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**Urban Planning in Saudi Arabia,
with Special Reference to the
Nitag Omrani Programme**

Zuhair Hassan Zahid

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Submitted to the University of Durham
for the degree of Doctor of Philosophy

Department of Geography 1996



- 4 JUN 1996

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of God, most gracious, most merciful

Declaration

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Zuhair Hassan Zahid

Durham, 1996

Abstract

Due to the 1973 oil boom most towns and cities in the Kingdom of Saudi Arabia (KSA) witnessed unprecedented physical growth and spatial development, giving rise to uncoordinated urban growth, illegal settlements and land acquisitions.

Successive generations of master plans, physical plans and general plans which were prepared for major urban centres and other medium sized towns and rural centres have not been successful in controlling effectively such undesirable phenomena.

In an attempt to rectify and control the urban development process in KSA the Deputy Minister for Town Planning (DMTP) initiated and implemented a significant project (the *Nitag Omrani*) for the delineation of urban growth boundaries for 100 Saudi towns and cities. This was carried out in response to the Royal Decree No. 13 dated 25 September 1985 which emphasised the pressing needs for controlled economic and rational urban growth and development patterns.

The prime objective of this research is to investigate the development of the urban and regional planning process in KSA, its limitations and implications and to evaluate the significance of the "*Nitag Omrani*" project for the delineation and definition of urban growth boundaries for 100 Saudi towns and cities. In view of the technical and administrative limitations of the "*Nitag*" studies in phasing development up to the year 2005, the research also strives to improve the methodology and approach towards establishing a more suitable urban planning process for KSA.

Preliminaries

Transliteration

The transliteration and spelling in English of Arabic place names and people can be a matter of debate and sometimes disagreement.

The spelling of place names corresponds with that used in the current Fifth Development Plan - 1990-1995, Ministry of Planning, KSA.

Spellings in common use have otherwise been adopted for personal names and the technical terms included in the glossary Appendix F, which are at the writer's discretion who seeks the reader's forbearance.

Dates

The year dates used in this work are without exception Gregorian. For reference purposes, Appendix E sets out Hijra Dates and their Gregorian equivalent.

Metrication

KSA follows the Metric System. All linear and area dimensions are therefore given in metric rather than Imperial units.

Author's Role

Following graduation in civil engineering at King Saud University, Riyadh in 1977 the author was immediately appointed to Deputy Ministry of Town Planning of MOMRA to work under the direction of the Deputy Minister responsible for town planning Dr. Saleh al Hathloul (DMTP). After gaining comprehensive field and departmental experience the author was appointed to the Co-ordination Department and in 1982 was promoted Director General of that department.

By Order No.13 of 1985 of the Council of Ministers, the Minister for Municipalities and Rural Affairs Ibrahim bin Abdullah al Ankary was instructed to delineate the boundaries of towns and cities in the Kingdom of Saudi Arabia (KSA) over the ensuing 20 years broken down into phases corresponding to the quinquennial National Development Plans. Thereafter the present author, reporting through DMTP, was given overall responsibility for the coordination and implementation of the nitag omrani programme. This included the preparation of manuals and work schedules for the various stages of the programme which was mainly implemented by the local planning authorities in the Kingdom.

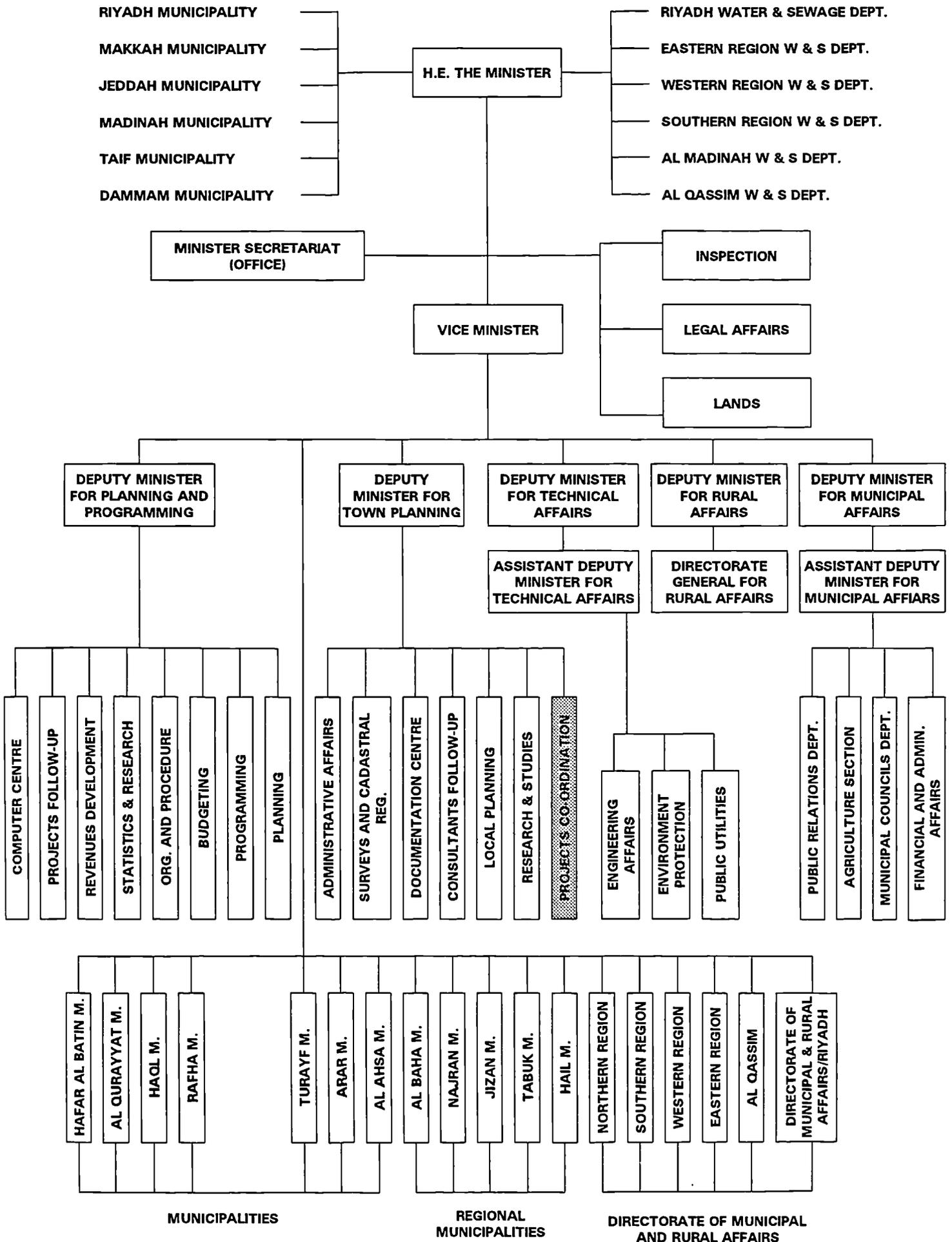
Pilot studies, lectures and seminars signalled the continuous and ceaseless efforts of the author from the beginning of this ambitious programme in 1985 to the successful completion in 1988.

The author was not only involved in the preparation of the technical reports and atlases for individual towns and cities but also in their final production and approval stages by the Council of Ministers' technical bureau. In addition, he supervised the production of a cumulative atlas showing the 1985 status quo of the principal towns and cities in KSA and a second one showing the approved delineation of their urban boundaries. The author has deposited copies of both atlases in Durham University

Library as they are clearly complementary to the present thesis. The manuals accompanying both atlases are bound into this thesis and included as Appendices A, B, C and D.

Fig. 1 demonstrates the existing organisational structure of MOMRA within the institutional context of planning in KSA and indicates the author's area of personal responsibility for Projects Co- ordination within that network. Against this background this thesis records the events leading to the formulation of the *nitag omrani* policy and the subsequent co-ordination of the survey analysis and plan-making by the author and his Directorate.

Figure 0.1: The Existing Organisational Structure of MOMRA



Acknowledgements

I wish to acknowledge with gratitude the gracious commitment and the personal care and assistance provided, throughout the development and formal approval stages of the *Nitag Omrani* Programme, by his Excellency the former Minister of Municipal and Rural Affairs (MOMRA), Sheikh Ibrahim Al-Angari who is now the personal consultant of the Custodian of the Two Holy Mosques King Fahad Ibn Abdul Aziz.

Also, I wish to extend my sincere appreciation to His Excellency the Minister of Higher Education, Dr Khaled M. Al-Angari for following up the development and implementation of the *Nitag Omrani* during his term of office as Minister.

I am deeply indebted to His Excellency, the present Minister, Dr Mohammed Al-El Sheikh for his ceaseless efforts in the implementation of the *Nitag Omrani* Programme in the cities and towns of the Kingdom. More particularly, I am extremely grateful to His Excellency the Deputy Minister for Town Planning (DMTP), Dr Saleh Al-Hathoul, for his dedication and professional support at all times and particularly during the follow-up stages of the *Nitag Omrani* Programme.

With great pleasure and appreciation, I am indebted to my supervisor Dr Douglas Pocock, reader in geography at the University of Durham, and my field supervisor, Roy Gazzard, former director and honorary fellow of the Centre for Middle Eastern and Islamic Studies in the University of Durham, for their contributions, comments, encouragement and invaluable support throughout my research.

The directors and technical staff of the *amanas*, municipalities and regional directorates deserve my highest regard for their outstanding dedication at the implementation and follow-up stages of the *nitag omrani* programme.

To the experts and the staff of the Coordination Department, I wish to acknowledge their valuable contribution throughout the development and implementation of the Programme, and in the training of local staff. I am particularly grateful to all those who lent a hand in the editing, translation and typing of this research from its outset until its finalisation. I am also grateful to Dr Abdel Basit, A. Karim and Dr Hassan Coultury for their involvement as members of the technical staff and for their advice and assistance in carrying out this work.

Finally, I would like to acknowledge here my greatest debt to my parents for their encouragement, and my gratitude to my wife and children who provided the support I needed and shared the strains and joys of my study.

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Chapter 1

Environmental Aspects and Socio-economic Characteristics of the Kingdom of Saudi Arabia

Physical Background

The surface area of the Kingdom extends over 2,240,350 sq km and represents about 80% of the area of the Arabian Peninsula. The population of the Kingdom was 9.5m in 1985.¹ The climate is predominantly of a pseudo-continental desert character with long, hot and dry summers and short cold winters. This pattern does not however account for some mountainous areas which receive heavy bursts of rainfall in the winter and spring.

The Kingdom comprises several distinct physiographic regions (see Fig. 1.1). Half the area of the Kingdom consists of two principal depressions: the empty quarter basin in the south, the largest sandy desert belt in the world; the Nejd basin in the north, also containing a large area of sandy desert. On the eastern side of the western coastal plain, the incline from the Red Sea rises sharply towards the eastern interior elevations (Fig. 1.2).

The Arabian Peninsula consists of two main geological components, which differ in form and content. The Arabian Shield is characterised by a considerable variety of rock formations, especially in the parts neighbouring the principal elevated chains. Among the main forms seen are igneous, metamorphic and volcanic rock characterised by cluster formations relatively resistant to penetration. These features are regarded as important limitations to the development of agricultural and mineral resources in the Arabian Shield.

Nufud Desert/Empty Quarter



Asir



Easter Region



Arabian Shield



Najjd Plateau



Valleys



Jabal Zawaya



Low Lands



Geology of the Kingdom

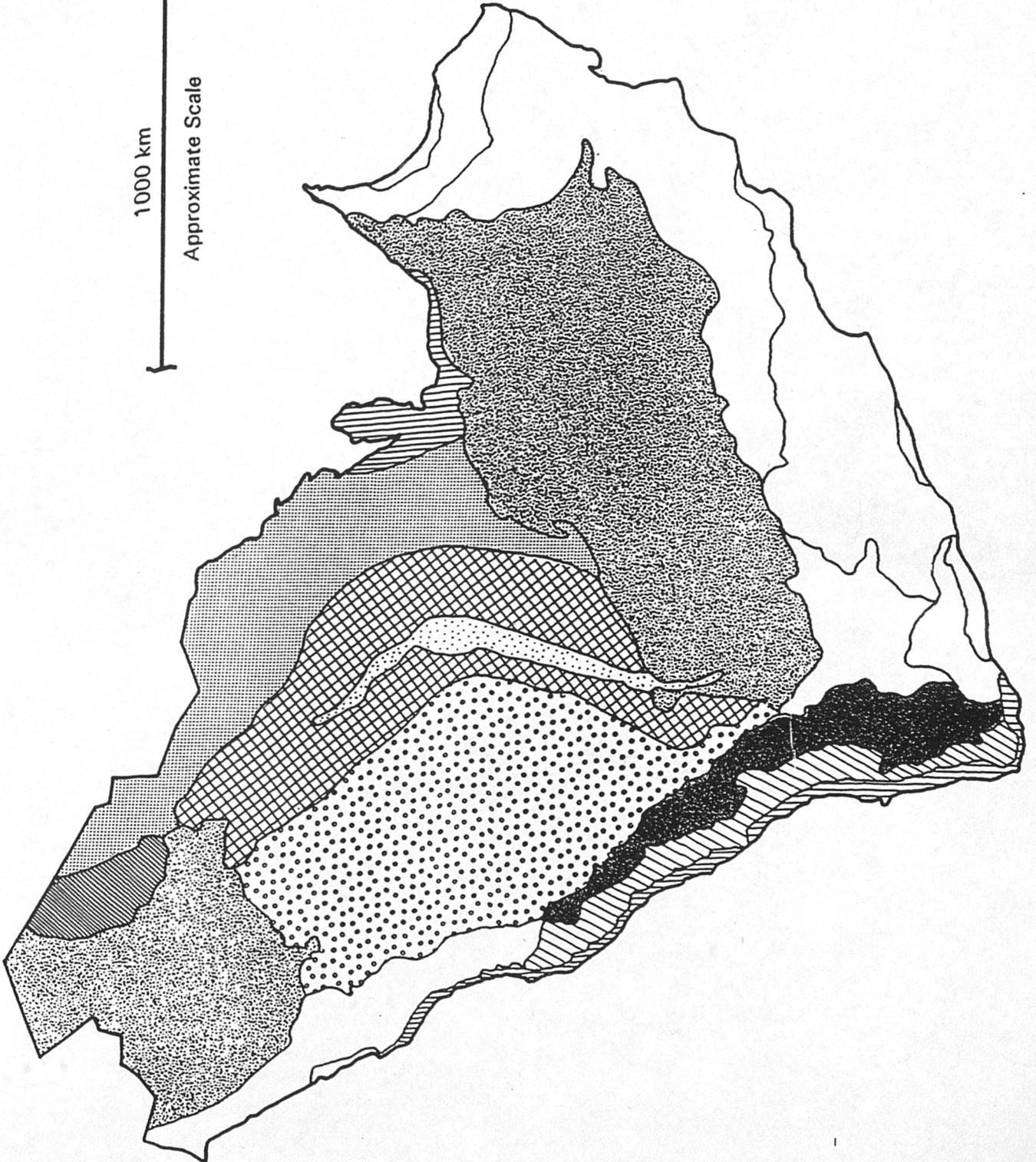
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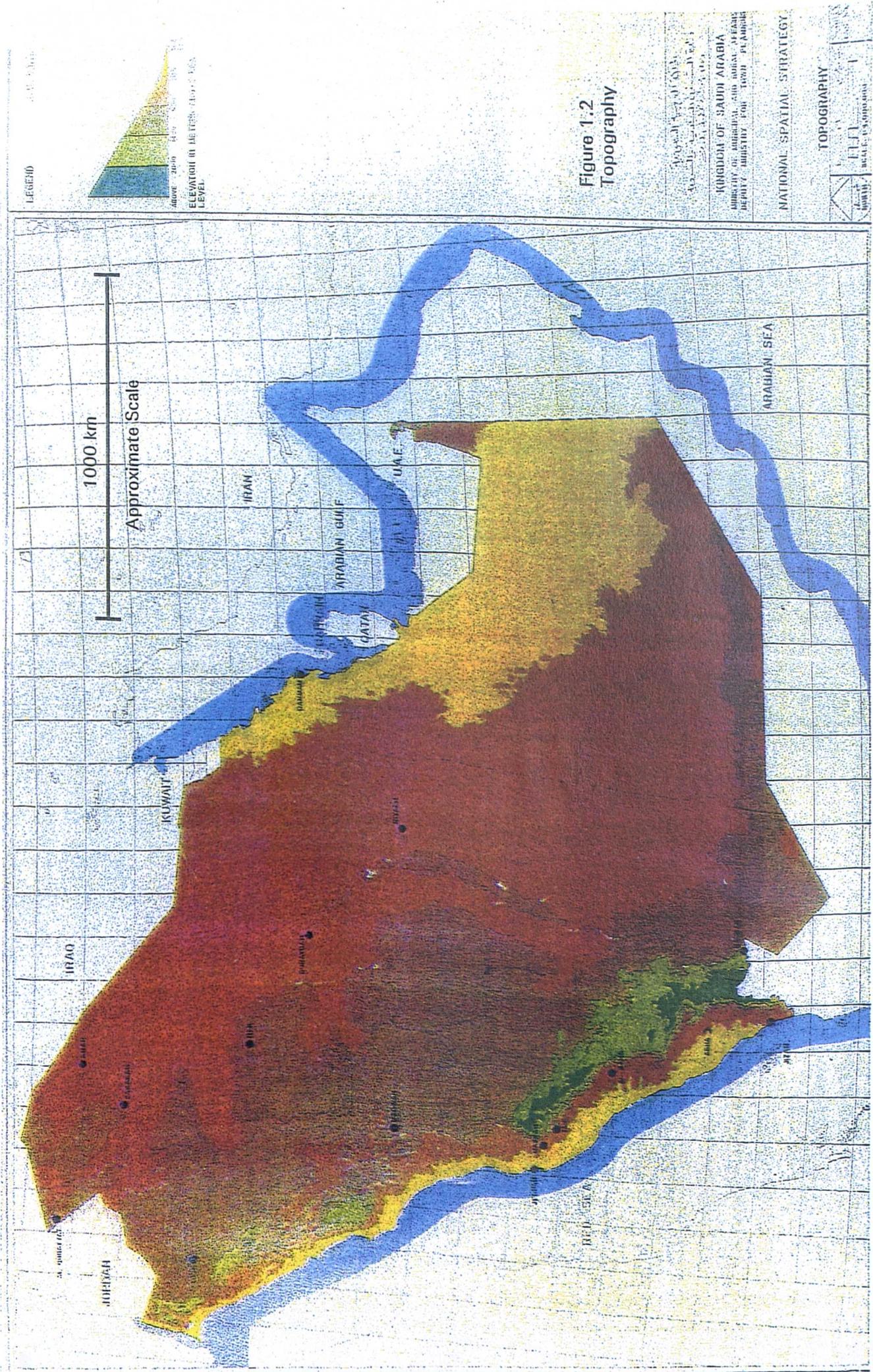
Figure 1.1
Physiographic
Regions



SCALE 1/4,000,000

1000 km
Approximate Scale





The Arabian rock shelf is relatively simple compared to that of the Arabian Shelf. It consists of many layers, especially limestone, sandstone and clay which were formed in the lower regions (the seas) as a result of steady conditions or stable changes. In the direction of the end of the rock shelf region it becomes a region devoted to the development of petroleum resources and agriculture.¹

When one turns to climate, average figures for temperature and rainfall in the KSA are somewhat misleading because there are wide variations from place to place and from year to year. That noted, most of the Kingdom consists of regions with a pseudo-continental desert climate characterised by hot, dry and relatively long summers. Winters are cold and short. The average temperature ranges from 15° in winter to 35° in summer. The seasonal spread over the course of a year ranges from lows below zero to a maxima of 50°C.²

While dryness is the dominant feature of the Kingdom's climate, the clearest variations are in rainfall. Although rainfall is rare, irregular, and impossible to predict, the average for most areas is 100mm or less, this low rainfall falling in winter and spring.

Climatic variations are most striking in the elevations of Asir and the south east of the country, where rainfall is exceptionally high: 300mm and more. In Taif it has ranged over the last 7 years from 80 to 220mm per year, which can be attributed to the height of the mountains and south westerly winds, such that the summers are relatively cool and rainfall plentiful.

Natural Resources

Mineral Resources

The KSA is the largest producer of crude oil, possessing about a fifth of the world's petroleum reserves.³ Likewise the KSA has enormous reserves of natural gas. The

LEGEND

METALLIC MINERALS

- 1. GOLD - SILVER
- 2. ZINC
- 3. COPPER
- 4. NICKEL
- 5. COBALT, MANGANESE AND URANIUM
- 6. IRON
- 7. ALUMINUM
- 8. TIN AND TUNGSTEN

NON-METALLIC MINERALS

- 1. DIATOMITE
- 2. PHOSPHATE
- 3. BERYLITE
- 4. FLUORITE
- 5. MAGNETITE
- 6. KYANITE
- 7. POTASH
- 8. SILICA SAND
- 9. COAL / LIGNITE

○ MAJOR DEPOSITS
○ MINOR DEPOSITS

SOURCE: GEOLOGICAL BUREAU, MINISTRY OF PLANNING, 1990.

المملكة العربية السعودية
الهيئة العامة للأبحاث الجيولوجية
الوزارة العامة للتخطيط

KINGDOM OF SAUDI ARABIA
Ministry of Geology and Mineral Affairs
Geology Authority for Total Planning

NATIONAL SPATIAL STRATEGY

LOCATION OF MINERAL RESOURCES

SCALE: 1:1,000,000

Figure 1.3: Significant Mineral Deposits

1000 km
Approximate Scale



1975 plan provided for the collection and processing of approximately 34 billion cubic metres of gas released with the oil extracted every month. Four centres for collection and processing of gas were brought into operation during the third 5-year plan. These centres are near to the oil fields, which lie exclusively in the eastern region.

Metallic minerals are found in igneous and metamorphic rocks in the western part of the Kingdom (Arabian Shield), stretching from the Gulf of Aqaba in the north to the Bab Al-Mandab Straits in the south.

There are organic deposits which may be exploited, including coal, as well as a large quantity of mineral ores including bauxite, but growth of this sector is still at an early stage.

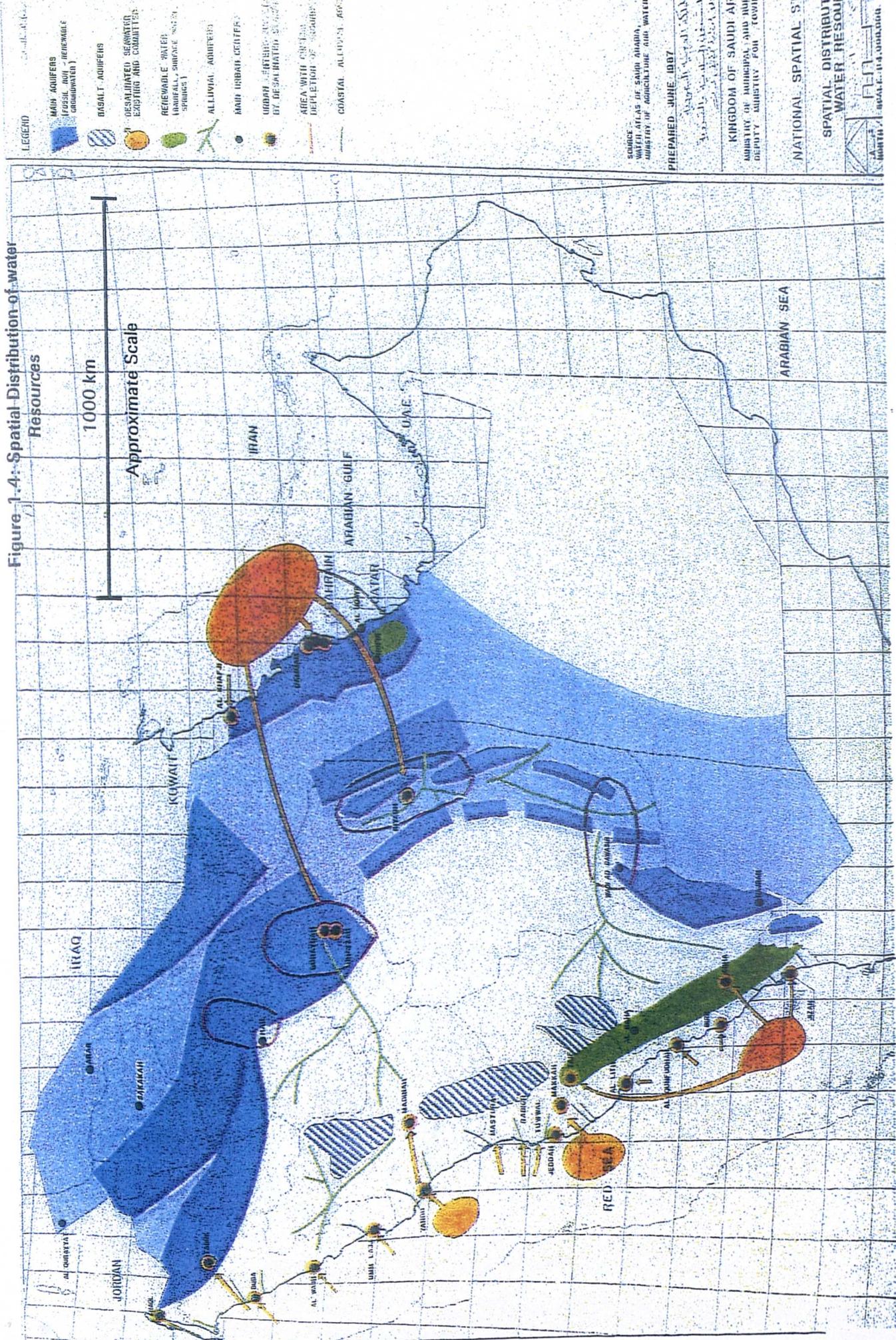
Priority for growth in the mining sector has been accorded to the non-mineral deposits like limestone and sandstone, as well as decorative stone for the construction industry. Despite the efforts made, the mining and quarrying sector accounts for less than 1% of the GDP of the Kingdom.

All the evidence points to the existence of large mineral deposits which will, in the event of successful exploration and plentiful investment, help to diversify the economic base and help substitute wide-ranging industrial activity for the oil industry on which the Kingdom currently depends for its GDP (Fig. 1.3).

Water Resources

Water is the basic factor determining the form and pattern of economic and social growth, and the distribution of irrigated settlement in the Kingdom. Underground water is the essential source, providing 84% of the total demand for water. There are four underground reservoirs of particular importance viz-a-viz their size and accessibility: Saq; Wajid; Tabuk; Wasia/Biyadh. They are located in the north, centre and east of the Kingdom. There are also three other reservoirs beyond the Arabian Shield (Fig. 1.4).

Figure 1.4: Spatial Distribution of water Resources



LEGEND

- MAIN AQUIFERS
- FOSSIL NON-RENEWABLE GROUNDWATER
- RENEWABLE WATER (SURFACE SPRINGS)
- DESALINATED SEAWATER (EXISTING AND COMING)
- MAJOR URBAN CENTERS
- COASTAL ALLUVIAL DEPOSITS

SOURCE: WATER ATLAS OF SAUDI ARABIA, MINISTRY OF AGRICULTURE AND WATER, 1988

PREPARED: JUNE 1987

Prepared by: *Abdul Wahid Al-Sayid*

Kingdom of Saudi Arabia
Ministry of Municipal and Urban Affairs
Deputy Ministry for Town Planning

NATIONAL SPATIAL STRATEGY
SPATIAL DISTRIBUTION OF WATER RESOURCES

Scale: 1:4,000,000

The remaining demand, 16%, is provided by surface water and desalinated water from the sea.⁴ Desalinated sea water has become an essential source of fresh water in the Kingdom and is now distributed through pipes from desalination plants on the Red Sea and Gulf coasts to interior points of consumption like Riyadh, Mecca and Taif.

The surface water in both the west and south of the country plays a vital role in the growth of those regions, where the seasonal rainfall is estimated to be about 9 million cubic metres per year. Appropriate use of dams and barrages has made possible the storage of this water.

The final source of water is recycled waste water (treated water). Although this source is still in its infancy, it could become a good source of pure water. It is absolutely essential that its use be ensured by greater efforts in this field, in order to underpin the Kingdom's efforts to achieve rapid growth (Tables 1.1 and 1.2).

Table 1.1
National Water Table (million m³ annually): Resources and Consumption

1990	1985	1980	Description (resources)
2100	1850	1140	Shallow Aquifers
		450	Desalinated Water
13,480	6380	1070	Non-Renewable Aquifers
110	100	-	Treated Sewage
16,230	8,600	2660	Total Resources
1990	1985	1980	Water Consumption
1650	1200	510	Municipal and Industrial
14,580	7400	1850	Irrigation/Agriculture
16,230	8,600	2360	Total Consumption

Source: 3rd 5 year national development plan.

Table 1.2
National Water Table (million m³ annually): Demand and Availability

1990	1985	1980	Description
			Water Demand
1650	1200	510	Municipal and Industry
14580	7400	1850	Irrigated Water
16230	8600	2360	Total Demand
2100	1850	1140	Ground Reservoirs and Shallow Water (renewable resources)
540	330	50	Desalinated Water
110	100	-	Reused Sewage
13480	6320	1170	Non-renewable Water (Aquifers)
16230	8600	2360	All Resources

Source: 3rd 5 year national development plan.

Economic Growth and Development in the Kingdom

Economic Development

Since 1974 there have been major economic and social changes, stemming essentially from the great achievements in transforming the components of the economic infrastructure. The most important of these were roads, electricity and an improvement in social services such as health care and education at all levels. Efforts in agriculture and industrial production were favoured with direct and active government participation, as well as a generous programme of assistance to private sector investment. The national economy depended for its progress and growth on the petroleum sector, which is considered the basic source of state revenue. However, since 1980 there has been a marked increase in national revenue from non-petroleum sectors which now provide in excess of 30%.

The tendency to diversify continued until the third 5-year Plan, 1980- 85. The Plan contained the important strategy of setting up an industrial base using petroleum and

gas. The result was the decision to found two industrial cities: Jubayl and Yanbu'. The former is in the eastern district and the latter in the west. The third 5-year Plan focused on productive sectors and activities in order to bring about diversification of the national economic infrastructure in the long term, and to reduce the State's dependence on oil. The Plan also continued to develop those necessary elements of the infrastructure which were not completed during the second 5-year Plan for economic and social development. The third Plan gave considerable importance to growth of human resources and urban and rural growth (Table 1.3).

Table 1.3
Government Expenditure

4th 5-year Plan		3rd 5-year Plan		2nd 5-year Plan	Sectors
%	Billion SR	%	Billion SR	%	
26.1	130.7	21.4	21.4	20.1	Economic Resources Dev.
27.1	130.3	22.1	124.3	10.9	Human Resources Dev.
27.9	89.7	12.4	69.6	4.9	Health and Community Facilities
10.4	76.9	24.7	139.1	25.3	Transportation
13.5	67.4	19.4	108.9	49.6	Housing and Municipalities
	495.0		562.3		Total Gov. Expenditure

Source: 3rd 5 year plan data. Table 3.1, p. 88. See Table 5.2 of 3rd 5 year plan.

The specific goals for diversification of the economic infrastructure are among the most important aims of the fourth 5-year Plan for economic and social development for the period 1985 to '90. Although the Plan's strategy was similar to that of its predecessor, it had to cope with a fall in revenue in view of the fall in oil prices on the world market. Nevertheless, the Plan was accompanied by rather more favourable circumstances in terms of the availability of infrastructural facilities. That led to the success of several national policies, including the reform of subsidies and loans

policies. Housing in particular was affected by a 22.6% decrease in the number of foreign workers and an increase in productive efficiency. The fourth Plan concentrated on the use of advanced technology, and the review of the system of education and training, the development of participation by the private sector in production and reform of government services.

When attention is turned to the manufacturing sector, the government has undertaken a policy to encourage favourable conditions for industrial growth. This includes not only increasing revenue but also that of transforming the structure of economic activity through the process of urbanisation and diversification of the local economic base. The two industrial cities - Jubayl and Yanbu' - are excellent examples of the government's efforts to set up a heavy industrial base. The industry which grew, as a result of the activity of SABIC, was mainly in the field of hydrocarbons, and to a lesser extent that of heavy minerals. These capital-intensive industries are distinguished by their high energy consumption, readily satisfied by the raw materials derived from the gas and oil industry. The ownership, administration and financial structure of these projects take the form of multi-national companies, whereby the Saudi investor is in partnership with international companies and capital. The vast majority of these projects came to settle in Jubayl and Yanbu'.

One of the world's largest petroleum refining plants is found in the eastern region at the port of Ras Tanura. Likewise there is a group of other well-known refineries including those in Jeddah and Riyadh, as well as a large number of factories still in the planning and preparatory stages. This level of (refining) industry has already been integrated into the world market for such goods.

The development of these activities obliged the government to establish sea ports. Jeddah and Dammam are still the main maritime gateways for merchandise, in addition

to Jubayl and Yanbu'. Industrial growth led to the expansion of new towns on both coasts like Diba, Al-Wajh, Amlaj, Jizan and Al-Khobar.

The second aim of non-petroleum industrial growth is orientated towards the satisfaction of the local market, including industries approved by the Ministry of Industry and Electricity, and those whose establishment is approved and licensed by the municipalities. These are labour-intensive industries like workshops and small-scale productive activities or small scale productive establishments. The central region contains 41% of the industrial activities, while 37% and 20% are located in the western and eastern regions respectively.⁵

Promotion of the agricultural sector became intimately linked with agricultural and financial policies pursued by the Kingdom, in particular the policy of financial incentives, and the policy guaranteeing crop prices. Basic conditions on which agricultural growth is predicated, like the natural environment and availability of water, took on secondary importance, even though they may be regarded as the mainstays of this important productive activity. The importance of the agricultural sector to the growth of the national Saudi economy must under no circumstances be overlooked, in light of the growing need for production of foodstuffs and the raising of income levels in the agricultural areas. In addition there are the aims of reducing dependency on imported agricultural produce and participating in the creation of more job opportunities in agriculture. It is also worth mentioning industrial activity which depends on agricultural raw materials: this will give greater importance to the promotion of agricultural growth.

Wheat, fodder (especially Hejazi clover), barley, dates, tomatoes and water melons are the principal crops, representing more than 80% of the total farmed land area in the Kingdom. Wheat alone represented 51-56% of the crop-yielding area in 1983-84. Quoting the latest estimates for wheat production, it becomes clear that in 1986 wheat

production accounted for 55-60% of the total agricultural output. The importance of wheat began to increase in 1981-82. Since then the area devoted to the crop has roughly doubled every year. Barley production by contrast declined. From 1975-80 an area of 3-5 million *dunums* (a Saudi *dunum* is approximately 1,000m²) was devoted to barley. This area fell by half every year for the subsequent four years. The fodder crop followed a similar pattern to that of wheat. Only limited progress was made in the promotion of the other crops (Figure 1.5).

Since the economic upturn, considerable attention has been paid to commercial activity and industry based on tourism and leisure areas. In the commercial sector, Jeddah and Dammam are known internationally as major commercial centres, while Yanbu' and Jubayl were established with an eye to domestic wholesale activity (warehousing) in addition to their fundamentally industrial character. Mecca and Medina are the two principal religious centres in the Kingdom. Seasonal commercial activity increases there, especially during Greater and Lesser Pilgrimages (Hajj and 'Umrah). It is also worth pointing out that activity in the remaining local commercial centres is limited in its impact to the administrative borders of the "emirates" (administrative regions), and a few sub-emirates. Activity in the principal emirates is greater than that in the smaller emirates by virtue of the size of their populations, market, production and income.

It is expected that the commercial sector will expand by a yearly average of 3% during the current 5-year Plan. By the end of the 5 years its share of GDP is expected to reach 11.4%.

There are in the Kingdom three types of outstanding tourism attraction which may be categorised as follows: leisure areas; cultural areas; religious areas. Areas of leisure tourism activities include the mountainous area in the region of Taif, Al-Baha and Asir. The areas considered most attractive for fishing, watersports, relaxation and

recreation are small coastal towns of Haql and Jeddah in the west and Nisf al-Qamar and 'Aziziyya on the crescent coast in the east. Cultural tourism activity is undertaken at historical and archaeological sites: the cities of Madain Salih (in the north west), Al-Baha (in the south), Najran (in the south west) and Tarut (in the east). Mecca and Medina are the main centres of religious attraction for Muslims worldwide. They are in addition important trading centres during the pilgrimage season.

The economic and social programme set up by the Saudi government requires a large and steady increase in manpower. As a result, the Saudi economy forced educational establishments to expand in order to furnish the labour market with qualified individuals. One must also note the migration of overseas labour as a distinct feature in the Gulf countries with a low population density and plenty of capital and opportunities for economic and social growth.

Since 1985, the urban labour force has increased from 1.75m to 4.2m, or 180% of the total growth in the urban labour force.⁶ All economic sectors with the exception of agriculture saw a high average yearly growth in labour. The most urbanised emirates, Riyadh, Sharqiyya, Mecca, and their principal towns, saw the greatest increase in the labour force, especially in manufacturing industry. The proportion of non-Saudis in government and municipal services rose slightly, from 27% in 1974 to 29% in 1983. This increase may be considered relatively small by comparison with the substantial increases in the number of non-Saudis in productive enterprises during the same period.⁸

Population and Settlement

Population Distribution

According to the population census, the number of inhabitants of the Kingdom increased markedly, from 6.3m in 1974, to nearly 9.5m in 1985. An average

population growth of 3.8% per year puts Saudi Arabia firmly in the category of nations with rapidly growing populations. The following factors contributed to that high average growth: a tangible decrease in the death rates from 19 per thousand in 1975 to 12 per thousand in 1983; a steady birth rate since 1975; a great improvement in standards of living and income levels; health facilities and their part in raising the standard of health and thus boosting population. Moreover, favourable economic factors and the surge of economic growth led to a large influx of non-Saudi workers. Altogether, these factors pushed the population to nearly 17m by 1993, according to preliminary census figures.

Table 1.4 shows the distribution of the population in the five regions for the years 1974, 1984 and 1992. From table 1.5, it may be clearly seen that the population distribution among the five regions did not change much between those years, and that the population of the nation as a whole grew, as did that of each of the regions, by 40-43%. One may infer from this that movement of population in the Kingdom takes place within the regions and not between them.

Table 1.4
Population by Region

Population (in thousands)			Region
1992	1984	1974	
2331.4	1078	770	Eastern Region
4690.9	3482	2459	Western Region
3997.5	2260	1589	Central Region
1045.8	951	679	Northern Region
999.3	1741	1232	Southern Region

Source: National Spatial Strategy

Table 1.5
Distribution of the Kingdom's Population by Regions 1974, 1985

%	Change 1974/85 (,000)	%	Population 1985 (,000)	%	Population 1974 (0,000)	Region
41.6	1023	36.6	3482	36.0	2459	Western
40.9	650	23.5	2239	23.6	1589	Central
41.3	509	18.3	1741	18.3	1232	Southern
40.0	308	11.3	1078	11.4	770	Eastern
43.0	192	10.3	971	10.2	779	Northern
41.3	2682	100.0	9411	100.0	6829	Total Kingdom

Source: Ministry of Municipal and Rural Affairs, Deputy of City Planning, *The National Spatial Growth*, Riyadh, 1990, p.71. (1) 1394 (1974) National Census; (2) Central Dept. of Statistics.

N.B. Does not include 210,000 inhabitants of nomads; and 73,000 living abroad at census time.

Settlement Structure

The number of centres of settlement in the Kingdom is estimated at about 10,500⁷, of various sizes, including large cities, medium-sized cities, as well as villages and other settlements called *hijar*. In general, as a direct result of the harsh environment and scarcity of water, the great majority of these settlements are small, many with a population less than 380. The five emirates - Mecca, Al-Baha, Asir, Jizan, and Najran - contain 8,000 settlements, i.e. 76.2% of the total. By contrast there is a small number of large cities and urban centres like Mecca, Taif, Jeddah, Riyadh, and Dammam with populations of more than 250,000. A few of these urban centres tend to constitute completely integrated urban areas.

In 1985, it was estimated that there were about 135 settlements of more than 2,500 people each. This figure is not too far removed from that of 1974 (87 settlements of more than 2,500 people each)⁸ (Tables 1.6 and 1.7). By the end of 1987 there were 14 centres with a population of more than 50,000 including Mecca, Jeddah, Riyadh, Dammam, Taif and Medina. The number of rural settlements counted totalled 10,365

villages and *hujar* (agricultural settlements) distributed among the emirates. These rural settlements are of different levels and sizes (Table 1.8) (see Figs. 1.6 and 1.7).

Table 1.6
Population of Major Urban Centers, by Size, 1974, 1985

Population (,000)		No. of Settlements		Settlement Size (inhabitants)
1985	1974	1974	1985	
401	261	82	53	2500-10,000
405	222	25	15	10,000-25,000
504	344	14	10	25,000-50,000
890	771	9	6	50,000-250,000
522	366	2	1	250,000-500,000
2421	1228	3	2	500,000+
5143	3192	135	87	Total

Source: 1974 National Census, Central Dept. of Statistics; and estimations by MOMRA.

Table 1.7
No. of Villages and Hijars, by Emirates, 1983

Villages and Hijars		Emirate (Region)
%	No.	
28.50	2963	Asir
26.50	2702	Makka Al-Mukarramah
11.80	1236	Al-Baha
9.00	934	Jizan
6.60	710	Riyadh
4.40	468	Qasim
4.20	450	Hayel
3.70	384	Madina Munawarrah
1.80	191	Eastern
1.80	166	Najran
0.80	79	Tabuk
0.40	36	Northern Frontiers
0.30	24	Al-Jouf
0.20	22	Qurrayat
100	10365	Total

Source: *Socio-economic Survey of Villages and Hijars in the Kingdom*, Sogreah Report, 1983.

Figure 1.6: Distribution of Urban Settlements by Population Size

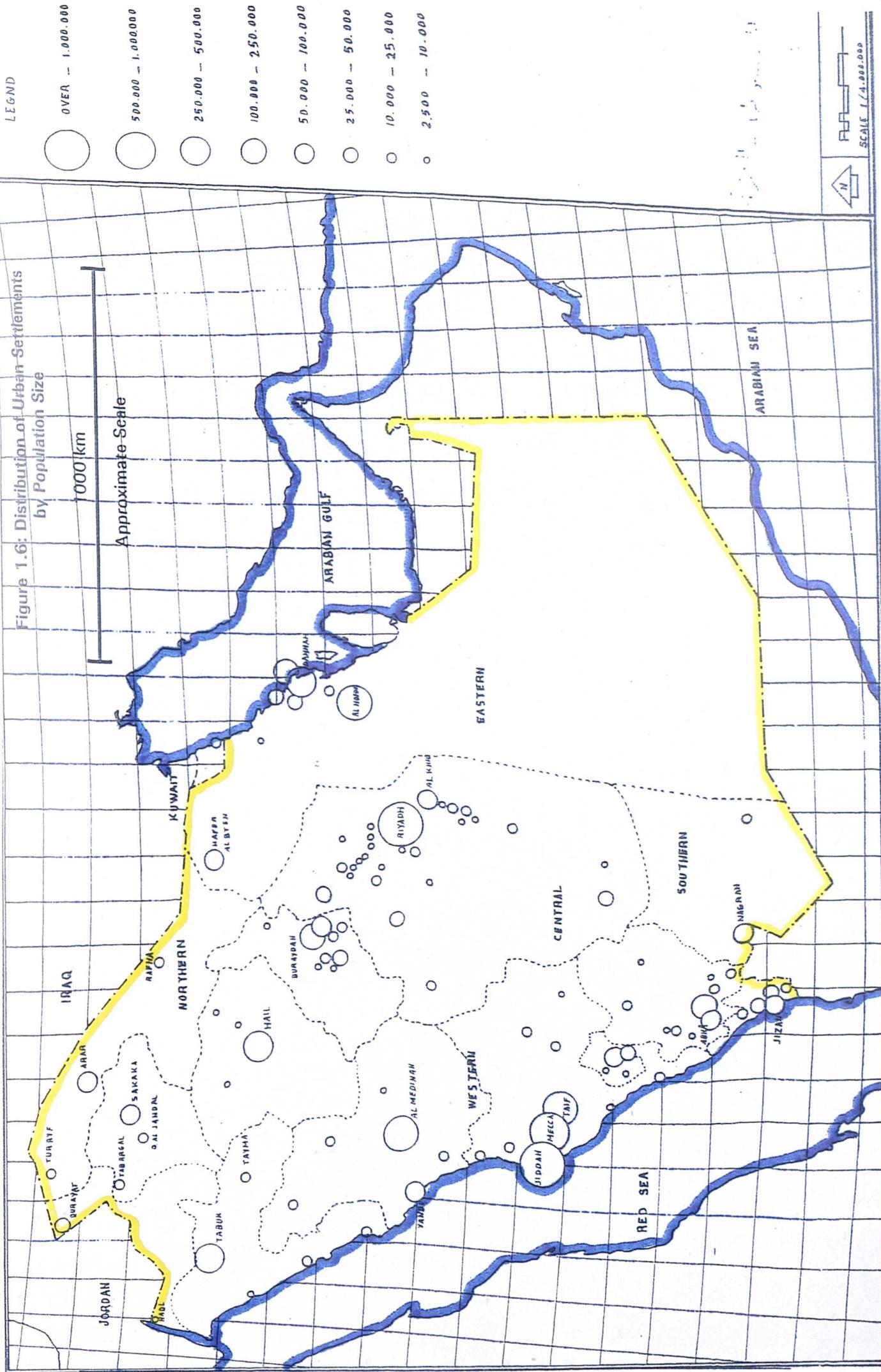
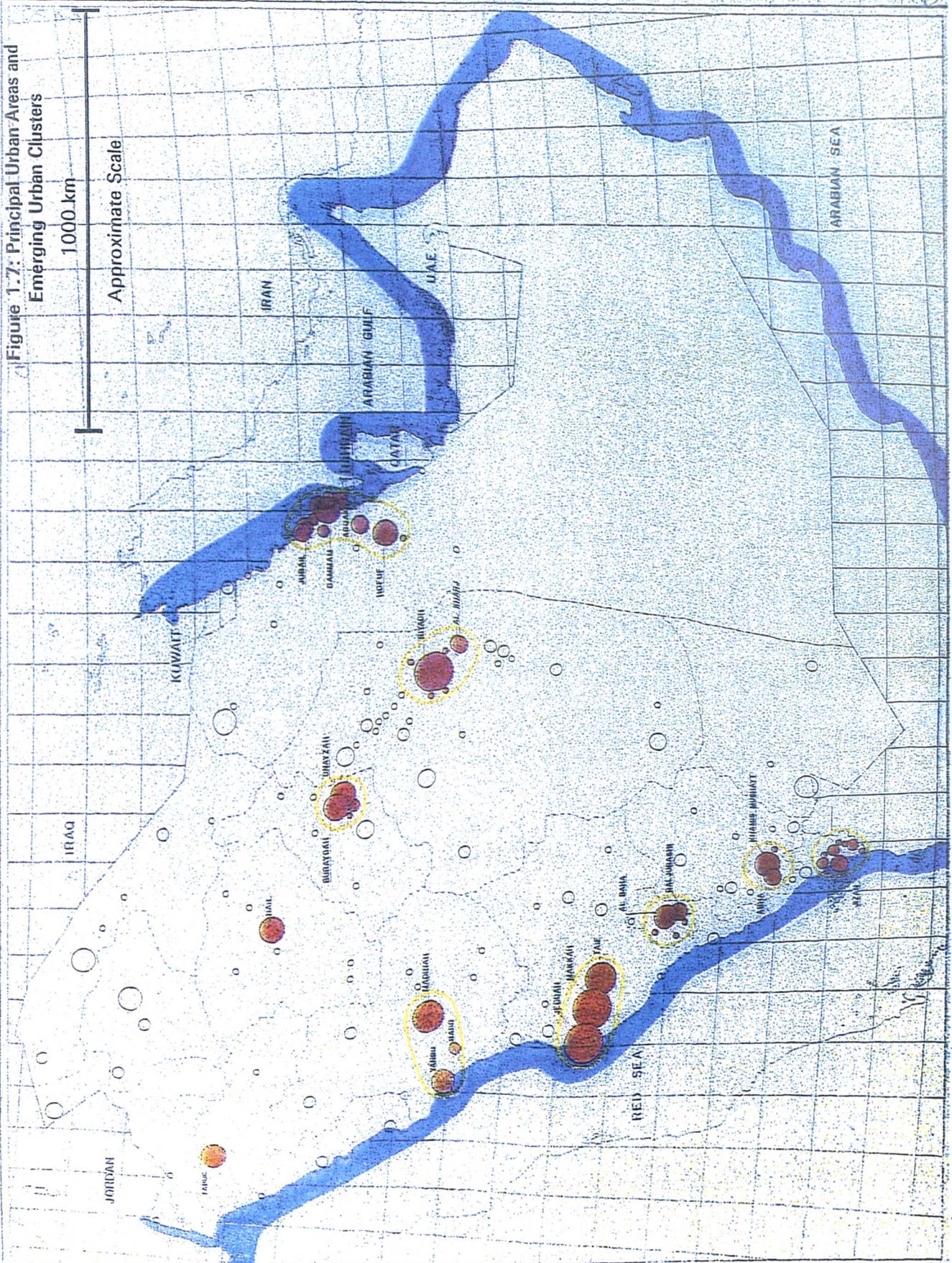


Figure 1.7: Principal Urban Areas and Emerging Urban Clusters



LEGEND

- MAIN DEVELOPING URBAN AREAS
- OTHER URBAN CENTERS
- EMERGING URBAN CLUSTERS

NOTE 1-
 MAIN DEVELOPING URBAN AREAS ARE
 DEFINED AS CONCENTRATIONS OF
 URBAN POPULATION IN EXCESS OF
 90,000

Kingdom of Saudi Arabia
 Ministry of Municipal and Rural Affairs
 Deputy Ministry for Urban Planning

NATIONAL SPATIAL STRATEGY

MAIN DEVELOPING URBAN AREAS

Table 1.8
Settlements by size and regional distribution

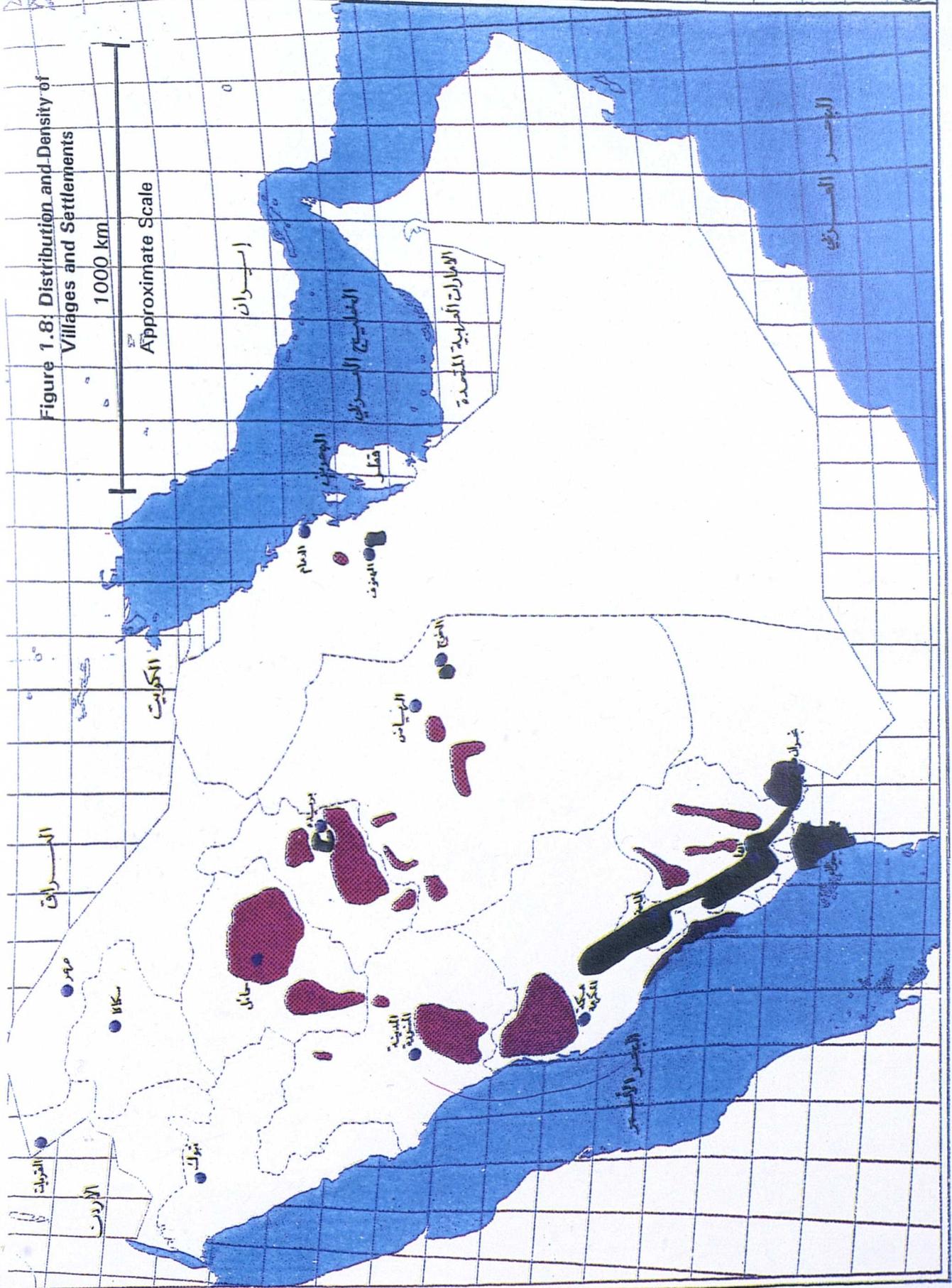
Urban Centres						Emirates
Over 500,000 inhabitants		250-500 (in thousands)		50- 250 (in thousands)		
1993	1985	1993	1985	1993	1985	
2	2	1	1	1	-	Holy Mecca
1	1	-	-	1	-	Riyadh
1	-	-	1	1	-	Holy Medinah
-	-	1	-	10	3	Eastern Region
-	-	-	-	3	2	Qassim
-	-	1	-	-	1	Tabuk
-	-	-	-	1	1	Hail
-	-	1	-	1	1	Assir
-	-	-	-	1	1	Najran
4	3	4	2	19	9	Total

Source: National Spatial Strategy.

From the above the following becomes evident:

1. About three-quarters of the total number of villages and *hijar* are concentrated in the south western emirates, i.e. Asir, Mecca, Al- Baha, Jizan. These contain about two-thirds of the rural population, most of them in very small settlements
2. The emirates of Riyadh, Al-Qasim, Ha'il and Medina contain one fifth of the rural settlements (19.3%).
3. The fourth northern emirates - Tobuk, the northern frontier, Al- Jauf and Al-Qaryat - contain only 1.7% of the total number of villages and *hijar*, despite their vast expanse.
4. The emirates of Sharqiyya and Najran contain 3.4% of the total number of villages and *hijar* (Fig. 1.8).

Figure 1.8: Distribution and Density of Villages and Settlements



- مناطق ذات كثافة عالية للتجمعات السكانية
High
- مناطق ذات كثافة متوسطة للتجمعات السكانية
Medium
- مناطق ذات كثافة منخفضة للتجمعات السكانية
Low

مصدر البيانات :
وزارة الشؤون البلدية والتخطيط
مؤسسة الرئاسة للتخطيط العمراني

المملكة العربية السعودية
وزارة الشؤون البلدية والتخطيط
مؤسسة الرئاسة للتخطيط العمراني
KINGDOM OF SAUDI ARABIA
MINISTRY OF MUNICIPAL AND RURAL PLANNING
DEPUTY MINISTRY FOR TOWN PLANNING
الترابطة المكانية الوطنية
NATIONAL SPATIAL STRATEGY
المركز القومي للتخطيط العمراني
مؤسسة الرئاسة للتخطيط العمراني

Social Services and Infrastructure

Housing

During the past twenty years of government planning, efforts have been made to put in place social services and infrastructure, by contrast with productive sectors. That becomes clear when making a direct comparison between allocations to social services and infrastructure and certain productive sectors. For example, government expenditure on the industrial sector up to the end of the third 5-year Plan reached 75.19 billion Saudi riyals, whereas expenditure on the townships in the same period alone reached 167.2 billion. This was in addition to expenditure on other sectors with separate budgets, like housing, health and education.

The low level of public investment in the productive sector can be attributed to the Saudi government's philosophy of growth, whereby such investment is delegated to the private sector. The private sector is energetic and the government serves simply as its regulatory mechanism. The advantages are abundantly evident of the government's correct choice - favouring large-scale investment in public services and infrastructure over investment in production. As a result the government has made great strides in those sectors. The objectives for growth in the social services and infrastructure may be summarised as follows: 1) the raising of living standards by providing the necessary means of welfare for Saudi people; 2) the creation of a productive and educated workforce; 3) the raising of the cultural level.

Appropriate housing is considered every citizen's basic need and a basic yardstick of living standards. The direct advantage to society becomes swiftly apparent in view of both the housing sector's human dimension and its impact on national economic growth. The housing sector has a considerable impact on the growth of several

productive activities including consumer goods, building materials, furniture etc. which in turn promote most of the economic activities in the market.

The government took an active role in developing the housing sector by investing directly and making soft loans available through the Real Estate Development Fund to the private sector to build houses. Responsibility for the development of public housing lies with the Ministry of Housing, which had built 20,026 housing units by the end of the fourth 5-year plan in 1990. Many other government establishments and organisations also actively participated in the development of the housing sector, by providing housing for their employees.

The results of planning and growth of the housing sector, and the continuity of government intervention, were as follows: 1) a plentiful reserve of housing in the Kingdom -- to the end of 1990 there was an abundant available supply in both public and private sectors, particularly in urban centres; 2) the realisation of a marked drop in real estate and rental prices; 3) stabilisation of construction costs.

Health

A Ministry of Health was set up in 1960. The Ministry was made solely responsible for setting up a programme of health care in the country. The ministry's policy embodied the following goals: to offer primary health care to all citizens; to promote the growth of a local workforce in the health sector; to encourage and broaden private sector participation in health care; to offer and put in place specialised health services.

Strenuous efforts to achieve this, and the supply of the necessary resources to develop health care facilities, resulted in a doubling of the number of health centres from 721 in 1976 to 1,438 in 1987.⁹ During the same period the number of doctors rose from 2,696 to 11,326, the number of graduates from health establishments rose from 227 to 649. There were 2.2 hospital beds per thousand people, and 615 people per doctor.

These were important achievements and the statistics compare well with those for developed countries.

With such great efforts made in this lively and important sector, the main problems came to be the lack of specialised Saudi personnel, especially in rural areas, and to an extent the lack of specialist health services in non-urban areas.

Education

The modern educational system began in 1924 with the setting up of the Educational Authority. The first secondary school in the Kingdom was set up in 1925, but it was not until the end of 1934 that the first Saudi primary education programme was in place. The first step towards adding higher education to the Saudi infrastructure had been taken in 1940 with the setting up of a College of Shari'a (Islamic Law) in Mecca.

A Ministry of Education was first set up in 1953. Education then took an essential step forward and acquired powerful momentum. The fruits of the Ministry's efforts are in the progress of the past twenty years. The amount of money spent on the education sector rose from 596 million riyals in 1969 to 23.6 billion in 1985.

The growth of education under the Ministry also came to encompass the establishment of the General Superintendency for the Education of Girls, set up in 1960; a Ministry for Higher Education was set up in 1975; then the General Superintendency for Technical Education and Vocational Training. The importance assigned to education in the KSA may be appreciated by considering that the King himself is the chairman of the higher Council for Education Policy, which was set up in 1965.

Transportation

The transportation sector includes the four major means of transport: road, rail, sea and air. In a country like Saudi Arabia, with its enormous distances, its distinctive

geography, and its scattered pattern of settlement, economic centres and natural resources, transport services play a vital role in integrating these diverse elements. The Kingdom has built an effective transport system as a result of the enormous investments made under the 5-year Plans (see Fig. 1.9).

The history of the road network in the Kingdom goes back to the year 1935 when the Department of Works and Mines was set up, later to become the Ministry of Transport. Since that time, the Ministry took on an important and active role in developing the international and inter-urban networks. According to the latest available statistics, up to 1989 the total length of asphalt road was 34,300 km, with 66,000 km of agricultural road¹⁰ (see Fig. 1.10).

The building of the first railway line, 571 km between Dammam and Riyadh, dates only from 1951. In 1985, a new twin track was completed between the two cities. The Public Railway Authority is responsible for passenger and freight transport. It is undertaking studies to determine the benefits of expanding the railway system to connect the industrial district of Jubayl to Riyadh.

The Saudi Ports Authority is responsible for the running and upkeep of the sea ports. The five Saudi ports are at Jeddah, Dammam, Jubayl, Yanbu' and Jizan. There are also several small ports on the Red Sea and the Gulf which serve the fishing industry and coastal transport. The ports at the new industrial centres of Jubayl and Yanbu' generally serve and support their local industry, whereas those of Jeddah and Dammam are first-rank industrial ports. The total quantity of goods to pass through these ports in 1987 was estimated at 64 million metric tonnes. The ports sector in general expanded with the establishment in 1970 of the National Maritime Transport Co.

An air transport department was first set up in 1939, operating with four aircraft. Since these humble beginnings, the Kingdom has begun to develop a fleet of aircraft,

LEGEND

- PLANS OF MAIN CARBAMENTS
- FREIGHT OR MAIN CARBAMENTS UNDER CONSTRUCTION
- EXISTING MAIN ROADS DESIGNATED BY DEPARTMENT OF TRANSPORT
- MAIN CARBAMENTS DESIGNED OR UNDER DESIGN
- ROADS DESIGNED OR UNDER DESIGN
- APPROXIMATED MAIN HIGHWAYS
- APPROXIMATED FEEDER OR SECONDARY ROAD
- MAIN ROAD UNDER CONSTRUCTION
- FEEDER OR SECONDARY ROAD UNDER CONSTRUCTION
- INTERNATIONAL AIRPORTS
- RAILWAYS
- AIRPORTS
- PORTS

SOURCE - MINISTRY OF COMMUNICATIONS, R.O.S.

الهيئة العامة للإستشارات والتخطيط
 KINGDOM OF SAUDI ARABIA
 MINISTRY OF MUNICIPAL AND RURAL AFFAIRS
 DEPUTY MINISTER FOR TOWN PLANNING

NATIONAL SPATIAL STRATEGY
 KINGDOM OF SAUDI ARABIA
 ROAD MAP 1402H (1988)
 SCALE: 1:5,000,000

Figure 1.9: Road, Rail and Port Facilities

1000 km
 Approximate Scale

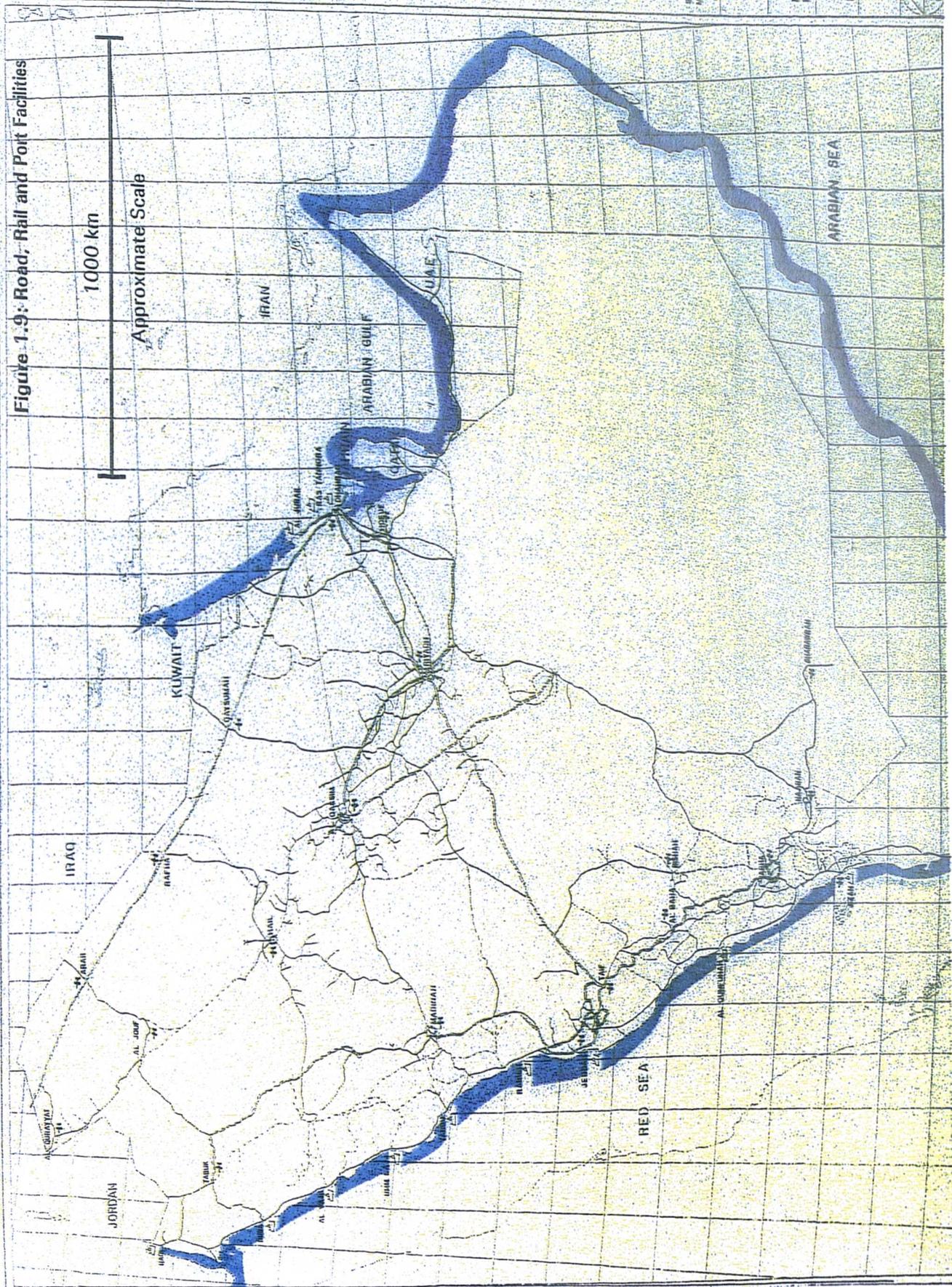
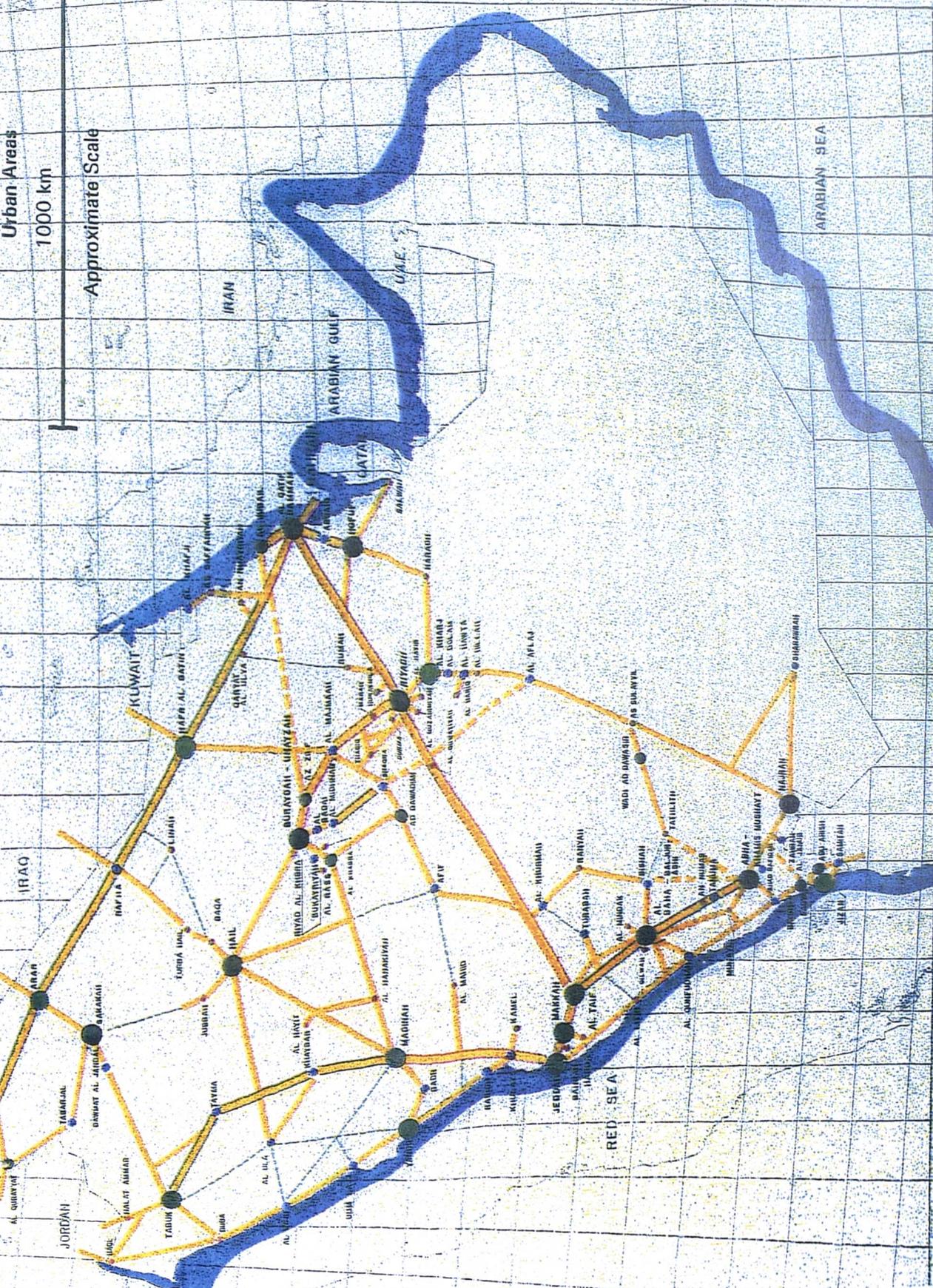


Figure 1.10: Connectivity Between Principal Urban Areas



LEGEND

CITY SIZE

- MORE THAN 50,000
- 25,000 - 50,000
- 10,000 - 25,000
- 2,500 - 10,000

CONNECTIVITY BETWEEN CITIES ABOVE 10,000 PERSONS

- FREIGHTWAY OR DUAL CARRIAGEWAY
- ASPHALTED ROAD HIGHWAY OR ASPHALTED SECONDARY OR FEEDER ROAD
- EXISTING MAIN ROAD FEEDING TO THE DUAL CARRIAGEWAY
- ASPHALTED MAIN HIGHWAY OR ASPHALTED SECONDARY OR FEEDER ROAD UNDER CONSTRUCTION
- FREIGHTWAY OR DUAL CARRIAGEWAY UNDER CONSTRUCTION
- ROAD DESIGNED OR UNDER DESIGN

SOURCE: Ministry of Communications, 1986

المملكة العربية السعودية
 المملكة العربية السعودية
 المملكة العربية السعودية

KINGDOM OF SAUDI ARABIA
 MINISTRY OF MUNICIPAL AND URBAN AFFAIRS
 DEPUTY MINISTRY FOR URBAN PLANNING

NATIONAL SPATIAL STRATEGY
 KINGDOM OF SAUDI ARABIA
 CONNECTIVITY MAP 1405 / 1406

1986

which consists of 110 modern passenger aircraft. There are 23 international and domestic airports, which in 1987 handled 13 million passengers. It may be said that the Kingdom has completed the economic infrastructure for air transport.

The current 5-year Plan set out transport policy goals for the years 1990-95, to be underpinned by balance and coordination between the government organs responsible for the various transport sectors, in order to offer good service and create a climate of market-oriented and modern service in all transport sectors. The fundamental features of that climate can be summarised as follows¹⁷: the creation of competition between the different modes of transport and within each mode; review of the structure of provision, which will influence competition between the various modes of transport; decentralisation of administration in the running and upkeep of the various transport facilities; encouragement of the private sector to increase its share in transport by simplifying legal, contractual and institutional procedures.

Communications

The Kingdom has taken great strides in the field of communications since the establishment of wireless telegraph stations in Mecca, Taif, Jeddah and Riyadh in the era of King Abd-al-Aziz. In 1974 the Ministry of Post, Telegraphs and Telephones (MOPTT) was set up to oversee the setting up of a modern communications service.

Postal centres were set up in the larger towns and they were equipped with the most modern machinery, systems and skilled labour. The Kingdom is divided into several regions (postal districts) and the service covers 5,681 towns and villages.¹¹ The amount of domestic and international mail handled reached 628 billion letters in 1988.

The telephone is a vital tool and means of communication. The programmes for massive expansion of the network began in 1987. It included the setting up of exchanges with equipment such as satellite and short-wave installations and coaxial

cable facilities. The exchanges' capacity grew from 177,000 lines in 1977 to 1.4 million in 1988. There has been a rapid increase in the numbers of subscribers to the mobile telephone service between Jeddah and Riyadh and the eastern areas. There were 40,000 "lines" in 1990.

MOPTT set out a series of policies to be carried out during the 5-year Plan, including the following: the expansion of postal, telegraph and telephone services; the intensive application of modern technology to make digital technology available to all the distribution and transport services, as well as exchange equipment; improvement of the scope of service by reforming both the postal and telephone organisations according to commercial management practices; reform of the communications system by allowing the private sector a greater share in communications activities, with special regard to some in particular, under the supervision of MOPTT.

Water

Many people believe that Saudi Arabia is a country with very little water. The reality by contrast is that the Kingdom enjoys plentiful supplies of underground fresh water. Some modern studies undertaken by the Ministry of Agriculture and Water show the presence of deep underground water reservoirs which could remain at present levels of consumption for decades and possibly centuries. But insofar as these sources are exhausted, the scarcity of water has become a constraint on the nation's agriculture and perhaps will remain so in future. But as regards surface water, the Kingdom is the largest country in the world without rivers, and the average yearly rainfall does not exceed 100mm although the south western parts can receive an average of 500mm.

The government has played a major and decisive role in the planning, allocation and administration of sources of water in the Kingdom, through the offices of the Ministry of Agriculture and Water, the Ministry of Urban and Rural Affairs, the Organisation

for Treatment of Sea Water, the Royal Institute for the Development of Yanbu and Jubayl, and Aramco. The government coordinates with these organisations in the attempt to put in place a national policy for the administration of water. The Ministry of Agriculture and Water took the initiative by assuming responsibility for putting in place a national policy for water. This was a task first undertaken in 1983.

The basic principles which will underlie the future development of water resources are: 1) the putting in place of a sound, multi-stage programme; 2) the strict limitation of agricultural water consumption; 3) reevaluation of the system for organising and financing the digging of wells, and the purchase of pumps; 4) undertaking hydrological studies to identify the principal and secondary deep underground sources.

Electricity

The electricity sector is an essential factor in the kingdom's planning strategy. It has therefore enjoyed the concern and ample support of the government through the establishment of a Ministry of Industry and Electricity and the organisations answerable to it, in particular the General Electricity Bureau. The functions, tasks and administration pertaining to the electricity service were delegated to private companies offered soft loans by the government ministries and organisations (the Saudi Fund for Industrial Development).

There are four companies operating under the United Saudi Electricity Company and six other small companies in the central region. All these companies benefited greatly from financial assistance from the aforementioned fund of 28 billion riyals from 1973 to 1987.

As a result of continual growth and support of the electricity sector, the electricity service increased to cover 92% of the population by the end of the fourth 5-year Plan (1985-90). As a result, the sufficiency of operation and supply were clearly evident.

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Chapter 2

The Evolution of the Urban and Regional Planning Process in Saudi Arabia

Introduction

The Kingdom's modern economic history began immediately after the unification of the Arabian peninsula under the flag of King Abdul Aziz Al-Saud and the proclamation of the establishment of the Kingdom of Saudi Arabia in 1932. The Kingdom's economy in the period prior to the discovery of oil on a commercial scale in 1939 was a simple one close to nature, with most pastoral and agricultural activity dependent on what little rain fell. A few inhabitants, especially those in the coastal cities, engaged in trade as well as serving the needs of pilgrims in Mecca, Medina and the ports where the pilgrims arrived, in particular Jeddah on the Red Sea.¹

This picture began gradually to change after the discovery of oil, which began in the eastern region of the Kingdom. The change became more marked in the period between 1952 and 1970 which bore witness to a series of important economic developments. The increase in oil revenue encouraged the expansion of government expenditure and the preparation of the state's administrative apparatus, the setting up of several infrastructural projects, and the education and health sectors.²

From the 1960's, the Saudi Arabian economy began to develop and expand in a fairly balanced manner as oil revenues began steadily to increase. The average GDP is estimated to have grown by about 11% per year during the period 1960 to 1970.

The development efforts made during the 1960s and before clearly showed up the need for a rationalisation of activity and for a scientific and ordered approach to it in order to solve the state's structural economic problems by means of achieving strictly defined

targets. This began with an extremely important preparatory phase in which the Higher Planning Council was set up in 1960. The state administrative apparatus was also given support with the establishment of several new ministries in 1962.

In 1969 the Council of Ministers decided on the broad outlines of the first five-year Plan for economic and social development, and the Central Planning Organisation prepared it. Early in 1970, the Council of Ministers decided on the Plan in its final form, covering the period 1970-1975, whereupon the Kingdom of Saudi Arabia entered the era of scientific planning for economic and social growth.

In 1975 the planning apparatus became complete with the transformation of the Central Planning Organisation into a ministry which supervised the various aspects of the Kingdom's planning activities so as to produce a comprehensive planning process encompassing both urban and rural sectors. In 1983 a regional planning policy was adopted. With this move, planning became the principal mechanism of comprehensive development in the Kingdom. The role of planning was not restricted to the overall economic and social considerations of the town, but extended to the various other scales, with attention being paid to both regional and local levels.³

Physical planning, both urban and rural, was integrated in the framework of general planning on a national level which took on an overall view of man, the land, and the various economic activities. Physical planning, or physical development planning, is only one of the branches of the science of planning, albeit the earliest to be applied in the Kingdom in view of the age of the cities. Planning in general is an organised and continual process which makes the ideal use of a society's resources so best to satisfy the needs of all the individuals who make up that society. Physical planning is built on the study of the relationship between man and location.

This chapter will briefly address the type and structure of settlement in the Kingdom, the development of that structure and the forces influencing it. It will then study the way the development of physical planning has proceeded to change the nature of settlement, from both the point of view of the organisations that derive from the application of physical planning, and that of the kind of plans employed in physical planning.

Primary elements influencing the development of urban patterns and structures:

Before the Second World War the Kingdom contained four relatively large towns, namely Mecca, Medina, Jeddah and Taif.⁴ The remaining towns in the Kingdom were small urban settlements in the form of small towns, and then a large number of villages and hamlets. All these centres were spread out in the desert at great distances from one another. During this period, the proportion of the population in towns (the settled portion) was about 20% of the urban population of the Kingdom. A few critical influences on the development of urban patterns in the Kingdom can be recognised.⁵

The impact of a modern transportation system has been a key factor. After the war, modern means of transport began to have a huge and direct impact on the towns of the Kingdom.⁶ The area of settlement increased and the towns grew horizontally in a series of leaps, producing districts in all directions around the basic urban settlement block. These were residential, trading, industrial and other areas, widely separated from one another and from the heart of the town. The distance between the centre of the town and its periphery could reach up to 8 km. This growth in urban population occurred within less than half a century, giving rise to a pattern of scattered, fragmented urban settlements. This fragmentation led to the physical and civic problems of the Saudi city.

The population grew, and with it migration from rural areas to the towns, pushing the urban portion of the total population to 42% according to the results of the first census undertaken in the Kingdom in 1974. The number of settlements counted as towns at that time reached 15 with a population of more than 30,000 inhabited by about 2.6 million people (out of a total population of about 7 million). Centres of settlement had until this period been closed and semi-isolated societies. This can be attributed to custom and tradition; societies built a Friday mosque, a market, and narrow winding streets affording shade and shelter from the seasonal sand-carrying winds. Another development was the villas built by many citizens to satisfy their privacy, leading to a drop in the residential density and population of the original urban quarters. With the increase in immigration of non-Saudis who preferred to live in residential flats, a large amount of land was devoted to the building of tall, many-storey buildings. Thus the residential density increased once again, and the settlement extended sporadically in many forms. The State was acutely aware of the need to direct urban growth in all the Kingdom's towns, beginning with Riyadh, the capital.

The 1970s saw the beginning of the economic boom in the Kingdom as oil revenues doubled and the government set aside a large proportion of national revenue for urban development projects, including infrastructural elements: public installations, services and roads. Building and construction continued apace, leading to the expansion of settlement in a series of huge disconnected leaps not only in the towns but also in the villages and groupings in all the districts of the Kingdom. All this led to an urban situation that called for reappraisal of the urban structure, a review of prevailing factors, and an attempt to control growth in a comprehensive and scientific manner.

The results of the economic boom period have become evident: the urban sector has expanded enormously, and most of the Kingdom's towns have grown faster than was predicted.⁸ This has warranted a review of the pattern and nature of growth of these

towns; the study of the main factors and indicators driving huge horizontal urban growth and the means of controlling it, so as to enable the bodies responsible for the preparation and supply of public utilities and services to provide the population with those services.

Positive moves were undertaken regarding the study and analysis of the types of urban structures: work to rationalise structures and to limit and control the extent of future urban growth; ways to measure the sporadic expansion of towns by defining their size and by infilling between the main development area and the built up areas scattered beyond and around the town's periphery; the start of an examination of the overall urban structure so as to synthesise both urban and rural patterns of urbanisation into a single comprehensive system of urban growth.

All of these efforts crystallised as the policy, firstly, of containment of urban growth in order to restrict towns and guard against a stage of run-away growth beyond the control of the responsible bodies; secondly, minimisation of the negative factors which accompanied the economic boom, these factors being those normally manifested as symptoms of over-urbanisation.

Evolution of the existing urban and regional planning process

The very first step in the emergence of a system of local planning institutions was initiated by the royal decree no. 9723 in 1937 which authorised the establishment of an 'Amana' (trustee centre) for the Holy Capital (Mecca) and municipal structures for other towns and urban centres.⁹ This system defined the municipality's duty to supervise the organisation and beautification of the towns; the designation of sites for certain activities; general conditions of residence and the prevention of encroachment on public roads and squares. In 1937 plans were drawn up for Dammam and Al-Khobar, including a plan for land subdivision, the design of road and block network etc. Dammam can be

considered the first modern, planned and studied city in the eastern region. It was the first city to be comprehensively planned, and the first city to do away with random unplanned urban growth, and likewise the first city to apply a system of numbered streets, and was as such a modern model subsequently emulated by other cities.

It was in 1958 that effective national planning through a series of government agencies was initiated (see Table 2.1). An interior ministry department was set up that year to deal with municipal affairs, called the Deputy Ministry of Interior for Municipal Affairs. It oversaw the municipalities and the study and preparation of everything related to the various town planning activities. The general plans were approved by the Minister of the Interior, while the detailed plans were approved by the Deputy Minister of Interior for Municipal Affairs. The role of the Deputy Minister of Interior for Municipal Affairs lasted until 1975.

Neither the civil servants nor the handful of urban planners in the Deputy Ministry of Interior for Municipal Affairs could have predicted the scale or nature of the huge Saudi urban expansion which took place during the 1970s as a result of the increase in government expenditure on the setting up of infrastructural elements, following the increase in oil revenues caused by the price rise after the October war, 1973.

To deal with this urban expansion, institutional and organisational reforms were undertaken in the principal ministries in 1975. A Ministry of Municipal and Rural Affairs was set up as an independent ministry to support the administrative functions of the Town Planning Office which was set up as one of the specialised ministerial administrative departments. Among the basic functions of the ministry were¹⁰ (a) regulation of urban growth, (b) the setting up of municipal services, and (c) land administration.

In 1977 the Council of Ministers issued a law allowing the Minister for Municipal and Rural Affairs to grant the municipalities a measure of freedom in town planning. In this connection a new organisational structure for the administration of the municipalities was established according to the concept of limited decentralisation. A major feature of this organisational structure was that the five Amanas of Riyadh, Jeddah, Mecca, Medina and Dammam became group A municipalities. They were allowed limited rights to plan and regulate growth in accordance with a ministerial decree on this subject. The Amanas of those cities became answerable to the Minister. That shaped a new distribution of administrative powers with decision-making responsibilities. Smaller cities and towns were divided into five groups - A, B, C, D, and E (Group E was abolished in 1979) according to population, and powers were granted in accordance with the various groups' administrative capabilities. Table 2.2 shows the number of cities, amanas and municipalities and their respective groups.

Table 2.1
Evolution of Spatial Planning in the Kingdom, by Agency, 1958-1992

Time Span for Plan/ Strategy	Period	Agency		Type of Planning	Planning Stage
		Division	Ministry		
20-30 years	1958-1968	Deputy Ministry for Municipal Affairs	Interior	Directive Plans	1
20-30 years	1968-1975	Deputy Ministry for Municipal Affairs	Interior	Master Plans	2
5 years	1975-1985	Deputy Ministry of Town Planning	Municipal and Rural Affairs	Action Master Plans and Action Area Plans	3
30 years	1978-1980	Deputy Ministry of Town Planning	Municipal and Rural Affairs	National Settlement Strategy	4
30 years	1985-1992	Deputy Ministry of Town planning	Municipal and Rural Affairs	National Spatial Strategy and Urban Boundary	5

(see Figures 2.1, 2.2 and 2.3 for examples respectively of a Directive Plan (Jeddah), a Master Directive Plan (Dammam) and an Action Area Plan (Al-Asiah).

Table 2.2
No. of Towns and Village Clusters by Municipality Type

Village Clusters Type				Municipality Type					Amana	Region
Total	D	C	B	Total	D	C	B	A		
6	-	3	3	28	15	12	1	-	1	Riyadh
6	-	4	2	13	2	9	1	1	3	Western
5	1	2	2	10	-	6	3	1	-	Southern
3	3	-	-	5	1	4	-	-	1	Eastern
7	1	5	1	9	3	4	1	1	-	Qassim
1	-	1	-	3	-	3	-	-	-	Northern
1	1	-	-	1	-	-	-	1	-	Al-Ahsa
7	-	7	-	4	2	1	-	1	-	Hail
6	2	4	-	6	-	3	3	-	-	Jizan
1	1	-	-	6	2	3	-	1	-	Tabuk
1	-	1	-	2	1	-	1	-	-	Najran
2	-	1	1	4	1	1	1	1	-	Baha
1	1	-	-	5	1	2	2	-	-	Municipalities & clusters report directly to MOMRA
47	10	28	9	96	28	48	13	7	5	Total

Since the small cities and towns were unable to undertake major plans for the regions in which they were preminent for lack of the necessary technical facilities, six regional offices were set up in 1975 and 1976 to help supervise planning and development activities.¹¹ Each of these prepared to assist the Ministry in its functions in the relevant region.

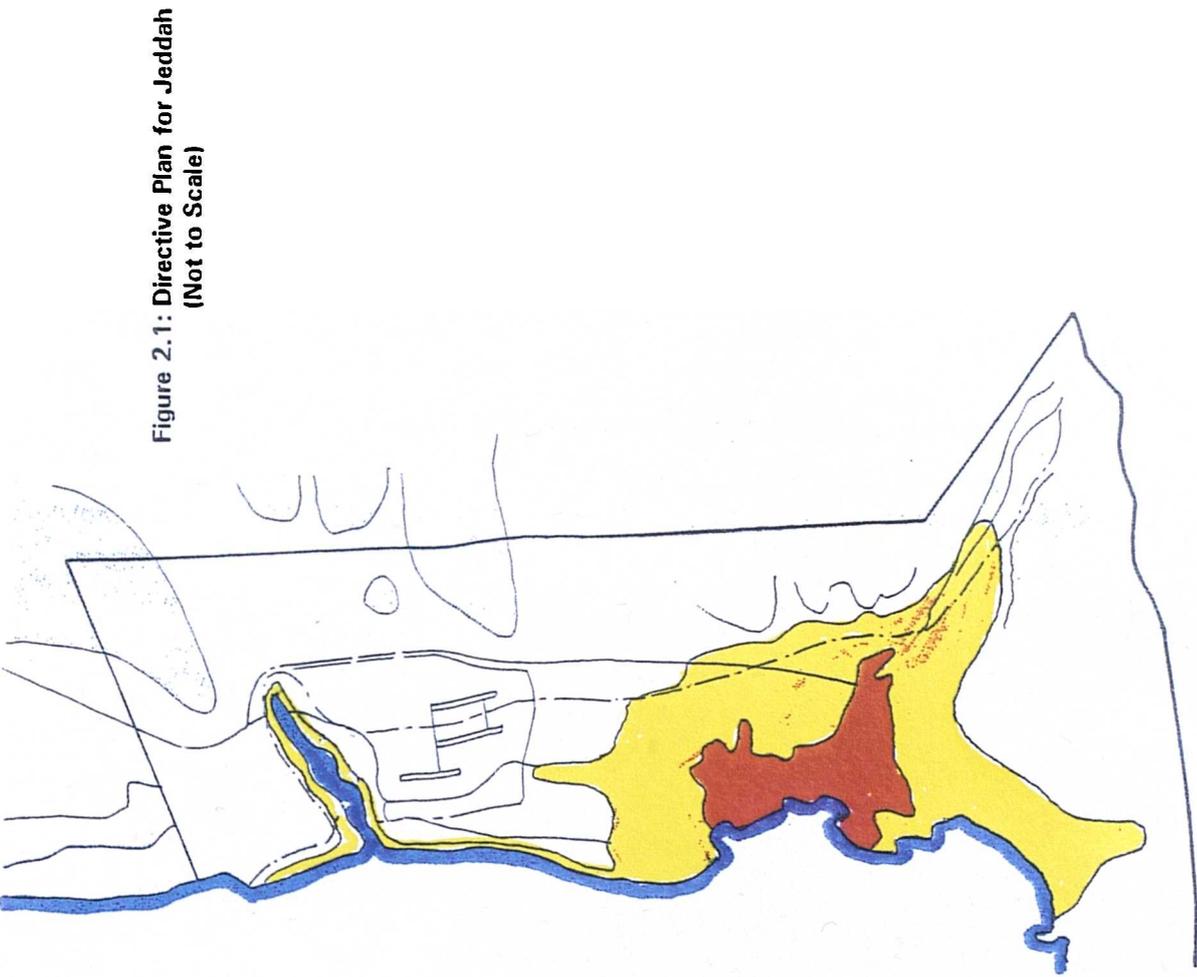


Figure 2.1: Directive Plan for Jeddah (Not to Scale)

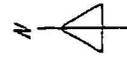


Figure 2.2: Master Directive Plan for Dammam (Not to Scale)

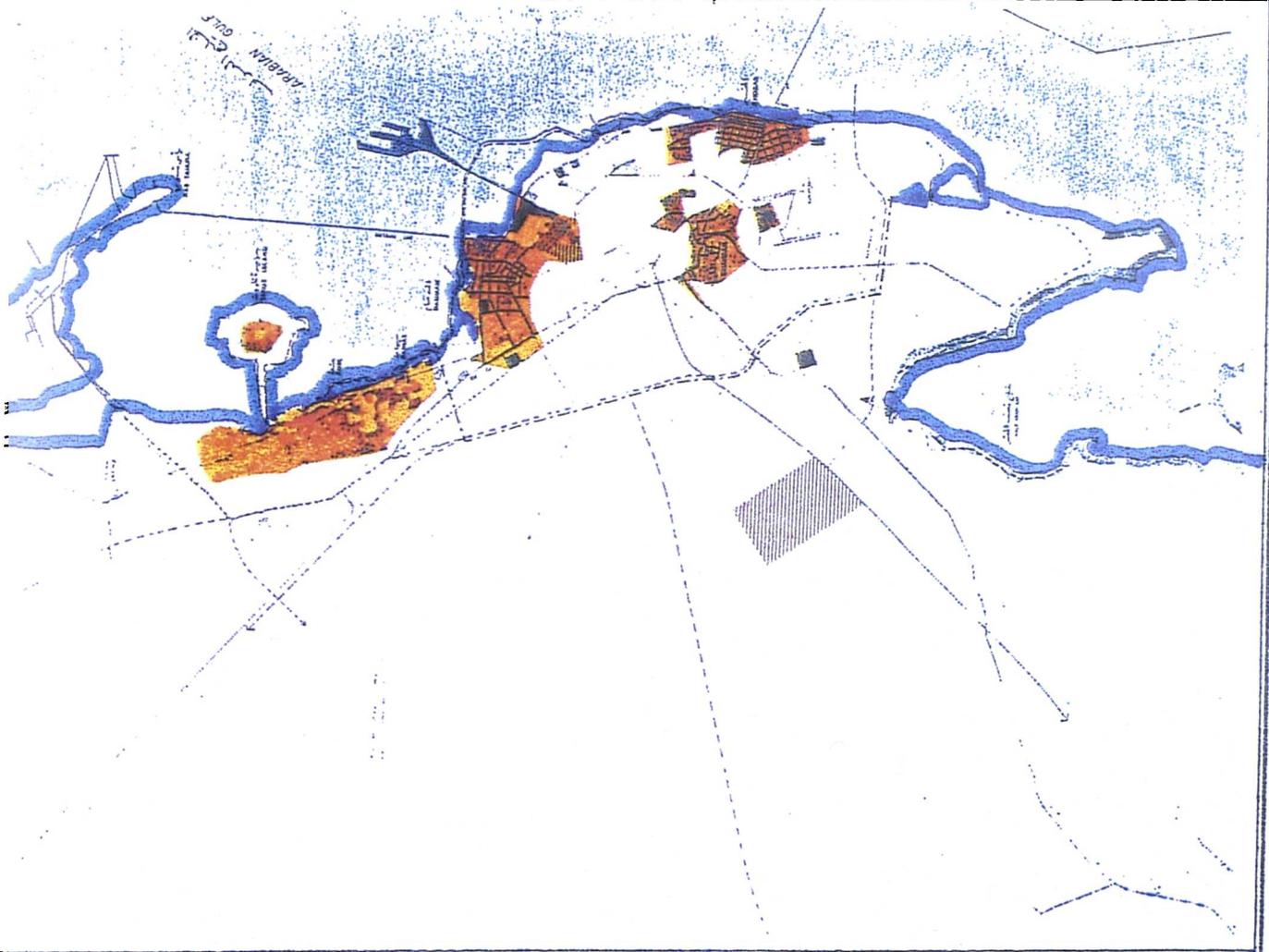
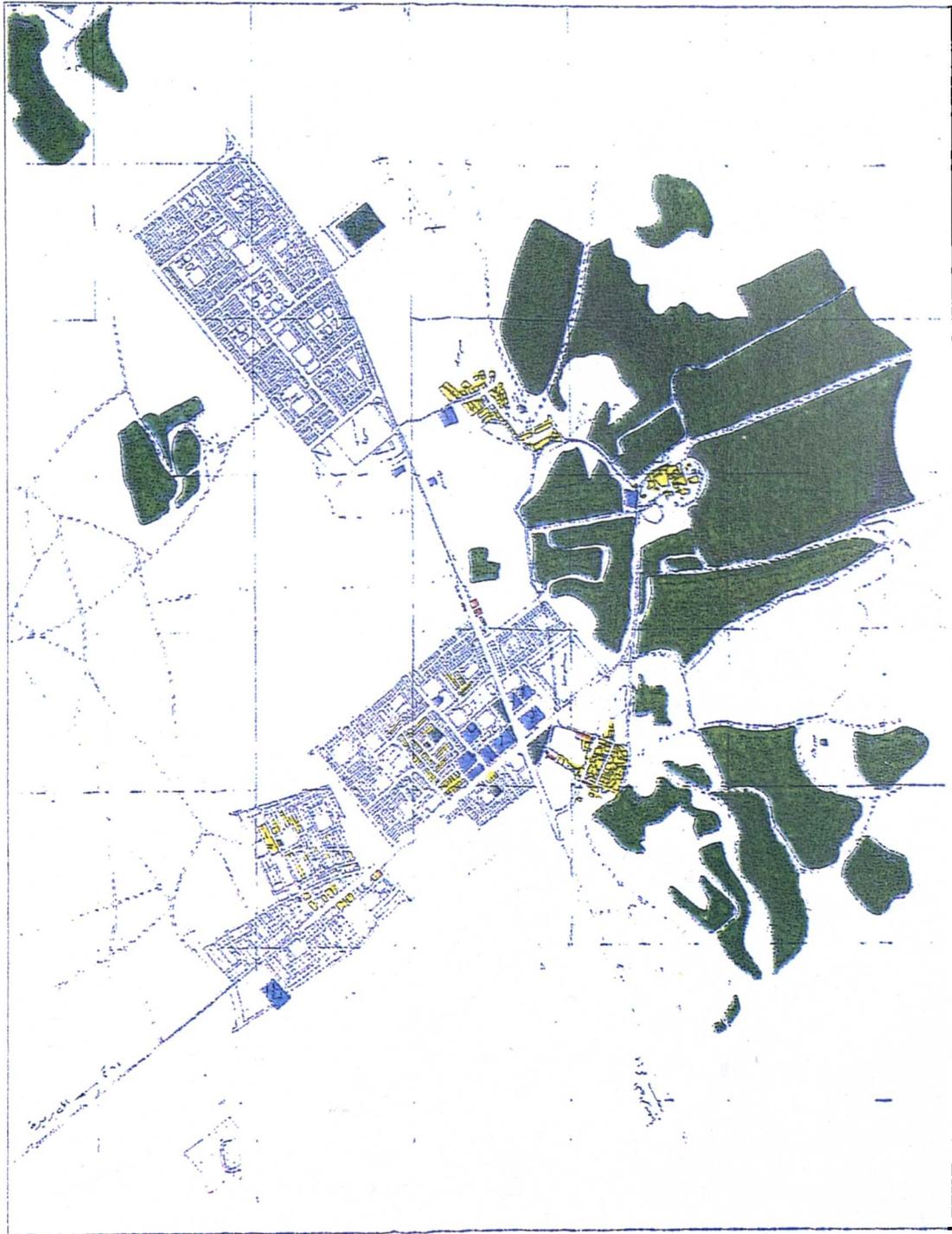


Figure 2.3: Action Area Plan for Al Asiah (Not to Scale)



- Residential
- Commercial
- Governmental
- Religious
- Agricultural
- Recreational

Action Area
Al - Asiah



In another organisational development, the Town Planning Bureau became the General Administration for Town Planning. In view of the growth of activity of that Administration, it was raised in status to that of a Deputy Ministry of Town Planning (DMTP) headed by a deputy minister in 1975 with responsibility for urban planning in the Kingdom. It now no longer relied on the advisory bureaux, instead relying on Saudi technical experts who could draw on Arab and foreign experience from within their ranks. The DMTP began with its own resources to study the urban structure of the towns and work on modernising them, in an effort to delimit future settlement, to rein in random expansion, control the size of towns and fill in gaps in construction between the main urban built-up areas and the built-up areas scattered beyond and around the peripheries.

Before 1960 guide plans were prepared by the regional offices of the Deputy Ministry of Interior for Municipal Affairs, with the assistance of the municipality's officials. For example, in the eastern region, where urban growth accelerated sharply in the vicinity of the Gulf oil fields, guideplans were developed for Dammam and 13 other towns. These were long-term plans covering a 20-year forecast period for population distribution, commercial, industrial and recreational installations and social facilities. The first guide plan for Jeddah was drawn up in 1964 with the support of the consultant Dr Abd Al-Rahman Makhluif.

The second stage of urban planning began at the end of the 1960s and ended in the mid 1970s. This period saw the preparation of master plans for the larger cities. These plans were developed in the framework of a regional analysis. During this period there were only two consultants working on strategies for regional growth, with five master plans for cities in the eastern region, and six master plans for the western region. For the planning of the capital, Riyadh, the largest city in the Kingdom, and the remaining cities of the central region, an agreement was concluded with the international consultancy, Doxiadis Associates.¹²

The master plans usually contain strictly defined proposals for land use and transport over a 20-30 year time framework for existing neighbourhood and potential growth areas. In the framework of these master plans, plans were drawn up for action areas for more concentrated and comprehensive growth projects, expected to be completed within a relatively shorter time framework.

The third stage of urban planning lasted from the mid 1970s until the mid 1980s. The DMTP contracted with the consultants for the up-dating or review of the plans¹³ for land use and transport in several large cities, and drew up comprehensive plans for several regions, which had not yet been studied during the preparation of earlier plans. The planning work was completed with the help of foreign consultants normally working with the participation of a local Saudi institution. This was for the purposes of contractual tendering. Planning efforts during this period were concentrated on the development of two types of plan, action area and master directive plans.

Action area plans were first produced for the larger cities, Riyadh, Jeddah, Dammam, the three largest Saudi cities by population. The action area plans were used as a means or tool for detailed planning and execution of a specific geographical programme and projects which suffered from specific problems or particular growth pressures. The importance of this method was that it provided a high degree of flexibility to define the short- term changes which might need to be made early in the broad major framework of the city's master plan.

Master directive plans are also known as comprehensive regional growth plans. They are the second type of plan drawn up during this stage. These comprehensive plans took into account the urban, social and economic factors influencing growth in rural settlements. Their importance was appreciated in relation to the regions studied, especially the regions of Ha'il, Tabuk, Mecca, Al-Qasim and Al-Baha.

During this stage, the DMTP applied its first strategy for settlement and the setting up of a hierarchical structure for the direction of future spatial growth in the Kingdom. This effort lasted from 1978 until 1980 and led to the proposal for future residential growth being concentrated in existing settlements.¹⁴

From the mid 1980s and up to the present, the DMTP, drawing on Saudi experts, its expert members and resident consultants drew up two urban policy master plan documents: The National Spatial Strategy 1990-2010, and the Urban Growth Containment Report.

The Spatial Strategy sets up a pyramidal system of national, regional and local growth poles. The basic strategic factors proposed for its first phase are: 1) adequate exploitation of existing infrastructural elements and services, 2) exploitation of the economic effects expected in the selected growth centres, and 3) the putting in place of development corridors between regions of urban growth, and comprehensive development of rural and small peripheral areas. The second and third stages of urban planning in the Kingdom concentrate on diversification and distribution (effective dispersal) of productive activities on a national level and further promotion of spatial integration within a clearly understood pyramidal structure.¹⁵

The Urban Growth Containment Reports set out stages and limits of growth for all Saudi towns over the next twenty years. These reports envisaged the setting up of a mechanism to regulate growth by means of extension of the supply of public utilities and services. The first phase is for the regions which gained government approval for the extension of public utilities up to the year 1995. The second phase (1995-2005) is for areas in which landowners are permitted to subdivide their holdings on the condition that they put in place the main infrastructure and utilities.

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Chapter 3

Urban Development and Planning Implications in the Kingdom

Introduction

The emergence of local and regional planning institutions in the Kingdom of Saudi Arabia and the subsequent development of contemporary urban planning process was first initiated by the Royal Decree of 1937, no. 8723. The establishment of the Deputy Ministry for Town Planning (DMTP) within the Ministry of Municipal and Rural Affairs in 1975 thus signalled the beginning of a new form of centralised urban and regional planning institution.

Initially the DMTP was set up with the aim of following and checking the urban planning activities delegated to the advisory bureaux. Recently however, it has been playing an active leading role in the planning and development of urban and rural areas throughout the Kingdom, capitalising on the Saudi national technical expertise and upgrading local planning capabilities.

Town planning activities have nevertheless encountered certain drawbacks. These drawbacks were manifest in the Saudi town as a picture of: random expansion and horizontal growth which led to the existence of dispersed urban blocks scattered around and beyond the town's periphery; the existence of empty tracts of land within the original built-up area of the town; and, in some, the failure to control the growth, which led to the failure to keep pace with that growth of efforts to set up and expand the infrastructural sector and its various installations.

Isolating the Saudi town in its original form rendered the government bodies responsible for planning unable to control the random growth of the town, and unable

to reach an acceptable stage of development. This was tantamount to over-urbanisation. This phenomenon called for sound analytical studies of the factors affecting planning and in particular those which combine to prevent the realisation of the desired aim to regulate urban growth and development. Nearly all the factors which directly and indirectly affected urban growth were then kept in check. There follows an analytical presentation of each of those factors in turn.

Direct factors influencing the nature of existing urban planning process

In its early stages, urban planning was concentrated on the preparation and implementation of residential plans without reference to a structural planning framework or General Guide Plans. This caused shortcomings in the shape of several problems, particularly those concerning proper physical formation of the rural population centres, as well as causing shortcomings in the economic and financial domain viz-a-viz the provision of the investment necessary to guarantee utilities and public services for the areas covered by these plans. These plans and their ownership were approved and distributed by subdivision, a state of affairs which made it difficult to rectify and redesign them according to sound scientific principles. The types of plans which were put into effect, and their drawbacks, will be briefly discussed.

In the context of urban planning in Saudi Arabia, the general guide plan meant redesigning the road network and the old quarter (town centre).² This pattern did not employ an overall strategy of containment of the urban centre and is very similar to the planning pattern applied for the selected action areas. In fact one could say that it was at a very great remove from the concept of the application of a guide plan. The drawbacks of the guide plan were many.

The social situations and local problems were treated within a narrow urban framework without regard to the realisation of local and regional integration: the plans were drawn

up by the townships. Moreover, the fundamental orientation of the guide plan was to contain towns within general limits from the point of view of the planning concept, the type of growth, and the distribution of public services and their restriction, as well as checking the urban phenomenon of fragmentation into urban blocks. However, the plan did not draw on sound and objective estimates of the population and their needs, did not take into account environmental factors like *wadis* and the path of high tension cables, and did not encompass the principles of direction of development and limitation of the size of the town. Again, plans were a short-term treatment of prevailing situations disregarding the long-term perspective on which urban planning ought to be predicated. There was no special consideration of regional integration in terms of utilities and public services, or the function of the town in a general framework of urban growth on the national level.³ There was no consideration of the design of an integrated road system. They were based on the subdivision of approved government land. They thus had no regard for: any comprehensive planning framework; phased development; regulation and organisation of construction; the basics of infrastructural planning. The result was a discontinuous and fragmented urban fabric.

Altogether, these limitations led to what can now be seen as a distorted pattern of urban growth which hinders sound spatial distribution of the essential public services.

Master Plans are concerned with the physical planning of the towns. They give a broader picture of planning than mere plans for selected action areas. They present a general picture of far-reaching growth, including a strategy for the various installations according to defined planning criteria which ensure fulfilment of the needs of the urban centres and the principle of rational spatial distribution within a regional frame. A summary of their characteristics would include that they were considered to be a training ground for the officials of local authorities,⁴ who cooperated with the advisory bureaux in the preparation of these plans, they drew on sound and objective estimates

of the population and their real needs, gave a comprehensive overall picture of long-term future urban growth, defined the various installations/land uses according to planning criteria. At the same time they did not ignore a regional perspective or the role of the town in a wider regional framework, taking into consideration the integration of road networks.

In many cases the estimates of Master Plans were wide of the mark for lack of serious participation by local authorities in the preparation of these plans or for lack of local officials altogether. There was also often failure of the townships to understand these plans, which led to a failure to implement them within the framework set out for them. There were also the problems of rejection of the plans or requests that they be modified. Among these problems were,

- (1) opposition to ownership leading to opposition to roads and public services sites (this resulted in failure to realise the goals of the master plans, and in turn led to changes in land usage and the phasing of development),
- (2) failure to adhere to the stages of implementation of the master plans (this led to delays in the execution of public utilities and services), and
- (3) failure to adhere to urban directives (which reflected confusion about the role of the town in the pyramidal settlement structure within the regional framework).

There was a whole knot of problems confronting the pattern of urban growth which relied on the two aforementioned types of plan. These problems led to limitations in the realisation of the aims of these plans, all of which seriously affected the nature of urban growth in the Saudi town.

Most of the towns' plans were drawn up by foreign consultants who were not appraised of much data on the social and economic circumstances,⁵ customs and traditions, and

considerations of lifestyle which have considerable influence on the urban environment and ways of planning it. Furthermore, the failure of local authorities to participate in the preparation of these plans left them bereft of much material and divorced from the actual reality targeted. The plans also suffered from excessive changes made during their preparation as a result of changes of personnel responsible for the planning process. Thus the plans lost touch with the basics and scientific fundamentals and sound planning criteria were not applied.

Flexibility was also a problem. Flexibility is a normal state of affairs with all plans, but if changes are made to previously prepared plans, owing to a lack of accurate data and information about prevailing conditions like geography or topography of the site, or environmental circumstances like those mentioned above - wadis or high-tension cables - and if the plan is changed more than once for more than one reason, then such changes have a negative impact on planning during implementation, rendering it devoid of content and unable to achieve its fundamental objective. Such a plan will consequently have a distorting effect on the town it caters for.

A prolonged period of preparation also carries dangers. The Saudi authorities undertaking a plan may well take more than four years. During this relatively long period, many factors crop up: these can be difficult to take into account. Consequently the plan loses objectivity. In the Kingdom an economic boom occurred during the early 1980s leading to a rapid urban growth with which the urban plans failed to keep pace. This led to negative effects on urban development, exemplified by uncontrolled sporadic urban growth accompanied by economic and social effects. These effects are still felt today.

Spatial planning at the town level, the town-region level, the macro-regional level, or the national/state level, must be firmly linked to sectoral plans (agriculture, industry, tourism etc.) in order to guide urbanisation. This can be achieved by coordinating and

integrating the various aspects of planning activity as a whole. Unfortunately, many of the plans prepared for Saudi cities lacked this vital coordinative aspect.⁶

Land ownership constituted one of the basic hindrances to implementation since the plans defined the uses to which each area of land could be put, and these defined uses could be opposed on the grounds that they ran counter to the specific wishes of the landowner, or merely because the owner might want to change the land use for the purposes of real estate speculation. In view of the landowner's sole right according to the law of the Kingdom of Saudi Arabia to freely determine land use, the planners had to offer alternative uses desired by the owner to serve the inhabitants of the district or neighbourhood.

Urban planners tried to avoid this problem and inaction in the designation of types of land use by adhering to scientific guiding principles in preparing those plans. They tried to contain the demands of the urban domain by implementing the plan in more than one way, for example by defining several alternative land uses.

The obstacle or problem of ownership - the owner deciding on use, the aforementioned alternatives resorted to by the planner, by means of setting aside sites or specific areas of land for public services, or the provision of services on a specific level like town only, or the region - all these factors often served to hamper implementation. Demands exceeded the quantities worked with according to general criteria and the principles of urban planning organisation. Either additional areas were required or modification of the highway network from the standpoint of widths and lengths of rights of way on a scale different from that structurally permitted. This led on occasion to expropriation of some land needed for public use, and that could prove a difficult process.

In the implementation stage further difficulties and problems came to light which were not clear in the preparatory stage. These difficulties were revealed when details of the

estimates and other data were brought together at the district or residential neighbourhood level. At this point the importance of the role of local authorities in urban planning came to the fore.⁷ It became necessary for them to assist and participate in suggesting alternatives for the implementation of the plans in their areas. But in many cases these authorities were not qualified to participate effectively in that way for lack of technical personnel trained in urban planning and implementation. In some districts the local officials had to prepare entire detailed plans for their districts and neighbourhoods derived from the general urban planning framework for the town.

This problem emphasised the need to set up special urban planning offices within the local authorities, furnish them with the necessary technical personnel, train them to prepare detailed plans, modify general plans, provide alternatives and solutions to urban difficulties of a local nature, and research at various levels what would be appropriate to local conditions.

Controlling the Land Grant Scheme

The study of the current nature of Saudi towns and settlements clearly reflects social characteristics and throws light on the limitations of previously applied urban planning. The aim is to calibrate planning templates appropriate to local Saudi conditions.

When one examines the nature of urban development, it becomes clear that most Saudi cities consist of a block, a traditional interlinked urban fabric arising from the Kingdom's social, economic and urban characteristics, and distances predicated on local environmental conditions. This is what is known as the old quarter which is surrounded by modern urban extensions in the form of tightly packed residential development based on land ownership conditions and lacking urban linkage to the heart of the town. Other urban features are accordingly likewise fragmented in size

and nature. This has necessitated various urban, architectural and environmental actions, as exemplified by Riyadh, Dammam and Jeddah (see later).

One of the benefits to accrue from knowledge of distortions in the urban fabric was that the planners of several new towns avoided the previous pitfalls. For example, when Jubayl and Yanbu' were established their plans were underpinned by a scientific approach befitting an industrial city. However, the planners neglected to integrate them with the nearby settlements functionally or physically. Fragmentation of the urban fabric became evident, but this was overcome during the next stage of planning, by taking steps which led to accommodation of all local and geographical characteristics of the surrounding urban environment.

Two clear examples of random expansion are the holy cities of Mecca and Medina. The nature of urban development progressed in a random pattern dictated by social and environmental conditions. But in view of the prestige of those two religious cities and the presence of the two Holy Mosques, the Custodian of the two Holy Mosques, King Fahd undertook great efforts to expand the area of the holy sites in a comprehensive planned framework in order to expand the urban limits of the city as a whole.

There were many factors which had a negative effect on the make-up of Saudi towns and settlements during the past twenty years. But the authorities became aware of these effects in good time and pushed through a bundle of legislation to transform the traditional style of planning into the one now prevalent in most districts and towns in the Kingdom.

The Kingdom of Saudi Arabia instituted a body of land subdivision policies in the context of its social principles, organisation and circumstances. These had a direct effect on the composition and nature of Saudi urbanisation.

The State stands by the principle of guaranteeing suitable housing to every citizen. In the context of these enlightened humanitarian principles, the central authorities charged the local authorities with the preparation of residential plans for limited income groups in towns and villages. To implement this policy, there must be sufficient government land to meet this end and consequent needs. As a result, sites were chosen which were far from the urban centre and the districts supplied with utilities and public services. Thus, urban blocks and land subdivisions emerged which were greater in size than the main town itself, and urban growth was consequently huge, dispersed and fragmented.

The areas earmarked in the plans were not subdivided in successive limited developmental phases as required according to the criteria for sound urban growth. Thus the new planned areas constituted an economic and urban burden on the original town as well as loosening the urban fabric. The population of these new planned areas exceeded that of the original town.

The principle of guaranteed housing was not restricted to those on a low income. Some other groups of citizens from various strata of society needed housing. Land was granted to individuals without restrictions according to original native area. The result was private plans for the granted land. These plans led to the expansion of the urbanised portion of the country, with several rural population centres. To these plans could also be attributed some negative economic effects, like real estate speculation. The choice of sites for the plans for the freely granted lands faced the same problems and planning obstacles as had the plans for low income groups. This aggravated the burden of fragmentation imposed on the towns, and imposed an economic burden on local resources in the designation of the main utilities networks.

Private ownership at various levels and of land of various sizes, either in the form of limited plans, or a group of many tracts of land, led to the existence of residential

quarters or neighbourhoods in some instances. These plans represented an urban problem for the original towns in terms of urban orientation since their aims were speculative - the realisation of the greatest return on real estate investment - rather than to integrate the old town with the urban fabric. These expansions required modifications and extensions to road and utilities networks, and the limited sites suggested for drilling for utilities, all of which led to expropriation of some land needed for these utilities, and the provision of appropriate compensation. These territories were planned either individually or collectively in a random manner, without sound links between them or with the old town centres. It is also worth pointing out that the planners' definition of public services to be provided suffered limitations both at the level of the development area (private lands) and that of the subdivided area, with its feeble attempts at functional integration both at the district level and viz-a-viz the town as a whole.

Special urban projects for government authorities and institutions are often larger than a small or medium-sized town. Thus these planned developments must be taken into account when preparing a comprehensive development plan. The authorities and institutions undertaking these projects select the sites best suited for their own specific purposes regardless of urban planning criteria, and often involving functional isolation from existing neighbouring settlements. They thus often came to represent an obstacle to expansion of the urban sector (when these expansions conflict with these plans) and the development of patterns of urban growth and comprehensive, interlinked reconstruction of the urban fabric. Since these large projects were not subject to controls on urban growth and planning criteria, they were isolated during the preparation of structural and guide plans and became quasi forbidden cities.

Indirect factors influencing the nature of existing urban planning process

Saudi Arabia is distinguished by systems of land ownership which developed in accordance with the requirements of Islamic law and urban development. The system of land ownership stems essentially from the Ottoman land ownership system, which, in brief, has led to the existence of privately owned land, publicly owned land known as 'meri' lands, and waqf (religious endowment) lands. The system, methods and forms of land ownership are among the most important factors influencing urban growth in the Kingdom, especially as regards implementation of the plans and urban development programmes. A brief outline of ownership types is therefore justified.

Private ownership refers to ownership of land by means of its owners (an individual or group of individuals). Ownership of land falls into the hands of an individual or group of individuals principally through sale, or alternatively as a donation or gift. The third source is inheritance.⁸

Landowners who have come to own land by any of the three aforementioned methods have the right to develop and change its urban status according to need, within the framework of the town's urban plan, i.e. either subdivision into several pieces or conglomeration into one piece, and then implementing various urban projects on it (adhering to the rules of the general plan for the town), be these residential projects, commercial centres or various other land uses, having due regard for the use specified in the general plan and the public road network.

In many cases private land ownership in towns constitutes an obstacle in the path of the general plans, owing to a land use conflict between the interests and wishes of the owner and the objectives of the plan. Even though the rules governing development according to the urban plan are binding, they do come up against obstacles that hinder enforcement. One of the main examples of this problem is when implementation of

some of the vital urban projects in the town's urban plan, stipulating a specific land use, requires expropriation of private land and the landowner refuses. This sometimes obstructs implementation of the project, or involves negotiation of compensation for the owner for the land.

Public ownership is the principal factor in the realisation and implementation of special urban development plans and the achievement of their objectives. State land is thus used either for public services (road and utilities projects etc.) or auxiliary services which private landowners are unable to furnish.

One of the main uses for which state land is exploited is residential projects for low-income groups, and the free granting of ownership to individuals (thus the land is transferred from public to private ownership). But most public lands lie outside the existing built up urban areas, and thus it is difficult to bring services and public utilities to these areas. Greater harm is furthermore entailed in the loosening of the urban fabric and fragmentation of the built up areas of the town into several scattered areas.

Public land ownership may change to private ownership by way of donation (grant) or sale on the part of the State. Private ownership becomes public ownership by means of expropriation. Expropriation can be with compensation or without compensation in some cases.

Endowment dates back to the Ottoman era: an individual or groups of individuals owned land and then endowed it in lieu of alms tax due, whether it be land with all types of land use or lands with buildings erected on it. They bestowed a certain income for the benefit of poor individuals or groups, or the destitute or orphaned children or for the care and upkeep of certain places of worship. In many cases ownership was an obstacle in the path of urban development and the implementation of general plans, due to the fact that the land was frequently very centrally located.

The principles and methods of dividing up districts and regulating construction were one of the main factors affecting urban planning. The division of the town into districts requires several technical considerations, in particular the gross and net urban density (the number of dwellings, or dwelling units per hectare, or the population per hectare), as well as the effects of the zoning decision on other urban factors like the road network. The potential capacity of a district (inhabitants and dwellings) is intimately bound up with the formation of an appropriate road network since there may be a need to level off the district's density as a result of the impossibility of accommodating that density with the existing road network, and the impossibility of expanding it and increasing its capacity. Another important implication of zoning regulations and building bylaws is the specification of ideal land use according to the capacity of the existing road network. Thus the road network dictates the volume of land users of the district, including permanent users, users who frequently come and go at specific times or continually, and so on. Thus prevailing conditions must be studied closely if a good, soundly-based plan is to be implemented to divide the district into zones and regulate construction.

There are two well-founded methods of dividing up land and regulating construction, but a sound study of the urban environment is required before deciding on either of them. They are: (1) dividing the town into districts and quarters of a specific density in light of the road network; (2) designating pivotal sectors around or along them, in terms of urban growth. Then the remaining sectors are put in place.

Both methods are required. The first method is required to bring about a balanced density and a balanced distribution of population in the urban context. The second method requires study and designation of the visual treatment and the study of the town as a physical block governed by formational relationships, and it can be remodelled in the visual study phases as instanced by Edward Lynch.⁹

There are operational principles which assert the need to apply planning criteria and designate separate areas for different land uses; there are other studies which dispute that, and assert that the interweaving of specific land uses will give the quarter of the residential neighbourhood more vitality without detracting from its basic functions, providing that the land uses serve activities which, despite their differences, are integrated.

Analysis of the customs, traditions and social function of a given district against the background of a town's wider function, has led to a particular type of urban formation, which has come to underpin the shaping of the urban environment. For example, analysis of the urban fabric of the old quarter of the Saudi town has established that it was best suited to economic and social conditions, and that the over-riding issue was the availability of alternative solutions consistent with various interpretations of the overall planning concept which could lead to an urban pattern better suited to the Arab Islamic urban environment. For example, many people prefer separate non-contiguous dwellings as a treatment of the issue of privacy, even though there are old contiguous buildings which nonetheless afforded privacy by means of openings etc. The model of separate dwellings has had a negative effect on contemporary urban areas, with the result that they do not constitute an interlinked pattern.

The system of urban planning, like any other planning system, has specific functions or steps which must be taken. At the same time, a road network should be set out according to implementation operations with a view to correcting the path and revising plans, to maintain continuity of the planning process, and ensure that it is successfully undertaken. That endeavour was hampered in many respects by shortcomings and restrictions deriving from certain steps. The result was a failure adequately to achieve objectives, or a distorted urban pattern, in the shape

of random or disconnected growth of the urban fabric. These shortcomings must be remedied to ensure an urban planning process which brings about a good urban environment for the Saudi city.

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Chapter 4

The Development of a Transitional Urban Planning Approach

The search for a transitional planning framework

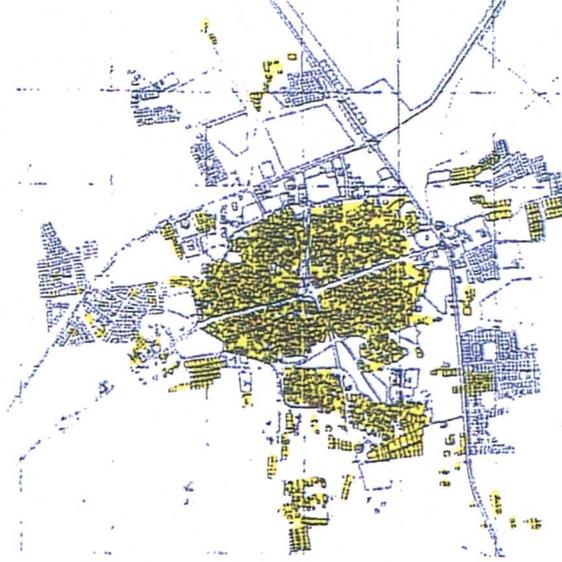
The attempts to prepare plans for urban growth, as described in chapter 3, were crucial in orienting urban growth in several urban and rural centres, especially with regard to cities like Jeddah, Riyadh, Dammam. A planning framework was completed which directed urban growth with scant regard for economic-limiting factors like the cost of extending public utility networks and social services at the various levels. Economic conjunctures and contingencies at the time allowed this pattern of unchecked growth to occur in specific temporal and economic phases.

It is worth pointing out that these attempts at planning did not bring into being the several elements envisaged for the execution of urban growth plans: such as the rationalisation of expenditure, adherence to specific limited phases of urban growth, or control of land use. In addition to these drawbacks was the absence of support and training for local planning authorities directing growth.

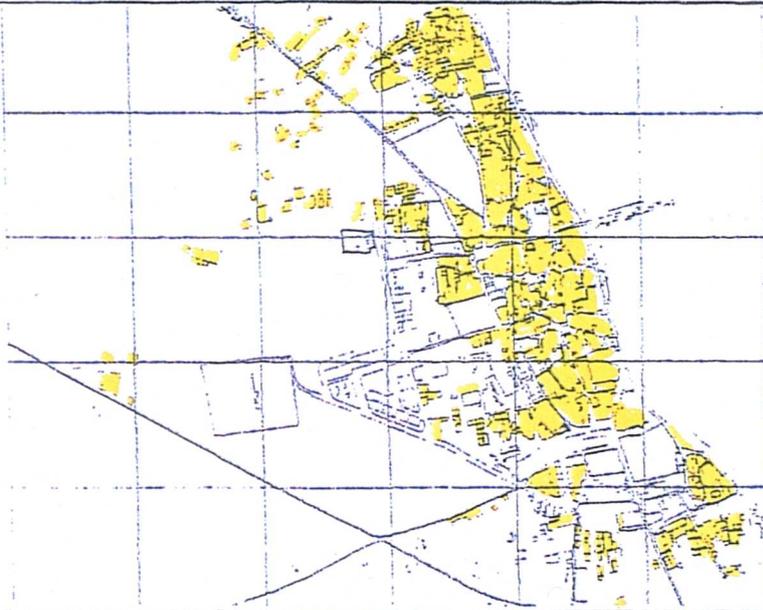
The phenomenon of random growth, and the difficulty of controlling it, provided the impetus for attention to be paid to a framework of transitional growth characterised by expressions, hypotheses and parameters appropriate to the particular economic and social conditions. These conditions warranted greater planning flexibility on account of the lack of clarity in the type of urban growth and the circumstances of economic changes during the lifetime of short-term plans (see Fig. 4.1 for examples of uncontrolled urban growth).

Figure 4.1:
Uncontrolled
Evolution of
Settlements of
Variable Scales

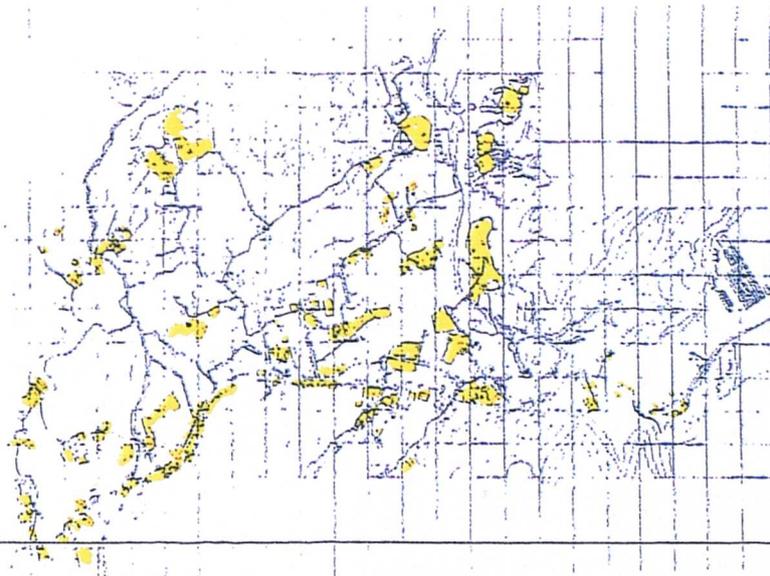
Urban Sprawl



Abu Areesh
Centri-petal



Samtah
Linear



A.I. - Namas
Nuclear

The Royal Decree and Council of Ministers' Recommendations for the Delineation and Control of Urban Growth

Decree no. 13 was issued by the Council of Ministers on 25 September 1985 as a result of i) ever-increasing demands for the extension of services and public utilities beyond the periphery of existing blocks of settlement, which led to the exhaustion of budgets, ii) the non-adherence of citizens to the limited stages of urban growth in certain planned urban centres, and iii) the urgent need to support the infrastructure and direct the best possible exploitation of utilities and services. The decree encompassed the delineation of zones of urban settlement for Saudi towns and cities for the next twenty years, until 2005, subject to approval by the Council of Ministers, and provided for attention to be paid to the system of stipulations for the approval of plans for land situated outside the delineated zone of settlement. Also provided for was a committee to study the situation with regard to empty plots - both included in and absent from previous plans - lying within the cities, and the suggestion of appropriate solutions for their development.

The *nitag omrani* concept and procedures

The Council of Ministers agreed, through the issue of the decree, that a moratorium be called on land plans in all towns and cities for two years. The halt provided the means of control to bring about a balance in urban and rural growth, and a means of arriving at a successful treatment which would lay down the ground rules for urban growth. Benefiting from some of the harsh lessons learned during the preparation of guidance plans, the *nitag omrani* concept permitted local authorities the necessary flexibility in directing urban growth and preparing the plans needed in a relatively short period of time.

The *nitag omrani* concept and method may be summarised as an audit of the requirement of the staggered phases of development viz-a-viz the national development proposals for total land use, services, and public utilities, without specifying particular

sites in the urban pattern existing in 1986. The growth over previous decades fundamentally circumscribed these expectations. The studies did not directly include a survey of social and economic needs in order that work might proceed with all due despatch to bring about the aims of curtailing random growth and laying down ground rules for the direction and control of urban growth.

Two phases were designated for growth in the urban centres. The first from 1986-1995 and the second from 1995-2005. This latter phase was to be divided into two parts according to an evaluation of prevailing conditions in the year 1995 and a study of the requirements and needs for growth in the years 2000-2005. Changes would be made in the light of obstacles and changes experienced during execution of the first phase. It is worth drawing attention to the putting in place of a protective framework around urban growth beyond the limits set for urban growth to the year 2005 with the aim of controlling the orientation of urban growth and securing the ground area necessary for future demand. This had to be achieved through the application of flexible urban ground rules.

The fundamentals of the *nitag omrani* studies

In order to carry out the much-respected decision of the Council of Ministers, the Ministry of Municipal and Rural Affairs undertook to set up a central working team within the Deputy Ministry of Town Planning (DMTP) headed by the author, the Director General of Project Co-ordination Department, in order to institute:

- a methodology of study (planning approach);
- the preparation of manuals for several essential tasks so as to allow the programme to proceed without specialist technical experts;
- the specification of quantifiable parameters by which to measure the present and calculate future needs such as housing, social services and infrastructure provisions;

- training programmes for the local organisations preparing studies;
- the development of systems for organising planning information;
- continual supervision of all the *amanat* and *baladiyyat* (see Glossary) at all stages of study;
- the surmounting of planning and administrative problems;
- support for the municipalities in the preparation of the final product of atlases and directives for each town and city;
- the preparation of an atlas of Saudi towns focusing on existing conditions, and another map focusing on the stages envisaged for limited urban growth, such that these two atlases would constitute a summary of the contents of the studies and recommendations of all Saudi towns and cities. They thus represent a single reference resource.

Working teams were set up to carry out the studies required in the *amanat* and *baladiyyat* without relying on technical expertise, rather relying on the limited capabilities of local organisations, in accordance with the recommendations for work specified for all stages of the study, under the supervision of the central working team.

A *nitag omrani* manual is produced. This consists of recommendations on how to prepare the studies, beginning with the information collection phase, including the preparation of the necessary base maps in order to quantify existing conditions, and proceeding to analysis and calculation of future requirements, and the preparation of alternative options to facilitate the fixing of the various stages of the *nitag* programme. This guide also includes some planning guidance standards which can be adhered to regardless of the widely divergent local variations found in Saudi towns.

On account of the urgent need to quantify the present and calculate future land use and public service needs, a list of planning standards was drawn up, derived from previously completed studies for several cities, both large and medium sized. These were drawn up by specialist consultants and local planning bodies in the *amanat* and *baladiyyat* in order to produce what amounted to a standard which could be adhered to according to the functional needs, sizes and overall level of development of the various Saudi towns.

These studies - undertaken by the DMTP in this field - were to be relied upon to provide a flexible base which could be adhered to and still accommodate the requirements of the towns. There are booklets with educational, health and religious standards and an outline of the fundamental principles on which the standards are based, be it in the surveying of the surface area of the region subserved or an estimate of the population served, with examples of the circumstances in which one of these principles may be applied. These booklets also made use of some of the planning standards which were laid down in the official reference works pertaining to the Rules, Laws and Regulations. Most of these standards required continued elaboration and development in the light of economic and social changes at all levels of planning in the Kingdom.

The standards were not sufficiently developed to be totally relied upon to assess the requirements of the towns, which varied considerably in size. Therefore certain aspects had to be discarded and new aspects adopted in order to arrive at workable guidelines. These were derived from the studies defining the *nitag omrani* in the towns of the Kingdom without achieving a complete development, on account of pressure of time.

Work programme and schedule

The programme laid down by the studies comprises several phases. The work schedules preparation stage represents the desk work part of the operation. During this part, all the schedules are drawn up for the necessary tasks covering all phases of the study. They may be summarised as follows (see also Appendix E):

- Scheduled instructions for preparatory work for the study: which comprises an exposition of all the phases of the study beginning with the information gathering phase and proceeding to fixing of the phases of delineation of urban growth without the use of complex technical terminology or the services of technical experts.
- Scheduled instructions for the preparation of the final technical report: which comprises an exposition summarising the main results of the studies and how to make use of the information and data in order to arrive at the *nitag omrani* required.
- Atlas of the towns accompanied by individual reports: this comprises a representation of the information on all the towns of the Kingdom in one single volume, including both existing circumstances and the situation after *nitag omrani*.
- Atlas of each individual town: which contains all the maps and drawings for each town (for use in the studies) according to the checklist compiled to ensure the correct preparation of these maps.

The study framework focuses on the use of the smallest practicable quantity of data needed to set limits on rapid growth during this transitional phase, in order to gain control over the process of urban growth. It dispenses with much information and social research which would require extended period of time to collect and prepare.

The work team was entrusted with visiting the various municipalities in turn and explaining the phases of the study. It was also asked to find ways to overcome the municipality's technical shortcomings; to solve the problem of categories by consult-

ation with the other work teams; to draw up a timetable representing the level of progress made in the studies and clarifying the course of work in progress.

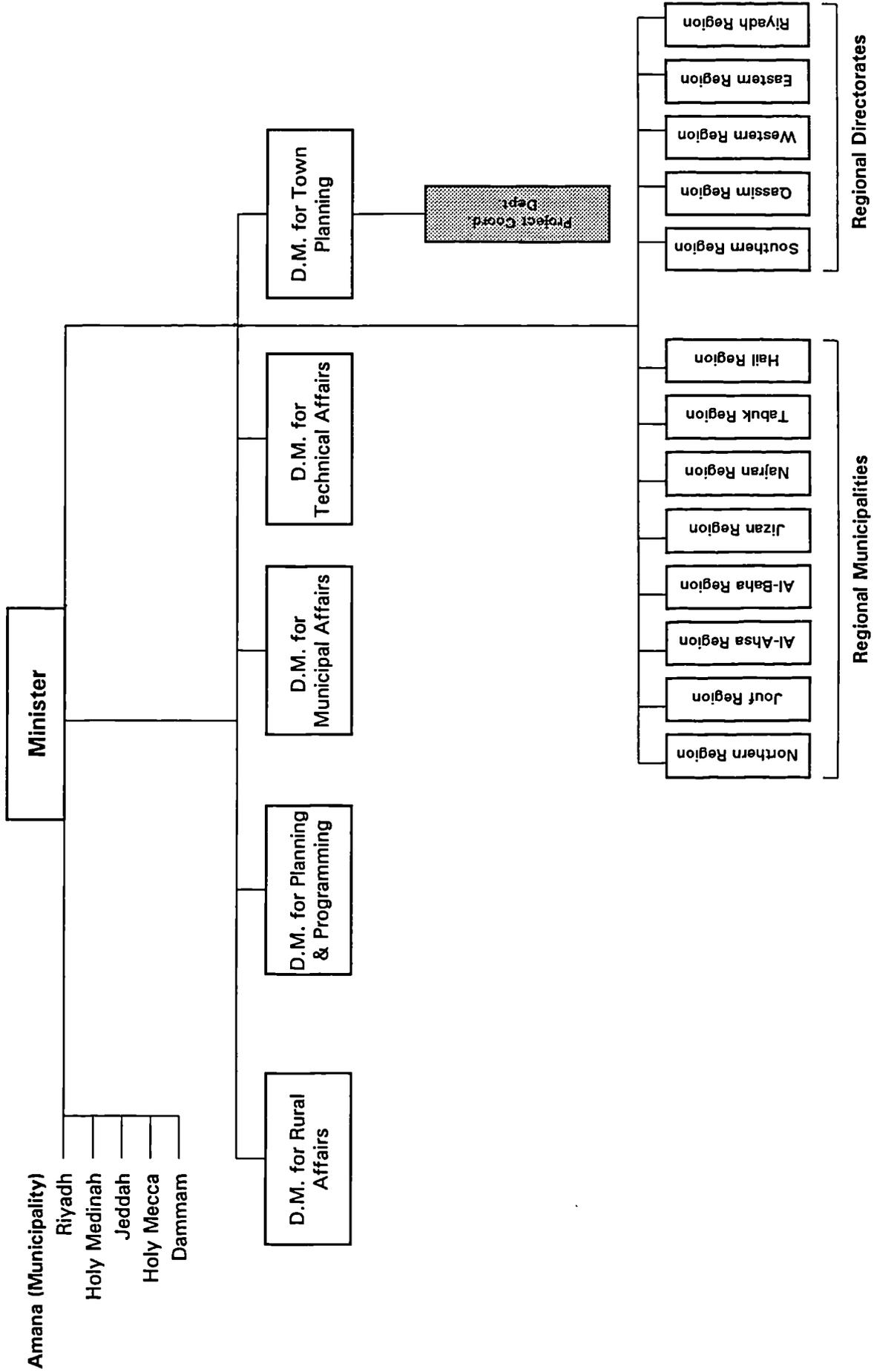
A structure was put in place to allow for follow-up studies for updating of information, step by step, viz-a-viz prevailing circumstances within the system of land information, in order to keep track of changes and define problems arising from the execution of the study and continued application. This would in effect be a process of consolidation drawing on the planning problems reported by the municipalities and *amanat* to the planning agency, as well as from sectoral tours of inspection endeavouring to solve these problems and tackle their various ramifications.

Definition and selection of towns for the *nitag omrani* studies

Towns were selected for the *nitag omrani* studies on the basis of the administrative land divisions in the Kingdom represented in the levels of local planning agencies. Characteristics of this organisational structure and its influence on the type and structure of planning activity upon execution of the programme of preparation of studies will be summarised.

The structure of local planning authorities in the Kingdom consists of three levels (Fig. 4.2): the *amanat*, *muduriyyat*, and *baladiyyat* of the regions. (There is also *baladiyyat* on another level comprising the branch *baladiyyat* and the village clusters and centres: status varies with the size and importance of the various urban and rural settlements in question.) The first level consists of five *amanas* for the administration and planning of the Metropolitan Areas in the Kingdom, namely Riyadh, Jeddah, Mecca, Medina and Dammam. Each is subserved by several branch *baladiyyat* (urban municipalities) which supervise the many districts as regards their planning requirements, including health and sanitation. These *amanas* represent the executive apparatus for local planning, and are financially and administratively independent of the other agencies

Figure 4.2: Interrelationship of Central and Local Planning Authorities



answerable to the Ministry for Municipal and Rural Affairs (MOMRA). They are directly responsible to His Excellency the Minister.

At the second level are five *muduriyyat* (regional directorates) answerable to MOMRA, to which in turn are answerable many *baladiyyas*, classified into levels a, b, c and d, and a collection of village cluster centres which have not been classified in the programme for the preparation of *nitag omrani* studies at the present time.

These directorates function as a link between the central level and the local level for small towns and rural areas, which vary in number from area to area. Their existence does not necessarily imply that they are responsible for the towns lying within their borders. Most of them lie within the area of large cities where *amanas* take responsibility. Therefore the new rationalisation process includes the abolition of most of them and the assumption of their responsibilities by the existing *amanas*.

Regional Municipalities are formed by municipalities which contain the site of one of the towns. It is responsible for the functions of the main municipality in addition to those of the secondary municipalities of the towns in the region. It was supported by a technical agency to supervise all the practical planning requirements of the urban centre as well as satellite towns and village centres. The principal municipalities of the region supervise several sub municipalities and village cluster centres at the various appropriate levels. These Regional Municipalities are answerable directly to MOMRA.

Urban municipalities (*baladiyyaat*) focus on the administration of urban growth in a specific town or city. They are answerable to the general directorate or to the Regional Municipality. It should be noted however that in the absence of '*muduriyyats*' (general directorates) Regional Municipalities assume similar roles.

The level of technical capabilities among the local planning centres of the Kingdom tended to vary according to the size and level of a given urban centre and the catchment area of its services. As a rule there was a surveyor or draughtsman in most of the medium sized municipalities able to undertake most planning tasks. It was against the background of these existing circumstances that a suitable programme was set up for the training of workers in the various municipalities to enable them to undertake the required planning work. The programme encompassed familiarising workers with the aims of *nitag omrani* and persuading them of the urgent need for it; familiarising them with the various levels of study, including structured data-gathering procedures; training them in how to organise land use information, storing the data and updating it systematically; familiarising them with the basics of town planning. All of this programme was to be achieved in stages, corresponding with the timetable for the preparation of the study required. The local agencies were supported by work schedules, as well as the aforementioned programme of lectures. Working teams were chosen from the municipalities and the general directorates and regions' municipalities. The DMTP assisted in and supervised these choices

Work schedule and stages of *nitag omrani* studies

The programme for the preparatory study comprised five stages: (1) compilation of basic data and coordinated preparation of maps, (2) physical surveys, (3) analytical stage, (4) delineation of urban settlement (*nitag omrani*), and (5) preparation of the study documents (see also Appendix B).

The preparation of base maps for the towns of the Kingdom represents a vital stage on account of a lack of recent aerial photography which could assist the preparation of planning studies for many towns and regions. Most of the aerial photography available only covered limited parts of some towns, and was out of date, as evidenced by government and private housing projects. The upshot was a lack of basic recent

maps for most of the towns of the Kingdom. So the towns and villages for which there were no aerial photographs were surveyed in order to clarify the prevailing situation. Base maps were used to prepare and define (a) an outline of the present stage of the town in order to make known its general shape, (b) all natural landmarks (e.g. wells, drainage channels, existing utilities networks and those under construction, roads of various kinds and railways), (c) built-up areas and structures at the town level (their type, elevation, condition and use).

The study relied upon the compilation of the greatest possible volume of data from original sources, including the relevant authorities themselves, the use of previous studies and surveys which the various agencies undertook and an attempt to update their data and use them as a basis for predictions. In the case of a lack of information, the municipalities undertook adequate physical surveys.

The urban survey set out to quantify the existing situation and define requirements for growth. This entailed the preparation of several maps and statistical information on the urban pattern. It sought both a structural drawing, clarifying the stages of historical growth of the town, and the current situation. The latter included land usage (geographical distribution of land usages viz-a-viz the various types of economic activity) (see Figs. 4.3 and 4.4 for examples), the state of repair of buildings (categories good, intermediate and poor), height (two storey accommodation, 2-4 storeys, more than four storeys), road networks (freeways, highways, collector roads, local roads) and the regions subserved and not subserved.

The survey of social services and utility networks was achieved through coordination between the municipality and the relevant parties. After a completion of the base maps referred to above, the municipalities concerned distributed them to the various parties (authority for water supply, sanitation and drainage; the electricity company; the telephone administration etc.). The aforementioned were asked for all information

- Residential, satisfactory
- Residential, good
- Governmental, good
- Governmental, satisfactory
- Parks
- Industrial
- Commercial

Analysis of Physical Structure

Qunfuthah



Figure 4.3:
Land Use
Survey for
Qunfatah

1 km
Approx.

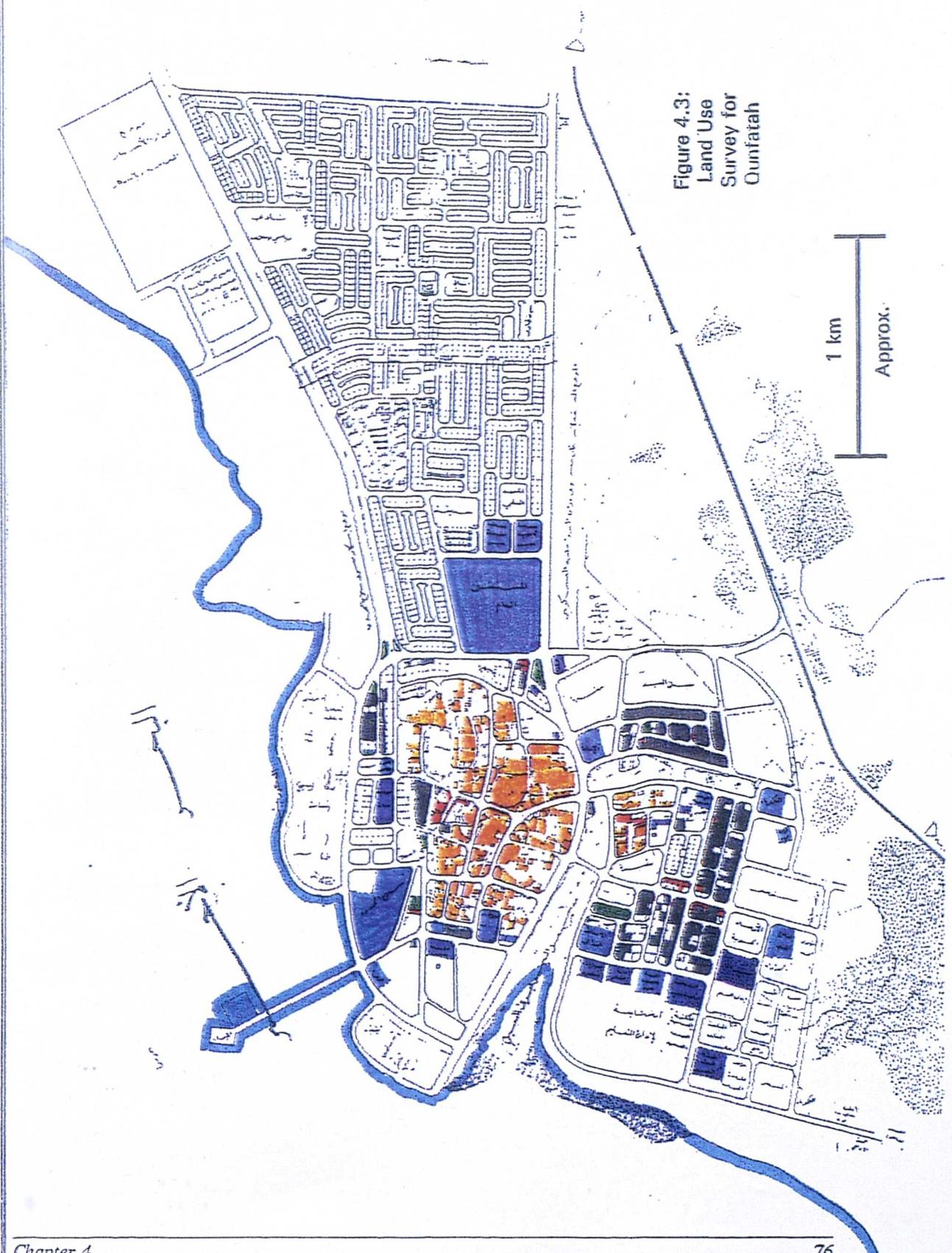
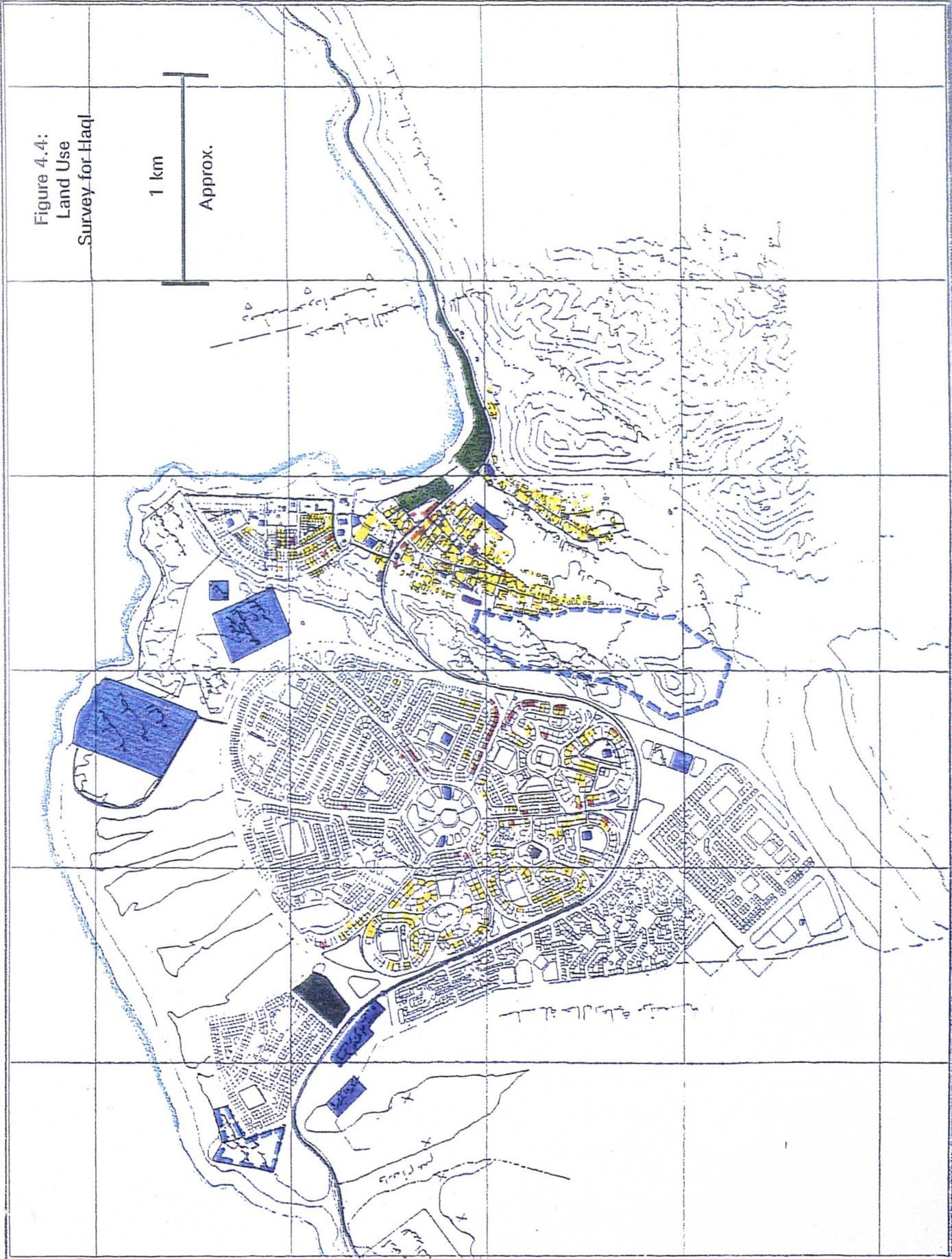
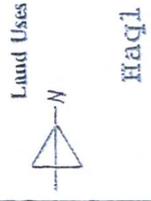


Figure 4.4:
Land Use
Survey for Haql

1 km
Approx.

- Residential
- Commercial
- Governmental
- Religious
- Agricultural
- Recreational
- Industrial
- Ruins
- Marine (Sea)
- Wadi
- Governmental Special



connected with the public utilities networks and the definition of regions covered by these networks, of regions not covered and of those currently undergoing the installation of works, in addition to a definition of the future projects in all the above-mentioned areas according to the five year development plan. The relevant municipalities also undertook the compilation and release of all data relating to each utility on a map with an appropriate scale, and the same pattern was adhered to with regard to social services. Copies of the base maps were distributed to all government bodies dealing with public services (education, health, religion, leisure, government etc.). These bodies were asked to define the location of current services and regions not served and future plans for each of the aforementioned services. The data gathered were transferred onto the maps at an appropriate scale.

Socioeconomic studies were restricted to population studies, i.e. the population structure - sex, numbers, nationality, age, and predictions on the basis of urban growth anticipated during the phases 1987-1995 and 1995-2005, by means of one of several methods. The first method was an estimate of population from direct sources by means of choosing a sample area and collecting the detailed data. This consisted of family characteristics; educational level and social (marital) status and birth and death rates; migration details; income, expenditure, and ownership of land, real estate and machinery; views of heads of households on the immediate environment, standard of living, and extent and adequacy of services and ease of access to them. Attention was paid to adherence to a single data framework according to the principles followed by the statistics department and databanks, in order to facilitate comparisons and extrapolations and the updating and trimming of data. It is worth pointing out, however, that putting this direct method into effect was no easy task in view of the lack of local technical personnel. So in most cases the population was assessed by indirect source methods. These require detailed comment.

It was also possible to assess population from Education Authorities by obtaining data on the number of pupils at the various levels of education for boys and girls. This can be expressed as a percentage of the overall population by reference to the population pyramid. For example, pupils in elementary schools represent 16% of the population, so if one knows their numbers, it becomes possible to arrive at an estimate of the population. This practical procedure became the cornerstone of population estimates in the majority of cases.

The electricity company records might also be reviewed in a given city. From these were obtained data useful for estimating the total population in the various districts. The principal data were: the number of subscribers (electricity meters) in different years; the number of subscribers who consumed an electric current in a given month of the previous year; the number distributed among the districts of the city and a calculation of the type of use evidenced by the meter (electricity for home consumption, shop, workshops etc.) as well as the type of premises in which the meter was installed (apartment, traditional Arab house, villa, shop, workshop, etc.) and the distribution of the user population according to categories of consumption. With a knowledge of the number of families and the average family size, it became possible to estimate the population of the town, and consumption served as an indicator or guide for comparison with other data.

There was another method used in the original survey, namely, taking the electrical energy consumed in the town per day, with a knowledge of the average consumption per person, it became possible to estimate the population. This auxiliary method was only employed to cross-check the data derived from the education authorities.

It was also possible to use the coverage of the telephone network as a basis for an estimate. The phone authority installed an average of 20 lines for every hundred

people. So from a knowledge of the number of lines it became possible to estimate the total population reasonably accurately.

Some towns made use of figures of the number of people working in various departments of government offices issuing entry or exit visas, and the manpower and social welfare institutions etc. It was noted that the workforce between the ages of 18 and 60, including working females, ranged in many towns between 25% and 35% of the population. So from a knowledge of these groups it became possible to arrive at a rough estimate of the population. Finally, primary health care centres and the family register offered a fifth source.

The third major step, the analysis and evaluation of existing conditions focused on residential analysis, analysis of services and public utilities networks, and an analysis of the urban structure. Each will be enumerated in turn.

Populations were assessed by taking into account the sex ratio, number of male workers and the population pyramid model. It was noted that the population growth rate in the Kingdom ranged in general between 3% and 4% per annum. The rate of increase in some towns could be attributed to an increase in job opportunities in agriculture, and the administrative and governmental and commercial services.

Expected or estimated populations were influenced to a great extent by the type of data upon which they were based. It was possible to estimate future population figures by exploiting our knowledge of population figures for two time phases, one of which was the official census for the year 1974, then the approximate number which was arrived at by the direct and indirect means referred to above. The more data there was on population figures in different time phases, the more accurate our estimates became. Estimates of the future population were arrived at by calculating the total population at the end of the period = the total population at the beginning of the period multiplied

by one + the percentage growth multiplied by the number of years elapsed between the start and end of the period.

All the data and information relating to the utilities networks were gathered from the concerned agencies administering these utilities. Information was also collected from religious, health, educational, leisure and government services. Analytical studies were made of this data, which were then summarised in the form of plans of public utilities and roads and a comprehensive map of public utilities.

In the light of these analytical studies, the land areas needed for services and public utilities were calculated. Unused areas of land available within the urban block were also located and defined, as were areas which could be exploited for the sake of these necessary services and public utilities. Likewise the remaining areas of unused land located outside the urban block were defined, and their existing use stated. (The Figs. 4.5 to 4.11 show examples of the basic mapping of urban facilities and utilities.)

Results and Conclusion

The results of analyses of the urban structure of many of the Kingdom's towns revealed the presence of i) quarters with a traditional character reflecting Islamic values and a planning and architectural heritage designed on a human scale, ii) modern districts with an engineering design which have largely foregone a traditional Arab character in the effort to provide utilities, services and road networks commensurate with modern development predicated on the arrival of the motor car. Both types of districts rub shoulders with ad hoc districts which have grown up without reference to any planning principles or criteria. This has contributed to the formation of a ruptured and discordant urban fabric, which has led to the lack of links between the different parts of the towns. It was in fact quite easy for the concerned agencies to analyse the urban structure simply by observing the historical growth of the town, the various land uses

Covered Areas

Grand Mosque



Friday Mosque



Local Mosque

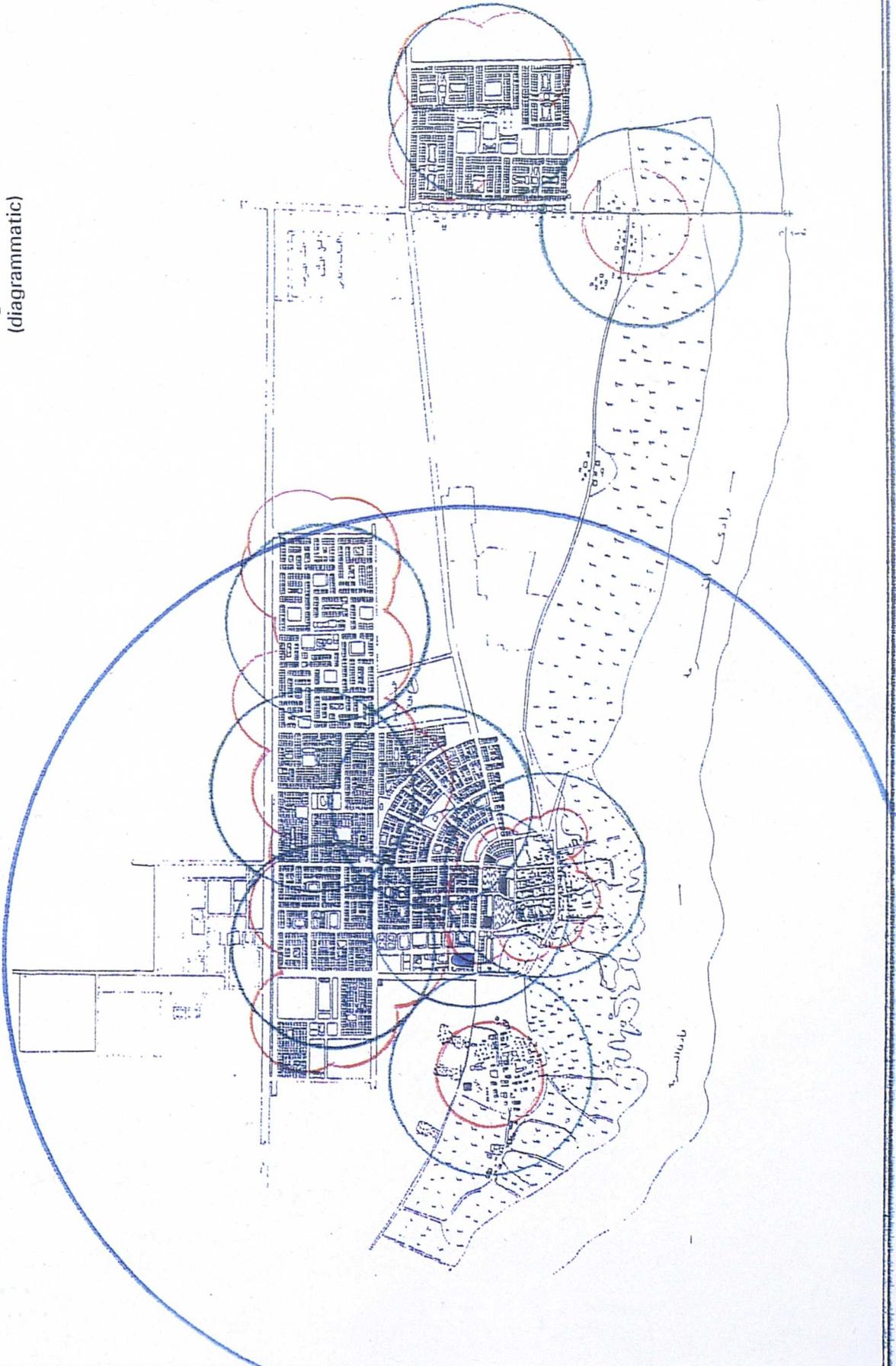


Religious Facilities

Al-Khurmah



Figure 4.5:
Al Khurmah:
Catchment Area for
Religious Facilities
(diagrammatic)



Private Dispensary



Public Dispensary



Hospital



Health Facilities

Al-Khurmah



Figure 4.6:
Al Khurmah:
Catchment Area for
Health Facilities
(diagrammatic)

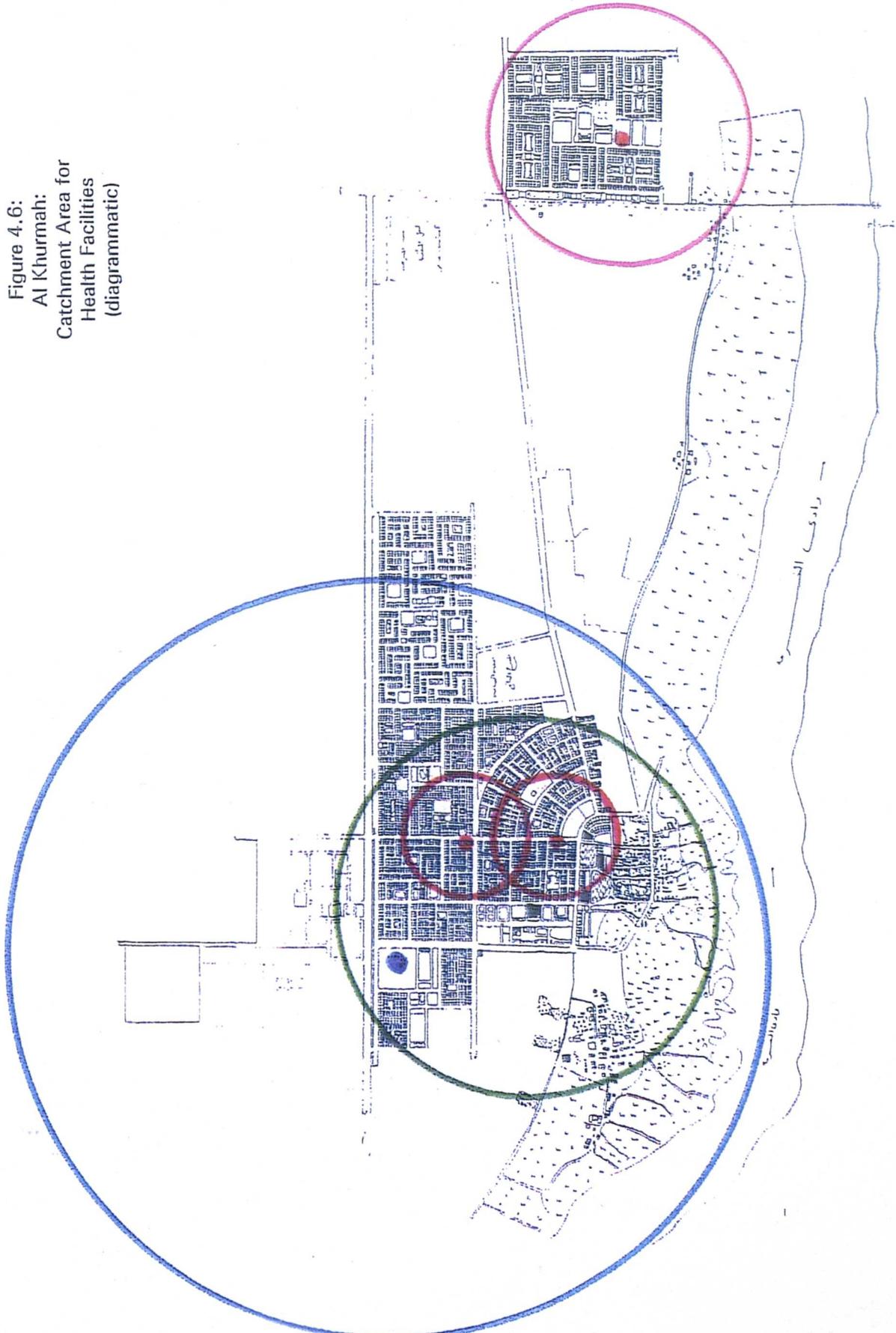
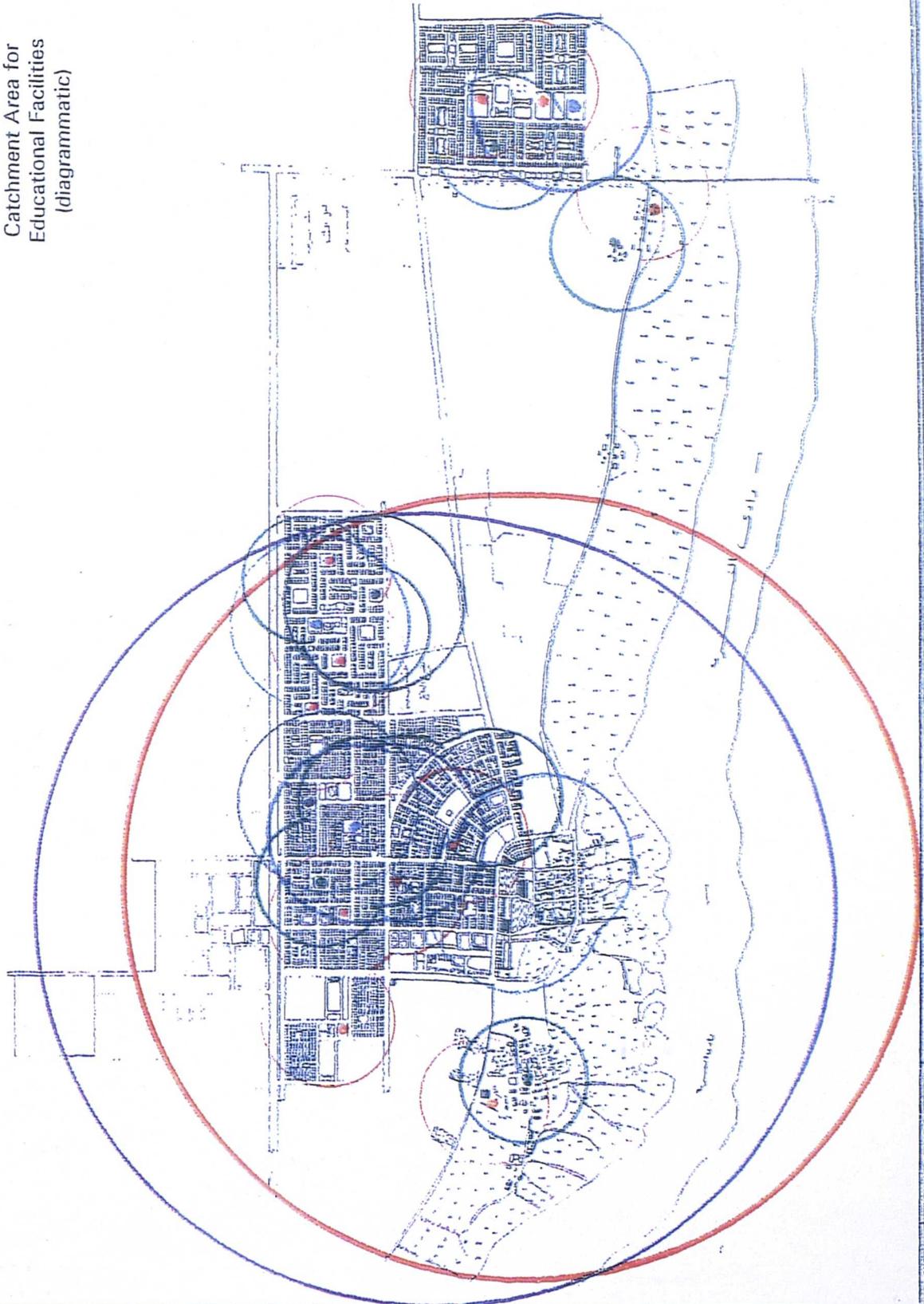


Figure 4.7:
Al Khurmah:
Catchment Area for
Educational Facilities
(diagrammatic)



- Girls, Intermediate
- Boys, Intermediate
- Girls, Elementary
- Boys, Elementary
- Boys, Secondary
- Girls, Secondary

Educational Facilities
Al-Khurmah



Electricity



Water



Telephone



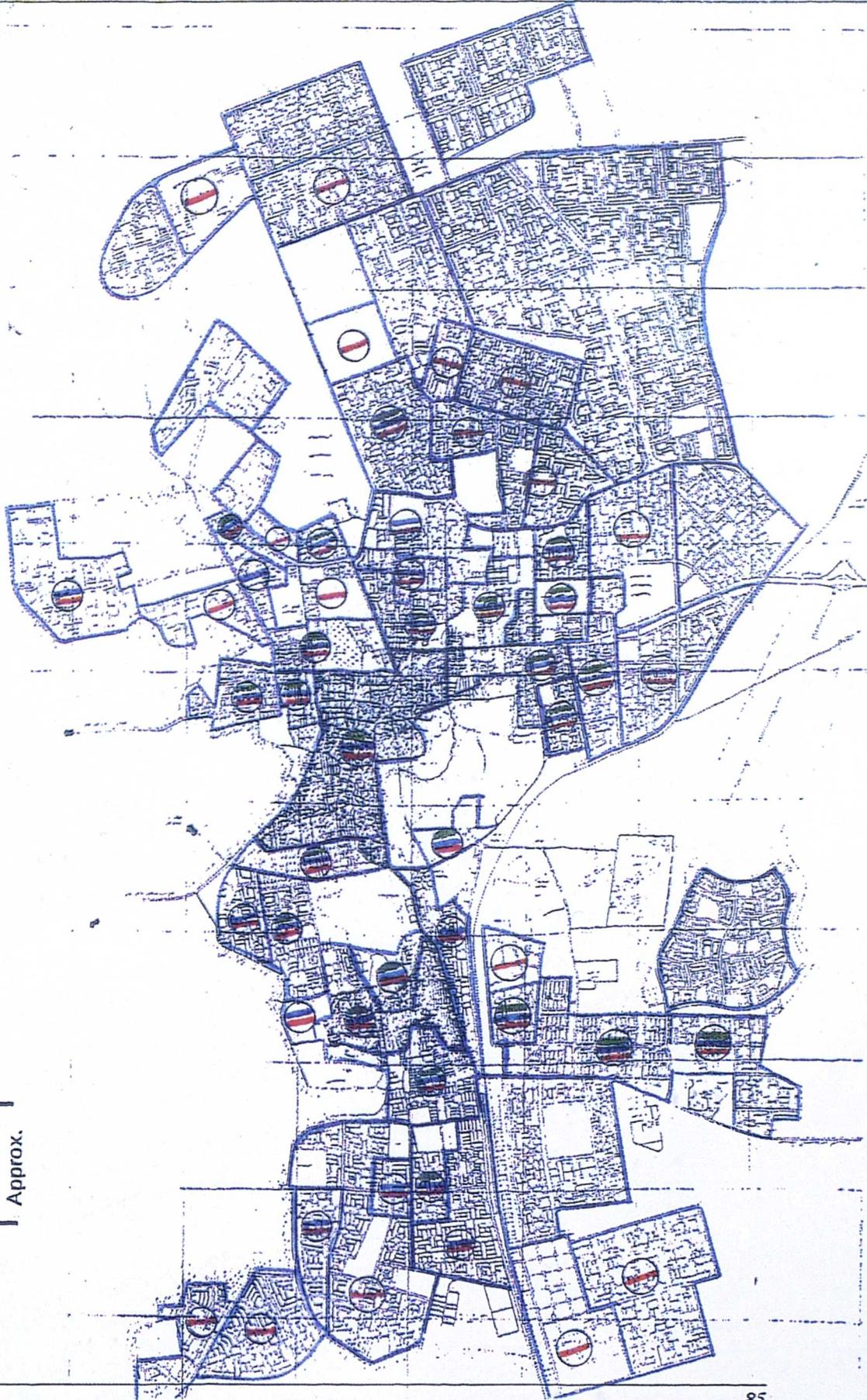
Figure 4.8:
Al Ahsa:
Availability of
Basic Utilities

Utility Grouping

Al-Ahsa



2 km
Approx.



- Covered Areas
- To be covered up to 1410 F
- To be covered up to 1425 F

Figure 4.9:
Al Ahsa: Existing
Areas served by
Electricity and
Proposals for
Second and Third
Phases

Electricity Network

Al-Ahsa



2 km
Approx.



Covered Areas

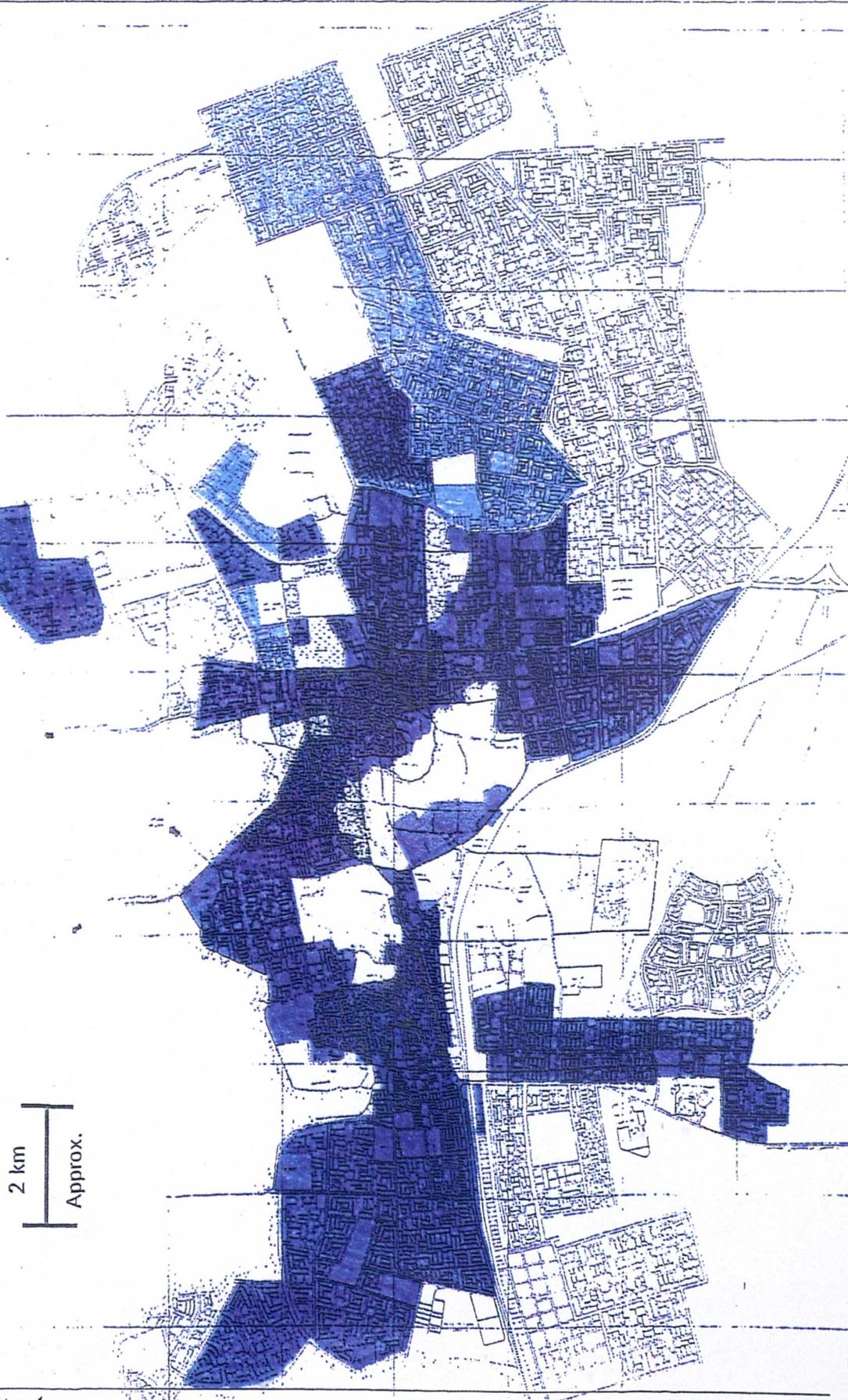
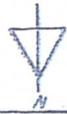


Areas to be covered later

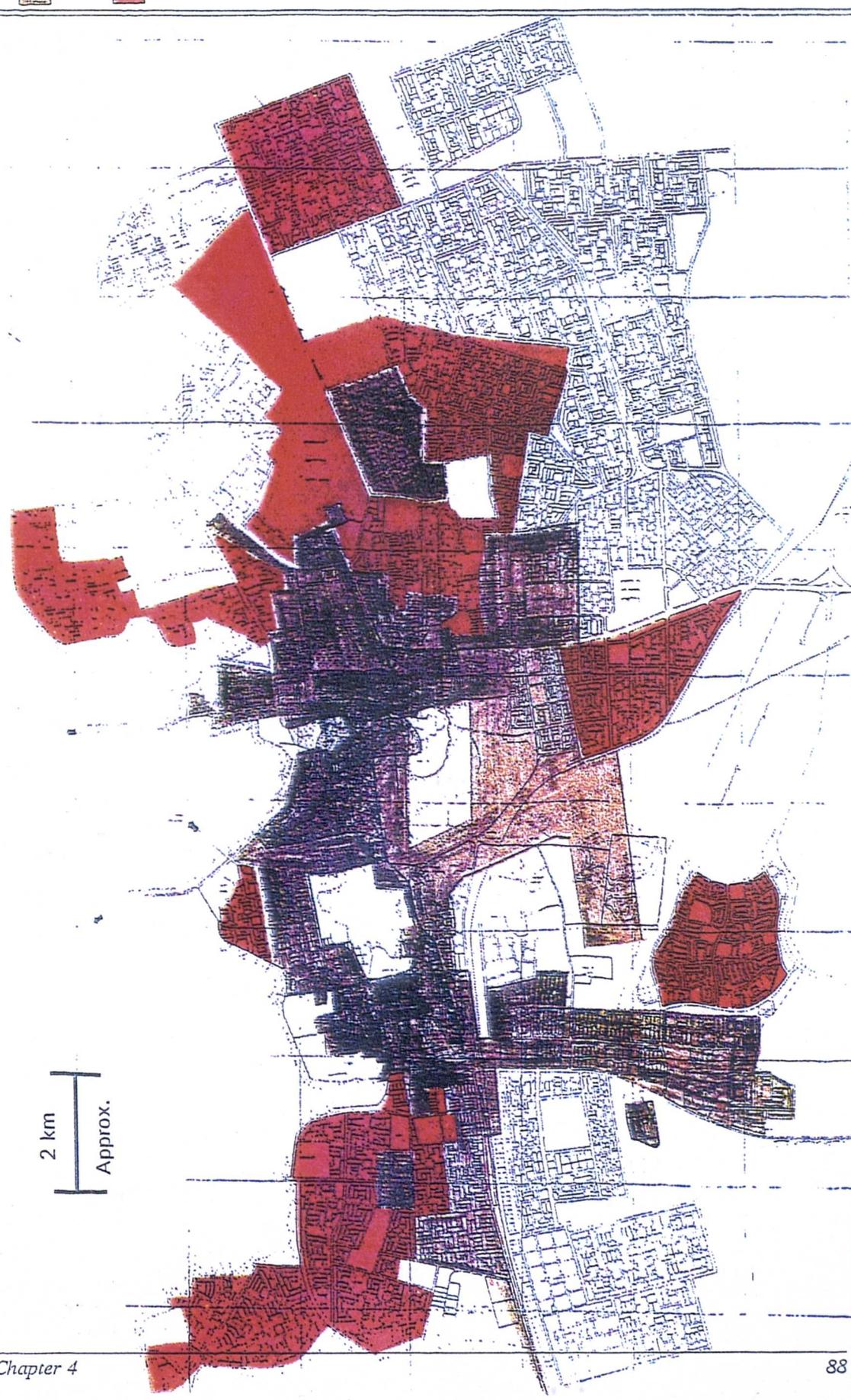
Figure 4.10:
Al Ahsa: Existing
Areas having
Potable Water
Supply and Areas
Proposed for
Future Supply

Water Network

Al-Ahsa



2 km
Approx.



Covered Areas

Areas to be covered

Figure 4.11:
Al Ahsa: Existing
Telephone Network and
Areas Proposed for
Extension of
the Service

Telephone Network

Al-Ahsa



and the locations of the existing buildings, the state of the roads and transport facilities and the current stratification.

It is impossible to understand a town, or its urban structure which imparts its identity, if we do not first take on board its dynamic character and the interplay of component parts during different stages of growth. Thus a town's historical development may be considered an essential element in an analysis of its urban structure. This stage includes a synthesis of all the previous plans for the town and all the information that can be found about the development of the urban block during different stages of growth. This stage necessitated a quantification of the changes that have occurred - gradual or harmonious expansion - and the reasons for each. Likewise it was necessary to bring to light the reasons and obstacles that hindered earlier growth. All this serves to build a picture of desirably and soundly-based growth which has benefited from earlier experiences.

From the study of existing conditions of land use it became possible to pinpoint the districts hosting activities resulting in several planning problems, like traffic bottlenecks etc. which required a definition of uses and their land requirements as well as providing land areas needed for public services in the old quarters or on their periphery in cases where it was not possible to find unused areas of land within them. Thus, special unused government land areas within and beyond the urban block were defined. They were undeveloped and had not been earmarked for future development. Suggestions were made regarding the necessary preconditions for development and the level of land works by calculating the number of built-up areas relative to the total number of sectors in the plans or the built-up areas, and also by calculating the density of buildings in the various districts with the aim of arriving at the ideal building density. A count was made of areas with a high building density, which would necessitate the provision of areas such as open leisure spaces and public services in the old districts

to accord with appropriate planning criteria. Increasingly isolated or unbalanced sites within the built-up areas were identified with a view to rectifying them by increasing their 'potential capacity', being the investigation of the district's natural resources, land use, services and utilities, public projects, transport networks with a view to the accommodation of greater numbers of inhabitants and the concomitant human activity within the district in question.

From the comprehensive survey of the buildings in various districts, it was possible to discover the population density in those districts as well as ascertaining which districts' capacities could be increased. Older districts were assessed to see which areas were of no historical value and required speedy housing solutions and the exploitation of land for public projects. Density calculations were made according to the following formula: No. of inhabitants = no. of units x average no. of family members.

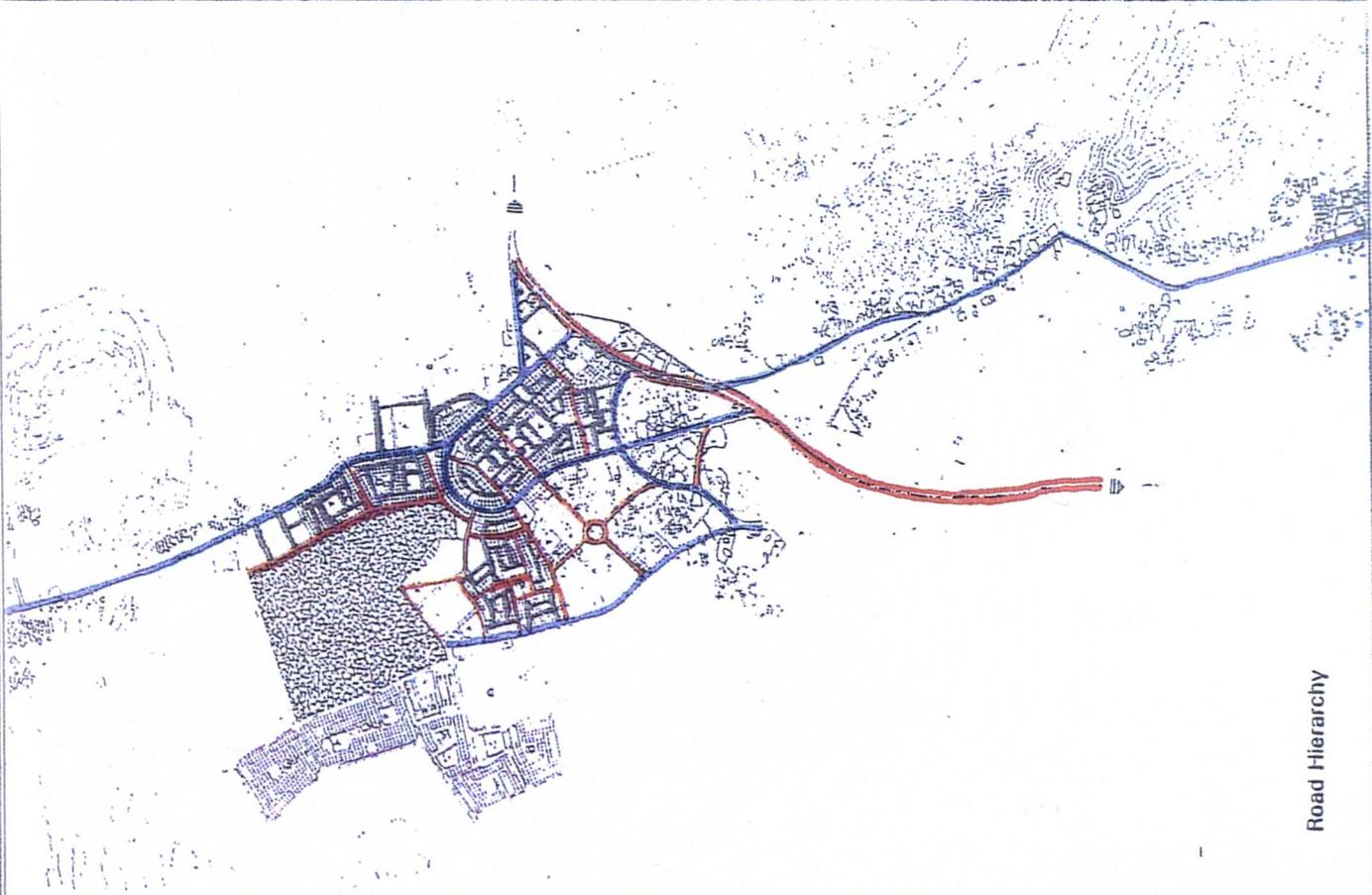
The categories of current road networks (freeways, highways, local and collector roads) were applied and it was decided how appropriate they were to their function, and to what extent they covered the needs of the town (Fig. 4.12). Districts were found which were not served by the road network at all. Certain main nodes of the existing network were examined in view of their relationship with the town's growth trends. The paramouncy was recognised of deciding on new nodes vital for the realisation of the strategic goals of the new urban plans attempting to interconnect the various districts with a transport network. It was also understood that the town must be linked to the towns around it at a regional level. We were able to decide on the various types of urban settlement needed and the pivotal points of growth and districts with a high population density. Similarly, districts with a low population density which could be used to solve the problems, again through analysis of the existing characteristics of the urban structure.

-  Freeway
-  Major Road
-  Collector
-  Local

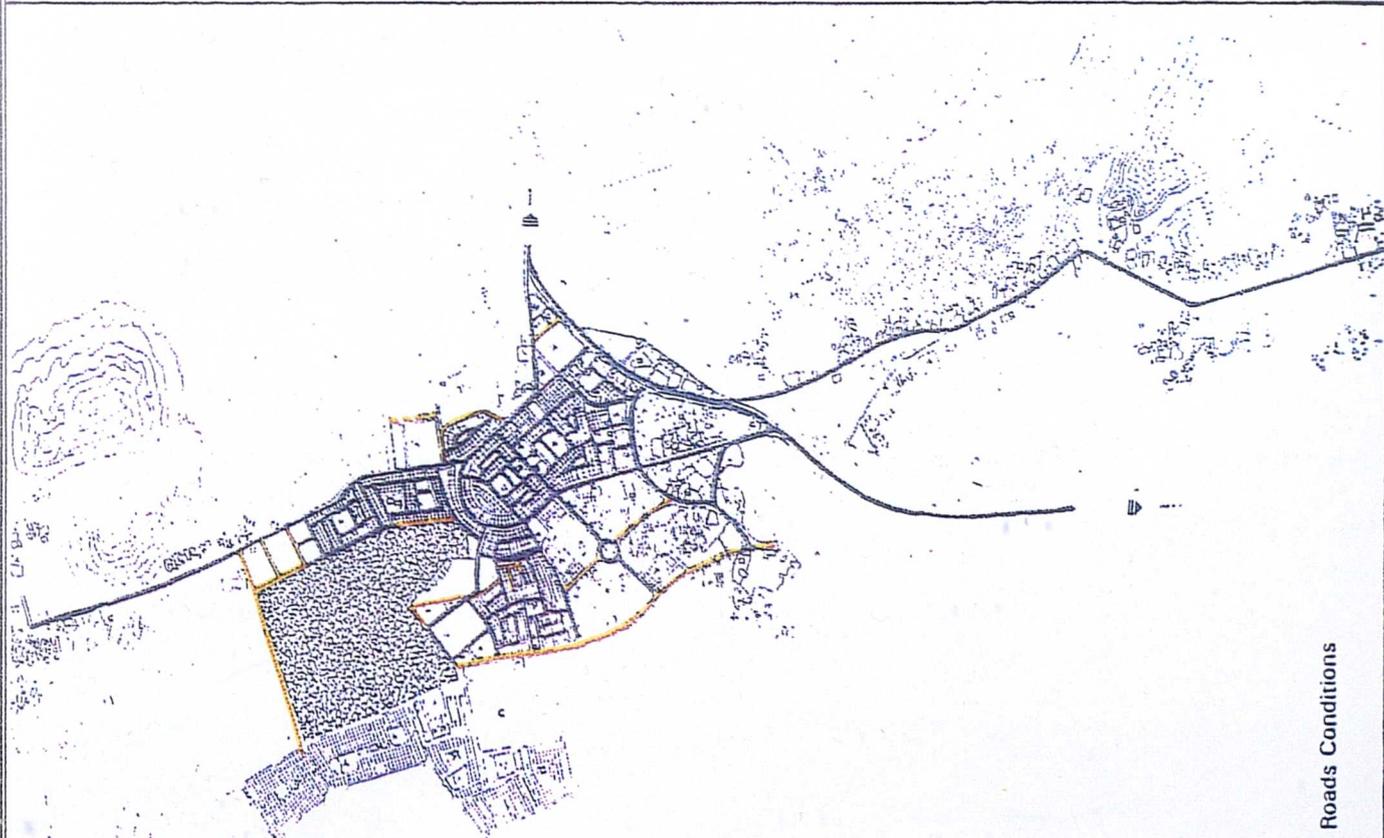
 Asphalted Roads

 Track
Figure 4.12:
 Badr: Existing
 Road Conditions
 and Proposed
 Future
 Classification

Badr



Road Hierarchy



Roads Conditions

The study contained a calculation of several future land use needs , as well as utilities, public services and municipal services (commercial and recreational). This was in the light of the set planning criteria and population prediction for the years 1995-2005.

The fourth major stage was the delineation of the *nitag omrani*. This and the choice of ideal town size was not a matter of aesthetic coordination to produce a particular form or picture. On the contrary it was a scientific procedure based on planning principles and criteria that took into account the actual needs of the towns. Planners and citizens participated to rationalise urban function and organise the process of growth. This procedure had a degree of flexibility, thus allowing it to accommodate real-life human changes and ensure continuity.

Three main principles were followed in the delineation of the *nitag omrani*.

The first was the result of "subjective" studies. These are results which follow from existing conditions and municipal surveys and an estimate of the population density and analytical studies in general. The main ones can be summarised as follows: (a) estimates of current population and future populations at various stages of growth, either from a direct estimate of the population or from a calculation of the number of buildings and residential units and families; (b) calculation of requirements of human activities for services, public utilities, investment projects, land for various uses, and the degree of convergence between these needs and the plans of the various government departments; (c) calculation of the district's potential capacity - which will function to limit growth in the urban block; (d) calculation of the land areas necessary for the various stages of growth, building on an estimate of the number of inhabitants and the services they require and the various land uses according to planning criteria.

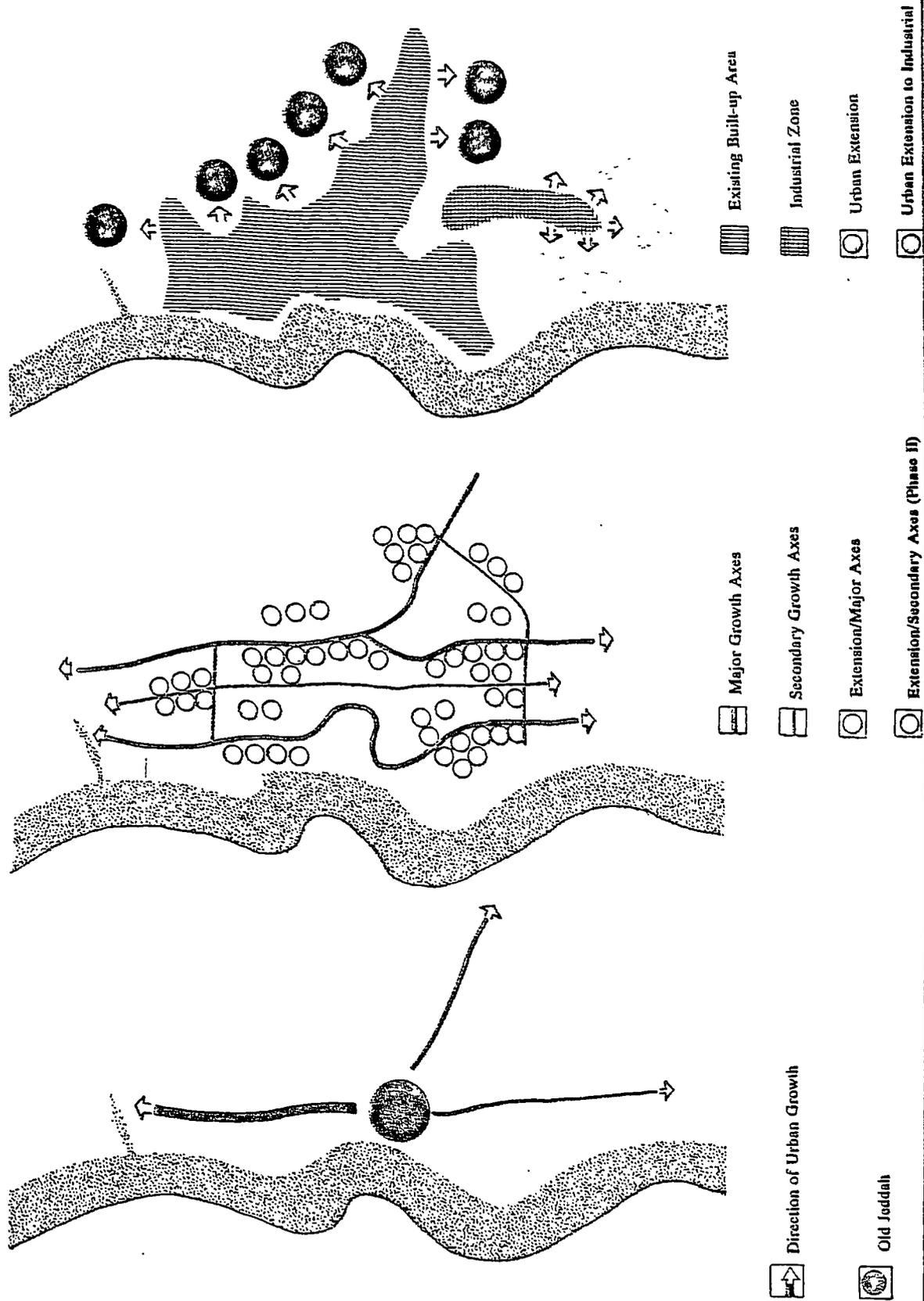
The second principle involved organisational and administrative considerations. This stage includes national plans for growth, and their main elements were: (a) deciding

on specific areas for land grants, taking into consideration the study of their locations, surface areas, potential for growth within the town limits or as an independent suburb; (b) defining the administrative borders of the *baladiyyat* and *amanat*; (c) taking government projects into consideration, such as housing for low-income groups and other development projects.

Thirdly there was the cost of urbanisation. The cost of urban growth (the cost of services, public utilities and their upkeep) was regarded as an important urban growth-limiting factor in the light of available material resources. Using such considerations, it became possible to estimate the ideal level of growth in land and services.

Several alternative ways of developing the *nitag omrani* were drawn up for each town in the following manner. One was an alternative land use strategy based on a study of factors which serve to attract inhabitants and limit the direction of growth of the urban block. These factors were the presence of recreational elements, centres of current services falling within the urban block and the availability of industrial districts representing work centres and sites of approved subdivision and land grants. Another alternative strategy of the urban growth focuses on the link between urban spread and the principal and secondary axes of growth from within the town itself (Fig. 4.13). Urban expansion is therefore expected along both sides of the main arteries into the town, and from them to the secondary axes. A third alternative focuses on the directions of natural growth found in the urban block. A fourth is based on the idea of beginning with the growth of districts which contain all the public utilities, then proceeding gradually through subsequent stages. This alternative relies on the idea of drawing upon the many advantages of each of the alternatives and discarding their drawbacks. This was in the framework of basic limitations through which were fixed this alternative's recommended growth stages. Then at each stage attention was paid

Figure 4.13:
Schematic
Diagram of
Alternative
Development
Strategies for
Jeddah



Development
Alternatives

to the priorities of these limitations, and particular care paid to their ultimate limits, namely main roads or natural obstacles (Fig. 4.14).

The *nitag omrani* was delineated in accordance with the Five-Year Development Plan, and care was taken that the expected population increase and the increased population's needs for services and utilities be accommodated during the phases planned, and that the delineation of the boundary accord as far as possible with the various government agency programmes during the period requested. The fixing of limits had to be based on logical principles to avoid fragmenting integrated projects or private landholdings belonging to one owner.

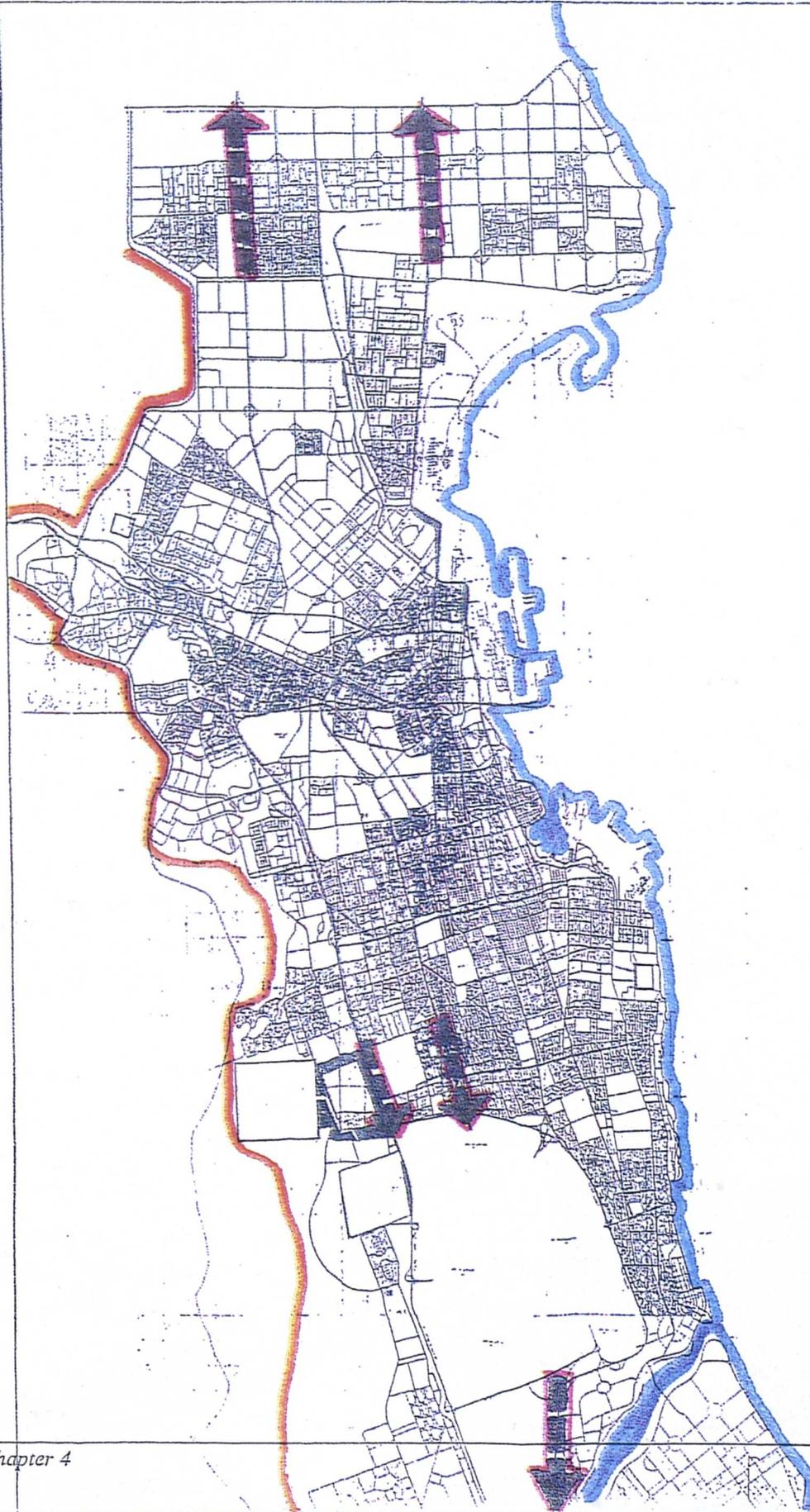
The studies specified that the data collected, and the staging based on that data, should be revised and corrected from time to time to keep abreast of various changes which could arise unexpectedly. The year 1993 was fixed as the time for updating information and reviewing the suggested stages for various phases of growth. The second stage was split into two parts, the first from 1995 to 2000, and the second from 2000 to 2005. On that basis the adjusted limits should be an indicator of what ought to be the limits of future growth, taking into account continual change.

The fifth stage, the final one and production stage, involved preparation of an atlas of Saudi towns and the *nitag omrani*, preparation of a technical report on the city, and preparation of an atlas of maps of each city.

The first consisted of a primary atlas of existing conditions only, and a secondary atlas integrating the hundred towns studied with two pages for each town. The first page summarised existing conditions and future needs, presented within the overall framework of a standardised database collected and evaluated according to standardised procedures. The second page (facing page) contained the final, fixed option for stages

Figure 4.14: Jeddah Physical Development Constraints

5km
(Approximate Scale)



of growth (1995-2005). The limit of urban growth was entered on the map of existing conditions showing land use.

Secondly, a separate report to a standard format was prepared for the collection of data about existing conditions, planning information and the analytical schedules which facilitated evaluation. On the basis of this analysis it was possible to calculate future needs and draw up options for the different stages of growth according to the local changes in each town.

The third component consisted of all the town maps necessary for the preparation of studies of existing conditions for each town were assembled, with supporting analytical diagrams and the plans showing the final urban growth stages.

A manual was prepared to explain the method and procedure of delineating the *nitag omrani*. It was prepared as guidelines to be followed by the *baladiyyas* and *amanas*. The aim was, firstly, to arrive at a technical approach to restricting town sizes and control the phenomenon of random growth. These studies were geared towards execution by work teams specially appointed for the job at the local level in both *baladiyyat* and *amanat*. This was undertaken in accordance with available possibilities, without regard for the technical capabilities required to successfully carry out this project. Therefore a programme was set up to be undertaken by non-specialists and others without a planning or engineering background. Most of the small municipalities - i.e. about 80% of them - undertaking this work had a surveyor or draughtsman. That activity was kept under continual supervision by a central multi-disciplinary team within the Deputy Ministry of Town Planning of MOMRA, headed by the writer who is the General Director for Coordination of Projects. It is worth pointing out that the studies had to be able to encompass a wide range of towns - from those with 2,000 inhabitants to others with more than a million; from towns with a flat topography to others with a distinctive topography; from towns of a traditional, rural Bedouin

character, to others of a transitional character to others yet of a deep-rooted historical character; from rich towns with natural resources and a variety of social services to others characterised by relative infrastructural deficiencies, and so on. There was in addition the consideration of the length of time needed to prepare even the briefest planning study. Thus two years were allowed for the 100 towns, that period to include the structuring of various aspects of the planning process. The principal aspects may be summarised as follows:

There was the structuring of planning criteria used in calculating the requirements for social services and public utilities. A pyramidal model and physical distribution were adhered to - criteria borrowed from certain planning studies.

There was simplification of the type and level of planning information and data used to evaluate existing conditions defining urban social and economic characteristics.

There was also simplification of the list of plans needed to prepare studies of the different stages of existing conditions, analysis and the alternative options for small towns.

There were, lastly, certain considerations which basically dovetail with national policy: i.e. national policy on the granting of lands, providing enough land for services to raise them to the level of developed nations, the addition of abundant land for expansion and further growth, and the reservation of land to cope with growth and accommodate rapid changes in economic circumstances.

In conclusion, then, a simplified procedure was devised to provide a picture of urban expansion without requiring that enormous efforts be expended in collecting the necessary information and data. This procedure had to tally with the capabilities of local authorities. It was an effort to control the rapid growth of settlement and curb the physical expansion of the towns. For the first time local authorities undertook the task of preparing alternative urban development plans in accordance with their

sectoral needs enabling them among other achievements to determine the requirements of these towns.

Some unforeseen constraints and limitations in the delineation process of the *nitag omrani*

It is not intended here to criticise the *nitag omrani* as an alternative means of directing urban growth and development in the Kingdom. The intention is to highlight and explain some of the unforeseen constraints and planning limitations which have affected the delineation of the *nitag omrani* for some urban areas and which have since provoked some criticism at the implementation stages.

The spatial pattern could give rise to criticism. Some urban centres consist of the primary built-up area or the main centre, surrounded by a number of dispersed secondary ones or small neighbourhoods which are separated by large tracts of vacant land. Although those disjointed urban areas are inhabited, and their claim for social services and infrastructure provisions during phase one of the *nitag omrani* is evident, the proposed development boundary, however, did not integrate them as a whole. For practical economic reasons, the large tracts of vacant lands had to be excluded and a relatively tight growth boundary for phase one had to be established separately, thus minimising the cost of service provisions. Al-Taif main urban centre and its Al-Hawiyah neighbourhood in the north is a good example where it was found that in 1987 the former was separated from the latter by a number of large farms. During the implementation stage of phase one of the *nitag omrani* it became apparent that considerable development has taken place between the two settlements. Due to such unforeseen rapid urban growth and development, it became necessary to modify one of the major *nitag omrani* recommendations, in particular the recommended division of phase two (1995-2005) into two phases of development by the end of 1993. Accordingly, the structure planning project for Al-Taif, now in progress, took this

into consideration and treated Taif, Al-Hawiyah and the urban development in between as an integrated whole in the delineation of the recently revised phase two of the proposed development.

Some partially inhabited illegal settlements were given priority in the provision and extension of social services and infrastructure, while several other approved vacant land subdivisions remained unserved during phase one of the *nitag omrani*.

Again, the delineation of the *nitag omrani* took into consideration the social, tribal and traditional values which have shaped the apparently dispersed spatial patterns of some urban centres. It was therefore rather difficult to enforce a cohesive pattern for the delineation of the *nitag* while maintaining the relative integrity and identity of such sporadic pattern of spatial distribution of small settlements and communities.

Most urban areas in the Kingdom have a considerable number of approved land subdivisions, which are not built and inhabited. The delineation of the *nitag omrani* development phases took into consideration only those inhabited built-up areas and those partially occupied land-subdivisions. Natural barriers such as mountains and other physical features such as roads or valleys were employed in the definition and delineation of the *nitag omrani* development boundaries. Accordingly some adjustments were made to the physical and spatial boundaries.

The *nitag omrani* programme identified several characteristic features of the Saudi urban environments. In particular, the phenomenon of the twin urban centres which called for some special treatment in the delineation of the *nitag omrani* boundaries. Special reference is given to Khamis and Abha twin cities and also to Al-Huffof and Al-Mubarraz urban centres while Dammam, Al-Khobar and Al-Dhahran, demonstrate the proximity of more than two urban areas. It is worth mentioning that the National Spatial Strategy (NSS) has recommended the spatial and physical integration of such

urban conglomerations as evidenced by the proposed development corridors which were identified in various parts of the Kingdom. Furthermore, the structure planning project for towns and cities in the Kingdom has recently adopted this concept of spatial and physical integration in a regional and sub-regional context where a selection of some village settlements and hamlets were also included with some urban centres.

In spite of the valid argument in favour of spatial and physical integration of adjacent urban centres, the delineation and definition of the *nitag omrani* was nevertheless established on a separate base. For instance, the *nitag omrani* for Yanbu Al-Bahar (old Yanbu) did not include Yanbu Assinaiyah (the new industrial town), and both towns were treated as separate entities. Similarly in the instance of Al-Jubail town and Al-Jubail Industrial town, where each one had a separately defined urban growth and development boundary.

The reasons behind such separations are varied and complex, despite the fact that in both cases the difference in functional role between the old towns and their continuous industrial ones is fairly obvious. Furthermore, both industrial towns play significant and distinctive economic roles on a national level, and have been guided by some special development control measures based on modern comprehensive development plans. As such, these towns have been treated as special development areas where security measures, physical characteristics and economic functions have been taken into consideration in the delineation process of their *nitag omrani*, which were also affected by the limitations of planning information and the time needed for the completion of the programme.

Ideally, however, the *nitag omrani* should have been established on the basis of comprehensive regional planning studies. Nevertheless, due to the limitations of time and planning information, some limited attempts were made to bridge the gap. Simplified regional and sub-regional base maps were utilised in addition to a limited

number of previously prepared regional planning studies in various parts of the Kingdom. Sectoral information from various government institutions, research investigations and some local knowledge and information provided the general bases for the determination of the functional role of various urban centres on regional, sub-regional and national levels. The *nitag omrani* investigative surveys also provided particular supplementary information which was sufficient for the assessment and evaluation of the hierarchic structures and spatial distribution of municipal services, commercial centres and recreational activities. Some regional services were designated to particular urban centres. These functions were mostly located outside the *nitag omranis*, but inside their urban protection zones, and they were excluded from the *nitag* development phases.

The industrial areas within or on the outskirts of urban centres were also excluded from the *nitag omrani* development phases. The development of such areas were therefore subject to the progressive needs and demands of the population, and also to the technical assessment and approval, on which the DMTP technical staff are already occupied.

In case of misinterpretations or difficulties of applying the *nitag omrani* development controls, the local authorities were permitted to refer the matter to the DMTP for assistance and clarification. Evidently this has caused further inconvenience to both the citizens and to the technical staff of the DMTP.

A number of difficulties were encountered when verifying and physically identifying the *nitag omrani* development boundaries. Phase two was the most difficult one to research due to the relatively large areas which were reserved for future development. Furthermore, in the absence of definite land marks in certain cases, and in view of the prohibitive costs of establishing reasonably accurate *nitag* boundaries, a consid-

erable number of municipalities were unable to undertake such a task in a satisfactory manner.

With reference to phase two of the *nitag omrani*, it was found that certain locations were adequately provided with some utilities such as electricity. Generally such areas will be included in phase one. However, due to the presence of some physical and natural barriers, and also in view of the reluctance of the residents to continue living there, such locations were excluded from phase one of the *nitag omrani* development programme.

The urban protection zones for a number of urban centres had to be approximately defined due to the lack of adequate planning information. During the implementation stage it was found that certain areas which were planned or developed were overlooked and unintentionally excluded from the *nitag omrani* development phases, particularly those areas which were located between the *nitag omrani* phase two and the urban protection zone. This is mainly due to the lack of comprehensive planning information and recently updated base-maps.

The *nitag omrani* for 2005 included large tracts of land for the future development of some urban centres. In fact, such land reserves apparently exceeded the anticipated needs for future growth and development. This is partly due to the inclusion of some unsuitable lands such as mountain areas and flood plains, and also due to the availability of a large number of private land subdivisions which had already been approved.

The *nitag omrani* also included some areas which were characterised by dispersed patterns of individual housing units and buildings. Although such cases were usually classified as existing conditions for the provision of infrastructure and social services, they are nevertheless governed by the *nitag omrani* development phases and the related

controlling measures. Figures 4.14 and 4.15 are shown here to illustrate for three settlements the drawing of the boundary in relation to the two phases of urban growth.

It is worth noting that the technical staff of some municipalities were not particularly serious about the outcome of the *nitag omrani* programme. However, the late realisation of the significance of these studies became apparent when the Council of Ministers formally approved the *nitag* recommendations. Subsequent requests for changes and alterations, during the implementation stages, have been particularly intensified by those municipalities but the DMTP has already established a very demanding procedure for the assessment and consideration of such requests. For instance, municipalities are expected to submit detailed technical reports to the DMTP verifying and explaining all the reasons in support of their application for any *nitag omrani* changes. Subject to the recommendations of the DMTP, a ministerial representative committee will further review the applications and submit the cases to the Council of Ministers through the Minister of Municipal and Rural Affairs. To date, a large number of applications are still being reviewed and the concerned municipalities have now learned the hard lessons in the planning process.

The technical limitations of a number of local planning institutions have affected not only the quality of the *nitag omrani* studies but also the sequence of planning operations and the limited time set for the completion of the programme. Further delays and repetitions of the *nitag* studies were also due to the unexpected changes and transfers of the various members of the local planning team in several municipalities.

Demographic information was also affected and, in certain cases, was quite misleading. Some municipal directors exaggerated the actual population number of their towns, believing that the importance of their municipalities is related to the size of their population. Such attitudes resulted in considerable delays and demanded considerable attention by the central planning team.

First Phase



Second Phase

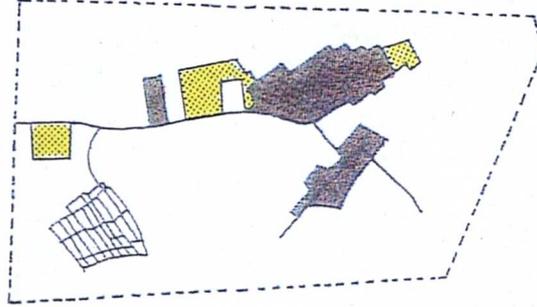


Protection Development Boundary

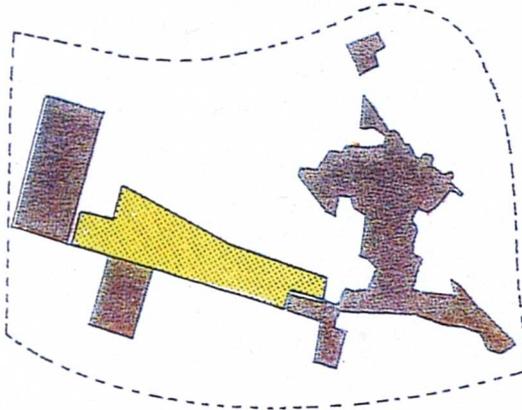
Figure 4.15:
Definition of the
Urban Boundary a
Jeddah, Al
Baquriah and
Turabah
(schematic
variations)

Ways of Defining

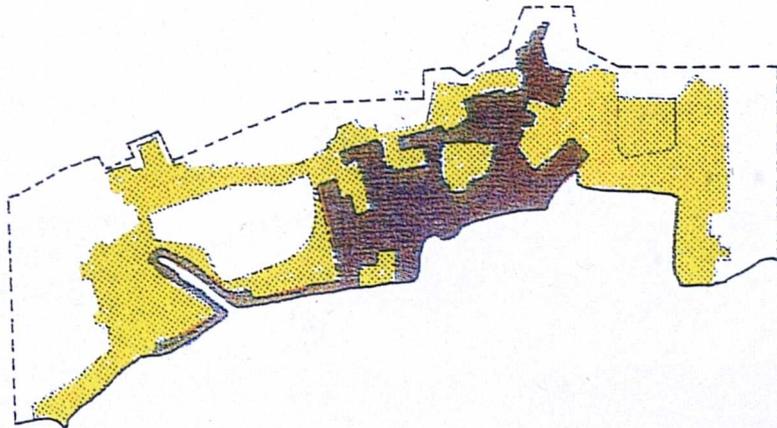
Urban Boundary



Turabah



Al - Baquriah



Jiddah

The verification of land ownership has been a serious handicap. The *nitag omrani* development control measures could not influence the timely development of the privately-owned vacant lands within the various development phases. However, some controlling measures were enforced in the planning and implementation of the primary road networks irrespective of the prevailing constraints of land ownership. It is worth mentioning that special studies relating to the control and future development of vacant lands were prepared after the completion of the *nitag omrani* programme.

Special attention was given to the preservation of agricultural lands within or adjacent to the existing built-up areas in various towns and cities. Only those productive and economically viable agricultural lands were subject to strict development controls. Non-productive allotments were excluded and can be reconsidered for land-use changes by the DMTP and the Ministry of Agriculture and Water Resources. The various transactions submitted to the DMTP requesting the conversion of agricultural lands within urban areas into residential usage offered some valuable indicators for the establishment and promotion of the *nitag omrani* development controls.

Some urban areas were excluded from the *nitag omrani* programme. That was mainly due to the dispersed patterns of the numerous built-up areas which were inhabited by various tribal groups. Regional and sub-regional planning studies were considered most appropriate in such unique situations.

The foregoing, however, is not a comprehensive coverage of the planning constraints and the unforeseen circumstances affecting the delineation process of the *nitag omrani*. The central DMTP planning team is therefore currently engaged in reviewing a number of operational aspects and preparing alternative solutions and recommendations for best practise. In this connection, the author has summarised the practical application of the *nitag omrani* technique to a major Saudi city and this is presented as a case study forming the next chapter.

Chapter 5

Nitag Omrani: Case Study

Introduction

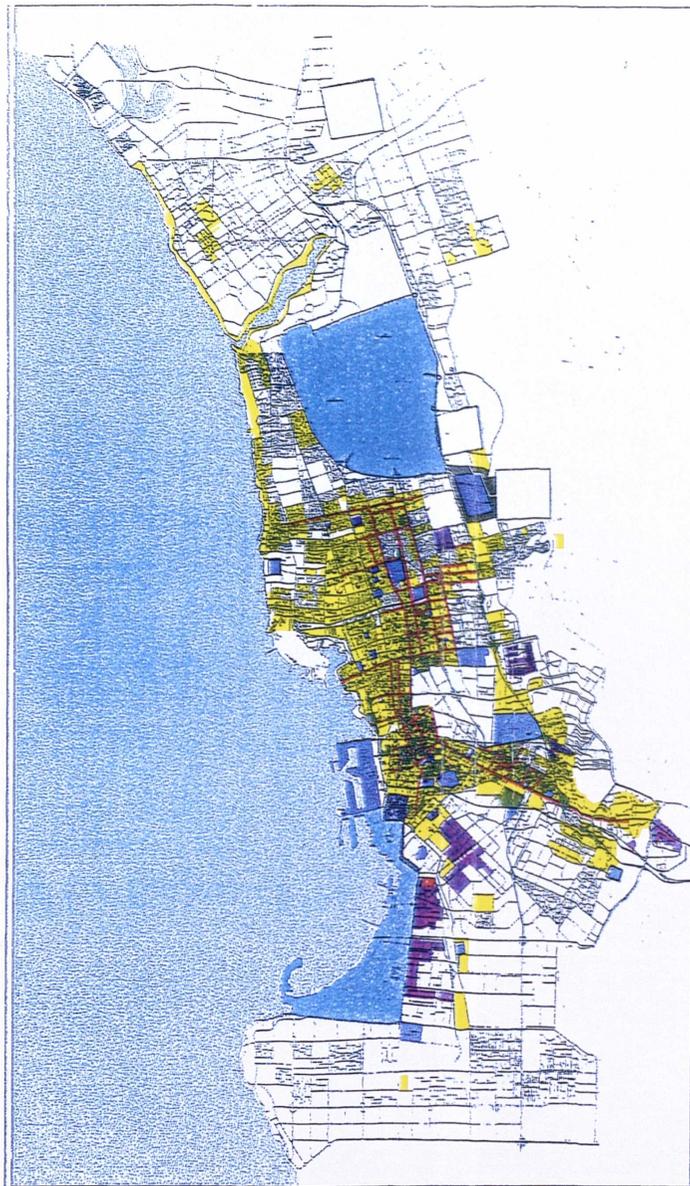
This is a case study illustrating the general approach to the delineation of the *nitag omrani* in a situation where carefully planned development was later out-stripped by spontaneous growth beyond the capacity of the infrastructure to contain it. Jeddah has in fact become the victim of its own success in the implementation of its original development plan and its subsequent revisions and amendments. While recognising that each town or city is unique, it can be said that the problem of urban containment exemplified by Jeddah is of universal application elsewhere.

What is instanced in this study is no more than the author's summary of the application of the detailed survey, analysis and plan making which forms the substance of the Manual accompanying the 100 Saudi Cities Atlas demonstrating the *status quo* and their development boundaries as subsequently authorised in the *Nitag Omrani* Atlas. (The manual is included as an appendix to the author's work.)

The city of Jeddah is located on the coastal plain of Tihama which extends between the Red Sea Coast and the Sarawat Mountain Range and the Hejaz Mountain Ranges. It is the second largest urban centre in the Kingdom in general, and the largest city in the Western Region in particular (which includes the Holy Cities of Makkah and Medinah, and the cities of Taif and Yanbu), a distinctive geographical location which has made it an important trading centre and a focal point for those coming from other countries of the world. Its important functional role is assured by being the major seaport of the Kingdom, handling about 80% of the foodstuff consumed in the kingdom. In addition to its role as airport for Makkah Al-Mukaramah and centre for

Land Uses

- Residential
- Commercial
- Governmental
- Religious
- Agricultural
- Recreational
- Industrial
- Ruins
- Marine (Sea)
- Wadi
- Governmental Special



Jeddah, G.S. 14

1. Gross Area = 10,289 Ha
2. Area of Urban Planning Spaces 1407 H: 18222 Ha
3. Planned Area of Urban Block 1407 H: 2118 Ha
4. 1st Phase Development 1859 Ha
5. 2nd Phase Development 2822 Ha
6. No. of Development Units (population densities) 50397 Ha
7. No. of Non-developed Units (population densities) 99693 Ha.
8. Coverage Percentage 18242 Ha
9. Coverage Water 1798 Ha
10. Coverage Telephone 1622 Ha
11. Coverage Roads 288 Ha
12. Average Dwelling Units/Plot 4
13. Average House/Plot size 99 person
14. No. of Approved Subdivisions 1025

SYMBOLS

1. Utility Table

- GAC - Gross Area Covered (thousand hectares)
- CI - Area Covered and Inhabited
- IU - Inhabited but Uncovered
- CP - Covered Plots

2. Municipal Services (Roads) Table

- TL - Total Length (Roads)
- AR - Asphalted Road
- UAR - Unasphalted Road
- LR - Lighted Roads
- PR - Paved Roads
- RR - Required Roads
- EAR - Existing and Asphalted Roads

3. Municipal Services (Recreational) Table

- N - Number (Units)
- A - Area (Ha)
- PR - Person Rating (Som)

4. Municipal Services (Shopping and Commercial Facilities) Table

- N - Number (Units)
- A - Area (Ha)
- PR - Person Rating (Som)

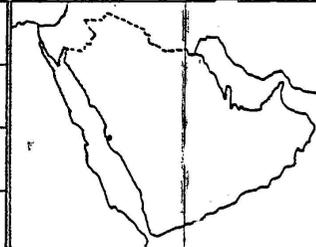
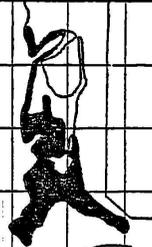
5. Public Facilities Table

- N - Number (Units)
- A - Area (Ha)
- RU - Rented Units (Units)
- PR - Person Rating (Som)
- LR - Land Requirement (Ha)

6. Administrative Buildings and Services Table

- N - Number (Units)
- RU - Rented Units (Units)
- GA - Gross Area
- LR - Land Requirement (Ha)

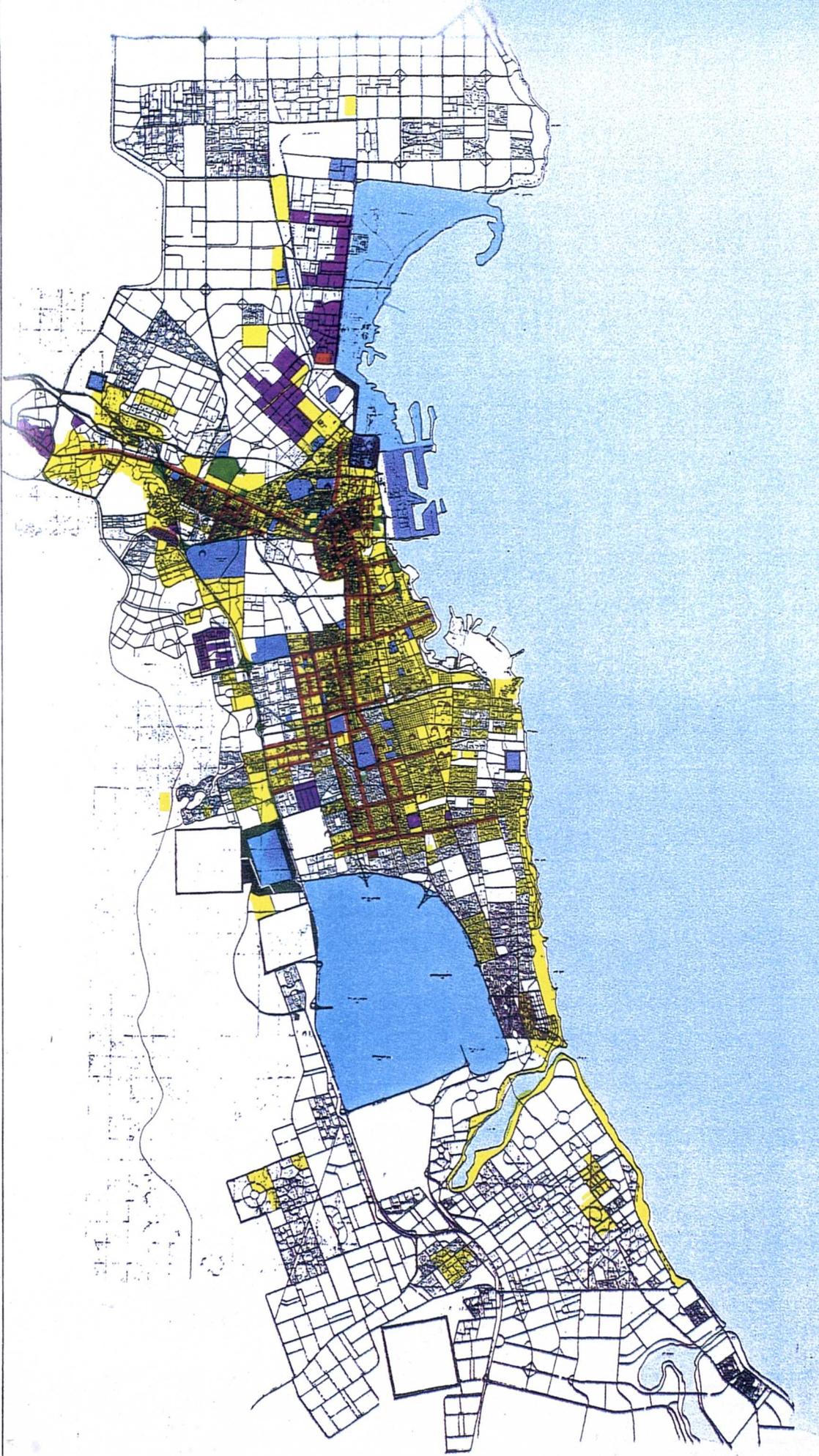
Jeddah



**Figure 5.1: Land Use Summary
Key to Generalities and Symbols**

Approximate Scale  5 km

**Figure 5.2:
Standard Atlas Format
Detailing Existing
Conditions at Jeddah**



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مخطط عام

Jeddah - Urban Boundary for 1415 and 1425 H

1 Natural Features

1.1 Location

Jeddah is located in Makkah Al-Mukarramah Region at 21°. 30' latitude and 39°. 10' longitude. It is 73 Km distant from the city of Makkah Al Mukarramah to the west.

1.2 Regional Context

Jeddah is the western gate of the Kingdom. It is a commercial sea port and has road linkages with all towns of the Kingdom (e.g. Makkah - Jeddah - Madinah highway, the road to the south (Taif - Jizan, and Taif - Riyadh road).

1.3 Climate

Hot and humid in summer. Temperature reaches maximum 43 C° and minimum 12 C° and 28 C° in average. Precipitation is 25 mm, with relative humidity of 67%.

1.4 Topography and Geology

Jeddah is situated in the Thama Coastal Plain between the Red Sea and Sarah Mountains. Surface deposits consist of granite rock, coarse sand silt stone; alluvium, offshore coral reefs, limestone; and interbeddings of loamy sand, pebbles and finer alluvium.

Public Utilities (in thousand)

Utility	GAC	Existing CI	Condition, IU	1407 CP	Projection 1415	Projection 1425
Electricity	43.2	22.6		518	6.12	12.7
Telephone	22.4	22.4	0.142	269	4.36	12.7
Water	22.3	22.3	0.291	627	4.51	12.7
Drainage	6.76	6.76	15.8	81.1	26.8	12.7
Roads	32	15.3	2	183	2.02	1.04

* See symbols list

2 Evolution and Development of the Settlement

2.1 Origin of the Settlement

Originated before Islam. Gained importance as a pilgrimage sea route to Makkah and Madinah and a rest place for the trading caravans between the north and south.

2.2 Settlement evolution is shown in the following figures



2.3 Features of Socio-Economic Development

Being the seat of foreign embassies, center of commercial activities and public facilities and higher education (King Abdul Aziz University) has advantageously affected the cultural and socio-economic development of the town.

3 Socio-Economic Conditions

3.1 Population

Survey of 1407 H (1986 G) recorded 1,212,000 inhabitants in Jeddah, with gross population density of 43 inh/ha.

3.2 Economic Activities

The majority of population is engaged in trade, fishing and agriculture sectors.

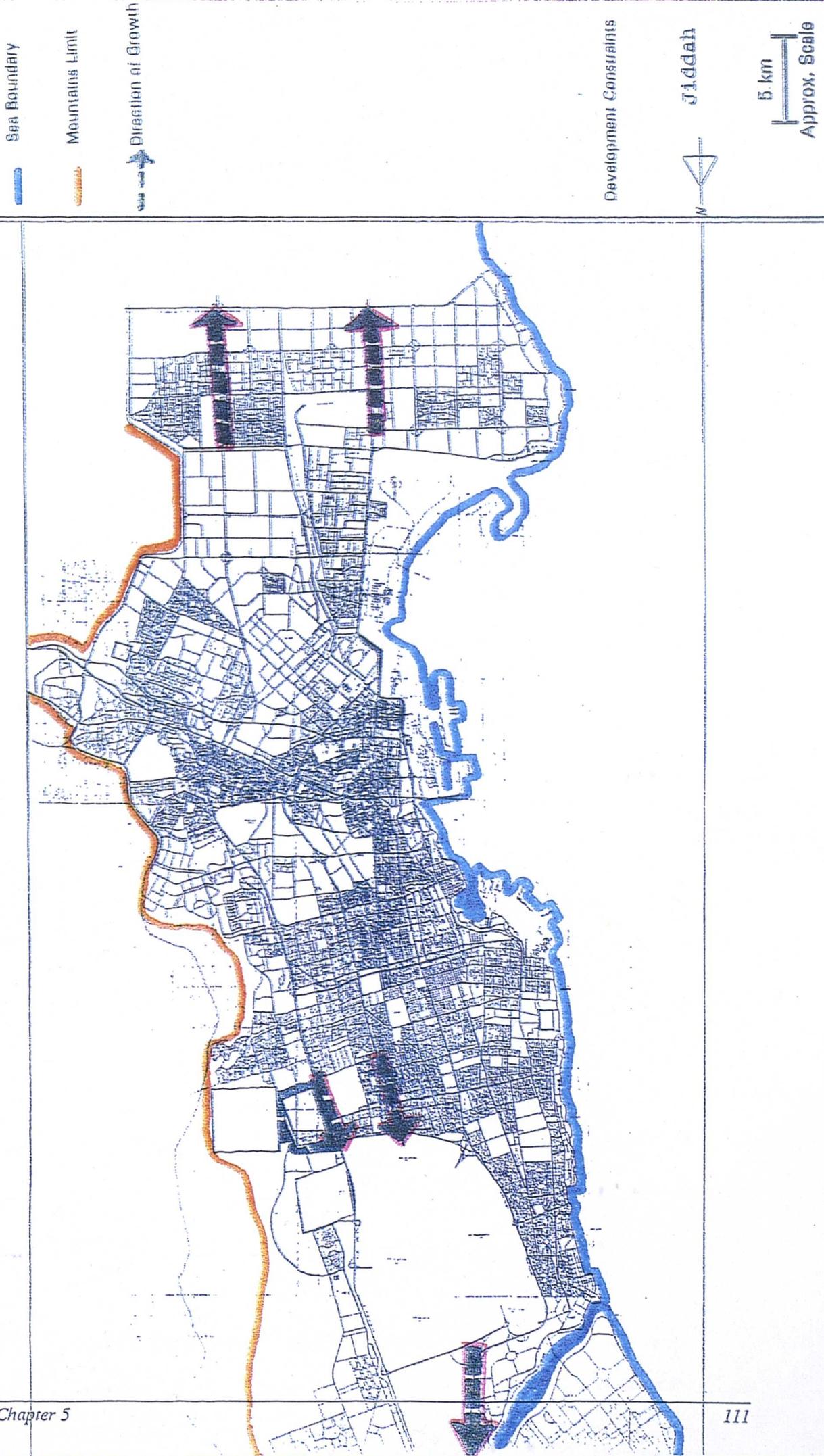
reception of pilgrims coming from all over the world, Jeddah is a main regional centre for administration and services.

Evolution and present pattern of the city's built-up area

On studying the historical evolution of the city of Jeddah, it is clear that the urban form of the city was merely the central area surrounded by a cluster of distant villages. The existence of Hejaz Mountain Ranges in the east and the Red Sea Coast in the west (Fig. 5.3) has resulted in a linear development of the city along the coast at an average width of nearly 12 kms. In 1945, the total built-up area of the city was 180 hectares. By 1951, it reached 315 hectares due to the economic developments which took place following increase in oil revenues, and by 1956, the total built-up area had covered 1065 hectares. During the period 1956-1961, the growth of the city slowed considerably due to the devaluation of the Saudi Riyal, the closure of the Suez Canal and the cuts in public expenditure. The total built-up area reached 1460 hectares, and a general plan for the development of the city of Jeddah was prepared.

During the period 1961-1966, the execution of the physical plan of the city was initiated and the total built-up area reached 2115 hectares. Meanwhile, the increase in oil prices had effects on speeding up execution of the physical plan proposed for the city. Consequently, the number of executed projects increased, particularly those for utility and road networks. In 1971, the built-up area reached 3250 hectares. As a result of increases in average per capita income, numbers of pilgrims and the general budget of the Kingdom, all criteria and predictions made for urban expansion have been surpassed, and in the face of increase in population numbers horizontal and vertical expansions in the city accelerated. Subsequently, the execution of large scale projects was initiated. Among such project were the re-planning of the old residential areas, construction of the public utility network and development of the industrial area in the south of the city and the Jeddah Islamic Seaport. The existence of the new airport in

Figure 5.3: Linear Growth Determined by Development Constraints



the north has had a great impact on attracting the growth of the city in this direction, and scattered new residential areas emerged in the north and east of the city. In 1981, the total built-up area was 11,415 hectares. With the advent of the year 1986, the total built-up area was doubled to 22,555 hectares, again surpassing all predictions made for urban expansion. Such unexpected and sporadic spatial development has necessitated reconsideration of the action area plans in an attempt to deal with this unexpected urban boom.

The accompanying population growth was from perhaps 100,000 in 1945 to 916,000 inhabitants in 1977, of which 47% were Saudis. In the same year, the total manpower was 569,000 people of whom 46.4% were Saudis. In 1990, the total manpower was estimated as 640,000 people out of a total population of the city which was estimated as 1.6 million inhabitants. The estimate of population during the period 1984-85 had been made by taking the average of four estimates: (1) the Municipality's conservancy contractor Arab Cleaning Enterprises (ACE); (2) data provided by the Ministry of Electricity; (3) the classification and distribution of the housing units, and (4) the number of elementary school children. The overall average suggested was 1,196,000.

The reason for the population increase was the improved economy consequent upon the increase in oil prices resulting in the migration of people to settle in Jeddah and the immigration of foreigners to KSA arising from the implementation of the National Five Year Development Plans, an improvement in the standard of living, and the importance and strategic location of Jeddah. It is expected that the increase will continue such that by 2005 the population will be 2.2 million people. With the exception of non-residential uses, it is expected that the density within the overall delineation of the urban growth boundaries in 2005 will be 25-45 persons per hectare.

When we turn to the land use distribution, 48.9% of the total urban area of the city is in non-residential use. As for housing, it has been grouped into four types according

to densities, such as villa areas with very low density (15.1% of the total area for housing) followed by residential areas with low density (30.6%), areas with medium density (49.5%) and areas with high density (4.8% of the total). Service areas represent as much as 10% of the total urban area of the city, which is a measure of the city's service function. Services are concentrated in the central area of the city, as well as along the major roads of the city such as Al-Medinah Al- Munawarah Road. As for religious services, it is noticed that the new urban extensions include sites which are suitable for installation of mosques with the required absorptive capacity. In contrast, the absorptive capacity in old residential areas is not in line with the rate of increase in population. In respect of health services, there is a fair number of public and private clinics and hospitals, the health service rates being one bed/400 persons and one physician/3000 persons. The prevailing trend now is to build hospitals in the outskirts of cities where lands and environment required for such services are available. As regards educational services (elementary, intermediate, and secondary schools), the concerned authorities face the difficulty of leased schools as well as the difficulty in finding parking places in front of schools, particularly in old residential areas. In regard to higher education services, Jeddah is the seat of the King Abdul Aziz University with its different branches, whether for boys or girls, together with a central library affiliated to it and a nucleus for a university hospital.

With respect to commercial services, wholesale activities are concentrated in the vicinity of the seaport and on Al-Medinah al- Munawarah Road, while those for retail sales are scattered in all residential areas of the city. Banks, gas stations, business offices, commercial agencies, hotels, etc., are similarly scattered.

With regard to industrial uses, there are some heavy industries, such as oil refining, which are located in the south of the city. Light industries, such as food stuff industries, are located in low-income, old housing areas due to low rental values, despite

encouragement by the Ministry of Industry to build new plants in the industrial area to the south of the city.

In respect of the condition of the buildings, the percentage of buildings in good condition is 78.24%, located in the north and south of the city; whereas the percentage of buildings in bad condition (16.11%) are located haphazardly but especially in the city centre and on Jeddah-Makkah Road. As regards building heights, one-storey and two-storey buildings predominate (86%) followed by three-storey buildings (10.63%), concentrated in the areas north and west of the old airport; four-storey buildings (2.63%) concentrated in the city centre and in some new residential areas, and finally buildings of more than four storeys (0.74%).

Finally, with regard to infrastructure, roads represent a high percent (about 30%) of the total area of city. The electricity network covers most of the built-up areas of the city. The telephone network covers about 24.8% and is located in the centre and east of the city, followed by the area proposed to be covered by telephone which represents 15.3%, leaving 59.9% of the built-up area unserved. The water network covers most of the built-up area except the southern part of the industrial area. The sewage disposal network covers the city centre and some other parts of the city, 7.5% of the total area of the city. There is another sewage disposal network project which is under execution which will cover 8.8% of the total area. Some 73% remains unconnected.

General bases and alternative methods for the delineation of urban development boundaries for the city

The basic approach was the reduction of residential densities and the provision of privacy for every household in a way that ensures a sound urban environment. Thereafter it involved the implementation of the stated policy of KSA which aims at providing the local people of the city with plots along with the provision of public utilities and services required to serve them.

By striking a balance between land supply and demand, future land values were controlled in a way that safeguarded the financial capabilities of the citizens. This was to avoid land speculation over the urban growth boundaries at each stage. This involved a consideration of the existing capacities of utilities and the definition of reduced residential densities, so as to ensure adequate flexibility in accommodating possible population increases which might exceed the present population projections.

There were four alternative methods for the delineation of urban development boundaries, namely those employing land use strategy, urban growth and development along primary and secondary roads, evolution of the built-up area and direction of urban growth, and the intensive utilisation of existing utility networks.

The land use strategy method is based on the various elements which attract population and have formed the built-up areas of the city of Jeddah. The elements are: a) the recreational areas, which are mostly located on the Red Sea Coast; b) the service centres, which are located in different parts of the built-up area of the city; c) the industrial area, which is located south of the city and which is considered one of the most important business centres; d) the approved land subdivisions and land grant schemes.

These four elements above have been taken into consideration in the development of this alternative and the establishment of urban growth boundaries; Figure 5.4 shows the *Nitag Omrani* phase for the land use strategy method and the urban growth boundaries.

Figure 5.4:
Jeddah's
Phased Areal
Development
Strategy

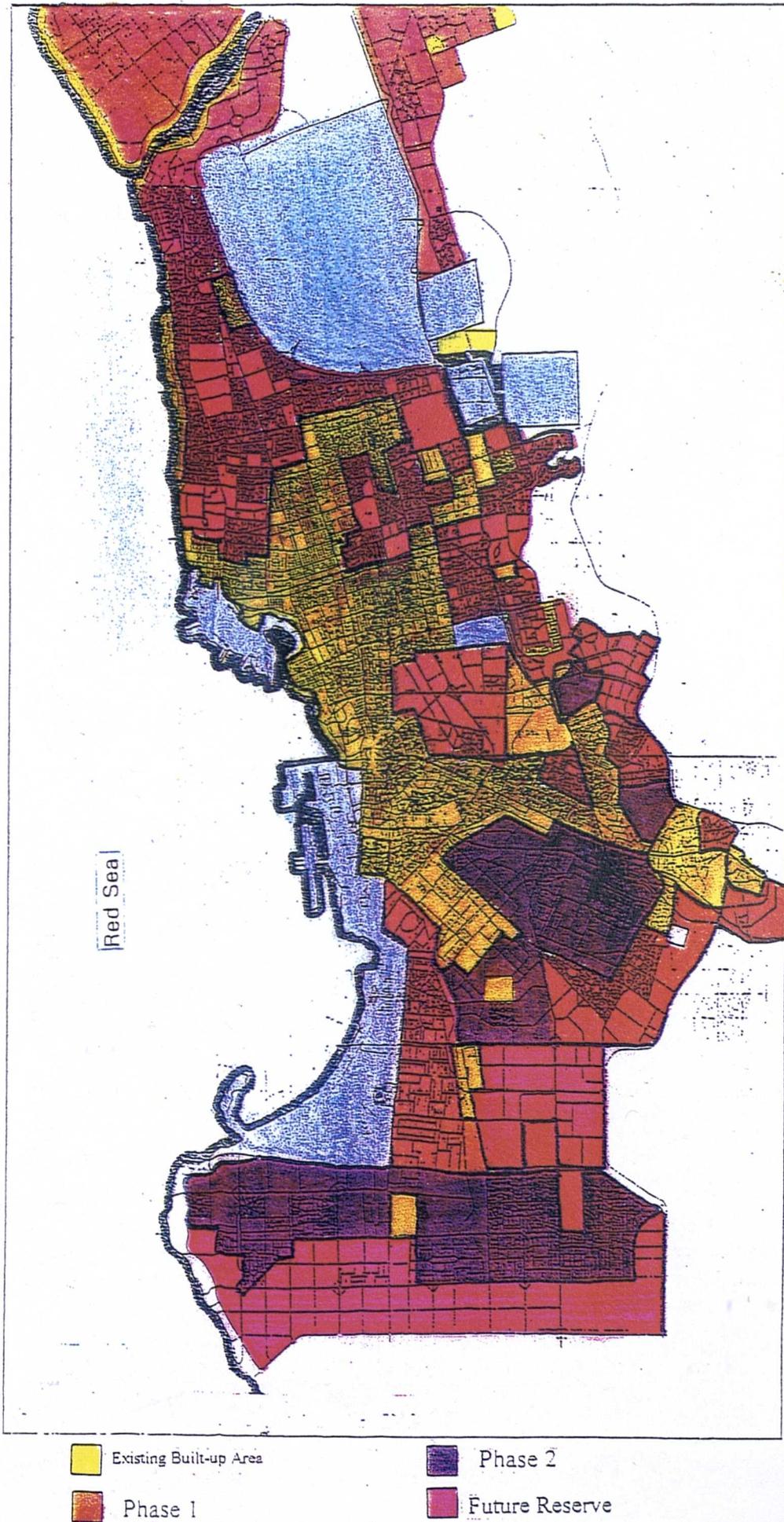


Table 5.1: The absorptive capacity with regard to population growth at the various development stages of the Nitag Omrani

Development Stage	Area (in ha.)	Population
1985-1990	6971	192000
1990-1995	9705	270000
1995-2000	15497	240000
2000-2005	18616	170000
Total	50789	872000

The method employing urban growth and development strategy along primary and secondary road takes note of the following development trends: a) longitudinal development along the main north-south axes within the built-up area of the city; b) east-west linear development intersecting with north-south axes; c) longitudinal development along the primary axes extending outside the built-up area of the city; d) intensive development zones at intersections of primary and secondary axes throughout the city of Jeddah as a whole.

Table 5.2: Shows the Nitag Omrani development phases and their respective gross areas and population absorptive capacities

Development Stage	Area (in ha.)	Population
1985-1990	6425	192000
1990-1995	9970	270000
1995-2000	15194	240000
2000-2005	18976	170000
Total	50565	872000

The third method takes note of the evolution of the built up areas and the directions of urban growth. By reducing the percentage of the area of extensions allocated for the southern section in favour of the percentage increase of those areas allocated for the northern and eastern directions, because of the great development attractions of

those axes, the Nitag Omrani development phases can be adjusted as follows: Northward 80%, Eastward 25%, Southward 15%. Tables 5.3-5.5 quantify these alternatives.

**Table 5.3: The study of growth directions:
Built-up area in 1966 = 2115 ha.**

Built-up areas percentage (%) and directions at the end of period	Northward		Eastward		Southward		Total area (ha.)
	%	Area (ha.)	%	Area (ha.)	%	Area (ha.)	
From 1956 to 1966	45	572.5	40	420.0	15	157.5	1150
From 1966 to 1976	70	3174.5	8	362.8	22	997.7	4535
From 1976 to 1986	56	8906.8	24	3817.2	20	3181.0	15905
Average	58.4		21.4		20.2		

Table 5.4: shows the Nitag Omrani Development Phases and their respective growth areas and population absorptive capacities

Development Stage	Area (in ha.)	Population
1985-1990	5563	192000
1990-1995	10213	270000
1995-2000	16215	240000
2000-2005	18616	170000
Total	50607	872000

The last alternative method takes note of existing utility networks, focusing on areas which are provided with three or more types of utilities (electricity, water, sewage disposal, telephone), followed by those areas which have only water and electricity, or telephone and electricity, then those with one utility. In the last phase, development is directed to those areas which are relatively close to the presence of utilities as classified.

Table 5.5: Shows the Nitag Omrani development phases and their respective gross areas and population absorptive capacities

Development Stage	Area (in ha.)	Population
1985-1990	7425	192000
1990-1995	5080	270000
1995-2000	16104	240000
2000-2005	21492	170000
Total	50101	872000

Evaluation of the alternative methods for the delineation of the urban boundary and selection of the best alternative

In order to evaluate the alternatives for the delineation of the urban development boundary for the city of Jeddah, eight criteria have been defined: A) Spatial integration of the built-up area during the various stages of implementation of the urban development boundaries. The purpose here is to organise the processes of implementation of the various development stages with particular emphasis on the timely and systematic provision of infrastructures and social service which will enhance the development of a cohesive urban pattern. B) The economic provision of infrastructure and social services, the purpose of which is to make use of the existing services, and develop them in a well planned and coordinated manner. This will help reduce conflicts and waste of resources of particularly at the implementation stages. C) The development and utilisation of approved land subdivisions, which involves development of those areas whose action area plans and subdivisions have already been approved. This will help to capitalise on the existing infrastructure provisions in the vacant and semi-vacant subdivisions and also establish adequate control of urban growth and the sporadic subdivision practices. D) The utilisation of the development potential and absorptive capacities of existing primary and secondary road axes. The objective is to organise the processes of implementation of the various stages for the delineation of

the urban development boundary through completion of construction of the existing main axes of the city which extend to serve large potential areas for future extensions, particularly those located on both sides of the main axes. This will help capitalise on their existing potential. E) The utilisation of the Red Sea Coast aims to make optimum use of the city's distinct potential in terms of its strategic location and the prevailing preference of its inhabitants to live along the coast thus enjoying the scenic and other environmental qualities. F) The development of the exclusive residential areas which were zoned in the Jeddah Master Plan will fulfil the needs of inhabitants in terms of privacy, environmental qualities and higher standards of housing and infrastructure. G) The daily business trips can be reduced in time and distance in the manner that will achieve economic, social and psychological benefits. H) The utilisation of existing main commercial centres aims to make use particularly of those traditional ones which are still attractive, by promoting their commercial rate and service function and also by enhancing their environmental qualities.

From a consideration of the *Nitag Omrani* alternatives, it is evident that alternative (B), which was based on the criteria of urban growth and development along primary and secondary road axes is the lowest in terms of gross value percentage. As such it is the least desirable in comparison to alternatives A, C and D. These alternatives are close in terms of gross value percentage. It was therefore necessary to reconsider and evaluate carefully the merits and demerits of those alternatives.

The basic determinants of development phases for the optimum alternative have been defined by availability of infrastructure in areas designated for urban expansions, integration of the existing built-up area (in terms of vacant lands within, and adjacent to, the built-up area), growth and development of the built-up area along existing axes and arterial roads, and approved land subdivisions in which roads were paved and asphalted.

While defining each phase of the *Nitag Omrani* development boundaries, the priorities of the above determinants were taken into consideration, together with the spatial determinant which can be main roads or natural barriers. This alternative includes three development phases.

The areal extent of the first phase (1987-1995) includes all the lands which are designated and approved for urban growth and development, particularly those which have already been provided with more than one type of infrastructure. Other areas which have only water or electricity are subsequently added to this phase, which also includes private and public land subdivisions in the northern and eastern parts of the city.

There are, however, some other planning considerations and determining issues which have considerable bearing on the definition of the areal extent and also on the specification of the development period for phase one of the *Nitag Omrani*. These include the need to secure adequate time for the preparation of utility plans and social services; the intensive utilisation of the largest possible areas which have already been provided with various utility networks; control and stabilisation of land prices by including large tracts of government land within this development phase; and the need to update planning information for the assessment of existing conditions in 1992 so as to prepare development plans and proposals for the next five years.

The definition of the areal extent for the second phase of the *Nitag Omrani* (1995-2005) is based on the inclusion of developable lands adjacent to the border line and limits of phase one of the *Nitag Omrani*; the utilisation of approved land subdivisions whose roads have already been paved and asphalted; and the acquisition of white lands which are considered a natural extension to the built-up areas during this phase.

The development phase beyond 2005 has been specially proposed for the city of Jeddah, which has an approved master plan. Accordingly, the future extensions of the

Nitag Omrani beyond 2005 will include all those vacant and unplanned areas which are located in the northern and southern extremities of the master plan as integral extensions to the previous development phase of the *Nitag Omrani*. These three phases are shown at Figure 5.5.

Following the formal approval of the *Nitag Omrani* documents, the local authority was requested to verify, describe and establish physical reference for the spatial limits of the various development phases. Natural features such as hills, valleys and coast lines were utilised when determining the physical barriers or limits. In addition, street names, road intersections, railways and canals; and the existing neighbourhood names and subdivision reference numbers were much employed in the descriptive reports. This very simple method was deliberately encouraged for the benefit of the inhabitants as an aid to their comprehension of the proposal. Graphic presentations and mapping may be required for the local authority, but these traditional methods appear to have been no less successful for the citizens and their daily needs and transactions.

Figure 5.5:
Jeddah:
Delimitation
of Urban
Protection
Zone

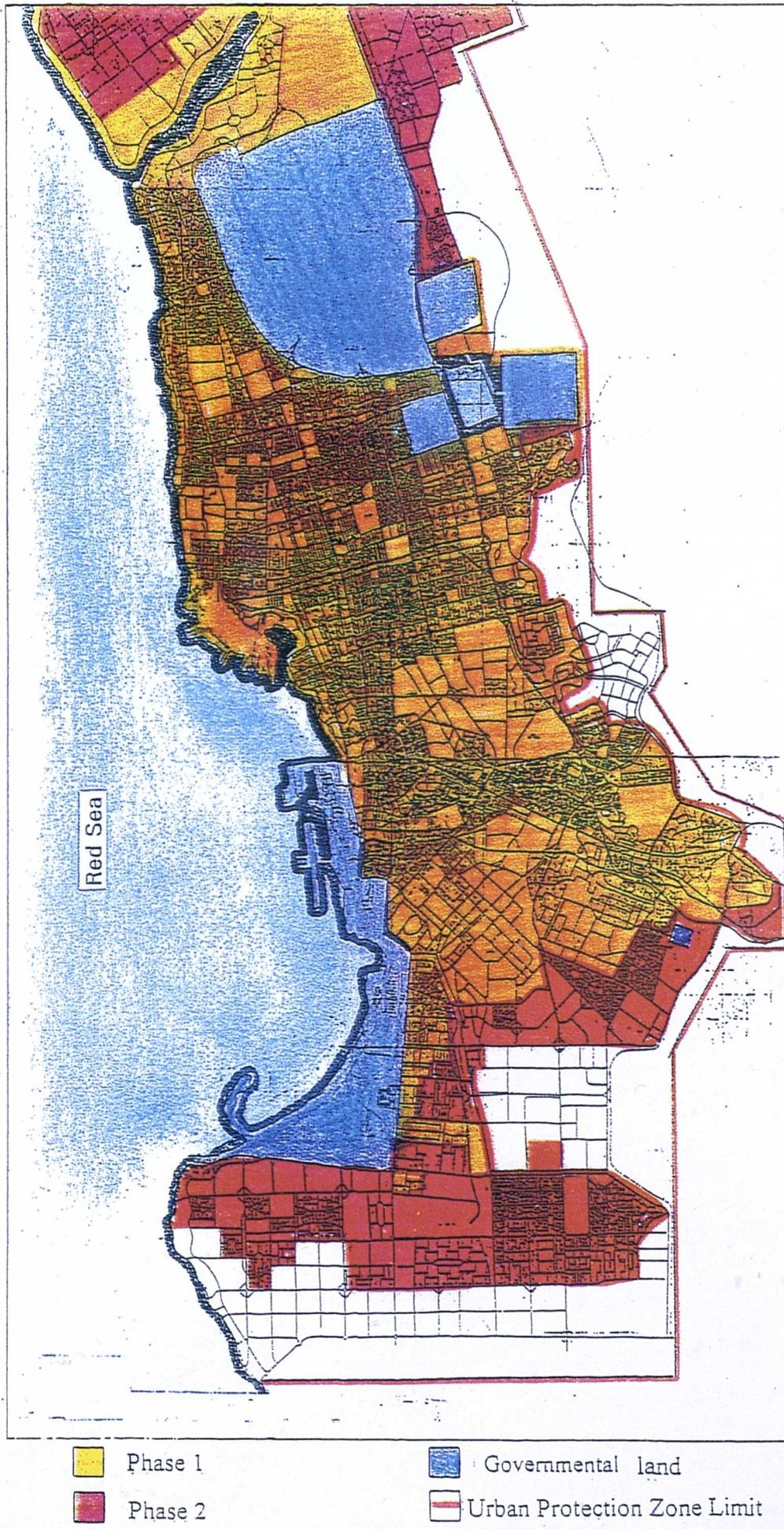


Figure 5.6:
Boundaries
Defined in
National
Atlas

Boundaries

Phase 1



Phase 2



Urban
Protection
Zone



5 km
Approximate
Scale

Chapter 6

Evaluation of the Nitag Omrani

Introduction

Evaluation is a basic and important part of the planning process. The executive bodies can arrange for it to take place during the course of implementation of the plan, such that, following assessment, either the plan continues on its original course, or else that course is modified. This chapter will attempt to evaluate the experimental application of the *nitag omrani* principle as a tool in the administration of urban growth in Saudi towns and cities. It will attempt to evaluate the positive and negative aspects of this experiment as a transitional planning programme with special characteristics appropriate to the speed of urban growth, and the singular manifestations of planning distinctive to Saudi Arabia. It will also examine the repercussions on social, economic and urban life of plans implemented. Such an evaluation involves certain standard steps, namely:

- Review of the plan and study programme.
- A study of the limitations imposed on the basis of the *nitag omrani* concept.
- A study of stumbling blocks and changes confronted during implementation.
- Evaluation of urban growth.

Given that the period which has elapsed since the approval or ratification of the *nitag omrani* in September 1989 is insufficient for fundamental changes to have been made to the urban structure, this evaluation can only be an attempt to give a tentative overview of the results of implementation of the plan. The evaluation has been conducted in the light of detailed actual data available on the towns or cities for which studies were prepared to update information on the starting date, and monitor changes

that have occurred since the *nitag* was applied. This is based on information and activities available from the *amanas* and *baladiyyas* about the problems of application of the plan, in addition to observations and fleeting impressions gleaned during tours of inspection.

The gathering of information represents a basic stumbling block in the path of most of the planning studies in the Kingdom, be it for lack of adequate detailed data held by most of the *baladiyyas* and *imaanas* on the status quo, or because they do not update their databases on a continual basis. Therefore this evaluation comes to rely on approximate data, and a few fundamental observations and statements of intent deriving from tours of inspection in addition to data from the general census of 1993. Recourse was also made to the various reports by the Supreme Council for the Development of Riyadh outlining the strategy for the urban development of the city, entitled the "first report", which plans for the provision of public utilities in the city of Riyadh to the year 1994. The first report was issued in 1993. The second report, dealing with the second phase division of the delineation of settlement (*nitag omrani*), 1994-1999, was issued in 1992, and a revised edition in 1994.

Review of plan and methodology of study

The programme methodology took into account the various phases of development envisaged by the national development plans regarding land use, services and public utilities without specifying a geographical location or the level of urban settlement. These plans were restricted to describing the directions of expansion of the city on the basis of the position in 1987. Expectations were clearly determined by urban growth during previous periods. The studies did not include social and economic data, relying instead on urban data presented in such a way as to reflect social and economic requirements. This was to enable this work to be completed with all due despatch in order to realise its goals of: putting a stop to random growth; laying down ground

rules for the orientation of planned urban growth; and the maintenance of control over that growth.

Limitations imposed on growth during the various phases

The limitations involved here included the planning of use of vacant land lying within the area delineated for the first phase without waiting for a request for planning from the owner. This was to facilitate the laying down of a network of main roads at the same time as public utilities and the interlinking of the various parts of town, providing that the proportions used for roads and public utilities did not exceed the structural proportions allotted to them (33%). It was, moreover, possible to overcome the problem of those lands which had hindered growth in many towns and cities when the owner failed to agree to their development in accordance with the urban plan for the city, and the approval required for confiscation had been lacking.

Again, planning permission was withheld from proposed development of land outside the first phase but within the second phase, before the conclusion of that phase. If the owner persisted with the development of his land, then he had to adhere to the requirements of the decree of the Council of Ministers regarding the extension of water, electricity and telephone networks - that they reach the new land in accordance with the sub division plan - in addition to asphaltting the roads within these new lands and providing them with pavements and lighting after obtaining approval of the design specifications from the authorities concerned with these utilities and approval to go ahead. It was thus possible to regulate the extension of utilities and services and projects upon which money was spent, although there was no real reason for it. It became possible to divide up growth into phases corresponding to population growth. The decree also ensured that the various bodies responsible for utilities and services did not put these in place as part of the second phase until the previous phase was complete, with the exception of roads and principal network arteries.

With regard to an area of land straddling more than one phase, the regulation specified that its use be planned as one integral unit. Its development should be carried out according to the limitations pertaining to that phase. Lastly, with regard to areas containing national and regional services whose scope exceeds that of the city service: these services should be developed according to actual need without being tied down to chronological phases fixed according to *nitag omrani* studies, with the proviso that MOMRA Deputy Ministry of Town Planning approve such a plan for the area hosting national or regional services.

Obstacles and changes confronting implementation

Among the main points which constituted the principal obstacles to the completion of these studies and to their implementation were the paucity and inaccuracy of data provided by the *baladiyas*. This led to a failure to include some areas during the preparation of the study. Then, later, the situation had to be remedied by granting the area in question "status quo". It also led to a lack of precise definition of the area of the study, so that some settlements within the city's area of influence were ignored.

The lack of technical staff also affected the accuracy of information. This in turn led to inaccurate results for some studies and hindered the updating of data and information defining the status quo.

The topographical delineation of the phase boundaries was no easy task. Some *baladiyas* were unable to lay down fixed points, especially when it came to establishing the limits of development areas. This was due to the expansion of the towns and cities and the weakness of the financial resources of the *baladiyas*, and the existence in some cases of topographical obstacles.

Again there were large landholdings whose owners were asked to divide them into smaller properties without asking them to plan their development. There were many

tracts of land with agricultural title-deeds but no agricultural activity. They resulted in discontinuity in the urban fabric and hindered the growth of cities when these lands were contiguous with built-up areas.

The measurement of urban growth is an obvious factor to be evaluated in terms of the measurement of the number and size of urban centres. The population census of 1993 revealed a growth in population that exceeded all estimates and expectations. There were cities like Riyadh, where the population increased from 1,417,000 in 1987 to 2,776,096 in 1993, i.e. nearly double. Jeddah's population increased from 1,312,000 in 1987 to 2,046,251 in 1993, i.e. an increase of about 60%. The population of a medium sized town like Buraydah increased from 154,000 to 248,636 in 1993 (61%). The population of a small town like Quaiyah increased from 9,400 to 12,496 (33%), and the town of Maraat grew from a population of 4,000 to 7,250 (80%). This variation in the percentage increase stems from many factors, among them the extent of job opportunities in these urban centres, as well as the accuracy of the data and estimates of 1987, which relied on approximation and extrapolated averages. Furthermore, there were some differences in the boundaries of statistical regions, in that the area surveyed in 1987 did not coincide with subsequent observation in 1993. The updating of information for 1993 shows that most cities and towns expanded within their first-stage boundaries, so that most unused land within them disappeared, particularly during the first phase. It is worth noting that rates of growth of built-up areas were much slower than population growth. This is borne out upon examination of the way buildings are used and unlicensed apartments were developed, which represented a heavy economic burden and a waste of public money. This led to rent increases in some Saudi cities following delineation of the *nitag omrani*; subsequently, rents fell to their natural levels according to the law of supply and demand, restoring rent equilibrium. Data and testimony also show that many unused areas of land both with and without plans

in the first phase were developed. It can be said with confidence, however, that *nitag omrani* restricted a lot of growth in towns and cities, despite increases in their population.

The orientation of urban growth in most towns and cities took place according to the phases set out by the *nitag omrani* concept. But it cannot be claimed that this applied to all. There were settlements which began fairly clearly to expand into the second phase as a consequence of land price changes wrought by *nitag omrani*. Land prices within the first phase rose in some cases, encouraging many people to become owners of land in the second phase and attempt to build on it. It is also worth pointing out that the availability of public utilities was a principal factor in the coming into existence of new built up areas in the first phase. Again, there were lands partially subserved by public utilities and services which were not included in the delineation of the first phase of *nitag omrani* in regions in which one of these services existed, especially electricity. This was due to a failure to encourage the owner to build on large areas of land around it, contenting themselves with exploiting it by describing it as being in an existing use situation. We must also remember that in more than 80% of towns and cities, especially small and medium-sized towns, social factors were the main impulse behind the orientation of urban growth, especially as regards tribal customs and the requirement that families be housed in their entirety in a given sector of town. This is in addition to the natural and physical reasons which influenced the expansion of the towns, either at major growth points or as conglomerations around centres for services. These extensions are attributable to: a fall in land prices, and the ready availability of government lands near services or containing services; ease of traversing the lands (which helped promote the creeping expansion of urban growth in this direction); the ready availability of utilities and public services.

Types of urban growth

The type of urban growth was connected with the shape and limitations of the city or town. There were settlements which extended for long distances, like tentacles along the main axes without entering the heart of the city; and there were other types consisting of urban conglomerations on the fringes, known as suburbs, maintaining a connection with the parent city or the old quarter. It can be said that the size of ad hoc districts began to diminish both in the cities and the towns which already had plans for them and those which did not.

As mentioned above in the section on orientation of development, the pattern of development of unused land was intimately linked to the phases of *nitag omrani*. But with regard to lands developed in the second phase or beyond the first phase, most of the plans tried to go beyond small areas to large areas with a low population density and low-rise buildings, in view of the drop in land prices. Also, adherence to the limitations of the *nitag omrani* regarding roads without recourse to the landowner limited the modalities of the type of development of unused land while adhering to the physical constraints furnished by these lands and type of development on them. Verbal communications indicate that in Riyadh unused and unplanned land diminished during the first phase. The use of 78km² of land in Riyadh was also planned for the second phase. This can be attributed to the fact that a part of this lies within the first phase and another part within the second phase, so it was planned as a complete entity. However, its development adhered to the limitations of each phase according to the decree of the Council of Ministers. There were lands planned for as part of the second phase without any requirement that the residents extend the utilities networks according to the limitations imposed on development. It may be said that control was successfully asserted over random expansion of the city, and the pattern of develop-

ment of these lands was made responsive to real needs for utilities, public services and roads.

The residential density of the district and planned areas increased as a result of the presence of urban built-up areas to which the extension of utilities and public services was allowed; and return on this extension was realised. This necessitated the prioritising of a limited programme in a detailed and scientific manner. Thus, by supplying utilities to districts of an appropriate residential density, a major objective was realised.

It can be said that the time frame was insufficient to have a significant effect on the levels of overcrowding expressed as the number of members of one family per room.

Although *nitag omrani* did not contain limitations on, or regulations for, construction, it did exert considerable influence on the type of building simply because the new development was characterised by buildings designed and constructed according to scientific principles and planning criteria. This encompassed consideration of building height, related to street width, principles of hygienic ventilation, lighting, use of local materials appropriate to the regional climate, and agreement with social customs. All this represented a new departure in urban development. It can be said that this period witnessed a high level of adherence to the principles of construction and sound planning. The outcome was a sound type of urban settlement with a clear influence on the type of urban growth. That did not simply mean the use of new building materials, for modern buildings can appear dilapidated, while traditional buildings using good local materials can be extremely comfortable and better suited to environmental conditions than other types of building.

Levels of land use were an important factor to be evaluated. High land use levels pointed to the realisation of greater material returns. But it can also be argued that

raising the level of land use does nothing to increase social benefits. Indeed, in many cases, the results of land exploitation are considered to be rather satisfactory.

Spatial organisation of urban activity

The central activity played a favoured role in the process of urban expansion, especially in cities neither limited nor encumbered by natural obstacles or existing residential areas. This is because these central areas housed special services: the majority of residential uses in many cities increased enormously, necessitating a concomitant level of services and the growth of central areas to satisfy the requirements of human activity. City centres were not shifted to new areas, but it can be said that there were axes along which modern developments were undertaken, amounting to an expansion of some medium-sized towns, according to the orientation of growth permitted them.

One of the many new planning phenomena brought to the fore by *nitag omrani* was the great demand for housing projects and districts at a considerable distance from the parent built-up urban area, characterised by tranquillity and lower land prices. Migration to the edges of the city takes place, encouraging the emergence of suburbs. The owners of land neighbouring the city went to some lengths to attempt to be included in the phases of the *nitag*. They participated in the process of development, and tried to benefit from the services and utilities of the city. There also occurred a sort of great stimulus to buy these lands near to the city due to the imminence of their development, particularly those around existing settlement, either urban or rural. This led to many changes in the dimensions of the built-up areas in these suburbs, and to many opportunities. These were facts on the ground which had to be taken into account when planning these towns and cities and the neighbouring districts lying within the *nitag* of the city's region or the sub region regarding nearby settlements. There were many settlements in which a kind of urban inflation took place. In many cases this was more

apparent than real, but in some cases it was real and of sufficient magnitude to threaten the original phasing of the city.

Most of the main roads were not shifted or diverted as a result of the fixing of *nitag omrani*. In fact, the *nitag omrani* did not include generally the preparation of an urban plan for the town or the development of a road network, although it did include suggestions for the development of road networks in some towns or cities, as mentioned earlier. Therefore, no special uses were introduced, as a result of the unchanged course of these roads. However, in some districts lying within urban built-up areas, but outside the boundaries of the *nitag*, known as *khubuub* or suburbs, activities developed to the point where they encompassed the urban development of the city. Consequently that was reflected in the roads connecting the suburbs and the city centre. This situation was of very limited significance, and it is worth pointing out that the influence of the *nitag omrani* did not reach the point where it had an effect on the functions of these pre-existing towns.

Evaluation of natural environmental factors affecting the city

The *nitag omrani* plan dovetailed perfectly with the aims of the town and city plans - whether or not these plans had already been completed - as regards the conservation of existing agricultural land adjacent to the towns and extending within the urban built-up area, on condition that the land be currently in use and not merely used for agricultural purposes. Also, care was taken that there should be enough areas containing an acceptable average population density at the level of the city with sanitation and health care provisions. The delineation of the phased *nitag omrani* took into account existing land used for services and industry, and sought to keep harmful uses away from residential areas. Care was also taken to protect nature reserves and regions representing the national heritage, like hunting regions, nature reserves and mountainous regions. One of the most important characteristics of the *nitag omrani*

was the effort made to conserve the natural features of the towns and cities and at the same time to achieve a synthesis of the urban environment with the natural environment.

Evaluation of the elements of the urban environment

Although the fixing of the *nitag* did not include fixed specifications for the kinds of buildings, or specific organisational regulations, or regulations for removal of buildings, all these measures were taken into account. An analysis of public services was based on planning criteria and specific assumptions. These facilitated the delineation of the necessary areas; formed the basis of the subdividing of areas; underpinned the estimate of the area needed per housing unit and the total area needed for housing. The assumptions also took into account the application of the *nitag omrani* limitations in order to arrive at a coherent urban environment. The analysis of the urban blocks was carried out on the basis of the existing buildings. In general it was possible to provide evidence of all these aspects of the analysis of the urban structure. It was established that in many towns and cities the limitations were adhered to and random growth was curtailed. As for road networks, most of the networks were put in place in an acceptably phased way, especially in the extended completed parts of existing built-up areas. The *nitag omrani* did not include the fixing of specifications for road building to be put out to tender, or the roads' suitability to social uses and functional activities which would generate traffic along them.

The movement of population to and from the town or city centre serves as an indicator of many economic, social and urban phenomena, and is of considerable assistance in the evaluation of the pattern of livelihoods and urban life in the city itself. One of the most important indicators which help to reveal population movement is the level of urbanisation. Whether urbanisation was premature or a natural growth process, it can be fairly said that there was considerable stability of urbanisation rates without major

migratory fluctuations. That can be seen clearly by comparing relative population increases in different towns. These are considered to be extremely close in most towns, with the exception of the major cities. It can also be said that levels of migration into them did not increase: on the contrary they diminished or held steady. At the level of the city, there was a tendency for inhabitants to move to the periphery and take up residence there.

One of the clearest effects was the exploitation of surplus housing. In all the large cities there was a number of units - approaching 100,000 - which were not suitable for housing. After these five years it can be said that most of this surplus has disappeared and is being used. This amounts to a clear rationalisation of resources and the plugging of a loss of investment in this domain. One consequence has been the stimulus for many people currently to invest in this sector. So there is no unused housing sector, neither in low-income nor luxury housing. Most housing is in areas partially or wholly subserved by utilities and public services. Most housing is in the first phase, with a small quantity in the second phase.

If we observe urban growth, it can be said that it was very largely rationalised insofar as construction in most cases was undertaken in areas covered by public utilities networks, particularly in those areas better supplied than others, and particularly in those areas lying within phase one of the *nitag omrani*. There was a total exploitation of areas lying outside the *nitag* which enjoyed adequate utilities networks. A kind of intensive growth occurred in these areas, and there was no wastage. Some networks in large cities like Riyadh were extended beyond the first phase, but they were mostly left unfurnished in order to encourage the residents to develop these districts and to put a stop to rising land prices.

The same pattern which manifested itself in the exploitation of the existing capacity of the various public utilities networks also occurred in the structure of the services.

Many areas grew to provide the various areas with services. This gave rise to a hierarchy of supply and demand in this network. Many sites were required for public services projects in both existing and new districts, especially those with a high population density.

References

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Chapter 7

New Developments in the Programme of Urban Growth Following the Nitag Omrani Experiment

Experience in the application of the *nitag omrani* had a considerable effect on the crystallisation and development of the pattern of urban planning in the Kingdom. This experience threw light on several aspects of planning in need of qualitative remedies, as well as several urban planning considerations. It had a great influence on the support and development of the planning process in the Kingdom, the most important of which was the preparation of base maps of all the Saudi towns and cities. There were only a few towns and cities in 1976 which had previously been photographed from the air. There were many places which had neither been photographed from the air nor had base maps made of them, nor had anyone taken a coherent planning view of them. Also, these studies also had the virtue of providing preliminary population estimates using direct and indirect methods, as mentioned above. They served as updated data which could be employed in many urban development projects and development in general. The last population count had been in 1974. It is worth pointing out that these preliminary estimates were borne out by preliminary data from the national census of 1993, taking into account the designating of geographical areas (tracts) for the census. Many of the towns and cities did not have road networks worthy of inclusion. Therefore the *nitag omrani* studies for some towns like Haql, Al-Majma'a, Amlaj, Al-Wajh, Shaqraa, Al-Qurayat, included as a part of the *nitag omrani* study the development of a suggested road network. There was insufficient time to flesh out these studies and apply the format to all the towns and cities in the Kingdom.

The *nitag omrani* studies highlighted the extent of the need for a data bank and the establishment of a base for planning data which would allow for the systematic provision of updated information in all the Saudi towns and cities. Indeed, immediately

after the conclusion of the delineation of the *nitag omrani* for settlements, the Deputy Ministry of Town Planning (DMTP) put into law its support for the development of a planning data unit and as a first step set up the Land Information System linking up all Saudi towns and cities. The DMTP assumed a training role with the local authority workers to standardise the pattern of work, use of computers, and development of this programme to become a network linking up with the DMTP as a central body and the *baladiyyas* and the *amanas* as local bodies through which data on all the towns and cities can be directly obtained. The system allows for continual updating. The DMTP also installed a system for geographical data and put in place a modern model appropriate to the technical level required for this phase. Model studies were undertaken for cities, like Ta'if, in order to provide a base which could be applied to all the towns and cities in the Kingdom.

The *nitag omrani* also highlighted major regional differences in quantity and quality of provision of public utilities. This led to moves by the Project Coordination Department, headed by the author, to study ways of remedying these discrepancies, and set up large-scale coordinating activities which would lay down a strategy for public utilities which could fulfil the needs of the various towns and cities according to planning criteria. Through its efforts to carry out the phases of the *nitag*, the Department saw the need to lay down a pattern which tallied with the yearly budgets of the *baladiyyas* and *amanas*, in order to harmonise the programmes for public utilities and services, and translate this pattern into the preparation of a project to fix the priorities of urban growth. These included the subdivision of the first phase of the *nitag omrani* into districts, and the laying down of basic criteria for assessing them in order to decide which were most suitable for urban growth. This study was applied to Ta'if city and the conclusions were presented to the issuers of the decree, where they found considerable favour.

It is worth emphasising that the *nitag omrani* studies marked the first time that local authorities prepared planning studies. DMTP-trained workers at these local authorities generated a climate of trust conducive to the designating of tasks required, and subsequently to the acceptance of the authorities as ones which would adhere to the measures they themselves had drawn up during the study stage. Later, according to this principle, the same local bodies would prepare studies of urban development priorities and strategies for public utilities, and also help in the task of preparing structural plans. In towns and cities which required the work of consultants to cooperate in the carrying out of these tasks, the local authorities worked as teams with the consultants, functioning as the basic and principal source directing the urban planning process in the Kingdom. As a vital by-product of the compilation of a database, the *Atlas of Saudi Towns and Cities* was prepared. This served as a concise, comprehensive and reliable reference work for researchers.

One of the main results of the *nitag* experience was the issue for the first time of a Royal Decree to halt urban development in all Saudi towns and cities for a period of two years during the study preparation period. This obliged local authorities rapidly to complete work in hand, and then provided a period for reflection to assess the status quo and the pattern of urban growth. The issue of a special Royal Decree supporting the *nitag omrani* principle was of considerable assistance in supporting local authorities in their adherence to the urban growth limitations, and in raising citizens' awareness of the importance of phased growth. Following on from this Royal Decree, and deriving from it, were the special guidelines for evaluation of the *nitag omrani* in 1991 and the subdivision of the second phase, 1995-2005, into two phases. The DMTP began work on studies to prepare for structural plans for towns and cities in the various regions of the Kingdom. These studies included the updating of information on the prevailing situation for the year 1995 and assessment of it, and the subdivision of the

second phase according to the Council of Ministers' decree, which sets out the pattern for the preparation of urban growth studies.

Basic Infrastructure

After the *nitag omrani* studies were completed, there was an enormous quantity of information. This necessitated the establishment of a database, to store the information and allow for systematic updating to benefit the various planning activities. The DMTP immediately set up a Land Information System (LIS) which recorded the status quo in Saudi towns and cities in 1987 and began to update it systematically. This system covered most of the towns and cities, though not with uniform thoroughness. Some were 40% to 45% covered, others were 80% covered and some were completely covered. Even though continual updating of the information was a task simply left undone in many towns and cities, the working plan still strove for complete coverage and constant updating, yielding data that can be relied upon at all stages of the planning process. A Geographical Information System (GIS) was set up in addition to the LIS, to draw up comprehensive maps and tables of all data at all planning levels. It was carried out as a sample study in Ta'if before being applied to all Saudi towns and cities. In general there is continual development to keep track of the processes of urban growth and to respond fast enough to the informational demands of the planning process.

The preparation of base maps had been the first step in the preparation of the *nitag omrani* study, and updated maps were required. The study threw light on the availability of base maps: base maps were found which had been prepared from aerial photography in 1987 and required updating during the course of the study. It was no easy matter to cover all Saudi towns and cities. The data were updated on the 1976 maps by means of physical survey. It was found when the study began in 1986 that in some towns and cities the aerial photography still did not cover all parts of every town,

not least because of the physical expansion that took place from 1976-1986. The technical staff of the *baladiyyas* could not prepare accurate survey maps for those areas of the towns and cities that had not been covered. Therefore a certain level of error became apparent after preparation of aerial photography of some towns and cities completed in 1989. In the light of this experience, MOMRA felt an urgent need to prepare survey maps for all towns and cities in the Kingdom. The importance was also felt of recording the planning information and data, in order to establish the *nitag omrani* for towns and cities, or for any other planning study, like structural plans, or the prioritising of urban development etc. This was to be done using computers and the LIS or GIS. The agency went on to set up a major project in this field.

The plan to put the *nitag omrani* studies into action relied fundamentally on the training of both skilled and unskilled local technical personnel to carry out the planning tasks. The plan relied upon putting in place a simple format for the information of those working in local areas, either *baladiyyas* or *amanas*. This consisted of works schedules which could be completely relied upon by the non-specialist. The plan also made use of courses which were organised from time to time by the DMTP. This was the first time a training programme had been instituted for local technical personnel. It made a deep impression on these workers, convincing them of the need for certain tasks and planning alternatives, and trained them to study the *nitag omrani*. It gave them the responsibility and a role in decision-making. The most vital effect was to tie local authorities in with the DMTP. This was not easy at the outset, as many local officials went back and submitted proposals for growth, only to have them sent straight back with requests for modification, on account of the feeling that they had been prepared without sufficient regard for actual circumstances, or even at some remove from reality.

This pattern persisted in the preparation of structural plans and other planning studies. The workers with the local authorities began to take full responsibility and participate in decision-making on the development of their environment. They submitted realistic proposals, arrived at through thorough study and practical dialogue, predicated on their sensitivity and assiduity.

It is worth drawing attention to a sizable number of *nitag omrani* studies which were undertaken without architects or civil engineers, relying merely on the knowledge of a surveyor or draughtsman. Any extremely defective results were the upshot due to the lack of supervision and a limited understanding of the intention of the programme. Rather than prejudice the whole operation, these defective studies were re-worked by experienced MOMRA staff from elsewhere in the Kingdom.

Planning and Coordinating Programmes

Structural Plans

The DMTP set the year 1993 for the updating of information on *nitag omrani* and the division of the second phase into two according to the stipulations of the decree of the Council of Ministers pertaining to the approval of the fundamentals of delineation of the *nitag omrani*. The aim was to study ways of preparing the structural plans to arrive at a flexible and coherent planning pattern. The phase encompassing the *nitag* applied from 1989-1995 was to be considered a transitional phase. The experiment began by a process of familiarisation with overseas experiences in this field. Particular attention was paid to the British experience, and a study was made of the concept of structure planning in the UK and how it might be adapted to Saudi conditions. This study attempted as far as possible to fill in gaps left by the *nitag*, like regional studies, a comprehensive overview of centres of settlement, and an attempt to study all the conglomerations of settlement which might influence or be influenced by the urban

centre. The structural plan was assigned the role of executive tool for the realisation of the national urban strategy for the Kingdom.⁽¹⁾ This strategy included the national spatial framework for urban growth. It entailed an overall synthesis with the sectoral national growth plans. It brought together the elements of overall planning and fixed the axes of growth for these plans according to the urban strategy. These plans were reinforced with the support of the aforementioned decree issued by the Council of Ministers. The strategy includes the updating of information, the setting of the *nitag*, and its division into two phases, the first for growth until 2000 and the second until 2005.

There were prolonged major debates over the best way of conducting the study. The final decision was that there would be three phases: the first for regional and pseudo-regional studies, which would form the basis of these plans; the second phase would be at the level of the urban centre and the rural area and what fell within its sphere of influence, or the region of the town: this is what is known as conceptual planning; the third phase was at the local level. These three scales assumed no designation of land use, thus affording the necessary flexibility, and represented an attempt to treat the pressure points found in the *nitag* studies, especially with regard to social and economic blueprints. In the year 1994, a plan was laid to prepare these plans for all the towns and cities of the Kingdom in close accordance with the *nitag omrani* plan viz-a-viz the central work team and the local working teams. When work began, it became clear that there were several obstacles and shortcomings in the regional studies, and insufficient local expertise in the *baladiyyas* adequately to address these problems and satisfactorily put in place a framework. There began a kind of subjection of the regional programme to regional goals, pushing the region to prominence when it had natural resources which influenced the preparation of the local framework plan. This focused on the relationship between the urban centre and the

surrounding urban or rural conglomerations of settlement, and the study of the local level of the urban centre itself and each of its conglomerations.

It can be said that the concept of a framework plan in the Kingdom is very different from that in the UK, where it is considered to be a policy rather than a plan. In the light of the negative aspects of the regional studies and perceptions of them, the application of the concept of the sub-regional plan - namely the region of the town itself plus the settlements surrounding it within a radius of approximately 6-10 km - has led to the designating of urban frames of a greater surface area than those fixed in the *nitag omrani* studies. Assessment and evaluation are currently being undertaken of areas of urban growth according to the limits of the framework plan, as well as the putting in place of the necessary urban limitations and the designating of principal land use, road networks and axes of growth. It can be said that the framework studies are extremely similar to the guidance studies in view of the incapacity at present of the local authorities alone to solve the planning problems without support from the agency. Hence collaboration with the agency in the preparation of the plan at all stages of the study. The socio-economic studies were abridged, so they simply became reports on estimates about the population, with the exception however of a few towns and cities which were able to provide consultants to take on this enormous task which had to be completed within an extremely short period of time (about nine months).

Infrastructure Development Strategy

It became clear from the study of the status quo that there were wide variations among the various public utilities in Saudi towns and cities. In this regard an individual in one town might happen to be twice as well provided for as someone else in another town of comparable size. Furthermore, on comparing the standard of public utilities and services in a given urban centre with the overall nationwide level, enormous discrepancies were revealed. In order to reduce these discrepancies and attempt to

introduce a measure of regional balance, a coordinating study was launched to prepare a public utilities strategy. Its brief was to record the current state in towns and cities, areas and regions of the Kingdom and prepare a detailed map showing these differences so that they could be smoothed out in future studies. A team of experts led by the author prepared a working plan to put the strategy into effect. A work schedule was prepared and there are currently several experimental studies underway on a limited number of towns and cities in preparation for its application in all Saudi towns and cities. In general terms, it is a comprehensive study of all towns and cities to make comparisons on the national and regional levels to identify which centres are more deserving of services than others and put in place a plan of action to erode these regional differences. A work schedule was prepared showing the various stages of the study.

Urban Development Priorities

Studies of five Saudi cities revealed not only differences between towns and cities in the extent of utilities and public services available, but also between districts of the same city. Indeed there were districts unsuitable for residence which enjoyed the provision of services and utilities, and other districts suitable for residence but completely lacking services. Furthermore, the national development plans are five-year plans, on the basis of which the yearly budgets are allocated to the *baladiyyas* and public utilities. Efforts were made to determine which districts were in greatest need of budgetary funds for services and utilities. Principles and criteria were laid down to determine urban development priorities and which districts were more deserving than others. This is the concluding step of the previous study (public utilities strategy, on both regional and national levels), but here on the local level within an individual city.

The central working team undertook the study, under the leadership of the author. They also prepared accompanying manuals and the models required to put the proposals into action. These were presented to overseas experts in the various specialities in order to elicit their opinions and broad approval of the principles. They were applied as a pilot study to the city of Ta'if. They were discussed with all the bodies responsible for public utilities and services and agreed before finally being ready for budgetary finance. Thus the study was made ready for application to the various Saudi towns and cities. (A manual encompassing the methodology of the study is given as Appendix B.)

Broadly speaking this is not a comprehensive summary of the planning and coordinating activities which were launched during or after the *nitag omrani* phase. But it can be said that with modest means the *nitag omrani* paved the way towards a broad information and research base without prejudice to financial and human resources. But this is not the sum total of the *nitag's* influence, for there are other studies and research undertaken as a part of this study, be it on a specific town, or a collection of towns or cities, focusing either on the functions of these towns or cities, or their classification, or the specific activity that holds them together, or various other analyses undertaken by the researchers. Moreover, there are studies upon which work has yet to begin which might perhaps lead to a reassessment of the results of this study in the future.

The *nitag omrani*, then, represents a transitional phase instrumental in the production of various planning studies and systems capable of modifying, controlling and regulating urban growth in Saudi urban and rural areas.

References

1. The national urban strategy: This is a long-term rationalisation framework for realising the aims of the National Development Plans. These can be summarised as: greater spatial equilibrium in urban growth; functional and productive interlinkage between the various parts of the national domain; the ideal exploitation of utilities and available resources and job opportunities.
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3. Manual for public utilities strategy.
4. Manual for urban development priorities.
5. Town Planning in Saudi Arabia.
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Chapter 8

Conclusions and Recommended Urban Policy Approval

During the past three decades, the Kingdom of Saudi Arabia has experienced a rapid socio-economic transformation, which has a considerable impact on the physical and spatial development of the urban and rural environment.

With the advent of the First National Development Plan in the early seventies the Kingdom thus entered the era of scientific planning for economic and social development. The plan was a significant historic achievement which set the pace for the subsequent development and social transformation throughout the Kingdom. The establishment of MOMRA in the mid-seventies signalled the development of modern planning institutions in the Kingdom, although this by no means should understate the previous role of the Ministry of the Interior in the development of contemporary urban planning process. For almost two decades (1958-1975) this Ministry played a significant part in the transformation, development and management of the physical environment throughout the Kingdom. Numerous and diversified technical expertise and planning consultants from various parts of the world contributed to the development and control of the urban environment. Nevertheless, the successive generations of development plans which were mainly prepared for major and medium sized urban centres could not adequately control the sporadic spatial development nor significantly curb the phenomena of illegal settlements and land subdivision practices. The reasons are varied and complex, but the most significant ones are those which relate to the rapid pace of urban growth and development which quickly outdated most development plans. Furthermore, the technical limitations of local planning authorities, the liberal land-subdivision practices and the lack of comprehensive setting for most urban

development plans, highlight the gray areas in the urban planning process, not only at the plan making stages, but also at the implementation stage.

The "Nitag Omrani Programme" is a unique urban planning approach which was initiated by the Council of Ministers for the delineation of urban growth boundaries for major towns and cities in the Kingdom. This programme, which was entrusted to MOMRA in 1985, was subsequently developed and implemented by the Coordination Department of the Deputy Ministry of Town Planning. It was the first large-scale urban planning project which fully involved 100 local planning authorities throughout the Kingdom, not only at the plan making stages, but also at the implementation and follow-up stages. It stimulated and strengthened the working relationships between MOMRA and its numerous local and regional planning institutions.

On the national level, the Nitag Omrani Programme had a tremendous impact on the development of citizens' participation in the planning process, and also in the promotion of planning awareness and the appreciation of the economic, social and environmental merits of development controls. At this juncture local planning authorities were specifically authorised for the first time ever by the Council of Ministers' Resolution No. 13 of 1986 to freeze land subdivision practices for a period of two years. The Nitag Programme was launched during that time, which was considered a fundamental step for the successful completion of the project. In fact, that was a much needed pause for all the private and government sectors to evaluate and reconsider the merits and demerits of their future development plans and economic investments in most urban centres.

This thesis acknowledges the technical limitations experienced during the preparation and implementation stages of the Nitag Omrani Programme. In fact, MOMRA was fully aware of the range, type and level of the technical capabilities of the various local planning authorities, and also of the untimely lack of the much needed basic

planning information. Nevertheless, the Programme was authorised to proceed and was carried out by local planning teams of not more than two municipal surveyors and one resident civil engineer. The participation of architects and urban planners was only limited to the five major municipalities in the Kingdom, and to the few regional directorates of MOMRA and some major municipal centres. The *Nitag Omrani* manual (Appendix A) took into consideration such marked variations in the technical capabilities of local planning authorities, and also suggested some rudimentary and basic planning procedures for the collection and utilisation of planning information. The contention is here to emphasise MOMRA's *Nitag* objective of promoting local planning initiatives, and creating rather than indulging in some alien large scale sophisticated fieldwork investigations. Curbing the rapid pace of uncontrolled and sporadic land subdivision practices in such a limited time, was a further major *Nitag* objective for the delineation of urban growth boundaries and the establishment of cohesive urban development patterns.

The successful completion of the *Nitag Omrani* Programme received formal approval from the Council of Ministers in 1989, and the recommendations for the delineation of urban growth boundaries for towns and cities were officially endorsed. The *Nitag Omrani* documents thus offer a substantial reference for the future planning and phasing of social services and infrastructure provision and also established spatially defined growth boundaries and control measures for the protection and management of the land resource for future development. Virtually all ministries concerned with the urban planning process welcomed the recommendations of the *Nitag Omrani* Programme, which offered a clear guidance for the planning and budgeting of their future development plans in urban areas. For the first time ever, a technical coordination committee was established on a national level for the systematic and timely planning and implementation of infrastructure provision. The economic sig-

nificance of coordinating planning activities has been well received by all concerned with the urban planning process. The term 'Nitag' is now a key manual for developers and land speculators alike, and is now a significant measure for the control and stabilisation of land problems in urban areas. It is worth mentioning that the vocabulary of the Nitag and the subsequent planning discipline that has been introduced strengthened the role of the local planning authorities in rendering planning advisory services to the citizens, who are now relatively conscious of the significance of phasing development, and of the importance of securing adequate social services and infrastructure provisions. "Inside the Nitag" or "Outside the Nitag" are now the prevailing cautionary expressions for developers and investors alike when assessing land prices and evaluating spatial locations for their investments.

The application of the Nitag recommendations provoked and stimulated a series of relevant urban planning studies. In particular "*Awlawiyat Al-Tanmiah*" or "Priority Development" for the provision and distribution of infrastructure and social services. This nitag, which is also pioneered by the Coordination Department, is now in progress. It is considered a logical extension of the Nitag Omrani Programme for the economic planning and budgeting of municipal resources, thus enhancing and controlling the development of the urban environment. A manual including simplified scoring sheets for the evaluation of existing neighbourhood was prepared. Data relate to population density, size of built-up areas, the quality, type and level of social services and infrastructure provisions for the assessment of existing conditions. The manual is flexible enough for use by various municipalities and does not exclude the social and political aspects in the evaluation process, nor the significance of the leverage of service provisions in manipulating urban growth and spatial patterns.

The credibility of the Nitag Omrani Programme has been recently extended in the development of the MOMRA structure planning project for Saudi towns, cities and

rural settlements. The work is currently in progress and is expected to update and consolidate the findings and recommendations of the Nitag Programme, particularly with regard to the development and rephrasing of the second urban growth boundary 1994 to 2005. This however, is not the sum total of the Nitag achievements. The Programme has paved the way and consolidated the setting up of the Land Information System (LIS) in 1987 for the continual updating of planning information. This has been complemented by the establishment of the Geographic Information System (GIS) in MOMRA. At present, the Coordination Department is engaged in the development of a Public Utility Strategy at the regional and national levels. It is to be expected that this project will have a far reaching effect, not only on the National Spatial Strategy, but also on the Five Year National Development Plans for the Kingdom.

The Nitag Omrani Programme represents a transitional phase instrumental in the production of various planning studies and systems capable of modifying, controlling and regulating urban growth in Saudi Arabia's urban and rural environments. Towards this end, the Nitag Omrani and the subsequent new development of the Programme remain a unique planning approach most suited for the development and control of the Saudi urban environment. The experience gained in the preparation and implementation of this project can be adapted and applied in developing countries where technical capabilities and planning information remain a serious hindrance to urban planning and development control.

Urban planning activity, producing master plans for most Saudi towns, has led to restrictions on prevailing conditions, mainly due to the nature of preparation of residential plans, containing plans for the granting of privatised land to low-income residential groups and several special residential plans. There was also a weakness of the urban formation as a result of failure to interlink the various residential plans. The lack of an agreed planning concept or a clear hierarchy in the structure of public

services and distribution of the appropriate residential density has also presented problems. Land ownership policies, coupled with arbitrary and undirected growth, has resulted in fragmentation of and contradictions between existing land uses during design of the master plans. Above all there has been a lack of an overall structure or a comprehensive road network design.

When implementing the proposals set out in the earlier master plans, it became apparent during the initial phases that there were difficulties in implementing the road network, public utilities and services, as a result of the circumstances surrounding the expropriation of the necessary land and the demand for sums of money in compensation. It also became apparent that the proposals and directions of the master plans ran counter to local conditions on the ground. This was as a result of assessment of prevailing conditions in the light of inaccurate planning data, whether concerning ownership, or population, or the projects necessary for urban development. These plans also encountered a lack of a regional developmental framework or a regional policy to elucidate the links between the urban centres, and regional requirements. All this led to inaccurate estimates of the volume of services needed for the towns' functions.

A lack of coordination between the different bodies undertaking the planning of urban development led to the waste of time and energy, duplication of work and mistakes in implementation, mainly attributable to the lack of coordination between the bodies responsible for sectoral and local planning. In many cases the sectoral institutions prepared their plans far away from the local plan. These plans were undertaken on the basis of planning criteria at variance with the criteria of local urban planning. Spatial discrepancies also occurred between local and sectoral authorities regarding the basis on which planning information and data is collected, and a failure to adhere to the limits set out for the authorities viz-a-viz each service or public utility. This was

due to the differing understandings of the concept of a region. Moreover, centralisation of services led to a failure to integrate the planning bodies at the level of the individual town. There was also the lack of a systematic follow-up and assessment of the urban plans, and therefore the occurrence of problems to which no solution was found. Lack of coordination of the various planning activities led to confusion and delays, for example the lack of contact between the bodies preparing the survey maps and the aerial photography units in order to obtain new aerial photographs essential for the preparation of the plans. Finally, there were delays in the drafting of the Planning Act, the designation of responsibilities among the various local bodies, and the definition of their role in implementation.

All the contracts dealing with the preparation of master plans for the Kingdom's towns stipulated that the local planning authorities would participate in the preparation of those plans. Despite the importance of this condition for qualification, training and raising the capabilities of the local technical staff, it was not adhered to. This impacted on the capabilities of those authorities when the time came to participate in the supervision, follow-up and up-dating of those plans. This was mainly attributable to the shortage of technical experts to follow up the preparatory stages of the plans and the local authority technical personnel's lack of experience in evaluating the draft technical reports and preliminary proposals. The inability of local technical staff to be precise in correlating lands and ownership led to arbitrary modifications of some sites for particular land use, road networks and utilities, as a result of pressure from private landowners. Finally, there was the non-implementation of the idea of having a local and regional planning bureau to follow up and coordinate proposals and planning changes.

In conclusion then, despite the many shortcomings of the studies, the short time frame for reigning in urban expansion, and the inexperience of the local authorities

concerned, the effect of the *nitag omrani* was extremely positive. DMTP knows more about the municipalities than they did before and the municipalities in turn know more about themselves. If only at the level of information gathering, there has been positive participation by local municipality officers with the central planning team of DMTP. The general public in turn has provided information that was not previously available and in doing so became aware of the nature of the planning process and the opportunities which it presents for maintaining and possibly improving the quality of life in Saudi Cities. Thus, *nitag omrani*, a process and programme designed to relieve the pressures of urbanisation on the national economy of the Kingdom of Saudi Arabia, has also had a broad educational repercussion across much of the Kingdom.

Appendix A

Approved 1986

"Urban Boundary Manual "

Prepared By

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Under supervision of

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Introduction

Saudi towns, in their early physical development, relied on natural disposition. Their form was so simple and responsive to local social and environmental conditions. The recent boom, accompanied by rapid cultural transformation, has made towns to grow at a more rapid pace than expected and planned, thus resulting in having urban problems which required immediate solutions before they become difficult to remedy. Rapid growth and voluminous expansion with large vacant areas within the boundaries of the towns were the most serious problems encountered.

Although government has been keen to provide a comprehensive range of facilities to the people every where they live at enormous costs, the speed of urbanization and emergence of so many dispersed residential areas throughout the towns put pressure on utility infrastructure networks which made it difficult, if not impossible for the government to run after the provision of all areas with facilities and utilities.

To provide services more efficiently and economically to all population, it had been imperative to restrain the huge urban sprawl through an urban limit approach which would control and guide growth according to town demands and population needs. Because of the interest at the highest level, Council of Ministers directed the Ministry of Municipal and Rural Affairs (Order No. 13 dated 9.1.1406 H) to delineate the physical boundaries of towns for the coming twenty years and break down growth into phases in conjunction with the Five Year National Development Plans, and present, for approval, all studies to the Council of Ministers within two years effective date of order issue.

Therefore, MOMRA formed a central team work of Deputy Ministry of Town Planning to undertake the exercise and issue a manual guide on the optimal scientific and practical procedure of carrying out the 'urban boundary' exercise within a specified time schedule with the aim of satisfying urban development goals at national, regional and local levels.

Branch working groups have been formed by the different municipalities and directorates of the Ministry to utilize the above mentioned manual and consolidate efforts to accomplish the exercise which enabled all municipalities to undertake a fully integrated planning task beginning with data collection and field surveys of existing conditions and changes throughout previous growths to coordination and discussions with the departments/organizations responsible for provision of services and utilities to finally delineation of 'urban boundary' limits for 1425 h.

While conducting the studies for the delineation of the physical boundaries for the cities and towns of the Kingdom, many positive aspects have actualized. They reflected on the planning work in the municipalities and on their technical staff. The most important aspects could be summarized as follows:

1. Preparation of a base map for each city and town in the Kingdom showing the existing conditions as well as changes which took place during the above development period.
2. Initiation of the establishment of a planning data system whose programmes have been developed at the local level of each city.

3. Coordination with government departments/organizations concerned with public utilities and services in all stages of the above mentioned study.

This atlas is the gist and fruit of the work for it contains precise and extensive data on the existing conditions of each city in terms of location and its natural characteristics such climate, terrain and natural resources; economic activities, historical evolution of the city along with statement on its early physical development and the stages for the development of its urban mass. As for demographic studies, the atlas includes data on the present population census, expected increases in population and classification by age structure and gender.

The atlas also includes urban studies dealing with land uses and gives a brief account of the urban texture of the city, building conditions, public utilities and services (e.g. water supply, electricity, telephone, sewerage and stormwater disposal), municipal services such as commercial and recreational areas and road network, and the main landmarks of the city.

The atlas contains data on the strategies of urban development with definition of the direction of growth in each city, and a wealth of general information on the existing urban mass, vacant lands and planned lands located within it, vacant lands located outside it and number of plots within it, and areas of lands required for the first and second stages of development.

The data is supported with some tables and illustrative figures as well as a map for the existing conditions (land uses) showing the urban boundary limits for the year 1415 H and the development stage 1425 H.

It is worth to mention that this Ministry will update all data in question before the end of the National Five Year Development Plans in order to re-evaluate the existing conditions in the cities and towns in the light of changes taking place in them, and define their development needs throughout the next five year plan.

Ibrahim Bin Abdullah Al-Ankary, Minister of Municipal and Rural Affairs.

Proposed Methodology for Urban Boundary Study

Major Elements of Methodology

Stage 1: Collection of Background Materials

- Complete required surveys.
- Prepare and review existing condition plan for the town or village.
- Update existing condition plan to include:
 - Identification of approved subdivisions, public and private developments.
 - Identification of non-built lands within the urban mass.
 - Identification of major growth axis.
- Settlement evolution.

Stage II: Field Surveys

- a) Physical Surveys including:
 - Developed areas.
 - Underway development areas.
 - Land uses (at block level).
- b) Public Utility and Facility Surveys:
 - Public facilities including educational, health, recreational, governmental and religious buildings ... etc.
 - Public utilities including water, electricity, sanitary and drainage, telephone and storm water drainage networks.
- c) Population studies to obtain number of population, and distribution of population densities throughout the town in addition to determination of average growth rate.

Stage III: Analytical Phase

Here, we follow the systematic approach of analysing all data and maps already gathered with guidance of Planning Standards so as to estimate requirements for urban growth. The following will be tackled:

- Analysis of population studies and determination of average growth rate of population in the town so as to estimate size of urban growth appropriate for the town over a given period of time.

- Determination of completion rate of utility infrastructure networks in subdivision plans and urban mass of the town.
- Determination of developed proportion of approved subdivisions as well as those undeveloped lands.
- Analysis of physical form of the town.
- Determination of absorption capacity of dispersed subdivisions.
- Comparison of subdivision sites, occupancy rate, and priorities with respect to different phases of development.
- Determination of areal requirements for urban development during the Five Year National Development Plans up to the end of the required phase.
- Emphasis on growth axis and setting up phases of their development.

Stage IV: Determination of Urban Boundary

This objective will be achieved through the previously mentioned studies which will be utilized in setting up development phase boundaries in conjunction with the Five Year National Development Plans provided concerned municipality clearly demarcates those boundaries of development phases.

Stage V: Preparation of Urban Boundary Report

This report supports maps that have been prepared throughout study stages. Each municipality and other concerned authorities are required to prepare a working paper on development controls of vacant (white) lands inside and outside the urban boundary.

1st Stage

Data Collection

This is the basis for urban boundary study to get accurate results. The relation between data collection stage and study results is consecutive: the more accurate data, the more real the results.

Preparation of Base Maps

The areal photography that had been carried out ten years ago covered most major towns of the Kingdom. It has laid down the basis for gradual updating of existing conditions maps. Later areal surveys have been carried out for some of the towns; thus complementing and developing base maps by technical staff of the municipalities.

In all cases, there should be base maps for the town or village which are essential to the Urban Boundary Study.

For town and villages not covered by areal photography, the concerned authority should prepare accurate survey maps for the existing built-up area clarifying existing condition with due regard to include for instance the following important elements in the base maps:

- Tentative boundary of existing conditions for the town or village..so as to have an idea of the general form of the town or village.
- Identifying all physical features in the town farms, culverts, valleys, wells, springs, streams, major roads (ingress and egress points), cemeteries, streets of different types (asphalted, tracks, under construction) rails and terminals etc.
- Building blocks at town level; types, heights, conditions, and usage.
- Existing and under construction utility infrastructure networks (electricity, telephone, water, sewerage etc.).

Techniques used for Survey Map Preparation

The following techniques should be regarded in the preparation of survey maps:

First: Triangulation Network

- Ground control points (triangulation network) should be established for the whole area, spaced at approx. 2 Km. Geodetic control points should be monumented permanently at raised spots around the village or town.
- Three guiding geodetic control points should be established so as to reconstruct the primary control point in case of loss.
- A description card should be prepared for every geodetic control points showing in a diagrammatic way location of the control point and surroundings. Preferably two photographs of the point should be attached.
- The distance between control points is measured in either direction using electronic distance meters or metal tape for several times to obtain the average distance.
- Measure angles using theodolite with reading accuracy of at least 1 second. Four observed angles should be equally distributed provided standard error should not exceed ± 3 seconds, followed by reading average of the four observed groups of angles.
- Measure coordinates of each control point based on local coordinate system then, if possible connect with the national geodetic network.

Second: Traversing

Once the main network is established, a traversing network is set within the communities or the places aimed for survey. Traverses are then connected to the main network. Points should be marked and constructed similar to the establishment of the main points, noting locations of points are suitably selected so that points are not exposed to damage. Lengths of lines between points are measured and angles observed. Traverse sides should be closed individually beginning with the controlling point and closing onto the other.

Third: Incorporation of Horizontal Control Points

Horizontal features should be observed using theodolite "angle and distance for each point" or prism and measuring tape. Additional measurements between points should be made if a prism is used in the survey process.

Fourth: Vertical Control

To represent the Earth on maps, elevation of points should be determined for some distinguished places (hill peaks, along valleys). In residential areas, elevation points are established by leveling net of 50 m length.

Vertical control uses a bench mark of the national geodetic network or a hypothetical mark for the village or town fixed with concrete. Altitude of such mark can be obtained from topographic maps at 1/50,000 scale.

Fifth: Plotting

Plotting of horizontal and vertical data is carried out at a suitable scale using metric coordinates with 10 x 10 cm grid map of an appropriate size for easy filing and printing as follows:

<u>Scale</u>	<u>Covered Area</u>
1: 1,000	0.75 x 1.00 Km
1: 2,500	1.50 x 2.00 Km
1: 5,000	3.00 x 4.00 Km
1: 10,000	6.00 x 8.00 Km

Survey should be updated on a continuous basis through incremental additions even at single structure level. Approved subdivisions (public and private) with their outer boundaries and main roads should also be incorporated into the master plan (Figure 1).

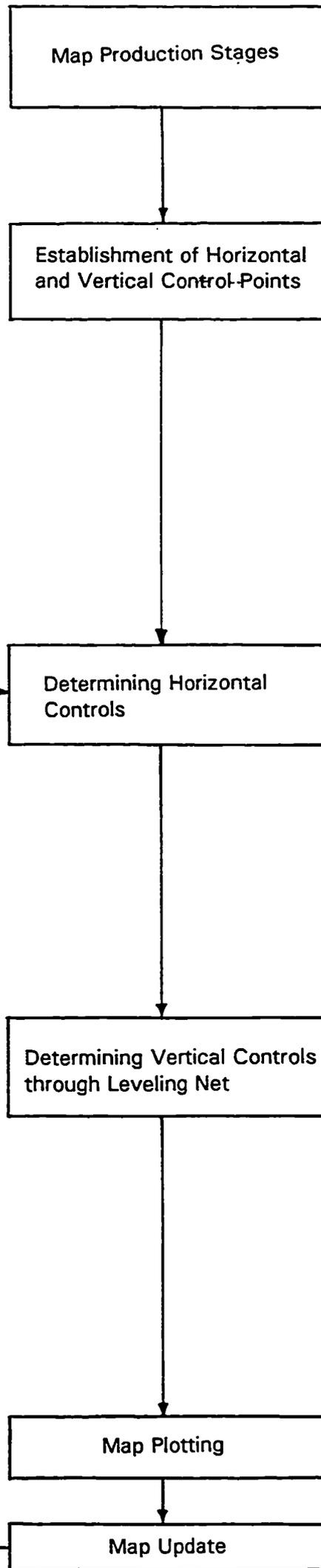
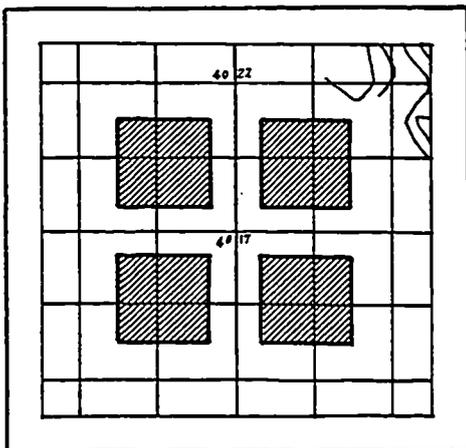
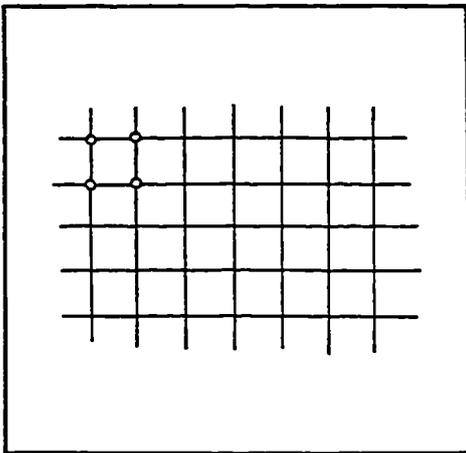
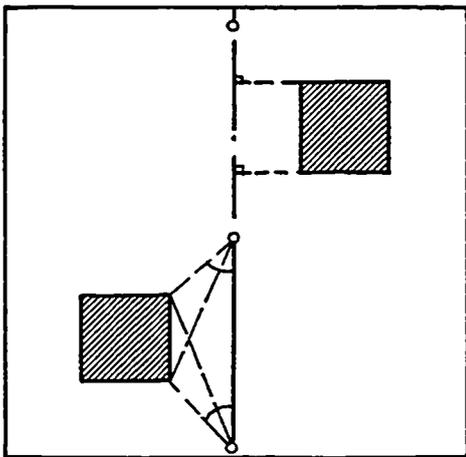
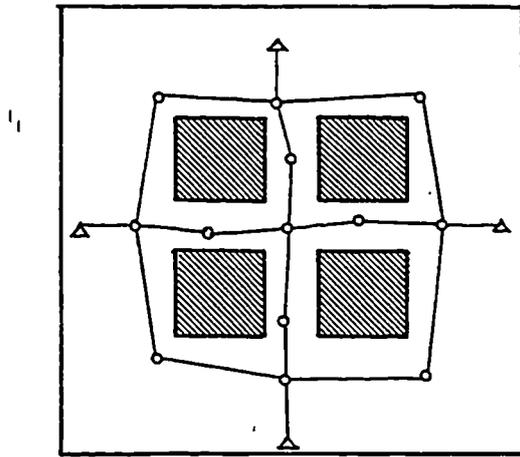
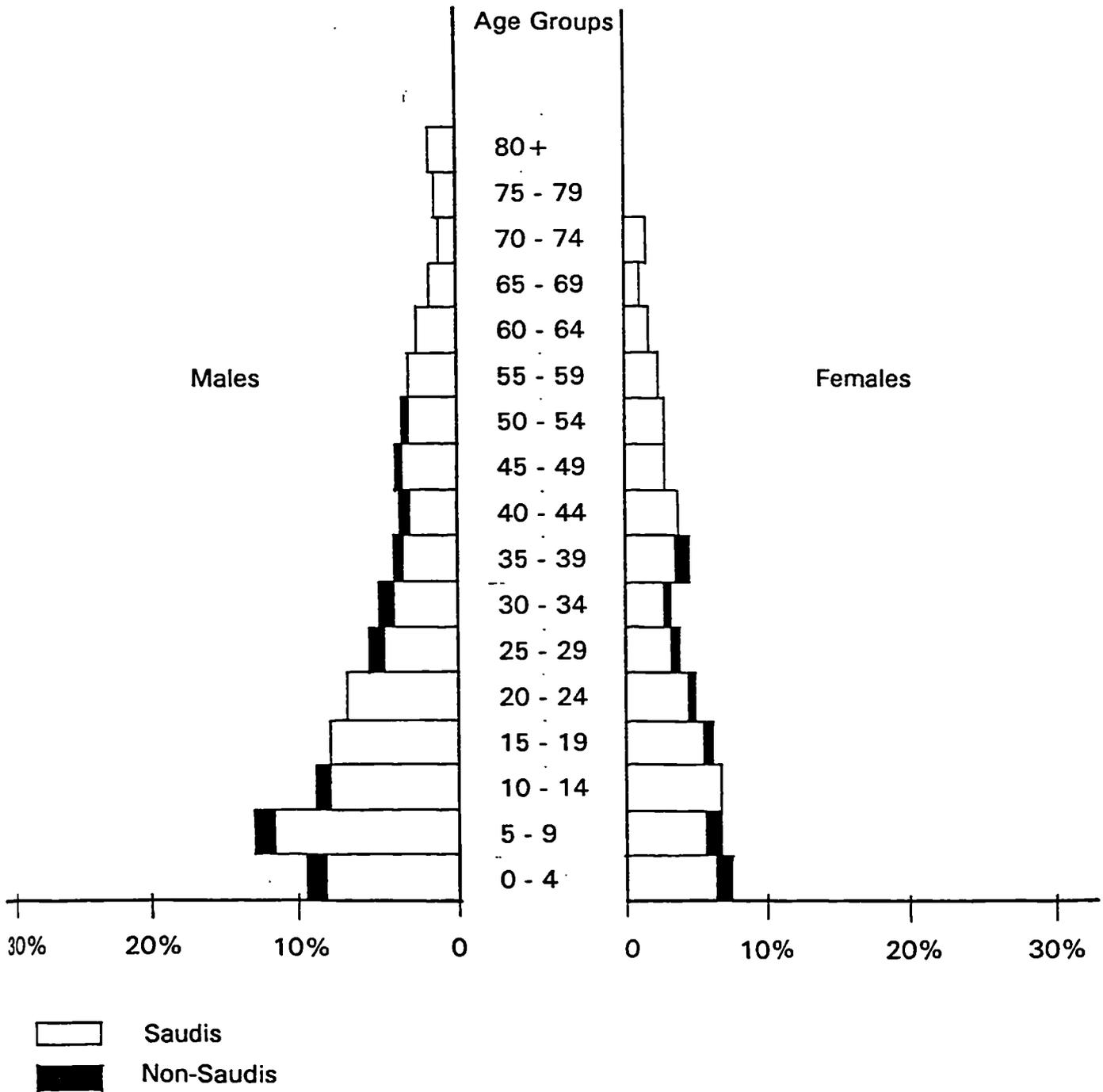


Figure 1: Survey Map Procedures

As Percentage of Total Population (10,000 Inhts, 1405 H)



Population Pyramid for small size Saudi Town.

ELECTRICITY

* = DATA NOT AVAILABLE
AV = AREA COVERED BY ELECTRICITY GRASS
S = DISTRICTS WITH SUPPLY
S (1/2) = DISTRICTS WITH SUPPLY (1/2)

- MAKKAH
- MADINAH
- JEDDAH
- DAMMAM
- TAIF
- YANBU
- QATIF
- SURABAYA
- LABU
- AL KHAMEES
- HAD
- KHART
- JIZAN
- ARAR
- ACHA
- SANAKA
- NATRAN
- YANBU
- HAKALBATH
- AL BAMA
- UNAIKAM
- QURAYAT
- JUBAIL
- MATHA
- BALJURASHI
- AK-RAS
- AZ-ZULFI
- BISHA
- KHAFT
- TURUF
- SHADRA
- AL BEKAYAH
- AL QURAYAT
- SABIA
- WADI AD DAWSIK
- AD DAWSIK
- RAS TANUKA
- AGU RISH
- AB BAI
- UNLAZ
- KEIF
- MULA
- ALWAJH
- KAFAH
- TANUMAH
- LAYLA AL-MALJ
- AD-BADIE
- MUTAT BANTE TRA
- SHARIRAH
- SENTAN
- AL MAZHAR
- ADDALAM
- DAHMAT AL JAH
- RABIGH
- TAYMAN
- TADAJEL
- TORBAH
- BADR
- AL KHURMAN
- KHAYBEK
- BESH
- KHELAH
- AL AD QURANDAN
- ZANBAN AL JAH
- AL MUZANTYAH
- AL QUNAYEH
- MUJAIL
- AL MADBAQ
- AL NAHRAH
- AL-NANAS
- MUTAT SUDAN
- HAD
- SIYON AL-KHUBA
- SHIDA
- AS-SQML
- RUNIAH
- SULWAN
- AL LATH
- BABA
- AL KHAKKIAN
- DHARMA
- MURMULA
- RAUDHAT SUDA
- AL HILWA
- TAMIR
- TACUJIL
- AK ROWNDAN
- AL KHUBARA
- AL GRAT
- MARAT
- JHADIA
- JUBAIL
- AL HARIQ
- TATHLETH
- AL ASIANI
- AL HASYIMIA
- TORBAH AL JAH
- SARAT AL JAH
- AL QUNAYEH

STATION AND RANGE

In accordance with Kerlinger's guidance, pre-tests (see section 4.4.3) were conducted prior to the actual questionnaire delivery to ensure the reliability of the research instrument. The pre-tests greatly helped the fine-tuning of the questionnaire so that the questions were easy to answer and the logic easy to follow. Furthermore, a small scale test-retest experiment, suggested by Reaves (1992: 80), was conducted to assess the reliability of the research instrument. After the final version of the questionnaire was ready, two practitioners who had participated in the pre-test stage of the research two months earlier were asked to fill in the questionnaire again. The answers were checked with their previous answers, and it was found that the two versions were similar. For practical reasons, it was difficult for the researcher to conduct a large scale test-retest experiment. However, the results, though qualitative in nature established the reliability measurement for the study.

4.5.2 Validity

“... suppose an educational scientist wishes to study ... the relation between authoritarianism and teaching style. ... there are no rulers to use, no scales with which to weigh the degree of authoritarianism, no clear-cut physical or behavioral attributes that point unmistakably to teaching style. It is necessary in such cases to invent indirect means to measure psychological and educational properties. These means are often so indirect that the validity of the measurement and its products is doubtful.”

(Kerlinger 1973: 456)

As discussed in the previous section, reliability is important for a research instrument. However, it is not enough for a test method to be reliable; it must also be valid. To illustrate this point, Carmines and Zeller (1994: 5) give a good example: “let us assume that a particular yardstick does not equal 36 inches; instead, the yardstick is 40 inches long. Thus, every time this yardstick is used to determine the height of a person (or object), it systematically underestimates height by 4 inches for every 36 inches. A person who is six feet tall according to

Example

Assuming a community of 3 ha gross area, 2 ha net area, with 10 buildings of 3 storeys each containing 4 dwelling units (apartments) where every unit houses 6 members (average household size), we will have the following:

$$\begin{aligned}\text{Community Population} &= \text{No. of Buildings} \times \text{No. of Storeys} \times \\ &\quad \text{No. of Dwelling Units} \times \text{HH size} = \\ &10 \times 3 \times 4 \times 6 = 720 \text{ inhabitants}\end{aligned}$$

$$\begin{aligned}\text{Then Net Density} &= 720 \text{ inhts} / 2 \text{ (Net Area)} = 360 \text{ inht/ha} \\ \text{Then Gross Density} &= 720 \text{ inhts} / 3 \text{ (Gross Density)} = 240 \text{ inht/ha}\end{aligned}$$

Thus, actual area of the town in the future depends on the appropriate gross density. If a town has an average gross density of 100 inhts/ha with the assumption of having 100,000 inhs in ten years to come, the appropriate gross size of its urban boundary would be covering 1000 ha, i.e. 10 sqkm or half this if 200 inht/ha is assumed or about 6.7 sqkm assuming 150 inhts/ha as shown in Figure No. 8.

b) Population Census

Population census and their distribution on the town space according to reasonable time spans is indispensable in determination of city growth and estimation of land demands for the various purposes. The larger the town and its socio-economic activities the more vital the need to provide information on population number, composition and distribution. Information can be made available through the following resources:

Direct Resources:

- Population Census
- Sample Surveys

Non-direct Resources:

- Official statistical reports
- Birth/death records
- Municipal records of building permits, yearly new and collapsing houses
- Employment and labor statistics by economic sectors
- No. of utility connections (electricity, telephone) and other resources

Researchers or planners encounter a number of obstacles, mostly the lack of skilled staff in the field of data collection and analysis. Accuracy must be maintained in data collection and cross checking. If data is unavailable or difficult to obtain through direct resources the planner has to contact many of the above mentioned agencies to obtain the information required for the preparation of preliminary estimates relevant to planning urgencies.

First Method

Demographic Data Collection Through Direct Resources

Once the planning authority has the ability to carry out a comprehensive or sample survey for the town with the objective of providing up-to-date and direct information, it is useful to utilize a questionnaire including the most important aspects required for planning purposes, such as:

- Household Characteristics: Composition, size, age, nationality, density in each community.
- Educational level, marital status, birth and death rates.
- Migration, duration of previous stay, place of origin & reasons for migration.
- Household income, expenditures and holdings (real estates and vehicles).
- Opinion response of Households heads concerning environmental and living conditions, adequacy and accessibility of public utilities and facilities.

The attached herewith questionnaire can be utilized as it has the following merits:

- Simplicity and comprehensiveness as it includes the most required data.
- Conformity with the unified data base of central department of statistics and data banks for easy cross checking and projections, data entry or delete.

Fifth: Sources of Household Income and Expenditure

	Last Month	Last Year	Shopping Place		
			Community	Town	Outside Town
a) How much SR do you spend on food, drink and clothing ?					
b) How much SR do you pay for rent here ?					
c) How much SR do you spend on furniture and appliances here ?					
d) How much SR do you spend on tuition ?					
e) How much SR do you spend on transportation and maintenance of vehicles ?					
f) Other expenditures					
g) How much SR do you pay for other parties outside this district ?					
Total Expenditures					
Total Savings					
a) Income from salary or wage (delete improper)					
b) Income from agricultural and animal produce					
c) Income from trade or industry					
d) Income from properties and real estates					
e) Income from subsidies and fees					
f) Other income resources					
Total Income					
Total Debts					

What is the present economic activity performed by employed members of the household ?

Industrial (1) Commercial (2) Agricultural (3) Construction (4) Service (5) Others (6)

Sixth: Household Holdings

1. Agricultural holdings or farms with an estimated value of SR presently (1).
2. Real Estates and Buildings with an estimated value of SR presently.
3. Vehicles (give number) with an estimated value of SR presently.
4. Other, to be mentioned, with an estimated value of SR presently.
 - Means of commuting to and from work: Private car (1) work vehicle (2) taxi (3) bus (4).

Opinion-response of household head with respect to adequacy of utilities, roads, facilities and communication means etc.

Interviewer General Remarks:

Signature

Date

A pilot survey is then carried out for testing validity of the questionnaire for collecting the required data prior to final format. This is followed by sample selection of households which will be interviewed. Sample households have to be randomly selected. Collected information will be kept in strict confidence for planning use only.

Sample Selection

In order to easily carryout a 5% household sample survey (or even lesser percentage depending on resources), an up-to-date household sample framework should be prepared according to the following steps:

1. Desect town/village into quarters (Haras) according to defined boundaries.
2. Count and give serial numbers to blocks in each quarter (Hara).
3. Select randomly 20% of the blocks in each quarter.
4. Count and give serial numbers to residential buildings within the randomly selected blocks in each quarter.
5. Select 50% of the buildings being counted in 4 above; count existing dwelling units, list occupied dwellings and disregard non-occupied ones.
6. Select 50% of the occupied dwelling units.

Thus, we obtain the required sample as follows:

$$\frac{100 \text{ (Quarters)}}{100} \times \frac{20 \text{ (Blocks)}}{100} \times \frac{50 \text{ (Res. Buildings)}}{100} \times \frac{50 \text{ Occupied D.U.}}{100} = 5\%$$

If it appeared difficult to prepare a new house hold sample framework like the one above, the planner has to resort to old official census data for each quarter; and estimate number of households in each quarter based on the assumption of an appropriate annual average growth rate of population (3-5 % as per recent socio-economic survey results of some Saudi towns) and prevailing household size in the region.

The following Table shows the necessary steps for estimation required for the sample survey in case it is difficult to obtain a new sample framework.

Serial	Population (Recent Census)	Estimation of Population Assuming 3-5% Annual Growth	No. of Households Based on Prevailing Household Size	No. of 5% Households

THIRD: POPULATION COMPOSITION

How many people usually live in the house? males, Females

Serial	Name	Relation to House hold Head	Sex 1. male 2. female	Age years Put dash if less than one year	Nationality Saudi Non-saudi	Marital Status		Educational Status
						Not married (1) Married (2) Divorced (3) Widow (4)	No. of wives under custody	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1								
2								
3								
15								

No. of weddings during past year (effective date of interview)
 No. of divorces during past year.
 No. of deaths during past year including sex and age and reason for death.

FOURTH: MOBILITY & MIGRATION

- 1- Household Head place of birth : in this town (1) outside this town(2)
- 2- If outside this town, mention the place within the Kingdom. Other Country; Arab/Foreign
- 3- Date of move into this town : less than 2 years (1) 2-less than 5 years (2) 5-less than 10 years (3) More than 10 years (4)

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2								
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No. of weddings during past year (effective date of interview)

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No. of deaths during past year including sex and age and reason for death.

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3- Date of move into this town : less than 2 years(1) 2-less than 5 years(2) 5-less than 10 years(3) More than 10 years(4)

Second Method

Population Count Through Non-Direct Resources

First: Through Electricity Companies

It is advisable to contact electricity company in order to obtain supporting data of total population throughout the town. Data includes:

- Number of subscribers (electricity meters) for different years.
- Number of subscribers within the months of the last year.
- Number of subscribers by communities and use (domestic, shops, workshops etc.).
- Type of unit connected with electricity meter (apartments Arab house, villa, shop, workshop etc.).
- Breakdown of consumers by consumption categories (so as to obtain certain supporting parameters such as household income and electric appliances used).

Through multiplication of the number of households by the average household size for a number of years we come out with an estimation of total city population to be used as a parameter in comparison with other data.

An estimation of total city population could be worked out through total daily consumption of electricity by the city. Assuming 5 kw per capita daily consumption and 500,000 kw average total city daily consumption (500 MW), the estimated number of population on that date is 100,000 inhabitants, i.e.:

$$\frac{500,000 \text{ kw total consumption}}{5 \text{ kw per capita consumption}} = 100,000 \text{ inhts}$$

Second: Departments of Education

Data on boys/girls enrollments for the different levels could be obtained from the statistical sections of the departments of education. Data include:

- Number of students in elementary level (6-12 years), boys and girls.
- Number of students in intermediate level (12-14 years), boys and girls.
- Number of students in secondary level (15-17 years), boys and girls.

Also, those enrolled in institutions for same ages are included, as well as those in private schools. Knowing the numbers of students within a certain age group and referring to distribution ratio in the population pyramid which features Saudi towns at present, then total population

could be obtained. Assuming the number of students in the age group "10-less than 15 years" (males and females) is 1500, we will have a total population of approximately 1500 inhabitants as they represent 15% of total population based on the assumption that all population within this age group are enrolled in schools.

Total Population = $1500 \times 100 =$ Approx. 10,000 inhts.

15

Noteworthy to mention that demographic studies of the Saudi towns revealed approximately 45 - 50% of the total population falling within the age group "0-below 15 years" which is reflected in the broadening base of the Saudi pyramid.

Third: Telephone Department

It is advisable to contact the Telephone Department to obtain information on number of population by sectors based on the distributed telephone lines, bearing in mind the difference between domestic lines and lines provided for the various institutions.

One can rely also on coverage as the basis for population estimate. Telephone department could provide 20 lines in average for every 100 people; thus, knowing number of telephone lines one can estimate the approximate total population.

Fourth: Employment and Labor Force Statistics

It is useful to obtain data on number of those engaged in employments from those departments which issue identification cards or recruitment visas as well as from labor office and organization of Social Insurance ... etc. Evidently, the labor force within the producing age groups "18-60 years" including working women in many of the Saudi towns account for 25-35% of total population, according to results of socio-economic surveys conducted for some Saudi towns. Knowing the number of population within this age group enables estimation of the approximate total population. These are merely guiding examples for obtaining approximate estimations of total town/village population.

Third Stage

Analytical Studies

This is the evaluation stage of existing conditions and identification of the different problems of the town based on already obtained data. The study tackles population forecasts, calculation of human activity demands and identification of problematic situations. Most important features of this study are:

- i) Demographic analysis
- ii) Utility infrastructure and facility analysis
- iii) Physical setting analysis

1. Analysis and Population Forecasts

The following demographic parameters are important for data analysis and verification.

- i) **Sex ration:** expressed as number of males per 100 females. In normal condition it is 105:100 in the youngest age cohort, i.e. males outnumber females throughout the country by 5% approximately. This ratio is used sometimes to judge the validity of population statistics and test data accuracy. The ratio could be applied for the different age cohorts but with variation due to varying patterns of mortality and migration among population. A comparison can be drawn for the sex ratio between a town that has undergone changing conditions and another town enjoying stable and normal conditions.

$$\frac{\text{Number of males in town (all age cohorts)} \times 100}{\text{Number of females in same town (all age cohorts)}}$$

or

$$\frac{\text{Number of males (less than 10 years)}}{\text{Number of females (less than 10 years)}}$$

The data indicates that males ratio in the Saudi towns outnumber females ratio in the producing cohorts (25-50 years) due to the foreign labor force of males within these cohorts.

2. Population Pyramid:

The distribution of population by age-sex cohorts shows the following:

- Broad base, narrow top pyramid, or stable levels or the opposite. A broad base indicates a young fertile population.
- Discerning increase or decrease in the number of males relative to females in the age groups. Normally, males outnumber females in the early age groups, but begin to drop in the older age groups (females outnumber males).
- Decrease, increase or stability of each cohort in relation to the one below due to death and migration.
- Discerning outnumbering in employment ratio between males and females within the producing age groups to indicate those groups engaged in employment more than the other groups.
- Population's past and future through changes occurring at the pyramid's base, mid and top, and whether new cohorts or potential births would be more or less than previous ones. Percentages shown in the following two figures can stand as models for the distribution by age-sex cohorts for the Saudi medium and small towns' population (125,000 and 10,000 inhts respectively). It is suggested, if data is not available to utilize this

distribution for the estimation of total population of the town. If number of school students in the different levels is known to us then we can estimate total population of the town.

3. Annual Crude Birth Rate =
$$\frac{\text{No. of Annual Births} \times 1000}{\text{Total Population}}$$

This ranges 35 - 45 per thousand population for the Kingdom as revealed by socio-economic surveys results for some Saudi towns.

4. Mortality =
$$\frac{\text{No. of Deaths} \times 1000}{\text{Total Population}}$$

Ranging 10 - 23 per thousand population for the Kingdom based on socio-economic surveys results for some Saudi towns.

5. Annual Rate of Natural Increase of Population

Which is the difference between crude birth and death rates in that year as a percentage of the base population, meanwhile compound growth rate includes annual natural increase plus net migration.

6. Annual Marriage Rate =
$$\frac{\text{No. of Marriages} \times 1000}{\text{Total Population}}$$

7. Annual Divorce Rate =
$$\frac{\text{No. of Divorces} \times 1000}{\text{Total Population}}$$

8. Annual In-Migration Rate =
$$\frac{\text{No. of In-Migration} \times 1000}{\text{Total Population in Place}}$$

9. Annual Out-Migration Rate =
$$\frac{\text{No. of Out-Migration} \times 1000}{\text{Total Population in Place}}$$

10. Net Migration = The difference between in-migration and out-migration plus or minus

11. Gross Population Density =
$$\frac{\text{Total Population}}{\text{Total Land Area}} = \text{inht/sqkm at national level, and inht/ha at town level.}$$

12. Based on the observed relation between growth rates over consecutive years it has been found that the town of 1% growth rate requires 70 years to double its previous population, therefore the time required for a country or a town to double its population can be drawn by dividing the figure 70 by the average growth rate. A town of 5% growth rate requires 14 years to double its population as it had been 14 years ago. By so doing, we can judge pace of growth; rapid or slow.

13.1 Adjustment of Population Forecasts According to Growth Rate:

Total Population = Total Population x (1 + Growth Rate)
At end of period At beginning of period

The average growth rate for the Kingdom generally ranges 3-4%. Increase in growth rate in certain towns is due to increasing job opportunities in the agricultural, administrative, governmental, commercial and construction sectors and societal aims and aspirations to increase fertility rate.

In light of the field studies conducted for the towns of the Kingdom, it is suggested to use as a guide the following population growth rates for the preparation of population projections should it be difficult to obtain growth rates from resourceful sources:

Region - 3.5%
Town over 100,000 population 4%
Town 10,000 - 50,000 population 3%

Examples

To calculate increase for a town population of 10,000 inhabitants in 1405 H (1985 G) and forecast population through 1410 H (1990 G) at 5% annual growth rate:

- Population increase during 1st year = 10,000 x 5% = 500
Population by end of 1st year = 10,000 + 500 = 10,500
- Increase during 2nd year = 10,500 x 5% = 525
Population by end of 2nd year = 10500 + 525 = 11025
- Increase during 3rd year = 11025 x 5% = 551
Population by end of 3rd year = 11025 + 551 = 11576

Process continues until end of the fifth year of up to the required period; but this is a lengthy process; therefore it is replaced by the following formula:

$$P2 = P1 (1 + R)^Y$$

Where:

P2 = Total population by end of period
P1 = Total population at start of period
R = Growth rate
Y = Number of years

Based on this formula, population can be calculated as follows:

T1 = 10,000 inhabitants
R = 1.05 (i.e. 1 + growth rate)
Y = 5 years

As:

$$(1.05)^5 = 1.05 \times 1.05 \times 1.05 \times 1.05 \times 1.05 = 1.2762815$$

Then:

$$P2 = 10,000 \times 1.2762815 = 12762.8150000 \\ = 12763 \text{ inhabitants approx.}$$

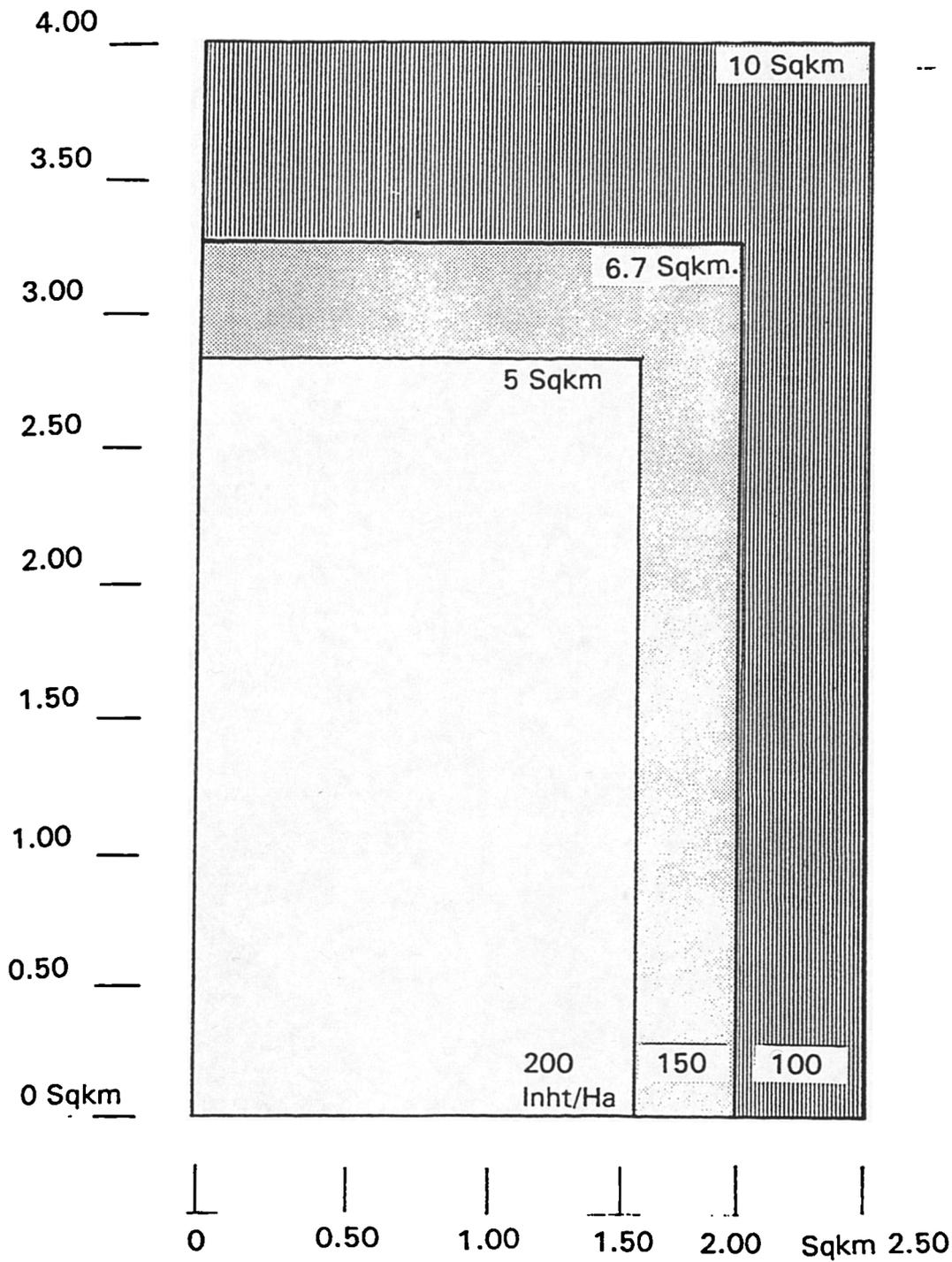
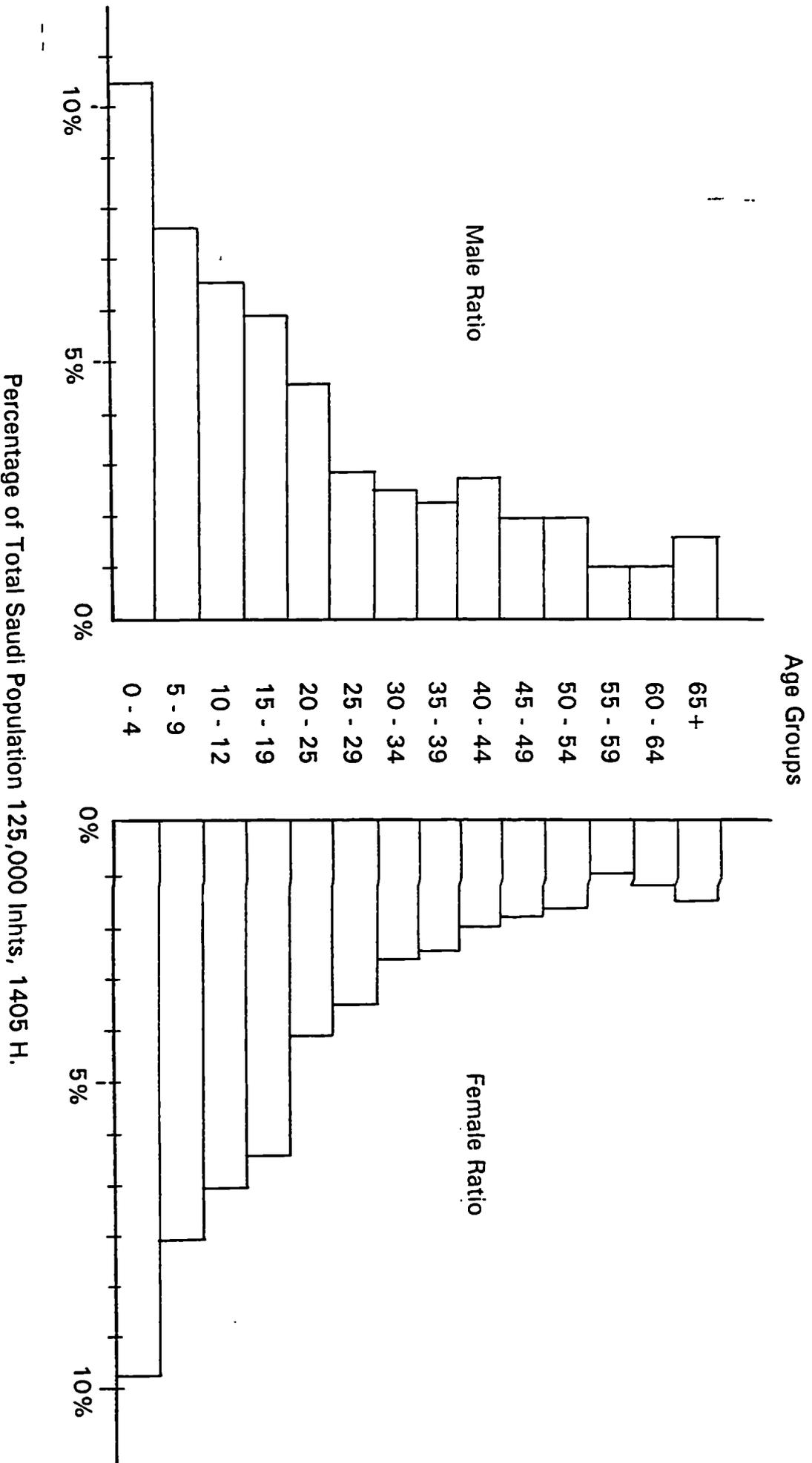
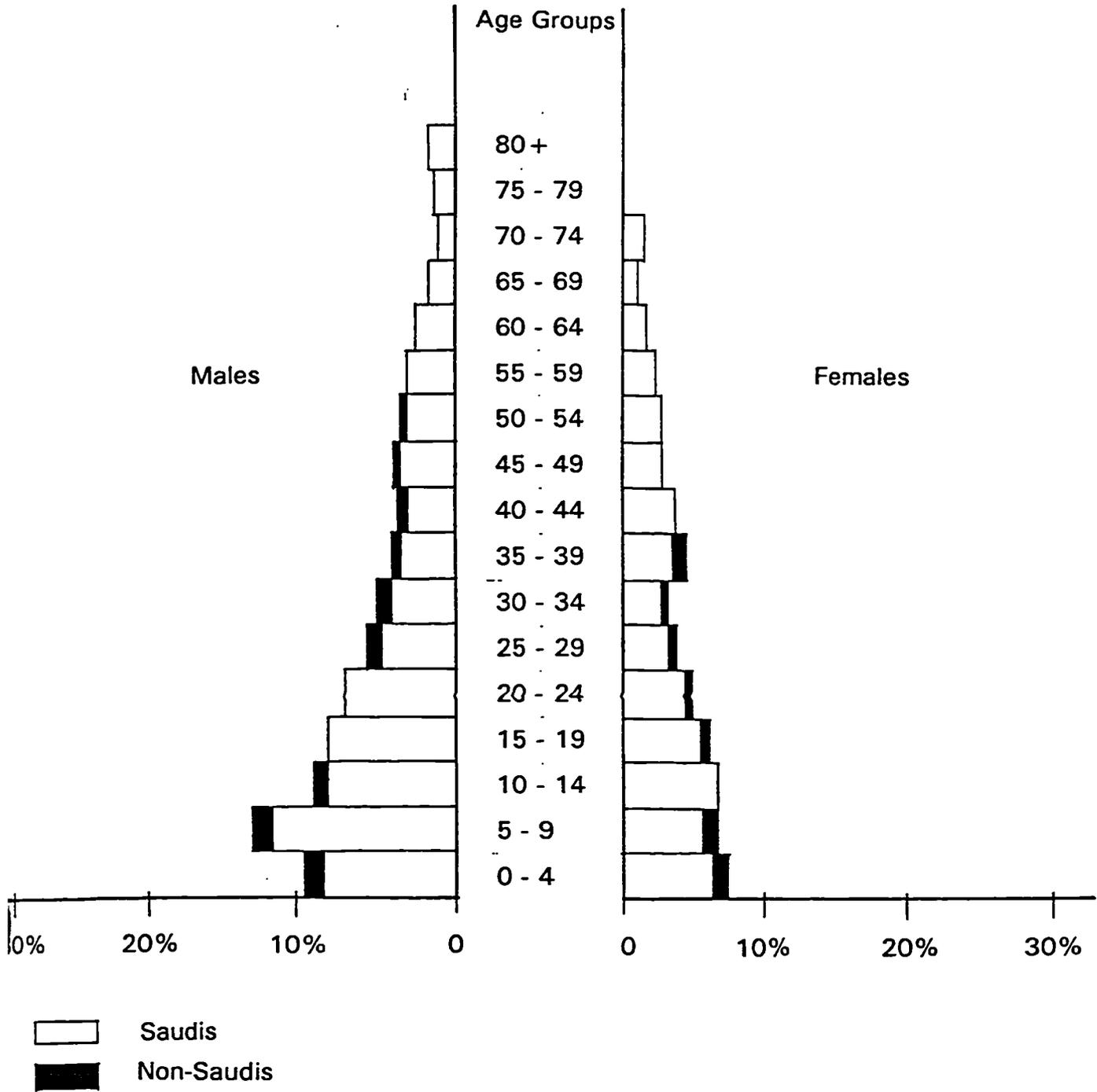


Figure 8: Size of a Town with Population Potential of 100,000 Inhts assuming reasonable Population Densities

Figure 9: Population Pyramid for Medium Saudi Town



As Percentage of Total Population (10,000 Inhts, 1405 H)



Population Pyramid for small size Saudi Town.

14. Calculation of the Dwelling Units Demand Requires:

- Total present dwelling units (percentage of bad, satisfactory, good units)
- Household size
- Average person per room after which the required number of rooms is calculated (then dwelling units) based on the assumed person/room ratio as indicated in the following Table:

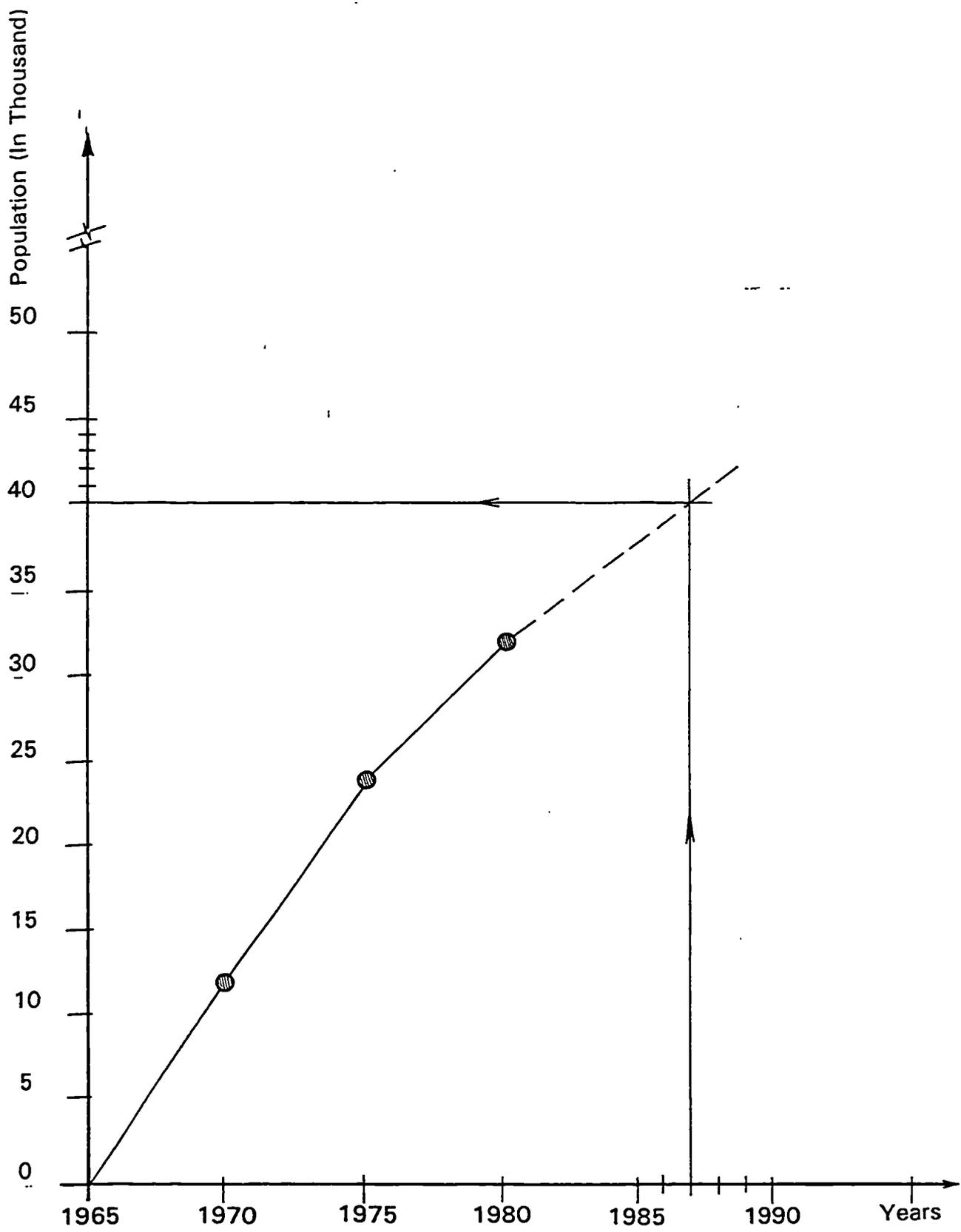
Year	Population	Person/Room	Total Rooms	Total Units (4 Rooms/ Unit)
(1)	(2)	(3)	(4)	(5)
1975	-	1.35	(2) / (3)	(4) / Average Dwelling Size
1980	10,000	1.30	7,692	1,923
1990	12,763	1.10	11,602	1,900

Note to compensate for bad dwellings.

15. Household Size in Small and Medium Size Saudi Towns

The following percentages can be used as model for the distribution of households by size in a small size Saudi town (approx. 10,000 population, e.g. Tayma town in 1405 H (1985 G)).

Household Size	No. of Households	% of Total Households	% of Total Population
2	76	6.7	1.6
3	19	1.7	0.6
4	94	8.3	4.0
5	114	10.0	6.0
6	113	11.7	8.3
7	94	8.3	7.0
8	228	20.0	19.1
9	37	3.3	3.6
10 - 14	228	20.0	28.1
15 +	115	10.0	21.7
Total	1,138	100	100



Correlation Curve Between Population and Time

Nationality	Household Size											
	1	2	3	4	5	6	7	8	9	10-14	15	Total
Saudis												
No. of Households	137	861	823	1075	1406	1311	1426	1093	1428	3411	294	13265
% of Total Households	1.5	6.5	6.2	8.1	10.6	9.9	10.8	8.2	10.8	25.7	2.2	100.0
% of Total Population	0.1	1.7	2.5	4.3	7.1	7.9	10.1	8.8	12.9	39.2	5.4	100.0
Non-Saudis												
No. of Households	317	627	807	806	750	472	369	332	217	411	-	5108
% of Total Households	6.2	12.3	15.8	15.8	14.7	9.2	7.2	6.5	4.2	8.1	-	100.0
% of Total Population	1.2	4.8	9.3	12.4	14.4	10.0	9.9	10.2	7.5	19.4	-	100.0
Total												
No. of Households	454	1488	1630	1881	2156	1783	1795	1425	1645	3822	294	18373
% of Total Households	2.5	8.1	8.9	10.2	11.7	9.7	9.8	7.7	9.0	20.8	1.6	100.0
% of Total Population	0.4	2.4	3.9	6.0	8.6	8.5	10.0	9.1	11.8	25.1	4.2	100.0

The average household size of the town proposed as a model for similar towns reaches 8.4. The following percentages can be adopted as models for the distribution of households by size in a medium size Saudi town (approx. 125,000 population, e.g. Tabuk city in 1403 H (1983 G)).

Population Forecasts

Forecasts or estimations of population are influenced to a great extent by the quality of collected data. The more valid and resourceful the data the more real and sound the estimates. For the purpose of future modeling and forecasting, we have to select the base figure which dates back to the National Census of 1394 H (1974 G) and the approximate figure obtained through the direct or the non-direct sources previously mentioned. Future estimates of population can be obtained through the following two methods:

- a) Total population by end of period = Total population at the start of period multiplied by $(1 + \text{growth percentage})$ powered by number of years lapsed between the two known points (refer to previously exercised examples).
- b) Drawing a graph as shown in the following figure having the coordinates to determine correlation curve then projecting lines onto the coordinates and reading the population figure.

Second: Public Utility and Facility Analysis

Already collected data on public utilities and facilities will now be analyzed as follows:

- Plotting of utility infrastructure and road networks.
- Preparation of an aggregate map for the public utilities.
- Analysis of data and calculation of area requirements for the various public utilities and facilities.
- Plotting sites of public facilities onto maps and determination of their sphere of influence.

a) Plotting Utility Infrastructure and Road Network

Following the collection of data on utilities, concerned municipality plot this data onto maps of suitable scale. Emphasis should be placed on the following:

- Covered areas.
- Areas under current coverage.
- Built-up areas lacking the required utility as well as subdivisions not yet serviced.
- Sites of future projects according to five year periods.
- Tendered areas awaiting commencement of work.
- Areas for which studies has been prepared.

The road map should include the following:

- Serviced areas (asphalt, sidewalks street lighting)
- Inhabited but not serviced.
- Location of car parks.

b) Aggregate Utility Map

This map aims in principle at determining serviced areas with water, electricity, telephone, sanitary drainage, stormwater drainage and roads etc.). In such case the coverage is 100%. As for other areas, they will be classified according to percentage of coverage. Matching and cross-checking of this map with the physical form analysis map would enable the determination of the different development phases according to already prescribed priorities which consider both covered and uncovered built-up areas with observance of population densities in these areas and assignment of priorities for construction of public utilities.

c) Plotting Sites of Public Facilities

Concerned municipality should plot all previously collected data regarding locations of the various public facilities onto maps of appropriate scale including religious, health, educational, administrative and recreational facilities etc.

Planning standards should be used as a guide in determining service radius of the existing public facilities and demands of unprovided areas as well as area requirements for the various projected facilities.

Analysis of Data and Calculation of Area Requirements for the Various Public Utilities and Facilities

Once plans for public utilities and facilities are prepared and service radius determined concerned municipality conducts an analysis including calculation of the different areas assigned for public utilities or facilities as well as the percentage of each area relative to gross area of the urban mass.

In light of the previous analysis municipality carries out the following tasks:

- Calculation of areas required for public utilities and facilities.
- Determination of available vacant land within the built-up area, and the areas which could be utilized for the necessary public utilities and facilities.
- Determination areas of the remaining vacant lands outside the built-up area and their selected locations.

Estimation of Land Area Required for the Public Utilities and Facilities

Calculation of land area required for the public utilities and facilities throughout the Five Year Development Plans up to the end of the intended period should be based on planning and design standards for each public utility and facility.

Method of calculating the required areas can be briefed as follows:

a) Total Required Units =

$$\frac{\text{Total Projected Population by end of the Intended Period (Maximum)}}{\text{Utility/Facility Absorptive Capacity (Minimum standard)}}$$

b) Total Required Areas for Facility =

Number of Required Units x Estimated Area for each Unit.

c) Number of Projected Units =

Required Units - Total Existing Units

Based on the above, calculation of projected requirements can be made as per formula (b) taking into consideration rented units to enable provision for future land requirements.

Third: Analysis of Physical Setting

Through analysis of physical setting for many of the Saudi towns, one can clearly see traditional physical environments reflecting cultural values of Islamic Architecture designed to human scale and the arise of new physical environments lacking much of the traditional Arab architectural identity in search for public utilities and road networks due to the introduction of the vehicle as an essential element in shaping the Arab town. Both environments are being separated by haphazard developments which resulted in the evolution of the fragmented shabby urban texture. For the analysis of physical setting, it is necessary to pursue the following basic aspects:

- Setting Evolution and Development
- Land Uses
- Existing Building Conditions
- Road Networks and their Efficiency

Settlement Evolution

One can not understand how the town came about without knowledge of the dynamics and interaction of its components with the passing time up to its present state. This includes collection of all former plans of the town and any available data related to its development over time, and tracing changes and reasons for change as well as identification of previous development problems and constraints to enable the formulation of its development scenario on sound basis and benefit from past experiences.

Land Uses and Analysis

Study findings of existing land uses:

- a) Determination of areas of mixed uses which result in having many planning problems such as traffic congestions and so on. This situation necessitates segregation of uses and determination of their requirements for lands.
- b) Provision of areas required for public facilities in old areas of at their peripheries of vacant (white) lands are not available inside.
- c) Determination of public and private white lands inside and outside the built-up area for future fill along with proposal of the necessary development controls.
- d) Determination of rate of developed lands through calculation of built-up plots relations to total plots in the plans or developed areas.
- e) Calculation of building density (ratio of built-up area: total gross area) so as to realize the optimum building density, identify high density near requiring provision of open spaces for recreational and public facilities in old areas according to planning standards.
- f) Determination of urban disorders and imbalanced areas for possible remedy through increase of their absorptive capacities.

Building Conditions

Through physical survey of building conditions, the following can be identified:

1. Building Heights: Population densities can be derived for the different parts of the town or village from building heights data.
2. Building Conditions: Determination of collapsing old areas having no cultural significance and requiring immediate replacements and utilization for public purposes.

No. of population = No. of units x average household size

Road Network and Its Efficiency

The following will be analyzed:

- Present hierarchy of road network
- Network efficiency
- Coverage
- Requirements of unserved areas
- Existing major growth axes, with emphasis on new growth axes with the objective of realizing new spatial strategies
- Potential zonal linkage and inter-city linkage at the regional level

Town Maps

1. Settlement evolution map, with appropriate scale showing settlement boundary throughout the different stages of settlement growth.
2. Land use map showing
 - Residential, commercial, industrial and recreational uses etc.
 - Conservation areas
 - Areas difficult to be developed
 - Public and private white lands
3. Building conditions maps, including:
 - Building heights map
 - Building conditions map
4. Road Network and transportation maps including:
 - Present hierarchy of Road Network (freeways, arterials, collectors, locals)
 - Existing condition map for Road Network showing asphalted roads, and those under construction.
5. Physical Structure Analysis Map identifying physical problems of the town such as disparities in densities, imbalances, haphazard developments, unserved and undeveloped areas etc..

Fourth Stage

Determination of Urban Boundary

The process of determining the urban boundary and optimal size of towns is not only a landscaping one but above all it is a scientific process based on planning standards and design criteria according to actual needs of the towns. Both citizens and planners participate in the rationalization of development costs and managing urban growth. The process is flexible enough to allow for mutable factors and ensure continuity.

Criteria for Determination of Urban Boundary

Most important criteria as follows:

1. Results of existing conditions studies, field surveys, estimation of actual population densities and analytical studies in general. The following are the most important:
 - a) Existing and projected population throughout phases of development.
 - b) Calculation of human activity requirements for public utilities and facilities, investments and lands for the different uses and conformity with sectoral plans.
 - c) Calculation of the absorptive capacities of the areas not yet developed but committed for development within the town.

- d) Calculation of area requirements for the different phases of development based on estimates of population and facility / use demands according to the planning standards.
2. Institutional and administrative considerations including the national development plans. Important aspects are:
 - a) Determination of certain areas for land grants with consideration to study their locations, area and possibility to develop them within the town boundary or considering them independent suburb.
 - b) Demarkation of administrative boundaries for the municipalities.
 - c) Consideration of public projects such low-income housing projects and other developments.
 3. Development Cost

This is an essential factor in determining urban boundary. Concerned authority should have this within the available financial resources.

The Urban Boundary in its Final Form

Design Steps

1. Preliminary Design

Starts with structuring and arranging the different uses and formulating more than one alternative design for delineation of town boundaries, then testing each alternative for efficiency in the following way:

- a) General planning criteria such as the relation between land uses and road network and the relation among the different uses and extent of their need.
- b) Testing alternative design performance based on how far development would be guided and goals achieved in line with National Spatial Strategy and the other following strategies:
 - Population strategies
 - Road network strategies
 - Activities concentration and spread strategy
 - Distribution strategy of facilities and their service radius
 - Strategy of industrial activity and distribution of industry
 - Strategy of public utilities and their extension beyond existing area

Selection Criteria of the Preferred Alternative

The selected alternative should incorporate many of the positive features of the other design alternatives and avoid negative aspects.

The selected strategy should ensure:

- Town expansion should form a natural extension of the existing built-up area or part of it and should be equal to the actual areas required for the population and physical growth.
- Feasibility to install transportation network for easy accessibility of development extension areas.
- Reflection of people societal aims and aspirations, as citizen participation is vital in the accomplishment of development plans.
- Affordability
- Determination of development priorities

Details and Production of Design

The preliminary design gives general picture of land use distribution and site planning for the future. In the second stage, this design is tackled in detail (sketches stage) followed by the design production in its final form.

Town Suburbs

Determination of the urban boundary for certain towns may necessitate the delineation of the physical boundaries of satellite towns in line with the decentralization of functions and services.

This led to the spread of dispersed residential areas known as suburbs which are residential commercial and administrative areas developed away from the prime town to restrict urban sprawl and are connected with prime town by a major roads. Such suburbs have their own utilities and facility with economic potentials so that they are not necessarily dependent on the prime town.

Suburbs do not mean those plans so dispersed away from the town with no function or specified use and lacking utilities and facilities. To make it clear suburb should comply with certain conditions and controls. Most important of these are:

1. Population does not exceed 20,000 inhts as recommended by Ministry of Planning regarding suburb development.
2. Distant enough to stay separate from prime town.
3. Enjoy adequate services for its population.
4. Has defined functions and absorbs variety of human activities to relieve prime town's burdens.

Determination of Urban Boundary for Suburbs

Managing urban growth of the suburbs should not take place to the disadvantage of specified land uses surrounding them which may impede land use efficiency.

Therefore, it must be emphasized to examine the role of suburbs within the functional strategy of the prime town. In light of this, their urban boundary can be determined and their development phased in conjunction with the Five Year Development Plans.

Fifth Stage

Preparation of Urban Boundary Report

Concerned municipalities should conduct and accomplish urban boundary studies for their towns based on what has been previously mentioned, along with the preparation of a report on background materials and information that have been utilized as a basis for those urban boundary studies.

All maps/plans related to urban boundary study should be prepared incorporating necessary data and information and presented with final study in the form of well produced map atlas, preferably coloured.

Following are the main components of the report:

- Introduction
- Background information (history, geography, topography and geology of town etc.
- Existing condition (settlement evolution, study of physical structure elements.
- Population study (distribution, present estimates, growth rates, projections, densities.
- Planning standards and design criteria for public utilities and facilities.
- Analytical studies
 - Analysis of physical structure
 - Infrastructures (water, electricity, telephone, sewerage, drainage, roads)
- Estimation of land requirements for public utilities and facilities throughout the Five Year Development Plans up to end of the intended period.
- Absorptive capacities of white lands within the built-up area.
- Derivation of parameters of physical structure analysis and development progress of the town.
- Relation of the approved land subdivisions with the different phases of growth.
- Planning indicators and directions of urban growth.
- Abstract of major considerations for the determination of urban boundary and phasing.

- **Determination of urban boundary up to the intended phase and the proposed phase boundary in accord with Five Year National Development Plans.**
- **Definition of "Urban Boundary" limits.**
- **Proposed controls and regulations respective to each growth phase.**
- **Proposal for protection of white and agricultural lands.**
- **Conclusion.**

Appendix B

Approved 1989

ATLAS FOR DELINEATION OF URBAN BOUNDARIES FOR SAUDI CITIES

This atlas has been prepared in the Deputy Ministry of Town Planning of the Ministry of Municipal and Rural Affairs under the direction of:

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ATLAS CONTENTS:

This atlas is the outcome of the aforementioned studies on the delineation of the physical boundaries for the cities and towns of the Kingdom. It contains precise and extensive data on the existing conditions in each city and town in terms of location and its natural characteristics such as climate, terrain and natural resources; economic activities, historical evolution of the city—along with statement on its early physical development and the stages for the development of its urban mass. As for demographic studies, the atlas includes data on the present population census and expected increases in population as shown in the tables attached. Regarding urban studies, it includes data on land uses, building conditions and heights, and a brief account of the urban texture of the city, public utilities and services (e.g. water supply, electricity, telephone, sewerage and stormwater disposal), municipal services especially commercial and recreational areas, road network and the main landmarks of the city.

The atlas also contains data on the strategies of urban development with definition of the direction of growth in each city, and a wealth of general information on the existing urban mass, vacant lands and planned lands located within it, vacant lands located outside it and number of plots within it, and areas of lands required for the 1415 H and 1425 H development stages.

DATA UPDATING:

Many unprecedented achievements were the fruits of the studies carried out for the delineation of the physical boundaries for the cities and towns of the Kingdom. The most important achievements are:

1. During the different stages of the study, the municipalities have played a positive role starting with the collection of basic data, carrying out field surveys and then conducting data analysis, proposal of different alternatives and participation in the selection of the best alternative. This ascertains that the municipalities were keen to put the study under implementation upon formal approval.
2. A base map is available for each city and town in the Kingdom. It includes the existing conditions and all changes which took place during the economic boom. It is worth to mention that before the initiation of the study most of the municipalities did not have a map including the existing conditions and some of them did not have base maps for the cities at all. No doubt that the provision of such updated maps is considered the best achievement in this area.
3. Development of Computer Programmes: On completion of the studies for the delineation of the physical boundaries of the cities and towns, computer programmes related to data collection have been developed with the aim of updating all data on cities and towns on continuous basis as well as making use of them in various planning matters of concern to the municipalities. The development of such programmes has been conducted at two levels:
 - a) At National Level: By dividing the Kingdom into emirates and sub-emirates.
 - b) At city/settlement level: by subdividing the city into quarters and blocks and then numbering the plots located within the block.

The information used in this system includes data on plots at the municipal level such as plot number; total area and built-up area, name of the subdivision in which the plot is located, type of plot use, information on streets surrounding the plot, and services connected to the plot such as electricity, telephone, sewerage, tree planting and pavement. The date of the survey etc. is also mentioned.

4. **Training of Municipal Staff on Computer Programming:** At present, the Deputy Ministry of Town Planning provides training on the computer programming, referred to in the previous para, to many municipal staff who have finalized the studies for the delineation of the physical boundaries, so as to enable them to update the data on continuous basis and sent them to the Deputy Ministry of Town Planning by the computer available at the municipality so that the central staff can promptly make the appropriate decisions in the light of data sent from other municipal staff.
5. **Availability of almost accurate population estimates and city sizes.**

Regulations for Urban Boundary Delineation

I. Terminology

1. Urban Boundary Documents:

A set of technical reports, Saudi cities atlas and atlases of attached maps which define the urban boundary for the cities of the Kingdom, development protection boundary and phasing of development as well.

2. Urban Boundary Limit:

Is meant to be the demarcation lines shown on maps included in the Urban Boundary set of documents, considered appropriate boundaries for rationalization of urban activities and coping with urban growth requirements up to 1425 H, so as to maximize economic efficiency of the available resources and achieve the optimal size of the cities.

3. Development Protection Boundaries:

These are the demarcation lines shown on maps included in the Urban Boundary set of documents. They limit lands reserved for future developments beyond urban boundary limit.

4. Phase 1 - Development boundaries up to 1415 H:

These are development limits inside the Urban Boundary encompassing existing built-up areas and those lands required to be developed up to 1415 H as per Urban Boundary Documents.

5. Phase 2 - Development Boundaries:

These are the areas confined within Phase 1 development bounds for 1415 H and Urban Boundaries. Here, development can be carried out in two phase as deemed by MOMRA based on a study to be prepared prior to ending of Phase 1. Boundaries for Phase 1 can be modified and approved and controls set forth by MOMRA resolution.

6. Public Utilities and Facilities:

Utilities meant to be systems of water, electricity, telephone, sewerage, stormwater drainage and roads networks; whereas facilities include religious, educational, health, administrative and recreational ones.

II. General Development Controls

1. White Lands beyond Urban Boundary:

a) Primary roads and public utilities are to be defined and implemented in those areas situated in between Development Protection Boundaries and Urban Boundary without awaiting for land owners to apply for Planning Permits observing road allotment ratio should not exceed the prescribed planning ratios.

- b) Banning of planning and development of white lands outside the city's urban boundary which are lying in between Development Protection Boundary and urban boundary until the proposition of MOMRA of the means, methods and controls necessary for handling of such type of land and the reporting of studies to the Council of Ministers within a period of three years from the date of approval of urban boundary documents for instructions.

2. White Lands within the Urban Boundary:

The Amanas and Municipalities undertake necessary measures to gradually plan those lands in consistency to local conditions and emergent circumstances taking into consideration areas served by public utilities and facilities. This to be carried out according to demographic studies and forecasts for each phase as follows:

- a) Phase 1 development: White lands to be planned without awaiting for land owner to apply for it, so as to enable alignment of primary roads and implement action of public utilities therein as well as linking together various parts of the city provided the area prescribed for roads and utilities not to exceed which is specified in the regulations.
- b) Phase 2 development: Lands defined for Phase 2 must not be permitted any planning or development during the period preceding Phase 2 (except primary roads which can be constructed without waiting for land owner to apply for it provided the ratio for roads should not exceed those established in the regulations except in the following cases:
 - In municipalities type 'Amana' and Class 'A' municipalities except Hafr Al Batin a property owner within Phase 2 desiring to plan his land prior to beginning of the phase should provide water supply, electricity and telephone networks to plots according to the preliminary subdivision plan, and the asphaltting, paving and illuminating of streets within plots as well as per approved specifications by the concerned authorities and the obtaining of their approval of the said utilities.
 - In municipalities Class B, C and Hafr Al Batin: A property owner within Phase 2 willing to plan his property prior to the beginning of Phase 2 should install water supply, electricity and telephone networks into his plots as well as asphaltting the roads within plots as per the preliminary subdivision plan and the approved specifications by the concerned authorities after obtaining their approval of the said utilities.

III. Implementation of Public Utilities and Facilities

All governmental authorities responsible for utilities and facilities must not construct any utility or facility beyond the development phase before the completion of the phase related utilities and facilities with the exception of roads and trunk networks of water supply, electricity and telephone.

IV. Urban Boundary Alteration

Whenever the need arises for the alteration of the urban boundary for a town, MOMRA undertakes full study of that town to be presented to a committee formed by representatives of MOMRA and Ministries of Interior, Finance and National Economy, P.T.T., Industry and Electricity and Communications. Recommendations should be reported to Council of Ministers for resolution.

- V. All governmental authorities and public institutions as well as other sectors should coordinate with MOMRA in the setting up of execution programs necessary for development within the phasing of Urban Growth Boundary in accordance with the actual needs of the towns.
- VI. Minister of MOMRA is empowered to issue directives and ordinances to put above stipulations into effect.

Appendix C

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Kingdom of Saudi Arabia
Ministry of Municipal and Rural Affairs
Deputy Ministry for Town Planning
Projects Coordination Department,
Study and Information Unit

MANUAL FOR URBAN DEVELOPMENT PRIORITIES

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Preface

Based on Resolution No. 175 of the Council of Ministers dated 18.9.1409h sanctioning the rules that determine the urban boundary and requiring institution of development priorities, particularly:

- 1) Para (2) of the 2nd item re "General Development Controls" with respect to white lands within the urban boundary states that 'Amanats' and municipalities shall take necessary measures as to the gradual planning of those lands with local adjustments, taking into consideration the already serviced areas, population studies, and anticipated increments for each development phase. Re: First Phase of Development "White lands included in this phase are to be planned without waiting for planning applications by owners so as to enable laying out of the main road network and implementation of public utilities therein and ensure urban integration among various parts of the town provided extractions for streets and public utilities should not exceed specified ratios.
- 2) The 3rd Item concerning the implementation of public facilities and utilities beyond each phase stipulates "all governmental agencies concerned with public facilities and utilities should not execute any facility or utility beyond any phase prior to the provision of all facilities and utilities related to the development phase except for roads and main trunks of water, electricity and telephone.
- 3) The 5th Item "all government departments, public agencies and other sectors should, in collaboration with MOMRA, institute the implementation programs required for development within the framework of the phases of urban boundary and in accord with the actual needs of the towns". Based on the Previously mentioned items, DMTP has launched this manual as an approach to the establishment of development priorities, maintaining coordination among all agencies participating in the development process and putting Council of Ministers resolution into effect.

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Introduction

Kingdom of Saudi Arabia has made great progress in the field of comprehensive development through the adoption of comprehensive planning approach. Most important was its outlook on spatial development as a sector closely interconnected with socio-economic development and wherein planning phases integrate from strategies and plans down to implementation and follow-up of development projects.

Out of this, an institutional framework for the bodies involved in the spatial development process has been instituted including the various sectors of the government concerned with the provision, operation and maintenance of public facilities and utilities as well as the local, regional, and national bodies involved in the institution of development plans at all levels. Those participatory bodies undertake the task of emergent coordination besides drawing up long and medium range plans and programs, and determination of development needs for urban and rural centers. Note worthy to say that the effectuation of coordination programs on the national, regional, and local levels, as well as determination of development priorities for urban and rural centers was not an easy task in the absence of spatial development plans for the majority of towns and villages.

After the completion of the urban boundary studies, all towns have had base maps defining areas to be developed within phase 1 and phase 2 (up to 1995 and 2005). An inventory of existing condition allowed for the determination of development priorities and institution of an integrated program for those priorities through which the urban space can be covered by facilities and utility infrastructural networks depending on the extent of provision and potentials. This study is to express the proposed criteria for the prioritization of development and form a methodology and uniformed language for the bodies involved in the development process through which spatial development priorities can be rated according to the actual needs of urban and rural centers.

CHAPTER 1

- 1.0 Objectives and Phasing of Development Priorities
- 1.1 Objectives
- 1.2 Methodology
- 1.3 Responsibility of Executing Agencies
- 1.4 Schedules for Implementation and Follow-up

1.0 Objectives and Phasing of Development Priorities

1.1 Objectives of the Study

This study aims at:

1. Rationalizing development costs.
2. Managing urban growth.
3. Training local staff toward coordination and use of development controls in the field.

1.1.1 Rationalizing Development & Costs

Development cost means capital outlays and expenditures made to the construction and maintenance of public facilities, utilities, and infrastructures. This represents the real cost of development. Provision of public facilities close to residential areas is an important factor in capital outlays for development. It is time and effort saving factor for the residents besides limiting maintenance and cleanliness costs. The study here is an attempt to lay down sort of criteria that help in rating development in order of priority so as to achieve the intended rationalization of development cost.

1.1.2 Managing Urban Growth

The following important factors render managing urban growth to be a tough task:

- Physical constraints (topography, streamheads and flows, dams).
- Extent of social benefits to be accrued.
- Compatibility with environmental, human and geographic setting such customs and climate.

Generally, this study facilitates sound selection of the sites suitable for development in order to achieve the intended benefits.

1.1.3 Training Local Staff Toward Coordination and use of Development Controls in the Field.

Other than those objectives is the attempt to lay down general criteria that enable the authorities to work out development controls for their communities based on feasible criteria away from personal outlooks or spontaneities.

1.2 Methodology and Phasing of Priorities

The working team to prepare this study should organize its work according to the following steps:

1.2.1 Data Collection and Updating Stage

This includes:

- Provision of up-to-date base maps for the town.
- Provision of population estimates, distribution and densities throughout the town.
- Provision of information relative to the distribution and sphere of influence public facility projects.

1.2.2 Stage of Selection of Criteria Applicable in Rating Development in Order of Priority:

This includes matching the selected criteria with the new information relative to the existing conditions of the town so as to increase or decrease the proposed weighing scores for each criterion before it is applied based on available information.

1.2.3 Output Analysis Stage, Conclusions and Priority Rating Based on Scoring Matrices.

1.3 Responsibilities of the Agencies Executing Priorities:

Activities here can be divided into three categories:

1.3.1 Field Local Activities

These include carrying out field surveys, data collection, preparation and distribution of maps to bodies involved in the urban development process, then collecting up those maps after incorporation of data, etc. This is a task to be carried out by local coordination offices.

1.3.2 Advisory Activities

These include extension of technical advice and exchange of opinions with the bodies involved in the urban development process, i.e. utility infrastructures networks. It also include proposition of the necessary standards, criteria and specifications, making further studies and specialized researches. This is the responsibility of the General Department of Projects Coordination in collaboration with the Central Coordination Committee.

1.3.3 Implementation & Follow-up Activities

They include monitoring work, overcoming problems, exchange of opinions with regard to deficiencies and working out feasible alternatives. This is the task of the Local Coordination Staff in collaboration with the experts of the Projects Coordination Department.

1.4 Schedules of Implementation and Follow-Up

The work is organized to be carried out in three main stages. 1st stage is expected to last 4-6 months, 2nd stage... one month, and 3rd stage... 2-3 months. Municipalities might be followed-up within the time allotted for each stage.

Schedule of Concluding Main Tasks

		M o n t h s								
Tasks	Time	1	2	3	4	5	6	7	8	9
Task 1										
Task 2										
Task 3										

Implementation Follow-Up Schedule

Time	Follow-Up 1st Stage	Follow-Up 2nd Stage	Follow-Up 3rd Stage
Follow-up	1,2,3,4,5,6	5,6,7	6,7,8,9,10
Municipality			
Municipality			
Municipality			

CHAPTER 2

- 2.0 Data Collection & Updating Stage
- 2.1 Preparation of Base Map and Study Areas.
- 2.2 Elaboration of Physical Data.
- 2.3 Demographic Data Update.
- 2.4 Utility & Roads Data Update.
- 2.5 Public Facilities Update

2.0 Data Collection & Update

One of the most important steps in rating development priorities is to collect, update and prepare the data necessary for this study in the form of tables, maps and plans or both together. The following data is most important:

2.1 Preparation of Base Maps & Study Areas

- At this stage, urban boundary study base maps, if available, can be utilized and updated in the same way of their preparation.
- New aerial maps can be utilized for the areas covered by old aerial mapping and those uncovered by the previous surveys. So as to observe new development.
- Carrying out field surveys for areas not covered by the new mapping.
- Collection of data, ie. photos and maps for larger projects and built up areas.

By combining of those elements, a base map at scale of 1/10,000 can be prepared for the town.

2.1.1 Subdivision of the Base Map

Upon preparation of the base map, the town is to be subdivided into planning sectors for which information is to be gathered. These sectors have to be compatible with the physical setting of the town and in accord with the residential plans or communities and quarters. The base for subdivision is the compatibility, as possible, with the available information relative to the town and the attempt to standardize the data base through:

- Maintaining the divisions adopted in defining the urban boundaries.
- Consistency with the classifications adopted in Land Information System.
- Maintaining the classifications adopted in Street and Building Indexing System.
- Maintaining same divisions adopted in the preparation of the physical plan of the town, if any structural, directive, master plan).

In case of noticeable discrepancy in the above-mentioned classifications, the one mostly used is to be adopted. Note worthy to say that the classifications used for data collection and which correspond with the data collection base are not obligatory to the planner who rates development priorities. It might be required to reduce or redivide part of them depending on the condition of development.

2.1.2 Definition of Study Areas

It is the planning unit for which planning information have to be collected and development priorities on the urban space rated.

Through it planned, inhabited vacant planned and unplanned lots as well as development axes can be identified.

2.2 Preparation of Physical Data

This includes the following tables and maps:

- Table showing gross and residential areas in each community within the town.
- Table showing building conditions (ratios of collapsing, poor, medium and good).
- Table showing building coverage and number of building permits in each community at the time of the study.
- Report on the condition of present development in the community, whether it is planned/occupied, unplanned/occupied, planned/unoccupied, unplanned/unoccupied or unplanned/unoccupied white lands.
- Type of development in the community: whether vacant, dispersed, semi-compacted or compacted.
- Maps showing evolutionary land use development of the town (at a suitable scale).
- Topographic and geologic map of the communities of the town as possible.
- Map showing general or structural plans with development phase boundary and projected uses.
- Urban boundary map of the town for 1415h 1995g) and 1425h (2005g).

2.2.1 Updating Land Use Map

Rating development, priorities requires a land use map so as to get a picture of the terrain and prevailing land uses within the communities of the town for which development weightage is to take place. Therefore, the updating of this map by the municipality of 1/1-,000 scale showing present and reserved uses, will help in the differential weightage among infrastructures. Same technique and colors already used in the preparation of plans and urban boundary should be followed.

2.3 Population Data Update

If it is difficult to carry out a sample socio-economic survey, a collection of data from secondary sources would be sufficient. The following would help:

2.3.1 Inventory of Building, Dwelling Units and Average Household Size.

- Built-up lots should be inventoried.

- Number of existing building on each lot with classification per storey.
- Number of dwelling units (vacant and occupied) in each building.
- Finding out prevailing average size of household in each community and multiplying it by the number of occupied dwelling units in that community.

2.3.2 Inventory of Elementary School Enrollments in Each Community.

Assuming this to constitute 16% of population according to normal distribution of population pyramid, the number of population in each community having a school could be extrapolated.

- 2.3.3 Extrapolation of the actual growth rates and multiplying them by the recent statistics or population forecasts.
- 2.3.4 Distributing population to communities, sub-communities and neighborhoods and calculating the overall density as well as residential density.

2.4 Public Utilities and Road Data Update

After the base map of the town is prepared, copies are to be dispatched to all utility departments (electricity, water, telephone, sanitary drainage, etc.) to provide up-to-date information as follows:

- Demarcating areas covered and uncovered by networks.
- Areas having underway utility projects.
- Conditions of present networks.
- Defining the alignments of main and secondary networks.
- Assignment age of the present networks and date of installation (less than 1 year, 1 year, 5, 10, 20, more than 20 years).
- Capacity of the present networks.
- Percentage of serviced households by each network in the community: 25%, 25-50%, 50-75%, 75% +.
- Level of service; whether trunklines or trunk and minor and house connections.
- Short and long-term utility plans.
- Standards employed in the evaluation of development priorities.
- Any other information.

Utility departments are requested to send back those maps to the municipalities with all data being incorporated (copies should be approved by each utility department). This would help in:

- Evaluation of the conditions of public utilities.

- Assessment of public utilities plans in light of the approved development plans for the town.

It is important to prepare a map showing type and conditions of road network at suitable scale. Municipalities could benefit from all studies and information made by other departments.

2.5 Public Facilities Data Update

Same data collection procedure in utilities could be followed. Facilities include religious, education, health, cultural, police and civil defense, commercial and recreational projects which have to be incorporated into the base maps, and after approval sent back to the concerned municipalities. the data includes:

- Identification of facility's site and type.
- Identification of size and level of facility.
- Identification of fully, partially serviced and unserved parts.
- Availability of lands for the new facilities.
- Spheres of influence for the various institutions (boys & girls elem. schools, religious, health).
- Future plans for the public facilities.

CHAPTER 3

- 3.0 Criteria for Priority Evaluation and Order.
- 3.1 Selection of Criteria Applicable to a City.
- 3.2 Using Convenient Scales for each Criterion.
- 3.3 Final Aggregate of Scores for Elements and Setting Up the Priority Order.

3.0 Criteria for Priority Evaluation and Order.

When a municipality establishes priorities for the development of existing residential areas and quarters, many criteria and elements will be available to it enabling it to make such preference. Among the most significant and standard elements or criteria, we mention the following:

- | | |
|--------------------------|-------------------------------------|
| 1. Population | 7. Building Permits |
| 2. Structural Plan | 8. Public Utilities |
| 3. Population Density | 9. Public Services |
| 4. Status of Development | 10. Building Conditions |
| 5. Type of Development | 11. Distance from the Built-Up Area |
| 6. Plot Coverage | 12. Topography |
| | 13. Other Elements |

It is noticed that such list does not represent a comprehensive count for all criteria which are applicable. Moreover, it is sometimes expected that a municipality will disregard a number of such criteria, if their respective data serving application is not available.

3.1 Selection of Criteria Applicable to a City

A municipality will be responsible for the review of the above evaluation elements and selection of those which are suitable to the conditions of the city, taking into consideration accuracy and subjection of such selection to proper basis, and application of most of the evaluation elements for when more elements are used, it becomes easy to establish the priorities and clearly organize the residential areas and quarters intended for development.

In view of the variant conditions and potentials of the municipalities, it may be suitable to apply other elements in addition to the above mentioned elements. As such, one blank, at least, has been left for "other criteria" which local conditions impose their application.

3.2 Using Convenient Scales for Each Criterion

We define below the methods of application of the criteria and the estimated scales and scores given to each criterion in the following manner:

3.2.1 Population

Population is one of the most important elements which should be taken into account in defining the priorities. The scores for such element vary from a city to another in accordance with the census and population projections of each city. The distribution of scores may vary between 3-20 scores in accord with the population groups in each area. In order to apply such an element, we give an example for a city whose population is 10,000. We group such population and give scores to each group as follows:

Less than 1,000	= 1
1,000 - less than 2,000	= 2
2,000	= 3
4,000	= 4
6,000	= 5
8,000	= 6

A table for the distribution of population over the city areas is then prepared as follows:

Ser. no.	Area	Population	Scores
1	Old Dirah (city center)	4000	4
2	Northern Area	1500	2
3	Southern Area	3000	3
4	Eastern Area	1000	2
5	Western Area	500	1

This result is then transferred to its respective column in the Table for the Final Aggregate for All Elements (The Final Matrix Table).

3.2.2 Population Density

Population density is an important element whose scores vary between 1-6 scores according to the densities in each city:

Less than 20 inhabitants/hectare	= 1
20 - 50 inhabitants/hectare	= 2
51 - 100 inhabitants/hectare	= 3
101 - 150 inhabitants/hectare	= 4
151 - 200 inhabitants/hectare	= 5
Over 200 inhabitants/hectare	= 6

In order to apply the previous example, we prepare the following table:

Ser. No.	Area	Population	Area (in hect.)	Density	Scores
1	Old Dirah	4000	50	80	3
2	Northern Area	1500	150	10	1
3	Southern Area	3000	75	40	2
4	Eastern Area	1000	100	10	1
5	Western Area	500	100	5	1

The scores are then transferred to their respective column in the Table of the Final Aggregate of Scores for Elements.

3.2.3 The General Plan of the City

General plans have been prepared for various cities of the Kingdom. Such plans define the stages for the priorities of the development of the different areas of the city, which usually do not exceed three stages. In order to apply this element, we give scores for each stage as follows:

Stage 1	3
Stage 2	2
Stage 3	1

Then we prepare a table showing the development stage and scores for each area in accord with the previous order. If we apply the previous example, such table will be as follows:

Ser. No.	Area	Stage According to Plan Study	Scores
1	Old Dirah	First	3
2	Northern Area	Third	1
3	Southern Area	First	3
4	Eastern Area	Second	2
5	Western Area	Third	1

Then the scores are transferred to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.4 Status of Development

This element is related to evaluation in accordance with the type and condition of development. City areas are defined according to the following:

	Scores
Planned and occupied	4
Haphazard and occupied	3
Planned and unoccupied	2
Haphazard and unoccupied	1
Unplanned and unoccupied	0

When we apply the previous example taking into account this element, we will prepare a table as follows:

Ser. No.	Area	Type & Condition of Development	Scores
1	Old Dirah	Haphazard/occupied	3
2	Northern Area	Planned/unoccupied	2
3	Southern Area	Planned/occupied	4
4	Eastern Area	Haphazard/unoccupied	1
5	Western Area	Planned/Unoccupied	2

Then the scores are transferred to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.5 Type of Development

This element is closely related to the population density, and it gives a visual description of the variant conditions of the areas. Its scores are in the following order:

White Area	0
Scattered Development	1
Semi-Scattered Development	2
Dense Development	3

In order to apply this element, we follow the previous example and prepare the table as follows:

Ser. No.	Area	Visual Description	Scores
1	Old Dirah	Dense	3
2	Northern Area	Scattered	1
3	Southern Area	Semi-Dense	2
4	Eastern Area	Scattered	1
5	Western Area	Scattered	1

Then we transfer the scores to their respective column in the Table of the Final Aggregate of the Scores for Elements.

3.2.6 Plot Coverage

The plot coverage is based on the ratio of the built-up plots to the total number of plots in an area. This element is more precise than that of "development type". Its scores vary from 0-5 scores as follows:

White Area	0
1 - 20%	1
21 - 40%	2
41 - 60%	3
61 - 80%	4
81 -100%	5

In order to apply this element, we prepare the table as in the previous example:

Ser. No.	Area	Built-Up Plots	Total No. of Plots	Percent	Scores
1	Old Dirah	650	700	93%	5
2	Northern Area	150	450	33%	2
3	Southern Area	350	600	58%	3
4	Eastern Area	100	400	25%	2
5	Western Area	75	350	21%	2

Then we transferred the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.7 Building Permits

This element indicates the future growth trend which depends on the citizens' wish in developing the white lands. As such, it is necessary to check with the department of building permits of the municipality to know the number of building permits which have been issued for each quarter during a specific period e.g. this year or the past two years, then we relate it to the number of vacant plots at the beginning of the period. It is noticed that the scores for this element are equal to those of the element of plot coverage:

Vacant Area/No Building	
Permits Issued	0
1 - 20%	1
21 - 40%	2
41 - 60%	3
61 - 80%	4
81 -100%	5

In order to apply this element, we prepare the table as in the previous example:

Ser. No.	Area	Plots for Which		Percent	Scores
		Vacant Plots	Bldg. Permits Have Been Issued		
1	Old Dirah	50	42	74%	5
2	Northern Area	120	25	21%	2
3	Southern Area	150	62	41%	3
4	Eastern Area	100	21	41%	2
5	Western Area	80	18	22%	2

Then we transfer the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

.3.2.8 Public Utilities

This element is among the most important elements. There are two ways of giving scores for public utilities. The first is according to utility coverage:

No Utilities	0
1 - 20%	1
21 - 40%	2
41 - 60%	3
61 - 80%	4
81 -100%	5

The second method is according to the condition of the utility network:

No Utility Network	0
Adjoining a network	1
Needs replacement	2
Partially installed	3
Complete but without connections	4
Complete	5

In order to apply this element, we prepare the following table, as in the previous example, taking into consideration the importance of the utility to citizens (i.e. multiplying the scores in the column for electricity by three and those in the column for water by two).

Table for Aggregation of Scores for Public Utilities

Ser. No.	Area	Elect. (x3)	Water Supply (x2)	Tele-phone	Sewe- rage	Storm- Water	Roads	Total Scores	Remarks
1	Old Dirah	15	10	5	-	-	5	35	
2	N. Area	9	6	3	-	-	3	21	
3	S. Area	12	8	4	-	-	1	28	
4	E. Area	3	2	1	-	-	1	7	
5	W. Area	-	-	1	-	-	1	2	

Then we transfer the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.9 Public Service

Public services include educational, religious, health, recreational and administrative services. They are among the most important elements. They are of varying degrees of importance and, therefore, in giving scores for such elements, we will only deal with the religious services at local mosque level, the educational services up to elementary education level and the health services up to dispensary level. Such services are classified in the following manner:

Unprovided	=	0
Provided/Insufficient	=	1
Provided/Sufficient	=	2

Such classification depends on the spheres of influence shown in the map sheets prepared under the studies for the Delineation of the Physical Boundary.

In order to apply this element, the following steps should be followed:

We complete the following table for aggregation of scores for public services:

Table for Aggregation of Scores for Public Services

Unprovided = 0
 Insufficient = 1
 Sufficient = 2

SER No	AREA OR QUARTER	SERVICES						TOTAL SCORES	REMARKS	
		EDUCATIONAL				RELIG- IOUS	HEALTH			RECREAT- IONAL
		ELEMENTARY		INTERMEDIATE		GRAND MOSQUE	HEALTH CENTERS			
		BOYS	GIRLS	BOYS	GIRLS					
1	Old Dirah	2	2	-	-	2	2	8		
2	N. Area	2	2	-	-	1	1	6		
3	S. Area	2	2	-	-	2	2	8		
4	E. Area	1	1	-	-	1	1	4		
5	W. Area	-	-	-	-	1	1	2		

Then we transfer the total scores in the last but one column of this table to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.10 Building Conditions

This element depends on the development condition in built-up areas. The Table for Building Conditions, included in the Technical Report on the Studies for the Delineation of the Physical Boundary, could be referred to. The scores for this element are as follows:

Threatening Collapse = 1
 Poor (old) = 2
 Fair = 3
 Good = 4

To apply this element, we follow the previous example and prepare the following table:

Ser. No.	Area	Building Condition	Scores
1	Old Dirah	Fair	3
2	Northern Area	Good	4
3	Southern Area	Good	4
4	Eastern Area	Good	4
5	Western Area	Good	4

Then we transfer the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.11 Distance from Main Built-Up Area

The Main Built-Up Area is the built-up area shown in the studies for the Delineation of the Physical Boundary. It is the main built-up area provided with complete utility networks and public services. This element is a secondary one and it is more effective in linear cities and less effective in central cities. The distance from the center of the Built-up Area to the center of a quarter could be measured in kilometers. A quarter is considered close to the Built-up Area, if the distance is not more than half kilometer according to estimation by the municipality. The scores for this element are as follows:

Area Within or Attached to the Built-Up Area	= 2
Close to the Built-Up Area	= 1
Distant from the Built-up Area	= 0

In order to apply this element, we follow the previous example and prepare the following table which shows the relationship of city areas with the Built-up Area:

Ser. No.	Area	Relationship With The Built-up Area	Scores
1	Old Dirah	Within it	2
2	Northern Area	Close to it	1
3	Southern Area	Close to it	1
4	Eastern Area	Distant from it	0
5	Western Area	Distant from it	0

Then we transfer the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.12 Topography

This element is effective in urban or rural centers of different topographic conditions. Its scores could be given as follows:

Area with Plain Topography	= 2
Area with Hard Topography	= 1
Area with Rugged Topography	= 0

In order to apply this element, we prepare the following table for topographic conditions (as in the previous example):

Ser. No.	Area	Topographic Condition	Scores
1	Old Dirah	Plain	2
2	Northern Area	Plain	2
3	Southern Area	Plain	2
4	Eastern Area	Hard	1
5	Western Area	Rugged	0

Then we transfer the scores to their respective column in the Table for the Final Aggregate of Scores for Elements.

3.2.13 Other Elements

They include the elements related to the conditions of each city as well as legal and administrative decisions made by decision-makers.

3.3 Final Aggregate of Scores For Elements and Setting Up The Priority Order

The scores for the different elements and city areas will be tabulated in the Table for the Final Aggregate of Scores for Elements (for the establishment of development priorities), bearing in mind that some elements are not applicable to certain cities and that some other elements, which have not been included in the list of elements, depend on the characteristics of a city and will be defined in consultation with the persons concerned in the Deputy Ministry for Town Planning. On tabulation of the scores for elements, a priority order for the city areas will be set up in accordance with the total scores obtained by each area, i.e. the area having the highest number of scores shall have the first priority, then the second area followed by the third area and so forth.

Table for Final Aggregate of Scores for Elements.

SER. No.	AREA OR QUARTER	POPULATION	DIRECTIVE PLAN	DEVELOPMENT STATUS	POPULATION DENSITY	DEVELOPMENT TYPE	PLOT COVERAGE	BUILDING PERMITS	PUBLIC UTILITIES	PUBLIC SERVICES	BUILDING CONDITIONS	DISTANCE FROM MAIN BUILT-UP AREA.	TOPOGRAPHY	OTHERS	TOTAL SCORES	PRIORITY ORDER
1	Dirah	4	3	3	3	3	5	5	35	8	3	2	2		76	1
2	N. Area	2	1	2	1	1	2	2	21	6	4	1	2		45	3
3	S. Area	3	3	4	2	2	3	3	28	8	4	1	2		63	2
4	E. Area	2	2	1	1	1	2	2	7	4	4	1	1		27	4
5	W. Area	1	1	2	1	1	2	2	2	2	4	1	1		18	5

However, in case of equal scores between two areas, which is possible at times, the central Follow-up Team of the Deputy Ministry for Town Planning, which is responsible for the follow-up of work with the municipality, shall be informed of such a case for reconsidering it and reviewing the scoring for certain elements, or perhaps making a recommendation on the initiation of development of the two areas with equal scores simultaneously, if such review process is not decisive in the establishment of priorities and preference of one area to another.

CHAPTER 4

4.0 Approval of Study and Final Output

4.1 Approval of Study

4.2 Atlases and Technical Report

4.3 Implementation Follow-Up and Study Update

4.0 Approval of Study

4.1 Approval of Priority Findings

After the completion of the previous steps related to the preparation of study and final rating of priorities, there comes an important stage, i.e. the approval of study which includes the following steps:

- Presentation of study before the Deputy Ministry for Town Planning.
- Presentation before the Central Coordination Committee to obtain approval by the various authorities of the rating of development priorities.
- Summing up all comments and recommendations about priorities rating.
- Incorporation of comments and re-rating priorities based on recommendations made by DMTP and Central Coordination Committee.
- Final presentation of the study to DMTP and bodies involved in the development process to obtain their approval including steering and high planning and coordination committees.
- Notification of the approval of the study in its final form to the municipalities, and the requirement to commence preparation of the atlas and the final report.

4.2 Preparation of the Atlas and the Technical Report for the Town

All study sheets for each town are to be compiled including base map, phasing and final study into an atlas. At the same time, a technical report should be prepared explaining:

- Methodology for study.
- Constraints being encountered.
- Problems solving technique.
- Final proposals and procedures to be observed.
- Proposed implementation technique and timetable.
- Adequate procedures to speed up implementation.

4.3 Implementation Follow-Up and Study Update

4.3.1 Follow-Up

Progress evaluation reports should be prepared demonstrating the following:

- Completed parts and verification of results to facilitate application.
- How to assist in solving problems facing implementation.
- Carrying out further studies for the areas having analogous relationships or those with varying priorities with respect to each utility and preparing feasible alternatives to develop those areas or rate them in order of priority.

4.3.2' Study Update

Rating process of development priorities does vary by the change of local, regional and national variables; therefore it must be reviewed every five years concurrently with the 5-year national development plans and updated accordingly. In case of a certain town requiring emergent updating of its development priorities, a work team could be mobilized to modify the priorities using same methodology. Various bodies involved in the process of updating should be required to abide by modification done so as to effect it at the appropriate time.

Appendix D

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Kingdom of Saudi Arabia
Ministry of Municipal and Rural Affairs
Deputy Ministry for Town Planning

TOWARD INFRASTRUCTURE DEVELOPMENT STRATEGY
FOR THE KINGDOM OF SAUDI ARABIA

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**Infrastructures Development Strategy
for the Metropolitan Sector**

1.0 Introduction

National socio-economic development plans have been much increasingly concerned over the past twenty years with providing towns and metropolitan conglomerations with various economic infrastructure including potable water networks, sanitary and storm water drainage, power plants, telecommunications, roads, and solid waste disposal.

It is known that utility infrastructural projects of different kinds play a major role in increasing socio-economic development returns at all levels, national, regional and local.

The importance to maintain adequate availability and accessibility of infrastructures is attributed to essential characteristics of those infrastructures as follows:

2.0 Importance and Characteristics of Infrastructure Projects

2.1 Multi-purpose Infrastructure Projects (electricity, water, etc.)

Such projects perform more than one function and serve numerous development purposes at the same time.

The multiplicity of purposes and functions performed by the individual or integrated infrastructures necessitates careful study in their provision to achieve the short, medium and long-term objectives and goals. There should be a care for their development to ensure sustainability and efficiency within reasonable economic cost.

2.2 Capital Intensive Projects

Urban infrastructure projects should be provided at minimum sizes capable of serving a certain number of population. Those sizes should be approximately of a relative optimum size. The cost per investment unit requires big portion of investment. Social overhead capital investments are relatively indivisible, therefore adequate amounts of investments are to be committed to the provision of an integrated infrastructure which might require more than one 5-year development plan to cope with.

The massive investments in infrastructure requires an institution of a rational strategy for the provision and development of infrastructure, even in rich countries. The financial resources, despite abundancy, are seen as rare resources and they require to be rationalized within the framework of certain benefit over a certain period of time.

2.3 Long Lasting Projects

The construction and specifications of infrastructure projects are based on minimum assignment age. A power plant for instance should

have an assignment age of not less than ten years, a road could have a 25 years assignment age, etc. Such projects could last longer with good maintenance, renewal and replacement as per certain technical specifications.

As those projects have relatively long assignment ages, they have to be provided within the framework of specified plans and productive capacities to ensure optimal utilization at least throughout their assignment age. Sustainability here could be achieved under certain economic operation and development, maintenance, renewal and replacement programs.

2.4 Capital Investments Projects Require Long Construction Period

Infrastructure projects are huge projects requiring longer construction period and they are characterized by both indivisibility and complementarity; therefore utmost care should be exercised in designing the strategy for planning and implementation of such projects so that they are ready for production and operation in due time.

2.5 Infrastructure Projects Accelerate the Growth of Urban Economy

Capital projects are termed 'infrastructures' so as to distinguish them from the superficial structures, ie. the economic development projects in the various productive sectors as well as the social development projects including health, education and mosques. Both secondary and tertiary economic sectors are consumer activities utilizing infrastructure projects without which direct economic development projects can not be provided to fulfill the demands of the population of towns.

The construction of infrastructure projects is a pre-condition to the establishment of various productive activities as they provide them with external economies.

Infrastructure projects are an economic stimulus for the socio-economic development projects. They create new jobs and reduce unemployment in the towns and metropolitan areas. They can be utilized to manipulate future direction of urban growth away from town centers (implementation of effective dispersion policy).

Infrastructure projects are ~~indirect~~ direct development projects. They have less economic or commercial profitability, meanwhile they enjoy relatively high social profitability. They stimulate urban economy to accumulate its capital formation and realize increases in per capita incomes through higher operation and productivity of both work and capital. The developing urban centers help stimulate development in surrounding rural areas, thus restraining rural population and achieving balanced development one the regional space.

3.0 Economic Installation, Operation and Management of Public Utilities in Towns

Economic cost of public utilities include includes two basic kinds of costs:

1. Construction (Capital Investment) costs, termed as Fixed Cost.
2. Management and operation costs or running (recurrent) expenses, termed as Changeable or Current Costs.

Fixed cost continues with the project at least throughout its assignment age ranging 10-15 or 20 years depending on they type of utility and technological aspects of operation and maintenance, etc.

As for the current costs of management and operation, they are amounts spent regularly, (on yearly basis) for fuel, maintenance, repair and management. They have to be reimbursed yearly through consumption fees according to unit price specified in the feasibility study of the utility project. This depends also on the general policy of the state to subsidize utilities depending on vitality of the utility and level of per capita real income and equity of utility distribution. Here, three basic considerations emerge:

1. The case of profits accrued beyond the yearly operation costs (current costs) where part of the capital is reimbursed. This occurs in advanced countries having well-guided management systems, sound operation and maintenance and public awareness in payment of utility fees.
2. The case of earnings equal to current costs where the state assumes consumption expenses of capital assets in favor of social profits being immeasurable in many cases and looked at as original investment.
3. The case of developing countries where utilities experience losses as annual operation costs exceeds collected up earnings due to several reasons. In this case, the government, despite the burden of financing development, assumes the difference in the form of subsidies. In all cases, the cost/benefit analysis should be applied to determine the economic management of the utility.

4.0 Development Strategy of Public Utilities in Urban Areas

Socio-economic development strategies aim spatially at providing urban settlements with adequate infrastructure due to their ability to generate growth and expulse socio-economic urbanization toward less developed peripheries. The development strategy for public utilities in the urban areas should lay down criteria for the establishment, strengthening and development of those utilities as well as criteria to achieve relatively maximum equity in distribution of infrastructure throughout the different towns of the Kingdom.

In the development of infrastructure it is intended to achieve:

- Quantitative growth in infrastructure, and
- More structural change with view to:
 1. improve performance and enhance productivity under same operation conditions.

2. maximize efficiency utilizing same inputs.
3. elongate assignment age through improved periodic, programs and appropriate renewal and replacement system.
4. provide areas deprived of infrastructure in order of priority.
5. reduce urban and regional disparities in infrastructure in coincidence with the socio-economic and spatial development plans.

4.1 Goal of Development Strategy of Public Utilities

Strategy means the art to manage the development of one of the national variables, e.g. investment, production or urban development. The urban development strategy is the art to manage this process, i.e. criteria for the rationalization of urban growth in favor the socio-economic and spatial development of the country.

For public utilities, it is the art to manage and develop the establishment, operation, and extension of utility networks of different kinds over the urban space.

Each strategy should have general and detailed goals as well as policies and programs to implement it and achieve the intended goals.

The general goals are defined at the stage of formulation of strategy, meanwhile the detailed goals could be set up after the analysis of the present problems related to the development of public utilities, so that they are clearly identified.

General Goals

- A. Realization of more inter-urban balanced provision of infrastructure to reduce disparities, particularly among different towns of same population size.
- B. Maximization efficiency of operation of infrastructures relatively to international standards.

4.2 Realization of Strategy Goals

Realization of strategy goals requires:

- Economic policies
- Institutional policies
- Social policies

4.3 Methodology

Strategy formulation starts with analysis of existing conditions of public utilities.

Ample information has been made available through Urban Boundary Exercise for 100 Saudi towns in 1407h.

4.3.1, Analysis of Present Public Utility Coverage, at City Level
(100 Saudi Towns...First Study).

The methodology of this study was based on the calculation of the national average of coverage for each utility and each city according to the data which had been made available from the urban boundary study in 1407.

The total population of the cities of the Kingdom was about 7314 thousand, and the total area of the towns amounted to 333.2 thousand hectares. The area of each city had been divided into two parts; populated area covered with utilities and non-populated area. The level of coverage had been calculated according to the following:

$$\text{Average Coverage} = \frac{\text{Populated Areas Covered With Utilities}}{\text{Total Populated Area}}$$

The results were as follows:

The national average coverage of electricity is 89.94%.
The national average coverage of telephone is 69.00%.
The national average coverage of water is 67.79%.
The national average coverage of sewerage is 7.70%.
The national average coverage of roads 70.82%.

These averages show that electricity has the highest coverage at the national level. Telephone follows electricity in coverage with 69%. Water achieved about 67.8% coverage. Sewerage was the lowest with only 7.7%.

Deviation of each utility from the national average was calculated. The following tables show the situation.

The Study Results

1. Urban Centers With All Utilities Above National Average

S. No.	Center	Population
1.	Medina	500,000
2.	Jeddah	1,312,000
3.	Unaizah	50,000
4.	Rastanura	30,000
5.	Jalajil	4,000
<hr/>		<hr/>
Total 5 towns		1,896,000
<hr/>		<hr/>

represents 26.05 of the total urban population.

2. Urban Centers Lacking All Utilities

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
1.	Runia	7,000	x	x	x	x	x
2.	Rowdat Sudair	5,000	x	x	x	x	x
3.	Al Khurrmah	12,000	x	x	x	x	x
4.	Dharan Al Janub	11,000	x	x	x	x	x
<u>Total 4 towns</u>		<u>35,000</u>	represents 0.48% of the total urban population.				

3. Urban Centers With One Utility Below National Average:

S. No.	Center	Population	Utility Below Average
1.	Abha	20,000	Water
2.	Al Haithin	2,500	Sewerage
3.	Timair	4,800	Sewerage
4.	Huta Bani Tamim	15,000	Sewerage
5.	Murat	4,000	Sewerage
6.	Huraimlah	5,500	Sewerage
7.	Durmah	6,000	Sewerage
8.	Magnab	15,000	Sewerage
9.	Shaqra	18,000	Sewerage
10.	Badr	12,000	Sewerage
11.	Beesh	11,500	Sewerage
12.	Al Khubra	4,000	Sewerage
13.	Al Muzamia	10,000	Sewerage
14.	Majma	21,000	Sewerage
15.	Neairia	9,000	Sewerage
16.	Al Gath	4,000	Sewerage
17.	Arar	6,500	Sewerage
18.	Qatif	167,500	Telephone
19.	Al Khamis	164,000	Water
<hr/>			
Total 19 towns		558,800	represents 7.68% of the total urban population.
<hr/>			

4. Urban Centers With Two Utilities Below National Average

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
1.	Thadiq	3,700	x			x	
2.	Al Hilwa	11,500		x		x	
3.	Riyadh	1,417,000	x	x			
4.	Unaizah	50,000		x			x
5.	Dammam	418,500		x	x		
6.	Mandaq	9,000			x	x	
7.	Sarat Biedah	2,500			x	x	
8.	Al Namas	9,000			x		x
9.	Sulail	7,800			x	x	
10.	Qurrayat	43,000			x	x	
11.	Riyadh Al Khabra	8,100			x	x	
12.	Bisha	22,000			x	x	
13.	Al Hannakia	1,039			x	x	
14.	Ahd Rafidha	11,000			x	x	
15.	Abu Arrish	25,000			x	x	
16.	Al Hassa	251,000			x		x
17.	Rafah	17,000				x	x
18.	Waja Al Aflaj	15,000					
19.	Al Harrieq	3,600					

Urban Centers With Two Utilities Below National Average

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
20.	Rabigh	13,500		x		x	
21.	Wadi Al Dawasir	35,000		x		x	
22.	Khayber	12,000				x	x
23.	Afif	20,000				x	x
24.	Dawadmi	32,000				x	x
25.	Umluj	20,000	x			x	
26.	Huttat Sudair	9,000				x	x
27.	Al Ola	18,000				x	x
28.	Taif	283,000			x		x
29.	Jubail	38,000	x	x			
<hr/>							
	Total 29 towns	2,806,200					
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5. Urban Centers With Three Utilities Below National Average

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
1.	Al-Zulfi	29,000	x		x	x	
2.	Hafr Al Baten	52,000	x	x		x	
3.	Sabia	40,000		x		x	x
4.	Baqa	7,000		x	x	x	
5.	Al Oyainah	2,500		x	x	x	
6.	Qalwa	7,000		x	x	x	
7.	Al Jizan	78,700		x	x		x
8.	Muhail	9,000		x	x	x	
9.	Al Rowaidah	3,800		x	x	x	
10.	Qunfuza	11,000		x		x	x
11.	Taymah	13,000		x	x	x	
12.	Tanumah	16,000		x	x	x	
13.	Tabuk	150,000		x	x	x	
14.	Khafji	21,000		x	x	x	
15.	Al Badie	15,000		x	x	x	
16.	Baljurashi	40,000			x	x	x
17.	Latin	7,000			x	x	x
18.	Turaif	20,000			x	x	x
19.	Tarumah	13,000		x	x	x	

Urban Centers With Three Utilities Below National Average

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
20.	Al Dalam	14,000			x	x	x
21.	Al-Samta	9,400			x	x	x
22.	Samta	15,000		x		x	x
23.	Sakaka	55,000			x	x	x
24.	Dumat Al Jandal	14,000			x	x	x
25.	Bureidah	145,000		x	x		x
26.	Al Wajh	18,000			x	x	x
27.	Duba	8,000			x	x	x
<hr/>							
	Total 27 towns	813,400	represents 11.17% of the total urban population.				
<hr/>							

6. Urban Centers With Four Utilities Below National Average

S.No.	Center	Population	Elec- tricity	Tele- phone	Water	Sewerage	Roads
1.	Khelais	11,500	x	x		x	x
2.	Turbah	2,500	x	x	x	x	
3.	Hail	101,000	x	x	x	x	
4.	Jubbah	3,700	x	x	x	x	
5.	Taihlith	3,200		x	x	x	x
6.	Harara	15,000	x	x	x	x	
7.	Najran	53,000		x	x	x	x
8.	Al Baha	50,000		x	x	x	x
9.	Al Ajia	3,000		x	x	x	x
10.	Haql	8,600		x	x	x	x
11.	Yanbu	52,000		x	x	x	x
12.	Tabarjel	13,000		x	x	x	x
13.	Ar Rass	30,000		x	x	x	x
14.	Al Kharj	97,000		x	x	x	x
<hr/>							
	Total 14 towns	443,500	represents 6.09% of the total urban population.				

Previous tables illustrate the coverage level of the public utilities. This could be illustrated as follows:

1. There are 5 towns of approximately 189,600 population representing 26.05% of the total urban population being covered with all utilities above the national average. (Table no.1)
2. There are 4 towns with approximately 35 thousand population representing 0.48% of the total urban population having average coverage lower than the national in all utilities. (Table no.2)
3. There are 19 towns of approximately half million population representing 7.68% of the total urban population with only one utility below the national average. Two towns are below average in water, one in telephone and 16 in sewerage system. (see Table 3)
4. There are 29 towns of about 7.8 million population representing 38.6% of the total urban population with two utilities below the national coverage level. (see Table 4)
5. There are 27 towns with three utilities below national level, these towns had 813 thousand population representing 11% of the total urban population. (see Table 5)
6. There are 14 towns with utilities below national average, these towns had 443,500 population representing 6% of the total urban population. (see Table 6)

From the above analysis, the following represents the utilities to be provided to cover the shortage to reach the national average.

1. 14 towns are in shortage of electricity.
2. 32 towns are in shortage of water.
3. 39 towns are in shortage of telephone.
4. 77 towns are in shortage of sewerage.
5. 14 towns are in shortage of roads.

(shortage means below national average level of service coverage)

4.3.2 Analysis of Present Public Utility Coverage, by Region.

Data from urban boundary study facilitated the classification of each town into three areas as follows:

- populated areas covered with utilities.
- populated areas not-covered with utilities.
- unpopulated areas but covered with utilities.

The study proceeds to investigate the variation in the level of coverage of utilities according to the above classification. The result was as follows:

1. Populated areas covered with utilities/total town area:

- national average for electricity is 60.54%.
- national average for telephone is 57.16%.
- national average for water is 63.67%.
- national average for sewerage is 18.93%.

2. Populated but not covered with utilities/total town area:

- national average for electricity is 7.64%.
- national average for telephone is 35.55%.
- national average for water is 29.35%.
- national average for sewerage is 79.73%.

3. Unpopulated but covered with utilities/total town area:

- national average for electricity is 31.81%.
- national average for telephone is 7.32%.
- national average for water is 6.98%.
- national average for sewerage is 1.75%.

The national space has been administratively dissected into 14 regions. The following table shows the regions and number of towns in each of them.

Regions of the Kingdom and Number of Towns

<u>Regions</u>	<u>No. of Towns</u>
Central	27
Najran	2
Jizan	5
Asir	10
Baha	4
Mecca Al Mukkarama	10
Medina Al Munanawarra	6
Tabuk	6
Qurrayatt	1
Jauf	3
Northern Borders	3
Eastern Region	9
Qassim	10
Hail	4
Total no. of towns	<u>100</u> =====

1. Populated areas covered by utilities:

- a) There are 5 regions below national average in electricity.
- b) There are 6 regions below national average in telephone.
- c) There are 10 regions below national average in water.
- d) There are 11 regions below national average in sewerage.

The following table summarizes the present regional situation of utility coverage in comparison with the national average.

Populated regions below the national average.

<u>Electricity</u>	<u>Telephone</u>	<u>Water</u>	<u>Sewerage</u>
Asir	Central	Najran	Central
Mecca	Najran	Jizan	Najran
Eastern	Baha	Asir	Jizan
Qurrayatt	Medina	Baha	Baha
Jouf	Eastern	Medina	Medina
	Hail	Tabuk	Tabuk
		Qurrayatt	Qurrayatt
		Jouf	Jouf
		Eastern	Northern
		Hail	Qassim
			Hail

2. Populated areas not covered by utilities:

- a) Regions lacking electricity; Jizan, Asir, Baha, Mecca, Medina, Tabuk, Qurrayatt, Jouf, Northern and Eastern Regions.
- b) Regions lacking telephone; all regions except Najran, Central, and Baha.
- c) Regions in shortage of water; Central, Mecca, Madina.
- d) Regions in shortage of sewerage; Asir, Mecca, Medina, and Eastern.

3. Unpopulated but covered with utilities:

There are some areas unpopulated, but fortunately some utilities have been provided due to some technical reasons from the side of the concerned sectoral agencies. These areas could be utilized in urban expansion in the future. These regions are as follows:

- a) Regarding electricity; regions of Asir, Mecca, Medina, and Qurrayat have some unpopulated parts relatively provided with electricity.
- b) Some unpopulated parts in Medina, Qurrayat, Northern Region have telephone system.
- c) Some empty parts in the region of Medina are provided with water.
- d) Also, some empty parts in Medina region have sewerage system.

5.0 Strategy Programming Guidelines to Reduce Disparities in Coverage.

5.1 At town level.

A. Programs to provide public utilities.

To provide at least three utilities for towns lacking all utilities. A field study should be carried out to investigate the actual needs of those towns based on priority, the number of population, area to be covered, the urban context and availability of productive potentials. Providence should be planned with an economic cost against expected economic or social returns.

B. Programs to provide one utility.

1. To provide water for the towns of Abha and Khamis Mushayt to reach the national level, especially for the populated parts.
2. Extending telephone to the town of Qatif, and to other populated uncovered parts to reach the national level.
3. There are 16 towns below the national average in sewerage system. This requires a program (based on a comprehensive study) for the development of sewerage in these towns and assign priorities based on variables such as:
 - existing of water network.
 - existing of a suitable network of roads to utilize it for sewerage.
 - number and density of population.
 - existence of some productive activities.
 - topography.
 - the stage of development of the town, extent of urbanization, and potentials for urban growth and expansion.

C. Program to provide at least one utility to 29 towns below national average. This program will enhance the development of the urbanization level of those towns as they constitute 38.6% of the total urban population. A study should be carried out to identify those towns endeavoring to reach the national level under the previously mentioned considerations.

D. Program to provide at least two utilities for 27 towns below national average. These represent 11% of the total urban

population. Most urgently required utilities are water and sewerage.

- E. Program to provide three utilities for towns below the national average in 4 utilities.

It is worth concluding that, the aforementioned programs are overlapping, consequently the field study will determine the priorities for towns and utilities in each strategic program. The following table illustrates the global situation.

- There are 14 towns in shortage of electricity.
- There are 32 towns in shortage of water.
- There are 39 towns in shortage of telephone.
- There are 35 towns in shortage of roads.

5.2 At Regional Level

1. Program to reduce regional disparities in water provision. There are 10 out of 14 regions in the Kingdom which are being below the national average in water coverage.
2. Program to reduce regional disparities in sewerage systems. There are 11 regions suffering shortage of sewerage. This requires a study to determine towns in order of priority with due consideration of parallel study of water system.
3. Program to reduce regional disparities in the provision of electricity and telephone. Electricity has priority over telephone.
4. Unpopulated areas being covered with some utilities:

Throughout all regions and within towns there are some parts which have been provided with either one utility or more. This requires a program that capitalizes on already provided infrastructures by directing new urban growth to settle in these parts to be economically justified. The policy will be to provide the rest of infrastructure within the framework of a settlement program.

6.0 Shortcomings Of Present Analysis:

The above analysis is based on data related to only area coverage of utilities in populated and unpopulated areas of the 100 urban centers. This variable by itself is not adequate to give a clear assessment of utilities as other factors like capacity utilization, efficiency of operation, age of network etc. are equally important to assess existing utilities.

Also, the data available for the existing analysis was taken from the Urban Boundary Atlas which was published in 1408h. The data obviously is outdated and can not be relied on to form a strategy.

7.0 Future aims for formulating a national strategy for development of public utilities: The future aims of the study will include following specific tasks:

- 7.1 To collect up-to-date data on public utilities which will assess all

requisite variables governing the performance of existing utilities. A detailed questionnaire is attached with the present study.

- 7.2 To identify major policy issues, goals, and objectives of the concerned institutions which are presently engaged in provision of utilities at the local level.
- 7.3 To evaluate all available data, programs and projects of the concerned authorities and predict their impact over following years. ..
- 7.4 Based on the above data collection and evaluation exercise, the aim will be to evolve at least a set of alternative strategies complete with their projected effectiveness and impact on the development of the urban areas.

TELEPHONE NETWORK

لا توجد معلومات حول هذا الموضوع في دليل الهاتف
 * (1/71) * DATA NOT AVAILABLE
 69% AREA COVERAGE (AVERAGE) FOR TELEPHONE NETWORK.

		MAKKAH	
		MAADINAH	ADDAB
		DAMMAM	TAF
		AL AHISA	
		BATIF	
		BURMDAH	
		TABUK	
		AL KHAMS	
		HAIL	
		KHARJ	
		JIZAN	ARAR
		ABHA	
		SAKAKA	
		NATRAH	
		YANBU	
		HAFIR AL BATEH	
		AL BAH	
		UNMIZAH	QURRAYAT
		JUBAIL	MATMA
		BALJURASHI	
		AR RAS	AS ZULFI
		BISHA	
		KHAFI	TURRI
			SHAGRA
			ALBENAYM
		AL QUNFUZAH	
		SABIAH	
		WADI AL DAMASIK	AD DAWASMI
			RAS TANURA
		ABUARISH	
		ABQUAIC	UMLAZ
			AEIF
			ALULA
			ALWATAN
		RAFAH	
		TANUMAH	
		LAYLA AL AELAS	
		AD BADI	
		HUTAT BAMIAC	TAMIM
		SHURAH	
		SANTAH	
		ALMAZNAQ	AD DALA
			DEHMAT
			ALJAND
		RABIGH	
		TAYMAN	
		TABARTI	
		TURBAY	
		QADR	
		AL KHURMAN	
		KHAYBER	
		BESH	
		KHULAS	
		ABD RUEMDAN	
		ZAHREN AL JUNA	
			ALMAZANIYA
			ALMAYSTAN
		MUHAIL	ALMANDAQ
			ALNCHARIM
			ANNAMAS
		HUTATSUDAR	
		HAGL	
		RIYADH AL KHABRA	
			DHIBA
			ALSEML
		BUNIAH	
		QULWAH	ALLAITH
			QAGA
			ALNONKHAM
			DHARMA
			MURAMLA
			RAWATSUDAR
		AL HILWA	TOWAR
			JALATIL
		AR ROWAIDAH	AL KHUBRA
			ALMAYT
			MARAT
			THADIQ
		JUBBAN	
		ALHARIG	
		TATHILITH	
		AL ASIAH	ALMAYTHIN
		TERSAH (HAIL)	SARAT ABEE
		ALQYANAH B JUBAIL	

ELECTRICITY

* = DATA NOT AVAILABLE

البيانات غير متوفرة

**

التعداد الكلي = 9999

- MAKKAH
- MADINAH
- FODDIE
- DAMMAM
- TAIF
- ALHASA
- QATIF
- BURAYDAH
- ABUK
- AL KHAMEES
- HAD
- KNAKT
- JIZAH
- ARAR
- ACHA
- SANAKA
- NATIRAN
- YANBU
- HAFR AL BATH
- AL BAH
- UNAIZAMI
- OURAYAT
- JURML
- MATMA
- BALURASHI
- AK-RAS
- AZ-ZILFI
- BISHA
- KHAFTI
- TURUF
- SABRA
- AL BEKAYDAH
- AL QURFUZAH
- SABIA
- WADI AD DAMSIR
- AD BAWASIT
- RAS TANUKA
- ASU ARISH
- AB QAI
- UMLAZ
- KEIF
- MULA
- ALWAJH
- KAFAH
- YANBUH
- LAYLA AL-ATLA
- AD-BADIE
- HUTAT BANTE TA
- SHARIRAH
- SANTAH
- AL MAZHAB
- AD DAMM
- DAUMAT AL JAH
- RABIGH
- TAYMAN
- TADAJEL
- TORBAH
- BADR
- AL KHURMAH
- KHAYBEK
- BESH
- ALWAD
- ALWAD
- ZANWAN AL JAH
- AL MUZANTYAH
- AL QUNAYEHA
- MUHAIL
- AL NAWADIQ
- AL NAWRAH
- AL-NAMAS
- HUTAT SUDHR
- AL AQI
- ALYAH AL RUBE
- DEIDA
- AS-SAML
- DUNIAH
- DULWAN
- AL LATH
- AL RA
- AL HANNAH
- AL HARMA
- MURMULA
- ALWADH SUDA
- AL HILWA
- JEMAR
- AL AJIL
- AL ROWMDAN
- AL RUBARA
- AL GRAT
- MARAT
- JHADIA
- JUBAII
- AL HARIR
- TATHLEITH
- AL AGINI
- AL HASTHIM
- TORBAH
- TORBAH
- AL QUNAYEHA

MATTER SIMPLY

لقد تم تحويل حسابنا من حسابنا القديم الى حسابنا الجديد (7/7/97) * LATA NOT A VINCIBLE * 67.79% AV MIN CIVIL * 101 MATTER ONLY

Table with multiple columns and rows, mostly containing illegible text or symbols.

MAKKAM	
MADINAH	
JEDDAH	
DAMMM	
TAF	
ALANSA	
QATIF	
BURADAH	
TABUK	
ALKHMIS	
HAL	
KHART	
JIZAN	
ARAR	
AGHA	
SAKAKA	
NAFRAN	
YANBU	
MAFIR ALBATON	
ALBABA	
QURRAYAT	VNAIZAN
JUBAIL	
BALTRASHI	MATNA
AR RAS	
AZ ZULFI	
BISHA	
KHAETI	
TURRI	
SHAGRA	
ALBHRUYA	
ALWUNFUZA	
SABIAH	
WADI AL DAWAJIR	AD DAWAD
	RATANUR
ASUARISH	
ABDUMUQ	
UMLAZI	AFIF
ALULA	
ALNATAN	
RAPAN	
TANUMM	
LAJLA AL AELAT	
AD RADIE	
HUYE ISISS	ALTAM
JHRURAH	
SAMTAN	
ALMAZHAR	
AD DAKAM	
DEWMMI AL TANDEL	RASHIM
TANMAN	
TABARTEL	
TURBAN	BOOR
AL KHURBAH	
KHAYBAR	
BESH	
KHELAS	
ANAS RYANDAN	
ZARRAN AL JAWID	ALMAZAMI
AL QUNAYETAN	
MUNAIL	
AL MAUDAG	ALNOURY
AN NAKAS	HUTAT SUDA
HAOL	
RIYADH AL KHAGRA	
DWIBA	
ALSOLAIL	
RUNIAM	
QULWAH	
AL LAITH	
BAQA	
AL HUNAKIAH	
DHARMA	
HORAMLA	
RAWDAT SUDAIR	
ALHILNA	
TEMAR	
JALATIL	
AR RAWALDAH	
AL KHIBARI	
AL GHAT	
MARAT	
THADQ	
JUBBAH	
AL HARIO	
TATHLEETH	
AL FO AH	ALHAYTHQ
TORRANI HATH	
SORAT ABREDAH	
ALOYANAH & JUBAIL	

NOT ON THE MARCH = 67.79%

Appendix E

Hijra Year Dates and Gregorian Equivalents

Hijrah Year	Starts on	Common Era	Hijrah Months
1390	9 March	1970	Muharam
1391	27 February	1971	Safar
1392	16 February	1972	Rabi 1
1393	4 February	1973	Rabi 2
1394	25 January	1974	Jumad 1
1395	14 January	1975	Jumad 2
1396	3 January	1976	Shaban
1397	23 December	1976	Ramadhan
1398	12 December	1977	Shawwal
1399	2 December	1978	Dhul-Qi'dah
1400	21 November	1979	Dhul-Hijja
1401	9 November	1980	Gregorian Months
1402	30 October	1981	January
1403	19 October	1981	February
1404	8 October	1983	March
1405	27 September	1984	April
1406	16 September	1985	May
1407	6 September	1986	June
1408	26 August	1987	July
1409	14 August	1988	August
1410	4 August	1989	September
1411	24 July	1990	October
1412	13 July	1991	November
1413	2 July	1992	December
1414	21 June	1993	
1415	10 June	1994	
1416	31 May	1995	
1417	19 May	1996	
1418	9 May	1997	
1419	28 April	1998	
1420	17 April	1999	
1421	6 April	2000	

Appendix F

Glossary of Arabic Words

<i>amana/imaanaat</i> (plural)	Major Municipality
<i>baladiya/baladiyyaat</i> (plural)	Municipality
<i>dunum</i>	1,000m ² (Saudi)
<i>hijarah</i>	hamlet or small village
<i>khubuub</i>	re-entrant
<i>muduryyah/muduryyaat</i> (plural)	Regional Municipality
<i>nitag omrani</i>	urban boundary
<i>wadi</i>	dry water-course or valley

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