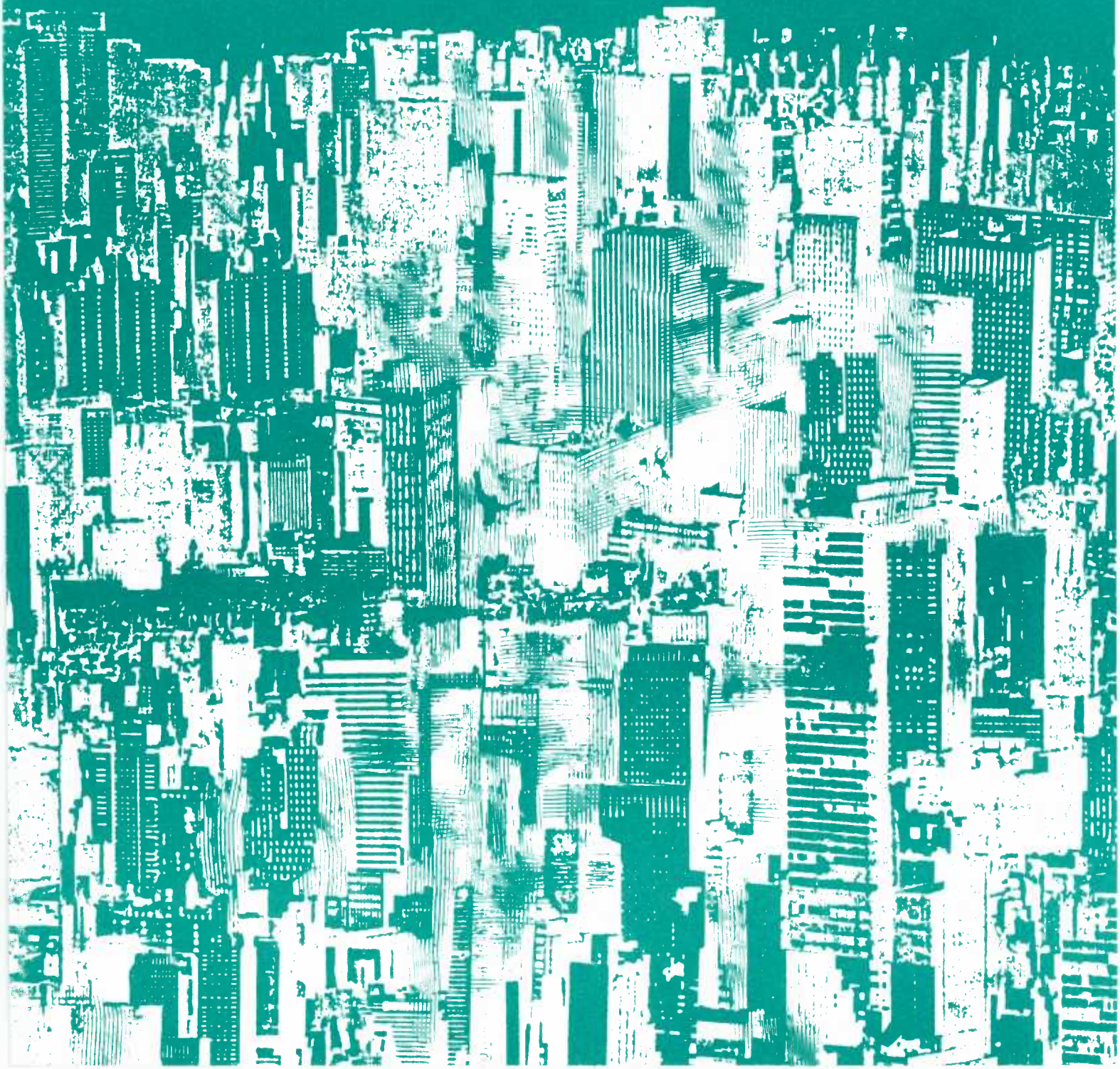
United Nations

Population Growth and Policies in Mega-Cities

CAIRO



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Population Growth and Policies in Mega-Cities

CAIRO

United Nations

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NOTE

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PREFACE

The present publication is one in a series of studies being prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat which focus on the population policies and plans of some mega-cities in developing countries, cities that are expected to have populations of at least 8 million inhabitants by the year 2000.

The object of the series is to examine the formulation, implementation and evaluation of the population policies of mega-cities from a broad perspective, emphasizing the reciprocal links between population and development in the spirit of the World Population Plan of Action.[1] The development of population policies to improve the standard of living and the quality of life of the inhabitants of the world's largest cities is a highly complex and multifaceted activity. It involves, for example, not only the analysis of migration trends, the preparation of population projections and the formulation of population distribution strategies but also the provision of cost-effective urban infrastructure (e.g., housing, water, sewerage, transportation and health and educational facilities), the monitoring and creation of employment, the assembly of urban land for development projects, the improvement of municipal revenue-raising mechanisms and the establishment of effective institutional arrangements for planning and managing urban growth.

Each of the technical papers in the series follows a common format consisting of five major sections. Section I provides basic information on demographic trends and reviews the use of demographic data in planning for rapidly growing urban populations. Section II presents background information on the city's economic base, the spatial structure of the metropolitan region and the sectoral and spatial distribution of jobs, all of which are crucial to a proper understanding of how population distribution strategies operate. Section III reviews early decentralization strategies and how they were evaluated and revised by local planners and then examines current population distribution strategies for the metropolitan region. Section IV deals with a number of key issues and sectors—the labour market, urban land, housing, water supply and so on—from the perspective of planning for rapidly growing urban populations and managing urban growth. Wherever possible, attention is given in that section to the extent to which various sectoral policies may have served as implicit spatial policies that reinforced or perhaps counteracted explicit spatial goals. Finally, section V examines the sectoral distribution of public investment and how that investment has influenced the achievement of spatial goals, how individual cities have generated revenue for municipal projects and what types of institutional arrangements have been established to plan for and manage urban growth.

To date, reports issued in the *Population Growth and Policies in Mega-Cities* series are:

CALCUTTA	(ST/ESA/SER.R/61)
SEOUL	(ST/ESA/SER.R/64)
METRO MANILA	(ST/ESA/SER.R/65)
BOMBAY	(ST/ESA/SER.R/67)
DELHI	(ST/ESA/SER.R/68)
DHAKA	(ST/ESA/SER.R/69)
BANGKOK	(ST/ESA/SER.R/72)
MADRAS	(ST/ESA/SER.R/75)
KARACHI	(ST/ESA/SER.R/77)
JAKARTA	(ST/ESA/SER.R/86)
MEXICO CITY	(ST/ESA/SER.R/105)

NOTES

[1] See *Report of the United Nations World Population Conference, 1974, Bucharest, 19-30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), chap. 1, and *Report of the International Conference on Population, 1984, Mexico City, 6-14 August 1984* (United Nations publication, Sales No. E.84.XIII.8 and Corr. 1 and 3), chap. I, sect. B.

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Explanatory notes

Symbols of United Nations documents are composed of capital letters combined with figures.

Reference to "dollars" ($) indicates United States dollars, unless otherwise stated.

The term "billion" signifies a thousand million.

Annual rates of growth or change refer to annual compound rates, unless otherwise stated.

A hyphen between years (e.g., 1984-1985) indicates the full period involved, including the beginning and end years; a slash (e.g., 1984/85) indicates a financial year, school year or crop year.

A point (.) is used to indicate decimals.

The following symbols have been used in the tables:

Two dots (..) indicate that data are not available or are not separately reported.

A dash (--) indicates that the amount is nil or negligible.

A hyphen (-) indicates that the item is not applicable.

A minus sign (-) before a number indicates a deficit or decrease, except as indicated.

Details and percentages in tables do not necessarily add to totals because of rounding.

The following abbreviations have been used in this report:

CAPMAS	Central Agency for Public Mobilization and Statistics
CCBA	Cairo Cleansing and Beautification Authority
CBD	central business district
CTC	Cairo Transportation Authority
CWO	Cairo Wastewater Organization
DPT	diphtheria, pertussis and tetanus
EPC	Environment Protection Company
FOF	Family of the Future
GCR	Greater Cairo Region
GDP	gross domestic product
GOGCWS	General Organization for Greater Cairo Water Supply
MCH	maternal and child health
NUPS	National Urban Policy Study
ORT	oral rehydration therapy
PADCO	Planning and Development Collaborative International
SOFRETU	Société française d'études et de realisation de transports urbains
UNFPA	United Nations Population Fund (formerly United Nations Fund for Population Activities)
USAID	United States Agency for International Development

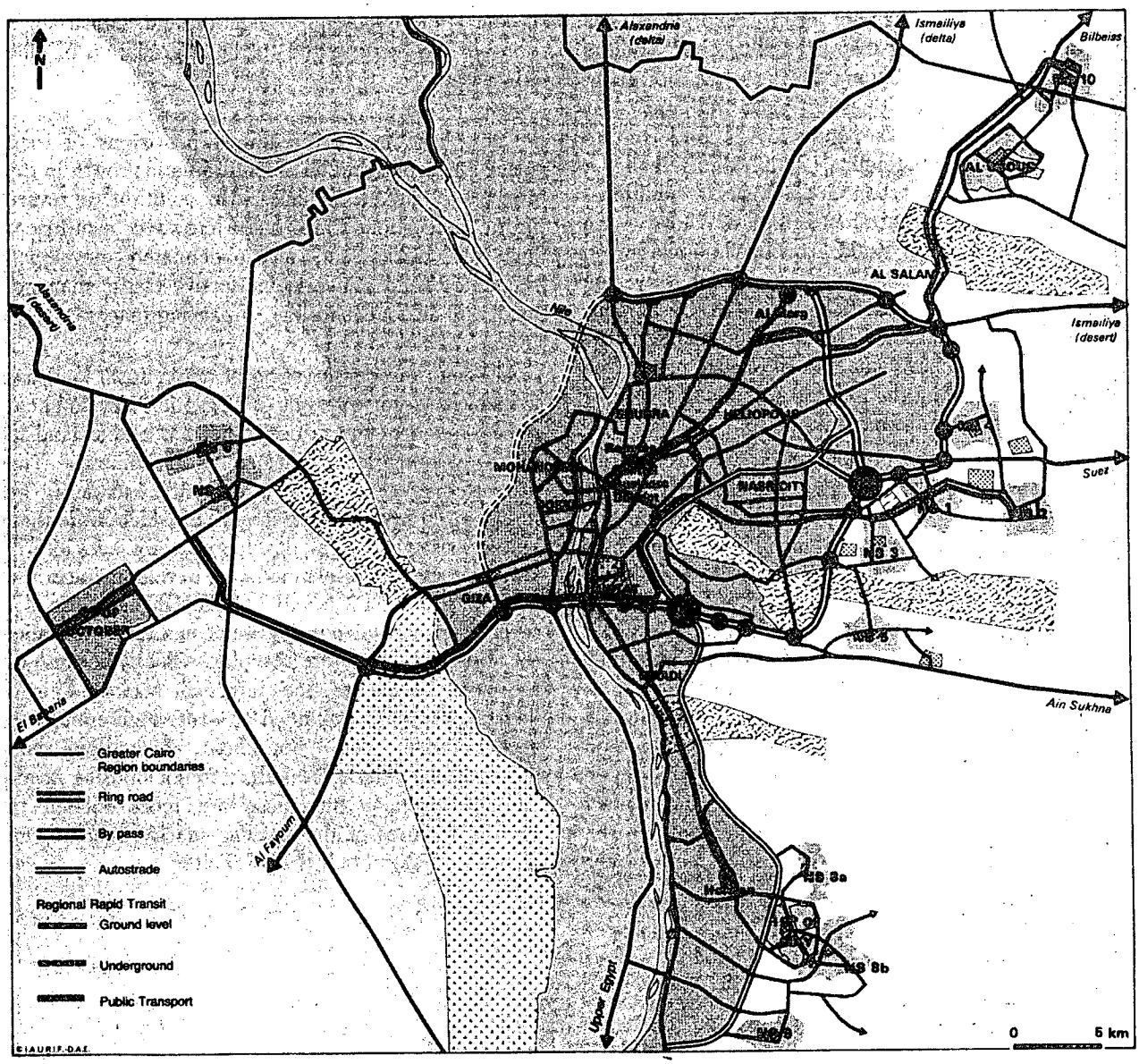
INTRODUCTION

Cairo, the capital of Egypt, is the largest city in Africa and the Middle East. As of 1986, nearly 10 million inhabitants were living in the Greater Cairo Region, which includes the Governorate of Cairo, the cities of Giza and Imbaba in the Governorate of Giza on the south-western bank of the Nile River, and the city of Shubra Al Kheima in the Governorate of Qaliubiah on the north-eastern bank (see map). By the year 2000, Cairo's population is projected to reach 17 million inhabitants. It is estimated that it will be necessary to accommodate 350,000 additional inhabitants, or the equivalent of one new town, each year. The extremely rapid growth of population in the Greater Cairo Region has resulted in very high average population densities, about 40,000 persons per square kilometre. In some of the older districts, such as Rod El Farag and Bab El Sharia, population densities are among the highest in the world, at over 100,000 persons per square kilometre.

Cairo's high rate of population growth has contributed to severe shortages of essential services. About 20 per cent of Cairo's population, mainly on the periphery, has no access to piped water and uses substitute sources such as canals, wells and public water fountains. Whereas the average per capita supply is about 300 litres daily, because of huge water losses resulting from leaking and broken pipes, only about half of that supply reaches the consumer. Projects undertaken in the past decade to improve Cairo's sewerage system have focused mainly on resolving system problems and improving services in areas currently included in the system; meanwhile, lower-income groups in informal settlements on the periphery remain unserved by existing waste-water systems. Cairo has serious air pollution, mainly from motor vehicles, but also from factories to the north and south of the city centre. Although the law prohibits discharge of waste water into the Nile, urbanization, irrigation, navigation and industrialization all have contributed to the degradation of Nile River water.

Cairo has one of the lowest provisions of road space per capita and has seen dramatic growth in the number of private vehicles. In addition to severe traffic congestion, Cairo has a crowded, insufficient bus and tram fleet, an inadequately developed secondary road network, ineffective traffic management and an acute shortage of parking spaces.

Although the conservation of agricultural land has long been a corner-stone of Egyptian development policy, much of the critically needed arable land in Cairo is being lost to urban encroachment. The urbanized area of Cairo is currently increasing by nearly 1,200 hectares per annum, of which more than half consists of illegal development on agricultural land and the rest is planned new development in the desert. Although it is widely believed that there is a severe shortage of housing units in Cairo, in reality the situation is far more complex. Chiefly because of the contribution of the informal sector, Cairo's housing stock has expanded at a rate high enough to accommodate new household formation and in-migration. There are indeed major housing needs among Egyptians but these are more related to specific features of the housing market than to the inability of households to find shelter.



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Source: "The Greater Cairo Master Scheme," *Les Cahiers de l'I.A.U.R.I.F.*, No. 75, March 1985, Paris, France.

I. DEMOGRAPHIC CHARACTERISTICS

A. Population growth

From an estimated population of around 600,000 inhabitants at the end of the nineteenth century, Cairo's population surpassed 1 million inhabitants by 1927, 2 million by 1947 and 3 million by 1960. Whereas Cairo's population growth averaged between 1 and 2 per cent per annum up to the early 1930s, its growth rate subsequently doubled, averaging around 4 per cent in the early 1960s (Egypt, 1982). Cairo's population growth declined, however, to below 2 per cent in the early 1970s—probably because of the large number of migrants working abroad and the fertility-depressing effects of stagnant economic conditions during the war years (1967-1973).

During 1976-1981 Cairo experienced rates of net in-migration that were approximately 50 per cent lower than the average during all previous intercensal periods since the Second World War. The decline was unanticipated, is poorly understood and has been little publicized. Vining (1985) has postulated that Cairo may provide the sole example of absolute diseconomies of urban scale and density leading to a reversal or slow-down of coreward migration independent of national economic development. One possible explanation is the fact that, as the most densely populated large urban area in the world, congestion costs and environmental degredation may have reached a point where economic productivity is no longer enhanced by location in the Cairo region. Also, population density is perhaps high enough throughout the Nile Delta to provide the kinds of population agglomerations necessary for modern industry (Vining, 1985). Finally, the decline in the rate of in-migration to Cairo is explained in part by the more rapid decline in the rate of natural increase there than in the rest of Egypt.

According to preliminary results of the 1986 census, nearly 9 million inhabitants (8,762,000)—excluding some 95,000 daily commuters—were living in the Cairo metropolitan area, an almost continuously urbanized area that is comprised of Cairo City, Giza City, Markaz El Giza and Shubra Al Kheima City; nearly 10 million inhabitants were living in the Greater Cairo Region (GCR)[1], which encompasses a number of small rural towns and agricultural villages in Giza and Qaliubiah Governorates (Central Agency for Public Mobilization and Statistics (CAPMAS), 1987a).

Regarding population redistribution within GCR, the pace of urban growth in the three governorates has been quite different. Whereas the city of Cairo was the initial growth pole, its growth spilled over into agricultural areas in Cairo Governorate, then into Giza Governorate, and then to Qaliubiah Governorate. Whereas Cairo grew by an average annual rate of about 4 per cent in the 1960s, Giza City grew by about 7 per cent and Shubra Al Kheima City (in Qaliubiah Governorate) by about 10 per cent. Cairo's population was growing by a little over 3 per cent per annum during the early 1980s, whereas Giza City grew by over 5 per cent and Shubra Al Kheima City by about 8 per cent (Egypt, 1982).

As for population changes in the smaller administrative units, there was an absolute decline in the population of Cairo's oldest residential neighbourhoods after about 1960 and a somewhat later decline in the growth of residential areas adjacent to the centre (e.g., Heliopolis). Factors accounting for the decline were changes in use from residential to office or commercial use and the collapse of old buildings due to lack of maintenance. At the same time, peripheral areas expanded rapidly. Three *qisms* on the periphery (Mataria in north-eastern Cairo, Boulak Al Dakrour in western Giza and Shubra Al Kheima in Qaliubiah Governorate) gained more than 200,000 inhabitants each during the intercensal period, more than doubling their population size, whereas three other *qisms* and one *markaz* on the periphery gained between 100,000 and 200,000 inhabitants each (Egypt, 1982).

According to statistics issued by Cairo Governorate, Cairo's crude death rate was estimated to be 7.3 per thousand in 1986. Average life expectancy at birth was 60-65 years for males and 63-68 years for females. The major causes of death were diseases of the digestive, respiratory and circulatory systems, followed by accidents. The infant mortality rate was estimated by officials of Cairo Governorate to be 42 per thousand live births in 1986.[2] The crude birth rate was estimated to be 30.6 per thousand in 1986. Average household size in Cairo Governorate was 4.4 persons per household.

B. Migration

Because of natural increase, pressure on limited cultivable land and lack of employment opportunities, migrants have been leaving Egypt's rural areas for Cairo for more than a century. Between 1935 and 1965, migration was the major component of population growth in GCR, explaining 65 per cent of total population growth (Egypt, 1982). With economic stagnation between 1965 and 1973, and large-scale migration abroad after 1973, net migration made up only 10 per cent of the city's total population growth in the 1966-1976 intercensal period. Since the late 1970s, migration towards GCR appears to have resumed.

Cairo Governorate is the main recipient of this migration (1,233,000 during 1966-1976), but also is the major supplier of outward migrants to other regions of Egypt (275,000) (Egypt, 1982). Giza Governorate is also a favoured destination for new migrants (234,000). However, the most striking feature of migration within GCR is the overspill of the city of Cairo into the city of Giza, which provided nearly half of the total in-migrants to Giza Governorate during 1966-1976. Qaliubiah Governorate has experienced both significant in-migration from the Delta and out-migration to industrial areas along the Ismailia Canal outside GCR.

In regard to the origins of migrants, the bulk of migration to GCR has been from villages in the Nile Delta, followed by places in Upper Egypt. Delta village migrants move primarily in family groups, whereas migrants from Upper Egypt are mainly unaccompanied males who either remain single or leave their families behind in their villages (Khalifa and Mohieddin, 1988). Staying at first with relatives, migrants tend to settle in the oldest, most densely populated *qisms* in central Cairo or in peri-urban villages that closely ressemble their native rural villages. There are significant occupational differences between migrants from the Delta and those from Upper Egypt, with the former pursuing a variety of occupations and the latter mainly engaged in domestic and personal service and in construction (Khalifa and Mohieddin, 1988).

Regarding the impacts of international labour migration, unlike the situation in a number of developing countries, where international migration precipitated strong rural-urban migration, research has indicated that the overwhelming majority of return migrants in Egypt have gone back to their villages and that their contribution to internal migration has been small. Indeed, it has been argued that, in the case of Egypt, international migration probably reduced internal migration because remittances received by rural families lessened the need for out-migration (Findlay, 1987). However, with the drying-up of employment opportunities in the Gulf countries, it is possible that Cairo will receive larger migration flows in the future.

C. Population projections

Cairo's first master plan, which was prepared in 1953, greatly underestimated demographic growth, projecting a population of only 5.5 million inhabitants by the year 2000. The 1970 Preliminary Master Plan of the Greater Cairo Area, which outlined the regional limits for GCR, identified three alternative target figures—11 million, 13.3 million and 16 million inhabitants by 1990. The medium variant, which was the target chosen, was based on the assumption that the average rate of net in-migration into Cairo would be 1.2 per cent per annum—a rate that in retrospect was clearly too low.

Several sets of population forecasts—e.g., made by CAPMAS, the World Bank, the United Nations—were evaluated in the National Urban Policy Study (NUPS). In its preferred strategy, NUPS projected the urban population of GCR to be 16.5 million by the year 2000 (Egypt, 1982). This figure excluded three small towns in agricultural areas but included new communities that were outside the official boundaries of GCR (e.g., Sadat City, Tenth of Ramadan). The National Population Council projects Cairo's population to reach 17 million by the year 2000.

II. THE ECONOMY

A. Historical background and development of the city's economic base

Although Cairo itself may be only about one thousand years old, parts of the metropolis are considerably older. Al Fustat, the first Muslim settlement in Egypt, which was built in A.D. 649, was joined in 1187 with three other settlements—Al Askar, Al Qatai and Al Qalina—to form pre-modern Cairo. Controlled by the Mamluks from 1250 to 1500, Cairo was conquered by the Turks in 1517 and entered a period of protracted decline, becoming essentially a backwater of the Ottoman Empire. Following a brief period of rule by Napoleon, who made Cairo his headquarters in 1798, Cairo's population rose up against the Turks. Under Viceroy Mohammed Ali (1805-1849), Cairo experienced rapid change, although the boundaries of the city were not fundamentally altered.

After about 1850, there was a sustained influx of foreigners into Cairo. Khedive Ismail (1863-1879), who sought to transform Cairo into a modern European-style city, commemorated the opening of the Suez Canal in 1869 by building new districts, using rectilinear, grid and radial plans, and constructing parks, wide streets and free-standing structures. Following a popular rebellion, the British occupied Cairo in 1881. During the period of British rule, a number of new suburbs (e.g., Garden City, Zamalek) were developed for foreigners and affluent Egyptians. Meanwhile, the old city, which contained nearly half of Cairo's population, was increasingly neglected.

Cairo experienced a major construction boom at the turn of the nineteenth century. A number of new elite areas were developed along the Nile. Heliopolis, a planned satellite city built under the guidance of a Belgian entrepreneur, Baron Empain, expanded rapidly after the introduction of electric tramways, which linked it to the central city. Built on desert land, Heliopolis has been considered to be a prototype for Egypt's modern desert cities. The construction of bridges across the Nile also promoted development of the north-eastern suburban area. Gradually, Cairo's more affluent residents moved out to these newer areas, leaving the central areas to the lower classes. With the increasing neglect of the old city and the gradual diversion of commercial activity to the wider paved streets of modern Cairo, the old and new cities became increasingly isolated and distinct (The Aga Khan Award for Architecture, 1985).

Cairo received an influx of rural-urban migrants after the First World War. During the 1920s and 1930s, the foreign community and Cairo's more affluent residents prospered and a new middle class began to develop. Cairo's poor became increasingly alienated, however, particularly after the Second World War. Following the 1952 revolution led by Nasser, the upper class was removed from power. Under President Nasser, the Government's policies focused chiefly on national economic and social development. Cairo was left with minimal budget allocations—at a time when its population doubled (from 3 million to 6 million) in less than 20 years (The Aga Khan Award for Architecture, 1985). The Government gained increasing control over industry, beginning with a series of nationalizations of private enterprises.

During the 1970s, under President Sadat, Cairo experienced another shift in economic policy. The Government's new strategy, called *Al-Infitah*, aimed at improving the efficiency of the public sector and liberalizing the economy, mainly by seeking increased foreign investment and giving a greater role to the private sector. During the decade 1974-1985, the economy grew rapidly, by 8 per cent per annum, stimulated by a large increase in foreign earnings from oil exports, workers' remittances, Suez Canal earnings, tourist receipts and foreign aid (World Bank, 1989).

Major developments in establishing Egypt's current industrial base took place after 1920, when Misr Bank began to grant loans to private industrial investors. Industrial establishments were highly concentrated in Cairo and Alexandria, and both cities developed a widely diversified industrial mix. After the Revolution of 1952, the Government's major efforts were directed towards introducing new types of industries and dispersing some industrial activities away from Cairo and Alexandria. The industrial stategy of the 1950s and early 1960s shaped to a great extent the present map of industrial Egypt. According to the Planning and Development Collaborative International (PADCO), which is based in Washington,

D.C., most Egyptian investment during the 1970s was allocated to the upgrading, expansion and renovation of already established industries (PADCO, 1982).

Cairo currently has a diversified economic base. As of 1976, Cairo accounted for 38 per cent of the nations's total manufacturing employment, 50 per cent of private manufacturing employment and more than 60 per cent of the nation's artisans (PADCO, 1982). The most dominant shares of industrial employment in Cairo are food processing, spinning and weaving, iron and steel and metallurgical industries. In Giza, the most dominant sectors are food processing, followed by tobacco and spinning and weaving. In Qaliubiah, spinning and weaving are by far the dominant activity, followed by the ceramic and construction industries (PADCO, 1982).

B. Recent performance of the economy

By the early 1980s, Egypt's economy was chiefly dependent on revenues from oil exports and repatriations from workers in the Middle East. With the fall in world oil prices and the reduced flow of remittances from abroad after 1982-1983, the country faced a difficult economic situation. In spite of the decline in foreign exchange earnings, overall economic growth was maintained at a 6-7 per cent level for another several years, but at a cost of a rapidly worsening balance of payments deficit and a sharp increase in foreign debt (World Bank, 1989). The difficult debt situation (with total foreign debt equivalent to over 100 per cent of GDP) led to a major debt rescheduling in May 1987. The economy recovered slightly in 1988, with GDP growing by about 3 per cent and the balance of payments deficit not worsening any further (World Bank, 1989).

In recent years, the Government made a number of significant policy changes aimed at reducing its traditional high level of subsidies. Between 1986 and 1989, for example, gasoline prices were increased by some 220 per cent. Electricity tariffs and fuel oil prices were increased significantly. The Government also increased taxes on many goods and services and made efforts at improving tax administration. As a recent World Bank report noted, these changes point in the right direction; however, they also reflect the very serious dilemma the Government faces today between the urgent need to adjust the economy and the necessity to maintain social and political stability, a task not made easier by the enormous distortions and disequilibria that have accumulated over the last three decades, as well as by the considerable worsening of the terms of trade (World Bank, 1989).

C. Spatial structure of the metropolitan region

Cairo was born on the east bank of the Nile River. Cairo's built-up area expanded steadily beyond its original Islamic core, the so-called traditional or medieval city. Until the early decades of the nineteenth century, this core was no more than 5 square kilometres in size. By the end of the century it had trebled to 15 square kilometres. Quarters adjacent to the Islamic core filled up and new quarters to the north, north-east and west began to grow in the second half of the nineteenth century. As the river was brought under control and the river-side marshes drained, the city gradually spread towards the west, completely filling in the land between the Citadel and the river with modern quarters in European style, and moving the centre of the city steadily westward (The Aga Khan Award for Architecture, 1985).

After the construction of bridges across the Nile, the city developed on the west bank in Giza, in particular along the 8-kilometre Pyramids Avenue, which dates from 1869. By 1920, Cairo had expanded around the Islamic core in three directions (west, north, and south) and covered an area of approximately 30 square kilometres. This rapid expansion over an area nearly six times the original medieval core was aided by the introduction of tramways, beginning in 1896. With the increase of population, quarters began to extend to the north and to the south, stretching the city into a very elongated shape.

The three decades following 1950 witnessed the trebling of Cairo's population and the more than doubling of its built-up area from less than 100 to 220 square kilometres. Major new districts were created, notably Nasr City to the east of the old Islamic core, Mokattam City to the south-east and New Maadi to the east of old Maadi. During the 1960s, which was a decade of exceptional demographic growth, the strongest population push took place in the periphery on agricultural land. In the 1970s, peripheral districts continued to expand and a number of new high-rise areas were developed in the centre. Across the Nile, the city of Giza extended westward to the Pyramids and northward to Imbaba, incorporating several villages, and adding an additional 100 square kilometres to Cairo's land area (The Aga Khan Award for Architecture, 1985). As Giza became the

major recipient of Cairo's population spill-over, new districts were developed such as Mohandissin, which was designed as a single-family dwelling area in the 1950s and was turned into a high-rise area in the 1970s. To the north of Cairo, the area between Shubra and rural Qaliubiah (known as Shubra Al Kheima) filled up with industrial and residential functions, adding another 30 square kilometres to Cairo's area in the process.

Currently, Cairo is divided into five major regions or sub-cities: the northern, eastern, central, western and southern cities. The northern city, which is the largest, has experienced phenomenal growth, in part because of its proximity to the Delta villages which have supplied the largest share of migrants (Khalifa and Mohieddin, 1988). To the south, the residential district of Maadi has become an important secondary pole. Still farther south, the industrial pole of Helwan (originally a winter resort) has become an important regional centre. The central city, or old Islamic core, has been losing population both in absolute and in proportional terms and now comprises less than 10 per cent of Cairo's total population, although its density is still as high as 90,000 inhabitants per square kilometre. The eastern city, which has been absorbing the spill-over population of the Islamic core as well as recent rural migrants, includes the cemeteries of Cairo (referred to in foreign sources as the City of the Dead), whose population is estimated to be in the range of from 250,000 to perhaps as many as 1 million inhabitants (The Aga Khan Award for Architecture, 1985). The authorities have recognized this *de facto* situation and have extended some municipal services, including water, electricity, schools, bus lines and even a police station to the City of the Dead. The western or downtown city has become increasingly commercialized over the past several decades as it has steadily lost residential population. The central business district has moved steadily westward, as new satellite centres across the Nile, such as Dokki, Abbassia and Mohandissin, have absorbed many of the functions of the original central business district.

D. The sectoral and spatial distribution of jobs

According to the 1976 census, the dominant economic sector in Cairo was services (34.2 per cent), followed by manufacturing (26.9 per cent) and trade (14.8 per cent). In Giza and Shubra Al Kheima, 21.2 and 48 per cent, respectively, of the active population was in the manufacturing sector (PADCO, 1982).

In regard to the spatial distribution of manufacturing jobs, basic consumer industries, such as clothing, leather and shoes, and wood and furniture, are mostly located in the city core. Industrial activities within the core specifically, and throughout the city generally, are typically small scale, with three or four employees being common. Basic intermediate industries such as printing and publishing and iron and steel products are located in Helwan and Massara; construction materials such as glass are located in Cairo; cement and gypsum in Helwan, Tura and Tebbin and red brick and metallic industries in Nasr City. Basic capital goods industries, such as electric and non-electric machinery, transport equipment such as vehicles, wagons and car assembly, are located in Wadi Hof (PADCO, 1982). Commercial activities are generally located along the major axes. The main commercial centres are the central business district, in which most banking and service industries are concentrated, and, to the east of this area, Mouski, in which most of the traditional trades are located.

Within GCR, industries tend to be relatively specialized and concentrated by sector. For example, tobacco production is concentrated in central Giza. Industries producing chemicals, construction materials and metals are concentrated in Sakkiet Meki, food processing in south Giza, textiles and chemicals at Imbaba and equipment and maintenance along the Alexandria Desert Road. Industries specializing in textiles and basic metals are concentrated in Shubra Al Kheima (PADCO, 1982).

E. The city in the regional and in the national urban context

Egypt's current population of 52 million inhabitants live on 4 per cent of the country's land area. A high proportion of the population—nearly 45 per cent—live in cities, with approximately 40 per cent of the total urban population living in Greater Cairo alone. By the year 2000, Egypt's total population will be at least 69 million (United Nations, 1989). There is some scope for increasing rural absorption as a result of land reclamation schemes and more labour-intensive production on existing arable land. Clearly, however, the great bulk of Egypt's future population growth will be accommodated in its cities.

Almost three fifths of the urban population increase is likely to be accommodated in Greater Cairo and in Alexandria. Alexandria is Egypt's largest port. With both a diversified industrial base (about one third of national industrial employment) and well-endowed urban capital stock, Alexandria has the greatest potential for competing with Cairo in absorbing population. It has some physical constraints on development (e.g., the linear shape of the city, the land reclamation schemes to the south-east), but these are not insuperable.

The canal region has the locational advantage of proximity to Cairo and to the Delta region and the economic and social advantage that further urban development is feasible without consuming agricultural land. Suez City functions as a secondary major industrial centre and as a trans-shipment point. Port Said is continuing to grow as a secondary port, free zone and service centre, while Ismailia has potential as a major service centre. The potential of the region for absorbing urban population at an above average rate depends heavily on Suez City, since the other cities are falling behind their master plan projected growth rates. The canal cities continue to suffer from severe service lags in spite of heavy infrastructure investment in the past. Their growth is also jeopardized by inadequate water resources because of additional demands on the Ismailia Canal for irrigation and other urban development.

As for Upper Egypt, development in the medium term is hampered by its poor interregional transport network, deficiencies in telecommunications and the narrow economic bases of the candidate cities. The best options for development are probably Qena/Naga Hamadi, Asyut (expanding its role as the dominant urban centre in Upper Egypt) and Aswan (in spite of the limited success of past regional development efforts) (PADCO, 1982).

As for the Delta cities, NUPS emphasized the need to address the special growth management problems of the Delta—a zone that had been seriously neglected in urban planning and overt urban policy design. NUPS noted that the overwhelming size of Cairo and its associated service and management problems had diverted attention from the relatively uncontrolled growth of Delta cities and the substantial build-up of the corridors of Cairo/Benha, Tanta/Damanhour and Kaft El Dawar/Alexandria. During the period 1960-1976, Delta cities of over 50,000 inhabitants grew more rapidly than the Cairo Metropolitan Region. Delta cities in general had no horizontal expansion possibilities except on arable land. The danger of prime land loss was exacerbated by the fact that the existing industrial base and location of Delta cities was such that they had substantial economic potential and were likely to be attractive as locations for industry. Given the urgency of the problem, NUPS recommended a moratorium on all industrial, institutional and housing projects outside the city boundaries (PADCO, 1982).

III. DECENTRALIZATION AND LOCATION

A. THE EVOLUTION OF SPATIAL STRATEGIES

Cairo has a long history of planned urban development. Over the past century, the new communities of Nasr City, Garden City, Maadi and Heliopolis were developed, with the latter two being planned as satellite cities, separated from the urban mass of Cairo (PADCO, 1982).

Cairo's first master plan, which was issued in 1956, closely followed the traditions of British town and country planning in that it was based on the concepts of optimal city size, containment, development standards for new growth and long-range planning to guide and control development. As typical of many of the early master plans prepared for developing country cities, the plan greatly underestimated Cairo's future demographic growth, projecting a population of only 5.5 million inhabitants by the year 2000 (The Aga Khan Award for Architecture, 1985).

Among its major legacies, the plan recommended development of a new government centre, Nasr City, to the north of the city outside the central business district. Constructed during the 1960s on 630 kilometres of vacant desert land along the airport road, Nasr City had a population of about 75,000 in 1980 and is the site of a number of ministries and important government institutions (e.g., the National Planning Institute, the Central Agency for Public Mobilization and Statistics). Perhaps the plan's most damaging legacy was its recommendation to construct a number of industrial sub-centres—Helwan, Shubra Al Kheima, Imbaba and Giza—in order to absorb rural-urban migrants and thereby contain Cairo's growth. With hindsight, promotion of these industrial centres—which absorbed 50 per cent of all industrial investment under Egypt's first five-year plan—clearly accelerated development on agricultural land and ultimately enhanced the dominance of GCR (The Aga Khan Award for Architecture, 1985).

Cairo's second master plan, the Preliminary Master Plan of the Greater Cairo Area, was drawn up by the Greater Cairo Planning Commission between 1965 and 1970 (and was approved by a Special Consultative Committee in 1971 and by Ministerial Decree in 1974). The plan retained a number of concepts from the 1956 master plan, namely, assigning Cairo an optimal size and containing the city by means of a ring road. However, the plan broke new ground by introducing the concept of a Greater Cairo Region and by recommending the construction of planned cities in the desert.

In 1973, a Presidential working paper formally supported the idea of constructing new cities in the desert as a means of conserving arable land and promoting the decentralization of Egypt's urban population. The policy was temporarily suspended, however, after the 1973 war and priority was assigned to reconstruction of towns in the canal zone. Once reconstruction was under way, the problem of over-concentration of population in Cairo once again became a pressing issue. In 1975, planning began for two new towns designed to accommodate 500,000 inhabitants each: Tenth of Ramadan City (located 60 kilometres from Cairo, half-way between Cairo and Ismailia); and Sadat City (located 75 kilometres from Cairo, half-way between Cairo and Alexandria). In 1977, planning commenced for New Ameriyah City (located 50 kilometres south-west of Alexandria), which had a target population of 500,000 and was designed to ease the urban pressures on Alexandria.

Later, a decision was made to plan a number of new towns as satellite cities in the Cairo Metropolitan Area. These cities were planned to be smaller than the free-standing cities mentioned above and to be more closely integrated with Cairo. Fifteenth of May, a satellite city for 150,000 designed to serve as a dormitory town for the Helwan industrial area, was launched in 1979 (although considered a satellite city because it is situated adjacent to the present boundary of the urbanized area, it is more akin to a new settlement). In the same year, the Government's commitment to the new towns policy was formalized by the creation of a New Urban Communities Authority and by the allocation of £E 384.2 million. Planning subsequently commenced for Sixth of October City (located 30 kilometres west of Giza, with a target population of 500,000), Al Amal City (located 40 kilometres east of Maadi, with a target population of 150,000), El Obour City (located 20 kilometres east of Heliopolis, with a target population of 500,000; and Salaam City (with a target population of 200,000), under construction by the Cairo Governorate.

Each of the desert cities was planned according to a hierarchical organization. The neighbourhood was the lowest unit, consisting of about 1,000 dwellings (for 4,000-6,000 inhabitants), with a primary school, a local mosque and a neighbourhood centre. Neighbourhoods were grouped in communities or districts of between 35,000 and 50,000 inhabitants, each providing higher-level services (e.g., a secondary school, health clinics, a police station). In general, roads and other infrastructure networks reflected standards in Europe. To promote the growth of the desert cities, the government utilized a number of incentives, including doubled salaries for government workers, rent subsidies for both industrial and residential units and tax holidays (e.g., 10-year tax exemptions) for new industries.

In the process of reconstructing the canal cities and planning for the new desert cities, the Chairman of the Advisory Committee for Reconstruction, Abdel Hai, was among the first in Egypt to recognize the need for an overall urban policy that not only could guide Egypt's spatial planning but also could be a means of bringing together the various agencies involved in urban development. With financial assistance from the United States Agency for International Development (USAID), the National Urban Policy Study was launched in June 1980. Carried out by PADCO and two Egyptian firms, the ECG Engineering Consultants Group and Sherif El-Hakim and Associates, the final report was submitted to the Government in July 1982.

NUPS was based upon the review of virtually all current major spatial and sectoral plans, as well as hundreds of interviews with government and private officials and extensive field work. It considered four alternative settlement strategies in arriving at a recommended strategy. Summarizing its major points, NUPS concluded that the most decentralized strategies would involve prohibitive costs. The report cautioned that Egypt's recent high economic growth rates might not continue in the post-1985 period. Hence, NUPS recommended an emphasis on economic growth through exploitation of the powerful economic potential of the Cairo region. Due to Cairo's existing industrial base and the relative ease with which it could expand on desert land, NUPS concluded that Greater Cairo provided the greatest opportunity for industrial growth and employment from which complementary growth in other regions could be launched (PADCO, 1983).

The report emphasized that, however undesirably perceived, the growth of Cairo could not be stopped in the foreseeable future, and certainly not in the next 20 years. Consequently, the key issue in the growth of GCR was not how to stop it, but how to manage it. NUPS emphasized that whereas the present directions of contiguous urban growth were primarily on the north/south axis, which was causing significant loss of some of the most highly productive arable land in the nation, Greater Cairo had virtually unlimited physical expansion possibilities to the east and west on to nearby desert land. In the past, the primary constraints to development of these areas had been the lack of infrastructure and ownership of large tracts of desert land by the military and other public and quasi-public groups. *Qisms*, such as those in the Maadi, Helwan/Tura/Tebbin areas and in the Nasr City and Heliopolis areas already had access to infrastructure and had developed as secondary commercial centres. Through infill of these *qisms* and complementary desert fringe area development, additional industrial and population growth could be accommodated without the additional expense of interregional infrastructure. Moreover, the continued development of these areas would provide alternative locations for firms located in the congested core area. Since these areas were already partially developed, they could provide immediate locations for population absorption if low- and middle-income residential sites were made available.

NUPS also encouraged the growth of close-in satellite cities. The report emphasized that Sixth of October and El Obour satellite cities provided good medium-term growth areas for GCR.[3] Located in the western and eastern deserts, respectively, they could benefit from growth that had already occurred in the Giza Plateau area and in north-eastern Cairo. Sixth of October was located where it could relieve growth pressure in the congested Boulac and surrounding Delta areas while benefiting from linkages with Alexandria via the desert road. El Obour was a natural expansion area of the El Khanka industrial area. Its early development would make future development of Tenth of Ramadan more feasible and generally strengthen the development potential of desert land between Cairo and the Suez Canal.

The two satellite cities provided a medium-term growth option primarily because they were distant enough from the region's existing built-up area to require interregional infrastructure (roads, water and electricity). At first, NUPS noted that it might be necessary to provide incentives to low- and middle-income groups to locate in the two satellites at least

until surrounding areas had been developed to provide necessary services and secondary employment opportunities.

In a somewhat controversial step, NUPS recommended that further development of the free-standing new towns be postponed until substantial modifications were made in their planning. The report noted the following:

> "World-wide experience has shown that free-standing new towns need other forms of attraction to be successful such as a new government capital (Brasilia) or military bases, universities and port-trading facilities; but even with these elements the successes have been few and growth rates lower than planned. The free-standing new towns of Tenth of Ramadan, Sadat City and New Ameriyah City do not have these advantages and are too far away from the center city to attract major industrial development activities, without very substantial public subsidy, within the next 20 years."

Although Tenth of Ramadan's location between Cairo and Ismailia provided it with a good longer-term development potential, NUPS emphasized that its current standards would make it extremely difficult and costly for it to reach its projected population target of 500,000 by the year 2000. Increasing densities and reducing the physical standards of infrastructure would make the new town more affordable to its future residents and reduce the need for ongoing subsidies. Even with these modifications, however, development of new towns was more costly than contiguous urban growth. NUPS therefore suggested that Tenth of Ramadan's first stage population target of 150,000 should be adopted as its 2000 target figure.

Sadat City's location was considered to be even more problematical as it was located too far from either Cairo or Alexandria to benefit from their agglomeration economies. NUPS emphasized that major efforts would be necessary to attract industrial and population growth. At best, because of its location, Sadat City offered post-2000 growth potential. By then, supporting desert development in western Cairo (e.g., the Sixth of October area) and the Ameriyah area of Alexandria would have occurred to support Sadat City growth.

Regarding development costs and standards, NUPS noted that the costs of constructing new towns were significantly greater than the costs associated with contiguous urban development. The New Communities Authority's estimated cost for the period 1986-2000 for Sadat City, Tenth of Ramadan, Fifteenth of May, and Sixth of October was approximately £E 3,519 million. This represented about 22-30 per cent of the total capital investment for intra-urban infrastructure allocated for the entire Cairo region over the 1986-2000 period. The New Towns would therefore require a very large proportion of the capital available for urban investment over the period, while producing a minimal return with regard to absorbing population growth. As the NUPS report cautioned, "the risks involved in the building of new towns are consequently enormous" (PADCO, 1982).

The report noted that development costs could be alleviated somewhat by good financial and management practices, including the need for incremental development, unlike the situation in Sadat City, for example, where much of the infrastructure and main roads were completed before the completion of even one urban neighbourhood. The report also emphasized the need for better cost recovery; reduction of infrastructure standards and increases in residential densities to reduce per captita costs; increases in land use efficiency; reduction of community facilities, costs and standards; and reduction of the cost and amount of publicly-built housing.

It is somewhat difficult to assess the legacy of NUPS. There was considerable disagreement among Egyptian officials over some of the major policy recommendations (particularly in regard to the development of Tenth of Ramadan and Sadat City), and the study did not receive the Government's stamp of approval. However, parts of the recommendations were adopted by the Government. Standards for the new towns were reduced (because of the persuasive argument that only 2.5 out of a projected 60 million inhabitants by the year 2000 would be served by facilities that represented a very large share of the urban development budget), and the decision was made to give priority to the close-in satellite cities and to reduce emphasis on the remote regions. NUPS's legacy was also reflected in budgetary allocations and in an increasing emphasis on development by the private sector.

At virtually the same time that the USAID-supported NUPS was being prepared under the aegis of the Advisory Committee for Reconstruction, the General Organization for Physical Planning (GOPP) within the Ministry of Development, New Communities and Land Reclamation was beginning preparations for a new master scheme, with technical assistance from the Institute for Development and

Urban Planning of the Greater Paris Region (l'Institut d'amenagement et d'urbanisme de la region d'Ile-de-France/l'IAURIF) and the French engineering firm, Omnium technique de l'urbanisme et de l'infrastructure (OTUI). Regarding co-ordination between the planning teams, the structure plan prepared by PADCO for GCR was more or less adopted by the French team (although they made some changes in the ring-road concept). Although there was no formal inter-agency co-operation, there was a great deal of informal contact between the two groups.

B. Current spatial strategies

Cairo's 1983 Master Scheme, which is nominally still in force, does not break with past policies. Among other things, the plan seeks: to limit the growth of population in GCR by halting the destruction of agricultural areas; to stop the radial development of the agglomeration by means of a ring road and non-contiguous new settlements; to improve the living conditions of Cairo residents through a more efficient public transport policy; to implement a better industrial location strategy; to protect Cairo's archeological and historical heritage; to protect water resources; and to control pollution (*IAURIF*, 1985).

Under the Master Scheme, development of the new towns and satellite cities will continue. The targets, however, have been scaled down and they are expected to absorb a total of only about 900,000 inhabitants by the year 2000—instead of their theoretical capacity of 1.9 million inhabitants. The residual population that cannot be absorbed by the new towns and satellite cities will be absorbed in what are termed new settlements. One of the major innovations of the Master Scheme is that the new settlements are designed to absorb almost 2 million inhabitants in the desert, thereby alleviating much of the risk to agricultural areas. The bulk of the new settlements, with nearly 1 million inhabitants, will be located to the east of the agglomeration in the Suez, Bilbeis and Ain Sukhna Road corridors. The second largest number—containing a total of about 500,000 inhabitants—will be located between Sixth of October satellite city and the Alexandria desert road. The remaining 300,000 inhabitants will be absorbed in new settlements located in the south around Fifteenth of May satellite city.

The new settlements are conceived as partially self-sufficient communities for a target population of 250,000 inhabitants each. They are expected to receive residual population which cannot be absorbed by the new towns, the satellite cities, or by infill within the urban agglomeration (in this sense, they offer a development alternative in the medium term). They differ from the new towns and the satellite cities in several respects. They are smaller and are physically and functionally tied to the urban agglomeration; moreover, they are located near existing residential and employment zones (to provide employment and a sufficient range of services in the short term). The new settlements are expected, however, to eventually develop an autonomous employment base in order to limit daily commuting and to foster the integration of different social groups. Over time, groups of from four to eight new settlements are expected to be linked together, with one of the settlements (or a satellite city) functioning as the central community for the provision of services.

One of the basic aims of the new settlement concept is to obtain a massive effect on the agricultural land market by creating a supply of urban land in the desert that will be highly attractive to low- and medium-income developers who currently reside in informal settlements on agricultural land. In this manner, private savings can be mobilized to finance land development. This would imply development standards similar to those observed on the private informal housing market and land prices roughly equivalent to those on the agricultural fringe.

A second major concept in the Master Scheme is that of development corridors, which link the Greater Cairo agglomeration with other economic regions of Egypt. The development corridors provide a structure for the regional integration of the new towns and new settlements with the Greater Cairo agglomeration. The absorptive capacity of the El Obour/Bilbeis corridor, whose development pole is the satellite city of El Obour, has been estimated at 240,000 inhabitants for El Obour and 125,000 for the new settlement that will be located beyond El Obour. The Suez Road corridor, which starts at the Cairo International Airport and heads in the direction of the new town of El Badr, will contain three new settlements designed to absorb 500,000 inhabitants. The Ain Sukhna road corridor, which is the site of the new town of El Amal, will contain two new settlements with a total population of 360,000 inhabitants by the year 2000. The Maadi/Helwan corridor to the south will absorb 150,000 inhabitants in the Fifteenth

of May satellite city and 300,000 inhabitants in two planned new settlements. The Alexandria desert road corridor, which hinges upon the satellite city of Sixth of October and, to a lesser extent, upon Sadat City, will absorb 250,000 inhabitants in Sixth of October City and 500,000 inhabitants in new settlements linking Sixth of October and the desert road.

Regarding the organization of the existing agglomeration, the homogeneous sector concept is a major tool for the spatial deconcentration of GCR. Homogeneous sectors are urban units of 1 million to 2 million inhabitants where practically all types of services and facilities can be found; where no more than 20 per cent of the labour force commutes to work outside the sector; and which have at least one major service centre within the sector (Egypt, 1982). In order to reinforce their economic autonomy, homogeneous sectors are separated from adjacent sectors by buffer zones (e.g., by major highways, railways, waterways, cliffs, military camps) that serve as physical barriers. Also as a means of fostering their autonomy, emphasis is placed on improving transport within the sector rather than to areas outside it. When applying these criteria to GCR, 11 homogeneous sectors were identified (five supplementary sectors, in both agricultural and desert areas, were also defined in order to cover the entire region).

The objective of the homogeneous sector concept is to break down the mononuclear organization of Cairo into small units that already have a certain degree of independence, particularly with regard to services and employment. A related objective is to reinforce the self-sufficiency of each sector in order to progressively create living conditions on the scale of a medium-sized town, where people can find jobs and facilities at a reasonable distance from their dwellings (Egypt, 1982).

IV. ISSUES AND SECTORS

A. The labour market

Available data suggest that open unemployment in Cairo is not a major problem. Periodic labour force surveys conducted prior to 1975 estimated that unemployment was below 5 per cent. By the late 1970s it was found to be 6 to 10 per cent. Underemployment and disguised unemployment (estimated at about 30 per cent) are serious problems. This is apparent in all segments of the service sector, from the large informal sector providing marginal jobs in vending and trading and a variety of occupations to the civil service, where the Government's policy of guaranteeing employment to university graduates has resulted in serious overstaffing. As the National Urban Policy Study noted, "the bureaucracy in Egypt is presently overstaffed, underpaid and undertrained" (PADCO, 1982). The salary schedule for the civil service is very low. Therefore, many high-level government officials spend a large part of their time on outside activities.

The contribution of Greater Cairo to economic growth in Egypt is very large. Cairo alone accounts for one quarter of the national jobs and has created jobs in the last two decades twice as fast as the rest of the country. In the manufacturing sector, Greater Cairo accounts for almost one half of the national output and its share of manufacturing employment is almost as large. Whereas current policy in Egypt calls for a moratorium on industrial investment in Cairo, if strictly enforced, this policy raises the spectre of rising rates of unemployment among the metropolitan labour force.

One of the major emphases of NUPS was the importance of employment as the prime determinant of population location. NUPS recommended the establishment of vocational training centres, as well as job information centres to act as clearing-houses to inform people looking for work about specific opportunities (PADCO, 1982).

NUPS also emphasized that a successful growth centre or new town had to have an employment base or a critical mass of population and jobs as a pre-condition to rapid self-sustaining growth. Unfortunately, jobs could not be easily created, especially in places far from existing infrastructure, labour and potential markets. Plants could be located only after the provision of adequate infrastructure and assurance that a critical mass of associated economic activities had been reached so that investment was not wasted. The NUPS report cautioned that the 20-year time frame for the Government's new towns policy was a short-time period for this critical mass to be achieved. It would be much easier to create jobs in urban places which already met industrial location requirements (PADCO, 1982).

As for the future, the activity ratio of the population for the year 2000 has been estimated at 30 per cent, as compared with 27.7 per cent in 1976. This ratio accounts for an increase both in female employment and in the number of people of working age. The required number of new jobs is estimated at 5.4 million, or twice that in 1982. The distribution of these jobs by activity sector would be as follows: 4 per cent in agriculture, 35 per cent in the secondary sector (industry, construction) and 61 per cent in the tertiary sector (services).

B. Urban land

Although the conservation of agricultural land has long been a corner-stone of Egyptian development policy, much of the critically needed arable land in Cairo is being lost to urban encroachment. The urbanized area of Cairo is currently increasing by nearly 1,200 hectares per annum, of which more than half consists of illegal development on agricultural land and the rest is planned new development in the desert (Dames and Moore, 1981).

Because most farm land in Egypt is in private hands, the Government has been unable to control the spread of illegal subdivisions. Due to a lack of irrigation and poor drainage, agricultural land values in many areas have been eroding, making conversion profitable. Prices for agricultural land have remained stable in real terms, or have even fallen, while prices for residential land have increased steadily since about 1970, when the informal housing phenomenon began to gain momentum. Whereas average prices ranged from £E 2/m² to £E 4/m² in the late 1960s, by the late 1970s they were £E 30/m² in peripheral areas and £E 60-100 and sometimes over £E 200 in prime locations (Abt Associates, 1982). Farmers and landlords were predictably willing to sell their land to urban investors at the new high prices.

Remittances from abroad have been involved in a majority of all residential land transactions in Cairo in recent years and have been a major factor in fueling the rise in land prices. A study conducted in the early 1980s concluded that unless the Government either created attractive alternative investment opportunities, effectively taxed away potential capital gains on land sales, or effectively prohibited private land transactions (e.g., by undertaking massive land banking or expropriations of nearly all developable urban land), the investment demand for land would likely continue at a high level, inflating land prices beyond the means of most Cairo residents (Abt Associates, 1982).

To date, the Government's major policy response has been negative controls, which are generally believed to have been ineffective. Under the terms of the 1978 Agricultural Law, all agricultural land was declared non-developable, regardless of use. Although there are some legal loopholes, the procedure for obtaining a variance is lengthy and few applications are made, with owners finding it much easier to go ahead with illegal subdivisions. Although owners of privately held property are legally required to register their land with the local district office of the Land Registration Division, most fail to do so. Although many people are cited and fined when they start construction, buildings are rarely removed by the authorities unless they are in a public place or on government land (Abt Associates, 1982).

In addition to a heavy reliance on negative controls, which have done little to prevent conversion of agricultural land, the Government has focused on the reclamation of desert land. A major problem, however, has been the fact that the Government has not been able to deliver the land fast enough. The reorientation of urban expansion on to desert land essentially hinges on allowing the controlled but rapid release of land. The lack of experimentation with such options is attributable to earlier regulations, and was reaffirmed by the planning law of 1983, which prohibited the legal release of land unless it was fully serviced at standards specified by law. The seemingly low standards required large front-end investments and caused financial burdens and delays which resulted in the fact that the amount of land marketed was insignificant in comparison to demand (Dames and Moore, 1981).

C. Housing

It is widely believed that there is a severe shortage of housing units in Cairo. The occupation of tomb houses converted into permanent dwellings is widespread in many Cairo cemeteries (estimates range from 250,000 to more than a million). Roof squatting is common and consists of small wood or brick constructions added on to the terrace of low standard buildings. Although Cairo's housing crisis has been vividly described in the international news media, in reality, the situation is far more complex. Mainly because of the contribution of the informal sector, Cairo's housing stock has expanded not only at a rate high enough to accommodate new household formation and in-migration, but also to accommodate some moves by established households. In fact, in the early 1980s, there was a vacancy rate equal to 5.5 per cent of the occupied housing stock and to 4.3 per cent of new units under construction (Abt Associates, 1982). Currently, it is estimated that Cairo may have a surplus of some 1 million housing units.

Case studies and in-depth interviews have confirmed the apparent anomaly of a large and growing housing surplus during a time of widely perceived housing shortages. As a recent study concluded, "there are indeed major housing needs among Egyptians but these are more related to specific features of housing and infrastructure and to housing costs than to the inability of households to find shelter" (Abt Associates, 1982).

Briefly recapping the history of Cairo's housing sector, the evolution of the housing stock over the past two decades has been strongly affected by external economic conditions. During the Nasser administration, the Government was heavily involved in the construction of low-cost public housing. Constructed on the outskirts of the city and in cleared slum areas in the central city, thousands of low-cost units were financed and constructed by the Development and Housing Company, a public sector development company. The Government also constructed workers' housing around newly established industrial centres and built public housing units for the middle class.

During the period of economic stagnation in the war years (1967-1973), there was a slow-down in the construction of low-cost public housing and the Development and Housing Company built only about 700 low-cost units. Although the Ministry of Housing constructed some 3,000 units of "Nasser Emergency Housing", the units were of poor quality and deterio-

rated rapidly (The Aga Khan Award for Architecture, 1985). By the mid-1970s, the construction of formal low-cost housing had come virtually to a halt. The Government attempted to deal with the shortage by constructing blocks of apartments in five-storey walk-ups. To make them affordable to low-income households, rents were lowered to nominal levels, e.g., one pound per room per month. The heavy subsidies entailed by this approach resulted in a major financial burden; moreover, the Government's inability to maintain the buildings resulted eventually in their conversion to ownership. By the late 1970s, the Government had adopted a policy of upgrading existing areas to capitalize on the standing housing stock.

Middle-income housing continued its normal course of expansion in its traditional locations. The Government stimulated the building of middle- and upper-income housing by providing the seed capital for the establishment of private companies such as the Saudi Egyptian Construction Company. Also, it facilitated the activities of housing co-operatives. Co-operatives purchase large parcels of urban fringe land from the Government at less than market rates, making instalment payments over a 15-year period. Because co-operatives do not pay property taxes on the land they own, they generally "land bank" the property while developing it incrementally in accordance with market demand.

Given the limitations of the formal housing market, the bulk of housing being supplied in Cairo in recent years has been "informal". It is estimated that informal housing accounted for 84 per cent of housing units constructed in Cairo between 1970 and 1981 (Abt Associates, 1982). Despite the generally high incidence of informal housing in Greater Cairo, much of it is highly concentrated geographically, particularly in areas south of Cairo such as Dar As Salaam and Helwan, west of Cairo in Giza, and north of Cairo in Shubra Al Kheima. Whereas informal housing is similar in terms of building design and materials to formal housing (in fact, new informal housing is of far better average quality than older existing housing), it is built in contravention of either building codes or zoning laws (Abt Associates, 1982).

The first type of illegal housing, which accounted for between one half to two thirds of all housing units added to the Cairo housing stock between 1976 and 1981, consists of the addition of floors to existing buildings, with the new floors often being different in style and function. This process of vertical expansion has led not only to an increase in housing densities in many areas of Cairo but also to overloaded foundations and sometimes to building collapses. The second type of illegal housing consists of encroachments on privately owned agricultural land. Relatively little development has taken place by squatting on desert land. Whereas agricultural land is generally flat, irrigated and drained by channels, and strongly structured by an agricultural plot layout that is thousands of years old, the desert consists of virgin sites, lacking water and without any traces of human habitation except for military tracks and quarries (IAURIF, 1985).

Development on agricultural land is generally characterized by walk-up buildings with a maximum of from four to five storeys. The layout is usually irregular, with street widths of only about 4 metres. Utilities and infrastructure are usually put in place after the housing is constructed and at considerable added expense. Since a decree was passed by the Cairo Governorate allowing water and sewerage hookups by illegal homes, there has been a rapid increase in the rate of utility connections—often obtained at the price of reduced service levels (e.g., low water pressure, electric shortages) because the design capacities of the networks are overextended.

Although Cairo has a large body of building codes and zoning laws and the authorities have widespread powers to remove violations and impose sanctions, attempts to control the informal housing sector have had little impact. Security of tenure in Cairo does not generally appear to be a problem. A study conducted in the early 1980s found that few, if any, households expressed concern about the failure to register land or buildings or to obtain building permits (Abt Associates, 1982). Moreover, when purchasers of buildings were asked why they had not made improvements, none mentioned concern with any aspect of security of tenure. One reason is that the Government has periodically conducted blanket legalizations (in 1956, 1966, 1981 and 1984), declaring informal settlements to be formal (The Aga Khan Award for Architecture, 1985).

The informal sector appears to be affected by general market conditions in much the same way as the formal sector. In recent years, Cairo has experienced significant housing cost increases in the formal and informal sectors, both as a result of increases in land costs and of the rising cost of construction materials and labour. Rapidly rising housing costs pose a major problem for households entering the housing market for the first time or for those wishing to change their place of residence. At the same time,

costs for the majority of households have remained stable for long periods as a result of stringent rent control laws (Abt Associates, 1982).

Cairo is a city in which nearly three fourths of all residents are renters, mostly on the private market. Whereas large key money payments paid to landlords have compensated for low rents and made rental housing a relatively attractive investment, rental units are usually poorly maintained and tenants must pay part of the maintenance and upkeep. Cairo has had rent controls since 1944. Although rental controls originally applied to units constructed before that year, the controls were gradually extended and now apply to all new construction. According to Cairo's most recent rent control legislation (1981), two thirds of units in new buildings must be set aside for rental, with legal rents pegged and frozen at 7 per cent of the combined value of the land and cost of construction at the time (World Bank, 1988).

Rent controls have had major distorting effects on the housing market. Landlords are allowed to collect up to two years' rent in advance, which must be returned to the tenant within four years. In practice, however, the increase in both the amount and incidence of key money has been at a rate in excess of 30 per cent per annum—paralleling or even exceeding recent rates of increase in land costs and housing construction (Abt Associates, 1982). Because key money can be collected only from new tenants, Cairo's system has a highly differential impact on residents of long standing and recent movers. Indeed, households that have moved into a unit within the previous several years are typically spending two to three times the fraction of their income on housing than are average households that have not moved (Abt Associates, 1982). As a recent World Bank study concluded, "in Cairo, rent controls do not seem to play a well-focused redistributive role" (World Bank, 1988).

In regard to housing finance, much of the finance in the housing sector comes from earnings of workers abroad, sales of inherited land, sales of jewellery and savings in informal credit associations (although the latter are more often used to finance key money than land and building purchase or construction). For the majority, formal housing finance is not relevant, for in order for an owner to be eligible for credit, he must have legal title to the land, must obtain a building permit and use formal construction methods (Abt Associates, 1982). As in the case with rent controls, low-income households find the transition to home ownership increasingly difficult over time because housing costs are rising more rapidly than incomes. Households without access to repatriations find it even more difficult to compete in the land and housing markets. The problem has been exacerbated recently by the rise in the prevalence and level of key money as a housing cost component. While in previous years households could pay rents out of current incomes, the rise of key money now requires significant payments from assets, thereby favouring higher-income groups and creating a serious distributional problem (Abt Associates, 1982).

Co-operative loans and subsidized building materials, which are available only after obtaining a building permit, also tend to go to middle- and higher-income households. Indeed, as a recent study noted, "it is manifestly clear that the current system is regressive both directly (in that it subsidizes better-off households) and indirectly, in that it raises the price of materials to the informal sector" (Abt Associates, 1982).

D. Water supply and environmental problems

Surface waters from the Nile River are the major source of Cairo's bulk water supply. Ground-water sources, which provide the remainder, can be considered only an extension of Nile surface flows, rather than a separate resource. As the Nile is likely to provide an abundant and reliable water supply for Greater Cairo through the end of the century and beyond, problems are related not to quantity but to water quality. Both the Nile River and the Ismailia Canal have been subjected to considerable pollution stemming from man-made conditions, such as leaking sewer systems, industrial waste discharges, irrigation return flows and river traffic. Although the Aswan High Dam has brought about a reduction in turbidity, the increased clarity of the water has encouraged algal growth.

Cairo's distribution system, which was constructed in the late nineteenth century, is obsolete and inadequate. The systems of the western and eastern sides of the Nile are operated separately because of the difference in pressure and poor transfer capacity. The Helwan and Maadi systems are independent from the Cairo system. About 20 per cent of Cairo's population, mainly on the periphery, have no access to piped water and use substitute sources such as canals, wells and public water fountains. Moreover, the supply fluctuates over much of the urban area. Average per capita supply is about 300 litres daily.

However, because of huge water losses resulting from leaking and broken pipes and poor household fittings, only about half of that supply reaches the consumer.

A 20-year programme to expand production capacity and extend Cairo's distribution network is currently under way at an estimated cost of $2.9 billion. One of the major projects, which has received financial assistance from USAID, has been the rehabilitation and expansion of the Rod El Farag water treament plant. Serving some 7.5 million customers and the central business district, the century-old plant was pushed beyond capacity and the quality of its water was often below acceptable standards. By means of a new intake system that uses gravity to draw water from the Nile, and a new pumping station to handle the transfer of larger volumes of water, the plant's output was increased from 200,000 to 650,000 cubic metres per day (USAID, 1988). The project also involved improving the quality of treated water, increasing water pressure throughout the service area and strengthening the management capacity of the General Organization for Greater Cairo Water Supply (GOGCWS).

The Federal Republic of Germany provided funding for expansion of the Imbaba Water Treatment plant and for a study for Giza City and West Cairo, which included a leakage and ground-water detection component. The Government of Japan extended a loan for trunk mains and service reservoirs in Nasr City and in South Cairo, while the Government of France provided funding for construction of the Shubra Al Kheima water treatment plant.

In addition to these large capital projects, the Government has attempted to conserve water through rate increases and public information campaigns. In mid-1985, the price per ton of water in Cairo was raised from 1.2 to 3 piastres, and rates were scaled according to the quantity of consumption. The new price was applicable up to the first 30 cubic metres; any additional consumption was assessed at 5 piastres. The economic rate for producing water is given by the GOGCWS as 8 piastres per cubic metre. However, some foreign consultants have quoted this figure at 18, which is the rate being charged in the World Bank-funded Beheira Governorate project (*Business Monthly*, 1986). In addition, the Government has conducted television, newspaper and radio campaigns, providing basic tips on plumbing in an effort to reduce losses resulting from inadequate maintenance of sanitary fittings.

Whereas efforts have been made to conserve water in Cairo proper, the new settlements have been heavy users of purified water. With water coming either from the Nile or from deep boreholes—which, in the case of the Tenth of Ramadan, for example, will eventually be replaced when water can be piped from the Ismailia Canal—each new settlement has only one water system, hence all water is processed to drinking water standards, regardless of use (Tipple, 1986). Indeed, purified water is used not only for water-borne sanitation but also for watering trees and lawns.

The Cairo sewerage system was installed between 1915 and 1920. Designed for a population of under 1 million inhabitants, the capacity of the system was expanded over the years to keep pace with the increasing size of the service area. During the mid-1970s, over 100 sewerage flooding incidents occurred daily in the streets of Cairo, resulting from insufficient pumping capacity, siltation, rubbish disposal and grossly overloaded lines. At least 3 million inhabitants on the outskirts of Cairo lived in unsewered areas, where overflowing septic tanks and cesspits created serious health hazards. Only about one half of the waste water collected was even partially treated in the existing treatment plants. The system could not begin to cope with the increases resulting from the increased capacity of the water supply system.

Projects undertaken in the past decade to improve the system included one of the largest sewerage projects in the world. "Cairo Sewerage I", a scheme funded by a $129 million grant from USAID and completed in 1988, involved the rehabilitation of 51 pumping stations and 39 ejector stations, construction of six new pumping stations, installation of 25 kilometres of force mains and gravity sewers on both sides of the Nile, developing a pilot programme for unsewered areas, and setting up a training programme for the Cairo Wastewater Organization (CW0) (USAID, 1988). The project vastly improved the hydraulic capacity of the waste-water system and has nearly eliminated the problem of sewerage flooding. However, because of the emphasis on resolving system problems and improving services in areas currently included in the system, the lowest-income groups in informal settlements on the periphery have remained unserved by existing water and waste-water systems.

USAID has now begun to address this problem. Cairo Sewerage II, which will run through 1994, at an estimated total cost of $555 million, seeks to expand the Cairo sewerage collection system into the largely unsewered areas on the West Bank of the Nile. The project will involve installation of a large intercepter system between the West Bank community of Imbaba and the new Abu Rawash treatment plant, construction of collectors, laterals and house connections in the presently unsewered areas of Imbaba and the Pyramids, construction of a relief system for the overloaded systems in the sewered communities of Mohandissin, Dokki and Giza, and rehabilitation of the Zenein sewage treatment plant (USAID, 1988).

Aside from the cleaning of streets and public markets, which is carried out by a municipal sanitation force, Cairo has a traditional and wholly unique waste collection system that has been operating for more than a century. Households that desire waste collection make arrangements through a unique system of brokers (*Wahis*), who operate a type of franchise system in which access to various zones is awarded to the *Zabbaleen*, a community that earns its livelihood from refuse collection. The *Wahis* are Moslems originally from the western desert oases, whose system has been perpetuated primarily through inheritance of collection rights (Haynes and El-Hakim, 1979). The some 30,000 *Zabbaleen*, who are mainly Coptic Christians from Upper Egypt, work for the *Wahis* free of charge, collecting waste door-to-door in donkey-drawn carts. Traditionally shunned and forced to live on the fringes of the city in squatter settlements, *Zabbaleen* families work together, with the father and children scavenging the waste and the women recycling it into pig feed and other reusable commodities (e.g., tin, paper, glass).

The *Zabbaleen* profit only from the recycling of solid waste, hence collection is haphazard, and items perceived to be of little recyclable value are discarded on the streets. Because the resource recovery value is higher from waste collected in wealthier areas, service tends to bypass many of Cairo's lower-income areas. Many lower-income households do not arrange for the services of the *Zabbaleen*, moreover, the radius of the service area is limited to within the boundaries of the urbanized area. The main problem, of course, is that the system is no longer able to cope with the waste generation of a rapidly growing metropolis.

In an effort to improve solid waste collection, the Cairo Cleansing and Beautification Authority (CCBA) issued a tender in December 1986 for private companies to take over the collection and haulage of household waste, using motorized vehicles. Whereas the traditional *Wahi-Zabbaleen* system did not have formal relations with the municipal authorities until the 1980s and had no experience with the management of highly integrated activities, the *Wahis* and *Zabbaleen* recognized that, rather than abandon the waste collection business, they would have to find a way to institutionalize their activities, coming to terms with each other and with the Government's new policy (Environmental Quality International, 1988). In submitting their tender, the *Wahis* and *Zabbaleen* underlined their traditional strengths (e.g., an experienced work-force, an efficient and inexpensive system) and were awarded the contract.

In developing the project, attention was given to the minimum disruption of the traditional *Wahi-Zabbaleen* roles, to designing a system that would extend service to the entire Cairo Governorate, and to securing credit. Towards this end, an agreement was reached whereby a majority share in the newly formed Environment Protection Company (EPC) would be owned by individual *Zabbaleen*, with membership open to the *Wahis*. Orders were placed for 20 specially designed trucks, although it was agreed that donkey carts would continue to be used in poorer areas. Backed by a Guarantee Fund established by USAID and the Ministry of Planning, a credit of £E 5 million was extended over three years to pay for the cost of mechanization. Zamalek and Manial were chosen for the pilot project because they had well-defined boundaries, roads that were paved and wide enough for mechanized vehicles and residents that were capable of paying the increased fees for mechanized service. Also, these areas incorporated high-, medium- and low-population densities, allowing the system to be evaluated under different conditions. The mechanization programme was launched on its scheduled date, 2 January 1988, and the donkey cart disappeared from Zamalek and Manial for the first time in a century (Environment Quality International, 1988).

In its first year the programme was carried out successfully. Not only did it eliminate the need for child labour, giving children the opportunity to go to school, but also it reduced collection time from 30 to 50 per cent, enabling the *Zabbaleen* to engage in other income-generating activities. In recognition of the achievements of EPC, the Cairo Governorate formally requested a five-year action plan outlining

EPC service extension to other areas of the city, starting with Maadi and Garden City (Environment Quality International, 1988).

Cairo has serious air pollution—mainly from motor vehicles but also from factories to the north and south of the city centre. The problem arises from the fact that, as the day warms in Cairo, dust and fumes begin to rise. In the afternoon, the sun's rays interact chemically with the gases in the air, increasing their toxicity. At nightfall, a layer of cold air forms some 1,000 feet above the city. The dust that has risen on the warm air cannot escape and falls back down again, beginning the cycle anew.

Regarding water pollution, although the law prohibits discharge of waste water into the Nile, urbanization, irrigation, navigation and industrialization as well as modifications of natural river flow environments all have contributed to the degradation of Nile River water. Bacteriological and virological data indicate considerable sewerage pollution. The total bacterial count of Nile water in 1976 was in the range of 10^4 to 10^6/100 ml. (PADCO, n.d.). Virological examinations of Nile water in 1976 indicated the presence of cytopathogenic agents in relatively high percentages of the samples, i.e., 25-37 per cent. Micropollutants in the Nile water include phenolic compounds, oil and grease, pesticides and heavy metals (PADCO, n.d.).

One of Cairo's unique environmental problems is the deterioration of the medieval city. Although Cairo has a relatively dry climate, ironically, water has caused tremendous damage. Leaking water pipes and inadequate surface drainage, combined with a rising water table and the corrosive salt content of the ground-water, have caused the rapid decay of a large number of structures in the old city. Whereas the water-table was over one and a half metres below ground level before 1950, the water-table in the old city is now almost at ground level in many areas. Capillary attraction into dry porous masonry above ground is considerable. As acids in the ground interact with chemicals in the masonry of the old buildings and with oxygen in the air at the wall surfaces, crystalline salts are formed that reduce the strength of the building material (The Aga Khan Award for Architecture, 1985). Repair of traditional construction is both difficult and expensive. Hence, deterioration from lack of maintenance causes floors to collapse, reducing many multi-storey buildings to dilapidated one- or two-storey structures.

E. Power

Cairo's electric power supply has improved markedly over the past five years. Electricity is now available to almost everyone in Cairo, although customers experience low voltage. Because the Government long maintained a policy of subsidizing electricity rates, the cost of electricity was far below its economic value, which stimulated the often uneconomic use of power. Recently, the Government adopted a policy of gradually raising electricity prices for various classes of customers to the economic value. The average price is now skewed towards private and heavy users, with the private sector paying close to market prices. The Government also recently instituted a programme for energy conservation.

Cairo is supplied from the nation's unified power system which interconnects all power stations with the major load centres. The Cairo distribution system serves some 2.2 million customers from 34,000 kilometres of low voltage cables and lines and 11,000 kilometres of 11 kv distribution cables and lines. Due to age and frequent overload, outages are common. Many of the distribution facilities appear to be overbuilt and this overbuilding may contribute to the higher than normal outage rate. Losses on the distribution are nearly 10 per cent and contribute to system-wide low voltage. Growth is expected to increase at a rate of from 7 to 9 per cent over the next five years.

The Egyptian Electricity Authority's ability to meet the nation's power requirements has been hindered by the drought in Africa, which has been the main cause of a reduced flow of the Nile into Lake Nasser and the resultant reduction in the output of the hydropower plant at Aswan. To maintain an adequate irrigation flow, the water level in the reservoir of Lake Nasser has been falling, reducing the generating output.

In regard to Egypt's fuel supply, a variety of indigenous primary energy resources are available in Egypt, but only in limited quantitites. Proven reserves of crude oil are estimated to be about 4 billion barrels and, at current rates of production, will be depleted in less than 20 years. Natural gas, which was discovered in Egypt as a by-product of petroleum exploration, was introduced into the domestic market in 1975 and is gradually being supplied to most households in the Greater Cairo area.

F. Health and education

Egypt's population has benefited from a comprehensive social welfare system that was created after the 1952 Revolution, and which has provided free education and health care. The Egyptian Government has long given high priority to the provision of public health services. Because of a policy of open admissions in its universities and medical schools (which take in 1,000 new medical students each year), the ratio of doctors to population is among the best in the developing world. Pharmacists also dispense medical advice, and a wide range of medication is available without prescription in Cairo's nearly 1,700 pharmacies (CAPMAS, 1987b). Although hospital bed coverage is more or less adequate, the out-patient clinics of Cairo's three main university hospitals are extremely overcrowded and are unable to cope with the increasing demand. To fill the gap, a growing number of Islamic clinics have been established. Generally opened with the approval and co-operation of the Government, the Islamic clinics cater mainly to the poor and are financed by fees, private contributions and by small amounts of foreign aid.

A number of ongoing projects in Egypt are having a major impact on child morbidity and mortality. Oral rehydration therapy (ORT) began in Egypt in the 1960s and has been successfully disseminated by the mass media—to the point that in 1986 over 96 per cent of mothers of children under three years of age reported knowing about the benefits of ORT and 70 per cent reported using it when needed (USAID, 1988). ORT clinics have been established in 85 per cent of the 3,000 maternal and child health (MCH) clinics nation-wide, and all MCH clinics have stocks of oral rehydration salts. The salts are also available in 98 per cent of Egyptian pharmacies. ORT training is being carried out in 30 teaching hospitals nationwide, and 30,000 physicians and nurses have received training. The ORT campaign, which is supported by television commercials shown daily on national television, is estimated to be responsible for reducing diarrhoeal-associated mortality in children under two by about 60 per cent. The Child Survival Project, which commenced in 1985, has provided immunizations for diptheria, pertussis and tetanus (DPT), and measles and polio. Eighty-two per cent of all children under five received the full series of DPT, 88 per cent received the full series of polio, and 76 per cent received the measles vaccine (USAID, 1988). Egypt now ranks second in the developing world (after Turkey) in achieving such a high coverage rate for immunizations. The Urban Health Delivery Systems project, which was completed in 1988, focused on training, technical assistance, community outreach programmes and support for the delivery of health care services in Cairo's poorest neighbourhoods. The project also involved the renovation of 15 clinics in Cairo and the construction of eight new clinics.

In 1963, Egypt became the first country in the Arab world to adopt a national population policy. In recent years, population policies in general, and family planning services in particular, have been given strong support by the Egyptian Government. The National Population Council, which was established in 1985, has a target of doubling nation-wide contraceptive prevalence by the year 2000. In 1984, some 30 per cent of currently married women aged 15-49 years were estimated to be using contraception.

Contraceptive knowledge is almost universal among women in Cairo, and 48.3 per cent of currently married women are currently practising family planning. There has been an increasing trend towards obtaining supply methods from pharmacies and private physicians (currently, 85 per cent of users obtain their method from pharmacies and private physicians, between 35 to 40 per cent of whom are supplied by the Family of the Future (FOF), a private social marketing organization supported by USAID. The remaining 15 per cent of users are served by the nearly 300 family planning clinics operated by the Ministry of Health and the Egyptian Family Planning Association (USAID, 1985a).

The Government of Egypt has made extensive use of the mass media to communicate the importance of limiting family size and the means by which births can be limited. To promote use of the condom and the pill, for example, the media mix consists of television and radio spots, advertisements in the more traditional print media (e.g., newspapers and magazines), outdoor posters, billboards, bus cards, neon signs, stickers and calendars (UNFPA, 1985).

The illiteracy rate in GCR has declined significantly over the past two decades, as a result both of better education and of the availability of reading materials, particularly of newspapers. As of 1986, 10 per cent of the population of the Cairo Governorate 10 years of age and over had a university degree or above and 33 per cent had achieved some level of qualification less than a university degree; 31 per cent could read and write, whereas 25 per cent of the population was classified as illiterate (CAPMAS, 1987).

The Ministry of Education supervises both public and private education. The basic compulsory cycle of nine grades consists of a six-year primary level and a three-year preparatory level. The secondary cycle of three years consists of a general programme of humanities, science or vocational education. A parallel set of Al-Azhar schools provide religious education. In recent years, a growing number of Islamic schools have been established. Unlike the Islamic clinics, which primarily serve the poor, the Islamic schools cater to the middle class, offering a more authentically Egyptian education than is offered in the foreign-sponsored private schools.

Higher education has grown rapidly in Cairo during the past two decades. Nearly all students who complete the secondary cycle go on to university. The sharp increase in enrolment has resulted in a greater number of university graduates seeking job placement under the Government's guaranteed employment scheme.

G. Transport

Cairo is one of the world's most densely populated cities, with one of the lowest provisions of road space per capita and dramatic growth in the number of private vehicles. In addition to severe traffic congestion, Cairo has a crowded, insufficient bus and tram fleet, an inadequately developed secondary road network, ineffective traffic management, especially in the central business district, and an acute shortage of parking spaces. Accident rates in Cairo are among the highest in the world, at 80 fatalities and 600 injuries per 10,000 vehicles (The Aga Khan Award for Architecture, 1985).

Cairo's first comprehensive transport plan, which was prepared in 1973 by Société française d'études et de réalisation de transports urbains (SOFRETU), recommended construction of a metro as the backbone of an improved public transport system. Whereas metros in developing country mega-cities have been widely criticized because of their insufficient ridership and exorbitant cost, the underground link was probably justified in Cairo's case because much of the system was already in place. The metro project, which began in 1981, consisted of three components: upgrading the existing, electrified suburban rail line to Helwan in the south by providing grade separation, improved track and stations and new rolling stock; constructing a central tunnel with five intermediate underground stations; and electrifying and upgrading the existing diesel-powered rail line to El Marg in the north. The first phase, including the central tunnel and most of the work on the Helwan line, was completed in late 1987. Because of delays and underground obstacles to the tunnelling (e.g., uncharted gas and sewage pipes, water mains, phone and power cables), the first phase cost more than twice the original estimate.

Cairo's 42.5-kilometre metro, which has the capacity to carry 60,000 passengers per hour in each direction, represents the first stage of ambitious transport planning which aims at reducing above-ground traffic by as much as 75 per cent. It is too early to assess the impact of the metro on Cairo's transportation patterns. It will undoubtedly serve as an efficient long-haul route from Helwan. However, because the metro runs only north-south, it will not be able to serve as a central network for the central business district (CBD) although it may decrease congestion in the central corridor. Although proposals were made to extend the system with additional lines, there is currently no financial commitment, hence it is unlikely that additional lines will be constructed within the next decade. The Government has conducted a major review of the bus network in order to increase accessibility to the metro system. Also, there have been discussions about establishing a through ticketing system, although no action has as yet been taken in this regard. One problem is that the metro, although heavily subsidized, is more expensive than other transport modes. Whereas the metro costs 20-50 piastres per trip, current fares for Cairo's trams and buses are set at the uneconomically low rates of 5 and 10 piastres, respectively.

As for the remainder of the public transport system, because of the poor quality of service, the number of daily passenger trips by public transport remained approximately constant over the past decade, whereas the use of private vehicles has increased rapidly. The publicly-operated Cairo Transportation Authority (CTA) has a stock of 2,300 vehicles, up to a third of which are not available for service on any given day. This represents fewer than 20 buses per 100,000 inhabitants, which is an exceptionally low figure even by developing country standards; the corresponding figure for a range of developing countries is about 60 buses per 100,000 inhabitants (The Aga Khan Award for Architecture, 1985). Passenger loadings on the buses are extremely high, with each bus carrying up to 2,100 passengers daily. Although there are proposals for increasing the bus stock by about 500 vehicles per year, even such large purchases will barely keep pace with the need to replace CTA's older stock. The Authority

also operates some 140 trams within the city, all of which are modern and under five years old. Besides the services provided by CTA, a Greater Cairo Bus Company was set up in the early 1980s to provide a premium service at higher fares. The fare differential was relatively small, however, and the company did not have sufficient vehicles or routes to enable it to make a major impact.

In addition to the severe shortage of public transport, Cairo has one of the smallest number of bus priority schemes of any of the world's mega-cities. Currently, proposals exist for an extension of bus lanes and bus priority routes within the central business district. However, because of driver indiscipline, there is concern that bus priority schemes may be unenforceable unless they are physically segregated.

Whereas the share of the formal public transport sector dropped significantly (from 73 per cent to 40 per cent during 1972-1983), the share of informal public transport, e.g., microbuses, private buses and taxis nearly doubled, from 14 per cent to 27 per cent. The microbus system in Cairo is basically a free market operation subject to few constraints. Transport planners have recommended that there should be greater regulation of the microbus system, e.g., there should be route numbers and destination indications, identified stops, adequate terminals and safety checks.

Although the number of private vehicles in Cairo has been increasing by 17 per cent per annum, the level of car ownership is low, at about 26 per thousand inhabitants (versus 300-450 in many European and North American cities). However, in 1980, the central business district was estimated to generate about 600 person-trips per hour per hectare (compared with 139 in central London), a phenomenon that may be related to the city's poor telephone communication system (The Aga Khan Award for Architecture, 1985).

The large number of transport studies and schemes prepared for Cairo during the 1970s and 1980s concurred that the demand for access to its central business district could not be met efficiently by private transport. Despite repeated recommendations to assign highest priority to public transport, most investment went into the construction of bridges and flyovers, which essentially service private automobile users (who account for only about 15 per cent of person trips) (The Aga Khan Award for Architecture, 1985). Another factor that spurred the growth of private transport was the heavily subsidized cost of fuel (the pump price of gasoline at 15 piastres per litre was only about half of the economic cost; the price of diesel at 3 piastres per litre was only about one tenth). Whereas gasoline prices were increased in two stages to 30 piastres, that is still below the market price.

A shortage of parking spaces is one of the major problems within the city. Currently, about 30,000 cars are parked at peak times within the central business district. In order to maintain a balance between road space and parking spaces, the total parking stock in Cairo has been recommended to be reduced to a target level set at 25,000 spaces. Based on current vehicle ownership trends, the number of cars may double within four or five years. Hence, transport plans have recommended construction of a number of multistorey car parks for off-street parking.

Regarding Cairo's road network, the severe transport infrastructure problems of Greater Cairo are not attributable to a lack of total space devoted to road use (about 25 per cent of the urbanized area is road space), but are more a function of the high percentage of unsurfaced roads in the city's secondary and tertiary network, bottle-necks in the existing primary road network and in its repair and maintenance and the absence of traffic management measures (World Bank, 1982).

The World Bank-assisted Greater Cairo Urban Development Project, which commenced in 1982 at a total estimated cost of $116 million, set forth a revised approach to urban transport based on low cost engineering and management measures. It was implemented along selected primary and secondary routes and within CBD and included the resurfacing of roads and repair and widening of footpaths, construction and paving of key bus routes and reserved bus lanes, limited expansion of automatic traffic signals, channelization at junctions, improved signs and road markings, street lighting on selected major corridors, improvements to the circulation plan within the CBD and construction of pedestrian-only rights-of-way (World Bank, 1982).

In regard to the highway network, the 1970 master plan included a proposal for a circular road completely surrounding the Cairo agglomeration. The 1983 Master Scheme revived the idea, conceiving of the road as a means of diverting through traffic, promoting urbanization in the eastern desert and facilitating access to already committed projects (e.g., Mokattan, Al Salaam, the satellite cities). In order to prevent further spontaneous urbanization of agricul-

tural areas crossed by the ring road, the Master Scheme proposed that the road should end at the Alexandria agricultural road, at least until the year 2000, in order to avoid crossing the large cultivated area to the north of Giza.

V. RESOURCES AND MANAGEMENT

A. Public investment

In regard to the co-ordination of investments within GCR, planning has been historically carried out by national agencies such as the General Organization for Physical Planning (GOPP) or the Transport Planning Authority of the Ministry of Transport, while implementation is undertaken by a number of agencies. The planning agencies generally regard the preparation of a master plan as an end in itself, as they are not involved in the day-to-day implementation of their plans. As the NUPS report concluded, "the situation is compounded by the general conception that urban planning is a physical or design exercise needing a master plan of the traditional type. The process of urban development planning leading to action plans, programmes and budgets has not yet been developed" (PADCO, 1982).

In spite of the emphasis on the new communities and the remote areas in the 1978-1982 five-year plan, Cairo continued to absorb a substantial share of plan investment, especially in big projects such as modernization of the sewerage system, the metro, the ring road, and extensions to the telephone system and the airport. Several of these projects made little contribution to the problems of remedying service lags. On the whole, moreover, the investment programme failed to address the implications of future population growth, as considerable attention was given to improving existing facilities (e.g., the sewerage system, the airport, Cairo University) but little attention to preparing for future growth.

B. Resource generation

The major sources of revenue at the governorate level are joint revenues, shared with the central Government. For example, all governorates receive 50 per cent of the special add-on tax placed on top of all import and export taxes, the tax on stocks, bonds etc., and the industrial and commercial profits tax. Even with these sources of revenue, the Cairo Governorate generates less than 20 per cent of its own budget annually. The other 50 per cent of the revenue collected from those taxes go to the General Secretariat of Local Government to be allocated for special development projects in all governorates (PADCO, 1982).

The other major sources of local revenue at the governorate level are one quarter of the land, building and additional taxes and revenues from utilites controlled at the governorate level. At the town and village levels the land tax remains the principal source of local revenue (25 per cent of that tax goes to the governorate). Towns also collect the tax on buildings, the entertainment tax, the rent tax and revenues from the rent of state property and from local public utilities. The various land, building and rent taxes do not yield significant revenue, however, because they are based upon an artificial assessment value resulting from rent control (PADCO, 1982).

The Government's tariff and pricing policies have prevented the authorities responsible for urban services from raising enough revenues to adequately maintain existing facilities and respond to new demands. The belief that water and other public services are "social services" rather than economic commodities is deeply embedded in Egypt, as in many other developing countries that have been subject to European influences. Tariffs and charges bear little relation to production and operating costs. Sewerage services are provided free and the water tariff has been only about 10 per cent of the cost of supply. Correspondingly, electricity rates are increasingly inadequate and public transport fare revenues usually do not cover more than a fraction of operating costs. In the housing sector, the Government does little or nothing to capture betterment-related rents, despite the precedent for such a policy in other developing countries.

In developing new cities in the desert, the level of subsidies has been particularly high, resulting from a variety of factors such as too cheaply priced land, the high share of community facilities in total investments, too low densities, the high standard for social infrastructure (up to four times higher than at other locations), and the heavy interest rate subsidies for housing. To cite one example, in the case of Tenth of Ramadan, land was sold at a nominal cost of PT 50/m^2, with the result that subsidies for land and infrastructure could ultimately add up to over 90 per cent of the cost (PADCO, 1982).

C. The institutional context

There are a number of agencies in Cairo that are concerned with urban development. Few of the agencies have a clear mandate, and there are several overlapping jurisdictions. The Ministry of Planning is responsible for approving budgetary appropriations for all central ministries, public authorities and the governorates and also undertakes regional planning studies. The Ministry for Development, New Communities and Land Reclamation (formerly the Ministry for Reconstruction, Housing, and Land Reclamation) is responsible for reconstruction, new town development, housing, public utilities and the development of desert land. Within this Ministry, GOPP is responsible for the preparation of urban master plans for each of the major cities and for implementation of the revised master scheme for Cairo (World Bank, 1982).

Power in Egypt is highly centralized and the implementation of most large-scale urban projects is carried out by agencies of the central Government. In Cairo, for example, the metro was constructed under the aegis of the Tunnels Authority; following its completion, it was taken over by the Ministry of Transport. Likewise, decisions regarding the ring road have been made by GOPP, the decision regarding the site for the new opera house was made by the Ministry of Culture and so forth.

Despite the apparent centralization of power, considerable effort has been made in recent years to devolve power to the local level. Currently, five distinct levels of local government—governorates, urban quarters, rural districts, towns and villages—have legal status. Each local unit has an executive committee and a popularly-elected council. In practice, however, the central Government has the power to veto any decision made by the local units that might interfere with its own policy. Moreover, the fact that central grants in aid total about 80 per cent of the local financial resources precludes any meaningful system of autonomy or local initiative (World Bank, 1982).

Greater Cairo is composed of three governorates, Cairo, Giza and Qaliubiah, 15 urban quarters (12 in Cairo and three in Giza), eight rural districts, eight towns and about 300 villages. Governors are appointed by the Head of State and they in turn oversee the presidents of each of the local executive committees. Cairo Governorate, which employs a staff of some 140,000 persons, is responsible for housing, public utilities, land development, slum upgrading, conservation and many aspects of urban planning, design and project implementation.

Cairo is somewhat unusual among developing country mega-cities in that it does not have a metropolitan region development authority. A Higher Commission for the Planning of Cairo, whose membership consists of the three Governors of the Governorates in GCR plus seven ministers, was established within the Prime Minister's office but is not considered a major force in urban planning.

CONCLUSION

Egypt is a country facing a severe urban crisis, the dimensions of which are being shaped by rapid population growth and limited habitable land. Cairo, with a population that is expected to reach more than 16 million inhabitants by the year 2000, is expanding rapidly, absorbing more than 1,200 hectares of agricultural land each year. Because of the combination of continued high birth rates, reductions in the rate of external migration and continued high rates of rural-to-urban migration, very high levels of demand will occur for jobs, housing and infrastructure services in the future.

The Government's major response has been one of the most ambitious physical planning efforts in the developing world. In an effort to, in President Sadat's words, "make the desert green", the Government has constructed free-standing new towns and satellite cities in the desert. Over the years, although targets have fallen short, the goal of urbanizing the desert remains a priority. It is somewhat ironic, however, that the recommendation of NUPS to pospone development of the free-standing new towns—which was rejected by the Government—has essentially come about as a result of market forces.

Regarding sectoral issues, in the absence of a strong urban land policy, there has been continuing encroachment on agricultural land. The Government has mainly relied on negative controls, which have been difficult to enforce. Because of the distorting effects of remittances and the attractiveness of land as an investment, land prices have risen dramatically, encouraging speculation and forcing lower-income households out of the formal land and housing market. The dimensions of the problem make it difficult to address. Indeed, the World Bank's Greater Cairo Urban Sector Memorandum was pessimistic about the prospects of controlling development on agricultural land, noting that "there are simply too many owners, too many transactions, and too great a financial incentive" (World Bank, 1983).

The major problems in the water supply and sewerage sectors have been the growth in the urban population share that is not served with sewerage and that has only limited access to water; inadequate water pressure; intermittent supply and huge water losses; frequent sewerage flooding; and overloading of the waste-water system. As a result of a number of huge internationally financed capital projects, the situation in the water and sewerage sectors has improved dramatically in recent years. Still, because of rapid population growth in peripheral areas, the backlog in service provision is actually widening over time. Cairo's major urban transport problems are: insufficient capacity in the bus and tram fleets, the rapid growth in automobile ownership and lack of traffic management and enforcement of traffic regulations.

Regarding Cairo's future, on the positive side, Egypt has a large domestic market, a diversified industrial base, ideal agro-climatic conditions, a favourable geographical location and a large, skilled labour force (World Bank, 1989). Life expectancy has increased significantly, and overall levels of health compare favourably with those in other developing countries at a similar level of development.

With regard to Cairo's economic future, whereas the city has long been accustomed to a high level of subsidies, the Government is moving in the direction of greater cost recovery. It is fully aware, however, of the short-run political costs of tariff increases and similar price adjustments. A key element that will determine future growth will be the ability of decision-makers to implement meaningful economic reforms fast enough without jeopardizing social and political stability (World Bank, 1989). Concerning external resources, in the past, the availability of low-cost, often free outside capital from USAID and other bilateral donors has served to cushion the Government from the reality of economic shortages. Egypt is likely to continue to enjoy a sizeable inflow of external resouces, although perhaps not at the exceptionally high level enjoyed over the past decade. Financing urban development in the future is likely to be one of Cairo's—and Egypt's—greatest challenges.

NOTES

[1] As established in 1966 and modified slightly in 1975, the limits of GCR accurately follow administrative limits in the agricultural areas to the north in the Delta and to the south in the Nile Valley, but when they reach the desert, the delimitation is a straight, arbitrary line. The three Governorates involved in GCR each administer much wider areas. Cairo Governorate, for example, stretches east to the Red Sea. In its present boundaries, the region covers almost 300,000 hectares, half of which is desert.

[2] The United States Agency for International Development (USAID) estimated the rate to be somewhat higher, at 50 per thousand live births.

[3] It is somewhat misleading to describe the El Obour project as supporting the objective of deconcentrating the growth of Cairo. If anything, it probably reinforces Cairo's growth. A much stronger case for El Obour is that it can demonstrate the efficiency of lower standards compared with those in the new towns.

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