# CHAPTER 2 EXISTING CONDITIONS, CONTEXT AND ISSUES OF THE STUDY AREA

## 2.1 Natural Setting and Environment

### 2.1.1 Meteorological Conditions

The Study area belongs to the subtropical arid climate regions. Winter, from November to February, is the rainy and cold season. The annual average precipitation is between 20 and 30mm. The average monthly precipitations are between 10 to 15mm in November and December, and 5 to 10mm in January (data between 1995 and 2000)[1]. Rainfall patterns are locally influenced by land use and desert areas. The average temperatures from June to September exceed 25°C, with daily peaks that could exceed 40°C.

The other main characteristics of the meteorological conditions in the Study area are:

- The predominance of NW to SE winds during the year
- The dust and sandstorms associated with the hot and dry winds of the desert, during the transitional seasons like in spring and autumn
- The modification of the natural patterns of local humidity and temperature due to urban sprawl

### 2.1.2 Topography and Morphology

The Greater Cairo Region is located at the narrow end of the delta area, at the upstream point of the division of the river Nile into the main 2 branches of Damietta, and Rosetta (also called the Rashid branch by the Egyptians). The alluvial agricultural plain is then widening to the north (wide end of the delta). The general altitude of the river Nile plain, which is urbanized, is at less than 50m.

The limestone plateau area on east lies at the altitude of 250 to 350m, with increased height and relief in the south-east (Gebel Abu Shamah, 578m). The main plateau units are those of Makattam and, in the north-east, Al Hamza. This area is a desert and arid area, with limited potential of urban development until the adoption of the Study area Master Scheme policy for the development of new urban communities in the desert area. The south-east is however a

[1] There are 3 meteorological stations in the Study area: the Abbassia station, the international airport station at about 29km from central Cairo, and the Bahtim station, located at about 13km NW of Central Cairo, in the urbanized delta area.

no-mans land. The lithological conditions in the south-east part have generated a morphology of several wadi oriented NW-SE, with steep interfluves and instable slopes.

The plateau area on west of the river Nile is at a lower topographical level, with increasing altitudes to the west, from about 60 to 150m. There are 2 main plateaus in this area, with higher topographic levels: The Kariet Al Kasheeb plateau in the SW, and the Al Mohawelat plateau in the NW. This area is subject to sand storms and presents morphology of sand dunes. The new urban community of 6$^{th}$ of October lies on the Qariet Al Kasheeb plateau, at about 200 m high.

### 2.1.3 Geology

(1) Geological conditions

The geology of the Study area is characterized by quaternary alluvial deposits in the Nile valley and tertiary limestone beds on both sides of the river Nile. The general structure of geological beds is constituted of truncated anticlinal and synclinal formations and similar recent sedimentary layers on the right and left banks of the river Nile.

On the right bank of the river Nile, near the old Cairo, the Mokattam plateau is constituted of white to grey limestone and intercalations of brown limestone, sandstones, and clays. These limestone beds belong to the upper Eocene period. Geological formations are older to the south but still belong to the Eocene beds, and younger to the north with limestone beds of the end of the tertiary period (Oligocene and Pliocene).

The limit between the quaternary alluvial deposits and the tertiary limestone beds of the Mokhattam plateau is morphologically represented by a scarp. All the area lying south-east of the Mokhattam plateau is geologically constituted of oldest tertiary formations (Eocene) with several faults of NW-SE orientation, which affect the morphology. The Wadi Digla, which is at the southern limit of New Cairo and is the border of the oldest formations, and all the watercourses of this area, are influenced by the fault system.

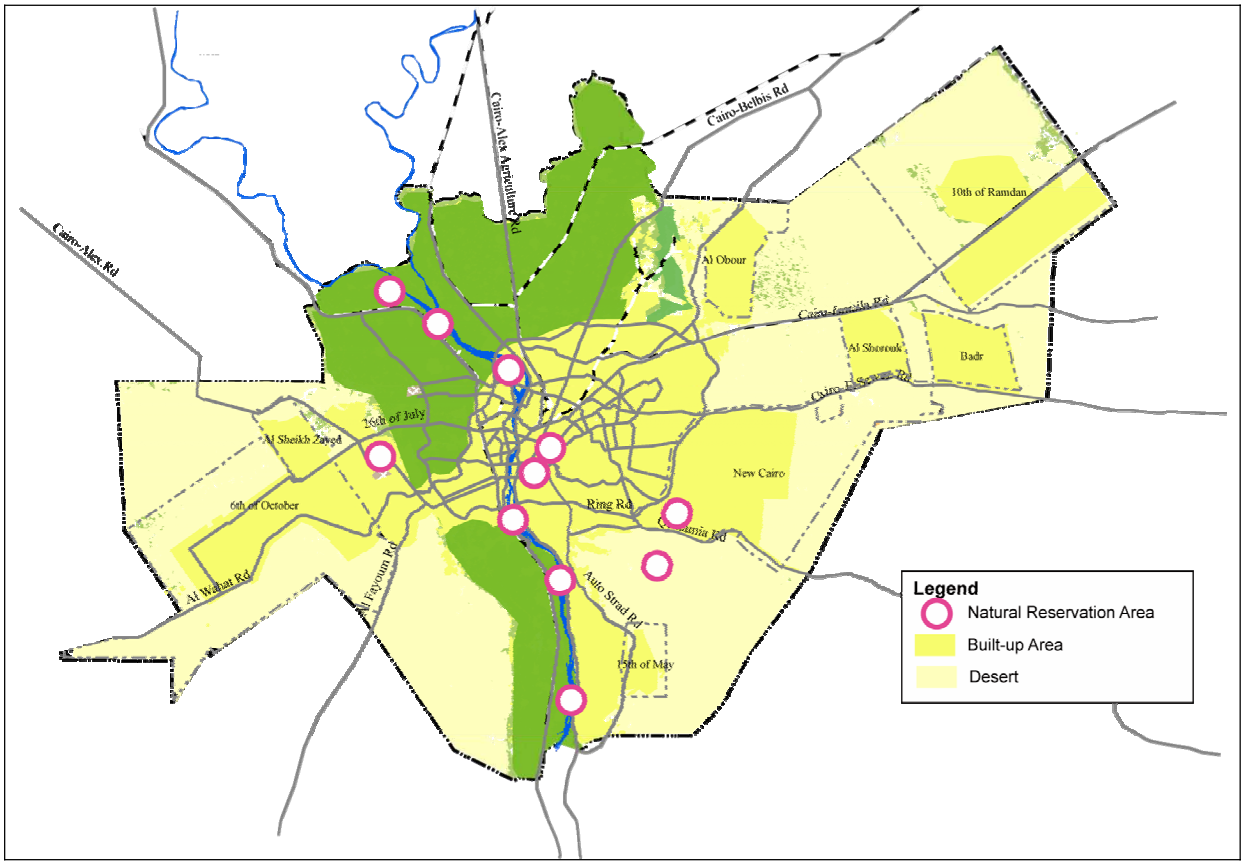
(2) Geological protectorates

Geology is considered as a natural patrimony which justifies its protection with the status of natural reserve. In the area of the study area, there are 11 nature protection areas, of which three protection areas are:

- The petrified forest protectorate area, in New Cairo(7km$^2$, declared by Decree 944/1989);
- The Qubet El Hassana Dome protectorate, in the Giza Governorate (1km$^2$, declared by Decree 946/1989); and
- The Add Wadi Degla protectorate.

Among three nature protection areas, first two areas have an objective of conservation of the geology as scientific heritage (fossiliferous patrimony or geological structure). The status of

the natural reserves is specified in the Law 102/1983 on the control of natural protected areas (EEAA).




Source: JICA study team

**Figure 2.1.1 Location of Natural Reservation Area**

### 2.1.4 Hydrogeology

(1) Presentation of the aquifer systems

The hydrology of the Study area is characterized by the presence of the flood plain aquifer of the river Nile. This aquifer is the main aquifer of the area and is called the Nile alluvium aquifer.

On the borders of the Study area, the hydrology can be more or less related to the aquifer systems of the Moghra basin, the Carbonate basin, or the wadi deposits basins. These aquifers are marginal in the Study area but can be significant on the western and eastern borders of the urban area and in the new urban community areas.

(2) Nile alluvium aquifer

The Nile alluvium aquifer lies in the quaternary and late tertiary deposits of the flood plain, and a marginal part of the desert fringes. The urban agglomeration of Cairo is mostly established on this aquifer unit. The extension of this aquifer corresponds to the Nile valley flood plain and the delta area, until the desert fringes along the Nile flood plain.

The aquifer reservoirs occupy thick layers of sand and gravels covered by clay to silty clay formations. The aquifer thickness is only 5 to 50m meters in the Cairo area, but it increases considerably to the north toward the Mediterranean coast. The depth of the water table is very shallow, only a few meters.

Groundwater recharge is done from the river Nile and through the infiltrations of the surface water and wastewater, including seepages from the irrigation and drainage canals. This groundwater reservoir is particularly sensitive to the surface pollutants. The aquifer is used for agriculture, industry, and domestic purpose. On the remote borders of the flood plain, irrigation water is largely supplied from this groundwater.

(3) Marginal aquifers

The Moghra aquifer system occupies mainly the western edge of the Delta and lies in the Miocene layers. It is very marginal on the western part of the Study area. This aquifer is deep, about 200 m in this area, and goes deeper toward the west in the desert. Recharge is done by deep percolation from the Nile alluvium aquifer.

The Carbonate aquifer system belongs to the layers from the Eocene to the Upper Cretaceous. It is a complex aquifer which occupies the rock fissures. This aquifer underlies the Nile aquifer system. This aquifer is marginal in the south-east of the Study area, and on the borders of the flood plain in the south part of the Study area.

The shallow *wadi* aquifer systems are much localized small aquifers, related to the underflow of the *wadi*, in the east zone of the Study area.

### 2.1.5 Watercourses and Waterways

The hydrography of the Study area is structured according to the river Nile and its delta. The natural watercourses are the branches of the river Nile in the plain, and the *wadi* coming from the eastern plateau area. The man-made watercourses are the water canals and irrigation drains. Apart from the river Nile, the main water courses are:

- The Damietta and Rosetta branches of the river Nile delta, in the north of the Study area
- The channels constructed for the transfer of the river Nile water resources into the remote areas. There are 2 channels: The Ismailia channel, to the north-east, and the Marrioteyah channel.
- The irrigation channels and drains in the agricultural area of the delta. The main drains are the El Mouheet drain in Giza and the Bahr El-Bagar drain, which has 2 main branches, the Belbaise drain and the Qaliobeya drain, in Qaliobeya. The Bahr El-Bagar drain basin is located in the very densely populated area of the eastern delta.
- The natural NW-SE oriented *wadi*, in the south-east of the Study area, which discharge into the river Nile during the rainy season. The main wadis are those of Helwan, Digla, and Abbassia, from north to the south.

### 2.1.6 Natural Vegetation and Wildlife

In the Study area, the valuable natural habitats or wildlife from the point of view of biological diversity are limited to the following areas:

- The desert land protectorate of Wadi Digla, at the south limit of the New Cairo urban community (60km$^2$, declared by Decrees 47/1999 and 3057/1999, under the Law 102/1983)
- The agro-systems along the Nile riverbanks and in the river islands, in the north and south borders

The fauna of the Wadi Digla protectorate includes various species of small rodents (rats, mouse, bats), rabbits, foxes, deer, and reptiles. The group of reptiles is the most diversified (18 species).

Nationwide jurisdictions for the management of natural flora and fauna are mainly shared between the Ministry of Agriculture and the Egyptian Environmental Affairs Agency (EEAA). The EEAA is in charge of management of the nature protectorates, and of institutional coordination for implementing the main conventions on nature conservation (Convention on Biological Diversity, RAMSAR Convention, Bonn Convention, CITES Convention). The National Strategy and Action Plan for Biodiversity Conservation is the main framework of actions undertaken for the preservation of natural habitats and wildlife, until 2017.

### 2.1.7 Conclusion related to Natural Setting and Environment

The major points discussed in this section are summarized in the following.

- The hydrography of the Study area is structured according to the river Nile and its delta. The Nile alluvium aquifer lies in the quaternary and late tertiary deposits of the flood plain. The urban agglomeration of Cairo is mostly established on this aquifer unit. The Study area belongs to the subtropical arid climate regions.
- The alluvial agricultural plain is widening to the north. The limestone plateau area on the east is a desert and arid area, with limited potential of urban development except for the new urban communities in the desert area. The south-east is a no-mans land with a morphology of several *wadi* oriented NW-SE, with steep interfluves and instable slopes. The plateau area on west of the river Nile is subject to sand storms and presents morphology of sand dunes. The new urban community of 6$^{th}$ of October lies on this plateau.
- GCR is surrounded by agricultural areas in the north, and desert lands to the east and west that are not allocated for urban expansion except for the designated NUCs.

## 2.2 Socio-Economy

### 2.2.1 Socio-Economic Profile of the Study Area

The socio-economic profile of the study area is summarized in Table 2.2.1 and the main points are explained in detail as follows:

1) The population in the study area in 2006 was approximately 16 million, which accounts for 22% to of the total population of Egypt. The annual growth rate of 2.22% in the study area between 1996-2006 was slightly higher than that of Egypt (2.04%). The age group of 15 years or older comprises 71%, of the total population, which is about 9% higher than that of Egypt (62%).

2) GRDP in the study area contributed to 31% of the national economy (GDP) in 2006. This represents a sizable contribution, demonstrating that the capital region is the economic engine of Egypt. The unemployment rate in the study area was approximately 7% in 2006, which was 2% less than the national average (9%).

3) Enrolment rates were 100% for primary education. Enrolment rates for university were 37% in the study area, which exceeded the national average (27%) in 2006. This shows the strong position of the capital region in terms of the higher education.

**Table 2.2.1 Major Socio-Economic Indicators of the Study Area in 2006**

| Indicator | | | Unit | 2006 |
|---|---|---|---|---|
| Population | Total[1)] | | 1000 | 16,101 |
| | Growth Rate in 1996-2006[1)] | | % per year | 2.22 |
| | Age Structure[1)] | less than 5 yrs old | % | 10 |
| | | 5 - 14 yrs old | % | 19 |
| | | 15- 65 yrs old | % | 66 |
| | | 65 yrs old or more | % | 5 |
| Economy | GRDP | | million LE | 164,372 |
| | GRDP per Capita (2001 price)[3)] | | LE per capita | 10,209 |
| Employment | Total[2)] | | 1000 | 4,310 |
| | Sector Share (Pri/Sec/Ter)[2)] | | % | 6/39/55 |
| | Unemployment[2)] | | % | 7 |
| Education | No. of Students[1)] | Primary | 1000 | 1,827 |
| | | Preparatory | 1000 | 479 |
| | | Secondary | 1000 | 593 |
| | | University | 1000 | 504 |
| | Enrolment (Pri/Prep/Sec/Univ)[1)] | | % | 100/50/58/37 |

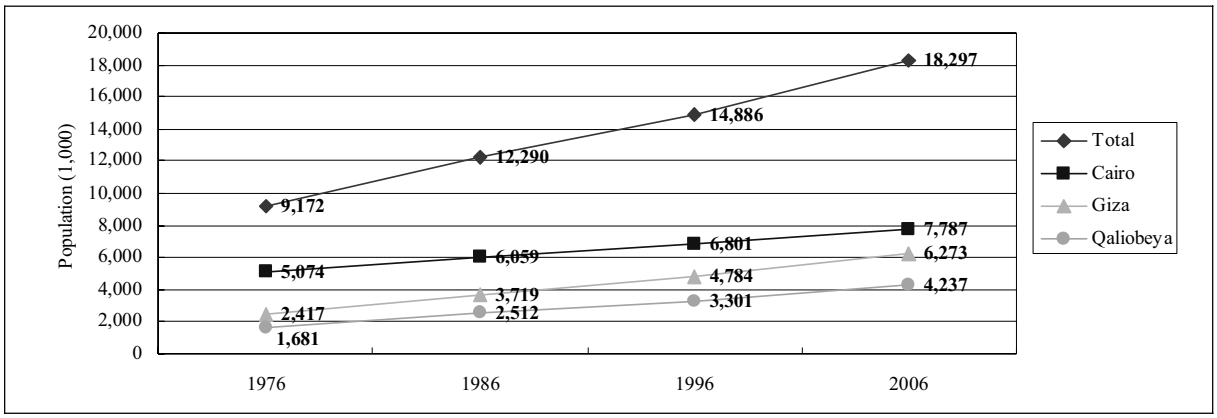
Source 1) Census, CAPMAS, 2006
Source 2) Statistics, CAPMAS, 2006
Source 3) Assumption based on Egypt Human Development Report 2005, UNDP

### 2.2.2 Population

(1) Population in three governorates

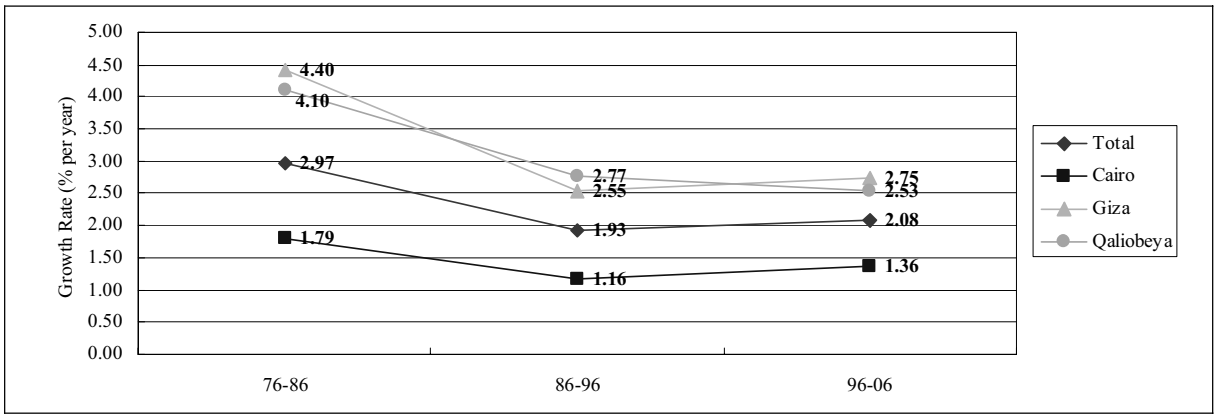
Total population of the three Cairo region governorates amounted to 18 million in 2006 (Figure 2.2.1). The growth rate improved to 2.08% per year in 1996-2006 (Figure 2.2.2). New

urban communities experienced a high growth rate in the same period, and it raised the overall growth rate of the three governorates. The high growth rate of NUCs changed of the trend for Cairo's growth rate from a descending trend to ascending one. Giza and Qaliobeya experienced higher growth rates than that of Cairo in 1976-2006. Surplus population has shifted from Cairo to Giza and Qaliobeya. This trend may continue.




Source: Census, CAPMAS, 2006

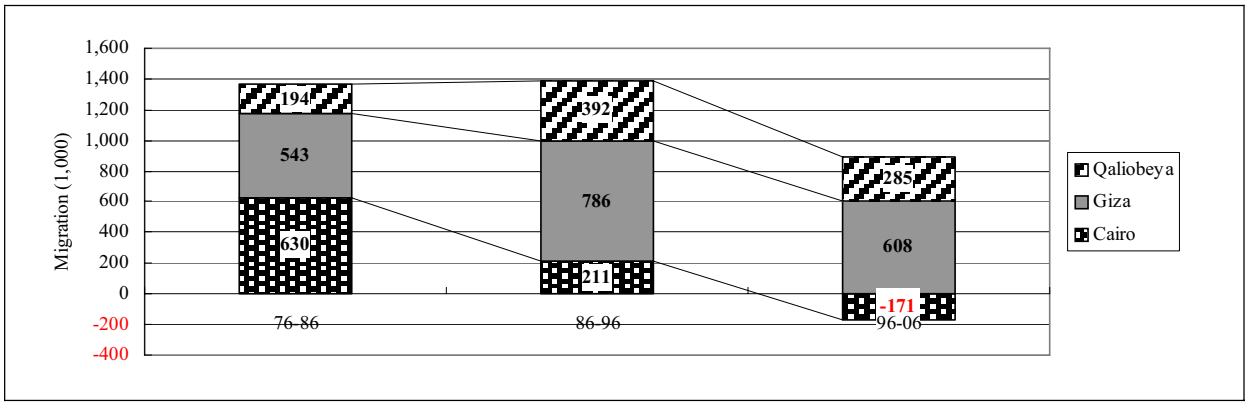
**Figure 2.2.1 Population of Cairo, Giza, and Qaliobeya in 1976-2006**




Source: Census, CAPMAS, 2006

**Figure 2.2.2 Population Growth Rate of Cairo, Giza, and Qaliobeya in 1976-2006**

Migration patterns into and out of the three Cairo region governorates in 1976-2006 show that the population concentration is being shifted from Cairo to Giza and Qaliobeya (Figure 2.2.3). Migration into Cairo has decreased to negative levels in 1996-2006, while Giza and Qaliobeya governorates both maintained a level of more than 0.8 million migration in 1996-2006.

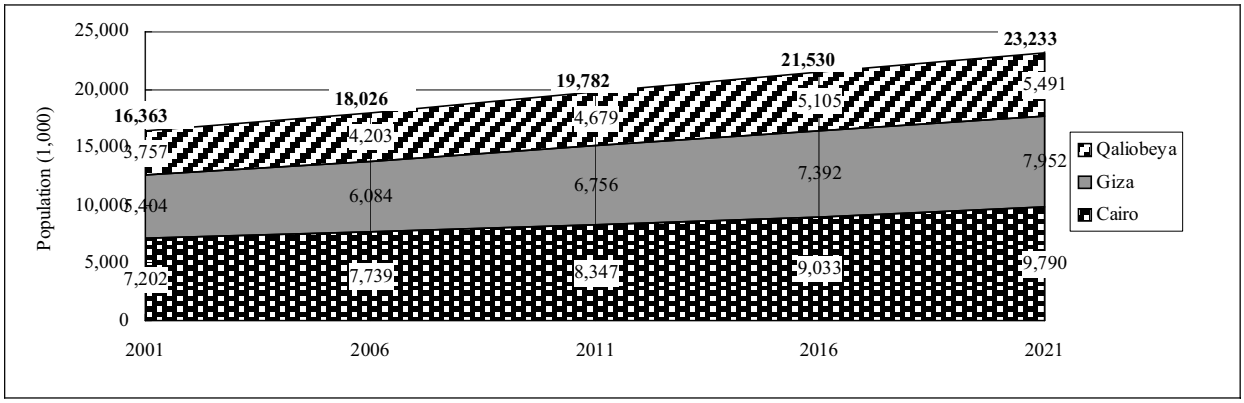



Source: Census, CAPMAS, 2006
Note: Migration in 1996-2006 is assumed on the basis of birth rate in 2005.

**Figure 2.2.3 Migration by Three Governorates in 1976-2006 (1,000)**

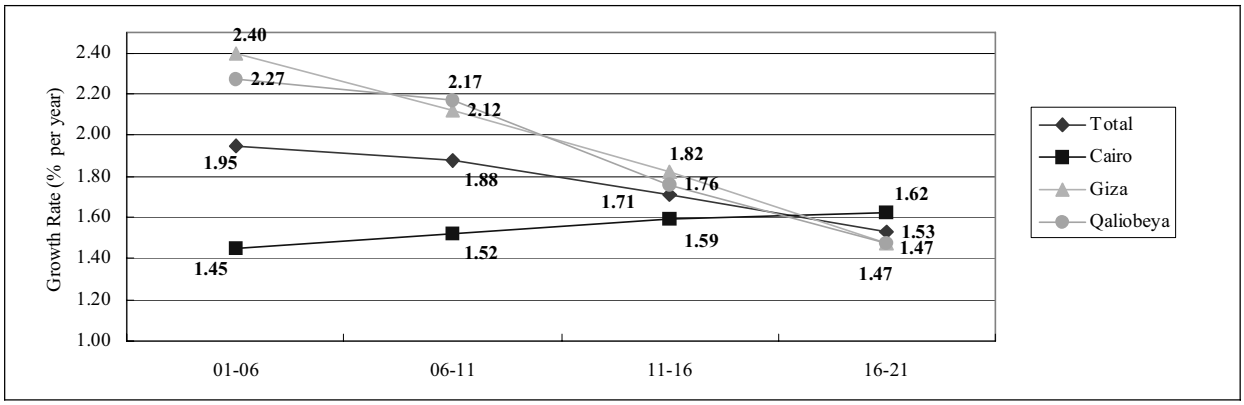
## (2) Existing population projection of three governorates up to 2021

Cairo Demographic Center (CDC) has prepared estimates for the population of Cairo, Giza and Qaliobeya up to 2021 (Figure 2.2.4 and Figure 2.2.5). CDC assumed that the annual growth rate of three governorates would decline from 1.95% to 1.53% between 2001-2021. The latest census revealed that the three Cairo region governorates experienced an annual growth rate at 2.08%, which was higher than the rate proposed by CDC.




Source: Cairo Demographic Center, 2001

**Figure 2.2.4 Population Projection by Cairo Demographic Center until 2021**

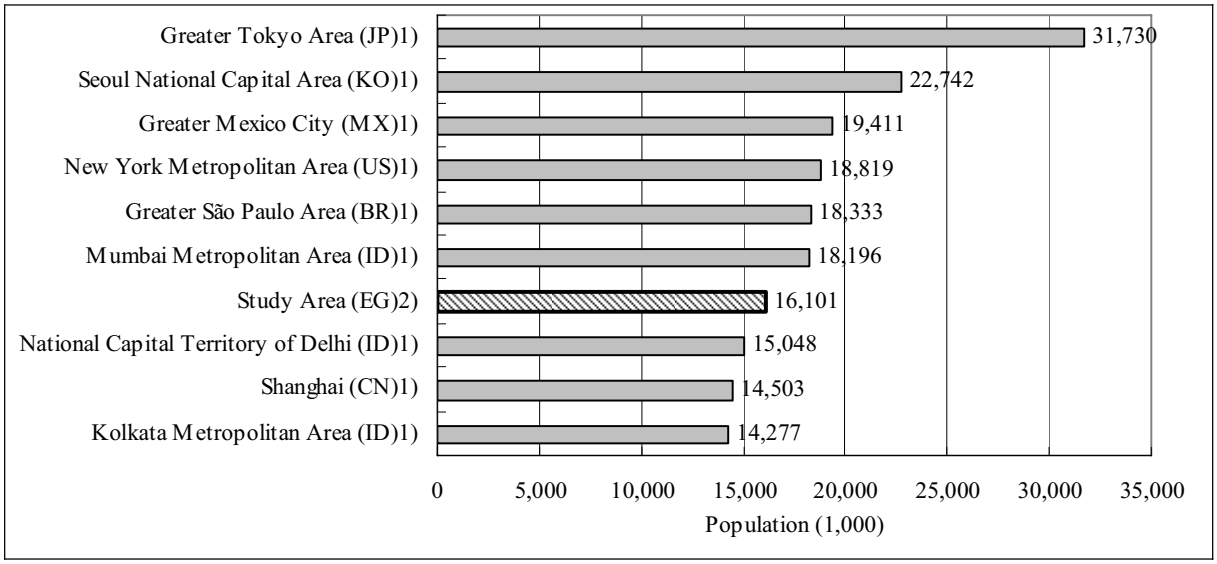



Source: Cairo Demographic Center, 2001

**Figure 2.2.5 Estimated Population Growth Rate by Cairo Demographic Center until 2021**

(3) Existing population in the Study Area

The existing population in the study area was about 13 million in 1996 and increased to 16 million by 2006. The annual growth rate was 2.22%/year, which is higher than that of three Cairo region governorates (Table 2.2.1). The population of 16 million elevated the study area to the position of the 7th largest urban agglomeration in the world and the largest in the Middle East (Figure 2.2.6). Higher population growth took place in study area, due partly to the attraction of residents to the new urban communities.




Source 1) World Urbanization Prospects Report, United Nations, 2005
Source 2) Census, CAPMAS, 2006
Note: BR: Brazil, CN: China, EG: Egypt, ID: India, JP: Japan, KO: Korea, MX: Mexico, and US: United States

**Figure 2.2.6 Population of Largest Metropolitan Areas in the World**

**Table 2.2.2 Existing Population in the Study Area in 1996-2006**

| Governorate | Population (1,000) | | Growth Rate (% per year) |
|---|---|---|---|
| | 1996 | 2006 | 1996-2006 |
| Cairo | 6,801 | 7,787 | 1.36 |
| (% within S.A.) | (100.0) | (100.0) | |
| Giza | 3,876 | 5,131 | 2.85 |
| (% within S.A.) | (81.0) | (81.8) | |
| Qaliobeya | 2,207 | 3,059 | 3.32 |
| (% within S.A.) | (66.9) | (72.2) | |
| Sub-total | 12,884 | 15,977 | 2.18 |
| (% within S.A.) | (86.5) | (87.3) | |
| 10th of Ramadan | 48 | 124 | 10.00 |
| Total | 13,045 | 16,101 | 2.22 |

Source: Census, CAPMAS, 2006

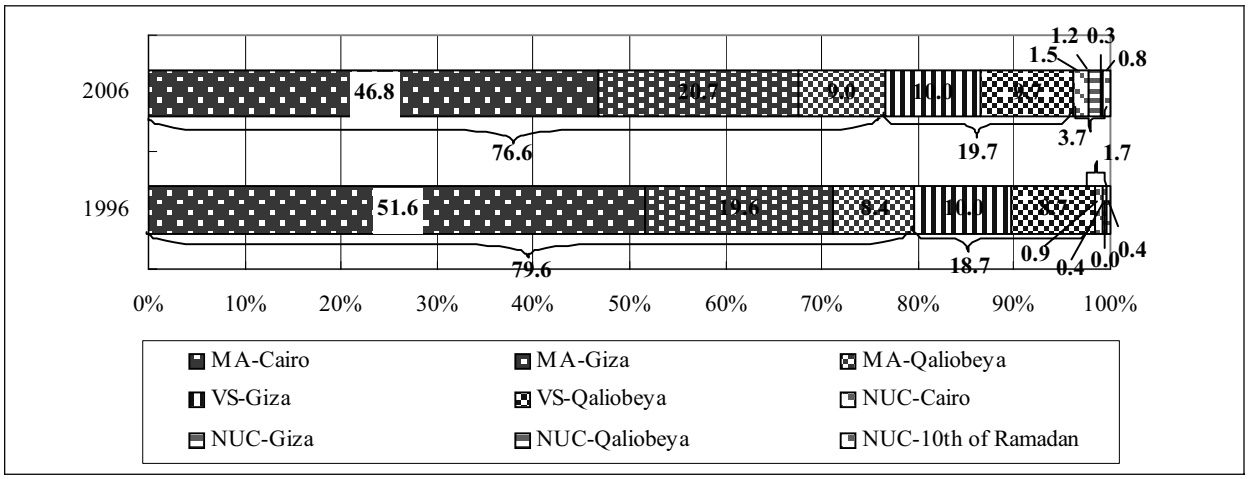
Within the study area, NUCs enjoyed the highest growth rate in 1996-2006, at more than 10% per year (Table 2.2.3). Villages and small towns followed with growth rates of 2.0% per year, and the main agglomeration experienced a relatively low rate of 1.7% per year. Incremental population has shifted from main agglomeration to villages and small town and NUCs. Qaliobeya still had a higher growth rate in the main agglomeration than that in villages and small towns.

Even though NUCs recorded the highest growth rate and tripled their population, the main agglomeration occupied a large share (more than 70%) of the total population (Figure 2.2.7). Villages and small towns shared 20% of the total population, and NUCs were limited to less than 4%. In addition, a large part of the incremental population still resides in the main agglomeration (Figure 2.2.8).

**Table 2.2.3 Population Distribution by Built-up Area in the Study Area in 1996 and 2006 (1,000)**

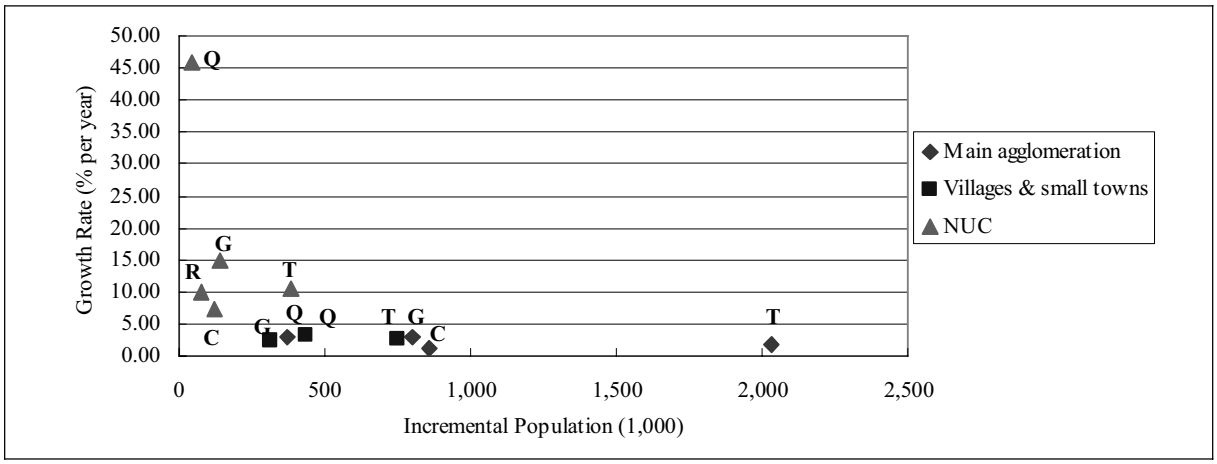
| Governorate | Population (1,000) | | | | | | Growth Rate in 1996-2006 (% per year) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Main Agglomeration | | Villages & Small Towns | | NUCs | | Main Agglo | V&S | NUCs |
| | 1996 | 2006 | 1996 | 2006 | 1996 | 2006 | | | |
| Cairo | 6,678 | 7,540 | 0 | 0 | 123 | 246 | 1.2 | - | 7.2 |
| Giza | 2,531 | 3,237 | 1,301 | 1,559 | 47 | 187 | 2.5 | 1.8 | 14.8 |
| Qaliobeya | 1,145 | 1,455 | 1,255 | 1,560 | 1 | 44 | 2.4 | 2.2 | 46.0 |
| 10th of Ramadan | 0 | 0 | 0 | 0 | 48 | 124 | - | - | 10.0 |
| Total | 10,355 | 12,232 | 2,556 | 3,119 | 218 | 601 | 1.7 | 2.0 | 10.7 |

Source: Census, CAPMAS, 2006




Source: Census, CAPMAS, 2006

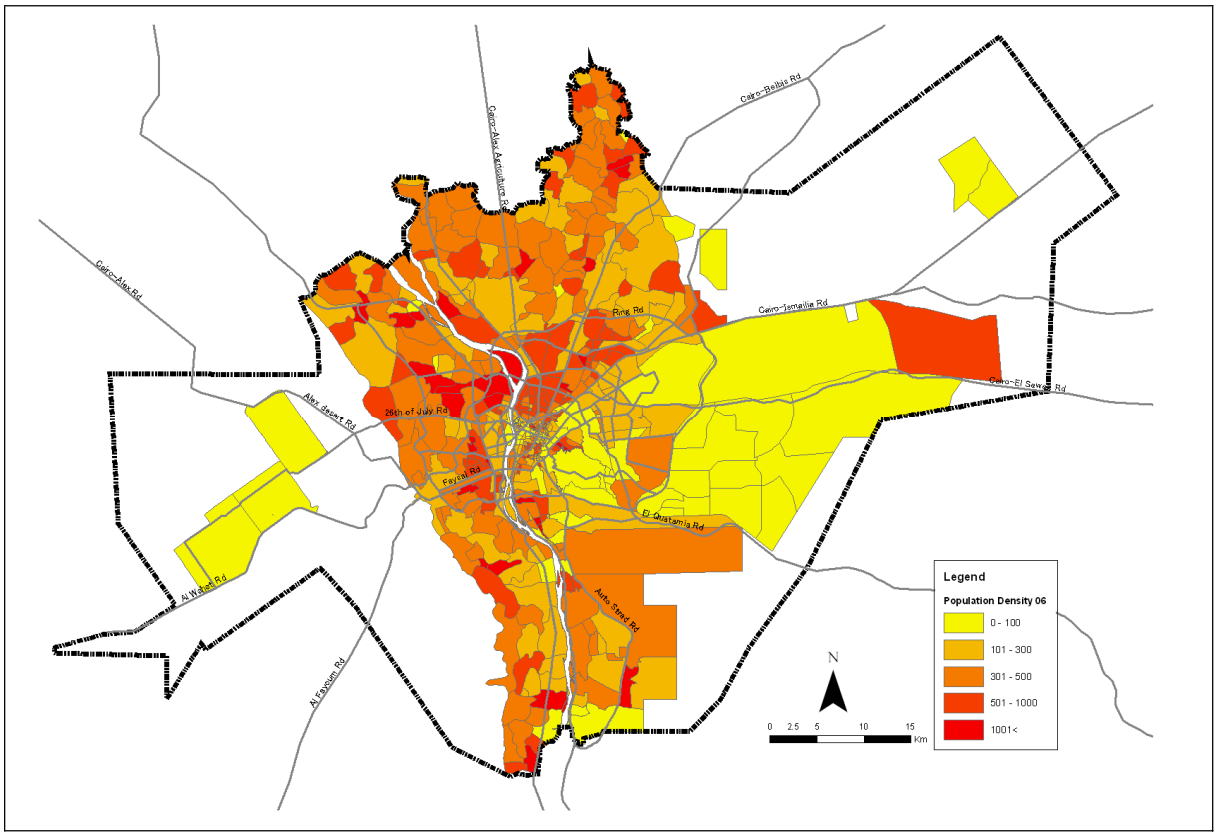
**Figure 2.2.7 Population Distribution by Built-up Area in 1996-2006**




Source: Census, CAPMAS, 2006
Note: C: Cairo, G: Giza, Q: Qaliobeya, R: 10th of Ramandan, and T: Total

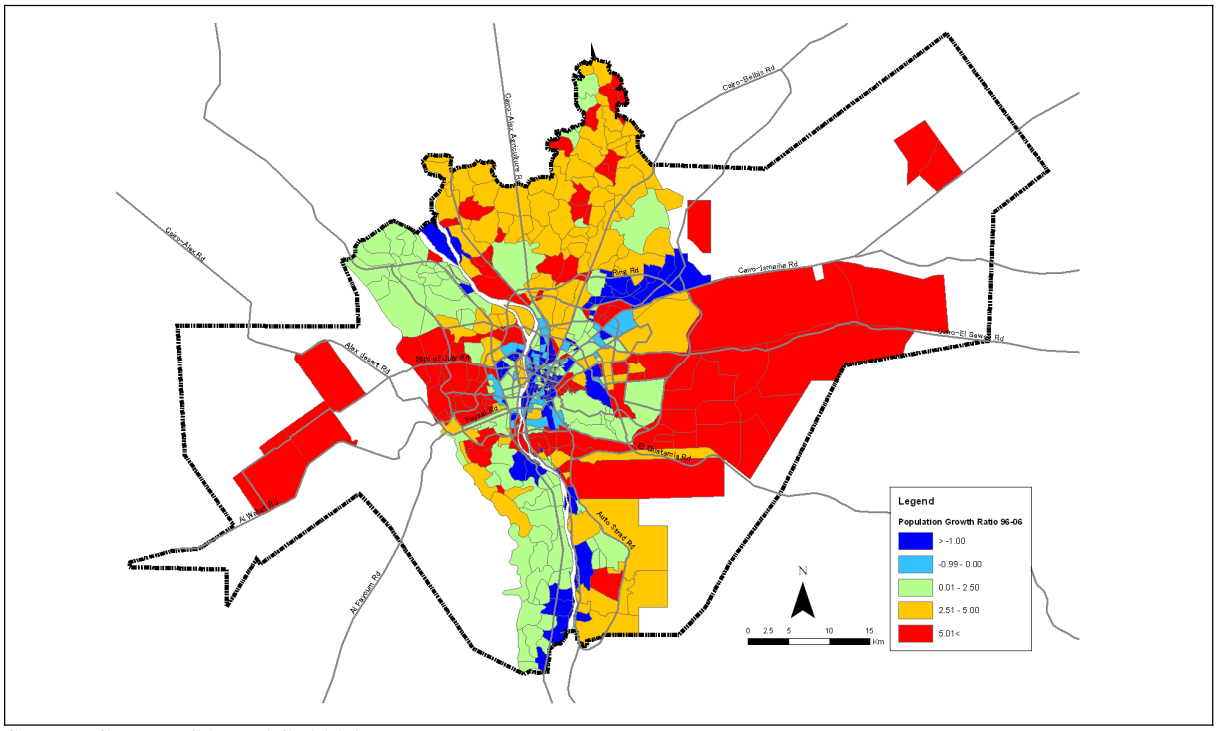
**Figure 2.2.8 Incremental Population and Growth Rate by Built-up Area in 1996-2006**

Population distribution by *shiakha*, which is the minimum sub-division of the administrative unit, in 2006 is depicted in Figure 2.2.9. *Shiakha* in the main agglomeration experienced negative growth rates in 1996-2006, and relatively high population growth rates were observed in *shiakha* outside the main agglomeration (Figure 2.2.10).




Source: Census, CAPMAS, 2006

**Figure 2.2.9 Population Distribution by *Shiakha* in the Study Area in 2006**



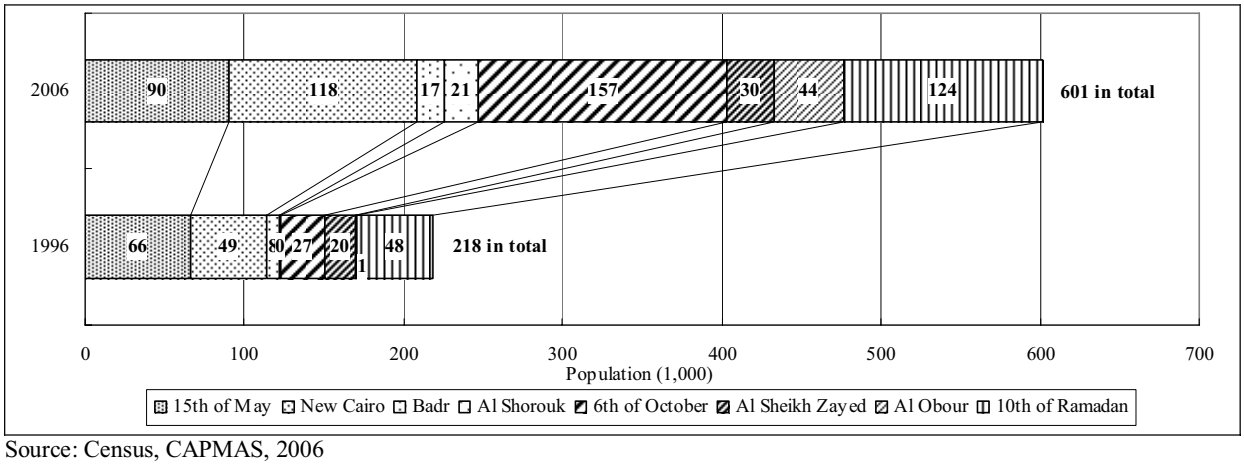

Source: Census, CAPMAS, 2006

**Figure 2.2.10 Population Growth Rate by *Shiakha* in the Study Area in 1996-2006**

(4) Population in new urban communities

NUCA estimated the existing population of NUCs at 1.5 million in 2006, while the future target was set at 11 million. Both figures are considerably larger than the 0.6 million estimated by the latest census in 2006. NUCA estimated the population based on the number of customers for water and electricity connections, while the census counted the population actually living in the units. The statistics differ because different definitions of the existing population were used by each organization.

The high population growth rate contributed to boosting the incremental population in NUCs. The population growth for the NUCs during the 10 years between 1996 and 2006 was as high as 11%.

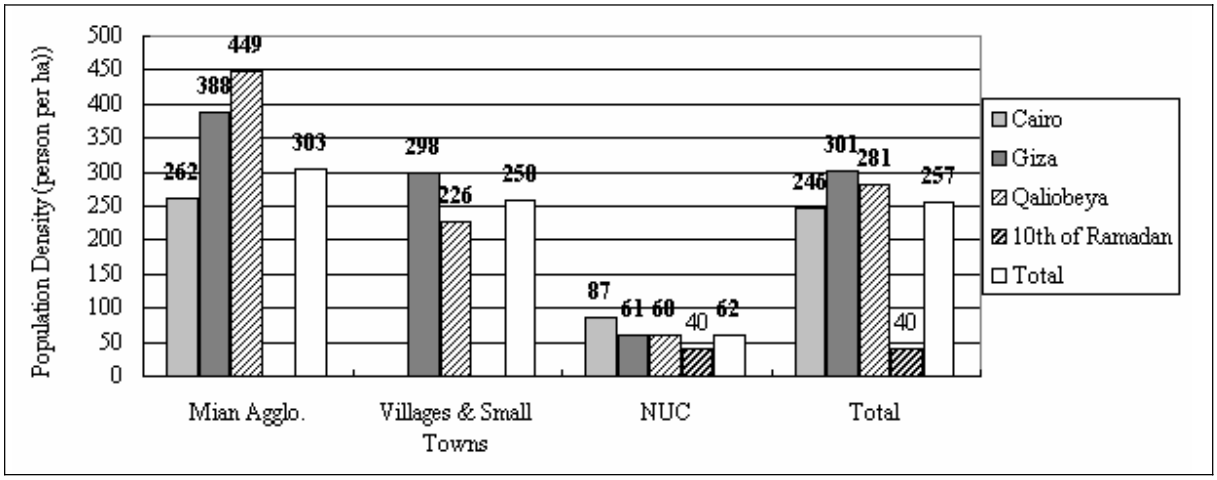



Source: Census, CAPMAS, 2006

**Figure 2.2.11 Existing Population by NUC in 1996 and 2006**

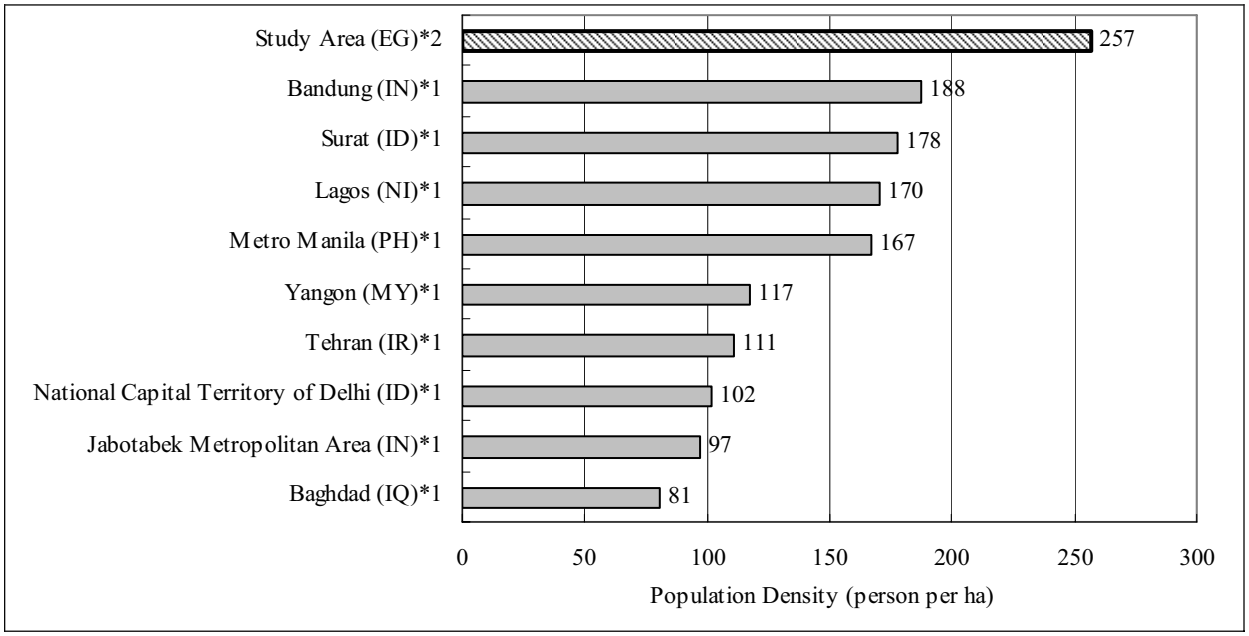
(5) Population density in the study area

The population density[2] in existing built-up areas within the study area was estimated at 257 persons per ha in 2006 (Figure 2.2.12). This was the highest population density of all metropolitan areas in the world (Figure 2.2.13). The main agglomeration had an even higher density of more than 300 persons per ha, and villages and small towns followed with 258 persons per ha. In particular, the main agglomeration in Qaliobeya had an extremely high density of 449 persons per ha. NUCs had the lowest density at 62 persons per ha.




Source: Census, CAPMAS, 2006

**Figure 2.2.12 Population Density by Built-up Area in the Study Area in 2006**

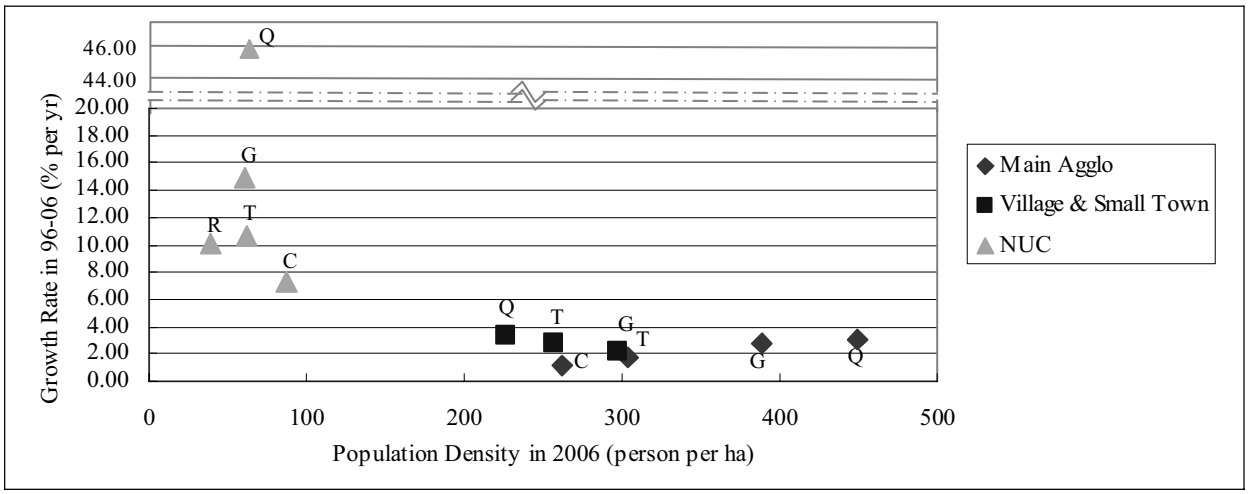



Source*1: World Urbanization Prospects Report, United Nations, 2005
Source*2: Census, CAPMAS, 2006
Note: EG: Egypt, ID: India, IN: Indonesia, IQ: Iraq, IR: Iran, MY: Myanmar, NI: Nigeria, and PH: Philippines

**Figure 2.2.13 Highest Population Density of Metropolitan Areas in the World**

[2] Population density was estimated based on the population by *shiakha* according to the latest census in 2006 and the existing built-up areas estimated from the satellite imagery in 2007.

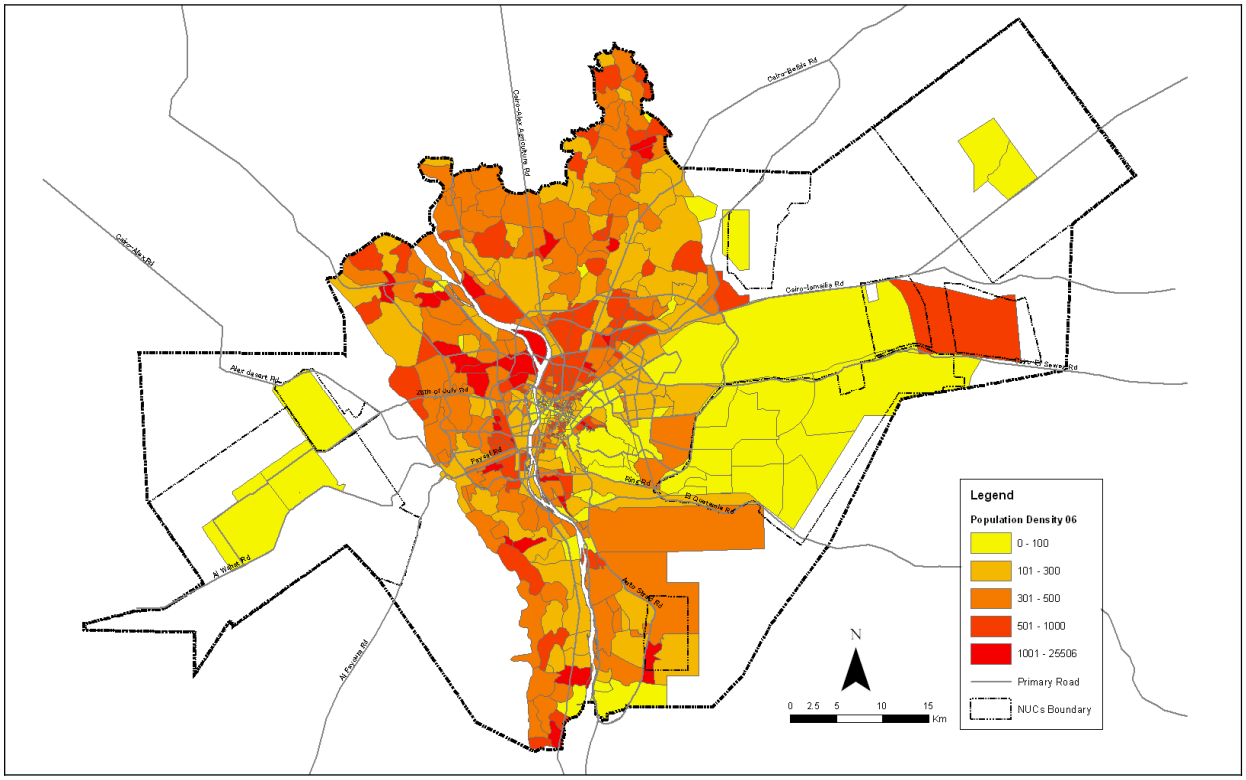
Figure 2.2.13 shows that population increase is still progressing in the high density areas, such as the main agglomeration and villages and small towns. These areas have more than 300 persons per ha and experienced a growth rate of more than 2% per year (Figure 2.2.14). This characteristic revealed that the population still increases mainly in areas that have a high population density, such as the main agglomeration and villages and small towns.




Source: Census, CAPMAS, 2006
Note: C: Cairo, G: Giza, Q: Qaliobeya, R: 10th of Ramadan NUC, and T: Total

**Figure 2.2.14 Population Density and Growth Rate by Built-up Area in the Study Area**

Figure 2.2.13 shows the population density of existing built-up areas by *shiakha* in 2006.



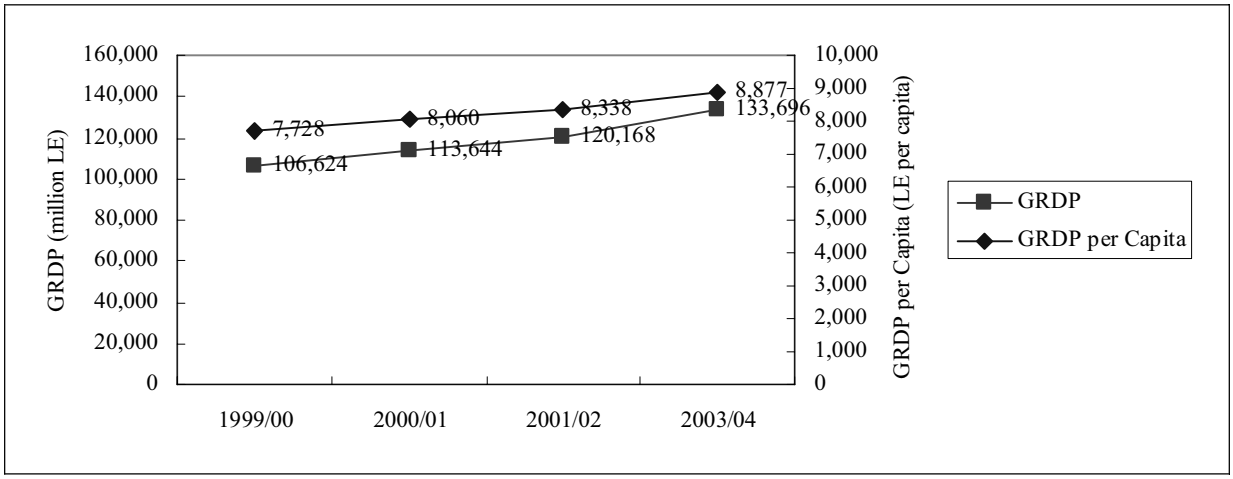

Source: JICA study team

**Figure 2.2.15 Population Density by *Shiakha* in the Study Area in 2006**

### 2.2.3 Economic Activities and Social Development

(1) GRDP and GRDP per capita in the study area

The Gross Regional Domestic Product (GRDP) of the study area moved in the same direction as GDP for the whole Egypt, but with different growth rates. For example, the GRDP growth rate for 2003/2004 was as high as 5.5% while GDP growth rate of Egypt was 4.2%. Figure 2.2.16 shows GRDP and GRDP per capita for the study area in 1999/2000-2003/2004.

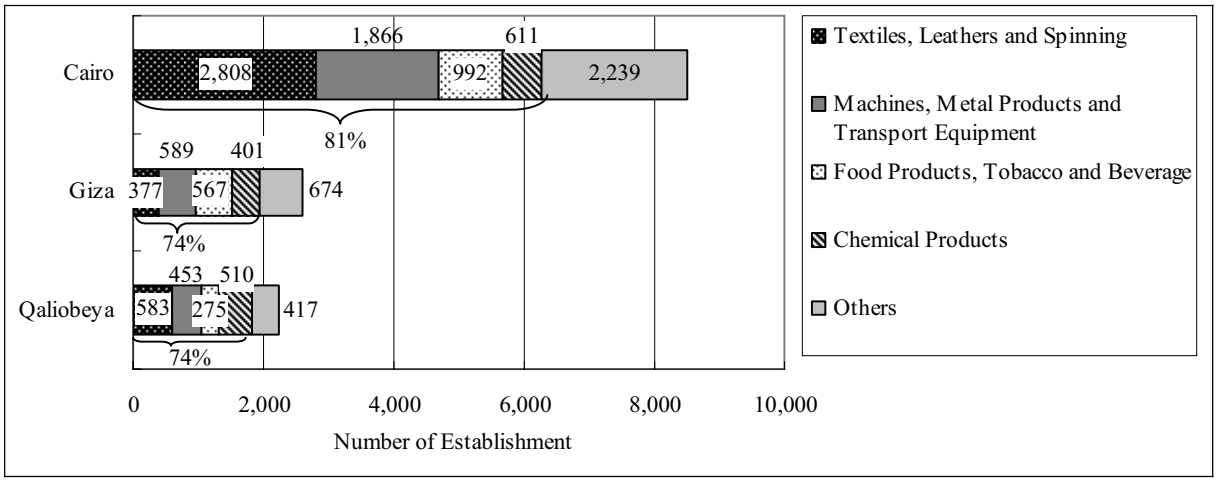



Source: Egypt Human Development Report, UNDP, 2005

**Figure 2.2.16 GRDP and GRDP per Capita in the Study Area in 1999/2000-2003/2004**

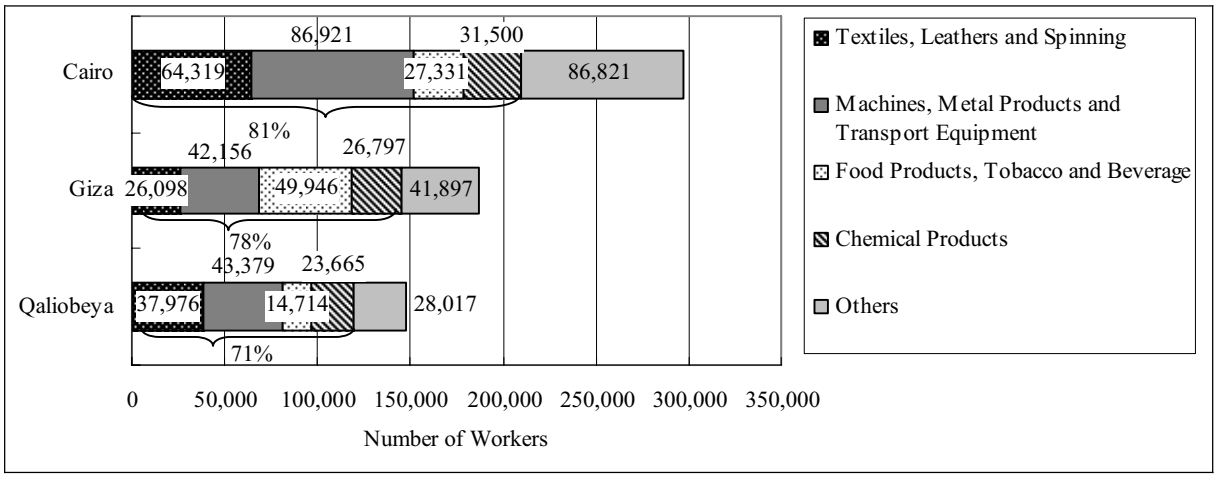
The high growth of GRDP in the study was led by the following five sectors: retail and wholesale, construction, tourism, telecommunication, and manufacturing. The study area had the largest retail and wholesale market of 16 million or more than 20% of the total population in Egypt. The construction sector was a major contributor to the Egyptian economy and it was one of its fastest-growing sectors. Large incremental population created demands for housing and utilities, which fueled economic growth. Owing to a rich archeological heritage, such as the pyramids and other major attractions, the tourism sector has supported growth of GRDP. The telecommunications and information technology sector has flourished in recent years, for example a new IT park "Smart Village" has been developed in the study area.

In the manufacturing sector, factories registered by the Industrial Development Authority (IDA) were dominated by four sectors: (i) textiles; (ii) machinery; (iii) food products; and (iv) chemical products. The number of relevant industries, in terms of the number of factories and the number of workers is shown in Figure 2.2.17 and Figure 2.2.18, respectively.




Source: Statistics, IDA, 2005
Note: Number of factories of Giza and Qaliobeya include ones in their whole administrative areas.

**Figure 2.2.17 Number of Factories by Main Activities Registered by IDA in Cairo, Giza, and Qaliobeya in 2004**




Source: Statistics, IDA, 2005
Note: Number of workers of Giza and Qaliobeya include ones in their whole administrative areas.

**Figure 2.2.18 Number of Workers by Main Activities Registered by IDA in Cairo, Giza, and Qaliobeya in 2004**

## (2) Education

The education system consisted of four different levels of primary, preparatory, secondary, and university. There were 3.4 million students in the study area in 2006. the enrolment rate for primary education was estimated at 100%. However, enrolment rates for preparatory and secondary education levels need to be improved, since their enrolment rates were at the relatively low level of less than 60% (Table 2.2.4).

**Table2.2.4 Number of Students by Education Level in the Study Area in 2006**

| Governorate | Number of Student (1,000) | | | | Attendance Rate (%) | | |
|---|---|---|---|---|---|---|---|
| | Pri. | Prep. | Sec. | Univ. | Pri. | Prep. | Sec. |
| Cairo | 752 | 288 | 344 | 190 | 100 | 74 | 76 |
| Giza | 681 | 72 | 108 | 255 | 100 | 20 | 30 |
| Qaliobeya | 379 | 114 | 132 | 59 | 100 | 60 | 65 |
| 10th of Ramadan | 14 | 4 | 8 | 0 | 100 | 50 | 57 |
| Total | 1,827 | 479 | 593 | 503 | 100 | 50 | 58 |

Source: Census, CAPMAS, 2006
Note: Primary (Pri.) covers six years education (6-11yrs old), Preparatory (Prep.) covers three years education (12-14 yrs old), Secondary (Sec.) covers three to five years education (15-17 yrs old), and University (Univ.) covers four years education (18-21 yrs old).

### 2.2.4 Conclusion related to Socio-Economic Conditions

(1) Population growth

Existing population in the study area increased to 16 million in 2006, with an annual growth rate at 2.22% higher than that of three Cairo region governorates. The population growth was led by NUCs, which experienced a high rate of more than 10% per year in 1996-2006. Villages and small towns had a growth rate of 2.0% per year higher than that of main agglomeration. Incremental population shifted from the central part of main agglomeration, in which the *shiakha* experienced the negative growth rate, to its outskirts, villages and small towns, and NUCs.

(2) Population distribution

The main agglomeration still had a large share of the total population (77%), even though its growth rate was lower than that of NUCs and villages and small towns. A large amount of the incremental population still occurred in the main agglomeration.

(3) Population density

The study area had a high density of 351 persons per ha in 2006. Within the existing built-up area, the main agglomeration formed very dense areas with 397 persons per ha. Population increase is still progressing in the highly density areas, with an annual growth rate of 1.7%.

(4) Economic activities and education

High GRDP growth rates were observed in recent years, and this was led by five sectors: (i) retail and wholesale; (ii) construction; (iii) tourism; (iv) telecommunications, and (v) manufacturing.

Provision of education achieved to satisfactory levels for the primary education, for which the enrolment rate was estimated at 100% in 2006. Preparatory and higher education needs to improve their enrolment rates.