	800	0.1
Fruit trees	3,600	0.4	45,200	2/ 5.6
Forest	17,800	2.2	74,900	9.2
Fodder shrub	-	-	22,200	2.7
Built-up area	1,900	0.2	3,600	0.4
Mineral reserve/quarry	71,500	8.8	71,500	8.8
Grazing/unarable area	616,300	75.9	551,000	67.9
Total	812,200	100.0	812,200	100.0

1/: Estimated based on the total land area of field crops/fallow

2/: Gross area including lands for catching rainfall

Source: The Study Team

Table 11 WATER ALLOCATION PLANS FOR 2005

(MCM/yr)

No.	Water Use	Demand in 2005	Water Allocation Plan			
			Case 1 Highland	Case 2 Amman	Case 3 Ghor	Case 4 Potash
1.	Municipal					
1.1	Local demand	13.11	13.11	13.11	13.11	13.11
1.2	To Greater Amman	36.00	29.0	36.0	24.0	17.0
	Municipal sub-total	<u>49.11</u>	<u>42.11</u>	<u>49.11</u>	<u>37.11</u>	<u>30.11</u>
2.	Irrigation & livestock					
2.1	Exist. groundwater irri.	22.8	22.8	22.8	22.8	22.8
2.2	Exist. spring irrigation	12.5	12.5	12.5	12.5	12.5
2.3	New irrigation projects	5.0	5.0	5.0	5.0	5.0
2.4	Livestock farming	1.8	1.8	1.8	1.8	1.8
2.5	Southern Ghor					
	(1) Stage I	37.6	37.6	37.6	37.6	37.6
	(2) Stage II	23.5	23.5	16.5	23.5	23.5
	Irrigation sub-total	<u>103.2</u>	<u>103.2</u>	<u>96.2</u>	<u>103.2</u>	<u>103.2</u>
3.	Industry					
3.1	Phosphate	11.0	11.0	11.0	11.0	11.0
3.2	Cement	0.6	0.6	0.6	0.6	0.6
3.3	Industrial complex in Karak, Tafila & Hasa	2.9	2.9	2.9	2.9	2.9
3.4	Oil shale at Lajjun	5.0	5.0	5.0	5.0	5.0
3.5	Oil shale at Sultani	2.0	2.0	2.0	2.0	2.0
3.6	Potash	12.0	12.0	12.0	12.0	12.0
3.7	Dead Sea Chemical Complex	14.0	2.25	2.25	7.0	14.0
	Industry sub-total	<u>47.5</u>	<u>35.75</u>	<u>35.75</u>	<u>40.5</u>	<u>47.5</u>
4.	Environment (Greenbelt, water park and green park)	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>
	Total	203.41	184.66	184.66	184.41	184.41

Note: (1) Water resources development potential is 184.9 MCM/yr.

(2) Figures in boldface shows partial allocation to the demand.

Source: The Study Team and the Water Sector Committee

Table 12 STRATEGIC INDUSTRIAL PROJECTS (1/3)

Project/Location	No. of Employees	Conditions/ Characteristics	Examples of Typical Industries to be introduced
Mu'tah Industrial Estate/Mu'tah	2,500	<p>High standard industrial estate composed of:</p> <ul style="list-style-type: none"> - Industrial estate with industrial apartments - University & research institute - Industrial incubation and development centre - Park, sports stadium, housing & amenities 	<ul style="list-style-type: none"> - Bakery products (biscuits, dry products) - Wearing apparel (uniforms, caps, underwear) - Printing & allied industries (binding, ink) - Cement, lime, plaster products & abrasives - Electrical/electronic machinery - Professional, scientific, measuring, controlling equipment - Sporting & athletic goods - Software & information technology - Research & commercialization <p>(high technology products including ceramics, new materials, utilization of mineral products/waste, local energy biotechnology & new agro-industry)</p>
New Karak Industrial Zone/South of New Karak	1,000	<p>Industrial zone for relocated establishments from Old Karak to stop urban problems & to lead new area development</p>	<ul style="list-style-type: none"> - Car repair & maintenance - Blacksmiths/fabricated metal products - Carpentry & woodworking - Electrical maintenance
Karak Handicraft Centre/Old Karak	40	<p>The centre being an integral part of the historic quarter of the town with such functions as</p> <ul style="list-style-type: none"> - Manufacture & sales of tourism related handicrafts - Training, promotion of traditional handicraft & art, & improvement - Display & demonstration 	<ul style="list-style-type: none"> - Embroideries & laces - Weaving of carpets & rugs - Traditional/local clothes - Leather products - Woodworking - Pottery & earthenware - Stoneware including marble & oil shale - Metalwork & accessories - Semi-processed agro-products

Table 12 STRATEGIC INDUSTRIAL PROJECTS (2/3)

Project/Location	No. of Employees	Conditions/Characteristics	Examples of Typical Industries to be introduced
Outer Tafila Industrial Estate/East of Tafila	1,000	Industrial estate with support facilities & amenities, cooperating with Polytechnic Institute	<ul style="list-style-type: none"> - Grain mill products - Wine industry - Made-up textile goods - Leather products - Footwear - Plastic products - Cement, lime, plaster products - Furniture & fixtures of metal - Machinery & equipment - Electrical/electronic machinery
Tafila Industrial Zone/periphery of Tafila Town	1,000	Industrial zone for relocated establishments from Tafila Town	<ul style="list-style-type: none"> - Car repair - Blacksmiths/fabricated metal products - Carpentry & woodworking - Electrical maintenance - Olive soap - Tourism related handicrafts
Tafila Handicraft Centre/Tafila Town	20	<ul style="list-style-type: none"> - The centre, forming a network with other tourism, culture & handicraft facilities, has functions such as: <ul style="list-style-type: none"> - Manufacture & sales of tourism related handicrafts - Training, promotion of traditional handicraft & art & improvement - Display & demonstration 	<ul style="list-style-type: none"> - Embroideries & laces - Weaving of carpets & rugs - Traditional/local clothes - Leather products - Wood working - Pottery & earthenware - Stoneware including marble & oil shale - Metal work & accessories - Semi-processed agro-products

Table 12 STRATEGIC INDUSTRIAL PROJECTS (3/3)

Project/Location	No. of Employees	Conditions/ Characteristics	Examples of Typical Industries to be introduced
Hasa Industrial Estate/Hasa along Desert Highway	3,000	Industrial estate, a goods circulation centre, a free zone with housing & amenities, being a core of desert development, utilizing underground water	<ul style="list-style-type: none"> - Prepared animal feeds - Leather products - Paperboard - Structural clay products - Cement, lime, plaster products - Founding & casting - Structural metal products - Machinery & equipment - Electrical/electronic machinery - Transport equipment (motor) (vehicle parts & accessories) - New energy-related products - Bedou handicraft - Pottery using phosphate slimes

Source: The Study Team

Table 13 PROSPECTIVE TOURISM PROJECTS

- (1) Rehabilitation of the Karak Castle
 - (A) Excavation in the ruin, study and restoration of excavated fragments
 - (B) Preparation for public exhibition such as explanation, lighting, safety devices, etc. for visitors
- (2) Restoration of Old Karak
 - (A) To create the Historic Quarter in Old Karak for restaurants, boutiques, shops, etc.
 - (B) Restoration and beautification of buildings and streets
 - (C) Relocation of the existing buildings on the Castle Square and arrangement of the evacuated space for event programmes
 - (D) To restore the City Wall and Watch Towers
 - (E) To establish necessary tourist facilities such as tourists office, bank, hotel, etc.
 - (F) To establish the Handicraft Centre, folklore music and dance, etc.
 - (G) To plan the continuous attraction such as Sound and Light, theatre, concert, etc.
- (3) Excavation and improvement of museum at Dhiban
- (4) Rest house at the Wadi Mujib viewpoint
- (5) Excavation and improvement of the museum at Rabba
- (6) Mu'tah and Mazar
 - (A) Improvement of the museum
 - (B) Establishment of the Jordan Islamic Centre
 - (C) Establishment of the Pilgrim Park surrounding the Muslim martyrs' tomb and the monument of battle field
- (7) Tafila: Rehabilitation and beautification of the city
- (8) Picnic garden in the Hasa Valley
- (9) Afra-Burbeita hot springs: Construction of a rest house and a medical rehabilitation station
- (10) Hasa Oasis Water Park: Construction of an artificial oasis, green picnic garden, a golf course, productive greenery, a rest house, a hotel, restaurants, an amusement centre, etc.
- (11) Rehabilitation of old Arab villages
 - (A) Restoration and beautification of old villages
 - (B) Restaurants, shops, folklore museums at Aima, Sinifha and Nammata
- (12) Old Dhana Village and Dhana Valley
 - (A) Restoration and beautification of the village for the tourism development
 - (B) Construction of a resort hotel
- (13) Outside of the Study Area
 - (A) Improvement of the Park Ghor Haditha
 - (B) Construction of a rest house in Mazra by the Dead Sea

Source: The Study Team

Table 14 LIST OF MASTER PLAN PROJECTS (1/2)

(1) Rural Development Plan

Projects related to the rural life

RDP-1	New Village Project
RDP-2	School Bus Project
RDP-3	Village Clinic Project
RDP-4	Home Garden Project
RDP-5	Darawish-Tafila Pipeline Project
RDP-6	Lajjun-Karak Pipeline Project

Projects related to the production sector

RDP-7 *	Lamb Fattening Centre Project
RDP-8 *	Rangeland Reservation Project
RDP-9 *	Fodder Shrubs Planting Project
RDP-10 *	Introducing Forage Crops into Farming Cycle Project
RDP-11 *	Introducing Legumes into Farming Cycle Project
RDP-12 *	Veterinary Clinics Project
RDP-13 *	Development of Farming in the Highlands Project
RDP-14 *	Production of Certified Seeds Project
RDP-15 *	Mechanized Agricultural Services Project
RDP-16 *	Fruit Tree Seedling Production Project
RDP-17 *	Soil Conservation and Fruit Tree Planting Project
RDP-18	Water Harvesting Development Project
RDP-19	Spring Irrigation Improvement Project
RDP-20	Cottage Industry Development Project
RDP-21	El Lajjun Oil Shale Retorting Project
RDP-22	Unused Minerals Utilization Development Project

Projects related to the environment protection and tourism

RDP-23	Afforestation Project
RDP-24	Greenbelt Project
RDP-25	Afra-Burbeita Hot Spring Multipurpose Pilot Project
RDP-26	Dhana Valley Tourism Development Project
RDP-27	Environmental Assessment of El Lajjun Oil Shale Project

Note: Projects attached with "*" are included in the Third Five-Year Plan.

Table 14 LIST OF MASTER PLAN PROJECTS (2/2)

(2) Urban Development Plan

- UDP-1 Karak Urban Development Project (Karak Handicraft Centre Programme, Karak Museum City Programme, and Karak Urban Development Programme)
- UDP-2 Mu'tah-Mazar Urban Development Project (Mu'tah Industrial Estate Programme, and Mu'tah-Mazar Urban Development Programme)
- UDP-3 Mu'tah University Related Project (Badia Research Institute etc.)
- UDP-4 Tafila Urban Development Project (Tafila Handicraft Centre Programme, Outer Tafila Industrial Estate Programme, and Tafila Urban Development Programme)

(3) Green Badia Plan

- GBP-1 Sustaining the Production Level of Existing Phosphate Mines
- GBP-2 Local Materials Utilizing Project (aggregates, natural sand, phosphate slimes, etc.)
- GBP-3 Green Badia Project (Water programme, Tourism and Environmental Programmes, Hasa New Town Programme (Phase 1), and New Energy Programme)
- GBP-4 Desert Dam Project
- GBP-5 Infrastructure and Housing Project (Phase 2)
- GBP-6 Hasa Industrial Estate Project
- GBP-7 Traffic Terminal Project
- GBP-8 Sultani Oil Shale Power Plant Project
- GBP-9 Environmental Assessment of Sultani Oil Shale Power Plant Project

Note: The Water Programme of GBP-3 includes groundwater development of the Darawish well field and the Darawish-Hasa Pipeline Project.

Table 15 PLANNED INVESTMENT DISTRIBUTION IN KARAK GOVERNORATE

(JD 1000 at current prices)

Sector/Year	1986	1987	1988	1989	1990	Total
Manpower & Employment	-	-	75	417	-	492
Social Development	480	804	386	375	146	2191
Woman's Affairs	62	49	74	30	75	290
Youth	75	250	345	360	770	1800
Health	248	180	1145	1179	1547	4299
Education	1544	1415	1559	1985	2564	9067
High Education	6087	6561	6795	4699	4900	29042
Awqaf	86	111	154	164	154	669
Culture	5	20	20	205	205	455
Housing & Government Building	1693	3054	4341	8006	7798	24892
Tourism & Antiquities	16	221	241	15	25	518
Trade and Supply	73	616	900	164	165	1918
Municipal & Rural Affairs	1756	1980	1850	1780	1676	9042
Total Social & Service Sector	12125 (40.0)	15261 (41.0)	17885 (38.8)	19379 (24.2)	20025 (20.5)	84675 (29.0)
Transportation	3800	6855	6430	5670	5400	28155
Telecommunications	4513	3915	395	80	15	8918
Energy & Resources	1051	780	780	1275	1180	5066
Water & Irrigation	225	1081	8211	5845	9770	25132
Total Infrastructure Sector	9589 (31.6)	12631 (33.9)	15816 (34.3)	12870 (16.1)	16365 (16.7)	67271 (23.1)
Agriculture	1288	5257	5982	6033	4194	22754
Industry	7349	4062	6437	41796	57325	116969
Total Productive Sector	8639 (28.5)	9319 (25.0)	12419 (26.9)	47829 (59.7)	61519 (62.8)	139723 (47.9)
Total Investment	30351 (100.0)	37211 (100.0)	46120 (100.0)	80078 (100.0)	97909 (100.0)	291669 (100.0)

Source: MOP, The Third Five-Year Plan

Note: Total amount of JD 292 million includes investment for Safi Sub-region especially the Arab Potash Company and irrigation in the Chor area.

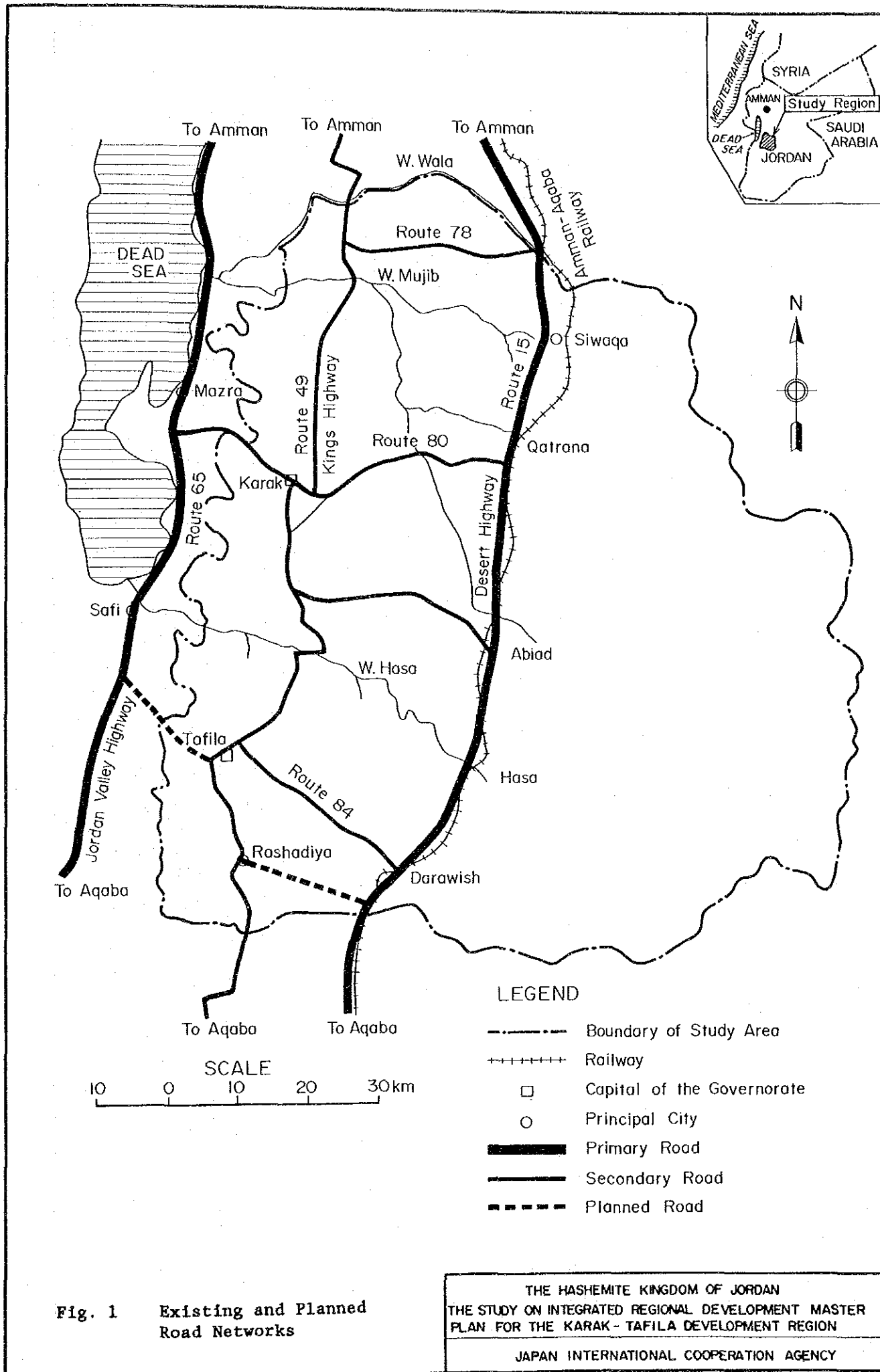
Table 16 PLANNED INVESTMENT DISTRIBUTION IN TAFILA GOVERNORATE

(JD 1000 at current prices)

Sector/Year	1986	1987	1988	1989	1990	Total
Manpower & Employment	-	-	-	-	-	-
Social Development	49	115	284	486	249	1183
Woman's Affairs	20	150	49	25	10	254
Youth	50	425	570	415	540	2000
Health	127	167	1103	1116	1445	3958
Education	777	843	927	1114	1541	5202
Awqaf	13	53	22	21	22	131
Culture	5	20	220	205	5	455
Housing & Government						
Building	1019	1384	2248	3500	4078	12229
Tourism & Antiquities	11	21	131	132	223	518
Trade and Supply	28	80	107	103	95	413
Municipal & Rural						
Affairs	1030	837	800	792	757	4216
Total Social & Service	3129	4095	6461	7909	8965	30559
Sector	(16.4)	(27.1)	(43.4)	(45.4)	(48.7)	(36.0)
Transportation	2910	3015	1770	3570	4260	15525
Telecommunications	555	715	90	80	10	1450
Energy & Resources	266	290	290	315	370	1531
Water & Irrigation	1203	1831	675	817	982	5508
Total Infrastructure	4934	5851	2825	4782	5622	24014
Sector	(25.9)	(38.7)	(19.0)	(27.5)	(30.5)	(28.3)
Agriculture	3738	3881	4747	2799	2009	17174
Industry	7250	1297	839	1930	1828	13144
Total Productive	10988	5178	5586	4729	3837	30318
Sector	(57.7)	(34.2)	(37.6)	(27.1)	(20.8)	(35.7)
Total Investment	19051	15124	14872	17420	18424	84891
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Source: MOP, The Third Five-Year Plan

FIGURES



Number of inhabitants (1985)			
1. Karak	14935	80. Abiad	283
2. Lajjun	200	81. Um El Ghozlan	169
3. Samra	531	82. Juweir	52
4. Izra	60	83. Noaymeh	170
5. Shehbiyyeh	2231	84. Hadabeh	41
6. Adir	2714	85. Rojem Ennawayseh	234
7. Ainun	543	86. El Manshiya	515
8. Eththnniya	1174	87. El Jauza	121
9. Mikkein	664	88. Edabbaka + Isawiya	103
10. Adnaniyyeh	1237	89A. Wadi Ennwayseh	105
11. Mirwid	846	89B. Rashdiyyeh	
12. Qatrana	2315	90. Tafila	15626
13. Mumya	385	91. Aima	1230
14. Abdaliyyeh	134	92. Sinifha	995
15. Kamnah	33	93. Alyeh	87
16. Gmuweir	1331	94. Essile	891
17. El Baqei	436	95. Almitan	72
18. Zahum	564	96. Abur	100
19. El Musheirifa	276	97. Elis	424
20. Manshiyat Abu Hammur	2142	98. Abil	285
21. Badhdhan	908	99. Shaedham	63
22. Sakka	454	100. An-Namata	211
23. Raudhah	262	101. Dhiba'a	109
24. Mraighah	54	102. Rhab	408
25. El Ma'muniya	234	103. Afra	104
26. Batir	823	104. El Burbeita	159
27. Wadi Ben Hammad	567	105. Jurf Ed Darawish	646
28. Um Rummanah	72	106. El Hasa	4077
29. Damekhi (Siwaqa)	120	107. El La'ban	288
30. Qureifilla	41	108. Arafah	336
31. Zugheiriya	48	109. Abu Banna	260
32. Saahoor	39	110. Ain Al Beida	2880
33. Bawwab	19	111. Ruweim	805
34. El Hawiya	140	112. El Harir	399
35. Sad Essoltan	480	113. Swaimie	24
36. Rakin	1994	114. Majadil	1
37. Judaiyida	1958	115. Zhaigah	115
38. Ai	4545	116. Bsaira	3618
39. Kathrabba	2191	117. Rashdiyyeh	5
40. Jauza	1486	118. Dhana	504
41. El Iraq	2028	119. Gharandal	1531
42. El Qasr	1929	120. Kadiesyyeh	2898
43. El Rabba	3026	121. Lahdhah	48
44. Simakiya	1335	122. Um Essarab	81
45. Humud	406	123. Sail Ria	88
46. Wasiyyeh	36	124. Qar Qoor	23
47. Faqu	3024	125. Janien	30
48. Imra	890	126. Dhiban	3020
49. Sirfa	2263	127. Falha	253
50. El Yarut	1005	128. Alyeh	809
51. Ariha and Abu Turaba	810	129. Dhaibeh	291
52. Mesar	296	130. Barza	350
53. Shihan	348	131. Shaqsiq	689
54. Jada	1338	132. Mathlootheh	199
55. Mughaiyir	383	133. Qbaibeh	48
56. Zahra	419	134. Um Shjaireh Gharbiyyeh	105
57. Mujib	861	135. Um Shajarah	54
58. Eddimna	471	136. Qasymieh	104
59. Majdalein	117	137. Meshferh	193
60. El Mazar	5099	138. Ara'er	16
61. Mauta	3432	139. Um Shjaireh Sharqiyyeh	82
62. Tayybeh	3325	140. Um Zabarah	43
63. Sarara	204	141. Alaqi	27
64. Um El Khanazir	30	142. Hano Allebbarah	8495
65. El Baqa	48	143. Wadi Rmail	128
66. Amashiyyeh	87	144. Jmayyel	
67. Dabbeh	227	145. Mzayyer Alia	
68. Khauka	6	146. Elayyan	
69. Juhra	349	147. Msaitbeh	
70. El Amaqa	123	148. Salyeh	
71. Sul	1502	149. Um Rsas	
72. Moab	5974	150. Ramah	
73. That Ras	2780	151. Abu Hlailefeh	
74. Mhiyy	1354	152. Mshairfet Slait	
75. El Hashimiya El Janubiya	757	153. Toar Hashash	
76. El Shariffeh	21	154. Thrayya	
77. Majra	284	155. Yahoona	
78. Hamdiyyeh	156	156. Rojom Fhaid	
79. Um Al Yanabee	56	157. Rojom Igab	
		Total	152,105

Note : Above figures are slightly different from the data given by MOP
Source : Regional Planning Department, MMRAE

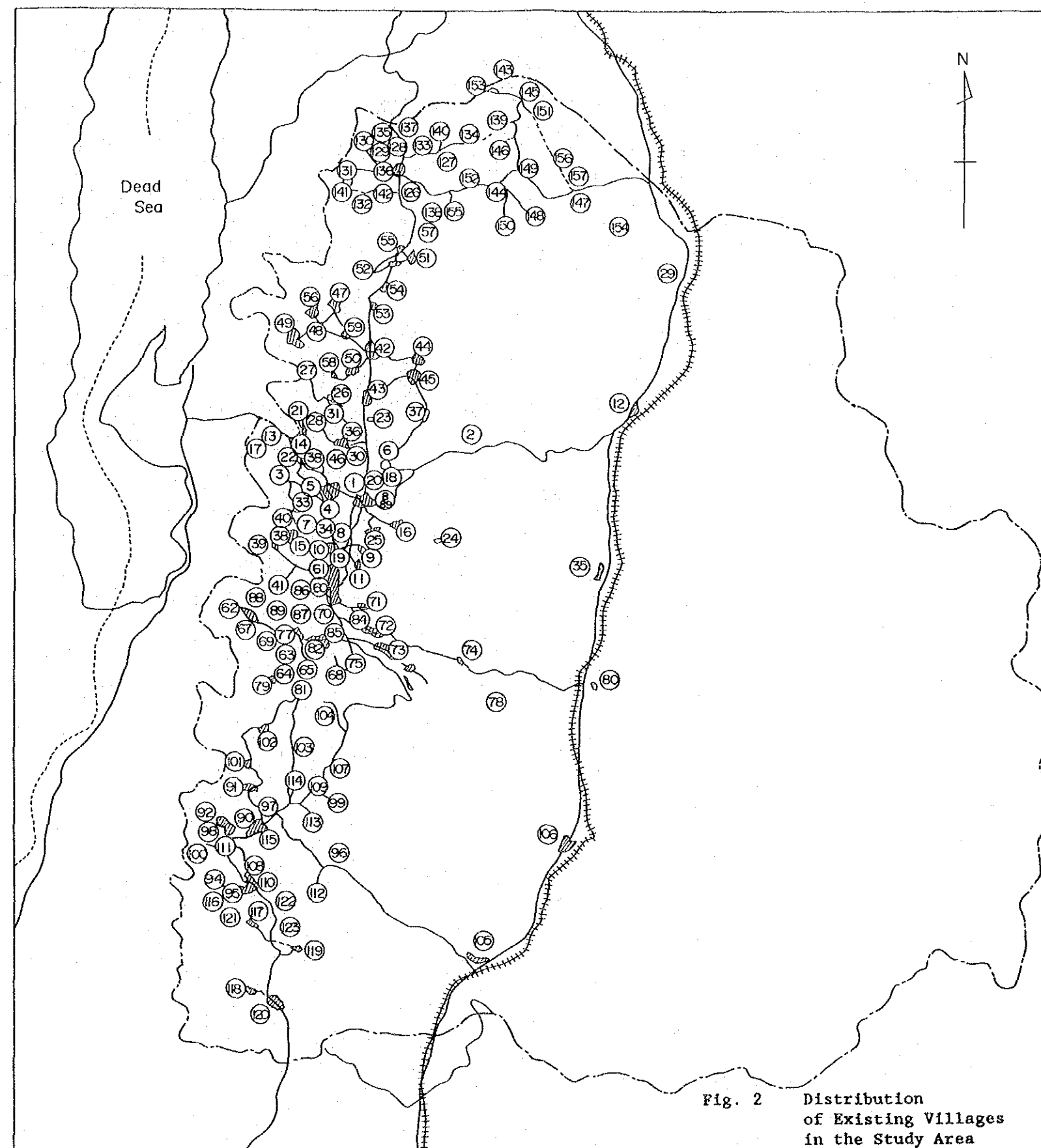
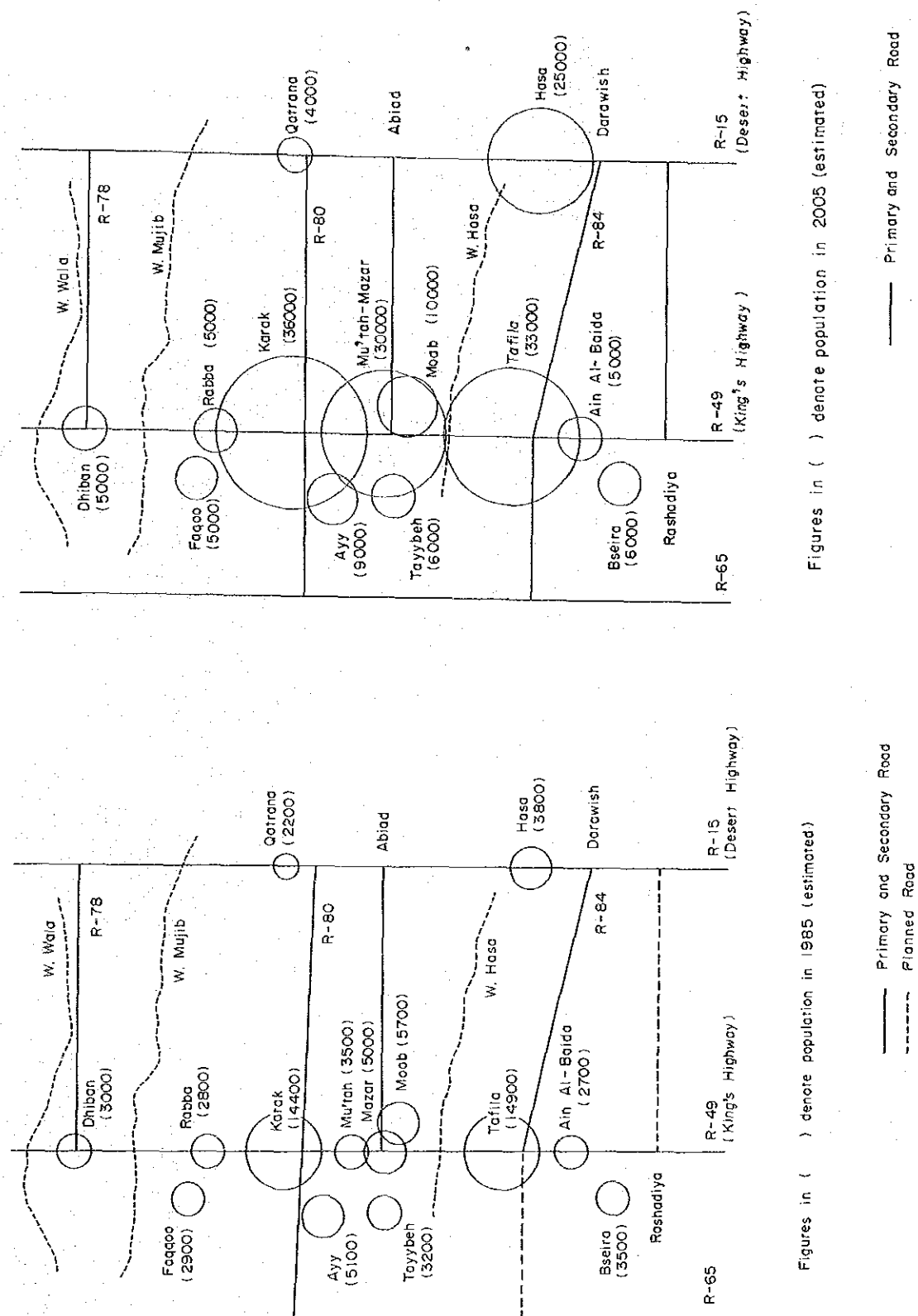


Fig. 2 Distribution of Existing Villages in the Study Area

Fig. 3 Present and Projected Spatial Structures



Figures in () denote population in 2005 (estimated)

Figures in () denote population in 1985 (estimated)

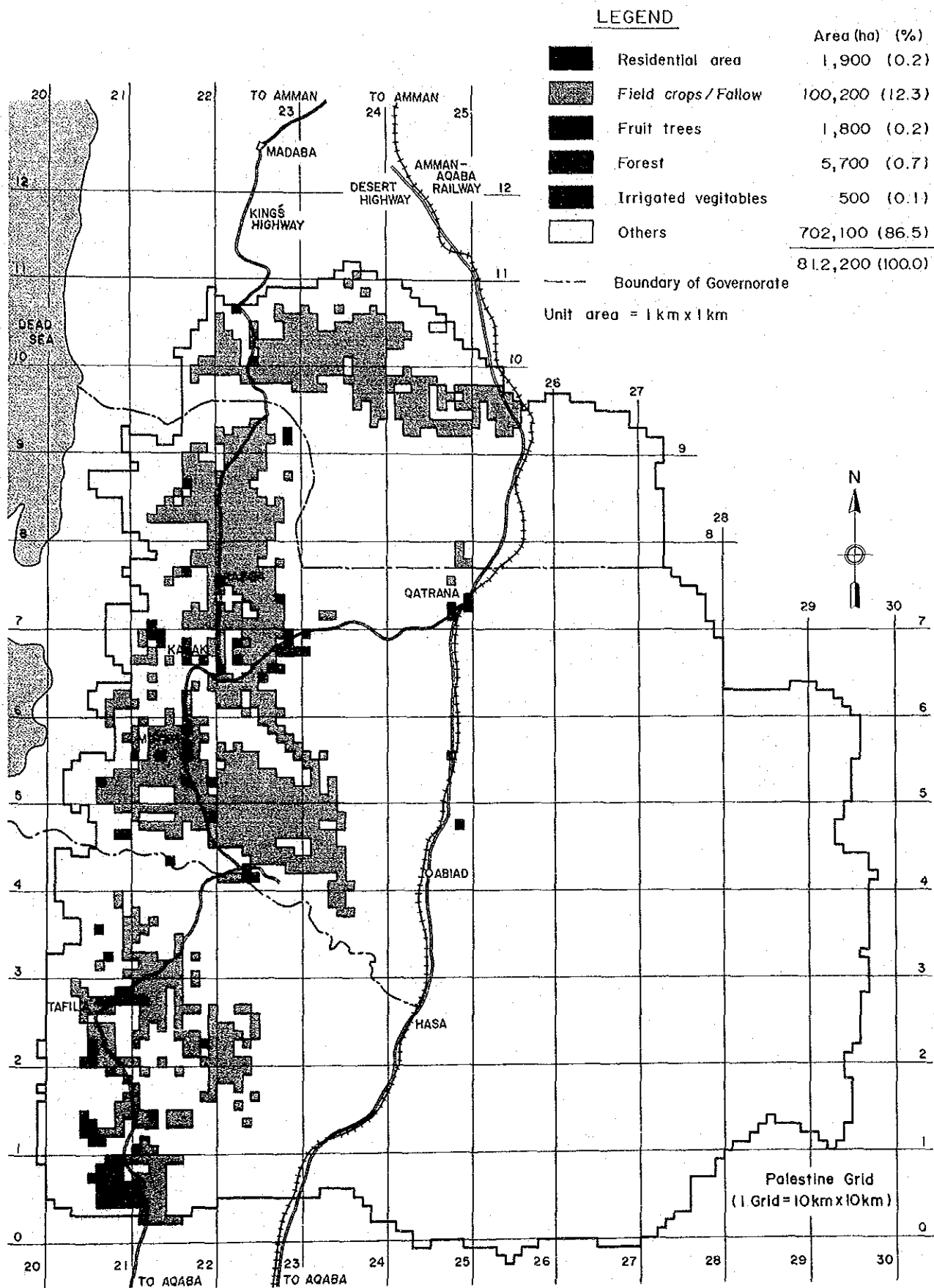


Fig. 4 Present Landuse Map

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

JAPAN INTERNATIONAL COOPERATION AGENCY

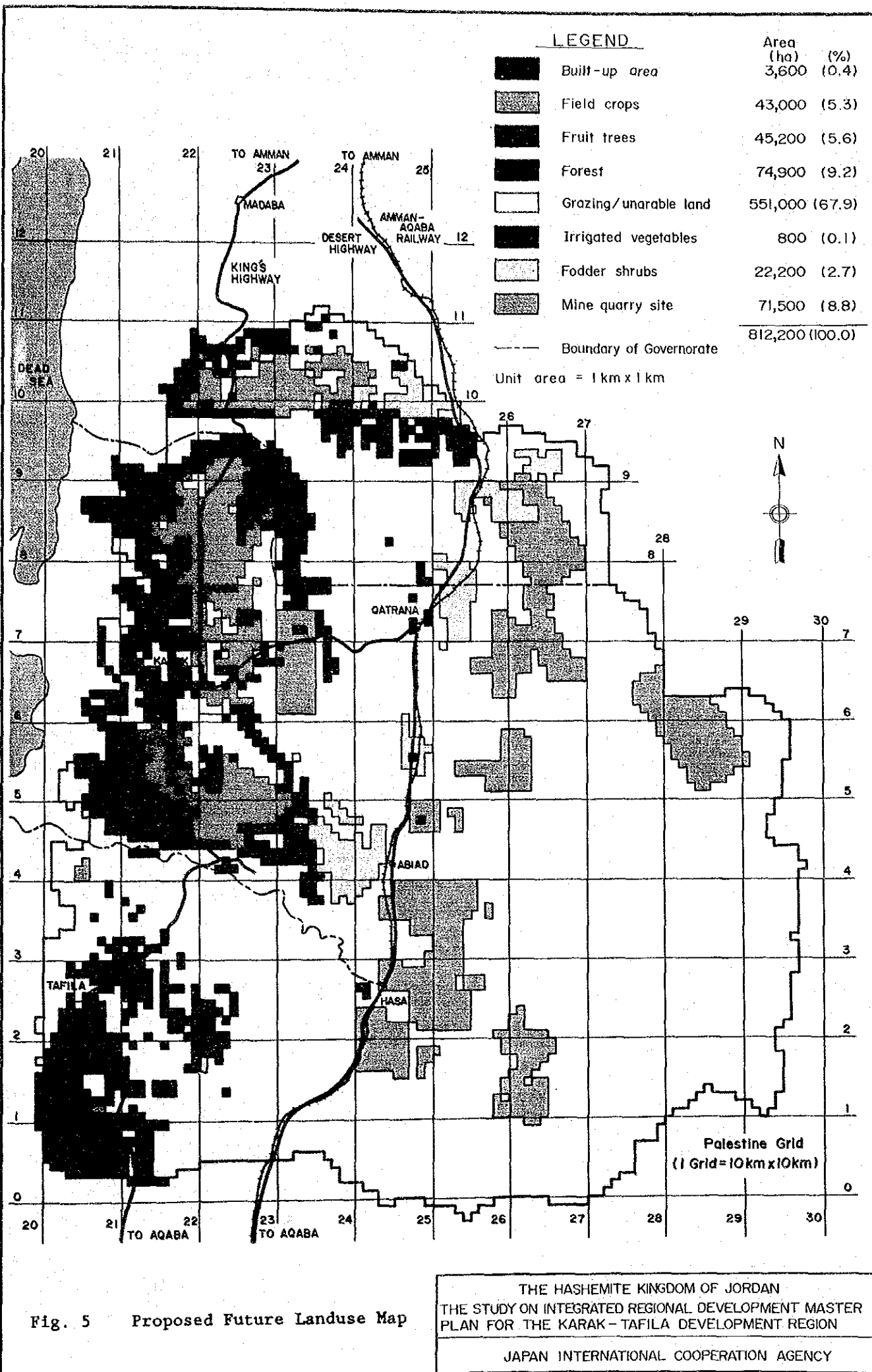


Fig. 5 Proposed Future Landuse Map

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

JAPAN INTERNATIONAL COOPERATION AGENCY

