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## **Interim Report**

**IR-07-010**

# Population and Human Capital Growth in Egypt: Projections for Governorates to 2051

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## **Abstract**

Human capital formation has been chosen as the initial focal point of this new IIASA population-development-environment case study on Egypt. With its population still likely to double and its water resources severely restricted, Egypt faces formidable population- and environment-related challenges. The government has an explicit population policy aimed at bringing the fertility rate down to replacement level by 2017. With its options for agricultural development severely limited, the future livelihood of this rapidly growing population can only be secured through rapid development in the industrial and service sectors. For both sectors, human capital development is a necessary prerequisite for success. Of course, such development needs to be complemented by the right investment and trade policies. But without a sufficiently well-educated population, Egypt will not be able to compete in the global service and industry markets. The study explores the human capital dimension at the aggregate level for the whole of Egypt and at the governorate level, distinguishing between 21 governorates and the Frontier Region. For each of the governorates a multi-state population projection model is defined that differentiates the population by age, sex, and level of education. The scenarios demonstrate the momentum of educational development: The challenges will be important for those governorates where past investments in education have been insufficient, especially for the female population, and where the working-age population will increase tremendously, such as in Fayoum, Menia, Assyout, and Suhag. The projections point to the necessity of major structural changes in the development of Egypt.

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## List of Acronyms and Technical Notes

ASFR – Age-specific fertility rate

ASMR – Age-specific mortality rate

CAPMAS – Central Agency for Public Mobilization and Statistics, Cairo, Egypt

CDC – Cairo Demographic Center

Dependency ratio – Population aged less than 15 and over 64 (dependent population), divided by the population aged 15 to 64 (productive population)

DHS – Demographic and Health Survey

EDHS – Egypt Demographic and Health Survey

ESCWA – United Nations Economic and Social Commission for Western Asia

GDP – Gross domestic product

HDI – Human development index

IIASA – International Institute for Applied Systems Analysis, Laxenburg, Austria

IMR – Infant mortality rate

LE – Life expectancy

NIDI – Netherlands Interdisciplinary Demographic Institute

NIR – Natural increase rates

NMMS – National Maternal Mortality Study

SAP – School-age population

TFR – Total fertility rate

U5MR – Under-five mortality rate

UN – United Nations

UNDP – United Nations Development Programme

UNESCO – United Nations Educational, Scientific and Cultural Organization

UNFPA – United Nations Population Fund

UNICEF – United Nations Children's Fund

USCB – United States Census Bureau

WAP – Working-age population

# Population and Human Capital Growth in Egypt: Projections for Governorates to 2051

Anne Goujon, Huda Alkitkat, Wolfgang Lutz, and Isolde Prommer

## Introduction

People are said to be the wealth of nations. But it makes a big difference for the wealth whether the people are illiterate or highly educated. Human capital acquired through education is generally considered to be one of the key prerequisites for economic and social development. Yet the process by which investments in education are being slowly translated into a higher educational attainment of the working-age population has so far not been given enough attention. The explicit description of the dynamics of human capital accumulation in Egypt as a whole and its individual governorates is the explicit focus of this publication.

The work described here has been carried out in scientific collaboration between IIASA's World Population Program and the Cairo Demographic Center. It is part of a broader IIASA effort to study the role of population trends and human capital in the sustainable development of individual countries. In this sense it fits into the tradition of more comprehensive population-development-environment studies as they have been carried out for a number of African countries (Lutz et al. 2002). Since population growth and human capital are of such overriding importance for the future development of Egypt, it was decided to cover this previously understudied area in considerable detail. These results will then be put into the context of broader development and environment challenges for Egypt, with special emphasis on future fresh water availability per person.

This report considers the future of human capital in Egypt at the national and sub-regional (governorates) levels by using the methodology of the multi-state population projection model. This model is implemented through several scenarios. It provides useful insight into the role that human capital could play for Egypt in the future if the necessary investments are allocated to education.

It seems evident that Egypt will only be able to cope with its population-development-environment challenges if it manages to significantly advance its economic development and slow population growth, where an emphasis on human capital formation (education) is likely to be a key factor. On the other hand, the situation of the education system in Egypt was and still is strongly influenced by the overall development of the country. More specifically, the main challenges facing the population of the country are high population growth rates, high density, poverty and unemployment, large gender gaps, and severe regional disparities. However, Egypt is



leading in educational attainment among all Arab countries of Northern Africa and the Middle East, even if it is the product of severe imbalances in the levels of educational attainment of the population. On the one hand, there is a large quantity of university graduates mostly in the humanities, whereas on the other hand, there is still a large proportion of children that achieve neither primary nor basic education (including primary and preparatory education) (Richards 1992). In 2006, we estimate that almost 50 percent of the population has not completed basic education (compulsory education including six years of primary and three years of junior secondary education), while the other 50 percent has a higher secondary education or more.

Economically at the beginning of the 21<sup>st</sup> century, Egypt faces several contradictory challenges. One of these is unemployment, the level of which has been increasing since the early 1990s (Fawzy 2002). Many authors emphasize the importance of increasing the labor intensity of growth (e.g., World Bank 1997; Radwan 1997). Although Egypt seems to have a competitive edge that enables its exports to compete on world markets, it seems not to realize its full potential partly because the country cannot rely on a skilled labor force, as can be seen from the changes in the Global Competitiveness Index<sup>1</sup> where Egypt ranks far below other countries in the region (for example, Tunisia), mostly because of the inadequacy of the labor force skills (Radwan 1997, World Economic Forum 2006). Unemployment is especially prevalent among those people with a completed secondary education, followed by those with a tertiary education. It is also particularly present among the new entrants in the labor market (UNDP 2005). The situation stems from a vicious circle: The persistent low levels of educational attainment of the labor force that would be the necessary ingredient to steer Egypt onto a different development path (Birdsall and Londoño 1997), prevent those who are educated from finding the necessary employment. Female education is one key element because of the high social returns and increased labor productivity associated with higher levels of education (Sachs 1996). At the moment, 44 percent of the female population 15+ is illiterate and 54 percent have not even completed primary education.

Although it is not the focus of this paper, several reports (Radwan 1997; Richards 1992; Galal 2003; UNDP 2005) point to severe shortages in terms of the efficiency and quality of education to provide the necessary skills for sustainable development. Egypt seems to lack workers who have the vocational and technical training required to increase worker productivity, technological adaptation, and innovation. Education and training have emerged as key drivers of competitiveness, ensuring that the labor force has access to new knowledge and is trained in new processes and the latest technologies. Although the report will tackle mostly the issue of increases in the quantity of education in the population through a comprehensive assessment of the changing composition of the population by age, sex, and level of formal educational attainment, we should always keep in mind that those should not be achieved at the expense of quality, and that both endeavors should be pursued in parallel.

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<sup>1</sup> The Global Competitiveness Index (World Economic Forum 2006) is a composite index calculated yearly for the past five years and ranks countries according to their scores in nine areas that are critical to driving productivity and competitiveness such as institutions, infrastructure, macro-economy, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation.

In this study we use the methodology of multi-state population projection to calculate the proportions by levels of educational attainment for five-year age groups of men and women for the period 1996 to 2051 for all governorates plus the whole of Egypt. The report is divided into three main parts. The first part analyses the past and present evolution of the main determinants of future population levels of educational attainment especially related to the labor force (working-age population) and to the disparities existing among the different regions. The second part presents the methodology used for the projections as well as the base-year parameters in terms of population, fertility, mortality, migration, and education transition as well as the scenario developed. The last part looks at the results of the projections with a special section on the whole of Egypt, together with some individual results for all governorates. Complete results and age pyramids are presented in the Appendix.

## **Background**

We will review some of the main demographic, educational, and employment characteristics of Egypt to provide the reader with a picture of the country at the starting point of our projection work. Egypt is divided into four basic regions: Urban governorates, Lower Egypt, Upper Egypt, and Frontier governorates. These regions are subdivided into the following 27 governorates (see also Figure 1):

- Urban governorates: Cairo, Alexandria, Port-Said, and Suez.
- Lower Egypt: Damietta, Dakahlia, Sharkia, Kalyoubia, Kafr El-Sheikh, Gharbia, Menoufia, Behera, and Ismailia.
- Upper Egypt: Giza, Beni-Suef, Fayoum, Menia, Assyout, Suhag, Quena, Aswan, and Luxor.
- Frontier: Red Sea, New Valley, Matrouh, North Sinai, and South Sinai.

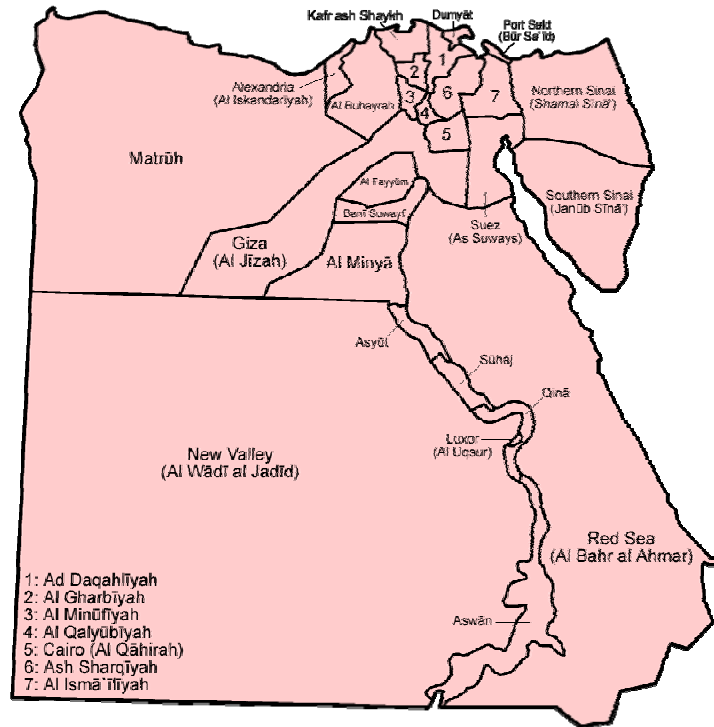


Figure 1. Map of Egypt and its governorates. Source: Wikipedia Commons available at: [http://commons.wikimedia.org/wiki/Image:Egypt\\_governorates\\_english.png#file](http://commons.wikimedia.org/wiki/Image:Egypt_governorates_english.png#file)

## Population

The population of Egypt accounts for one-fourth of the population in the Arab world. This is a country of high population growth – it almost tripled between 1950 and 2005, from 25 million to more than 70 million in 2005. In 1996, according to the census (CAPMAS 1998), Egypt had about 59 million persons distributed among 27 governorates. Although the 2006 Egyptian census results were not yet available at the time of this writing, preliminary estimates show a rapid population increase, with the total population reaching 71 million (estimates as per 1.1.2006 from the Central Agency for Public Mobilization and Statistics). The United Nations estimated the Egyptian population to be 74 million in 2005. However the rate of population growth has been steadily leveling off during the previous decades, from 2.4 percent in 1976-1986 to 2.1 percent in 1986-1996 and 1.9 percent in 1996-2006. At the moment, most of the increase comes from the rural governorates in Lower and Upper Egypt, as well as in the Frontier governorates (see Table 1).

Table 1. Births, deaths, and natural increase rates by governorate and for the whole of Egypt in 2004. Source: CAPMAS (2004).

Governorates	Births	Deaths	NIR	Governorates	Births	Deaths	NIR
Cairo	23.9	6.4	17.5	Beni-Suef	27.9	6.8	21.1
Alexandria	23.9	6.7	17.2	Fayoum	27.4	6.3	21.1
Port-Said	21.0	5.8	15.2	Menia	28.9	6.9	22.0
Suez	26.8	6.2	20.6	Assyout	28.1	7.1	21.0
Damietta	26.9	6.6	20.3	Suhag	27.2	6.8	20.4
Dakahlia	25.2	6.2	19.0	Quena	26.4	6.3	20.1
Sharkia	27.0	6.1	20.9	Aswan	25.4	6.1	19.3
Kalyoubia	24.7	6.2	18.5	Luxor	24.6	6.9	17.7
Kafr El-Sheikh	25.0	6.1	18.9	Red Sea	25.8	5.0	20.8
Gharbia	24.1	6.2	17.9	New Valley	25.8	5.2	20.6
Menoufia	24.6	6.0	18.6	Matrouh	35.9	6.3	29.6
Behera	25.1	6.0	19.1	North Sinai	30.6	6.2	24.4
Ismailia	29.0	6.5	22.5	South Sinai	26.5	6.2	20.3
Giza	25.9	6.5	19.4	Total Egypt	25.8	6.4	19.4

The working-age population (aged 15-64) and the school-age population (aged 5-24) have increased tremendously during that period (see Figure 2). The working-age population more than doubled between 1970 and 2000, from 19 to 40 million. The high levels of unemployment can be partly explained by this increase, especially after 1985, where the proportion of the population in the working-age population increased strongly. The increase in the school-age population has been less dramatic than that of the labor force: from 8 million in 1970 to 16 million in 2005, with a visible leveling off in the last five years (2000-2005).

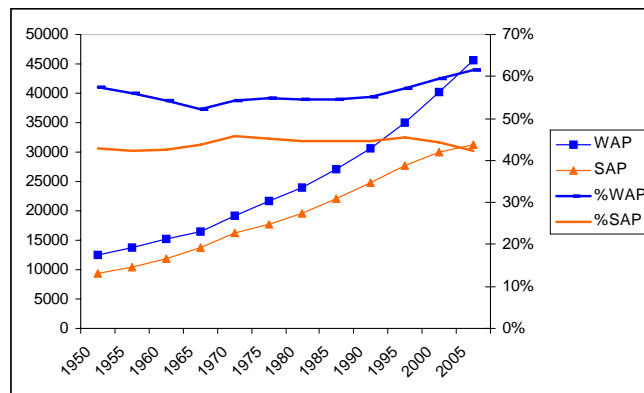


Figure 2. Working-age population and school-age population, 1950-2005, in absolute numbers (in thousands) and in proportion of the total population (in percentage). Source: UN (2005a).

The total dependency ratio (the ratio of the sum of the population aged 0-14 and that aged 65+ to the population aged 15-64) has been acting accordingly: it was above 80 percent for most of the period 1960 to 1995 (see Figure 3). Since 1990-1995, it began to descend due to the decline of the share of the young in the total population and the increase in the labor force population. This shows that Egypt could enter the window of opportunity where it could benefit from a large labor force.

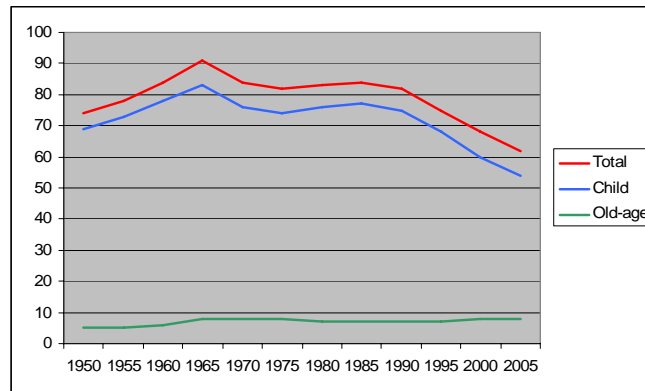


Figure 3. Total, child and old age dependency ratios, 1950-2005. Source: UN (2005a).

### Fertility

In comparison to other Arab countries, Egypt is a country where the decline in fertility was quite slow during the period 1980-2000, together with some other Muslim countries such as Sudan, Bahrain, Yemen, etc. (ESCWA 2005). However, there are two main phases in the fertility decline of Egypt (see Figure 4). It was quite rapid during the period between 1980 and the mid-1990s where the total fertility rate went from 5.3 children per woman (1979-1980) to 3.3 children (1995-1997). Between 1995 and 2005, the trend in fertility decline slowed down, and two Demographic and Health Surveys indicated an increase in TFRs around 1998 and 2000 that was mostly discussed in the literature (Engelhardt 2005; Eltigani 2003; El-Zanaty and Way 2004). Eltigani's (2003) analysis shows that the stalling occurred mostly among women from middle and high standard households, while the fertility of women from low standard households declined importantly, mainly through delayed age at marriage and reduced fertility within the bound of marriage. Engelhardt (2005) finds that the DHS data on which the analysis is based suffers from various distortions in terms of women's age and underreporting of below age five children. Moreover, when looking at the tempo effect, she finds that there was little fertility decline between 1992 and 1996, but a resumed fall from 1997 to 1999 due mostly to the increase in contraceptive use. The latest DHS surveys (2003 and 2005) point to the return of a general fertility decline although at a slower pace. The TFR in 2005 was estimated at 3.1 children per woman in the whole of Egypt.

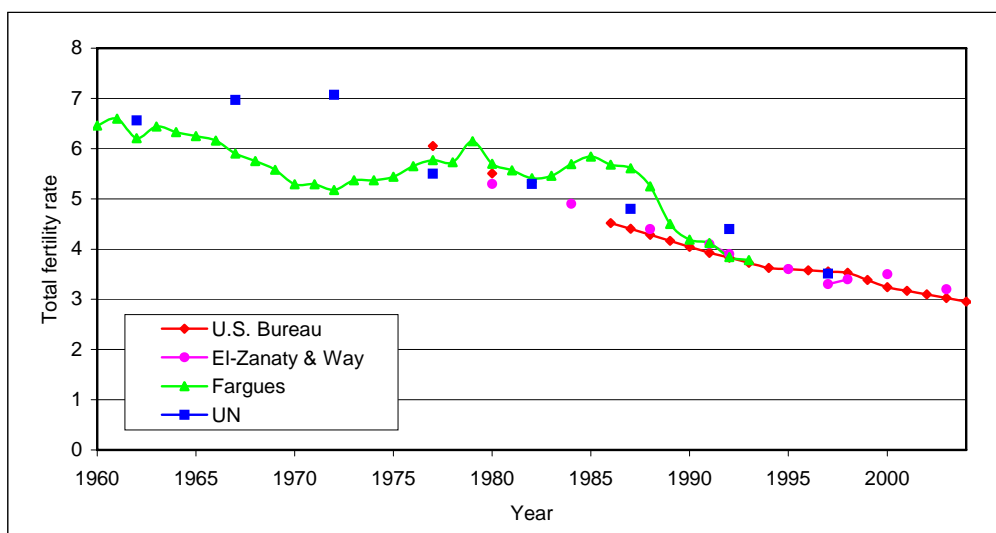


Figure 4. Estimates of total fertility rates per woman in Egypt. Source: Engelhardt (2005: 1). Data sources: Fargues (1997); El-Zanaty and Way (2004); UN (2000b); USCB (2004).

At the regional level, Table 2 shows that fertility has been declining continuously in Upper Egypt, the region with the highest fertility, where TFR went from 5.4 in 1980 to 3.7 in 2005. In other regions, the TFR marked a pause in its decline between 1995 and 2000 as observed at the national level. This was especially true in the Urban governorates. After the return of decline in 2000, its pace has been more homogenous across regions as all four seem to be following a parallel path.

Table 2. Total fertility rates in Egypt by place of residence, 1988-2005. Source: El-Zanaty and Way (2006).

Place of residence	Total Fertility Rates				
	1988	1992	1995	2000	2005
Total Egypt	4.4	3.9	3.6	3.5	3.1
Urban governorates	3.0	2.7	2.8	2.9	2.5
Lower Egypt	4.5	3.7	3.2	3.2	2.9
Urban	3.8	2.8	2.7	3.1	2.7
Rural	4.7	4.1	3.5	3.3	3.0
Upper Egypt	5.4	5.2	4.7	4.2	3.7
Urban	4.2	3.6	3.8	3.4	3.1
Rural	6.2	6.0	5.2	4.7	3.9
Frontier governorates	-	-	-	3.8	3.3

In 2005, rural Upper Egypt had the highest TFR with 3.9 children per woman, followed by the Frontier governorates with 3.3 children. Women in rural Lower Egypt (3.0 children) have almost a similar fertility rate as women in urban Upper Egypt (3.1 children). The lowest TFR can be found in the Urban governorates (2.5 children). Table 3 shows fertility by levels of education across several DHS covering the period 1988-

2005. It reveals that the TFR decreases rapidly with increasing educational level. Even a few years in school are sufficient to reduce fertility. For instance in 1992, women with no education had 5.0 children, whereas women with an incomplete primary education had 4.0 children. The differentials have been diminishing over the last 17 years; the difference between the lowest and the highest category was 2.2 children in 1988 and is only 0.8 in 2005. This is mainly due to the rapid decline in the fertility of women with no education (from 5.4 children in 1988 to 3.8 children in 2005) and with uncompleted primary education (from 4.8 in 1988 to 3.4 in 2005). The fertility of women with a secondary education and higher has been more or less constant during the last 15 years, at around 3.0 children per woman. According to the earlier study of Eltigani (2003), households with higher education and higher income levels were responsible for the stalling of fertility at a time when women in other education categories also experienced a leveling off of their fertility. A study conducted by the CDC (2006) shows that the gender bias toward boys and the desire to have three children, added to the pressure from the close surrounding communities, are the main reasons given by the interviewed participants for having more than two children among the educated people in Egypt.

Table 3. Fertility by level of education. Source: El-Zanaty and Way (2001).

Level of Education	Total Fertility Rates				
	1988	1992	1995	2000	2005
No education	5.4	5.0	4.6	4.1	3.8
Primary incomplete	4.8	4.0	3.7	3.8	3.4
Primary complete	3.6	3.0	3.1	3.4	2.9
/some secondary					
Secondary complete	3.2	2.9	3.0	3.2	3.0
/higher					
Total Education	4.4	3.9	3.6	3.5	3.1

## Mortality

According to the United Nations *World Population Prospects 2004* (UN 2005a), life expectancy at birth has increased by 27 years over the past 50-year period, from 42.4 years in 1950-1955 to 69.6 years in 2000-2005. This represents an enhancement of about 6 months per year across the reference period. The increment was nearly linear with a slight slowdown in the period 1970-1975 to 1980-1985.

Analyzing the LE by governorates (Table 4), the greatest gender difference in LE is 3.7 years in Kafr El-Sheikh (Lower Egypt) and the smallest difference is in Quena (Upper Egypt). People live longest in New Valley (Frontier governorates) (on average 69.8 and 70.0 years). Men live shortest in the governorate of Ismailia (Lower Egypt) and reach on average 63.6 years; females live shortest in the governorate of Assyout (Upper Egypt) and reach on average 65.7 years. The biggest gender differences and the lowest LE are in the regions of Lower Egypt. The governorates of Upper Egypt experience a smaller gender gap and higher LE, but these governorates are split into two major groups, namely, the ones with a gender gap above two years – these border Lower Egypt – and the ones below or around one year. The Urban and Frontier governorates have a gender gap between 0.3 years (New Valley, Frontier governorates)

and 2.2 years (Cairo). It is not surprising that the governorates with the lowest life expectancy are those with the biggest gender gap, lowest urbanization rates, and lowest HDIs (see Table 4). The HDI is a compound index based on measures of literacy rates, GDP per capita, and LE.

Most of the improvements that happened at the level of childhood mortality during the period 1960-1980 are due to the reduction of the incidence of diarrheal diseases that, until 1979, accounted for roughly half of all infant and childhood deaths in Egypt (Miller 1992).

The actual estimated value for the infant mortality rate by the UN (2005a) is 37 deaths per 1,000 live births for both sexes in the period 2000-2005. To reach the Millennium Development Goal Target 5 (UN 2000a) to reduce by two-thirds, between 1990 and 2015, the under-five mortality rate by the year 2015, Egypt has to further decrease its IMR to 25, and the under-five mortality rate to 34. According to the *Egypt Interim Demographic and Health Survey 2003* (El-Zanaty and Way 2004), as quoted in UN (2005b: 96), the U5MR was 45.7 and the IMR was 38 by the year 2003.

The IMR and the U5MR are higher for males than for females. Based on UN (2005a), there is no evidence that gender discrimination plays a role in Egypt. But considering the results of various *Egypt Demographic and Health Surveys*, the childhood or child mortality rate is higher for females than for males (e.g., the rates are 14.6 for boys compared to 16.1 for girls in the EDHS 2000 (El-Zanaty and Way 2001); 38.2 for boys and 46.8 for girls in the EDHS 1988 (Sayed et al. 1989)). According to these data, not only the mortality rates decreased, but also the gender gap. In the EDHS 1988, the female rate was 18 percent higher than the male rate; in the EDHS 2000 the female rate was only 2 percent higher. The national vital registration under-reports the infant mortality rate, otherwise the adjusted ratios would not be higher than the unadjusted ones (i.e., compared to the UN 1998 data used in UN 2005a; USCB 2005; UNICEF 2006; Hill et al. 1998). But more importantly, the gap of the adjusted and registered ratios became smaller over time. The EDHS 1992 (EDHS-II) (El-Zanaty et al. 1993), 1995 (EDHS-III) (El-Zanaty et al. 1996), and 2000 (EDHS-IV) (El-Zanaty and Way 2001), and the DHS Interim Reports of the years 2003 (El-Zanaty and Way 2004), 1998 (EIDHS 1999), and 1997 (EIDHS 1998) also show a constant decline of the U5MR and IMR. Comparing the IMR and U5MR of the EDHS surveys to other data sources, the EDHS is fairly close to those values or below those with the exception of the vital statistics (Hill et al. 1998).

The more recent estimates of maternal mortality rates show an improvement and give a value of 84 maternal deaths per 100,000 live births in the year 2000, and a lifetime risk of maternal death for one woman in 310 (AbouZahr and Wardlaw 2001: Annex Table G). The same source estimates the number of maternal deaths at 3,000 in 1995 and 1,400 in the year 2000.



Table 4. Comparison of life expectancy at birth (in years), estimates, by administrative regions, by different sources, 1996-2001. The sources are listed at the bottom of the table.

Governorate	LE male (1996-2001)	LE female (1996-2001)	Gender difference (1996-2001)	LE both sexes (2001)	Rural pop. (as % of total) 2001	HDI (2001)	HDI rank	LE both sexes (2002)	Rural pop. (as % of total) 2001	HDI (2002)	HDI rank
Urban governorates				68.1	0	0.756	1	71.1	0	0.765	1
Cairo	66.5	68.7	2.2	67.7	0	0.752	3	70.7	0	0.762	2
Alexandria	66.0	67.0	1.0	67.9	0	0.741	5	70.9	0	0.752	4
Port-Said	65.5	67.0	1.5	68.5	0	0.774	1	71.6	0	0.78	1
Suez	66.2	67.5	1.3	68.2	0	0.753	2	71.2	0	0.761	3
Lower Egypt				67.5	71.1	0.678	3	70.5	71.1	0.666	3
Damietta	65.3	67.6	2.3	68.4	72.2	0.708	8	71.5	70.4	0.717	5
Dakahlia	64.7	68.2	3.4	67.7	71.7	0.677	16	70.7	71.7	0.685	11
Sharkia	65.3	67.7	2.4	67.2	77.4	0.659	18	70.2	77.4	0.668	13
Kalyoubia	66.0	68.2	2.2	68.5	51.6	0.690	13	71.6	59.2	0.694	10
Kafr El-Sheikh	64.2	67.9	3.7	66.6	76.6	0.654	20	69.6	76.7	0.66	14
Gharbia	65.8	68.9	3.1	68.2	68.1	0.696	10	71.2	68.6	0.703	7
Menoufia	66.5	69.3	2.8	67.5	79.8	0.680	15	70.5	79.7	0.677	12
Behera	64.8	67.8	3.1	67.5	76.9	0.649	21	70.5	79.9	0.655	15
Ismailia	63.6	66.5	2.9	66.9	49.8	0.704	9	69.9	49.9	0.709	6
Upper Egypt				66.2	69.3	0.649	4	69.2		0.653	4
Giza	65.3	66.1	0.8	65.6	45.5	0.690	13	68.5	40.5	0.694	9
Beni-Suef	64.7	67.6	2.9	67.6	76.6	0.613	24	70.6	76.6	0.621	17
Fayoum	66.1	68.3	2.3	65.6	77.7	0.599	27	68.5	77.7	0.603	22
Menia	64.8	66.9	2.1	65.4	80.8	0.609	25	68.3	80.8	0.618	20
Assyout	64.7	65.7	1.0	66.7	72.9	0.616	23	68.3	73.0	0.618	20
Suhag	65.7	66.6	1.0	66.5	78.5	0.609	25	69.5	78.6	0.618	18
Luxor				66.5	78.8	0.628	22	69.5	78.8	0.618	19
Quena	67.0	67.1	0.1	65.9	53.7	0.658	19	68.8	53.4	0.646	16
Aswan	66.6	67.7	1.1	67.2	56.2	0.691	12	72.2	57.6	0.696	8

Governorate	LE male (1996-2001)	LE female (1996-2001)	Gender difference (1996-2001)	LE both sexes (2001)	Rural pop. (as % of total) 2001	HDI (2001)	HDI rank	LE both sexes (2002)	Rural pop. (as % of total) 2001	HDI (2002)	HDI rank
Frontier governorates				67.2	43.4	0.711	2	70.1	42.3	0.708	2
Red Sea	67.3	68.7	1.4	67.2	27.6	0.741	5	70.2	27.8	0.729	
New Valley	69.8	70.0	0.3	67.2	51.7	0.718	7	70.2	51.5	0.72	
Matrouh	67.6	68.3	0.7	67.1	46.1	0.661	17	70.1	44.9	0.666	
North Sinai	67.2	68.5	1.3	67.2	44.8	0.694	11	70.2	71.9	0.692	
South Sinai	64.2	66.1	1.9	67.1	50.7	0.747	4	70.1	50.7	0.735	
Total Egypt	64.6	66.2	1.6	67.1	57.1	0.680		70.1	69.4	0.687	
Egypt 1995-2000 (UN 2005a)	65.6	69.6	4.0	67.6	57.9 (2000)						
Sources:	Authors' estimates			UNDP (2003: 133) Annex Table G.1 and G.8				UNDP (2004: 183) Annex Table G.1 and G.8			

The National Maternal Mortality Study of the year 2000 provides ratios on a regional level and shows that mothers face the highest risk to die when they live in the Frontier governorates, and the lowest risk in metropolitan Egypt (Ministry of Health and Population 2001: 4). Most of the maternal deaths, namely two out of three women (62 percent), took place in health facilities, followed by deliveries at home (29 percent), and 9 percent during transport. We should note that in the NMMS study, the lowest mortality ratios are found in the Urban governorates. Most improvements since 2000 have occurred in the Urban governorates and in Upper Egypt.

Gwatkin et al. (2003) show that independent of their residence, women finishing the fifth grade of primary school are more likely to attend antenatal care, deliver in a health care institution, use modern contraceptives, and be vaccinated against tetanus. Further, children of the poorest quintile have three times more risk of dying in their first year of life when they are born at home without any attendance of medically trained persons, and less likely when the mothers finish at least the fifth grade of school.

## **Migration**

Migration has been very important in Egypt for the last decades. However, the statistics on migration have been very poor; migration is very volatile and permits little analysis (Cochrane and Massiah 1995). Egyptian emigration is mostly directed to the Gulf States. CAPMAS (2000) estimated the number of Egyptians abroad in 2000 to be around 2.7 million, of which 1.9 are in the Arab Gulf countries and in Libya, and 0.8 million in North America, Western Europe (Italy and Greece) and Australia. There were two important moments in the migration pattern. Between 1970 and 1985, when unemployment began to soar and salaries in the public sphere were very low, a wave of emigration started for the higher educated Egyptians who could find better-paying positions in the major oil exporting countries, whose economies were blooming due to the increase in oil prices (Richards 1992; Radwan 1997). It was estimated that about 10 to 15 percent of the labor force migrated during this period. This trend also includes university staff, which had an adverse effect on the quality of higher education (Richards 1992). When the Iraq war broke out in 1990, many Egyptian migrants had to come back. Migration is important to the country in terms of the remittances for poverty alleviation (Zohry 2005). Egypt ranks fifth among developing countries in terms of the size of the remittances that were estimated to be 2.8 billion in 2001/2002 (CBE 2003).

## **Urbanization**

The overpopulation problem of Egypt is accentuated by the fact that most of the country is uninhabited, with 95 percent of the population concentrated in 5.5 percent of the surface area, in the Nile valley and delta, in the coastal zones, and in the northern governorates. The population density in Egypt, excluding urban and desert areas, is as high as 1743 persons per square kilometer (Zahir et al. 2006).

In 1996, Cairo, the capital, had the highest share of the Egyptian population, 11.5 percent. That was also true during the previous two censuses (CAPMAS 1976, 1986) although the share of the Egyptian population living in Cairo has been declining. Population density in Cairo is approaching 33,000 persons per square kilometer (Zahir

et al. 2006). The last three censuses show that the Lower Egypt region was more populated than the Upper Egypt region (43 percent versus 35 percent in 1996). The Frontier region is scarcely populated with only 1 percent of the total population. Table 5 shows the proportion of the population by governorates.

Table 5. Proportion of the population by governorates, 1976, 1986, and 1996. Source: CAPMAS (2005).

Governorates	Population proportion (in percent)			Governorates	Population proportion (in percent)		
	1976	1986	1996		1976	1986	1996
Cairo	13.9	12.6	11.5	Beni-Suef	3.0	3.0	3.1
Alexandria	6.3	6.1	5.6	Fayoum	3.1	3.2	3.4
Port-Said	0.7	0.8	0.9	Menia	5.6	5.5	5.6
Suez	0.5	0.7	0.7	Assyout	4.6	4.6	4.7
Total Urban Gov.	21.4	20.2	18.7	Suhag	5.3	5.1	5.3
Damietta	1.6	1.5	1.5	Quena	4.7	4.1	4.1
Dakahlia	7.5	7.2	7.1	Aswan	1.7	1.7	1.6
Sharkia	7.2	7.1	7.2	Luxor	-	0.6	0.6
Kalyoubia	4.6	5.2	5.6	Upper Egypt Gov.	34.6	35.5	36.5
Kafr El-Sheikh	3.8	3.8	3.7	Red Sea	0.2	0.2	0.3
Gharbia	6.3	6.0	5.7	New Valley	0.2	0.2	0.2
Menoufia	4.7	4.6	4.7	Matrouh	0.3	0.3	0.4
Behera	6.7	6.7	6.7	North Sinai	0.0	0.4	0.4
Ismailia	1.0	1.1	1.2	South Sinai	0.0	0.1	0.1
Lower Egypt Gov.	43.3	43.2	43.5	Total Frontier Gov.	1.2	1.2	1.4
Giza	6.6	7.7	8.1	Total Egypt	100.0	100.0	100.0

The urban population in Egypt increased until 1986. Since 1986, the growth rate of the urban population has been regressing. This leads to a stagnation of the population living in each area at around 60 percent rural and 40 percent urban (see Figure 5). The high concentration of population in Egypt's rural areas makes it one of the most densely populated rural areas in the world (Zahir et al. 2006). The urban population is centralized in a few big cities: greater Cairo (Cairo, Giza, Kalyoubia) and Alexandria comprise more than 50 percent of the urban population (CDC 2003b).

Lower fertility and mortality rates, as well as a lower percentage of illiterates characterize the urban populations. Table 6 shows that although a large share of the rural population is illiterate, illiteracy is also present in urban areas, where 27 percent of the urban population aged 10 and above has never been to school (33.9 percent of these are women).

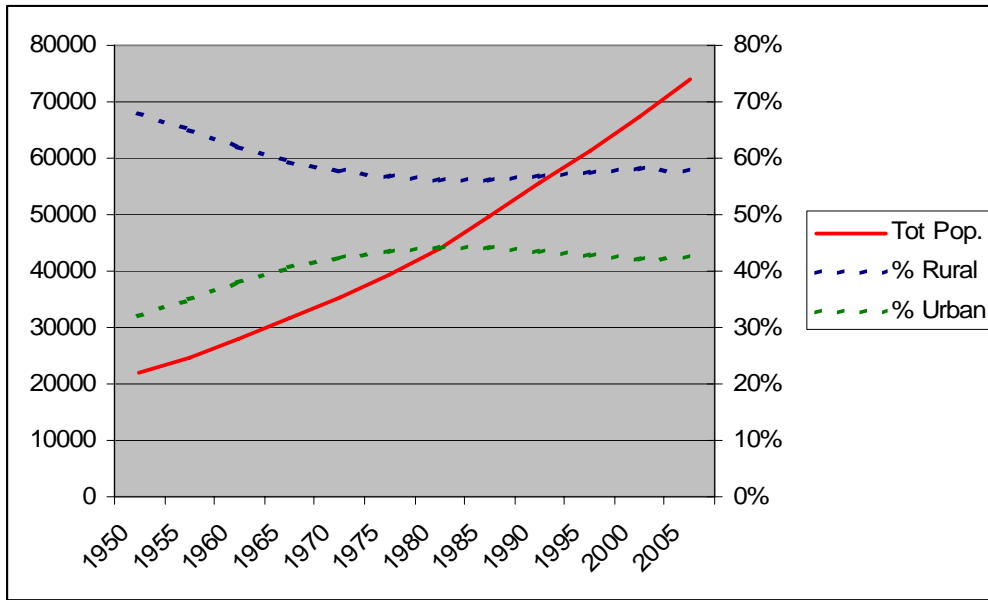


Figure 5. Total population (in thousands), proportions urban and rural (in percent), Egypt, 1950-2005. Source: UN (2005a).

Table 6. Percent distribution of population aged 10+ by education status, sex, and place of residence, 1996. Source: CDC (2003a).

Education	Urban			Rural		
	Male	Female	Total	Male	Female	Total
Illiterate	19.9	33.9	26.7	36.4	63.3	49.6
Read and write	22.2	17.4	19.8	23.1	12.4	17.8
Below intermediate	20.3	19.6	19.6	19	13.2	16.1
Intermediate	22.4	19.9	21.2	16.3	9.1	12.8
Intermediate +	3.0	2.6	2.8	1.7	1.0	1.4
University	11.8	7.3	9.6	3.4	1.0	2.2
University +	0.4	0.3	0.3	0.1	0.0	0.1
Total	100	100	100	100	100	100

### Labor force and unemployment

According to past censuses in Egypt, the activity rates increased significantly from 36 percent in 1976 to 47 percent in 1996, and specifically for females from 6.6 percent in 1976 to 14.5 percent in 1996. According to UNDP (2005), the labor force participation of the total population aged 15 and above in 2004 was 30 percent. Behera has the highest value (43 percent) and Suhag the lowest (24 percent).

Unemployment has been a recurrent problem in the Egyptian economy since the 1990s. After a period of underemployment in the 1960s where the State was the second main employer after agriculture, Egypt was faced with problems of increasing unemployment after 1975, due to the saturation of the agriculture and State sector. It is estimated that between 1975 and 1985, 10-15 percent of the population migrated out of

Egypt, mainly to the neighboring oil-producing economies in the Gulf. The next decade was marked by rising unemployment rates, to levels as high as 13 percent (Radwan 1997; Fergany 1995). The unemployment rate was 10 percent for Egypt in 2004 (UNDP 2005). Currently, unemployment is particularly acute among the 15-25 year olds, particularly for those seeking employment for the first time. It seems that unemployment is particularly high for those with a secondary or higher level of education. It affects more women than men, especially in urban areas (Radwan 1997). Unemployment is especially high, between 17 and 24 percent, in the two Urban governorates Port-Said and Suez, as well as in Luxor in Upper Egypt. Beni-Suef has the lowest value (3.4 percent) (see Table 7).

Table 7. Labor force and unemployment, 2004. Source: UNDP (2005).

Governorates	Labor force (15+) (percent of total population)	Unemployment rate (in percent)
Cairo	30.5	9.7
Alexandria	25.5	7.1
Port-Said	37.7	24.1
Suez	29.5	17.9
Damietta	29.5	8.7
Dakahlia	32.4	9.2
Sharkia	33.8	10.4
Kalyoubia	30.0	10.2
Kafr El-Sheikh	32.0	14.0
Gharbia	35.1	11.7
Menoufia	34.3	9.9
Behera	42.6	8.6
Ismailia	30.0	19.4
Giza	27.1	7.7
Beni-Suef	32.2	3.4
Fayoum	28.5	6.8
Menia	31.6	12.9
Assyout	26.4	9.8
Suhag	23.7	9.2
Quena	26.4	13.3
Aswan	28.7	13.1
Luxor	24.3	21.9
Red Sea	30.2	8.7
New Valley	39.4	6.7
Matrouh	32.9	9.7
North Sinai	27.2	12.7
South Sinai	36.9	9.4
Total Egypt	29.8	9.9

Table 8. Unemployment rates by educational attainment (ages 15 and above) in percent for 2004. Source: UNDP (2005).

Governorates	Below Secondary	Secondary	University
Cairo	1.2	12.1	12.2
Alexandria	1.6	13.1	8.6
Port-Said	10.3	27.8	26.3
Suez	3.8	22.7	21.1
Damietta	0.2	19.5	25.8
Dakahlia	0.2	19.7	17.2
Sharkia	0.3	23.5	16.9
Kalyoubia	0.3	18.7	16.5
Kafr El-Sheikh	0.2	27.6	25.3
Gharbia	0.4	21.9	20.7
Menoufia	0.4	18.7	16.6
Behera	0.2	25.5	21.7
Ismailia	0.9	35.1	23.9
Giza	1.3	13.9	11.0
Beni-Suef	0.1	8.6	14.7
Fayoum	0.2	15.2	14.2
Menia	0.1	31.4	26.8
Assyout	0.2	21.2	17.9
Suhag	0.1	23.5	20.5
Quena	0.7	24.3	24.7
Aswan	1.6	31.8	12.3
Luxor	0.9	24.1	24.5
Red Sea	0.0	13.2	8.5
New Valley	0.6	8.9	8.1
Matrouh	0.0	15.5	19.6
North Sinai	0.0	24.3	5.5
South Sinai	2.4	16.4	4.9
Total Egypt	0.9	19.8	14.0

Unemployment among those persons who have less than a secondary education in Egypt is significantly lower than for those with a secondary education. The unemployment rate for below secondary in 2004 was 0.9 percent and 20 percent for those with secondary. It is also high for the university educated. The same situation applies to the governorates. The unemployment rate for below secondary education is less than 4 percent for all governorates except Port-Said (10 percent). The rate is higher for those with a secondary and university education (see Table 8). The situation regarding unemployment is mostly due to three reasons. The first is the slowdown in public hiring, although the government remains a major employer (29 percent of all employment in 2003) (UNDP 2005). The second is that emigration to the oil-producing countries has been slowing down and many emigrants returned home in the 1990s after the Iraqi war. The third and main reason is that the population growth has been higher than the growth in the sectors responsible for employment. However, projections of

employment forecast an increase in employment growth rates in the construction, manufacturing, and tourism sectors (UNDP 2005).

## **Education**

The development of education has been a priority for many years. Since the 1990s, the Egyptian government has committed substantial resources to prioritizing education by increasing the portion of the government's budget directed to education from 12 percent to 20 percent between 1990 and 1997 (Zahir et al. 2006) and by integrating education in the constitution.<sup>2</sup> This is in contrast with the fact that illiteracy is still widely spread and the labor force levels of educational attainment are particularly low. This draws attention to the problems of effectively financing the education in Egypt and, moreover, to the momentum of educational development.

Formal education in Egypt began more than one thousand years ago and consisted mainly of religious education (Yousif et al. 1996). About 8 percent of all pupils in 2000 were enrolled in the Al-Azharite school system, which teaches Islamic education as well as the regular curriculum (Dev Tech Systems 2003). The efforts aimed at universalizing education in Egypt began with the first Egyptian constitution in 1923, which stipulates that elementary education is compulsory and free for all Egyptian children. Egypt is one of the countries that signed the Universal Declaration of Human Rights in 1948. One main step in the elaboration of the present Egyptian education system was the Egyptian revolution against the British occupation in 1952 and the education policies that followed under the regime of President Nasser (1952-1970), when the education system opened its doors to all segments of the population. Major efforts were made to establish a unified compulsory elementary education to offer enough free educational opportunities for all Egyptians in various educational stages. Primary and secondary enrolment soared as a result, although never achieving the goal of universal education, and created an influx of the newly-educated cohorts into higher education in the late 1960s and 1970s. University fees were abolished in 1963 and in 1964, the government promised to employ any university graduates who could not find employment. This was done first in state-owned companies and then in the government bureaucracy until the early 1980s. The Nasser policy created several imbalances: On the one hand, there is a large quantity of university graduates mostly in the humanities, whereas on the other hand, there is still a large proportion of children that achieve neither primary nor basic education (including primary and preparatory education) (Richards 1992).

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<sup>2</sup> In the present Egyptian constitution, the following fundamental principles have been integrated: (1) Education is a basic right for all Egyptian citizens that the Egyptian State should guarantee by providing equal opportunities for all citizens (Article No. 1). (2) Basic education (primary and preparatory education) is compulsory (Article No. 18 for primary education). Before 1981, compulsory education included only primary education. Compulsory education was extended to encompass preparatory education in 1981. (3) Education in all educational facilities in Egypt is free of charge in all stages of learning (Article No. 20). (4) Illiteracy eradication is a national duty (Article No. 21).



Table 9. The Egyptian education system. Source: Adapted from Ministry of Education (2003).

Level	Stage	No. of years	Age group	Remarks
Pre-primary education	Pre primary	2	4-5	
Primary education	Primary	6	6-12	
	Preparatory	3	12-15	Predominantly general education with only a small percentage of vocational and sport preparatory schools
Secondary education	General secondary (3 years) and vocational secondary (3 and 5 years)	3 or 5	15-18 or 15-20	Vocational secondary education includes industrial, agricultural and commercial studies.
University education	Upper intermediate	2	18-20	
	University or higher institutes	4 or 5	18-22 or 18-23	Education in medical colleges is for seven years including internship

The current system of education in Egypt (see Table 9) consists of three educational levels: Basic (primary and preparatory), secondary, and university.<sup>3</sup> The duration of pre-university education is 12 years starting from the age of six until the age of 18. This pre-university education includes nine years of compulsory education. Compulsory education consists of two cycles: the primary cycle takes six years<sup>4</sup> and the preparatory cycle takes three years. Governors in each Egyptian governorate are responsible for issuing the necessary decrees to regulate and implement compulsory education and distribute children aged six among basic education schools within the governorates. Compulsory education is followed by three years of secondary education (whether general or vocational) or five years of advanced technical secondary education. Students receive a general secondary education completion certificate after passing two exams: The first is held at the end of the second year of secondary school and the second at the end of the third year. Studies in technical secondary education are implemented at two levels: Technicians (three-year system) and senior technicians (five-year system). A general examination is held at the end of the year of the second school term for grade three, and students who pass that examination receive the technical-school diploma for the three-year system. Another general examination is held for the fifth-grade students and if they pass the exam, they are awarded a technical-school diploma for the five-year-system. Students who have received a general secondary education completion certificate and students who have graduated from technical secondary education can join the final level of the Egyptian education system,

<sup>3</sup> There is also kindergarten, which is available to children ages 4-6.

<sup>4</sup> Primary education lasted six years until 1988, when it was reduced to five years. Since 1999, it has been restored to six years.

namely, university and higher education, which is provided by university colleges or higher institutes (both private and public). The duration of study at this level extends from two years in the middle technical institutes to 4-7 years in university colleges and higher institutes.

Most students are enrolled in the state school system. However a small proportion is enrolled in the Al-Azharite religious school system that covers all phases of the education system from basic to secondary education, and is more present in rural areas. Students of the Al-Azharite system are allowed to continue their post secondary studies at the Al-Azhar University, which was founded in 988 A.D. The state school system and the Al-Azharite system are free of charge, also at the tertiary level. However private tutoring is a common practice, especially in secondary education for those who wish to continue to higher education, and is putting a heavy financial burden on families. The private education provided in ordinary schools, language schools, and religious schools is very expensive.

Egypt has witnessed substantial progress in levels of educational attainment over the last decades. This can be seen from several indicators that reflect the effect of past and present policies: illiteracy rates, levels of educational attainment of the adult population, and levels of school enrolment.

### ***Literacy***

Illiteracy, like the level of educational attainment, is a measure of past educational efforts. Figure 6 shows the illiteracy rate of the population aged 15 and older in Egypt for the period 1970-2004 (plotted on the left y-axis) and the number of illiterate persons (plotted on the right y-axis). It is estimated that in 2004, the majority of the adult female population was illiterate (52 percent). Literacy skills are more prevalent among the adult male population as only 33 percent are estimated to be illiterate in 2004 (UNESCO 2002). Figure 6 measures the progress that has been made over the past 30 years when in 1970, illiteracy rates were as high as 54 percent for males and 83 percent for females. However, although progress has been achieved in reducing illiteracy, one notices that the size of the gender gap has not changed, pointing to a lack of prioritization of women. Figure 6 shows that as a result of population growth, the absolute number of illiterates has been growing continually during the last 30 years.

Table 10 provides a look across regions showing very strong differentials in the proportion of the population with no education (which is a close approximation to illiteracy, most likely underestimating it). Urban Egypt is more than twice as literate as rural Egypt. The least educated are women residing in rural Upper Egypt, where 51 percent of the women did not go to school in 2000.

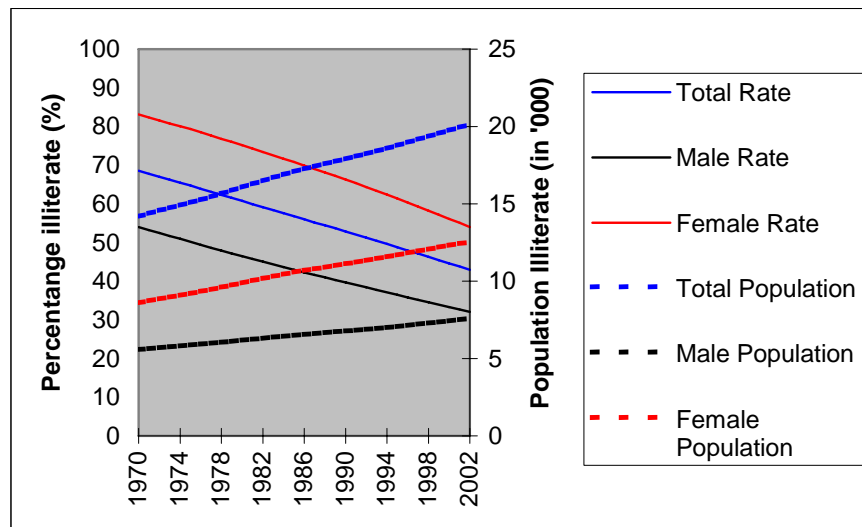


Figure 6. Illiteracy rates and the illiterate population, males, females, and total, 1970-2004. Source: UNESCO (2002).

Table 10. Percentage distribution of the male and female household population aged 6 and over with no education by sex and place of residence in 2000. Source: El-Zanaty and Way (2001).

Place of Residence	No Schooling (in percent)			Median Years of Education		
	Male	Female	Difference	Male	Female	Difference
Urban governorates	12.0	20.9	8.9	7.8	5.9	1.9
Lower Egypt	19.2	34.5	15.3	5.1	3.0	2.1
Urban	12.4	21.5	9.1	6.9	5.4	1.5
Rural	21.9	39.7	17.8	4.6	1.8	2.8
Upper Egypt	20.8	41.9	21.1	4.7	1.3	3.4
Urban	13.0	22.8	9.8	6.4	5.0	1.4
Rural	24.5	50.9	26.4	4.0	0.0	4.0
Frontier governorates	19.4	37.4	18.0	5.5	3.2	2.3
Total Egypt	18.4	34.5	16.1	5.4	3.1	2.3
Total Urban	12.4	21.6	9.2	7.1	5.5	1.6
Total Rural	23.1	44.8	21.7	4.4	0.5	3.9

### **Level of educational attainment**

The level of educational attainment is one of the most important features of the population because it is associated with many other factors, ranging from reproductive behavior, use of contraceptives, health of children, morbidity and mortality, as well as a large range of economic and development factors. Table 10 shows that the median number of years of education of the total population is rather low in Egypt; El-Zanaty and Way (2001) estimate it at only 5.4 years for males and 3.1 years for females, pointing to more than a two-year difference between males and females and to a median level of education below the full completion of the primary cycle.

Table 11 gives a clearer picture of the level of educational attainment of the population and of its bipolarization between two major groups of educational attainment, namely, no education, and secondary education and higher. It seems that Egyptians, especially females, have a barrier to entering primary education, although it is compulsory. But the large majority of those who have entered school will achieve secondary and possibly even higher education. This is very clear in the younger age groups, up to age 35 for males and 30 for females.

Table 11. Levels of educational attainment in the population aged 10 and over, in 1976, 1986, 1996, and 2001. Sources: CDC (2003a) except for 2001 (authors' calculations).

	Illiterate			Read & write			Primary			Secondary and higher		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1960	57.9	84.5	71.3	31.7	11.7	21.7	2.2	1.1	1.7	8.2	2.7	5.3
1976	42.8	72.6	57.3	28.6	13.0	21.0	17.0	9.2	13.1	11.6	5.2	8.6
1986	37.6	62.8	49.9	24.0	15.0	19.6	17.0	11.5	14.2	21.4	10.7	16.3
1996	29.1	50.3	39.4	22.7	14.6	18.7	19.6	15.6	17.7	28.6	19.5	24.2
2001	25.9	45.5	35.6	20.6	13.8	17.2	19.8	16.3	18.0	33.7	24.4	29.1

Table 12. Educational attainment of the male and female population by place of residence, Egypt, 2000. Source: El-Zanaty and Way (2001).

Place of residence	No education		Primary incomplete		Primary complete /some secondary		Secondary complete		Higher	
	M	F	M	F	M	F	M	F	M	F
	Urban									
governorates	12.0	20.9	18.2	19.0	29.3	25.4	18.8	18.5	21.7	16.2
Lower Egypt	19.2	34.5	24.5	23.3	29.1	21.3	18.0	15.2	9.2	5.7
Urban	12.4	21.5	22.0	22.1	28.6	24.0	20.5	20.6	16.4	11.7
Rural	21.9	39.7	25.6	23.8	29.2	20.2	17.0	13.1	6.4	3.3
Upper Egypt	20.8	41.9	26.5	22.7	28.0	20.3	17.0	10.4	7.6	4.8
Urban	13.0	22.8	22.7	22.0	29.0	25.3	20.9	18.5	14.3	11.4
Rural	24.5	50.9	28.3	23.1	27.5	17.8	15.2	6.5	4.5	1.6
Frontier										
governorates	19.4	37.4	21.5	16.8	30.5	24.3	19.3	15.0	9.4	6.5
Total	18.4	34.5	24.0	22.2	28.8	21.7	17.8	14.1	11.1	7.4
Total Urban	12.4	21.6	20.5	20.7	29.3	25.0	19.9	19.1	18.1	13.6
Total Rural	23.1	44.8	26.7	23.4	28.5	19.2	16.2	10.1	5.6	2.5

The changes in educational attainment over successive cohorts show that the level of schooling for both women and men has increased substantially over time. For example, the proportion with a complete secondary education is 15 percent for males in age group 50-54 against 39 percent for males in age group 20-24. The difference is even more dramatic for females, where the figures for the same cohorts are 8 and 35 percent, respectively. As a result of the substantial improvement experienced by women in education, the gender gap in educational attainment has narrowed among younger

cohorts. Actually, if we exclude the no education category, the difference in educational attainment between female and male cohorts aged 20-24 is negligible. Even the female age group 15-19 seems to have higher education than the corresponding male cohort.

An examination of educational attainment by place of residence indicates that urban residents have attended school longer than rural residents. Table 12 shows lower levels of educational attainment in Upper Egypt and, more particularly, among its rural female inhabitants.

### **Enrolment**

A comparison between educational attainment, which reflects enrolment ratios of the past, and present enrolment shows that Egypt has made great progress in providing education for all. The rate of absorption in primary education rose to 93 percent for both sexes in 2000/2001, 95 percent for males and 90 percent for females (UNESCO 2004). However, many survey data bring different results regarding enrolment, especially primary enrolment, e.g., UNICEF (2007) reports a net enrolment ratio for primary school of 83 percent.

Table 13. Percentage of the population aged 6-24 years who are currently attending school, by age group, sex, and place of residence. Source: El-Zanaty and Way (2001).

	Lower Egypt			Upper Egypt			Total				
	Urban	Rural	Urban governorates	Total	Urban	Rural		Frontier governorates			
Male											
6-10	88.4	87.1	88.8	89.2	89.7	89.0	85.7	86.3	85.5	84.6	87.6
11-15	86.7	84.3	86.5	84.8	85.2	84.6	85.2	88.0	84.0	86.7	85.3
6-15	87.5	85.6	87.5	86.8	87.3	86.6	85.4	87.2	84.8	85.6	86.3
16-20	59.3	45.5	63.2	48.5	58.1	44.9	48.9	54.4	46.6	46.8	51.3
21-24	20.4	12.6	23.0	14.0	17.8	12.4	15.1	18.9	12.9	12.8	16.3
Female											
6-10	89.8	79.9	89.0	87.1	90.6	85.8	78.5	90.0	74.0	79.9	83.9
11-15	89.3	70.8	88.1	82.9	93.3	79.3	69.4	87.6	61.6	70.5	78.2
6-15	89.6	75.2	88.5	84.9	92.0	82.4	73.8	88.7	67.6	75.0	80.9
16-20	54.5	28.2	57.3	38.9	55.4	32.6	31.8	49.9	22.9	35.8	39.7
21-24	14.7	5.4	16.2	7.8	12.9	5.8	8.2	14.7	4.8	5.4	9.6
Total											
6-10	89.1	83.7	88.9	88.1	90.2	87.4	82.3	88.1	80.1	82.5	85.8
11-15	88.0	77.8	87.3	83.9	89.1	82.1	77.4	87.8	73.0	78.9	81.8
6-15	88.5	80.6	88.0	85.9	89.6	84.6	79.8	87.9	76.5	80.7	83.7
16-20	56.9	36.9	60.2	43.7	56.8	38.8	40.3	52.0	34.9	40.6	45.5
21-24	17.6	8.9	19.7	10.8	15.4	9.0	11.5	16.8	8.7	8.8	12.9

El-Zanaty and Way (2001) collected information on school attendance for the 2000 DHS (see Table 13). This survey shows somewhat higher rates of enrolment, with 86 percent of the age group 6-10 and 82 percent of the age group 11-15 (corresponding to the age groups of compulsory education) being enrolled. According to this survey, the gender gap is rather small during primary education (88 percent males and 84 percent females), but increases during preparatory education (85 percent males and 78 females) and higher (51 percent males and 40 percent females for the age group 16-20). The DHS survey shows that under the age of 15, there are few differentials among school attendance rates by place of residence. However, for secondary education, boys are more likely to attend school if they reside in urban areas (59 percent) than in rural areas (46 percent). The place of residence has a stronger effect on the school attendance of girls. In age group 6-15 (compulsory education), 90 percent of urban girls attended school in 2000 compared to only 75 percent for rural girls. In rural Upper Egypt, attendance is as low as 68 percent and as high as 92 percent in urban Lower Egypt.

Table 14 presents the UNESCO data on levels of enrolment ratios at the three general levels of primary, secondary and tertiary education at the national level. These ratios are noticeably higher than the ones found in the DHS Survey.

Table 14. Gross enrolment rates in primary, secondary, and tertiary education. Sources: for 1960 and 1970, UNESCO (1976); for 1970 and 1980, UNESCO (1995); for 2000 and 2004, UNESCO (2004).

	Primary			Secondary			Tertiary		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1960	80	52	66	23	9	16	8	2	5
1970	84	53	69	44	21	32	11	4	8
1980	84	61	73	61	39	50	21	11	16
1990	102	86	94	84	68	76	23	12	18
2000	105	96	101	87	80	83			36
2004	103	98	101	90	84	87			33

According to UNDP (2005), intake in primary education is approaching universality as the primary gross enrolment ratio reaches 96.4 for the whole of Egypt. Cairo has the highest ratio (110 percent) and the Red Sea has the lowest (68.8 percent). Concerning the transition to preparatory education, the proportion of primary completers is almost 100 percent for all governorates except Beni-Suef and South Sinai (about 95.5 percent). The transition to secondary by a proportion of the preparatory completers shows most governorates at nearly 90 percent, with South Sinai showing the lowest value at around 76 percent. Secondary gross enrolment ratios are more than 75 percent in most governorates; in Suez, Aswan, and Damietta they are more than 90 percent, but only 54 percent in South Sinai (see Table 15).

Table 15. Education flows. Source: UNDP (2005).

Governorates	Primary enrolment ratio 2003/2004	Transition to preparatory percent of primary completers 2002/2003	Preparatory enrolment ratio 2003/2004	Transition to secondary percent of preparatory completers 2002/2003	Secondary enrolment ratio 2003/2004
Cairo	109.9	99.9	98.7	83.6	83.1
Alexandria	109.5	99.3	107.4	83.2	77.0
Port Said	92.8	99.9	86.6	93.1	88.8
Suez	100.4	102.2	90.7	93.9	93.4
Total Urban	108.5	100.3	100.4	88.5	82.0
Damietta	102.0	99.8	95.3	96.1	93.1
Dakahlia	97.8	101.1	95.8	94.6	88.4
Sharkia	102.5	100.6	100.0	92.6	83.6
Kalyoubia	96.3	98.4	83.7	93.0	69.2
Kafr El-Sheihk	93.0	100.0	98.0	98.4	87.9
Gharbia	94.5	100.9	99.5	92.4	84.9
Menoufia	89.9	102.2	92.5	93.8	82.5
Behera	96.3	98.2	96.5	77.7	69.4
Ismailia	101.1	99.3	93.7	94.2	81.4
Total Lower	96.7	100.1	95.3	92.5	80.8
Giza	98.7	98.0	88.6	77.9	63.7
Beni- Suef	90.5	95.8	82.1	89.4	62.2
Fayoum	82.9	99.8	85.1	96.9	70.3
Menia	100.8	95.7	88.9	90.2	71.5
Assyout	91.5	101.2	94.7	91.6	61.6
Suhag	92.1	101.8	103.4	90.5	72.8
Quena	93.7	101.0	104.7	90.9	88.8
Aswan	92.7	98.1	109.2	89.9	95.2
Luxur	92.5	100.3	113.0	94.1	93.2
Total Upper	93.8	99.1	93.6	90.2	70.7
Red Sea	68.6	108.7	76.6	96.0	68.9
New Valley	73.6	104.0	82.1	94.4	91.4
Matrouh	89.9	97.9	76.6	81.7	54.4
North Sinai	42.6	100.1	80.2	88.2	66.9
South Sinai	67.2	95.6	68.3	75.6	53.6
Total Frontier	61.8	101.3	78.2	87.2	67.4
Total Egypt	96.4	99.6	95.2	88.9	77.2

### ***Education expenditures***

Education is predominantly publicly financed in Egypt. At the beginning of the 21<sup>st</sup> century, the government of Egypt declared education a top priority. In the 1990s, education had already been defined as a national project for the 1990s and “increased its national education budget by an average of 8 percent per year in real terms during the period 1991-1997” (UN 2002: 16). The total budget allocation as a percentage of the overall government spending increased from 12 percent to 19 percent between 1990/1991 and 1999/2000. The share of education in the gross national product (GNP)

increased from 4.8 percent in 1990/1991 to 5.5 percent in 1996/1997 (there is no later data available). Public expenditures for education represent the majority of the overall social spending (60 percent in 1995).

### ***Future Challenges***

Egypt has a universal, free education policy. However, universal primary school enrolment has not yet been achieved. Meeting the goal set by the World Education Forum in Dakar in April 2000 to halve adult illiteracy by 2015 will most likely fail.<sup>5</sup> Unless an extraordinary effort is made, the number of illiterate adults will fall by only five percentage points by that date. The main problem seems to be reaching the rural population in some governorates, mainly in Upper Egypt, especially women. Besides illiteracy, the National Plan for Education for All (Ministry of Education 2003), which has been defined as the national goal for the educational policy, sees the following challenges to be met by 2015/2016:

1. Expand the provision of pre-school services, giving priority to rural and poor urban areas as well as improve the quality of pre-educational services.
2. Increase intake rates of children aged 6 to 15 to achieve full absorption, targeting groups to remove gender and regional gaps.
3. Improve the quality of compulsory education by improving the quality of teachers, the method of teaching, upgrading curricula and introducing new technologies.

If Egypt is to realize the window of opportunity that will occur in the first half of this century, it will need a highly-educated labor force. The projections by level of education will implement the steps to improve school enrolment and translate into levels of educational attainment of the future labor force. Hypothetical scenarios can show how quickly progress can be implemented, taking into account the momentum of both population and education. Moreover, population projections will disaggregate the population by sex and regions to be able to model the many disparities that are an important facet of education in Egypt.

### **Model Description**

The projection of human capital stock by age and sex is an example of the application of the multidimensional cohort-component model, since education tends to be acquired at younger ages and then moves along cohort lines. Changes in the educational composition of the total population (aged 10 and older) are typically caused by depletion (through mortality) of less-educated cohorts and the entry of more-educated younger cohorts (Goujon and Lutz 2004).

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<sup>5</sup> However, there are still around 30 countries that by 2015 are unlikely to achieve any more than a 30 percent improvement over their 2000 literacy rates. This list includes: Bangladesh, Benin, Burkina Faso, Cambodia, Comoros, Côte d'Ivoire, Dominican Republic, Egypt, Eritrea, Ethiopia, Gambia, Guatemala, Haiti, India, Iraq, Malawi, Mali, Mauritania, Morocco, Myanmar, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Senegal, and the United Arab Emirates.



The multi-state model chosen for this study subdivides the Egyptian population into five distinct groups according to educational status. Each subpopulation is stratified by age (five-year age groups) and sex. There are three other parameters for this model: Fertility by educational status; number of international migrants by age, sex, and educational status; and mortality by age and sex. Data on the population by age, sex, and education for the base year were extracted from the results of the 1996 Egypt census (CAPMAS 1998). Data on the age-specific fertility rates by education for the base year were estimated from the *Egypt Demographic Health Surveys 2000 and 2005* (El-Zanaty and Way 2001, 2006) and vital statistics. Data on mortality by age and sex were taken from vital statistics; and data on migration were taken from the Egypt censuses 1986 (CAPMAS 1986) and 1996 (CAPMAS 1998) and from migration surveys in Egypt, as well as using the United Nations estimates for the total number of migrants for the whole of Egypt.

The projections were carried out at the national as well as sub-national levels (Muhafazah = Governorates). Luxor and Quena originally formed one entity and were aggregated into one governorate called Quena until 1986, when they were separated into two different governorates. It was decided to group all Frontier governorates under the Frontier region since the data is rather skewed with a larger male population and irregularities in the age structure. Although this aggregation prevents the analysis from being completely at the level of governorates, the proportion of the population in the Frontier region is rather small (1.4 percent of total Egypt in 1996). The analysis is, therefore, carried out on 21 governorates and the Frontier region.

The projections were made for the period 1996-2051 according to a set of scenarios as detailed in the following pages. Input data for projection by level of education consists of five components: 1) population by age, sex, and education; 2) age- and education-specific fertility rates; 3) age-, sex-, and education-specific mortality rates; 4) age-, sex- and education-specific net number of migrants; and 5) age- and sex-specific transition probabilities. Those components were gathered and/or estimated for both the national and governorate levels.

### **Population by age, sex, and education**

The model requires the distribution of the population by age and sex for five categories of education (illiterate, read and write, basic education, secondary education, tertiary education) for 16 age groups (from 0-4 to 75 and older), and for the whole of Egypt (21 governorates plus the Frontier region). The starting population is based on the 1996 census data because the detailed results of the November 2006 census will only become available in 2008 (by education and governorate). According to the 1996 census, the population (10 years and older) is distributed by age, sex, and 10 levels of education as shown in Table 16. The five new categories shown in Table 16 are consistent with the classification of UNESCO that is used for elaborating the National Plan for Education for All (Ministry of Education 2003).

Table 16. Aggregation of the 1996 census categories to five education categories for the study. Sources: Authors' calculations based on CAPMAS (1998).

Census categories	Education categories	Definition	ISCED*
Illiterate	Illiterate		
Read and write	Read and write		
Primary completed	Basic	Includes six years of primary education (children aged 6-12) and three years of preparatory education (children aged 12-15)	1, 2
Below intermediate	Secondary	Includes general secondary education (three years for ages 15-18) or vocational secondary education (three and five years for ages 15-18 or 15-20)	3
Above intermediate	Tertiary	Includes upper intermediate institutes (two years for ages 18-20) and university or higher institutes (four or five years for ages 18-22 or 18-23)	4, 5, 6
University degree			
High diploma			
Master degree			
PhD			

\* The International Standard Classification of Education is a framework for the compilation and presentation of national and international education statistics and indicators.

Several adjustments had to be made to the original census data. First, the education status for those under 10 years of age, which is not available from the census, needed to be estimated. It was assumed that those in the age group 0-5 are illiterate. Children above age 6 are to be shared between the categories 'illiterate' and 'read and write' based on enrolment rates at each governorate level assuming that children aged 6-9 enrolled in school will be able to read and write. Second, the 1996 census had to be corrected for underestimation of the population in the age groups 0-4 and 5-9. This was done by reverting to the population of the 1986 census, which was projected by sex and age under specific assumptions for mortality and fertility for the whole of Egypt and for each governorate separately. The projected population in 1996 was used to adjust the age composition of the 1996 raw data. The adjusted total population is 63.8 million instead of 59.2 million, a difference of almost 8 percent.<sup>6</sup> The share of the population by level of educational attainment was not modified. As a result of the adjustment that was done separately for Egypt and for all governorates, the sum of the governorates does not equal the total for Egypt. The difference is, however, minimal and less than 2 percent.

<sup>6</sup> Our adjustment is in line with estimates made by other agencies, such as the U.S. Census Bureau (64.7 million) (USCB 2005) and the United Nations (61.2 million) (UN 2005a).

## Age- and education-specific fertility rates

Age-specific fertility rates, i.e., the number of children per 1,000 women during a specific year, are used to calculate total fertility rates. For the calculations of the base period (1996-2001) we depended on data from vital statistics and the 2000 Egypt Demographic Health Survey (El-Zanaty and Way 2001). After the data became available from the 2005 DHS (El-Zanaty and Way 2006), we updated the next period (2001-2006).

The data had to be adjusted because of the differences in the definitions of education. The categories used in the DHS do not match our education categories, especially at the lowest and highest levels of education. We distinguish between women who can read and write and illiterate women, whereas the DHS classifies only women with no education (formal education). Also, at higher levels of education, women who have completed secondary and those who have moved to tertiary education are aggregated in one group in the DHS, whereas we differentiate between the two groups of women. Fertility differentials for the five education categories used in the report had to be derived by using correlations between the fertility levels of women for the categories and the proportions of women of reproductive age in the DHS for 2000 (fertility for the period 1997-2000) and 2005 (fertility for the period 2002-2005). The trend line was then used with the proportion of women of reproductive age originating from the census for our particular five categories to derive the fertility differentials for the whole of Egypt for 1996-2001 and 2001-2006. The results are presented in Table 17.

Table 17. Total fertility rates by education category from DHS 2000 and DHS 2005 and adjusted TFR. Sources: (1) El-Zanaty and Way (2001); (2) El-Zanaty and Way (2006); (3) authors' calculations.

DHS Education Categories	TFR 1997-2000 (1)	TFR 2002-2005 (2)	Education Categories	Adjusted TFR 1996-2001 (3)	Adjusted TFR 2001-2006 (3)
No education	4.09	3.80	Illiterate	3.82	3.48
Primary incomplete	3.78	3.40	Read & write	3.44	3.11
Primary complete	3.36	2.90	Basic	3.25	2.88
/some secondary			Secondary	3.02	2.69
Secondary complete and higher	3.22	3.00	Tertiary	2.92	2.60
Total	3.50	3.10	Total	3.50	3.10

In a second step, the data had to be estimated at the governorate level. The total fertility rates were extracted from the regional data provided by the DHS covering the fertility of women during the periods 1997-2000 and 2002-2005 for the four regions. We used vital statistics data on births to estimate the TFR by region, and the DHS to estimate the age profile. Data on education is available from the DHS, but only at the country level. We assumed that the relative difference between the overall TFR and the TFR of each education category is the same for Egypt as for each governorate. Hence, based on these various sources, we estimated two sets of ASFR and TFR for each governorate and education category for the first two periods of the projections (1996-2001 and 2001-2006). Table 18 presents the TFR in 2001-2006 by governorate.

Table 18. Total fertility rates by level of education for 21 governorates and the Frontier region, 2001-2006. Source: Authors' calculations.

Governorate	Level of Education					Total
	Illiterate	Read & write	Basic	Complete secondary	Tertiary	
Cairo	3.0	2.7	2.5	2.3	2.2	2.5
Alexandria	3.0	2.7	2.5	2.3	2.2	2.5
Port-Said	3.0	2.7	2.5	2.3	2.2	2.6
Suez	3.2	2.8	2.6	2.4	2.4	2.6
Damietta	3.2	2.9	2.7	2.5	2.4	2.7
Dakahlia	3.3	2.9	2.7	2.5	2.4	2.8
Sharkia	3.9	3.5	3.2	3.0	2.9	3.4
Kalyoubia	3.3	2.9	2.7	2.5	2.4	2.8
Kafr El-Sheikh	3.1	2.8	2.6	2.4	2.3	2.8
Gharbia	3.1	2.8	2.6	2.4	2.3	2.7
Menoufia	3.6	3.2	3.0	2.8	2.7	3.1
Behera	3.3	2.9	2.7	2.5	2.4	2.9
Ismailia	3.8	3.4	3.2	3.0	2.9	3.3
Giza	3.4	3.0	2.8	2.6	2.5	3.0
Beni-Suef	3.6	3.2	2.9	2.7	2.7	3.3
Fayoum	4.6	4.1	3.8	3.6	3.4	4.3
Menia	4.9	4.4	4.1	3.8	3.7	4.6
Assyout	5.0	4.4	4.1	3.8	3.7	4.6
Suhag	4.8	4.3	4.0	3.7	3.6	4.4
Quena	4.3	3.8	3.5	3.3	3.2	3.9
Aswan	3.0	2.7	2.5	2.3	2.2	2.6
Frontier region	3.1	2.8	2.6	2.4	2.3	2.7
<b>Total Egypt</b>	<b>3.5</b>	<b>3.1</b>	<b>2.9</b>	<b>2.7</b>	<b>2.6</b>	<b>3.1</b>

### Age- and sex-specific mortality rates

We used the average number of deaths from the vital statistics for the years 1999, 2000, and 2001 to calculate the age-specific mortality rates for the base period (1996-2001). The denominator was an estimate of the population in the middle of the year 2000. The obtained ASMR were used to construct a life table with the help of the Population Analysis Spreadsheets of the USCB.<sup>7</sup> Mortality by level of education is not readily available from the vital statistics. Therefore, we used the information on child mortality by the mother's level of education for the first age group available for the whole of Egypt to introduce some differentials. It was then assumed, as for fertility, that the relative difference between the overall life expectancy at birth for Egypt and the life expectancy at birth of each education category is constant across governorates (see Tables 19 and 20).

<sup>7</sup> The spreadsheets can be accessed online at: <http://www.census.gov/ipc/www/pas.html>

Table 19. Life expectancy at birth by level of education for males in 21 governorates and the Frontier region, 1996-2001. Source: Authors' calculations.

Governorate	Level of Education					Total
	Illiterate	Read & write	Basic	Complete secondary	Tertiary	
Cairo	64.2	64.2	65.4	67.7	71.2	66.0
Alexandria	62.2	62.2	63.4	65.6	69.5	63.7
Port-Said	63.0	63.0	64.2	66.4	70.0	64.8
Suez	63.9	63.9	65.1	67.3	70.9	66.4
Damietta	63.0	63.0	64.2	66.5	70.0	64.0
Dakahlia	62.5	62.5	63.7	66.0	69.5	63.7
Sharkia	63.1	63.1	64.3	66.5	70.1	64.2
Kalyoubia	63.7	63.7	64.9	67.3	70.8	64.9
Kafr El-Sheikh	62.1	62.1	63.2	65.5	69.0	63.1
Gharbia	63.5	63.5	64.7	67.0	70.5	64.8
Menoufia	64.2	64.2	65.4	67.7	71.2	65.4
Behera	62.6	62.6	63.8	66.0	69.6	63.5
Ismailia	61.4	61.4	62.6	64.8	68.4	62.7
Giza	68.9	68.9	69.8	70.5	71.8	69.5
Beni-Suef	62.6	62.6	63.8	66.0	69.5	63.5
Fayoum	63.8	63.8	65.3	67.2	70.8	64.6
Menia	62.6	62.6	63.7	66.0	69.6	63.5
Assyout	62.5	62.5	63.7	66.0	69.5	63.5
Suhag	63.4	63.4	64.6	66.9	70.5	64.4
Quena	64.7	64.7	65.9	68.2	71.7	65.6
Aswan	64.3	64.3	65.5	67.8	71.3	65.6
Frontier region	65.1	65.1	65.6	68.6	72.1	66.5
Total Egypt	62.8	62.8	64.0	66.3	69.9	64.0

Table 20. Life expectancy at birth by level of education for females in 21 governorates and the Frontier region, 1996-2001. Source: Authors' calculations.

Governorate	Level of Education					Total
	Illiterate	Read & write	Basic	Complete secondary	Tertiary	
Cairo	66.6	66.6	67.8	70.2	74.1	68.1
Alexandria	65.1	65.1	66.2	68.6	72.6	66.3
Port-Saod	64.5	64.5	65.7	68.1	72.3	66.1
Suez	65.3	65.3	66.7	69.1	73.0	66.5
Damietta	65.6	65.6	66.8	69.2	73.1	66.5
Dakahlia	66.1	66.1	67.3	69.7	73.6	67.0
Sharkia	65.7	65.7	66.9	69.2	73.7	66.4
Kalyoubia	66.1	66.1	67.3	69.6	73.7	66.9
Kafr El-Sheikh	65.7	65.7	67.0	69.5	73.4	66.4
Gharbia	66.8	66.8	68.0	70.4	74.3	67.7
Menoufia	67.1	67.1	68.3	70.7	74.6	67.9
Behera	65.8	65.8	67.0	69.4	73.4	66.3
Ismailia	64.5	64.5	65.7	68.1	72.1	65.5
Giza	68.6	68.6	69.4	70.1	71.9	69.0
Beni-Suef	65.5	65.5	66.6	69.2	73.1	66.0
Fayoum	66.2	66.2	67.4	69.8	73.7	66.7
Menia	64.8	64.8	66.1	68.8	72.5	65.3
Assyout	63.8	63.8	65.0	67.4	71.3	64.3
Suhag	64.7	64.7	65.9	68.3	72.2	65.1
Quena	65.0	65.0	66.5	68.8	72.7	65.5
Aswan	65.6	65.6	66.8	69.2	73.2	66.4
Frontier region	66.4	66.4	67.9	70.3	74.1	67.3
Total Egypt	64.1	64.1	65.4	67.6	71.7	64.9

### Age-, sex- and education-specific net number of migrants

The migration statistics needed for the projections are twofold: The level of international migration at the governorate and country level, and the level of internal migration between governorates. However, statistics on both types of migration are scarce for Egypt. International migration flows are mainly in the direction of the Arab Gulf countries, and to a much lesser extent to Europe. CAPMAS estimated the number of Egyptian abroad to be 2.7 million (Zohry 2005) based on the reports from Egyptian embassies abroad, records of cross-border flows from the Ministry of the Interior, work permits from the Ministry of Manpower and Emigration, and other sources. These statistics are not really reliable as they may count individuals several times. For example, the estimates of the number of Egyptian migrants in Italy made by an Egyptian source is more than twice the estimate made by the Italian government (Zohry 2005). Therefore, the assumptions about the net number of migrants are rather crude and are based on three main sources:

- The results of the Push and Pull Factors of International Migration (PPFIM) survey that was conducted in Egypt in 1997 (CDC and NIDI 2003).
- The estimate of migration flows at the governorate level between the 1986 and 1996 censuses (Alkitkat 2000).

- The United Nations estimate of the “net number of international migrants” for Egypt during the period 1995-2000 (450,000 migrants) (UN 2005a).

The PPFIM 1997 was used to obtain the age, education, and sex profile of the migrants. This was then applied to the United Nations estimate for net migration for the starting period 1996-2001. The net number of migrants was further distributed by five-year age groups using the same age distribution as in the 1996 census (see Table 21). The education distribution of migrants was given by the PPFIM. We simply assumed that all children under five years of age would be in the category “No education”. The resulting distribution by age is shown in Tables 22 (for males) and 23 (for females).

Table 21. Age-specific net number of migrants (1996-2001) (in thousands). Source: CDC and NIDI (2003).

Age group	Percent migrants PPFIM	Total number of migrants <sup>a)</sup>	Number of male migrants <sup>b)</sup>	Number of female migrants <sup>c)</sup>
(1)	(2)	(3)	(4)	(5)
< 25	7.3	-32.85	-30.22	-2.63
25-34	51.9	-233.55	-214.87	-18.68
35-44	28.7	-129.15	-118.82	-10.33
45-54	8.8	-39.60	-36.43	-3.17
55+	3.3	-14.85	-13.66	-1.19

<sup>a)</sup> -450 \* column (2)

<sup>b)</sup> column (3) \* 92 percent

<sup>c)</sup> column (3) \* 8 percent

Table 22. Number of net migrants by level of education, males. Source: Authors' calculations.

Age group	Level of Education				
	Illiterate	Read & write	Basic	Secondary	Tertiary
0-	-5.97	0.00	0.00	0.00	0.00
5-	-0.40	-6.30	0.00	0.00	0.00
10-	-2.46	-3.25	-1.22	0.00	0.00
15-	-0.81	-1.06	-0.40	-2.10	-1.78
20-	-0.59	-0.78	-0.29	-1.52	-1.31
25-	-14.50	-19.13	-7.19	-37.43	-32.11
30-	-13.73	-18.11	-6.81	-35.45	-30.41
35-	-8.46	-11.16	-4.20	-21.85	-18.75
40-	-7.15	-9.43	-3.54	-18.45	-15.83
45-	-2.81	-3.70	-1.39	-7.24	-6.21
50-	-1.98	-2.61	-0.98	-5.12	-4.39
55-	-0.55	-0.72	-0.28	-1.41	-1.21
60-	-0.50	-0.66	-0.25	-1.28	-1.10
65-	-0.36	-0.47	-0.18	-0.92	-0.79
70-	-0.22	-0.29	-0.12	-0.57	-0.49
75+	-0.17	-0.22	-0.08	-0.44	-0.38

Table 23. Number of net migrants by level of education, females. Source: Authors' calculations.

Age group	Level of Education				
	Illiterate	Read & write	Basic	Secondary	Tertiary
0-	-0.53	0.00	0.00	0.00	0.00
5-	-0.07	-0.52	0.00	0.00	0.00
10-	-0.21	-0.28	-0.11	0.00	0.00
15-	-0.07	-0.09	-0.03	-0.18	-0.15
20-	-0.05	-0.07	-0.03	-0.13	-0.11
25-	-1.31	-1.72	-0.65	-3.38	-2.90
30-	-1.15	-1.51	-0.57	-2.96	-2.54
35-	-0.75	-0.99	-0.38	-1.95	-1.67
40-	-0.60	-0.80	-0.30	-1.55	-1.34
45-	-0.23	-0.31	-0.11	-0.60	-0.51
50-	-0.19	-0.24	-0.09	-0.48	-0.41
55-	-0.05	-0.06	-0.03	-0.12	-0.10
60-	-0.05	-0.06	-0.02	-0.12	-0.10
65-	-0.03	-0.04	-0.02	-0.07	-0.06
70-	-0.02	-0.03	-0.01	-0.05	-0.04
75+	-0.01	-0.02	-0.01	-0.04	-0.03

Table 24. Net number of migrants (in thousands) by governorate and by sex, 1996-2001. Source: Authors' calculations.

Governorate	Net number of migrants	
	Male	Female
Cairo	-49375	-3443
Alexandria	-23211	-1764
Port-Said	-693	-58
Suez	-909	-81
Damietta	-192	-46
Dakahlia	-28238	-2983
Sharkia	-22329	-2256
Kalyoubia	-40045	-3529
Kafr El-Sheikh	-2034	-244
Gharbia	-13829	-1446
Menoufia	-23789	-8223
Behera	-3055	-394
Ismailia	-2040	-192
Giza	-1380	-166
Beni-Suef	-4718	-393
Fayoum	-6448	-567
Menia	-13195	-896
Assyout	-20533	-1596
Suhag	-30435	-2216
Quena	-13920	-1074
Aswan	-430	-6
Frontier region	-716	-34



To obtain the age- and sex- specific number of migrants by level of education at the governorate level, we combined the data on migration flows at the governorate level, within Egypt between governorates, and the number of net migrants at the national level between the 1986 and 1996 censuses, and the age- and sex-specific number of migrants by level of education for the whole of Egypt from the previous step (we combined internal migration and international migration). Table 24 shows the net number of migrants by governorate and by sex for 1996-2001.

### Age- and sex-specific transition probabilities

Transition probabilities represent the probability for an individual to move from one education category to the next. It happens almost exclusively at young ages during the time when most of the schooling occurs. Transition probabilities do not exist as such and have to be calculated. This can be best done with precise enrolment data by age, sex, and level of education. However, this information is seldom available, therefore, we use more crude estimation procedures based on the existing highest level of education attained by the population, which is most likely available from the census data. We assume that the share of the population between education categories represents the present transition along cohort lines. The estimation of the base-year calculation is as follows:  $T_{ij}$  is the transition probability of moving from education state  $i$  to education state  $j$ . 1, 2, 3, 4, 5 are abbreviations for the five categories in the Egyptian education system. Transitions typically occur in two stages as can be seen from the equations:

$$T_{1,2} (5-9) = \frac{popr_2(5-9)}{popr_1(0-4)}$$

$$T_{1,2} (10-14) = 1 - \frac{popr_1(10-14)}{popr_1(5-9)}$$

$$T_{2,3}(10-14) = \frac{popr_3(10-14)}{popr_2(5-9)}$$

$$T_{2,3} (15-19) = 1 - \frac{popr_2(15-19)}{popr_2(10-14)}$$

$$T_{3,4}(15-19) = \frac{popr_4(15-19)}{popr_3(10-14)}$$

$$T_{3,4} (20-24) = 1 - \frac{popr_3(20-24)}{popr_3(15-19)}$$

$$T_{4,5}(20-24) = \frac{popr_5(20-24)}{popr_4(15-19)}$$

$$T_{4,5} (25-29) = \frac{popr_5(25-29) - popr_5(20-24)}{popr_4(20-24)}$$

where  $popr_i$  is the proportion of the population in state  $i$ . Table 25 shows the transition probabilities estimated for the starting period 1996-2001.

Table 25. Transition probabilities estimated for 1996-2001, both sexes. Source: Authors' calculations.

Governorate	Level of Education <sup>a)</sup>	Male		Female	
Total Egypt	From 1 to 2 <sup>b)</sup>	0.78	0.48	0.71	0.27
	From 2 to 3 <sup>c)</sup>	0.59	0.75	0.59	0.77
	From 3 to 4 <sup>d)</sup>	0.50	0.81	0.54	0.83
	From 4 to 5 <sup>e)</sup>	0.42	0.21	0.41	0.10
Cairo	From 1 to 2 <sup>b)</sup>	0.78	0.64	0.79	0.62
	From 2 to 3 <sup>c)</sup>	0.66	0.78	0.67	0.79
	From 3 to 4 <sup>d)</sup>	0.56	0.79	0.61	0.82
	From 4 to 5 <sup>e)</sup>	0.52	0.30	0.50	0.18
Alexandria	From 1 to 2 <sup>b)</sup>	0.79	0.67	0.79	0.61
	From 2 to 3 <sup>c)</sup>	0.50	0.68	0.51	0.70
	From 3 to 4 <sup>d)</sup>	0.59	0.76	0.65	0.78
	From 4 to 5 <sup>e)</sup>	0.52	0.25	0.54	0.14
Port-Said	From 1 to 2 <sup>b)</sup>	0.79	0.81	0.80	0.78
	From 2 to 3 <sup>c)</sup>	0.80	0.80	0.79	0.83
	From 3 to 4 <sup>d)</sup>	0.54	0.87	0.61	0.90
	From 4 to 5 <sup>e)</sup>	0.40	0.20	0.47	0.09
Suez	From 1 to 2 <sup>b)</sup>	0.79	0.82	0.80	0.81
	From 2 to 3 <sup>c)</sup>	0.75	0.73	0.76	0.75
	From 3 to 4 <sup>d)</sup>	0.49	0.79	0.53	0.82
	From 4 to 5 <sup>e)</sup>	0.35	0.13	0.41	0.09
Damietta	From 1 to 2 <sup>b)</sup>	0.80	0.60	0.72	0.83
	From 2 to 3 <sup>c)</sup>	0.55	0.64	0.68	0.75
	From 3 to 4 <sup>d)</sup>	0.50	0.83	0.61	0.83
	From 4 to 5 <sup>e)</sup>	0.40	0.21	0.40	0.09
Dakahlia	From 1 to 2 <sup>b)</sup>	0.79	0.54	0.71	0.64
	From 2 to 3 <sup>c)</sup>	0.59	0.70	0.67	0.76
	From 3 to 4 <sup>d)</sup>	0.50	0.82	0.56	0.88
	From 4 to 5 <sup>e)</sup>	0.40	0.20	0.39	0.08
Sharkia	From 1 to 2 <sup>b)</sup>	0.79	0.40	0.71	0.34
	From 2 to 3 <sup>c)</sup>	0.62	0.72	0.65	0.76
	From 3 to 4 <sup>d)</sup>	0.41	0.80	0.46	0.87
	From 4 to 5 <sup>e)</sup>	0.44	0.22	0.34	0.09
Kalyoubia	From 1 to 2 <sup>b)</sup>	0.80	0.47	0.72	0.45
	From 2 to 3 <sup>c)</sup>	0.57	0.72	0.62	0.75
	From 3 to 4 <sup>d)</sup>	0.46	0.69	0.51	0.77
	From 4 to 5 <sup>e)</sup>	0.43	0.22	0.38	0.09
Kafr El-Sheikh	From 1 to 2 <sup>b)</sup>	0.79	0.39	0.71	0.30
	From 2 to 3 <sup>c)</sup>	0.70	0.75	0.72	0.80
	From 3 to 4 <sup>d)</sup>	0.36	0.85	0.43	0.90
	From 4 to 5 <sup>e)</sup>	0.39	0.18	0.26	0.07
Gharbia	From 1 to 2 <sup>b)</sup>	0.79	0.68	0.72	0.65
	From 2 to 3 <sup>c)</sup>	0.66	0.81	0.72	0.83
	From 3 to 4 <sup>d)</sup>	0.47	0.80	0.51	0.87
	From 4 to 5 <sup>e)</sup>	0.44	0.20	0.38	0.06
Menoufia	From 1 to 2 <sup>b)</sup>	0.80	0.60	0.72	0.50
	From 2 to 3 <sup>c)</sup>	0.70	0.74	0.74	0.77
	From 3 to 4 <sup>d)</sup>	0.43	0.75	0.47	0.86
	From 4 to 5 <sup>e)</sup>	0.37	0.20	0.34	0.08
Behera	From 1 to 2 <sup>b)</sup>	0.80	0.33	0.71	0.07

Governorate	Level of Education <sup>a)</sup>	Male		Female	
Ismailia	From 2 to 3 <sup>c)</sup>	0.49	0.73	0.48	0.77
	From 3 to 4 <sup>d)</sup>	0.49	0.84	0.51	0.87
	From 4 to 5 <sup>e)</sup>	0.33	0.16	0.30	0.07
	From 1 to 2 <sup>b)</sup>	0.80	0.57	0.72	0.59
	From 2 to 3 <sup>c)</sup>	0.65	0.72	0.72	0.71
Giza	From 3 to 4 <sup>d)</sup>	0.47	0.75	0.55	0.77
	From 4 to 5 <sup>e)</sup>	0.39	0.19	0.34	0.12
	From 1 to 2 <sup>b)</sup>	0.74	0.60	0.63	0.50
	From 2 to 3 <sup>c)</sup>	0.63	0.76	0.69	0.75
	From 3 to 4 <sup>d)</sup>	0.48	0.79	0.50	0.78
Beni-Suef	From 4 to 5 <sup>e)</sup>	0.47	0.24	0.46	0.15
	From 1 to 2 <sup>b)</sup>	0.74	0.23	0.63	0.00
	From 2 to 3 <sup>c)</sup>	0.63	0.77	0.50	0.79
	From 3 to 4 <sup>d)</sup>	0.44	0.86	0.51	0.88
	From 4 to 5 <sup>e)</sup>	0.35	0.15	0.35	0.05
Fayoum	From 1 to 2 <sup>b)</sup>	0.73	0.10	0.63	0.00
	From 2 to 3 <sup>c)</sup>	0.56	0.82	0.46	0.83
	From 3 to 4 <sup>d)</sup>	0.47	0.88	0.53	0.89
	From 4 to 5 <sup>e)</sup>	0.27	0.16	0.31	0.10
	From 1 to 2 <sup>b)</sup>	0.73	0.36	0.62	0.00
Menia	From 2 to 3 <sup>c)</sup>	0.59	0.81	0.48	0.82
	From 3 to 4 <sup>d)</sup>	0.50	0.87	0.55	0.88
	From 4 to 5 <sup>e)</sup>	0.32	0.15	0.30	0.07
	From 1 to 2 <sup>b)</sup>	0.73	0.35	0.62	0.04
	From 2 to 3 <sup>c)</sup>	0.55	0.80	0.50	0.80
Assyout	From 3 to 4 <sup>d)</sup>	0.61	0.85	0.61	0.86
	From 4 to 5 <sup>e)</sup>	0.28	0.18	0.30	0.08
	From 1 to 2 <sup>b)</sup>	0.73	0.55	0.61	0.14
	From 2 to 3 <sup>c)</sup>	0.57	0.73	0.52	0.75
	From 3 to 4 <sup>d)</sup>	0.43	0.83	0.42	0.82
Suhag	From 4 to 5 <sup>e)</sup>	0.46	0.18	0.40	0.07
	From 1 to 2 <sup>b)</sup>	0.73	0.61	0.62	0.33
	From 2 to 3 <sup>c)</sup>	0.38	0.74	0.38	0.70
	From 3 to 4 <sup>d)</sup>	0.69	0.85	0.58	0.78
	From 4 to 5 <sup>e)</sup>	0.39	0.18	0.34	0.06
Quena	From 1 to 2 <sup>b)</sup>	0.73	0.83	0.62	0.78
	From 2 to 3 <sup>c)</sup>	0.66	0.80	0.76	75.00
	From 3 to 4 <sup>d)</sup>	0.57	0.82	0.52	0.72
	From 4 to 5 <sup>e)</sup>	0.34	0.14	0.39	0.05
	From 1 to 2 <sup>b)</sup>	0.75	0.62	0.66	0.46
Aswan	From 2 to 3 <sup>c)</sup>	0.55	0.68	0.58	0.72
	From 3 to 4 <sup>d)</sup>	0.54	0.81	0.53	0.76
	From 4 to 5 <sup>e)</sup>	0.49	0.20	0.37	0.14

<sup>a)</sup> 1 = Illiterate; 2 = Read and write; 3 = Basic; 4 = Secondary; 5 = Tertiary

<sup>b)</sup> Ages 5-9 and 10-14

<sup>c)</sup> Ages 10-14 and 15-19

<sup>d)</sup> Ages 15-19 and 20-24

<sup>e)</sup> Ages 20-24 and 25-29

## **Scenarios for projections**

The projections of the total population by level of education for Egypt and its 21 governorates (plus the Frontier region) were conducted by using three scenarios for the period 1996-2051.

### **a) Constant Scenario**

This scenario assumes that all components (fertility, mortality, migration, and transition) remain constant over the projection period at the same level as they were in the base year. It provides a benchmark for comparison. It is especially useful to see the improvements in education already embedded into the population. As explained above, an intermediate step was conducted to control the changes that occur in fertility between the 2000 DHS (1997-2000) and the 2005 DHS (2002-2005).

### **b) Goal Scenario**

This scenario reproduces goals set by the government and international agencies on the demographics and education of Egypt. Fertility was assumed to follow the national target set by the National Population Policy and Strategies (2002-2017) (Ministry of Health and Population 2002), which aims to reduce the total fertility rate from 3.5 in the base period (1996-2001) to the replacement level of 2.1 children by 2017. This will occur in the period 2016-2021, where it would stabilize until the end of the projection period. The goals are set up for the whole country and not for individual governorates separately; hence, we assumed that the relative difference between the fertility of Egypt and the fertility of the governorates observed in 1996 will be kept until 2017 (Table 26). Mortality will decline during the whole projection period, with life expectancy at birth increasing by two years every decade for both sexes, all education categories, and all governorates. It is assumed that migration will be constant at the starting year level during the whole projection period. As to education, it was assumed that the Millennium Development Goals would be successfully achieved, which includes the full intake into primary education and completion of basic education for all by 2015 (implemented in 2011-2016) (UN 2003). The gender gap will be eliminated at the primary and secondary levels by 2005 (implemented in 2001-2006) and at all levels of education by 2015 (implemented for the period 2011-2016). Transition probabilities will remain constant thereafter until the end of the projection period (Table 27). Other transition probabilities (above basic education) will remain constant for the whole projection period. Since the transition probabilities are dependent on the population in the departing state, this assumption will mean an increase in persons with secondary and tertiary education.

Table 26. Assumed total fertility rates by level of education, goal scenario (2016-2021).

Governorate	2001-2006	20016-2021					2016-2021	2046-2051
	Total	Level of Education					Total	Total
	TFR	Illiterate	Read & write	Basic	Secondary	Tertiary	TFR	TFR
Cairo	2.48	2.15	1.98	1.81	1.61	1.51	1.74	1.59
Alexandria	2.5	2.14	1.96	1.79	1.6	1.5	1.69	1.58
Port-Said	2.56	2.14	1.96	1.79	1.6	1.5	1.63	1.58
Suez	2.64	2.26	2.08	1.9	1.69	1.59	1.75	1.69
Damietta	2.73	2.32	2.14	1.95	1.74	1.63	1.8	1.73
Dakahlia	2.79	2.34	2.15	1.96	1.75	1.64	1.84	1.74
Sharkia	3.42	2.8	2.58	2.35	2.09	1.97	2.26	2.1
Kalyoubia	2.83	2.35	2.16	1.97	1.76	1.65	1.89	1.77
Kafr El-Sheikh	2.76	2.24	2.06	1.88	1.68	1.58	1.81	1.69
Gharbia	2.67	2.25	2.07	1.89	1.68	1.58	1.76	1.68
Menoufia	3.1	2.58	2.37	2.17	1.93	1.82	2.05	1.93
Behera	2.93	2.34	2.15	1.96	1.75	1.64	1.92	1.75
Ismailia	3.26	2.74	2.52	2.3	2.05	1.93	2.18	2.06
Giza	2.95	2.44	2.25	2.05	1.83	1.72	1.97	1.83
Beni-Suef	3.28	2.55	2.35	2.14	1.91	1.8	2.18	1.91
Fayoum	4.25	3.3	3.04	2.77	2.47	2.32	2.81	2.47
Menia	4.55	3.54	3.25	2.97	2.64	2.49	3.01	2.64
Assyout	4.55	3.56	3.27	2.99	2.66	2.5	3.01	2.65
Suhag	4.43	3.44	3.17	2.89	2.58	2.42	2.91	2.58
Quena	3.91	3.05	2.81	2.56	2.28	2.15	2.55	2.25
Aswan	2.57	2.14	1.96	1.79	1.6	1.5	1.69	1.59
Frontier region	2.74	2.23	2.05	1.87	1.67	1.57	1.82	1.66
<b>Total Egypt</b>	<b>3.1</b>	<b>2.5</b>	<b>2.3</b>	<b>2.1</b>	<b>1.87</b>	<b>1.76</b>	<b>2.1</b>	<b>1.99</b>

Table 27. Assumed transition probabilities for Egypt, goal scenario, 2011-2016.

Level of Education <sup>a)</sup>	1996-2001				2011-2016			
	Male		Female		Male		Female	
From 1 to 2 <sup>b)</sup>	0.77	0.48	0.71	0.27	1.00	1.00	1.00	1.00
From 2 to 3 <sup>c)</sup>	0.59	0.75	0.59	0.77	1.00	1.00	1.00	1.00
From 3 to 4 <sup>d)</sup>	0.50	0.81	0.54	0.83	0.50	0.81	0.50	0.81
From 4 to 5 <sup>e)</sup>	0.42	0.21	0.41	0.10	0.42	0.21	0.42	0.21

<sup>a)</sup> 1 = Illiterate; 2 = Read and write; 3 = Basic; 4 = Secondary; 5 = Tertiary

<sup>b)</sup> Ages 5-9 and 10-14

<sup>c)</sup> Ages 10-14 and 15-19

<sup>d)</sup> Ages 15-19 and 20-24

<sup>e)</sup> Ages 20-24 and 25-29

### **c) Trend Scenario**

This scenario reproduces the trend observed in education and fertility in the last years. Fertility follows the trend observed in Egypt through several rounds of fertility surveys between 1995 and 2005, fitting an exponential curve. The total fertility rate was observed to reach the level of 1.7 in 2051. We assumed that the relative difference between the TFR for the whole of Egypt and the other categories would be kept at the level observed in 2001-2006. The same is true of the relative difference between the TFR of the whole of Egypt and the TFR in each governorate. Table 28 presents the results of the exercise. Another possibility would have been to calculate the trend based directly on the TFR by education categories and by DHS regions to define the overall shape of the future fertility by education and governorates. However, this exercise led to unrealistic and contradicting results that did not seem acceptable. Education trends were calculated in two steps: First, for each education category in each governorate as well as for the whole of Egypt, we calculated the trend to 2031 looking across three cohorts in 1996<sup>8</sup> based on the proportions by levels of education. The values for the proportions in 2031, obtained through the extension of the trend shown by the cohorts, were used to calculate new transition probabilities for the target period of 2026-2031 (see Table 29). In a second step, we extended the trend to 2051 for the whole of Egypt. We applied the increase in the transition rates observed in Egypt for the period 2031-2051 to all governorates.

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<sup>8</sup> The reference cohorts were (1) for the illiterate category, the age groups 10-14, 15-19, 20-24; (2) for the read and write category, the age groups 15-19, 20-24, 25-29; (3) for both the basic education and complete secondary education categories, the age groups 20-24, 25-29, 30-34; and for the tertiary category, the age groups 25-29, 30-34, 35-39.

Table 28. Assumed total fertility rates by level of education, trend scenario, 2046-2051.

Governorate	2001-2006	2046-2051					2046-2051
	Total	Level of Education					Total
	TFR	Illiterate	Read & write	Basic	Secondary	Tertiary	TFR
Cairo	2.48	1.74	1.56	1.44	1.34	1.29	1.35
Alexandria	2.5	1.73	1.55	1.43	1.33	1.28	1.36
Port-Said	2.56	1.73	1.55	1.43	1.33	1.28	1.33
Suez	2.64	1.83	1.64	1.51	1.41	1.36	1.41
Damietta	2.73	1.88	1.68	1.55	1.45	1.39	1.49
Dakahlia	2.79	1.89	1.69	1.56	1.46	1.4	1.49
Sharkia	3.42	2.26	2.03	1.87	1.75	1.68	1.78
Kalyoubia	2.83	1.9	1.7	1.57	1.47	1.41	1.5
Kafr El-Sheikh	2.76	1.81	1.62	1.5	1.4	1.35	1.42
Gharbia	2.67	1.82	1.63	1.5	1.4	1.35	1.42
Menoufia	3.1	2.08	1.87	1.72	1.61	1.55	1.64
Behera	2.93	1.89	1.69	1.56	1.46	1.4	1.52
Ismailia	3.26	2.22	1.99	1.83	1.71	1.65	1.75
Giza	2.95	1.97	1.77	1.63	1.52	1.47	1.58
Beni-Suef	3.28	2.06	1.85	1.7	1.59	1.53	1.74
Fayoum	4.25	2.67	2.39	2.2	2.06	1.98	2.24
Menia	4.55	2.86	2.56	2.36	2.21	2.12	2.4
Assyout	4.55	2.87	2.58	2.38	2.22	2.13	2.38
Suhag	4.43	2.78	2.49	2.3	2.15	2.07	2.29
Quena	3.91	2.46	2.21	2.04	1.9	1.83	1.97
Aswan	2.57	1.73	1.55	1.43	1.33	1.28	1.37
Frontier region	2.74	1.8	1.61	1.49	1.39	1.34	1.42
Total Egypt	3.1	2.02	1.81	1.67	1.56	1.51	1.69

Table 29. Assumed transition probabilities, trend scenario, 2026-2031.

Governorate	Level of Education <sup>a)</sup>	1996-2001				2026-2031			
		Male		Female		Male		Female	
Total Egypt	From 1 to 2 <sup>b)</sup>	0.78	0.48	0.71	0.27	0.96	0.34	0.95	0.08
	From 2 to 3 <sup>c)</sup>	0.59	0.75	0.59	0.77	0.77	0.68	0.65	0.76
	From 3 to 4 <sup>d)</sup>	0.50	0.81	0.54	0.83	0.36	0.81	0.48	0.84
	From 4 to 5 <sup>e)</sup>	0.42	0.21	0.41	0.10	0.42	0.21	0.41	0.10
Cairo	From 1 to 2 <sup>b)</sup>	0.78	0.64	0.79	0.62	0.89	0.60	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.66	0.78	0.67	0.79	0.81	0.76	0.73	0.77
	From 3 to 4 <sup>d)</sup>	0.56	0.79	0.61	0.82	0.37	0.79	0.53	0.82
	From 4 to 5 <sup>e)</sup>	0.52	0.30	0.50	0.18	0.52	0.30	0.50	0.18
Alexandria	From 1 to 2 <sup>b)</sup>	0.79	0.67	0.79	0.61	0.94	0.60	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.50	0.68	0.51	0.70	0.59	0.66	0.58	0.69
	From 3 to 4 <sup>d)</sup>	0.59	0.76	0.65	0.78	0.44	0.76	0.59	0.79
	From 4 to 5 <sup>e)</sup>	0.52	0.25	0.54	0.14	0.52	0.25	0.54	0.14
Port-Said	From 1 to 2 <sup>b)</sup>	0.79	0.81	0.80	0.78	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.80	0.80	0.79	0.83	0.89	1.00	0.86	1.00
	From 3 to 4 <sup>d)</sup>	0.54	0.87	0.61	0.90	0.37	0.87	0.40	0.90
	From 4 to 5 <sup>e)</sup>	0.40	0.20	0.47	0.09	0.40	0.20	0.47	0.09
Suez	From 1 to 2 <sup>b)</sup>	0.78	0.81	0.80	0.78	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.80	0.80	0.79	0.83	0.89	1.00	0.86	1.00
	From 3 to 4 <sup>d)</sup>	0.54	0.87	0.61	0.90	0.37	0.87	0.40	0.90
	From 4 to 5 <sup>e)</sup>	0.40	0.20	0.47	0.09	0.40	0.20	0.47	0.09
Damietta	From 1 to 2 <sup>b)</sup>	0.80	0.60	0.72	0.83	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.55	0.64	0.68	0.75	0.59	0.61	0.37	0.72
	From 3 to 4 <sup>d)</sup>	0.50	0.83	0.61	0.83	0.82	0.83	0.83	0.84
	From 4 to 5 <sup>e)</sup>	0.40	0.21	0.40	0.09	0.40	0.21	0.40	0.09
Dakahlia	From 1 to 2 <sup>b)</sup>	0.79	0.54	0.71	0.64	0.99	0.31	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.59	0.70	0.67	0.76	0.68	0.68	0.39	0.76
	From 3 to 4 <sup>d)</sup>	0.50	0.82	0.56	0.88	0.40	0.82	0.89	0.88
	From 4 to 5 <sup>e)</sup>	0.40	0.20	0.39	0.08	0.40	0.20	0.39	0.08
Sharkia	From 1 to 2 <sup>b)</sup>	0.79	0.40	0.71	0.34	0.95	0.29	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.62	0.72	0.65	0.76	0.75	0.70	0.61	0.76
	From 3 to 4 <sup>d)</sup>	0.41	0.80	0.46	0.87	0.29	0.81	0.58	0.88
	From 4 to 5 <sup>e)</sup>	0.44	0.22	0.34	0.09	0.44	0.22	0.34	0.09
Kalyoubia	From 1 to 2 <sup>b)</sup>	0.80	0.47	0.72	0.45	0.92	0.40	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.57	0.72	0.62	0.75	0.67	0.71	0.61	0.75
	From 3 to 4 <sup>d)</sup>	0.46	0.69	0.51	0.77	0.29	0.70	0.51	0.78
	From 4 to 5 <sup>e)</sup>	0.43	0.22	0.38	0.09	0.43	0.22	0.38	0.09
Kafr El-Sheikh	From 1 to 2 <sup>b)</sup>	0.79	0.39	0.71	0.30	1.00	0.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.70	0.75	0.72	0.80	0.85	0.72	0.59	0.80
	From 3 to 4 <sup>d)</sup>	0.36	0.85	0.43	0.90	0.22	0.86	0.68	0.90
	From 4 to 5 <sup>e)</sup>	0.39	0.18	0.26	0.07	0.39	0.18	0.26	0.07
Gharbia	From 1 to 2 <sup>b)</sup>	0.79	0.68	0.72	0.65	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.66	0.81	0.72	0.83	0.83	0.76	0.50	0.82
	From 3 to 4 <sup>d)</sup>	0.47	0.80	0.51	0.87	0.38	0.80	0.77	0.87
	From 4 to 5 <sup>e)</sup>	0.44	0.20	0.38	0.06	0.44	0.20	0.38	0.06
Menoufia	From 1 to 2 <sup>b)</sup>	0.80	0.60	0.72	0.50	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.70	0.74	0.74	0.77	0.78	0.71	0.59	0.77
	From 3 to 4 <sup>d)</sup>	0.43	0.75	0.47	0.86	0.30	0.76	0.58	0.87
	From 4 to 5 <sup>e)</sup>	0.73	0.20	0.34	0.08	0.37	0.20	0.34	0.08



Governorate	Level of Education <sup>a)</sup>	1996-2001				2026-2031			
		Male		Female		Male		Female	
Behera	From 1 to 2 <sup>b)</sup>	0.80	0.33	0.71	0.07	0.98	0.05	0.96	0.00
	From 2 to 3 <sup>c)</sup>	0.49	0.73	0.48	0.77	0.68	0.72	0.54	0.77
	From 3 to 4 <sup>d)</sup>	0.49	0.84	0.51	0.87	0.41	0.85	0.61	0.88
	From 4 to 5 <sup>e)</sup>	0.33	0.16	0.30	0.07	0.33	0.16	0.30	0.07
Ismailia	From 1 to 2 <sup>b)</sup>	0.80	0.57	0.72	0.59	0.92	0.53	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.65	0.72	0.72	0.71	0.77	0.70	0.62	0.70
	From 3 to 4 <sup>d)</sup>	0.47	0.75	0.55	0.77	0.29	0.76	0.59	0.77
	From 4 to 5 <sup>e)</sup>	0.39	0.19	0.34	0.12	0.39	0.19	0.34	0.12
Giza	From 1 to 2 <sup>b)</sup>	0.74	0.60	0.63	0.50	0.95	0.49	0.95	0.33
	From 2 to 3 <sup>c)</sup>	0.63	0.76	0.69	0.75	0.82	0.73	0.71	0.74
	From 3 to 4 <sup>d)</sup>	0.48	0.79	0.50	0.78	0.36	0.79	0.47	0.78
	From 4 to 5 <sup>e)</sup>	0.47	0.24	0.46	0.15	0.47	0.24	0.46	0.15
Beni-Suef	From 1 to 2 <sup>b)</sup>	0.74	0.23	0.63	0.00	0.87	0.15	0.76	0.00
	From 2 to 3 <sup>c)</sup>	0.63	0.77	0.50	0.79	0.84	0.75	0.59	0.79
	From 3 to 4 <sup>d)</sup>	0.44	0.86	0.51	0.88	0.25	0.87	0.40	0.89
	From 4 to 5 <sup>e)</sup>	0.35	0.15	0.35	0.05	0.35	0.15	0.35	0.05
Fayoum	From 1 to 2 <sup>b)</sup>	0.74	0.10	0.63	0.00	0.91	0.00	0.77	0.00
	From 2 to 3 <sup>c)</sup>	0.56	0.82	0.46	0.83	0.81	0.80	0.58	0.83
	From 3 to 4 <sup>d)</sup>	0.47	0.88	0.53	0.89	0.29	0.88	0.43	0.89
	From 4 to 5 <sup>e)</sup>	0.27	0.16	0.31	0.10	0.27	0.16	0.31	0.10
Menia	From 1 to 2 <sup>b)</sup>	0.73	0.36	0.62	0.00	0.94	0.21	0.77	0.00
	From 2 to 3 <sup>c)</sup>	0.59	0.81	0.48	0.82	0.74	0.80	0.54	0.82
	From 3 to 4 <sup>d)</sup>	0.50	0.87	0.55	0.88	0.36	0.88	0.55	0.88
	From 4 to 5 <sup>e)</sup>	0.32	0.15	0.30	0.07	0.32	0.15	0.30	0.07
Assyout	From 1 to 2 <sup>b)</sup>	0.73	0.35	0.62	0.04	0.91	0.25	0.83	0.00
	From 2 to 3 <sup>c)</sup>	0.55	0.80	0.50	0.80	0.66	0.79	0.55	0.81
	From 3 to 4 <sup>d)</sup>	0.61	0.85	0.61	0.86	0.40	0.86	0.58	0.87
	From 4 to 5 <sup>e)</sup>	0.28	0.18	0.30	0.08	0.28	0.18	0.30	0.08
Suhag	From 1 to 2 <sup>b)</sup>	0.73	0.55	0.61	0.14	1.00	1.00	0.90	0.00
	From 2 to 3 <sup>c)</sup>	0.57	0.73	0.52	0.75	0.51	0.73	0.52	0.76
	From 3 to 4 <sup>d)</sup>	0.43	0.83	0.42	0.82	0.51	0.84	0.52	0.83
	From 4 to 5 <sup>e)</sup>	0.46	0.18	0.40	0.07	0.46	0.18	0.40	0.07
Quena	From 1 to 2 <sup>b)</sup>	0.73	0.61	0.62	0.33	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.38	0.74	0.38	0.70	0.26	0.75	0.31	0.75
	From 3 to 4 <sup>d)</sup>	0.69	0.85	0.58	0.78	0.79	0.85	1.00	0.79
	From 4 to 5 <sup>e)</sup>	0.39	0.18	0.34	0.06	0.39	0.18	0.34	0.06
Aswan	From 1 to 2 <sup>b)</sup>	0.73	0.83	0.62	0.78	1.00	1.00	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.66	0.80	0.76	0.75	0.54	0.79	0.41	0.74
	From 3 to 4 <sup>d)</sup>	0.57	0.82	0.52	0.72	0.55	0.83	0.75	0.73
	From 4 to 5 <sup>e)</sup>	0.34	0.14	0.39	0.05	0.34	0.14	0.39	0.05
Frontier region	From 1 to 2 <sup>b)</sup>	0.75	0.62	0.66	0.46	0.91	0.56	1.00	1.00
	From 2 to 3 <sup>c)</sup>	0.55	0.68	0.58	0.72	0.62	0.67	0.53	0.72
	From 3 to 4 <sup>d)</sup>	0.54	0.81	0.53	0.76	0.37	0.82	0.89	0.77
	From 4 to 5 <sup>e)</sup>	0.48	0.20	0.37	0.14	0.48	0.20	0.37	0.14

<sup>a)</sup> 1 = Illiterate; 2 = Read and write; 3 = Basic; 4 = Secondary; 5 = Tertiary

<sup>b)</sup> Ages 5-9 and 10-14

<sup>c)</sup> Ages 10-14 and 15-19

<sup>d)</sup> Ages 15-19 and 20-24

<sup>e)</sup> Ages 20-24 and 25-29

## Results

### Egypt

The population of Egypt will increase rapidly within the next few decades. In all scenarios, it will reach a level of approximately 90 million inhabitants in 2015. By 2031, the population will be between 104 and 115 million, depending on the scenario, and between 121 and 151 million in 2051. The constant scenario gives the highest population (151 million) which would mean more than a doubling of the 2006 population, whereas the two other scenarios have closer absolute population levels: 128 million according to the trend scenario and 121 million according to the goal scenario. These converging results in terms of population are due to the convergence of fertility rates to 2036-2041 as can be seen in Figure 7, although the TFRs diverge again afterwards.

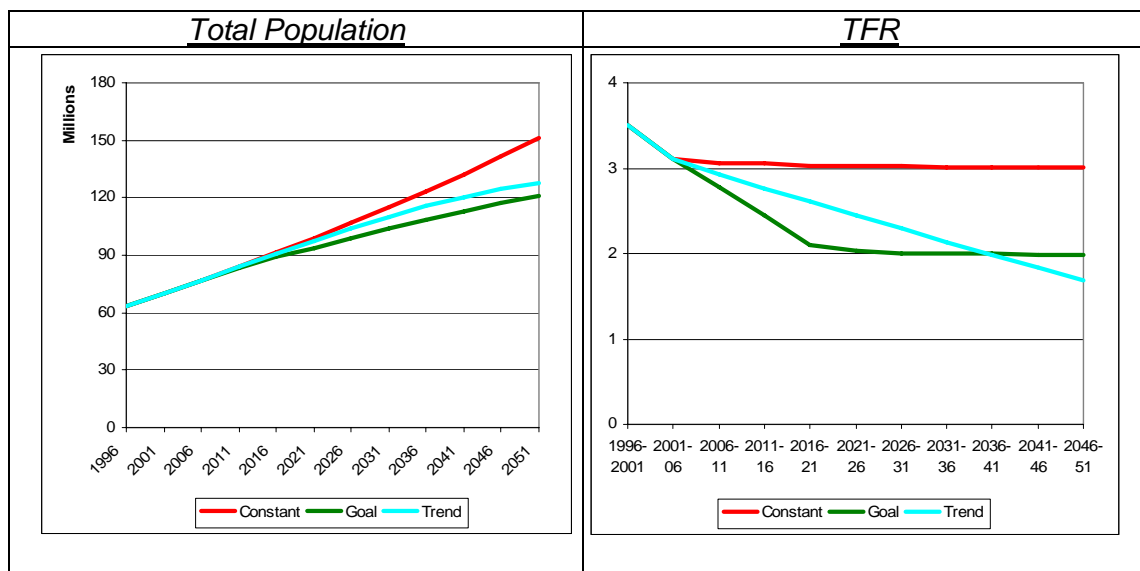


Figure 7. Total population (in millions) and TFR, 1996-2051, according to the constant, goal, and trend scenarios.

If we look at the age structure and the dependency ratios, we can see that the population will remain young over the next 50 years, although Figure 8 shows that the old age dependency ratio will increase substantially, especially after 2030 when it will increase from 10 percent to about 20 percent according to the trend and goal scenarios. The fertility decline envisaged through the trend and goal scenarios will lead the young age dependency ratio from 65 percent in 1996 to 30-32 percent in 2051. This will be favorable for the country because the total dependency ratio will level off over the next 20 to 30 years, depending on the scenario, and will cruise around 50 percent until the middle of the 21<sup>st</sup> century, when it might possibly increase. The working-age population (aged 15-64) that numbered 42 million in 2001 will increase to 67 million in 2026, according to both the goal and the trend scenarios. In 2051 it will increase to 79 million, according to the goal scenario and 85 million, according to the trend scenario (see Table

32). This development means that the country will have a large working-age population available for the development and economic success of the country. However, as discussed above, this will not happen unless the working-age population has the adapted skills to participate and enhance the development of the country. Besides, the working-age population will be very young. In 2001, 34 percent of the working-age population belonged to the 15-24 year age group. Although the share of the young population will diminish slowly until 2016 and more rapidly thereafter, it will still be around 26-27 percent in 2026 (goal and trend scenarios) and 21-22 percent in 2051. This implies the necessity for the labor market to provide sufficient employment opportunities for those new entrants.

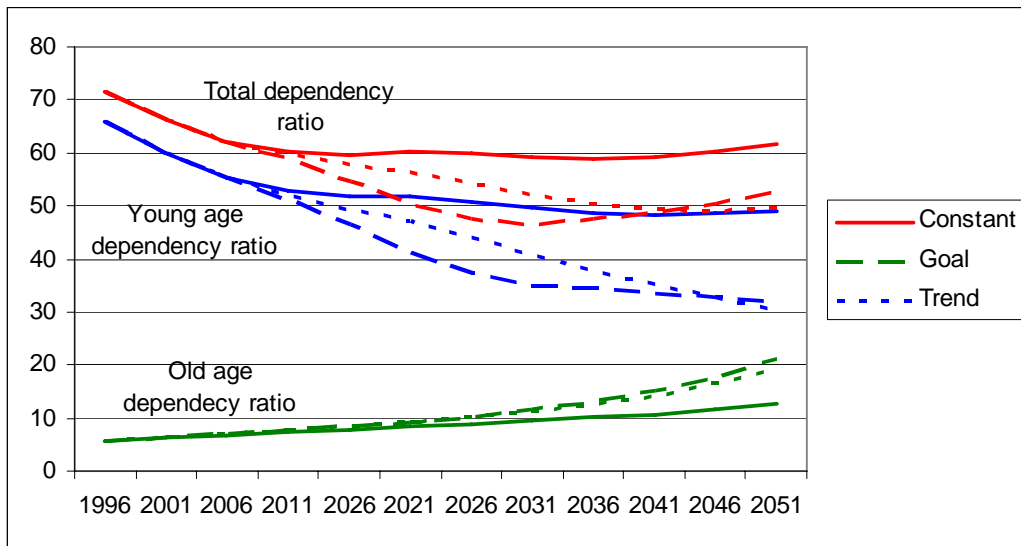


Figure 8. Dependency ratios according to the constant, goal, and trend scenarios, 1996-2051.

Figure 9 and Table 30 show the educational attainment of the labor force over the next 50 years, according to the three scenarios. Although the figures and numbers are different, there are some common features of importance for the future of Egypt. The proportion of the workers with little or no education will diminish as a result of past and present policies because high illiteracy rates are also (and not only) a result of the momentum of education spread throughout the total population. Under the constant scenario that almost freezes enrolment at the present level, one can see that the proportion of illiterate people in the working-age population will diminish from 42 percent in 1996 to 16 percent in 2051. The education momentum is also responsible for the fact that even under the most optimistic (goal) scenario, the population will not be 100 percent literate before 2051.

Another piece of important information is that the proportion with a secondary and tertiary education will increase as a result of past policies. Under the constant scenario, the proportion with a secondary and higher education will increase from 31 percent in 1996 to 60 percent in 2051, almost double. This increase will happen mostly

at the level of secondary education because the progress in tertiary education is more modest. According to the same constant scenario, tertiary educated persons would account for 15 percent in 2051, up from 10 percent in 1996. Under the goal scenario and the trend scenario, the population with a secondary education would increase to 55 percent and 51 percent, respectively; the values for tertiary education would be 28 percent and 17 percent, respectively.

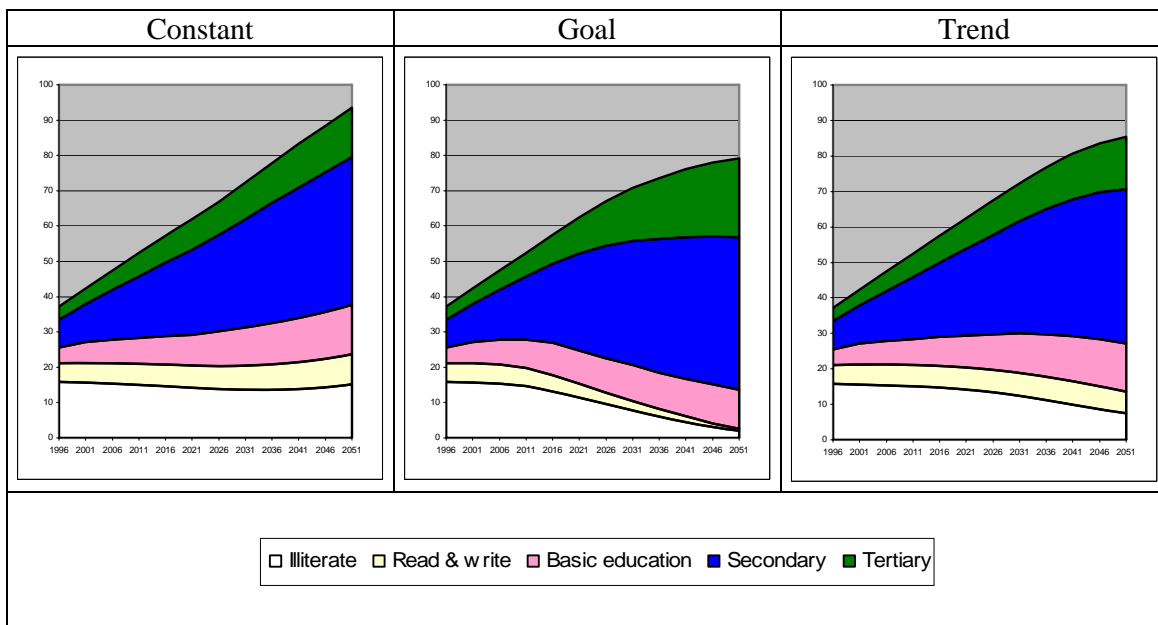


Figure 9. Population aged 15-64 by level of educational attainment, 1996-2051, according to the constant, goal, and trend scenarios.

A more problematic dimension of the results has to do with the gender gap, which is relative to the full participation of women in society. If the trend were to continue, the gender gap would not even be fully closed by 2051. It is especially prominent in the illiterate category, where 11 percent of the female working-age population would still be illiterate. The gender gap is also noticeable at the tertiary level. Only under the goal scenario is it clear that most of the gender differentials in levels of educational attainment would disappear.

The overall fertility level will be influenced by the changes in the overall proportion of women in the levels of education. According to the constant scenario, the TFR remains constant at the 2001-2006 level within each education category. As a result of the changes in the proportion of women by education categories that result from younger, better-educated cohorts replacing older, less-educated ones, the overall TFR declines to three children by the end of the projection period. Under the goal scenario, where the TFR remains constant as of 2016-2021, a further decline to below two would be achieved due to the increasing levels of education.

Table 30. Share of the working-age population (15-64 years of age) by sex, for 2001, 2026, and 2051, according to the constant, goal, and trend scenarios.

Year	Scenario	Sex	Level of Education (in percent)				
			Illiterate	Read & write	Basic	Complete secondary	Tertiary
2001	All	Male	26.7	16.2	15.8	28.3	13.1
		Female	47.4	9.8	12.3	22.4	8.1
		Total	36.9	13.0	14.1	25.4	10.6
2026	Constant	Male	14.9	10.8	16.3	41.5	16.6
		Female	26.3	8.6	12.9	40.2	12.0
		Total	20.7	9.7	14.6	40.8	14.2
	Goal	Male	10.3	5.3	15.3	49.2	19.9
		Female	18.2	4.4	13.8	45.9	17.7
		Total	14.3	4.8	14.6	47.5	18.8
	Trend	Male	14.2	10.6	16.8	41.8	16.5
		Female	25.1	8.4	13.2	41.2	12.1
		Total	19.8	9.5	14.9	41.5	14.3
2051	Constant	Male	11.2	10.1	16.8	44.5	17.4
		Female	20.9	8.3	13.3	44.9	12.6
		Total	16.2	9.2	15.0	44.7	14.9
	Goal	Male	1.6	0.6	14.3	55.3	28.2
		Female	3.5	0.7	13.8	53.8	28.2
		Total	2.6	0.6	14.0	54.5	28.2
	Trend	Male	5.8	7.3	17.7	49.6	19.5
		Female	11.4	7.3	14.0	52.3	15.0
		Total	8.7	7.3	15.8	51.0	17.2

Our projections for Egypt are in line with other projections, as can be seen from Table 31. The constant fertility scenario of the United Nations (2005a) gives larger population numbers for 2050 as compared to ours, but this is mostly due to the assumption that fertility is kept at a constant level of 3.3, whereas the IIASA/CDC fertility in this scenario goes down to 3.0 by 2046-2051. Our trend scenario and the UN medium scenario give very close results: 128 million and 126 million, respectively, in 2050/2051. The official CDC scenarios that are implemented until 2021 (CDC 2000) show a smaller population increase than both the UN and the IIASA/CDC projections. This is mostly due to the starting population that is estimated lower in the official CDC projection, where little adjustment has been made especially for underestimation of the first age groups.

Table 31. Total population, 1996-2051, according to the IIASA/CDC scenarios and to the United Nations variants. The population numbers for the UN variants are for the years 1995 to 2050. Source for the UN variants: UN (2005a). Source for the CDC scenarios: CDC (2000).

	IIASA/CDC Scenarios			UN Variants				Constant Fertility TFR=3.29	CDC Scenarios		
	Constant	Goal	Trend	Medium	High	Low	Medium		High	Low	
1996	63782	63782	63782	61225	61225	61225	61225	58755	58755	58755	
2001	70413	70413	70413	67285	67285	67285	67285	65072	65300	64656	
2006	76816	76946	76946	74033	74033	74033	74033	71595	72262	70612	
2011	83873	83295	83801	81133	81919	80347	82025	78247	79437	76513	
2016	91398	89096	90747	88175	90341	86009	90828	84728	86559	82199	
2021	99173	93982	97527	94834	98812	90856	100048	90883	93462	87472	
2026	107059	98911	103946	101092	106990	95204	109633				
2031	115132	103832	109946	107056	115188	99019	119871				
2036	123544	108622	115468	112689	123642	102099	131089				
2041	132368	113100	120399	117803	132237	104241	143359				
2046	141561	117197	124592	122234	140653	105410	156583				
2051	151058	120991	127915	125916	148649	105679	170705				

## Governorates

Projections were carried out at the governorate levels. As explained in the methodology section, most of the demographic (fertility, mortality, migration) assumptions were not developed individually for each governorate but rather evaluate the future of the governorates according to some common development at the national level. On the contrary, the assumptions in terms of education probabilities developed for the trend scenario are based on the latest educational development observed from the levels of educational attainment present among the youngest cohorts in the latest census. In that sense, a comparison between the trend and the goal scenarios by governorate will give an illustrative picture of the gap between the development intentions of the government and development agencies, and the present pace of change forwarded into the future. The results for the governorates are presented in Appendix A in the form of pyramids and detailed tables.

Because of high fertility, the working-age population will increase heavily in some governorates. It will be almost double the size between 2001 and 2026 in Assyout, Fayoum, Quena, Menia, and Suhag (see Table 32). In half of the governorates, the working-age population will have doubled by 2051. In addition to those mentioned earlier, this concerns Beni-Suef, Behera, Giza, Ismailia, Menoufia, and Sharkia. Some of these governorates already have very high levels of unemployment (see Table 7) and will most likely be pressured by the increase in the working population. This concerns Assyout, Ismailia, Quena, Menia, Menoufia, and Sharkia. One should also consider that the working-age population will be very young, with a large proportion in the 15-24 age group. In Assyout, for instance, 36 percent of the population was between 15-24 years old in 2001; in 2051, that age group will represent more than one quarter (25-27 percent) of the working-age population, according to both the trend and the goal scenarios. The same setting is present in Fayoum, Menoufia, and Suhag.

Table 32. Absolute working-age population (in thousands) and proportion of the age group 15-24 (in percent) in the working-age population in 2001, 2026, and 2051, according to the constant, goal, and trend scenarios. Source: Authors' calculations.

Governorate	Constant						Goal				Trend			
	2001		2026		2051		2026		2051		2026		2051	
	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP	Absolute WAP	Percent 15-24 in WAP
Cairo	5326	29	7112	23	8149	23	7133	22	7130	18	7157	22	7556	19
Alexandria	2533	28	3256	23	3672	23	3268	22	3193	18	3283	22	3409	18
Port-Said	351	28	456	22	507	22	457	21	441	17	464	22	492	18
Suez	295	32	433	23	520	23	439	22	454	18	447	23	512	19
Damietta	669	31	1051	23	1310	23	1053	22	1129	18	1059	23	1226	19
Dakahlia	3095	33	4748	25	5952	24	4754	24	5100	19	4780	24	5489	20
Sharkia	3062	35	5227	28	7774	28	5222	27	6481	22	5256	28	7051	23
Kalyoubia	2255	35	3450	26	4423	25	3451	25	3774	20	3470	26	4050	21
Kafr El-Sheikh	1640	33	2605	24	3250	23	2609	23	2787	18	2624	24	3019	19
Gharbia	2562	32	3830	24	4647	23	3832	23	3990	18	3853	24	4315	20
Menoufia	1937	34	3075	27	4204	27	3074	26	3570	21	3090	27	3844	22
Behera	2955	34	4805	25	6263	25	4807	24	5286	19	4836	25	5776	20
Ismailia	491	33	810	27	1157	27	810	26	972	21	815	26	1054	22
Giza	3438	35	5601	25	7448	24	5581	24	6248	19	5619	25	6813	20
Beni- Suef	1295	36	2167	26	3006	26	2167	25	2524	20	2180	26	2756	21
Fayoum	1496	36	3031	31	5316	31	3022	30	4312	24	3044	30	4768	26
Menia	2359	36	4570	32	8371	32	4557	31	6757	25	4592	32	7495	27
Assyout	1972	36	3725	32	6699	32	3718	31	5432	25	3745	31	6002	27
Suhag	2157	36	4012	32	7155	32	4003	31	5811	25	4031	32	6433	27
Quena	2000	36	3591	29	5727	29	3585	28	4718	23	3608	29	5196	25
Aswan	724	33	1075	23	1227	22	1077	22	1061	17	1083	22	1141	18
Frontier	548	34	841	23	1002	23	842	22	859	18	845	23	919	19
Total Egypt	42358	34	66973	27	93482	27	67011	26	79124	21	67410	27	85359	22

The constant scenario shows what improvements have been made in the recent and less recent past. It shows the leap in terms of levels of education over the next 50 years, if the current completion rates continue. This happens in two directions: The first is the reduction of illiteracy rates in the population at a dramatic pace, similar to the urban governorates, where the percentage of illiterate aged 25 and above is at least five times higher in 2001 compared to 2051, for instance, in Port-Said and Suez. The changes are less intense in the poorer governorates, such as in Fayoum or Suhag, but still represent a major decline in the proportion illiterate in the 25+ age groups, from 67 percent in 2001 to 30 percent in 2051 and from 65 percent in 2001 to 24 percent in 2051, respectively. The second is the change in the educational composition of the population. According to the constant scenario, the proportion of the population with a secondary education echoes what we wrote earlier on the imbalances of the education system. Whereas in 2001 about 19 percent of the Egyptian population had completed secondary education, this will be 46 percent in 2051. Amazingly, in all governorates, even the poorer ones, this percentage will be above 40 percent, even in Fayoum, Assyout, Menia, Quena, and Beni-Suef. In some governorates, the share of the 25+ population having completed secondary education will be above 50 percent, such as Port-Said and Suez in the Urban governorates, and Dakahlia, Menoufia, Gharbia, and Kafr El-Sheikh in Lower Egypt. In comparison with the changes occurring among the illiterate and the secondary-educated population, the other educational categories – read and write, basic education, and tertiary education – would experience little change, if the constant scenario were applied. The constant scenario also shows that most of the present efforts are aimed at improving the educational status of the female population. If the increase in levels of education were greater for men during the 50 years between 2001 and 2051, it would be even more important for women, both in terms of literacy and in increasing the number of women with completed secondary education. For instance, in many governorates the proportion illiterate in the 25+ population is divided by 8 in the 50 years, from 43 percent in 2001 to 5 percent in 2051 in Suez, and from 48 percent to 6 percent in Damietta. The same is true at the secondary levels of education.

A comparison between the trend and the goal scenarios show that the trend scenario seems to be sufficient in suppressing illiteracy in most governorates, while in others, efforts will have to be expanded. For instance, in Cairo, Alexandria, Port-Said, and Suez for the Urban governorates, in Damietta and Gharbia in Lower Egypt, and in Aswan in Upper Egypt, the proportion aged 15 and above who are illiterate in 2051 is below 5 percent and is approximately equal in the goal and trend scenarios. These governorates are not homogenous; some of them – like most of the Urban governorates – have a long tradition of campaigning against illiteracy, while others still had quite high levels of illiteracy in 2001, such as Gharbia with 34 percent. A few of the governorates do achieve their goals in terms of eradication of illiteracy in the working-age male population, but not for the female population. This is the case for Suhag and Quena in Upper Egypt, where efforts will have to be intensified for the women. In all other governorates and for both sexes, the scenarios will not be sufficient to ban illiteracy from the population. This lack of success is twofold. The first reason is the legacy of the lack of past investments in education that cannot be repaired unless the country invests in a large-scale literacy campaign (similar to what has happened locally in India). In many governorates, the proportion illiterate in the 15+ population was above 50 percent in 2001; these people will not fully disappear until 2051 and will be crucial to the development of those governorates. The second reason is that some of the



investments to reach universal intake in primary education have not been well implemented. This is particularly true for Giza and Quena in Upper Egypt, to a lesser extent for Dakhalia, Sharkia, Kalyoubia, and Kafr El-Sheikh in Lower Egypt, and for the Frontier region.

Table.33. Total fertility rates in 2001-2006 and in 2046-2051 according to the constant, goal, and trend scenarios.

Governorate	2001-2006	2046-2051		
		Constant	Goal	Trend
Cairo	2.48	2.40	1.59	1.35
Alexandria	2.50	2.41	1.58	1.36
Port-Said	2.56	2.34	1.58	1.33
Suez	2.64	2.50	1.69	1.41
Damietta	2.73	2.58	1.73	1.49
Dakahlia	2.79	2.63	1.74	1.49
Sharkia	3.42	3.23	2.10	1.78
Kalyoubia	2.83	2.70	1.77	1.50
Kafr El-Sheikh	2.76	2.58	1.69	1.42
Gharbia	2.67	2.52	1.68	1.42
Menoufia	3.10	2.93	1.93	1.64
Behera	2.93	2.75	1.75	1.52
Ismailia	3.26	3.11	2.06	1.75
Giza	2.95	2.82	1.83	1.58
Beni-Suef	3.28	3.08	1.91	1.74
Fayoum	4.25	3.98	2.47	2.24
Menia	4.55	4.27	2.64	2.40
Assyout	4.55	4.29	2.65	2.38
Suhag	4.43	4.13	2.58	2.29
Quena	3.91	3.63	2.25	1.97
Aswan	2.57	2.41	1.59	1.37
Frontier regions	2.74	2.58	1.66	1.42
Total Egypt	3.10	3.00	1.99	1.69

As discussed in the introduction and background sections, tertiary education will be important for the development of Egypt. As we have seen, the proportion with completed secondary education has increased and this could allow for a parallel increase in the proportion completing a tertiary education. One can see from the constant scenario that the proportion in tertiary education would increase mostly as a result of the increase in secondary education and the probability that the proportion of that group would move to tertiary education. In the case of Suez, Suhag, and Quena, the trend scenario translates into significantly higher shares of the 25+ population with a tertiary education than with the other scenarios, showing the effect of recent increases in enrolment. For the other governorates, the scenarios end in a very close share of the tertiary-educated population, from a minimum of 12 percent in 2051 in Menia, Quena, and Beni-Suef, to a maximum of 33 percent in Cairo. Although the gap between the proportion of men and women with a tertiary education will close, it will not be as dramatic as for the other education categories, such as secondary education. Only in

Alexandria will the gender gap close in the 25+ population, whereas in most governorates, the difference will be between 6 and 10 percentage points in favor of men, to a maximum of 17 percent in Aswan, with 32 percent of the men and 15 percent of the women having completed tertiary education. This is a clear point for policy targeting to allow more female students to enter university, if Egypt wants to achieve a knowledge-based society.

As mentioned in the discussion of the results for the whole of Egypt, education will have an impact on the overall fertility level. For instance, in Table 33, the constant fertility scenarios show that in 2051, the effect alone of changes in the weight of the different education groups could push the fertility down by 3-9 percent. The effect is especially strong in the governorates where changes in the levels of educational attainment have occurred in the recent past, such as Port-Said, Kafr El-Sheikh, Sohag, and Quena.

### Differences between the whole of Egypt and the sum of the governorates

As discussed earlier, we developed scenarios for the whole of Egypt and for 21 governorates and the Frontier region separately. It is interesting to see if there is a difference when summing up the population of the governorates and the projections for the whole of Egypt for the period 1996-2051. As can be seen from Figure 10 and Table 34, the difference is not that large. In terms of total population, the sum of the governorates gives a systematically higher population than the projections of Egypt: 5.5 percent higher in 2051 according to the constant scenario; 3.8 percent higher according to the goal scenario; and 5.7 percent higher according to the trend scenario. If there is a difference in terms of population size, Table 34 shows that the levels of education are very close.

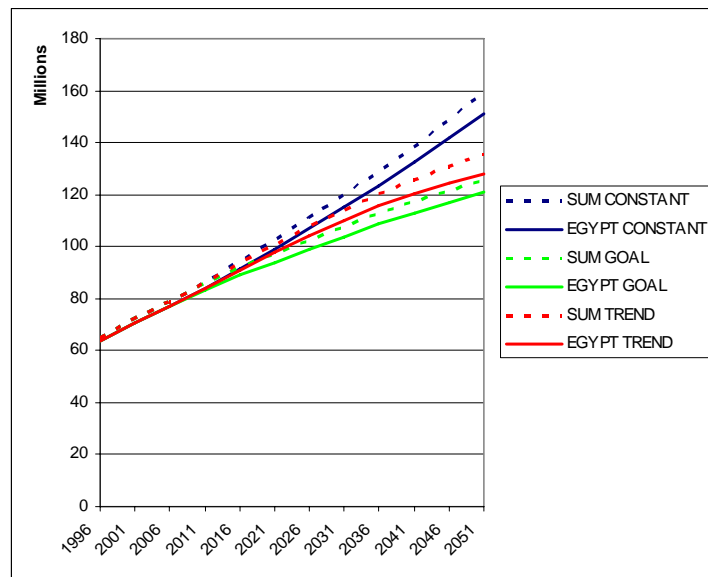


Figure 10. The population of the whole of Egypt and the sum of the governorates, 1996-2051, for the constant, goal, and trend scenarios.

Table 34. Shares of Figure 10, showing the population of the whole of Egypt and the sum of the governorates, 1996-2051, for the constant, goal, and trend scenarios.

	1996					2051				
	Level of Education (in percent)					Level of Education (in percent)				
	1 <sup>a)</sup>	2 <sup>b)</sup>	3 <sup>c)</sup>	4 <sup>d)</sup>	5 <sup>e)</sup>	1 <sup>a)</sup>	2 <sup>b)</sup>	3 <sup>c)</sup>	4 <sup>d)</sup>	5 <sup>e)</sup>
Sum Constant	47	23	12	13	6	28	17	14	31	10
Egypt Constant	46	23	12	13	6	27	18	14	31	11
Sum Goal	47	23	12	13	6	12	9	17	41	21
Egypt Goal	46	23	12	13	6	12	9	17	41	21
Sum Trend	47	23	12	13	6	16	16	16	39	14
Egypt Trend	46	23	12	13	6	15	14	17	39	14

a) 1 = Illiterate

b) 2 = Read and write

c) 3 = Basic

d) 4 = Secondary

e) 5 = Tertiary

### Special scenarios for the whole of Egypt

To show the possible impact of future education and fertility trends, we developed some long-term scenarios to the beginning of the next century (to 2101) for the whole of Egypt. The twelve scenarios involve the following assumptions:

- Constant fertility (const\_fert): As in the constant scenario, the fertility is kept constant within each education category at levels observed in 2001-2006.
- Goal fertility (goal\_fert): As in the goal scenario, the fertility reaches replacement fertility in 2016-2021 and is kept at this level until the end of the projection period.
- Trend fertility (trend\_fert): As in the trend scenario until 2046-2051 and constant afterwards until 2101.
- Accelerated fertility decline (accel\_fert): The TFR by education category reached in the trend scenario in 2046-2051 is achieved under this scenario in 2026-2031.
- Constant education (const\_edu): As in the constant scenario, the transition probabilities are kept constant at levels observed in 1996-2001.
- Goal education (goal\_edu): As in the goal scenario, the transitions are kept constant after reaching the target.
- Trend education (trend\_edu): As in the trend scenario, the transitions are calculated until the period 2046-2051 and afterwards the transitions are interpolated until they reach the probabilities observed in 2046-2051 under the goal scenario in 2066-2071. Transition probabilities are kept constant afterwards.

There is only one scenario for mortality with the same increase of two years per decade within each education category until 2101. Migration is kept constant at the

levels observed in 1996-2001 throughout the projection period. Figure 11 gives the total population for the whole of Egypt according to the 12 special scenarios.

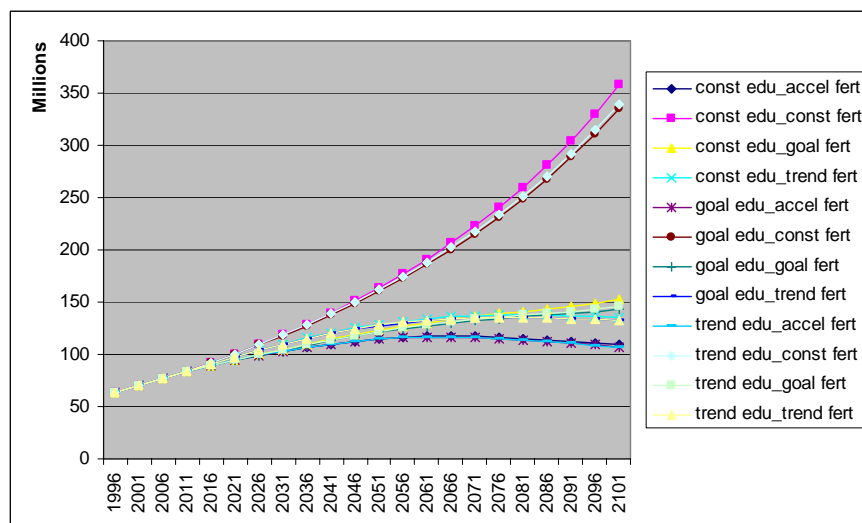


Figure 11. Total population, Egypt, 1996-2101, according to 12 special scenarios.

The scenarios show that the fertility will be the main driver of population change in Egypt over the next 100 years. Under the constant fertility scenarios at the 2001-2006 levels, a very unlikely development for Egypt would occur: The population would be as high as 358 million at the turn of next century. Actually, a significant part of this growth would be due to the increase in the proportion of the old-age population, due to the assumption of increasing life expectancy. The pyramids in Appendix B show that within the 21<sup>st</sup> century, Egypt will have to deal with ageing, because around 25-30 percent of the population will be above age 65, depending on the fertility scenario (except for the constant fertility scenarios). If we ignore the assumption of constant fertility, the population goes in two directions, depending on whether one takes the accelerated fertility decline assumption or the goal or trend fertility assumptions. In the case of an accelerated fertility decline, the population would grow to 116-118 million in 2066 and then start to decline, reaching 107-109 million in 2101. What is even more interesting is that the levels of education impact quite seriously on population growth as seen from the difference between the different trend fertility scenarios as associated with different education scenarios that could lead to 143-152 million people in 2101, depending on which education path is chosen.

The pyramids presented in Appendix B show that the Egyptian population would have a totally different human capital base depending on the education scenario. The pyramids show the momentum of education diffusion and provide a solid basis to push for an earlier start in increasing enrolment, without sacrificing quality. Eradication of illiteracy (meaning that all people will achieve at least a junior secondary education) in the working-age population, for males and females at the same time, will happen only in 2066 under the goal scenario, and not until 2096 under the trend scenario. According to the goal scenario, the gender gap in tertiary education will disappear in 2051, but this

will only happen in 2096 according to the trend scenario. However, the trend scenario, which can be seen as an extension of present efforts in education, shows that the population of Egypt will be very well educated at the turn of the next century, with almost 85 percent of the population having completed at least secondary education and 28 percent possessing a tertiary education. This is one percent higher than the rates in 2005 for the 25 countries of the European Union.

## Conclusions

This report is based on a detailed analysis of the changes that could occur in Egypt over the next 50 years, with some extensions to the end of the century that are related to demography and the development of human capital for the whole of Egypt and at the governorate level. The present situation related to human capital in Egypt is characterized by three main dimensions. The first is extensive investments in education with little returns in terms of a qualified labor force. In 2001 about 37 percent of the working-age population was illiterate. Another 13 percent could read and write, but had never completed primary education. This meant that 50 percent of the working-age population was very low qualified. Even more striking was the discrepancy between the education of the male and female working-age population. If 27 percent of the men aged 15-64 were illiterate, almost one out of two women were illiterate (47 percent in 2001), which explains the low participation of women in the qualified labor force. However, Egypt has been increasing the share of its total budget for the social sector and in particular for education substantially over the last decade: The education sector received 10.2 percent of the total government spending in 1990-1991 and 18 percent in 1998-1999 (Zahir et al. 2006).

The second dimension is the high rate of population growth. It was above 2 percent until 1990 and above 1.5 percent until 2015 (UN 2005a). Fertility has been slowly but steadily declining to 3.1 children in 2005. This will bring many more years of population increase in the future. As a consequence, the so-called demographic window of opportunity will be relatively flat and long stretched. This window results from a low total dependency ratio which implies large working-age populations that can contribute to the economy. However, the contribution of the working-age population will only happen if it has the qualifications to realize the development goals. High population growth will create increasing pressure on the education system to provide quality education for all and on the labor market to create jobs that are able to absorb both the increases in the levels of qualifications and the numbers of young entrants to the work force.

The third dimension has to do with the capacity of the economy to create the job opportunities needed to utilize the growing working-age population. As discussed earlier, the levels of unemployment have been very high since the 1980s, fluctuating between 10 percent and 15 percent. This brings many worries within the context of increasing the size of the labor force.

Our main conclusion from this work is that education could be a crucial input to help Egypt reach its development goals. After looking at the recent developments in terms of fertility, mortality, migration, education, and labor force participation, we developed scenarios to look at the future human capital until 2051 for the whole of

Egypt and for the governorates. The constant scenario shows what would happen if all parameters would remain constant at starting year levels. The goal scenario implements targets in terms of fertility reduction and increases in schooling levels. The trend scenario, based on retrospective analysis, extrapolates present trends to translate them into future parameters.

We find that the total population in Egypt will increase from 70.4 million in 2001 to 99-104 million in 2026 and 121-128 million in 2051, depending on the scenario. Within the next 30 years, the proportion of people aged 5-20 will decrease from 34 percent to 21 percent, but the actual number will increase by another 20 percent (from 23 million in 2001 to 25-27 million in 2051). The working-age population will also increase considerably and even triple in some governorates between 2001 and 2051 (Assyout, Fayoum, Menia, and Suhag) according to the trend scenario. This will add another constraint since the working population aged 15-24 will have a high share of new entrants into the labor force, from 34 percent in 2001 for the whole of Egypt to 21-22 percent in 2051 according to the constant and the trend scenarios, respectively. In some governorates, the proportion in 2051 will be as high as 25-27 percent. At the same time, if the proportion of workers with little or no education diminishes as a result of past and present policies, even under the most optimistic (goal) scenario, the population will not be 100 percent literate before 2051. Part of the problem of high illiteracy rates in the population is a result of the momentum of education spread throughout the total population. The proportion with secondary and tertiary education will also increase as a result of past policies, from 31 percent in 1996 to 60 percent in 2051, which is almost double. This increase will happen mostly at the level of secondary education, because progress in tertiary education is more modest. The gender gap that is linked to the full participation of women in the society will not have been fully closed by 2051. It is especially prominent in the illiterate category, where 11 percent of the female working-age population would still be illiterate. The gender gap is also noticeable at the tertiary level. Only under the goal scenario is it clear that most of the gender differentials in levels of educational attainment would disappear.

Results for the governorates show the different degrees of education momentum. A comparison between the trend and the goal scenarios show that the trend scenario seems to be sufficient in suppressing illiteracy in most governorates, while in others, efforts will have to be expanded. The same is true about the removal of the gender differentials in the levels of education of the working-age population.

The implications of the projections are not trivial. The main outcome is that Egypt will need to better utilize its population as an engine of growth for the development of the country to realize the window of opportunity that would be offered by a large working-age population and low dependency ratios over the next 50 years. The battle will have to be fought on three fronts. The first is the development of human capital by increasing the levels of educational attainment. The projections show that although the country is moving in the right direction, the pace might be too slow and too heterogeneous among governorates so that an intensification of reforms and an increase in enrolment would be needed overall and in particular in some governorates, where past investments have been lagging. Another benefit from increasing the levels of education is that it could increase the demand for skilled Egyptian workers outside the country and ease the pressure on the labor markets. "The pool of migrant employees created would constitute a dynamic resource of great benefit to Egypt through their

exposure to the demanding levels of efficiency abroad, as well as their savings and remittances” (UNDP 2005: 103). The second front is that the economy will have to be structurally changed. We totally share the conclusions of the UNDP report (2005) that proposes the development of growth sectors such as manufacturing, commerce, services, information and communication technology, and tourism in order to accelerate the growth in employment for the expanding skilled population and the remaining unskilled population. The third front is related to the environment and to solving the equation between high population growth and the sustainability of natural resources.

In conclusion, all of these policies in Egypt must be conscious of the severe limitations in water availability. While massive job creation is imperative, given the near certain doubling of the working-age population, this cannot be in agriculture or other heavily water-consuming industries. The necessary improvements in water efficiency of food production, as well as in household water consumption, are costly and require special skills. Egypt must generate the income for implementing such technologies by developing industries which produce high value and internationally marketable output, while using high labor and human capital input combined with minimal water input. Identifying and developing such strategies is the main challenge for the near future.

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# Appendix A. Results of the Projections to 2051 for Egypt and its Governorates According to the Constant, Goal, and Trend Scenarios

## Egypt

Figure A-1. Population pyramids for Egypt, 2001 and 2051, according to the constant, goal, and trend scenarios.

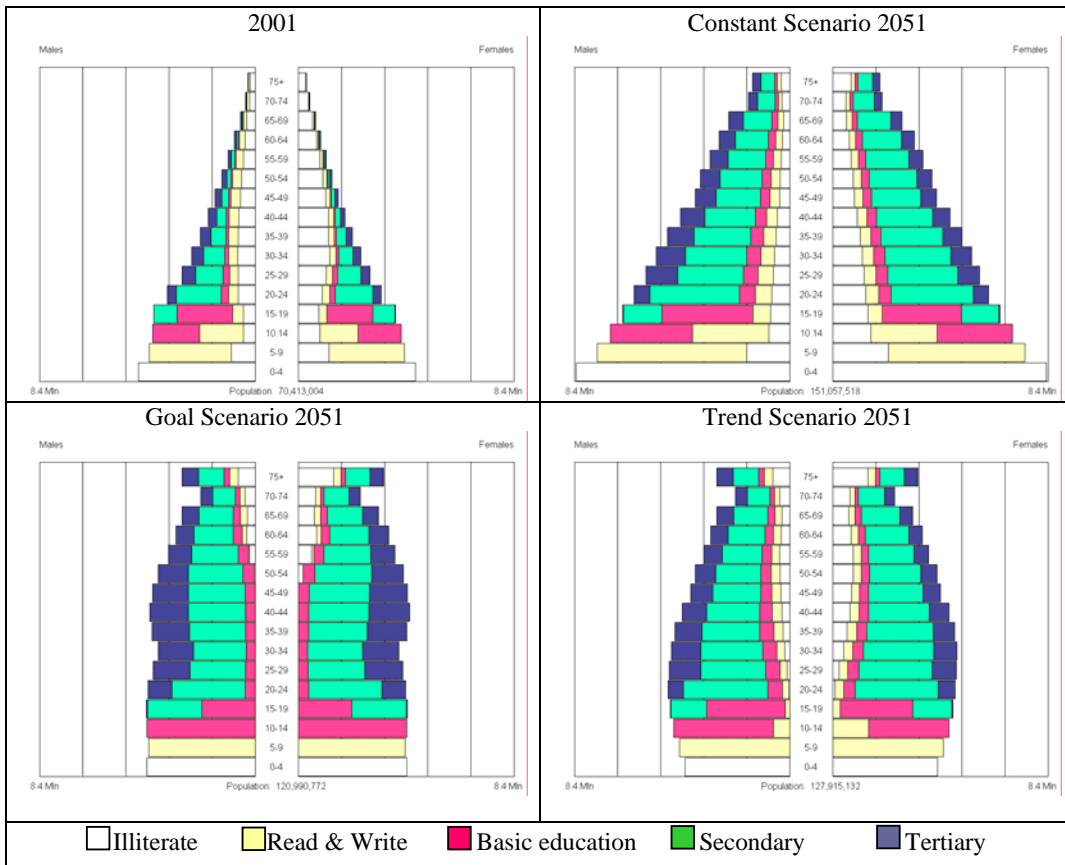


Table A-1. Proportion of the population (in percent) by age, sex, and level of education and total, Egypt.

Scenario	Year	Age	Males					Females					Both sexes									
			Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total		
2001	15-19	15-19	12	11	55	23	0	3964740	21	9	48	23	0	3779303	16	10	51	23	0	7744043		
		20-24	20	11	9	51	10	3415548	29	9	7	46	10	3223908	24	10	8	48	10	6639456		
		25-29	23	11	9	37	19	2862176	39	9	7	33	13	2792905	31	10	8	35	16	5655081		
		30-34	28	14	7	32	19	2477636	50	10	4	23	13	2436057	39	12	6	28	16	4913693		
		35-39	31	18	6	26	20	2149067	56	11	4	18	12	2109170	43	14	5	22	16	4258237		
		40-44	35	21	5	20	18	1830676	64	11	3	12	9	1812398	49	16	4	16	14	3643074		
		45-49	36	24	6	16	17	1568010	68	12	3	9	8	1542866	52	18	4	12	13	3110876		
		50-54	41	27	5	13	14	1301205	74	11	3	6	6	1294756	57	19	4	9	10	2595961		
		55-59	43	27	6	11	13	1055170	79	10	3	4	4	1076100	61	18	4	8	8	2131270		
		60-64	48	27	6	9	11	810906	82	10	2	4	3	855715	66	18	4	6	7	1666621		
		65+	60	26	4	4	6	1244243	88	8	1	2	1	1402021	75	16	3	3	3	2646264		
		15+	29	17	15	27	13	22679377	50	10	12	21	8	22325199	39	13	13	24	10	45004576		
		25+	35	20	6	23	17	15299089	61	10	4	16	9	15321988	48	15	5	19	13	30621077		
		Constant	2026	15-19	12	11	55	23	0	4832431	21	8	47	23	0	4833152	16	10	51	23	0	9665583
				20-24	11	11	10	58	10	4321703	21	8	8	53	10	4331880	16	10	9	55	10	8653583
25-29	11			10	10	46	22	4129294	21	8	8	47	15	4242770	16	9	9	47	18	8372064		
30-34	11			10	11	46	22	3775268	21	8	8	48	15	3983604	16	9	9	47	18	7758872		
35-39	11			10	11	46	22	3562504	21	8	8	48	15	3835187	16	9	9	47	18	7397691		
40-44	11			10	11	47	22	3435822	21	8	8	48	15	3572937	16	9	9	47	18	7008759		
45-49	20			10	9	41	20	2840413	29	9	7	42	15	2990089	24	9	8	41	17	5830502		
50-54	24			11	9	38	19	2338507	38	9	7	33	13	2525367	31	10	8	35	16	4863874		
55-59	28			14	7	33	19	1977481	49	9	4	23	13	2117200	39	11	6	28	16	4094681		
60-64	30			17	6	26	21	1607220	55	10	4	18	13	1720186	43	14	5	22	17	3327406		
65+	36			23	5	17	19	2831577	67	11	3	9	9	3165117	52	17	4	13	14	5996694		
15+	17			12	15	40	17	36652220	30	9	12	38	12	37317489	23	10	14	39	14	72969709		
25+	18			12	9	40	21	26498086	33	9	7	38	14	28152457	26	10	8	39	17	54650543		
Goal	2026			15-19	12	11	55	23	0	4437415	0	8	47	23	0	4436636	0	10	51	23	0	8874051
				20-24	11	11	10	58	10	4321703	21	8	8	53	10	4331880	16	10	9	55	10	8653583
		25-29	11	10	10	46	22	4129294	21	8	8	47	15	4242770	16	9	9	47	18	8372064		
		30-34	11	10	11	46	22	3775268	21	8	8	48	15	3983604	16	9	9	47	18	7758872		
		35-39	11	10	11	46	22	3562504	21	8	8	48	15	3835187	16	9	9	47	18	7397691		
		40-44	11	10	11	47	22	3435822	21	8	8	48	15	3572937	16	9	9	47	18	7008759		
		45-49	20	10	9	41	20	2840413	29	9	7	42	15	2990089	24	9	8	41	17	5830502		
		50-54	24	11	9	38	19	2338507	38	9	7	33	13	2525367	31	10	8	35	16	4863874		
		55-59	28	14	7	33	19	1977481	49	9	4	23	13	2117200	39	11	6	28	16	4094681		
		60-64	30	17	6	26	21	1607220	55	10	4	18	13	1720186	43	14	5	22	17	3327406		
		65+	36	23	5	17	19	3252400	68	11	3	9	9	3565586	53	17	4	13	14	6817986		
		15+	13	12	15	40	17	36113901	23	9	12	38	12	37715320	18	10	14	39	14	73829221		
		25+	17	12	9	40	21	27299664	30	9	7	38	14	28894672	23	10	8	39	17	56194336		
		Trend	2051	15-19	0	4	66	30	1	4673247	0	6	60	33	1	4682102	0	5	63	31	1	9355349
				20-24	1	5	12	69	13	4754722	2	7	9	68	14	4771581	2	6	11	69	13	9526303
25-29	2			6	12	54	26	4704334	5	7	9	59	20	4822201	4	6	11	56	23	9526535		
30-34	4			7	12	52	25	4623811	9	7	9	57	19	4837066	6	7	10	55	22	9460877		
35-39	6			8	12	51	23	4480571	12	8	9	54	18	4751915	9	8	10	53	20	9232486		
40-44	8			9	12	49	23	4210869	15	8	8	52	17	4532338	11	8	10	51	20	8743207		
45-49	9			9	11	48	23	3860799	17	8	8	51	16	4204431	13	8	10	50	19	8065230		
50-54	10			9	11	47	22	3695459	20	8	8	49	16	4059483	15	9	9	48	19	7754942		
55-59	12			10	11	46	22	3360657	22	8	8	48	15	3738556	17	9	9	47	18	7099213		
60-64	11			10	11	47	22	3093213	20	8	8	48	16	3501504	16	9	9	48	19	6594717		
65+	18			10	9	41	23	7825773	30	8	6	39	16	8842006	24	9	8	40	19	1666779		
15+	8			8	16	48	20	49283455	15	7	13	50	15	52743183	11	8	14	49	18	102026638		
25+	9			9	11	48	23	39855486	17	8	8	50	17	43289500	14	8	9	49	20	83144986		

## Urban Governorates

Figure A-2. Population pyramids for Cairo, 2001 and 2051, according to the constant, goal, and trend scenarios.

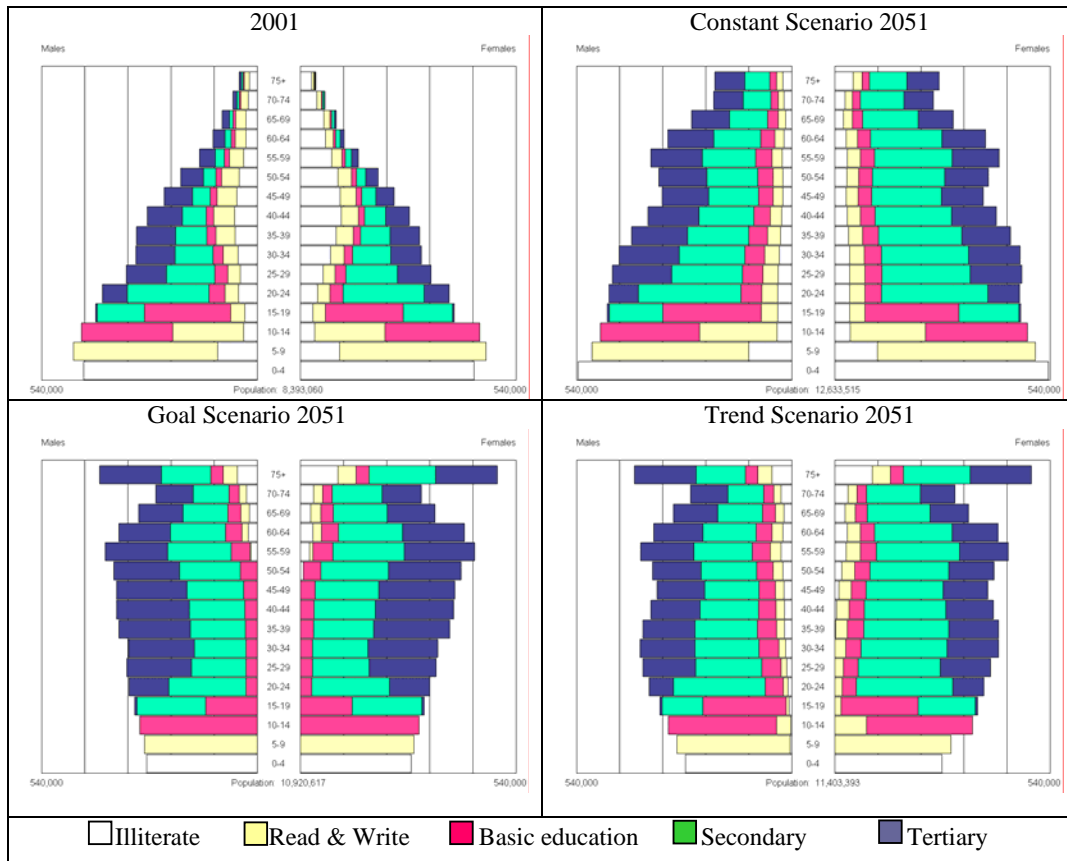




Figure A-3. Population pyramids for Alexandria, 2001 and 2051, according to the constant, goal, and trend scenarios.

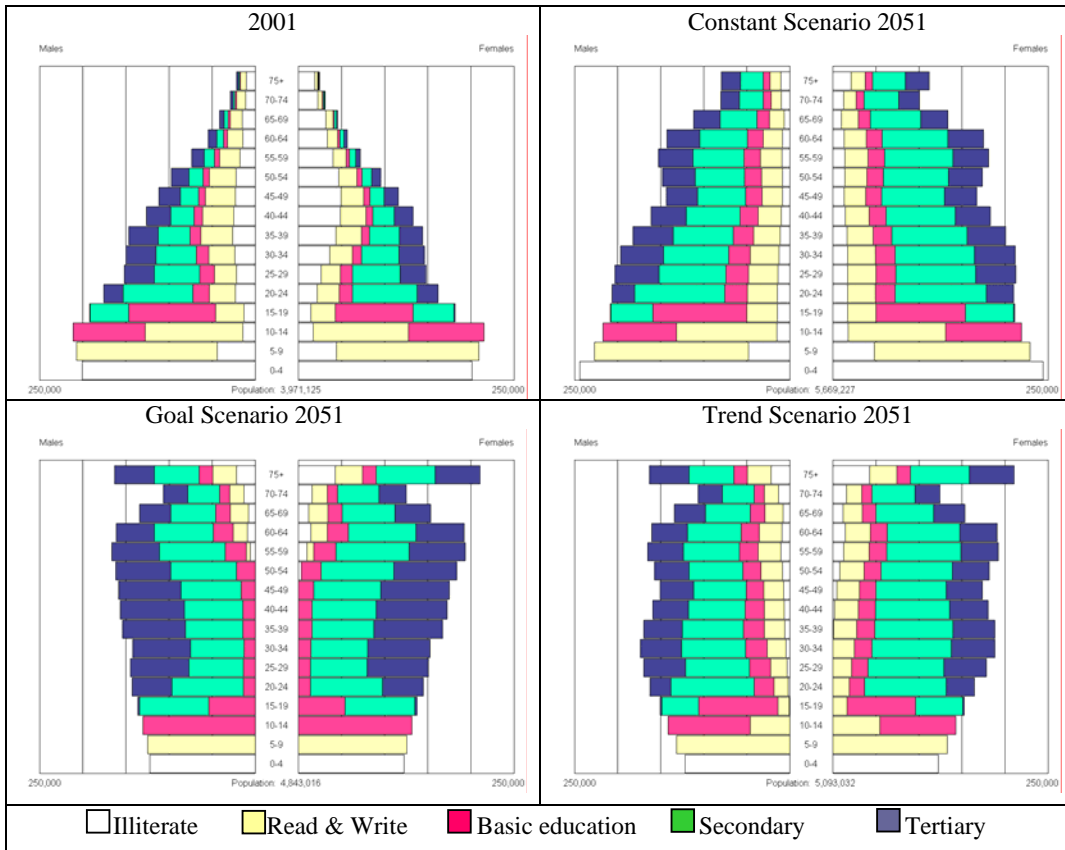






Figure A-4. Population pyramids for Port-Said, 2001 and 2051, according to the constant, goal, and trend scenarios.

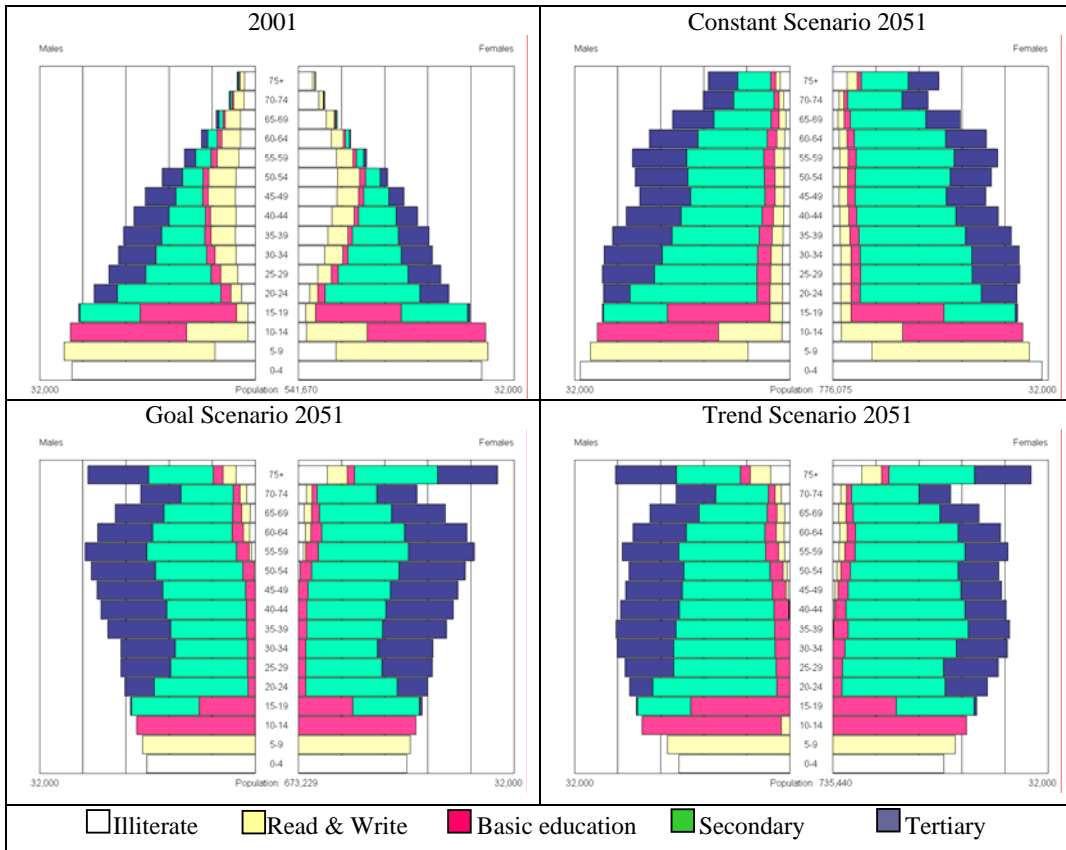
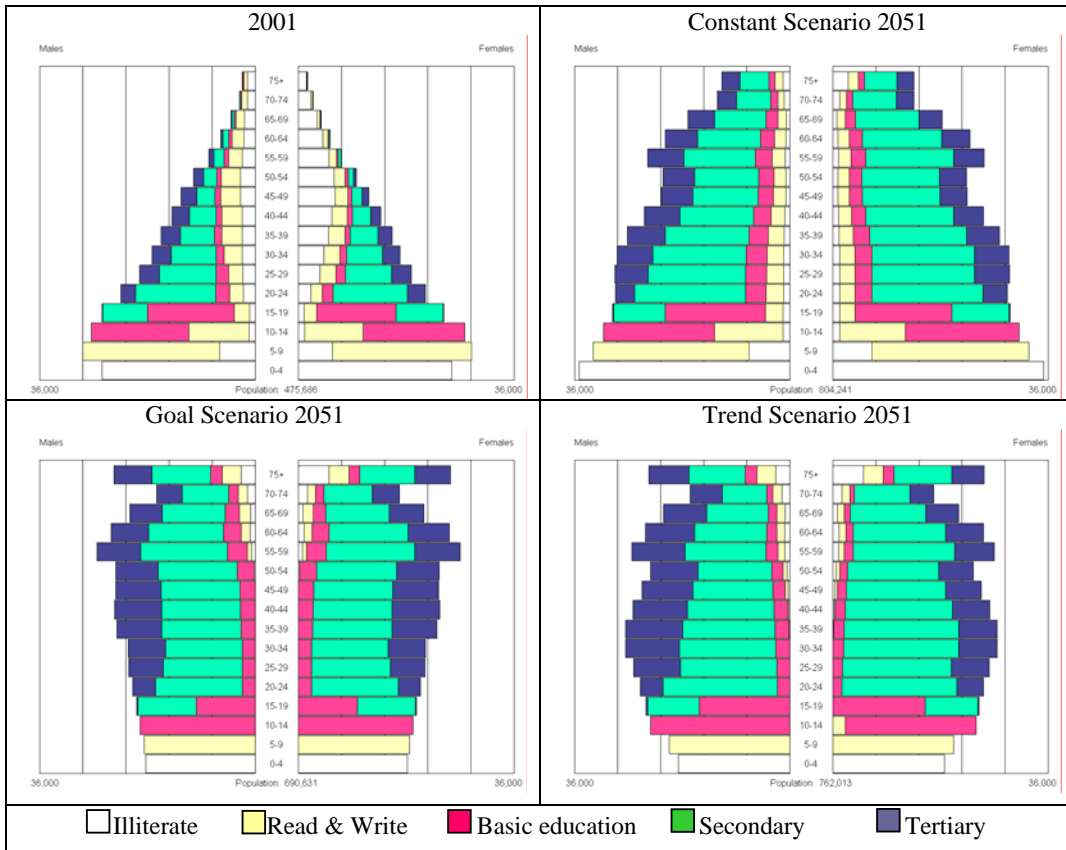


Table A-4. Proportion of the population (in percent) by age, sex, and level of education and total, Port-Said.

Scenario	Year	Age	Males					Females					Both sexes							
			Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total
Constant	2001	15-19	4	7	55	34	1	26193	4	5	50	39	1	25435	4	6	52	36	1	51628
		20-24	8	7	6	64	15	23927	7	5	5	63	19	22345	8	6	6	64	17	46272
		25-29	12	11	7	45	25	21729	14	9	5	49	23	21149	13	10	6	47	24	42878
		30-34	14	15	6	37	27	20258	20	13	4	39	24	19915	17	14	5	38	26	40173
		35-39	15	19	5	33	29	19519	22	16	3	36	23	19378	19	17	4	34	26	38897
		40-44	16	21	4	30	29	18019	28	18	4	31	18	17711	22	19	4	31	24	35730
		45-49	18	25	5	24	28	16296	36	21	5	24	15	15692	27	23	5	24	21	31988
		50-54	21	29	6	22	22	13780	44	25	7	16	8	13227	32	27	6	19	15	27007
		55-59	23	30	8	22	16	10542	55	24	6	11	4	10120	39	27	7	17	10	20662
		60-64	28	34	8	17	12	8035	62	23	5	7	3	7777	45	29	6	12	8	15812
		65+	44	36	6	8	5	12339	76	18	3	2	1	12178	60	27	5	5	3	24517
		15+	16	18	13	34	19	190637	27	14	11	34	14	184927	21	16	12	34	17	375564
		25+	19	22	6	29	23	140517	35	17	4	28	16	137147	27	20	5	28	20	277664
		Constant	2026	15-19	4	7	55	34	1	26045	4	5	50	39	1	25674	4	6	52	36
20-24	4			7	7	68	14	24343	4	5	5	66	19	24033	4	6	6	67	17	48376
25-29	4			6	7	55	28	25587	4	5	5	60	25	25457	4	6	6	57	27	51044
30-34	4			6	7	51	31	27149	4	5	5	60	26	27338	4	6	6	56	28	54487
35-39	4			6	7	49	33	25995	4	5	5	60	26	26890	4	6	6	55	29	52885
40-44	4			6	7	49	34	24459	4	5	5	60	26	24396	4	6	6	55	30	48855
45-49	8			6	6	46	33	21891	7	5	5	57	25	21114	8	6	5	52	29	43005
50-54	12			11	7	40	30	19373	13	9	5	49	24	19509	13	10	6	45	27	38882
55-59	14			15	6	35	30	17290	19	13	4	40	25	17696	16	14	5	37	27	34986
60-64	14			18	5	33	30	15463	22	15	3	36	25	16239	18	16	4	34	27	31702
65+	18			20	5	27	30	29080	35	20	5	25	16	32527	27	20	5	26	23	61607
15+	8			10	11	45	26	256675	11	9	9	50	21	260873	9	9	10	48	24	517548
25+	9			10	6	44	31	206287	13	9	5	50	24	211166	11	10	6	47	27	417453
Goal	2026			15-19	0	7	55	34	1	23813	0	5	50	39	1	23450	0	6	52	36
		20-24	4	7	7	68	14	24343	4	5	5	66	19	24033	4	6	6	67	17	48376
		25-29	4	6	7	55	28	25587	4	5	5	60	25	25457	4	6	6	57	27	51044
		30-34	4	6	7	51	31	27660	4	5	5	60	26	27338	4	6	6	56	28	54487
		35-39	4	6	7	49	33	25995	4	5	5	60	26	26890	4	6	6	55	29	52885
		40-44	4	6	7	49	34	24459	4	5	5	60	26	24396	4	6	6	55	30	48855
		45-49	8	6	6	46	33	21891	7	5	5	57	25	21114	8	6	5	52	29	43005
		50-54	12	11	7	40	30	19373	13	9	5	49	24	19509	13	10	6	45	27	38882
		55-59	14	15	6	35	30	17290	19	13	4	40	25	17696	16	14	5	37	27	34986
		60-64	14	18	5	33	30	15463	22	15	3	36	25	16239	18	16	4	34	27	31702
		65+	18	20	5	27	30	33556	35	20	5	25	16	36510	27	20	5	26	23	70066
		15+	7	10	11	45	26	262010	10	9	9	50	21	265231	9	9	10	48	24	527241
		25+	8	10	6	44	31	213572	13	9	5	50	24	217500	10	10	6	47	27	431072
		Trend	2051	15-19	0	7	55	34	1	18530	0	5	50	39	1	18328	0	6	52	36
20-24	4			7	7	68	14	27732	4	5	5	66	19	27381	4	6	6	67	17	55113
25-29	4			6	7	55	28	27909	4	5	5	60	25	27761	4	6	6	57	27	55670
30-34	4			6	7	51	31	27660	4	5	5	60	26	27700	4	6	6	56	28	55360
35-39	4			6	7	49	34	26373	4	5	5	60	26	26543	4	6	6	55	30	52916
40-44	4			6	7	49	34	24319	4	5	5	60	26	24625	4	6	6	55	30	48944
45-49	4			6	7	49	34	22306	4	5	5	60	26	22730	4	6	6	55	30	45036
50-54	4			6	7	49	34	22987	4	5	5	60	26	23586	4	6	6	55	30	46573
55-59	4			6	7	49	34	23446	4	5	5	60	26	24503	4	6	6	54	30	47949
60-64	4			6	7	49	35	20885	4	5	5	59	27	22832	4	5	6	54	31	43717
65+	7			6	6	45	36	42559	8	6	4	54	28	48907	7	6	5	50	32	91466
15+	4			6	11	50	28	294030	5	5	9	57	23	304024	5	6	10	54	26	598054
25+	4			6	7	49	33	238444	5	5	5	58	26	249187	5	6	6	54	30	487631

Figure A-5. Population pyramids for Suez, 2001 and 2051, according to the constant, goal, and trend scenarios.





## Lower Egypt

Figure A-6. Population pyramids for Damietta, 2001 and 2051, according to the constant, goal, and trend scenarios.

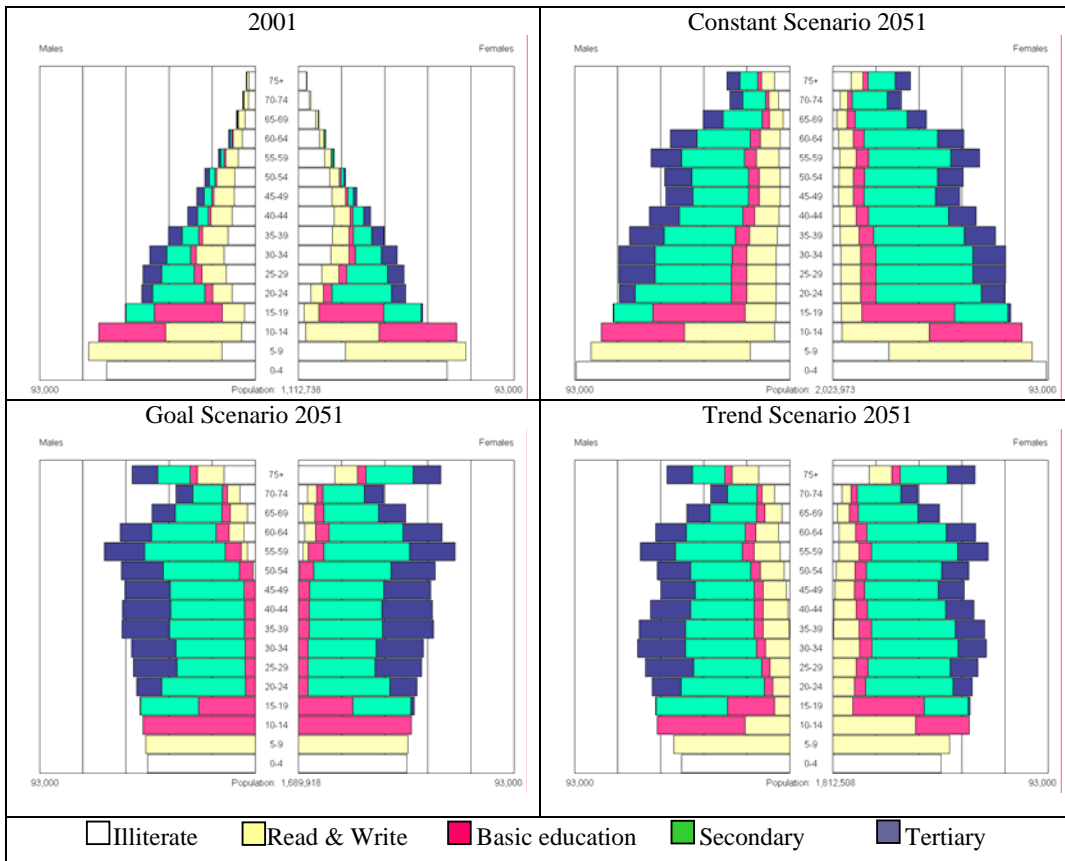




Figure A-7. Population pyramids for Dakahlia, 2001 and 2051, according to the constant, goal, and trend scenarios.

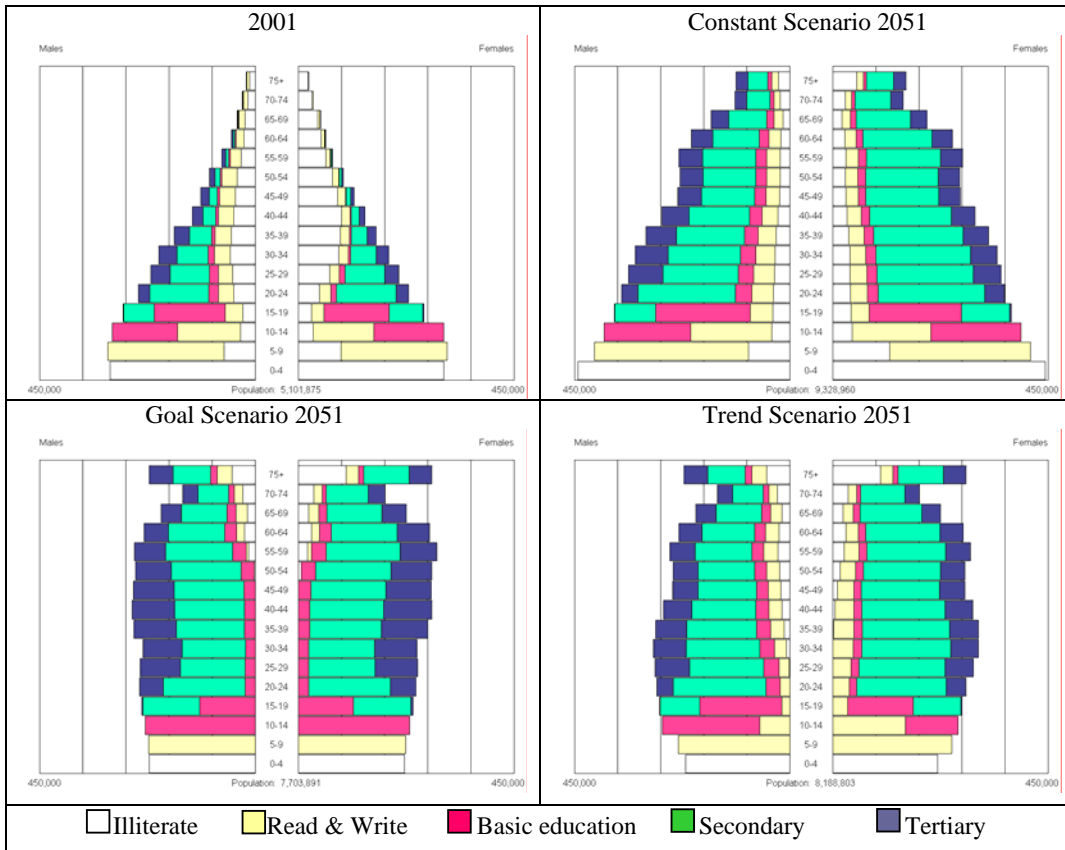






Figure A-8. Population pyramids for Sharkia, 2001 and 2051, according to the constant, goal, and trend scenarios.

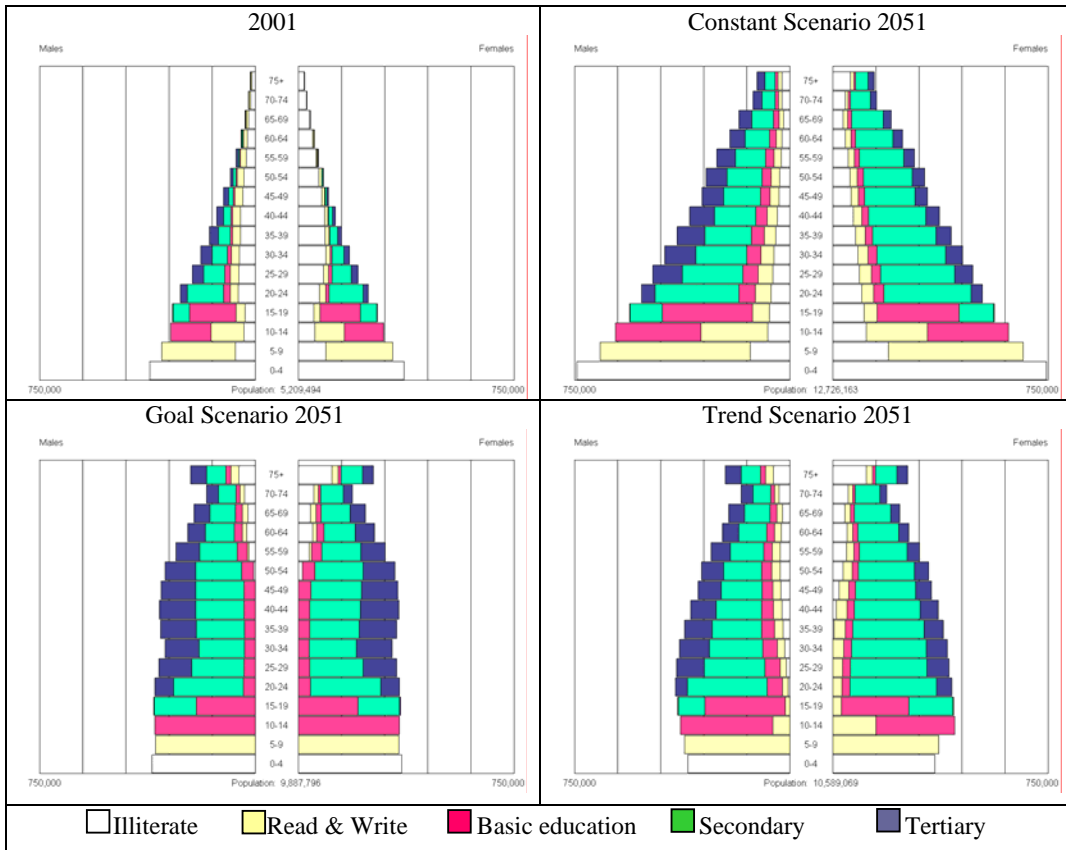




Figure A-9. Population pyramids for Kalyoubia, 2001 and 2051, according to the constant, goal, and trend scenarios.

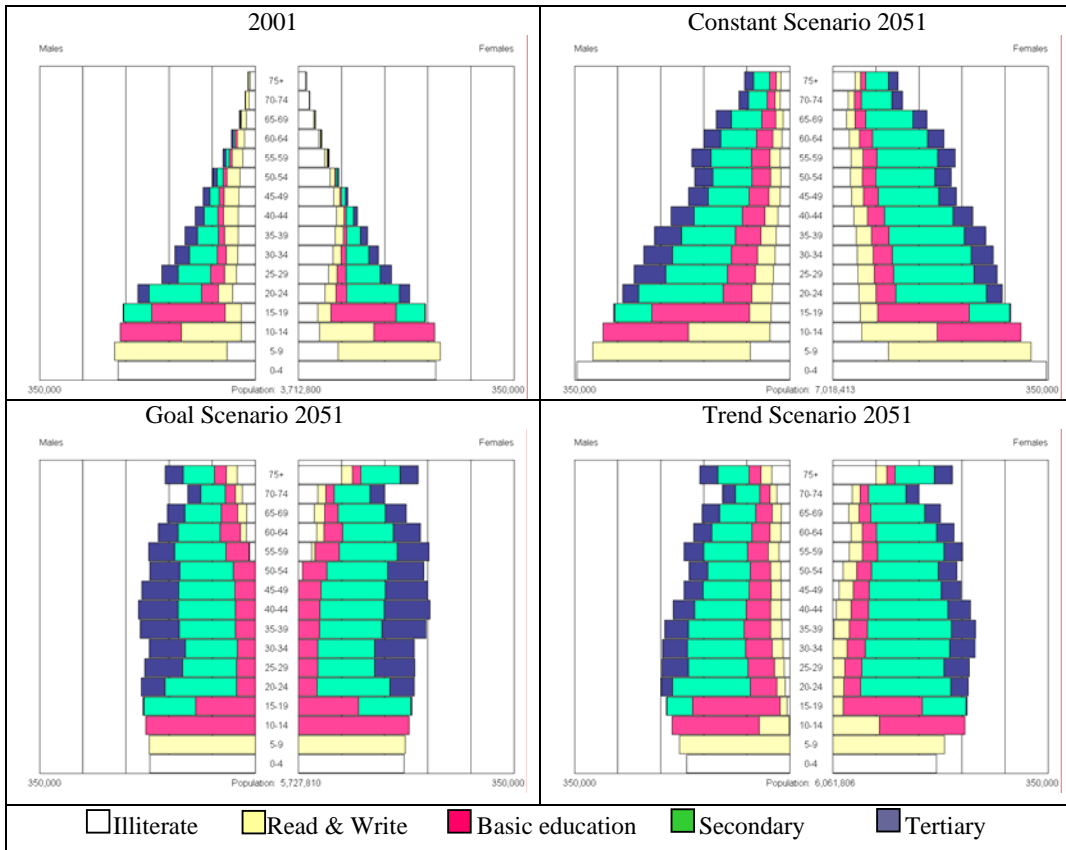




Figure A-10. Population pyramids for Kafr El-Sheikh, 2001 and 2051, according to the constant, goal, and trend scenarios.

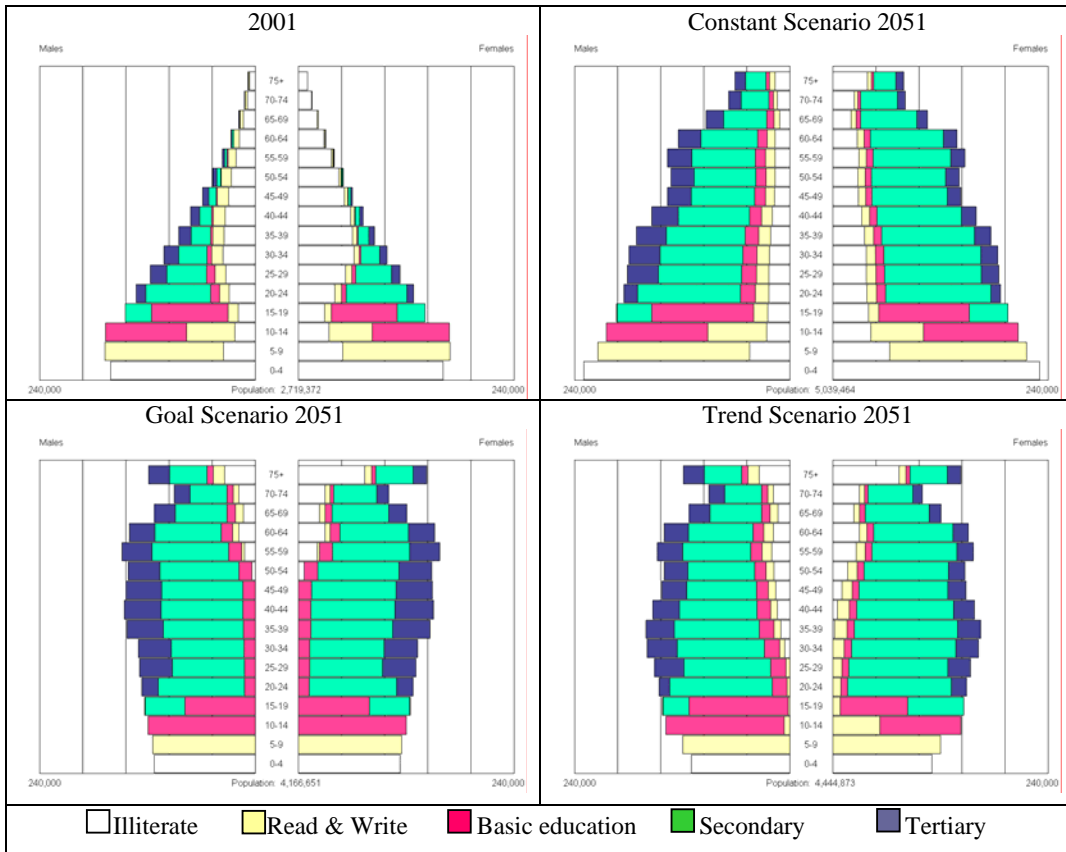




Figure A-11. Population pyramids for Gharbia, 2001 and 2051, according to the constant, goal, and trend scenarios.

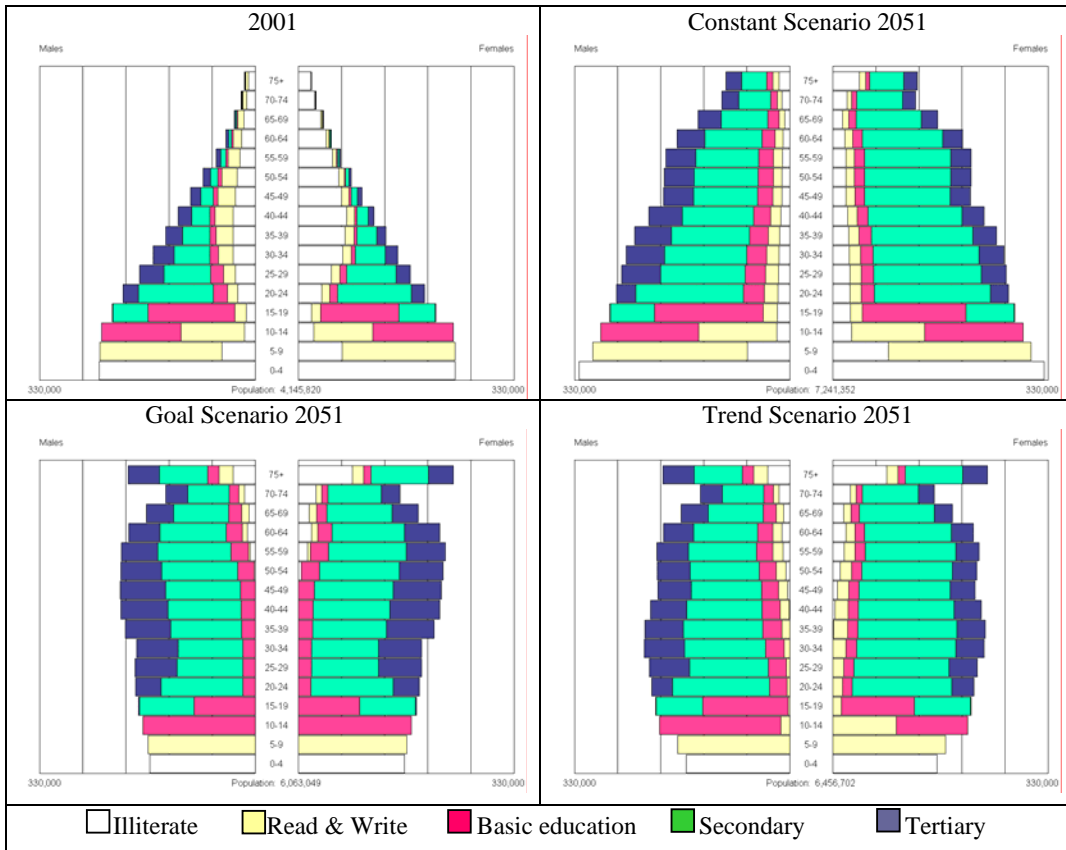




Table A-11. Proportion of the population (in percent) by age, sex, and level of education and total, Gharbia.

Scenario	Year	Age	Males					Females					Both sexes							
			Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total
2001	15-19	15-19	6	8	61	25	0	218617	10	7	57	26	0	210016	8	7	59	26	0	428633
		20-24	13	8	11	57	11	201983	18	6	6	58	11	193021	16	7	9	58	11	395004
		25-29	17	11	11	41	21	176938	29	8	6	44	13	171444	23	9	9	42	17	348382
		30-34	22	14	8	35	21	156587	45	8	4	30	13	152282	33	11	6	33	17	308869
		35-39	25	19	7	31	19	137067	53	10	3	23	11	133901	39	15	5	27	15	270968
		40-44	29	23	7	24	17	118039	63	11	3	14	8	115933	46	17	5	19	13	233972
		45-49	30	27	7	19	16	98837	68	12	4	10	7	97307	49	20	5	15	11	196144
		50-54	35	29	7	14	14	79727	75	11	3	6	4	81175	55	20	5	10	9	160902
		55-59	40	29	7	12	12	60276	81	9	3	4	3	63985	61	19	5	8	7	124261
		60-64	47	29	6	9	9	44953	85	8	2	3	2	50038	67	18	4	6	5	94991
		65+	59	28	4	4	4	69840	91	6	1	1	1	85566	77	16	2	3	2	155406
		15+	23	17	17	30	13	1362864	46	8	12	26	7	1354668	34	13	14	28	10	2717532
		25+	29	21	8	26	17	942264	59	9	4	20	8	951631	44	15	6	23	12	1893895
Constant	2026	15-19	7	8	61	24	0	238268	10	7	57	26	0	240787	8	7	59	25	0	479055
		20-24	7	8	12	62	11	218666	10	7	7	66	10	221650	8	7	10	64	11	440316
		25-29	7	8	12	50	23	219714	10	6	7	62	14	226570	8	7	10	56	19	446284
		30-34	7	7	12	50	23	223423	10	6	7	62	14	233765	8	7	10	56	19	457188
		35-39	6	7	12	50	24	217773	10	6	7	62	15	230082	8	7	10	56	19	447855
		40-44	6	7	12	51	24	197713	10	6	7	62	15	202126	8	7	10	57	19	399839
		45-49	13	7	11	46	23	178010	18	6	6	55	14	183033	16	7	8	51	18	361043
		50-54	17	10	11	41	21	152735	29	7	6	44	13	159061	23	9	9	43	17	311796
		55-59	21	14	8	35	21	130525	44	8	4	31	14	136337	33	11	6	33	17	266862
		60-64	24	18	7	31	20	106206	52	10	3	23	11	113074	39	14	5	27	16	219280
		65+	30	25	7	20	18	182841	67	11	3	11	8	211785	50	17	5	15	12	394626
		15+	12	10	17	43	19	2065874	22	7	12	48	11	2158270	17	9	14	45	15	4224144
		25+	13	11	11	43	22	1608940	25	7	6	48	13	1695833	19	9	8	46	18	3304773
Goal	2026	15-19	7	8	61	24	0	276002	10	7	57	26	0	278790	8	7	59	25	0	554792
		20-24	7	8	12	62	11	265913	10	7	7	66	10	269333	8	7	10	64	11	535246
		25-29	7	8	12	50	24	258287	10	6	7	62	14	265581	8	7	10	56	19	523868
		30-34	7	7	12	50	23	251166	10	6	7	62	14	262139	8	7	10	56	19	513305
		35-39	7	7	12	50	24	237700	10	6	7	62	15	251046	8	7	10	56	19	488746
		40-44	6	7	12	51	24	216452	10	6	7	62	15	231906	8	7	10	57	19	448358
		45-49	6	7	12	51	24	193952	10	6	7	62	15	210731	8	7	10	57	19	404683
		50-54	6	7	12	51	24	192509	9	6	7	62	15	211670	8	7	10	57	19	404179
		55-59	6	7	12	51	24	189902	9	6	7	62	15	212111	8	7	10	57	19	402013
		60-64	6	7	12	51	25	173055	9	6	7	62	15	198777	8	6	9	57	20	371832
		65+	11	8	11	46	25	343410	18	6	6	53	16	416527	15	7	8	50	20	759937
		15+	7	7	17	48	20	2598348	11	6	12	58	13	2808611	9	7	14	53	16	5406959
		25+	7	7	12	50	24	2056433	11	6	7	61	15	2260488	9	7	9	55	19	4316921
Trend	2026	15-19	1	7	64	27	0	229917	2	9	53	36	0	232227	1	8	59	32	0	462144
		20-24	2	8	13	66	12	220772	3	8	7	68	13	223568	3	8	10	67	13	444340
		25-29	4	8	13	52	24	221213	5	8	7	63	17	227819	5	8	10	58	20	449032
		30-34	5	8	13	51	23	224681	8	7	7	62	16	234743	7	8	10	57	19	459424
		35-39	6	8	12	50	23	219258	10	6	7	61	15	231293	8	7	10	56	19	450551
		40-44	6	7	12	51	24	199516	10	6	7	62	15	203529	8	7	10	57	19	403045
		45-49	13	7	11	46	23	180325	18	6	6	55	14	184865	16	7	9	51	18	365190
		50-54	17	10	11	41	21	155741	29	7	6	44	13	161448	23	9	9	43	17	317189
		55-59	21	14	8	35	21	134512	44	8	4	30	14	139483	33	11	6	33	17	273995
		60-64	24	18	7	31	20	111335	53	10	3	23	11	117164	39	14	5	27	15	228499
		65+	30	25	7	20	18	209115	68	11	3	11	7	237743	50	17	5	15	12	446858
		15+	11	10	17	44	19	2106385	20	8	11	48	12	2193882	16	9	14	46	15	4300267
		25+	13	11	11	43	22	1655696	25	8	6	48	14	1738087	19	9	8	45	18	3393783
Trend	2051	15-19	0	1	64	34	1	206048	0	6	53	40	0	211623	0	4	58	37	1	417671
		20-24	0	2	13	70	15	211984	0	7	7	71	16	216161	0	5	10	70	15	428145
		25-29	0	3	13	56	29	215717	0	8	7	66	20	221208	0	5	10	61	24	436925
		30-34	0	4	13	55	28	222767	0	9	7	66	19	231443	0	6	10	61	23	454210
		35-39	0	5	13	55	26	222307	0	9	7	65	19	233902	0	7	10	60	23	456209
		40-44	0	6	13	54	26	213386	2	9	7	65	18	227611	1	7	10	60	22	440997
		45-49	2	7	13	53	25	202190	3	8	7	64	18	217767	2	8	10	59	21	419957
		50-54	3	7	13	52	24	202814	5	8	7	63	17	220254	4	7	10	58	20	423068
		55-59	5	7	12	51	24	204361	8	7	7	62	16	223974	7	7	10	57	20	428335
		60-64	6	7	12	51	24	193520	9	6	7	62	16	215774	8	7	9	56	20	409294
		65+	12	8	10	45	25	498498	22	7	6	50	15	574620	17	7	8	48	20	1073118
		15+	4	6	16	52	23	2593592	7	7	10	60	16	2794337	5	7	13	56	19	5387929
		25+	4	6	12	52	26	2175560	8	8	7	61	17	2366553	6	7	9	56	21	4542113

Figure A-12. Population pyramids for Menoufia, 2001 and 2051, according to the constant, goal, and trend scenarios.

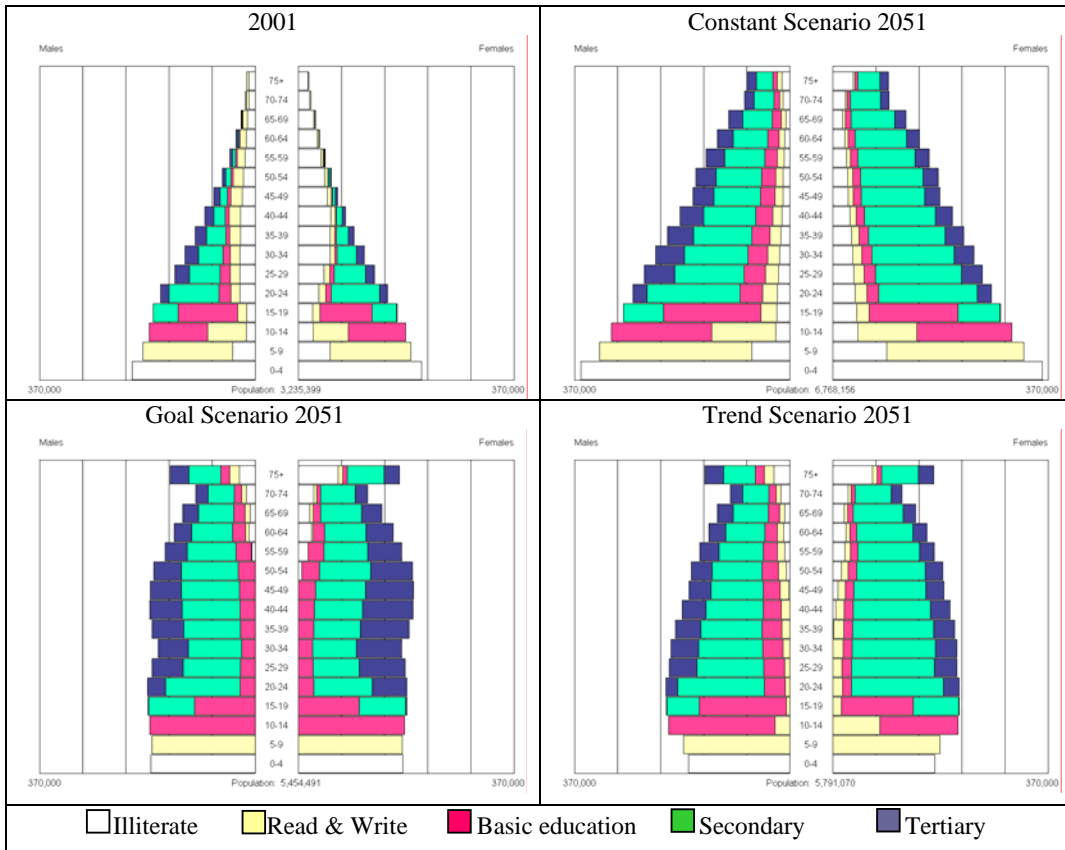




Figure A-13. Population pyramids for Behera, 2001 and 2051, according to the constant, goal, and trend scenarios.

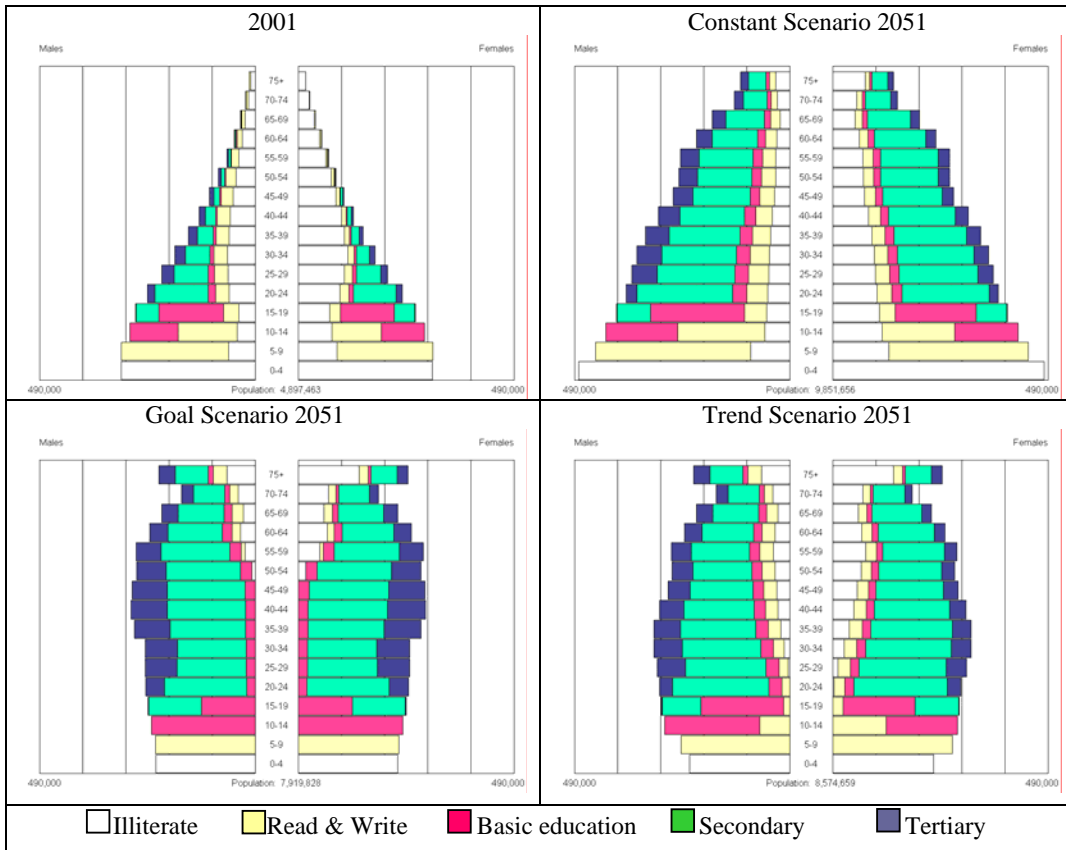
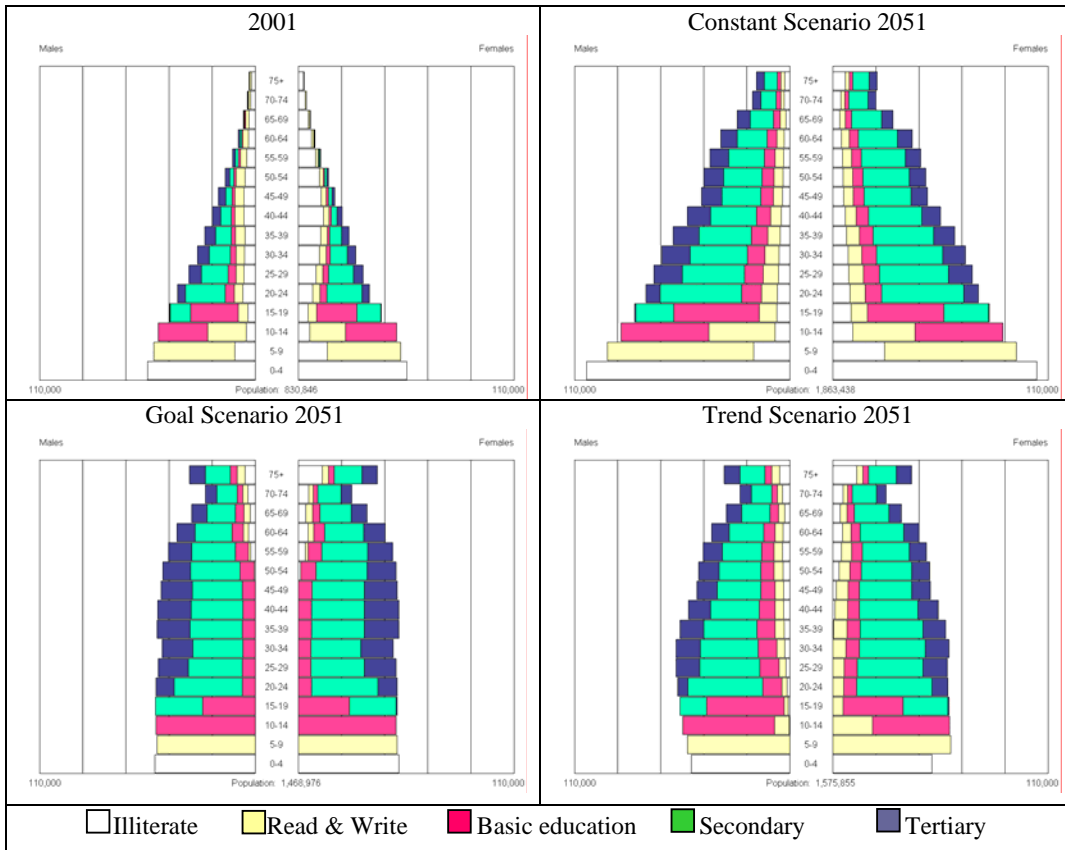




Figure A-14. Population pyramids for Ismailia, 2001 and 2051, according to the constant, goal, and trend scenarios.





## Upper Egypt

Figure A-15. Population pyramids for Giza, 2001 and 2051, according to the constant, goal, and trend scenarios.

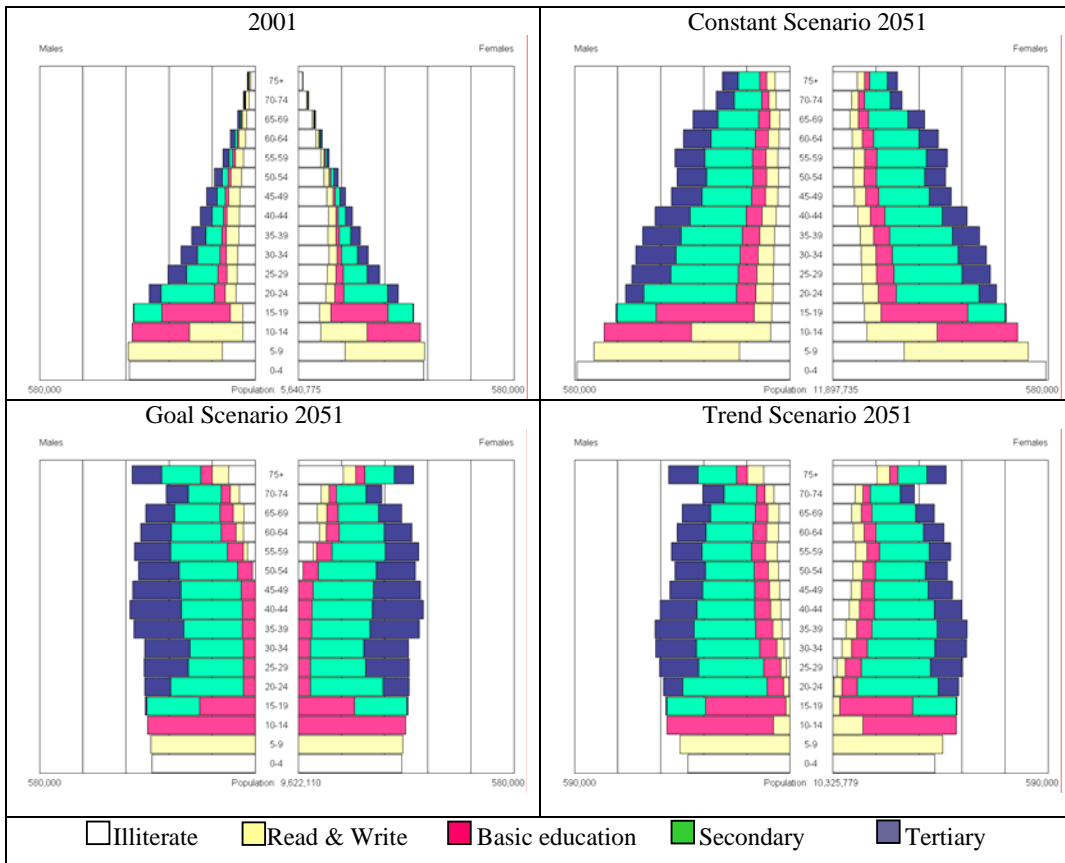






Figure A-16. Population pyramids for Beni-Suef, 2001 and 2051, according to the constant, goal, and trend scenarios.

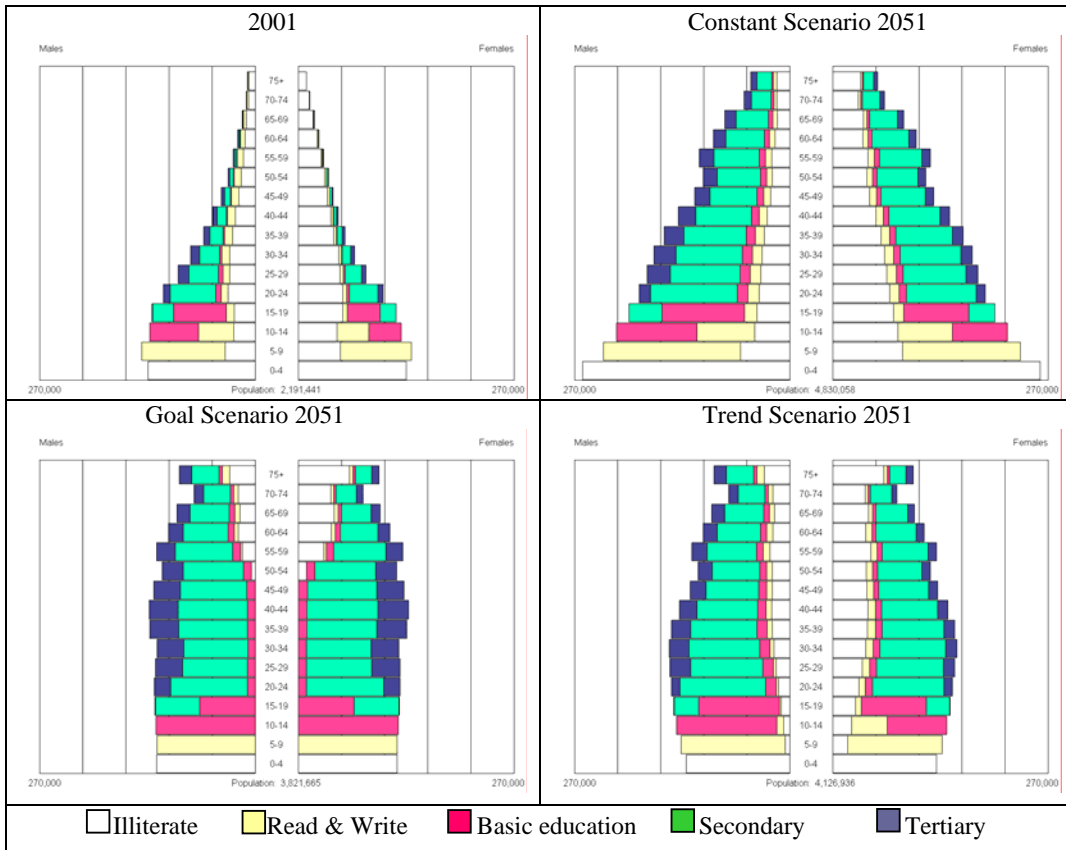




Figure A-17. Population pyramids for Fayoum, 2001 and 2051, according to the constant, goal, and trend scenarios.

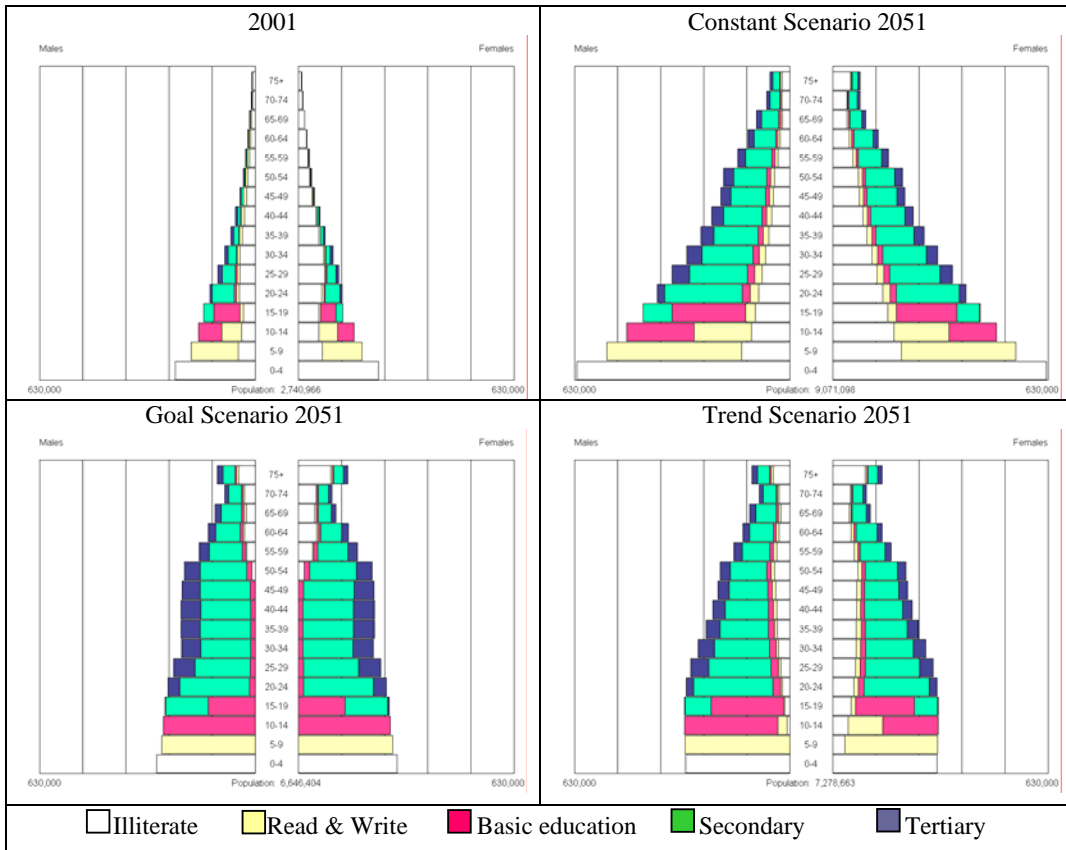




Figure A-18. Population pyramids for Menia, 2001 and 2051, according to the constant, goal, and trend scenarios.

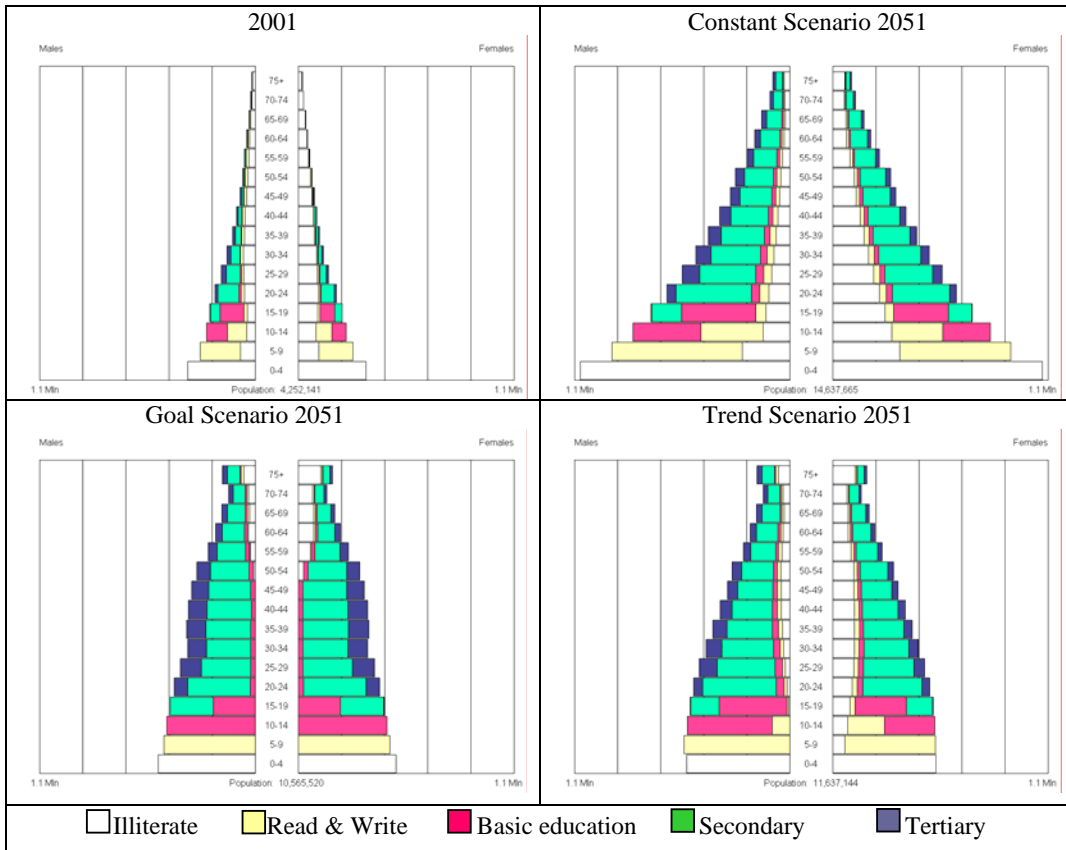


Table A-18. Proportion of the population (in percent) by age, sex, and level of education and total, Menia.

Scenario	Year	Age	Males					Females					Both sexes							
			Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total	Illiterate	Read & write	Basic education	Secondary	Tertiary	Total
2001	15-19	15-19	17	7	53	22	0	230450	44	5	34	16	0	222434	30	6	44	19	0	452884
		20-24	27	7	6	53	7	206668	53	5	3	34	5	192507	40	6	4	44	6	399175
		25-29	33	7	6	40	14	172838	63	5	3	22	7	152720	47	6	4	32	10	325558
		30-34	42	9	3	32	14	145158	73	5	2	13	7	127041	56	7	3	23	10	272199
		35-39	47	12	3	25	13	116967	77	5	2	10	6	106734	61	9	2	18	9	223701
		40-44	53	16	3	19	10	96616	83	6	1	6	4	92069	67	11	2	13	7	188685
		45-49	54	19	3	14	10	78760	85	6	1	5	3	80860	70	12	2	9	7	159620
		50-54	59	22	3	10	7	65006	88	6	1	3	2	69920	74	13	2	6	4	134926
		55-59	62	22	3	8	6	53689	91	5	1	2	1	58649	77	13	2	5	3	112338
		60-64	66	21	3	5	4	42415	92	5	1	1	1	47557	80	13	2	3	2	89972
		65+	74	20	2	2	2	73284	95	4	1	1	0	81593	85	11	1	1	1	154877
		15+	40	12	13	27	8	1281851	69	5	8	14	4	1232084	54	8	10	21	6	2513935
25+	50	14	3	23	10	844733	80	5	2	9	4	817143	65	10	3	16	7	1661876		
Constant	2026	15-19	17	8	54	22	0	391181	38	6	40	17	0	392787	27	7	47	19	0	783968
		20-24	17	8	7	61	7	339763	37	6	5	47	5	341740	27	7	6	54	6	681503
		25-29	17	7	7	52	16	317226	37	6	5	43	9	322775	27	7	6	48	12	640001
		30-34	17	7	7	53	16	262663	37	6	5	44	9	268144	27	6	6	48	12	530807
		35-39	17	7	7	53	16	230758	37	6	5	44	9	232697	27	6	6	48	12	463455
		40-44	17	7	7	53	16	207902	44	5	4	39	8	211254	31	6	5	46	12	419156
		45-49	28	7	6	46	15	180971	53	5	3	32	8	179540	40	6	4	39	11	360511
		50-54	33	6	6	41	14	147417	63	5	3	23	7	138666	48	6	4	32	10	286083
		55-59	42	9	3	33	14	118702	73	5	2	14	7	110732	57	7	3	24	10	229434
		60-64	47	12	3	26	13	88209	76	5	2	10	7	87347	62	9	2	18	10	175556
		65+	54	18	3	15	10	142914	84	6	1	5	4	165486	70	11	2	10	7	308400
		15+	23	8	14	44	11	2427706	47	5	10	32	6	2451168	35	7	12	38	9	4878874
25+	26	8	6	45	15	1696762	51	5	4	33	8	1716641	38	7	5	39	11	3413403		
Goal	2026	15-19	0	8	54	22	0	358768	0	6	40	17	0	360228	0	7	47	19	0	718996
		20-24	17	8	7	61	7	339763	37	6	5	47	5	341740	27	7	6	54	6	681503
		25-29	17	7	7	52	16	317226	37	6	5	43	9	322775	27	7	6	48	12	640001
		30-34	17	7	7	53	16	262663	37	6	5	44	9	268144	27	6	6	48	12	530807
		35-39	17	7	7	53	16	230758	37	6	5	44	9	232697	27	6	6	48	12	463455
		40-44	17	7	7	53	16	207902	44	5	4	39	8	211254	31	6	5	46	12	419156
		45-49	28	7	6	46	15	180971	53	5	3	32	8	179540	40	6	4	39	11	360511
		50-54	33	6	6	41	14	147417	63	5	3	23	7	138666	48	6	4	32	10	286083
		55-59	42	9	3	33	14	118702	73	5	2	14	7	110732	57	7	3	24	10	229434
		60-64	47	12	3	26	13	88209	76	5	2	10	7	87347	62	9	2	18	10	175556
		65+	54	18	3	15	10	164122	85	6	1	5	4	187163	71	11	2	10	7	351285
		15+	16	8	14	44	11	2444145	31	5	10	32	6	2464489	24	7	12	38	9	4908634
25+	23	8	6	45	15	1741482	44	5	4	33	8	1758360	33	7	5	39	11	3499842		
Trend	2051	15-19	1	2	68	29	0	509442	17	5	52	26	0	511584	9	3	60	27	0	1021026
		20-24	3	3	8	77	9	491832	20	5	6	61	8	494330	11	4	7	69	9	986162
		25-29	5	3	8	64	20	463348	23	5	6	55	12	469326	14	4	7	59	16	932674
		30-34	7	4	8	62	19	428802	25	6	5	53	11	438039	16	5	7	57	15	866841
		35-39	10	5	8	60	18	392582	27	6	5	51	11	403875	19	6	6	55	14	796457
		40-44	12	5	7	58	17	356901	30	6	5	49	10	370076	21	6	6	53	14	726977
		45-49	14	6	7	56	17	319303	32	6	5	47	10	333615	23	6	6	52	13	652918
		50-54	16	6	7	55	16	294522	35	6	5	46	9	310353	25	6	6	50	13	604875
		55-59	17	6	7	53	16	238718	37	6	5	44	9	252700	27	6	6	49	12	491418
		60-64	17	7	7	54	16	202407	37	6	5	44	9	213243	27	6	6	49	12	415650
		65+	26	7	5	46	16	475445	53	5	3	31	9	503774	40	6	4	38	12	979219
		15+	11	5	15	56	14	4173302	30	5	11	46	9	4300915	20	5	13	51	11	8474217
25+	13	5	7	57	17	3172028	33	6	5	46	10	3295001	23	5	6	51	14	6467029		

Figure A-19. Population pyramids for Assyout, 2001 and 2051, according to the constant, goal, and trend scenarios.

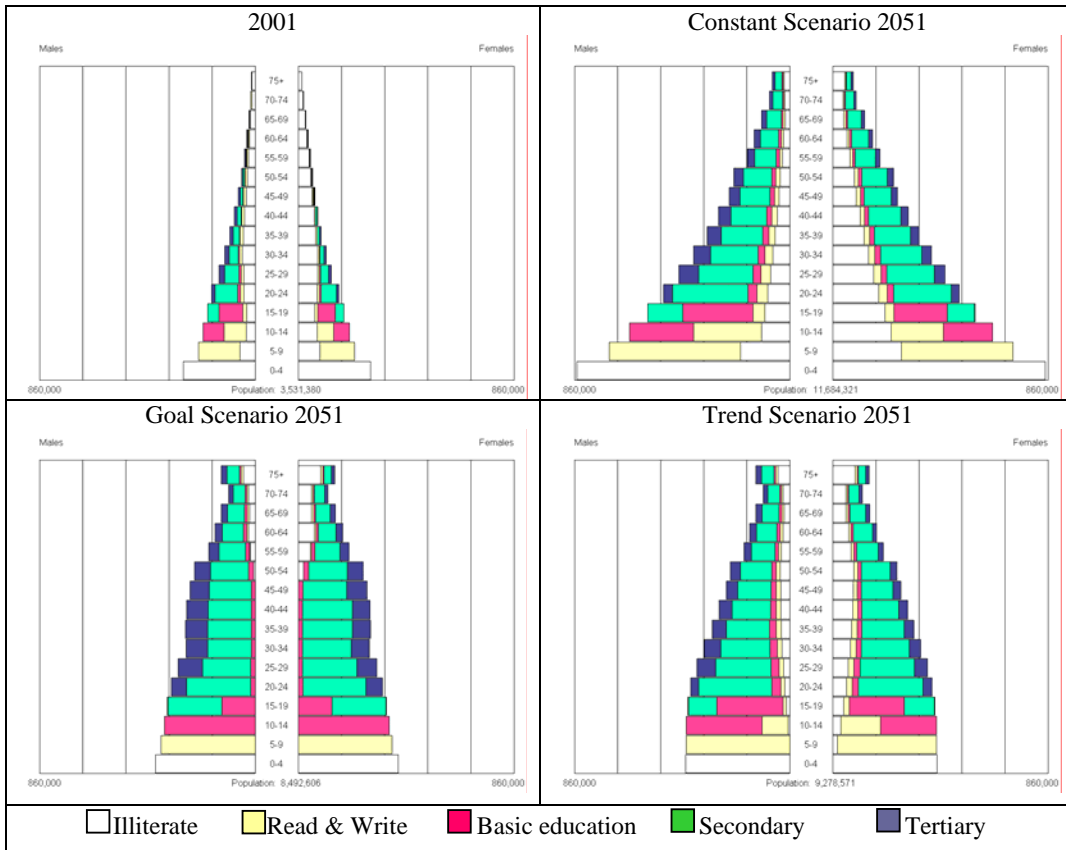






Figure A-20. Population pyramids for Suhag, 2001 and 2051, according to the constant, goal, and trend scenarios.

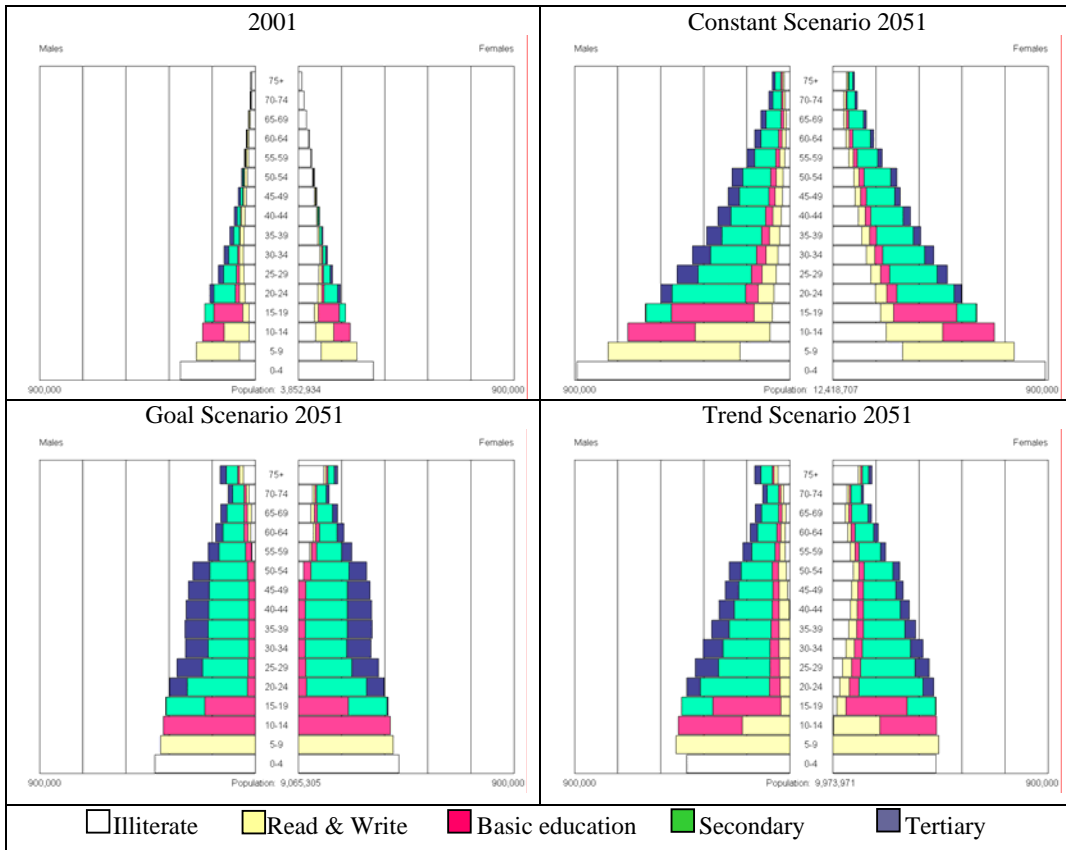




Figure A-21. Population pyramids for Quena, 2001 and 2051, according to the constant, goal, and trend scenarios.

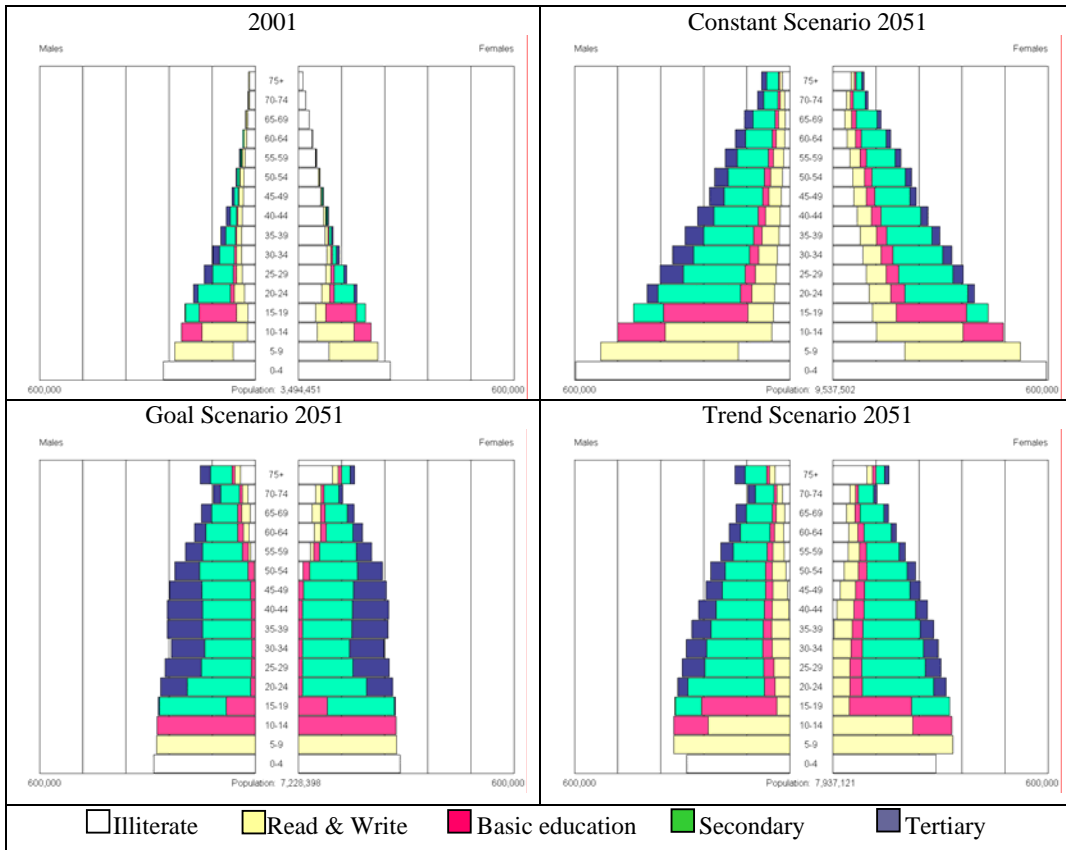




Figure A-22. Population pyramids for Aswan, 2001 and 2051, according to the constant, goal, and trend scenarios.

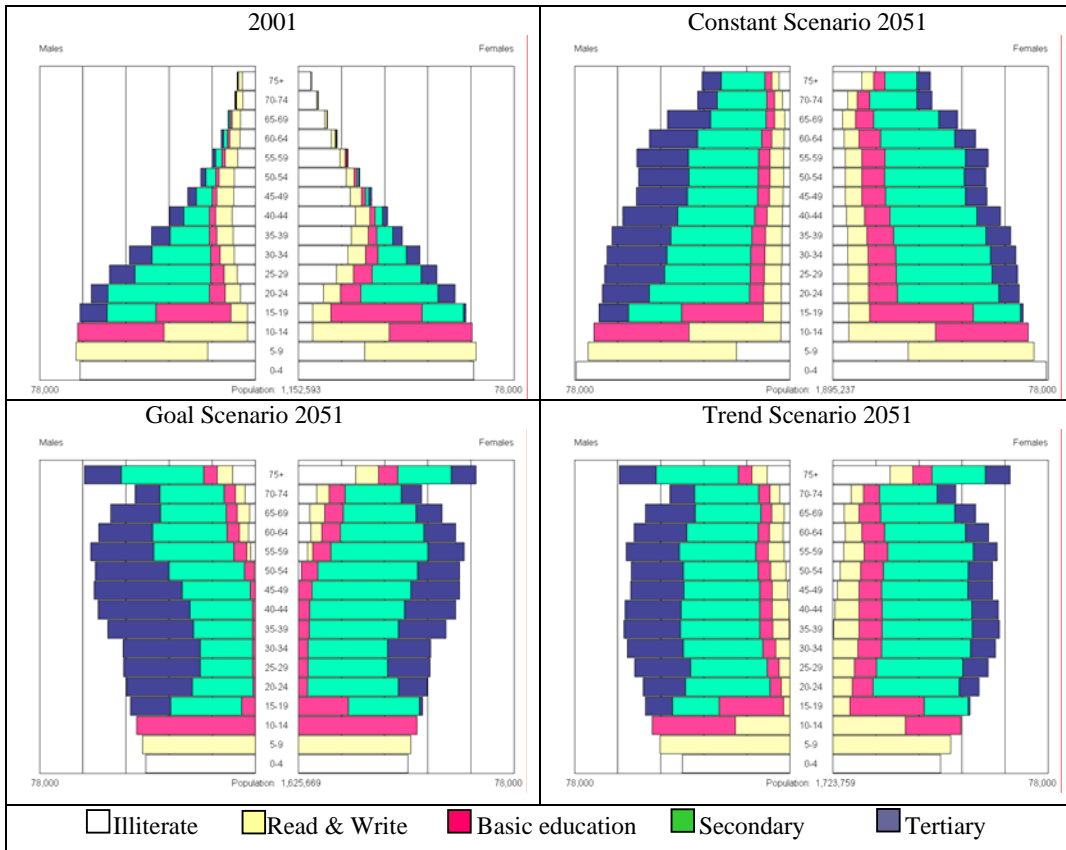
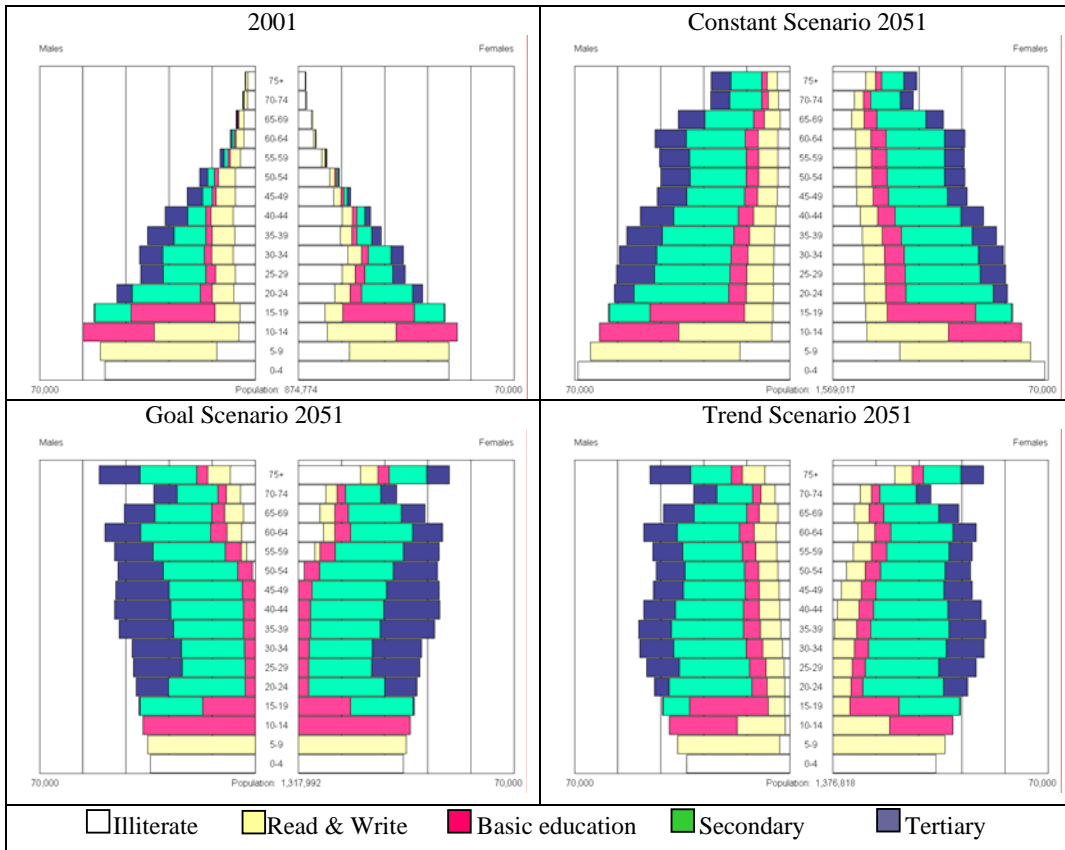




Figure A-23. Population pyramids for the Frontier Governorates, 2001 and 2051, according to the constant, goal, and trend scenarios.







## Appendix B. Results of the Projections to 2101 for Egypt According to 12 Scenarios

