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## HIGHLIGHTS OF THE HUMAN SETTLEMENTS SITUATION IN THE KINGDOM OF SAUDI ARABIA Country Profile



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## FOREWORD

Within the framework of the work programme of its Human Settlements Division, the United Nations Economic and Social Commission for Western Asia (ESCWA) has embarked on the preparation of country profiles on human settlements and the building materials and construction industries in all its member countries.

The profiles are not meant to be an end in themselves. Rather, they represent a foundation on which other studies can be based in an endeavour to achieve the twin goals of integrating the physical dimension of planning with the overall national socio-economic and environmental development planning and the development of local building materials and construction industries.

The profile is structured to present general information on the country, with emphasis on physical, socio-economic, demographic and other aspects that affect or are affected by human settlements development, and includes data on the building materials and construction industries. Where applicable, the profile outlines declared government policies, objectives and strategies for the development of human settlements and of the building materials and construction industries. It includes the present situation as regards the institutions that have been set up and the manpower trained for the implementation of the declared policies and, where appropriate, it points out gaps, problems and constraints, as well as existing or potential opportunities that must be taken into account in formulating future policies and plans for the development of human settlements and the building materials and construction industries.

Follow-up action will include an in-depth analysis of the information contained in the country profile, the formulation of proposals and recommendations for the solution of existing problems with a view to achieving the twin goals mentioned above and, once all the countries of the ESCWA region have been covered, a set of indicators will be compiled and periodically updated which will provide the planners and policy makers with a useful tool for evaluating and monitoring the progress made in the development of the human settlements, building materials and construction industries.

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## I. BACKGROUND INFORMATION

The Kingdom of Saudi Arabia was established and named as such in 1932. The country occupies about four-fifths of the Arabian peninsula, and is bordered by Jordan, Iraq, Kuwait, Qatar, the United Arab Emirates, Oman, Democratic Yemen, the Yemen Arab Republic, the Red Sea and the Gulf.

The geography of the country is dominated by a plateau that rises steeply from the Red Sea coast to altitudes over 3,000 metres (m) in the south, and then slopes down gently towards the Gulf. The interior of the south-east contains the world's largest sand desert, called the Empty Quarter.

Desert conditions dominate the climate. December through February is the coolest season with mean temperatures of 14° C-23° C. Summer temperatures reach 38° C-49° C. The mean precipitation ranges from almost nothing in the Empty Quarter, to 65-70 millimetres (mm) per year in Jeddah, Riyadh and Dammam, and 380 mm per year in the highlands of Asir. Vegetation is generally very poor and is mostly confined to small herbs and shrubs. Underground water is the main source of fresh water; it met about 84 per cent of the total demand in 1985.

Saudi Arabia is not exceptionally rich in the mineral resources used in building material manufacture. The known iron ore reserves are estimated to be 52 million tons, of which 4 million tons are of high quality (70 per cent iron content), 25 million tons of medium quality (45 per cent), and the rest is low grade. The ores are found at Wadi Sawanin near Tabuk on the Red Sea coast, Wadi Fatima near Jeddah, and Wadi Idsas west of Riyadh. High quality gypsum exists in very large quantities along the Red Sea and Gulf coasts, and also near Riyadh. Marble is mainly found in central parts of the country in widely scattered deposits of medium to coarse-grained varieties in different colours. Other ornamental stone deposits include granites, gabbros, limestones, sandstones and anorthosites. Clay and limestone deposits are found in the western and central regions and are extensively exploited. High quality silica sand deposits have also been found, but they are not exploited.

The administration of the country has been gradually decentralized and is currently divided into three levels of responsibility: (i) ministries and government agencies organized on a sectoral basis at the national and regional level; (ii) municipalities and village cluster centres at the

regional level under the Ministry of Municipal and Rural Affairs, which cover urban, land, environment and infrastructure sectors; and (iii) the 14 administrative regions (or emirates), each coming under a governor appointed by the King. The governor controls a three-tier structure of subregional emirates, sub-emirates and associate settlements.

The population of Saudi Arabia was estimated at 1.5 to 2.0 million in the 1930s. The first census of 1962-1963 recorded 3.3 million. The 1974 census put the Kingdom's population at slightly over 7 million, of which 73 per cent was considered to be settled and the remainder nomadic. All of the subsequent total population figures in print are estimates, as the 1974 census was the only official one to be published. Population figures based on sample surveys carried out for master plan studies between 1978 and 1985 exist for major towns (see table 5). According to United Nations estimates, the total population of the country reached around 9.4 million in 1980 and 11.5 million in 1985. The Saudi Arabian Government estimates the present (1987) population to be 14,016,000, and the 1990 population at just below 15 million. United Nations projections have produced a population of nearly 20 million for the year 2000, and 36 million for 2025. Table 1 gives the growth of the total population by significant age groups.

Saudi Arabian nationals represented an estimated 59 per cent of the total population in 1985. Nearly one quarter of expatriates, numbering about 1.2 million, live in collective households. Table 2 gives an estimated regional distribution of national and non-national private households (see the map).

The contribution of the oil and gas sector to the gross domestic product (GDP) fell from around 70 per cent to about 40 per cent during the Third Plan period (1980-1985), respectively. The decline in other sectors was as follows: construction from 21.1 to 19.9 per cent; community services from 19.9 to 19.1 per cent, and agriculture from 18.0 to 13.9 per cent over the same period.

In 1987 construction also remained the leading employer of non-nationals (29 per cent of the total expatriate work-force in the Kingdom), although its share has declined considerably since the late 1970s.

Map. Kingdom of Saudi Arabia

Administrative Divisions

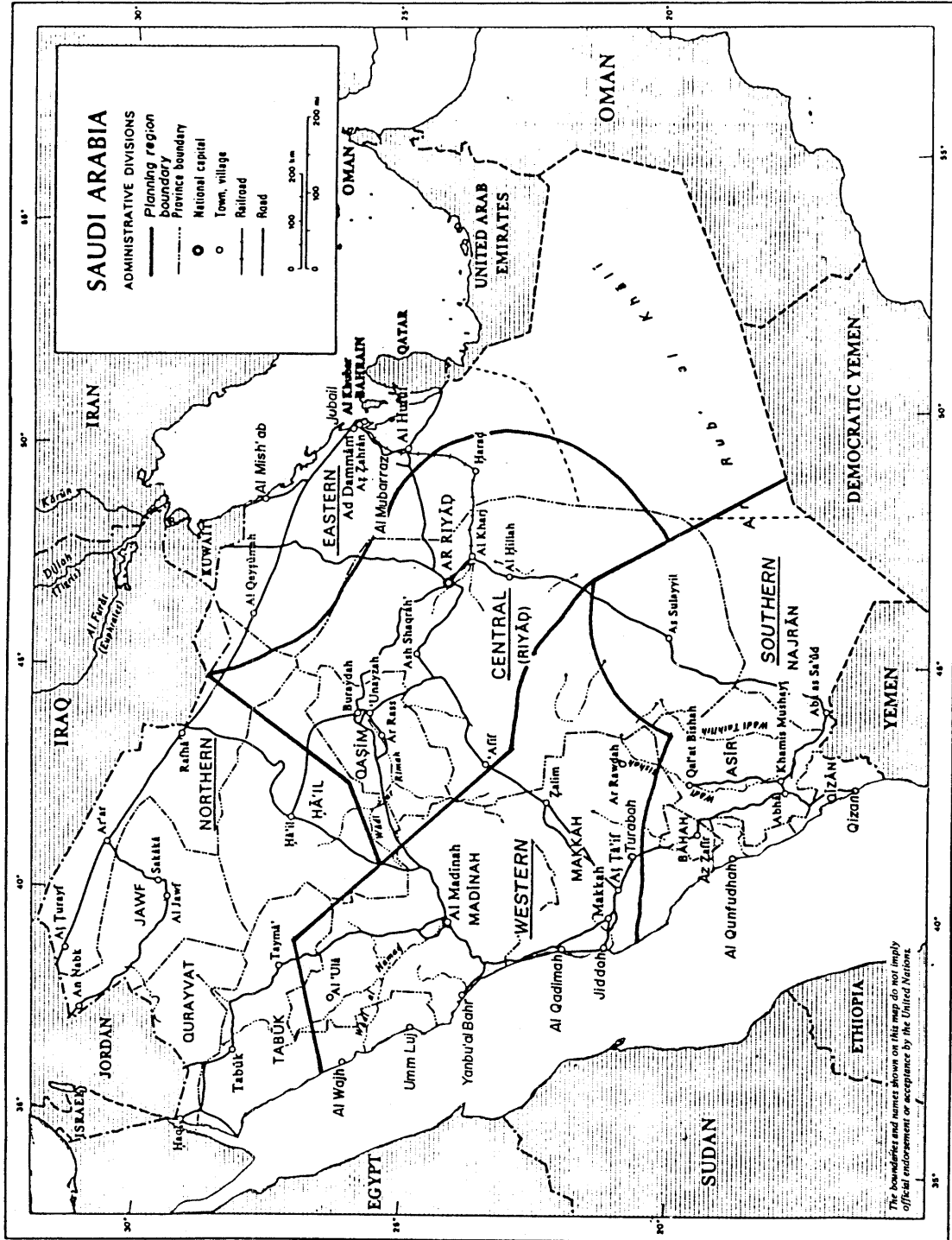


Table 1. Population by major age groups, Saudi Arabia

Age group	Total population		
	1975	1980	1985
0-14	3,212,000	4,141,000	5,146,000
15-64	3,821,000	4,969,000	6,091,000
65 and over	218,000	258,000	305,000
<b>Total</b>	<b>7,251,000</b>	<b>9,372,000</b>	<b>11,542,000</b>

Source: United Nations, Department of International Economic and Social Affairs, World Population Prospects. Estimates and Projections as Assessed in 1984, Population Studies No. 98. (United Nations publication, Sales No. E.86.XIII.3).

Table 2. National and non-national households by region, Saudi Arabia 1985

Region	Private households a/		
	National	Non-national	Total
Central	240,977	247,397	488,374
Eastern	230,499	166,141	396,640
Northern	52,386	36,275	88,661
Western	168,384	253,202	421,586
Southern	56,128	22,490	78,618
<b>Total</b>	<b>748,375</b>	<b>725,505</b>	<b>1,473,880</b>

Source: Data estimated by the United Nations Economic and Social Commission for Western Asia.

a/ Excluding 1,176,400 expatriates living in collective households.

Table 3. National and non-national population by region, Saudi Arabia 1985

Region	National	Non-national	Total
Central	2,176,019	1,630,722	3,806,741
Eastern	2,081,410	1,095,118	3,176,528
Northern	473,048	239,109	712,157
Western	1,520,510	1,668,979	3,189,489
Southern	506,837	148,247	655,084
<b>Total</b>	<b>6,757,824</b>	<b>4,782,176</b>	<b>11,540,000</b>

Source: Data estimated by the United Nations Economic and Social Commission for Western Asia.



## II. LAND AND SETTLEMENT PATTERNS

The urbanization of the Kingdom has been very rapid since the large-scale exploitation of oil in the 1940s and 1950s. It was estimated that in the 1930s one fifth to one quarter of the total population of 1.5-2.0 million lived in urban<sup>1/</sup> settlements, while one half were villagers and the remainder nomads. It has been estimated that, at the time of the first census (1962/1963), 24 per cent of the total population, around 0.8 million persons, lived in cities of over 20,000 inhabitants.

The ratio of the population living in settlements of over 5,000 inhabitants is estimated to have increased considerably from about 59 per cent to over 72 per cent during the decade 1975-1985 (see table 4). The national population is much less urbanized (43 per cent in 1980) than the non-national (89 per cent). The majority of the population of cities with over 50,000 inhabitants is non-national, while more than 80 per cent of the rural population is composed of nationals. Ninety-two per cent of non-nationals and 89 per cent of nationals are concentrated in the western, central and eastern regions; only the western region has a non-national majority (see table 3).

Table 4. Urban and rural population, Saudi Arabia

Location	1975	1980	1985
Urban <sup>a/</sup>	4,250,000	6,170,000	8,360,000
Rural	3,000,000	3,200,000	3,180,000
Total	7,250,000	9,370,000	11,540,000

Source: United Nations, Department of International Economic and Social Affairs, The Prospects of World Urbanization, revised as of 1984-1985, Population Studies No. 101, (United Nations publication, Sales No. E.87.XIII.3), New York, 1987.

<sup>a/</sup> Population in settlements of 5,000 or more inhabitants.

In the 1930s, Makkah was the largest city with an estimated population of 50,000 settled inhabitants. In 1962, Riyadh had outgrown Makkah as the largest city, and there were

<sup>1/</sup> The definition of urban is not given in the source.

six cities with more than 50,000 inhabitants namely Riyadh (197,800), Makkah (158,641), Jeddah (147,811), Madinah (71,998), Taif (53,954) and Hofuf (50,000), which together comprised 20.6 per cent of the country's population. By 1974, in addition to the above, Dammam, Tabuk, Buraydah and Mubarraz had also grown to over 50,000. Thus, the 10 cities each with over 50,000 inhabitants comprised 34.6 per cent of the population in 1974 (see table 5). Jeddah had become the second largest city after Riyadh; Makkah and Madinah were the third and the fourth largest. The same ranking probably applies today, although the close size of the populations of Riyadh and Jeddah apparently causes some confusion.<sup>1/</sup>

The development of the rank and size distribution of the four largest cities of the Kingdom over the last two and a half decades is as follows:

City/population rank ratios	1962	1974	1980	1985	Ideal <sup>a/</sup>
1st/2nd	1.25	1.19	1.13	1.02	2.0
1st/3rd	1.34	1.82	2.04	2.22	3.0
1st/4th	2.75	3.37	3.67	3.40	4.0

<sup>a/</sup> Under certain assumptions G. K. Zipf's rank and size rule results in these ratios.

The second city has steadily approached the primary city in population size, while the third city has distanced itself further and since 1974 the fourth has kept its relative position (see table 5).

Notable conurbations<sup>2/</sup> of the Kingdom in order of 1985 size are as follows (their estimated 1974 and 1985 populations, in thousands, are in brackets):

1. Western (I): Jeddah, Makkah, Taif and Turabah (1,250; 2,750);

<sup>1/</sup> Some non-national sources cite Jeddah as being the primary city.

<sup>2/</sup> An urban agglomeration formed by the merging of several urban centres between which some regular daily and/or weekly trip pattern exists.

2. Central (I): Riyadh, Kharj (780; 1,800);
3. Eastern: Jubail, Dammam, Khobar, Dhahran, Hofuf (248);(...)<sup>1/</sup>
4. Western (II): Madinah, Khyber, Yanbu (275; 600);
5. Southern (I): Baha, Bisha (85; 275);
6. Southern (II): Abha, Khamis Mushayt, Jizan (130; 250);
7. Central (II): Buraydah, Unayzah (120; 190);
8. Northern: Sakakah, Arar, Jawf (40; 70).

Hail, Tabuk, King Khalid Military City and Najran are too far away from any other settlement to form conurbations (see the map). The above eight main urban concentrations account for about half of the Kingdom's population.

The two western urban regions are distinguished as being the religious centres of the Kingdom, as well as of the whole world of Islam. The eastern conurbation is the main industrial centre of the country. Riyadh is the royal capital of the Kingdom, and its administrative function is continuously being strengthened through the transfer of government offices that remain in Jeddah.

The rapid growth of the cities of the Kingdom has three components, namely natural growth, the influx of foreign workers and rural/urban migration. Many indigenous migrants are attracted by job opportunities, but perhaps an equal number of nomadic bedouin settle on the outskirts of the cities in order to benefit from the amenities offered. A sample household survey carried out in Riyadh in 1968 showed that about 85 per cent of household heads were born outside the city, but that only 21 per cent were from other Arab countries. These settlers form shanty towns that offer the important advantage of easy access to both the city and the desert.

Shanty towns in the Jeddah-Makkah area are formed mostly by pilgrims who stay on in the Kingdom after completing their pilgrimage. The pilgrimage (Hajj) creates a yearly tidal population movement which involves some 10 per cent of the Kingdom's population (1.1 million in 1982) and a comparable number of pilgrims from abroad (0.9 million in 1982). The event poses a unique problem for the planners and authorities of the Jeddah-Makkah area.

The Kingdom covers an estimated land area of 2.15 million square kilometres (sq km), of which about 45,000 sq km, are arable. Less than 6,000 sq km, i.e. 0.3 per cent of the total, are actually cultivated. Rangeland covers 37 per cent,

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<sup>1/</sup> Data not available.

Table 5. Population of major cities by selected available years,  
Saudi Arabia

Planning region	City (Administrative region)	Year	Population (Thousands)	Status in NSSa/	Rank 1974	Source/description
Central	Riyadh (Riyadh)	1974	667	NC	1	Census
		1980	1,259			Master plan estimate (MPE)
		1986	1,600			MPE
		1990	2,164			MPE
		2000	3,005			UN
	Kharj (Riyadh)	1974	42	DC	14	Census
	Buraydah (Qassim)	1974	70	RC	9	Census
		1982	108			Sample survey
		1985	120			MPE
		1990	150			MPE
		1995	200			MPE
		2000	250			MPE
	Unayzah (Qassim)	1974	34	DC	17	Census
		1982	47			Sample survey
		1985	50			MPE
1990		60	MPE			
1995		70	MPE			
Eastern	Dammam (Eastern)	1974	128	NC	6	Census
		1978	130			Sample survey
		1985	178			MPE high (low: 145)
		1990	241			MPE high (low: 179)
		1995	296			MPE high (low: 202)
	Hofuf (Eastern)	1974	101	DC	7	Census
		1980	179			UNDIESA
		1990	291			UNDIESA
		2000	413			UNDIESA
	Mubarratz (Eastern)	1974	54	--	10	Census
	Khobar (Eastern)	1974	49	DC	12	Census
		1978	93			Sample survey
		1985	158			MPE high (low: 128)
		1990	208			MPE high (low: 155)
		1995	261			MPE high (low: 178)
Eastern (cont.)	Dhahran (Eastern)	1974	16	DC	23	Census
		1978	30			Sample survey
		1985	55			MPE high (low: 45)
		1990	83			MPE high (low: 62)
		1995	121			MPE high (low: 83)

Continued

Table 5 (Continued)

Planning region	City (Administrative region)	Year	Population (Thousands)	Status in NSS <sup>a/</sup>	Rank 1974	Source/description
	Jubail	1980	16	DC	--	Fourth Development Plan
	New industrial town (Eastern)	1985	35			Fourth Development Plan
		1990	55			Fourth Development Plan
		2000	100			Middle East Economic Digest (MEED)
		2010	290			Ministry of Planning
	King Khalid Military City: Hafr Al-batin (Eastern)	1974	23	RC	21	Census
		2000	80			MEED
Northern	Tabuk (Tabuk)	1974	75	RC	8	Census
		1979	90			MEED
		1982	120			MEED
		1985	126			MEED
	Hail (Hail)	1974	41	DC	16	Census
		1983	83			Sample survey
		1985	97			MPE
		2005	203			MPE
	Sakakah (Jawf)	1974	21	DC	22	Census
Western	Jeddah (Makkah)	1974	561	NC	2	Census
		1980	1,118			MPE
		1984	1,459			MPE Linear (Exponential: 1,938)
		1990	1,772			MPE
		2000	2,462			MPE
	Makkah (Makkah)	1974	367	NC	3	Census
		1981	618			Sample survey
		1985	696			MPE
		--	1,500			Master plan fixed maximum <sup>b/</sup>
	Taif (Makkah)	1974	197	RC	5	Census
		1978	218			Private household survey
		1980	228			MPE
		1985	264			MPE
		1990	302			MPE
		1995	340			MPE

Continued

Table 5 (Continued)

Planning region	City (Administrative region)	Year	Population (Thousands)	Status in NSS <sup>a/</sup>	Rank 1974	Source/description
Western (cont.)	Madinah (Madinah)	1974	198	NC	4	Census
		1978	311			Sample survey
		1985	454			MPE high (low: 320)
		1990	600			MPE high (low: 400)
		2000	1,000			MPE
	Yanbu	1980	18	DT	-	Fourth Development Plan
	New industrial town (Madinah)	1985	36			Fourth Development Plan
		1990	62			Middle East Review
		2006	115			Middle East Review
		2010	150			Ministry of Planning
Southern	Khamis Mushayt (Asir)	1974	50	c/	11	Census
		1978	55			Sample survey
		1982	80			MPE
		--	100			Master plan fixed maximum
	Abha (Asir)	1974	30	RC	20	Census
		1978	40			Sample survey
		1985	59			MPE
		--	150			Master plan fixed maximum
	Qalat Bishuh (Asir)	1974	42	DC	15	Census
		1982	100			MEED
	Baha (Asir)	1974	32	RC	19	Census
		1982	100			MEED
	Jizan (Jizan)	1974	33	RC	18	Census
		1978	52			Sample survey
		1980	56			MPE
		1985	80			MPE (including new town)
		1990	107			MPE (including new town)
	Najran (Najran)	1974	48	DC	13	Census

Source: Compiled by the United Nations Economic and Social Commission for Western Asia from national and international sources.

a/ NSS: National Settlement Strategy of the Third Five Year Development Plan (1980-1985), which has not yet been officially adopted. The designations in this column are taken from "The Hail region comprehensive plan: technical report No. 3 (1984)". NC: National (or metropolitan) centre; RC: regional centre; DC: district (or subregional) centre; DT: district town (or major trade centre);

b/ In addition to this fixed ultimate plan population, the master plan of Makkah assumes that 2.2 million pilgrims are to be accommodated in the city;

c/ Khamis Mushayt is not designated separately, as it forms part of the Abha Metropolitan Area.

and forests 1 per cent of the total area. Settlement areas cover an estimated 4,500 sq km. which represent about 0.2 per cent of the total surface area of the country (1985). The overall population density of the Kingdom was approximately 3.4, 4.4 and 5.4 persons per sq km in the years 1975, 1980 and 1985 respectively. The average urban population density for the country is estimated to be around 26 persons per hectare (p/ha). The maximum residential population density cited in master plan studies is 460 p/ha in the central Bukhariyyah area of Taif (1981). The coverage of residential land-use in urban areas ranges from around 30 per cent in high-density cities to about 85 per cent of the total urban area in low-density towns.

Although most of the land in the Kingdom is owned by the Government, the "Barren Land Distribution Law (1968)" provides free grants of potentially productive land to any Saudi Arabian citizen able and willing to farm. The land, however, reverts to the Government if the new holder fails to put it into productive use within two to three years. The programme is managed by the Public Land Management Department, established in 1968, which is attached to the Ministry of Agriculture and Water.

The Kingdom does not possess a comprehensive cadastral system or any cadastral maps. The existing land registration system is based on Islamic law and is implemented by local courts through the resolution of disputes.

The experience of rapid urbanization, however, and the difficulties encountered in the implementation of planning instruments such as master plans, action area plans and zoning codes, demonstrated the necessity of a nation-wide cadastral system, and a project was started in the early 1980s.

### III. PHYSICAL DEVELOPMENT PLANNING

The Kingdom of Saudi Arabia is one of the few countries in the ESCWA region, and indeed in the world, to have an integrated approach to physical settlement planning at the national, regional and local level, as well as across the main land-use activity sectors.

The development of physical planning in the Kingdom can be viewed in two main stages, i.e. an early phase from around 1930 up to the beginning of the 1970s, and the later phase up to the present. In the early phase emphasis was on construction, fast growth and change. The physical shape of urban areas resulted from individual decisions regulated, to a certain extent, through land-use and building regulations. The system of municipalities was established by Royal Order in 1937. Road and Building Regulations, issued in 1941, dealt with planning procedure, land-use and right-of-way. In this early phase, the physical planning activities of two urban areas, i.e. Dammam-Khobar and Riyadh, are worth mentioning.

At the end of the 1930s and beginning of the 1940s, the Arabian American Oil Company (ARAMCO) set up oil exploration centres and related settlements that were based on a road network system. The 1937 Dammam-Khobar master plan is an example of this approach. The proposed network was implemented without regard to the pattern of the existing settlements. All previous irregular development was demolished in the process.

In 1953 a decision was taken to relocate all government offices in Riyadh, and a new residential district, Melez, was designed to accommodate civil servants and their families. The plan for Melez comprised a hierarchical gridiron road network with square-shaped plots each measuring 25 m x 25 m. The Melez plan became a prototype for the later planning of residential areas, and was thus an important influence on the planning of Riyadh and other towns of the Kingdom. The new areas were developed with much lower densities than the old quarters of the city. The oldest quarter, Dira, for example has about five times the average density of new areas. Similarly, the area allocated to streets is about three times larger in the new areas.

The later phase of planning in the Kingdom is characterized by the comprehensive approach to urban and regional physical development. It can be said to have



started in 1972 with the publication of the Physical Development Plan for the Western Region. Other regional plans followed at short intervals: the central and northern plan in 1972, the eastern in 1973 and the southern in 1974. Although these first plans formed the corner-stones of regional development planning, they lacked a comprehensive approach to urban development on a national scale. In 1975, the realization of this fact led to the establishment of a new Ministry of Municipal and Rural Affairs (MOMRA), which has full authority for physical planning at all levels. The Deputy Ministry for Town Planning (DMTP) was authorized to prepare master action plans for seven cities in the Kingdom, namely, Jeddah, Riyadh, Dammam, Taif, Madinah, Abha and Jizan.<sup>1/</sup> These plans, completed by 1977, consisted of 15 technical reports, eight of which were on data and analysis, and seven on implementation. The plans were considered to be the starting points for a continuous planning process. The consultancy firms involved were asked to assist in the establishment of planning and development departments in the cities. Initially, the United Nations contributed to the development of a planning system for the Kingdom through two projects, i.e. the National and Regional Physical Planning Project (July 1973 to March 1976), and the Physical Planning Project (March 1976 to December 1980).

The overall objective of the latter was to enhance the operational capacity of MOMRA, and in particular of the DMTP, as well as to provide full assistance in the performance of their functions and in the preparation of regional, urban and rural spatial development plans.

The main goal of development planning in the Kingdom, which has significant spatial implications and which was formulated in the first Five-Year Plan in 1970 and further refined in the second Five-Year Plan in 1975, was that of spreading the benefits of rapid economic growth as widely as possible throughout the social groups and regions of the country.

A National Settlement Strategy (NSS) was formulated in 1978 in order to pursue this goal. The aim is to identify settlements with a growth potential and to promote a settlement pattern that will lead to the most efficient distribution of resources. NSS is designed to cover a long

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<sup>1/</sup> DMTP (MOMRA) has no responsibility for planning in Riyadh, which comes under a special Royal Commission, nor for the new industrial cities of Jubail and Yanbu, which comes under another Royal Commission.

time period, and thus provides the overall national spatial context for five-yearly national plans. DMTP is currently undertaking a review of NSS. The settlement hierarchy, proposed by the 1978 strategy, defines four main types of centres: metropolitan (national), regional, district (subregional) and major trade centres (first order district towns). See table 5 for the designation of cities. National centres, i.e. Makkah, Madinah, Riyadh, Dammam and Jeddah, all have nation-wide religious, administrative or commercial significance and have a metropolitan character with large, urbanized tributary areas. More or less contiguous, long-term, urban development taking the form of wide corridors is foreseen along the main highways: (a) between Jeddah, Makkah, Taif, Baha and Bishal in the west; and (b) between Hail, Buraydah-Unayzah, Riyadh-Kharj, Hofuf-Dhahran-Khobar-Dammam and Jubail in the centre and the east. A minor corridor is foreseen between Madinah and Yanbu. Jizan and Abha in the south, and Tabuk and Sakakah-Jawf in the north, will remain as isolated urban areas. The Jeddah-Taif, Hofuf-Jubail and Kharj-Riyadh-Buraydah development corridors are already quite visible on the ground.

The Ministry of Planning has also proposed a system of development centres that form the backbone of the regional planning strategy of development plans; they largely coincide with NSS.

The master action plans prepared under the United Nations supported Physical Planning Project for the seven metropolitan areas (see above), covered an initial population of 3.08 million (approximately 70 per cent of the total urban population), a total area of 10,400 sq km, 18 cities and 350 villages. A master action plan consists of: (a) a long range master directive plan that defines the policy framework to guide the growth and development of the metropolitan area for a period of 15 years; (b) an execution plan that outlines the development policies, programmes and projects of various sectors in each sub-area at five year intervals which correspond to the national five-year plan periods, accompanied by a capital improvements programme; (c) area action plans; and (d) cultural area plans that provide implementation details of projects for priority areas. The master action plan also includes studies on land development policies, comprehensive planning regulations and planning standards for community services. A significant institutional innovation related to master action plan-making is the steering committee that brings together the regional directors of the Physical Planning Project, the heads of local government departments and United Nations advisers under the chairmanship of the

mayor of the class-A municipality where the meeting is held. The steering committee provides intersectoral co-ordination at the metropolitan level, identifies planning needs, examines and approves planning proposals, and functions as the policy-making body for the action plan coming within its jurisdiction.

A later United Nations-supported project, i.e. the Regional Development Planning Project, which was started in 1980 aimed at integrating urban/rural development. The Hail, Qassim, Makkah, Baha and Tabuk regional development planning studies were initiated in the early 1980s, and those of Jizan, Qatif and Ihsa in 1985. These projects undertake the planning of both the central city and its rural hinterland. The typical settlement pattern in the rural hinterland of most large cities consists of hundreds of small, remote settlements that are scattered over a vast area. The overall guiding objective of the regional plans is the provision of urban-level services to rural settlements that involve as little displacement of the population as possible. In a typical regional plan, alternative strategies are defined and their impact is compared before any physical plan choice is made.

The settlement hierarchy and service distribution problems of the rural hinterland of urban centres in the Kingdom have been solved in all the regional planning exercises by organizing a system of village clusters, each consisting of tens of villages in accordance with total population size, distance, road links, natural barriers and other relevant criteria.

A centrally-located village, usually the most populous one, is designated as the village cluster centre in which most of the higher-level services are to be concentrated. For remote areas that cannot be included in a cluster, independent service sub-centres are created. The rapid development of intensive agriculture is a strategic aspect of all regional plans. The ultimate goal of the Kingdom's rural development policy is to create an alternate life-style to the one offered by big cities in order to keep the population anchored in rural areas. The level of subsidy required to achieve this strategic goal is considered to be a necessary expenditure.

Industrial development is controlled by a system of licensing that to a large extent influences the decisions of individual industrial developers concerning location. There have been suggestions that this system should be supplemented

by spatially differentiated grants, loans and other incentives that would increase its power as a development control tool. Under the existing system of land tenure and property laws, private residential development is not as easy to control as industrial and commercial development.

The monitoring of development that can provide a feedback for the ongoing planning process depends on the availability of appropriate data. Demographic, socio-economic, infrastructural, transportation, land-use and other data have hitherto been collected on an ad hoc basis by the consultants commissioned to prepare the regional and master plans. Comparability and the consistency of data, as well as the continuity of monitoring would all be improved if the basic data needed for planning could be collected on a standardized, systematic basis by the public planning authority concerned.

Regional planning in the Kingdom is currently based on 14 planning regions (see the map) that reflect administrative, rather than functional boundaries. Planning region boundaries should be reviewed periodically so as to incorporate the effects of changing linkages and the gravitational structure of the settlement system.

In an international workshop on the regional planning process, which was organized by DMTP in collaboration with the United Nations Development Programme early in 1986 in Riyadh, it was found that human resources in the field of regional and town planning were inadequate, and it was suggested that the Kingdom would benefit immensely from well-organized mid-career training programmes and the incorporation of a regional planning component into both the undergraduate and graduate programmes of appropriate universities.

#### IV. HOUSING

The housing balance of the Kingdom progressed from a state of serious underprovision in the early 1970s to a situation of considerable surplus, i.e. a very high rate of vacancies, within the period of only a decade and a half. During the First Development Plan period (1970-1975) only about one half of the stated need for 154,000 new dwellings and replacement units could be met. It was estimated that about 12.5 per cent of all dwellings needed to be replaced every year because of their poor structural condition. Squatter development appeared around the big cities, and rents rose in the middle and high income sectors; the conversion of some dwellings to business use further aggravated the situation. The total need for new and replacement units was put at 338,000 dwellings in the Second Development Plan period (1975-1980), of which around 75 per cent were built during the same period. The private sector constructed about 59 per cent of these dwellings.

The total housing need of the country in the Third Development Plan period (1980-1985) was estimated at 730,000 units, of which around 450,000 were to be built in settlements with more than 30,000 inhabitants. Almost all (97 per cent) of this urban need was actually realized within the same period. The Fourth Development Plan (1985-1990) estimates the need for 325,000 new units up to the end of the plan period. Around 100,000 of this requirement already existed in 1985 in the form of vacant dwellings (see table 6).

The housing objectives of the Second, Third and Fourth Development Plans included "a decent safe and sanitary dwelling for every household", "appropriate environmental conditions", the "promotion of private sector involvement in housing construction", "increasing home ownership for Saudi families" and the "improvement of rural housing". The Fourth Plan places a lot of emphasis on the provision of public housing for low-income Saudi Arabians, selectively subsidized loans, the enforcement of building codes and the construction of public housing, only in under-supplied areas. More than \$US 10 billion is earmarked for the housing programme of the plan.

The total 1985 stock of private dwellings is estimated at around 1.8 million, of which about 6 per cent are vacant. Table 6 gives an estimated regional distribution of private units. An estimated expatriate population of 1.18 million resides in collective living quarters throughout the Kingdom.

Table 6. Estimated housing stock by regions: national and non-national, Saudi Arabia 1985  
(Private dwellings)\*

Planning regions	National households <sup>a/</sup>	Non-national households <sup>a/</sup>	Total	Vacant dwellings	Total
Central	301,221	252,345	553,566	31,973	585,539
Eastern	288,124	169,464	457,588	29,311	486,899
Northern	65,483	37,001	102,484	5,260	107,744
Western	210,480	258,266	468,746	29,416	498,162
Southern	70,160	22,940	93,100	4,779	97,879
<b>Total</b>	<b>935,468</b>	<b>740,016</b>	<b>1,675,484</b>	<b>100,740</b>	<b>1,776,224</b>

Source: Estimated by the United Nations Economic and Social Commission for Western Asia.

\* Excludes collective living quarters accommodating an estimated 1,176,400 expatriates.

<sup>a/</sup> Includes an estimation of second homes.

The institutionalization of house building in the Kingdom can be dated back to 1971, when a General Housing Department was created under the Ministry of Finance and National Economy. The Department was entrusted with the design, construction and maintenance of public housing projects. Soon afterwards, a review by the High Committee for Administrative Reform led to the strengthening of the General Housing Department under its new title of Housing Organization. The Ministry of Public Works and Housing (MPWH) was created in 1975 as one of the six ministries added to the Council of Ministers. MPWH has three Deputy Ministries: Housing, Public Works and Building Contracts Classification. The main functions of MPWH are: (a) to formulate and provide technical and supervisory support for public housing programmes; (b) to regulate the contractors; (c) to plan for the improvement of housing and public works; and (d) to carry out housing censuses and special studies. Several other ministries, public and semi-public agencies and private firms also make significant contributions to housing, essentially through the construction of rental units for their own employees. These include the National Guards, the Ministries of Defence and Aviation, the Interior and Foreign Affairs, the Royal Commissions for Jubail and Yanbu, Saudi Arabian Airlines, desalination agencies, hospitals and universities.

A major contributor to the development of housing in the Kingdom is the Real Estate Development Fund (REDF), established in 1974 as a semi-governmental financial institution attached to the Ministry of Finance and National Economy. In 1985 REDF had 24 branch offices in major towns of the Kingdom. The primary function of REDF is to estimate the construction of residential and mixed residential-commercial-office schemes by the private sector. This is achieved by offering: (a) private, interest-free, long-term loans to Saudi Arabian nationals; and (b) investment loans to Saudi Arabian citizens and firms. Private loans are given to Saudi Arabian applicants 18 years and over if they are married, or 21 years and over if they are unmarried, regardless of their social status and place of residence, provided that they own a suitable plot, but not a house. The value of the loan ranges from 200,000 Saudi Arabian riyals (SRls) to SRls 300,000 (\$US 53,000 to \$US 80,000), and is payable in equal annual instalments over 25 years. The ownership of a plot of land can be secured through the land grant policy, under which every Saudi Arabian national is entitled to a free plot of land in a planned layout that is approved and developed on state land to the required level of services and environmental standards by a municipality.

Two types of schemes are operative under the land grant policy. A land award scheme that consists of plots ranging in size from 30 m x 30 m to 100 m x 100 m, is designed by the municipality and approved by the DMTP. Only one plot can be given to a person in any one city.<sup>1/</sup> The second type is the limited-income scheme, which usually offers plots 20 m x 20 m. The layouts are designed, approved and developed by the municipality, i.e. without recourse to the DMTP. The applicant must be a citizen over the age of 18, be resident in the city, must not own a house or a plot in the city, nor have received an REDF grant or loan. No deed is issued for the plot unless it conforms to a planned layout, and no building permit is given unless the applicant possesses a deed to the plot.

Investment loans, started in 1976, are intended for individuals or companies who are planning to build mixed housing schemes, i.e. apartments and villas, office and/or commercial complexes, banks, showrooms, etc., for rent. The loan covers 50 per cent of the project cost and has a ceiling

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<sup>1/</sup> Although statistics on the number of persons owning plots in more than one city through these schemes are not available, they probably represent quite a high percentage.

of SRIs 10 million (\$US 2.7 million) it is recovered after ten years, without interest. Compliance with regulations and standards such as the environmental and architectural quality, parking, safety and construction standards, is an important condition attached to the loan. REDF is financed by generous allocations from the national budget. From the time of its inception up to 1985, the REDF has approved 303,273 private loan applications for 363,927 dwelling units amounting to SRIs 79 billion (\$US 21 billion). Investment loans amounting to SRIs 4.6 billion (\$US 1.2 billion) were granted to 2,200 applicants for 27,775 housing units over the same period.

The public housing programmes undertaken by MPWH fall into two main groups: government and general public. The target groups of all public housing programmes are limited-income Saudi Arabians. Government housing, also named "rush housing", was realized within a short period of about two years during the late 1970s in order to accommodate the sudden influx into the big cities of rural Saudi Arabians. Only three rush housing projects exist, one each in Jeddah, Riyadh and Dammam, which are all in the form of high-rise, very high-density apartment complexes built on relatively cheap but well-serviced land on the outskirts of the three cities. The dwelling units in all three projects are designed for a standard six-member Saudi Arabian family, with a floor area of 231 square metres (sq m) per unit, i.e. 38.4 sq m per person. The three projects together account for 4,752 dwelling units, and can thus accommodate about 28,500 persons (see table 7).

There are 10 general public housing projects throughout the Kingdom, all which were due to be completed by the early 1980s. Three of these consist of low-rise, high-density apartment complexes, one for Jeddah, Riyadh and Al-Khobar. Six projects were only composed of villas, and one in Riyadh was a mixed apartment-villa project. These 10 projects together contain 9,934 apartment units designed to house about 55,000 persons, and 10,516 villas that can accommodate over 63,000 persons. Unit sizes and family size assumptions are the same as for rush housing. The total capacity of all public housing projects is 25,202 dwelling units planned to house about 147,000 persons. Each project is designed and built in the form of a planned unit development containing all the necessary community, shopping, recreational, educational, health and religious services for inhabitants. Table 8 gives selected indicators of the housing situation in the Kingdom as a whole and for some regions.



Table 7. Selected characteristics of public housing projects completed or under construction, Saudi Arabia

Project description	Population	Dwelling units	Floor area per unit (sq m)	Floor area per person (sq m)	Status of project in August 1984
Rush housing	28 512	4 752	231	38.42	Completed
Apartment blocks	54 882	9 934	231	41.82	Completed
Villas	63 186	10 516	230	38.23	Under construction
Total/average	146 580	25 202	230	39.61	

Source: Saudi Arabia, "The importance of population as an integral part of development planning in the Kingdom of Saudi Arabia", official paper submitted to the Conference on Population, Mexico City, Mexico, August 1984.

Table 8. Housing indicators, Saudi Arabia

Indicator	Year	Value	Unit of measurement
<u>Housing completions</u>			
Public sector			
Deputy Ministry of Housing	1975-1985	25 000	dw <sup>a/</sup>
Other Government	1975-1985	138 000	dw
Private sector	1975-1985	414 000	dw
Public sector			
Low-income	1980-1985	17 800	dw
Employee	1980-1985	121 600	dw
Private sector			
Publicly financed	1980-1985	195 000	dw
Privately financed	1980-1985	103 400	dw
Expenditure on residential construction	1970	23.77	Percentage of GFCF <sup>b/</sup>
	1975	14.65	Percentage of GFCF
	1977	10.54	Percentage of GFCF
Household size (private households)			
All households	1986	7.86	p/hh <sup>b/</sup>
National households	1986	9.03	p/hh
Non-national households	1986	4.97	p/hh
Public housing <sup>c/</sup>	1975-1984	6.00	p/dw <sup>d/</sup>
Building types (Jizan region)			
Apartment unit	1978	5.20	p/dw
Traditional house	1978	5.90	p/dw
Villa	1978	6.10	p/dw
Shanty	1978	5.30	p/dw
<u>Crowding</u>			
Jizan city	1978	1.25	p/hr <sup>e/</sup>
Abha (urban, national households)	1980	1.70	p/hr
Qassim region	1985	1.00	p/hr
Riyadh city	1968	1.40	p/hr
Riyadh city	1977	1.50	p/hr
Madinah city	1978	1.60	p/hr
Dammam Metropolitan Area	1978	2.00	p/hr
Taif city	1978	0.87	p/hr
Public housing projects	1975-1984	1.00	p/hr

Continued

Table 8. (continued)

Indicator	Year	Value	Unit of measurement
<b>Dwelling unit size</b>			
Jizan region (cities)	1978	4.64	r/dw <sup>f/</sup>
Apartment unit	1978	4.16	r/dw
Traditional house	1978	4.72	r/dw
Villa	1978	4.88	r/dw
Shanty	1978	4.24	r/dw
Abha city	1980	3.00	r/dw
Qassim region	1985	6.76	r/dw
Riyadh city	1968	3.90	r/dw
Riyadh city	1977	4.30	r/dw
Madinah city	1978	4.00	r/dw
Taif city	1978	6.30	r/dw
Abha (national households)	1980	67.32	sq m/dw
Jeddah	1978	86.89	sq m/dw
Taif (old town)	1978	65.00	sq m/dw
Taif (Bukhariyyah) <sup>g/</sup>	1978	90.00	sq m/dw
<b>Residential space per person</b>			
Abha (national households)	1980	13.20	sq m/p
Jeddah	1978	16.46	sq m/p
Taif (Old Town)	1978	11.82	sq m/p
Taif (Bukhariyyah) <sup>g/</sup>	1978	15.00	sq m/p

**Source:** Compiled, calculated or estimated by the United Nations Economic and Social Commission for Western Asia from data contained in master plan reports and other national sources.

- <sup>a/</sup> Dwellings (dw).
- <sup>b/</sup> Persons/household (p/hh).
- <sup>c/</sup> Project design standard common to both apartment units and villas.
- <sup>d/</sup> Persons/dwelling (p/dw).
- <sup>e/</sup> Persons/habitable room (p/hr).
- <sup>f/</sup> Rooms/dwelling (r/dw).
- <sup>g/</sup> A centrally located high density area in Taif city.

## V. INFRASTRUCTURE

Since the beginning of the 1970s, the development of both social (health, education, etc.) and technical (water, electricity, transport, etc.) infrastructure has been considered to form an integral and vital part of the total development of the Kingdom. MOMRA was initially created to undertake comprehensive development of the infrastructure of the country. The objectives of MOMRA included the extension of services to all urban and rural inhabitants, the optimum utilization of and accessibility to these services by all citizens, the adoption of the highest standards for municipal utilities and the use of efficient and modern techniques of management. The importance placed on infrastructure can be gauged by the total cost of MOMRAS technical infrastructure investment projects during the First, Second and Third Development Plan periods. This was in excess of SRls 174 billion (\$US 48 billion).

During the decade 1975-1985, the daily per capita production of desalinated water increased 21-fold from 6.5 litres to 134 litres, while annual per capita generated electric power increased 6.5 times from 589 kilowatt hours (kWh) to 3,856 kWh. The number of passenger cars per thousand persons increased six fold from 31 to 188 (see table 9). The ratio of population covered by technical infrastructure networks also increased rapidly since the beginning of the development plans. Table 10 presents a selection of coverage ratios for some regions and cities and, where available, for the whole country.

Table 9. Technical service indicators, Saudi Arabia

<u>Water</u>			
Consumption (litres/person/day)	45.00	74.00	137.00 <sup>a/</sup>
Estimated production of desalination plants (litres/person/day)	6.50	18.10	134.10 <sup>a/</sup>
<u>Electricity</u>			
Installed capacity (kW/person)	0.19	0.75	1.45
Generated power (kWh/person/year)	589.00	2,018.00	3,856.00
Consumption (kWh/person/year)	519.00	1,861.00	3,631.00
<u>Transport</u>			
Cars per thousand persons (incl. taxis)	31.00	109.00	188.00
Buses per thousand persons	1.06	2.55	3.53
Goods vehicles per thousand persons	29.00	102.00	167.00

Source: Saudi Arabia, Ministry of Planning, Achievements of the Development Plans, 1970-1985: Facts and Figures (1985).

a/ 1984 figures.

b/ Gross fixed capital formation (GFCF).

Table 10. Actual and planned coverage of some infrastructure networks, Saudi Arabia

Network/settlement	Year	Percentage	Frame of reference
<u>Water</u>			
Urban areas (total)	1980	65	Population
Rural areas (total)	1980	20	Population
Riyadh city	1977	81	ua <sup>a/</sup>
Riyadh city	1980	75	Population
Jeddah	1980	60	Population
Makkah	1980	60	Population
Madinah	1978	56	dw <sup>b/</sup>
Madinah	1980	50	Population
Taif city	1978	32	dw
Taif city	1980	50	Population
Dammam	1980	80	Population
Dammam (drinking water)	1980	31	dw
Dammam (general use)	1980	92	dw
Khobar	1980	39	dw
Khobar/Thuqbah	1980	90	Population
Dhahran	1980	90	Population
Hofuf	1980	50	Population
Dammam metropolitan area	1980	34	dw
Jizan (urban areas)	1978	71	dw
Jizan (rural areas)	1978	12	dw
Qassim region	1985	60	dw
Buraydah	1985	86	dw
Unayzah	1985	94	dw
Hail city	1985	61	ua
<u>Sewerage</u>			
Riyadh city	1980	18	ua
Riyadh city	1985	21	ua
Riyadh city (plan)	1990	21	ua
Riyadh city (drainage of storm water)	1980	7	ua
Riyadh city (plan for drainage of storm water)	1990	21	ua
Jeddah city	1978	74	Population
Madinah	1978	33	Households
Taif city	1978	4	dw
Dammam	1980	87	dw
Khobar	1980	90	dw

Continued

Table 10. (continued)

Network/settlement	Year	Percentage	Frame of reference
Dammam Metropolitan Area	1980	88	dw
Jizan (urban areas)	1978	10	dw
Jizan (urban areas: plan)	1985	50	Population
Jizan (urban areas: plan)	1990	80	Population
Jizan (urban areas: plan)	1995	100	Population
Abha Metropolitan Area	1980	0	--
Qassim region	1985	33	dw
Buraydah city	1985	50	dw
Unayzah city	1985	39	dw
Hail region and city	1985	0	--

Electricity

Jeddah city	1971	68	Population
Jeddah city	1978	97	Population
Madinah	1978	80	dw
Taif city	1978	96	dw
Dammam	1980	100	dw
Khobar	1980	100	dw
Qassim region	1985	84	dw
Jizan region (urban areas)	1978	61	dw
Jizan region (rural areas)	1978	12	dw
Jizan region	1980	56	Population
Jizan region (plan)	1985	90	Population
Jizan region (plan)	1990	100	Population
Abha metropolitan area	1978	45	All dw
Abha metropolitan area	1978	97	Apartments
Abha metropolitan area	1978	71	Villas

Source: Data compiled by the United Nations Economic and Social Commission for Western Asia from master plan reports and other national sources.

a/ Urban area (ua).

b/ Dwellings (dw).

## VI. CONSTRUCTION AND BUILDING MATERIALS

During the early 1970s when the Kingdom was launched into its integrated rapid development phase, the primitive state of the construction and building materials industry was seen to be a serious hindrance to the realization of capital investment projects. Building materials, labour and managerial skills were all in short supply; prices climbed rapidly. Fast building technology was not available, and institutions for the planning, financing and execution of construction works did not exist. The Second Development Plan (1975-1980) estimated that the gross value of construction investment in the Kingdom needed to increase at the rate of about SRls 10 billion (\$US 2.75 billion) per year over the short-term.

Drastic measures were subsequently taken to modernize and improve the construction capacity. These included offering assistance to local contractors in terms of equipment and management, incentives to foreign contractors and labour, the prompt importation and delivery of building materials and the use of the latest construction machinery and equipment. Priorities were assigned to construction programmes and projects. A procedural reform that involved a comprehensive review of all the related regulations, codes and legal procedures that caused delays in visa and port formalities, importation and the settlement of disputes was initiated, in order to facilitate contractors' operations in general. A continuous monitoring system was initiated in an effort to control compliance with specifications, design quality and cost-effectiveness in the major construction subsectors such as highways, schools, municipal engineering works and industrial buildings. Material testing laboratories were also established.

The result of these efforts was a boom in construction activity. The construction sector grew at an average annual rate of 18.5 per cent during the First Plan period (1970-1975), 17.7 per cent during the Second (1975-1980), and slowed down to 10.2 per cent during the Third (1980-1985), following the completion of major infrastructure and housing projects. Construction represented 9 per cent of total GDP in 1975 and 13.3 per cent in 1984. Construction works in all the economic sectors respectively formed 81.1 per cent, 76.6 per cent and 74.1 per cent of the total GFCF of the Kingdom in 1975, 1980 and 1984. The building construction component alone represented approximately 41 per cent, 44 per cent and 47 per cent of total GFCF for the same years. In 1984,

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employment in the construction sector represented about one fifth of total employment in the Kingdom, i.e. about 886,000 workers (see table 11).

The construction industry of the Kingdom is almost entirely in the private sector. Its major client, the government sector, accounted for approximately 67 per cent of construction sector turnover in 1986.

The building material industry of the Kingdom covers a wide spectrum of processes from simple stone cutting to sophisticated high technology products. In 1984, an estimated 460 plants were in operation and 60 others were under construction in the non-metallic material sector. In an effort to reduce the post-boom risk of overcapacity in certain building material sectors, the Government has taken measures to promote the exportation of building materials. Saudi Industrial Development Fund loans to the building material sector have declined by more than 20 per cent since 1980. In 1986 Saudi Arabia was still the largest importer of building materials in the ESCWA region.

The number of operating cement factories increased from three in 1975 to seven in 1985. Three additional factories were under construction in 1986. The overall output/capacity ratio of the plants was 94 per cent, 46 per cent and 105 per cent in 1975, 1980 and 1985 respectively. The total installed capacity for cement production increased 4.3 times between 1975 and 1980, but by only 52 per cent from 1980 to 1985, when it reached 9.16 million tons per year, while cement production increased by about 230 per cent over the same period. In the latter year, 9.63 million tons were produced. A considerable slowdown in the rate of increase in cement consumption can be observed during the second half of the period 1975-1985. Total and per capita consumption respectively increased 4.4 and 3.4 times during 1975-1980 but only 47 and 19 per cent from 1980 to 1985. Total cement consumption in 1985 was 18.95 million tons, i.e. about twice the level of production (see table 12).

There are two main iron and steel rolling mills in the Kingdom that had a total capacity of 780,000 tons of raw iron, 800,000 tons of raw steel and 940,000 tons of rolled products in 1986. Additional capacities of 200,000 tons of raw steel and 250,000 tons of rolled products were being added in the same year. The production of reinforcing bars, rods and wire increased by more than a 100-fold from 10,000 tons in 1980 to over 1.0 million tons in 1985, when it met nearly one quarter of the apparent demand for iron and steel products.

Table 11. Construction indicators, Saudi Arabia  
(Current prices)\*

Indicator	1975	1980	1984
GDP <sup>a/</sup> in construction	14,806 <sup>b/</sup> 4,209 <sup>c/</sup>	48,631 <sup>b/</sup> 14,618 <sup>c/</sup>	44,635 <sup>b/</sup> 12,485 <sup>c/</sup>
GDP <sup>a/</sup> in construction as a percentage of total GDP	9.0	9.4	13.3
GFCF in construction	27,203 7,733	81,470 24,490	71,646 20,041
GFCF in construction of buildings	13,690 3,892	46,849 14,083	45,231 12,652
GFCF in construction as a percentage of total GFCF	81.1	76.6	74.1
GFCF in building as a percentage of total GFCF	40.8	44.0	46.8
Employment in construction (thousands)	...	638.9 <sup>d/</sup>	885.9
Employment in construction as a percentage of total employment	--	21.1	19.9

Sources: Saudi Arabia, Ministry of Planning, Achievements of the Development Plans, 1970-1985: Facts and Figures; Saudi Arabia, Central Department of Statistics, Statistical Yearbook 1984, twentieth issue; and Saudi Arabia, Ministry of Planning, Fourth Development Plan: 1985-1990.

\* \$US 1.0 were equivalent to SRls 3.5176, SRls 3.3267 and SRls 3.5750 in 1975, 1980 and 1984 respectively.

- a/ In producers' values.
- b/ Millions of SRls.
- c/ Millions of US dollars
- d/ 1979 figure.

Note: ... Denotes figures are not available.

Table 12. Development of the cement industry, Saudi Arabia

Indicator	1975	1980	1985
Number of plants	3.0	3.0	7.0 <sup>a/</sup>
Installed capacity <sup>b/</sup>	1,200.0	6,310.0	9,160.0
Production <sup>a/</sup>	1,125.0	2,011.0	9,628.0
Output/capacity ratio (percentage)	93.8	46.1	105.1
Consumption total <sup>a/</sup>	2,951.2	12,912.6	18,950.0
Consumption per capita <sup>c/</sup>	407.0	1,378.0	1,642.0

Source: Data compiled and/or estimated by the United Nations Economic and Social Commission for Western Asia from national and international sources.

a/ In addition the Saudi-Kuwaiti Cement, Saudi White Cement and Arabian Cement (expansion) Company plants were under construction in 1985 and 1986.

b/ Thousands of tons/year.

c/ Kilogrammes/year.

The country's demand for these products is expected to decline until 1990, then build up to its 1985 level again in 1995 and reach 5.24 million tons in 2000. Per capita consumption, on the other hand, is expected to decline from a maximum of 366 kg per person in 1985 down to around 260 kg by the year 2000 (see table 13).

Other notable building material industries are the bricks, blocks and cement products industry (which consisted of 2,176 private establishments employing about 30,000 workers in 1981), the stone cutting, crushing and stone product industry (which had 217 establishments employing nearly 4,000 workers) and the glass and glass product industry (with 87 plants employing around 700 workers) (see table 14).

Research on building systems and materials is largely undertaken by eight organizations in the Kingdom. These are the University of Petroleum and Minerals, the King Saud and King Faisal Universities, the Ministries of Planning and Public Works/Housing, the Saudi Arabian Standards

Organization, the King Abdulaziz City of Science and Technology and the Saudi Consulting House. In their replies to a recent questionnaire sent out by ESCWA, the current research subjects cited in order of frequency are the ingredients, quality and deterioration of concrete, limestone, local timber in comparison with imported timber, pre-cast ferroconcrete and reinforced concrete, masonry building systems, and solar energy. The utilization of local materials as a substitute for imported materials, and the building construction systems suited to local materials are subject areas where further improvement is required.

Table 13. Development of the iron and steel industry, Saudi Arabia

Indicator	Year	Value	Unit
Number of major plants	1975	1	Rolling mill
	1980	2	Rolling mill
	1985	2	Rolling mill
Installed capacity			
Existing:			
Raw iron	1986	780	Thousands of tons
Raw steel	1986	800	Thousands of tons
Rolled products	1986	940	Thousands of tons
Under construction:			
Raw steel	1986	200	Thousands of tons
Rolled products	1986	250	Thousands of tons
Production of rebars, rods and wire	1980	10	Thousands of tons
	1981	65	Thousands of tons
	1982	110	Thousands of tons
	1983	380	Thousands of tons
	1984	972	Thousands of tons
	1985	1,017	Thousands of tons
Apparent consumption:			
Total	1975	1,039	Thousands of tons
	1980	2,238	Thousands of tons
	1985	4,231	Thousands of tons

Continued

Table 13. (continued)

Indicator	Year	Value	Unit
Per capita	1975	143	kg/person
	1980	239	kg/person
	1985	366	kg/person
	1990	275 <sup>a/</sup>	kg/person
	1995	253 <sup>a/</sup>	kg/person
	2000	264 <sup>a/</sup>	kg/person
Projected demand	1990	3,300	Thousands of tons
	1995	4,230	Thousands of tons
	2000	5,240	Thousands of tons

Source: Data compiled and/or calculated by the United Nations Economic and Social Commission for Western Asia from data obtained from Joint ESCWA/UNIDO Division, Iron and Steel Industry in the ESCWA Region (E/ESCWA/ID/87/6) Baghdad, July 1987 and from other national and international sources.

a/ Based on population estimates in the United Nations Department of International Economic and Social Affairs, The Prospects of World Urbanisation: Revised as of 1984-1985, Population Studies No. 101 (United Nations publication, Sales No. E.87.XIII.3).

Table 14. Miscellaneous building material industries, private establishments, Saudi Arabia 1981

Industry	Number of establishments	Employment
Mining and quarrying	5	31
Bricks, blocks, cement and cement products	2,176	29,647
Stone cutting, crushing and stone products	217	3,926
Glass and glass products	87	696

Source: Saudi Arabia, Central Department of Statistics, Census of Private Establishments: Summary Results, (1981).

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