

Executive Summary

of a Project carried out by IIASA
in collaboration with the Cairo Demographic Center

Population and Human Capital in Egypt

Project Report / February 2007

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

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



Presented at the Workshop on Population, Human Capital and Water in Egypt,
held at the Academy of Scientific Research and Technology (ASRT) on March 7, 2007

Population Growth and Sustainable Development Challenges

The combination of continued rapid population growth and severely constrained fresh water resources confronts Egypt with great challenges in her pursuit of sustainable development. The total population of Egypt increased from 22 million in 1950 to 75 million today, and is likely to increase to above 120 million by 2050 (see Figure 1). This more than five-fold increase in population size occurs in the context of fixed fresh water availability or even declining availability in the context of climate change. Already in 1997, Egypt fell below the international standard of water scarcity of 1000 m³/person/year. Over the coming decades this declining trend will continue toward highly critical levels. In addition, an otherwise much welcomed increase in economic growth tends to be associated with a much higher household water consumption as well as consumption for agricultural and industrial purposes.

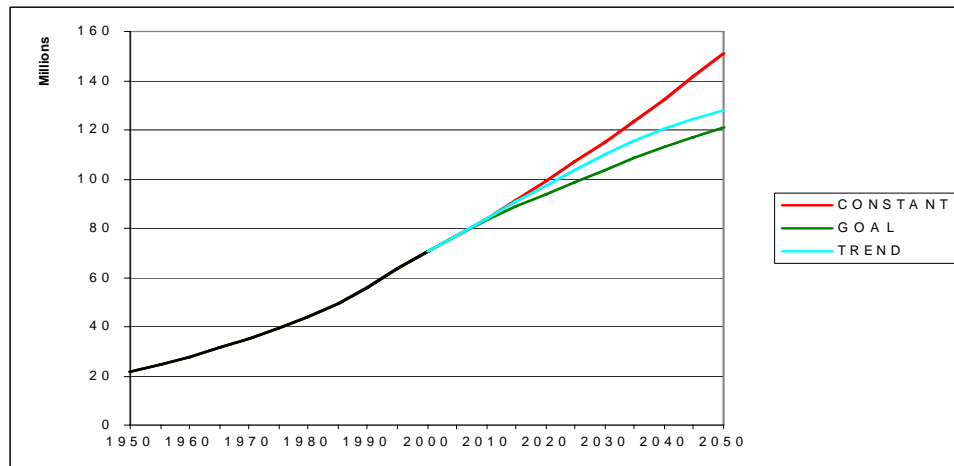


Figure 1. Total population growth of Egypt, 1950-2051, historical trends, and three different future scenarios as discussed in the text.

What are Egypt's options in this highly challenging context? There are clearly ways of coping with great water scarcity, yet still ensuring a decent quality of life for all citizens, but they are costly and require a highly-skilled population, in addition to high technological and financial inputs. Much research on this question has focused on the civil engineering and environmental modeling side of this equation. This study wants to complement our understanding through a focus on the population and human capital side of the equation. This is guided by the understanding that in this context, it is not only the sheer number of people and their distribution that matters, but also the skills of the people (what economists call the "quality" dimension) that are an important prerequisite for sustained economic growth and a sustainable management of natural resources.

This study applies a very powerful demographic methodology—called multi-state population projections—which was developed at IIASA and can model the dynamics of population change not only by age and sex, but also by additional dimensions such as the level of educational attainment. It also considers the fact that women with different levels of educational attainment tend to have different levels of fertility. Since the spatial distribution of the population greatly matters, and there are important differences in the levels of human capital among the different parts of Egypt, the analysis is carried out at the level of individual governorates. The data is based on the 1996 census and has been updated in terms of more recent trends with the help of the 2000 and 2005 Demographic and Health Surveys. The model is set up in a way that as soon as reliable data from the 2006 census becomes available at this level of disaggregation, the projections can be updated.

Three Scenarios for Future Fertility and Education

The empirical starting data provide the population by age, sex, and level of educational attainment in five categories (illiterate, can read and write, basic education, secondary education, and tertiary education) for 21 governorates and the Frontier region. This can be presented visually in the form of age pyramids with women on the right-hand side and men on the left, sorted by age with the youngest at the bottom, the colors indicating the level of educational attainment. Figure 2 shows an education-age pyramid for Egypt as a whole in 2001.

Unlike for all industrialized and an increasing number of developing countries which recently experienced strong fertility declines, the population pyramid for Egypt in 2001 still looks like a pyramid, with each age group smaller than the previous one. Figure 2 also shows that women are on average less educated than men and that younger cohorts are better educated than older ones.

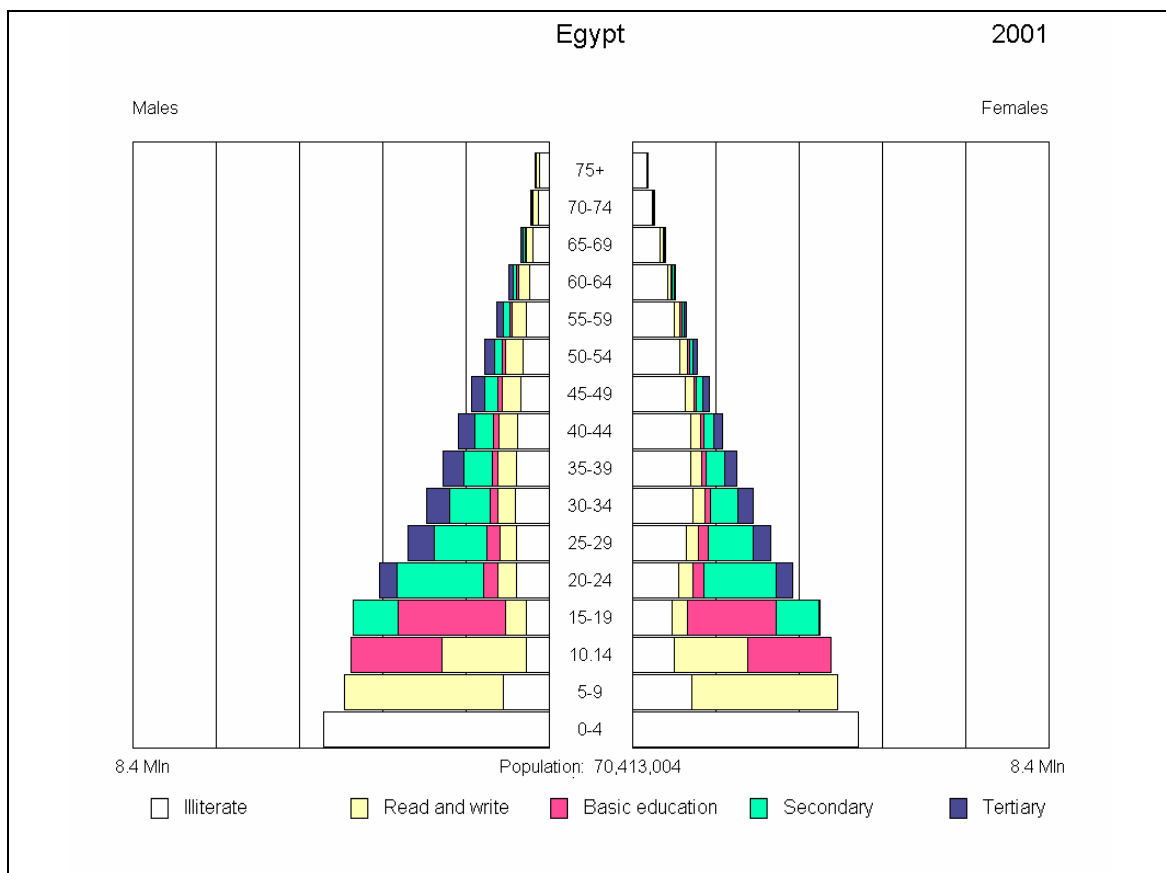


Figure 2. Population pyramid by level of education for the whole of Egypt in 2001.

Projections of the future size and composition of the population by age, sex, and level of educational attainment require assumptions about future trends in fertility, mortality, and migration (and how they differ by level of education), as well as future trends in progression to higher educational attainment categories by age and sex, which is closely related to the frequently-used indicator of school enrolment rates. Different combinations of alternative assumptions on each of these parameters result in large numbers of scenarios. For a clearer picture, the following three main scenarios have been defined:

Constant Rates Scenario: All demographic and educational transition rates stay constant at the same level as in the base year. This also implies a constant fertility rate of slightly above three children per woman on average.

Goal Scenario: This assumes that nationally and internationally agreed goals will be met. In particular, it assumes that the national goal of reaching replacement level fertility by 2017 (with constancy thereafter) will be met, as well as the Millennium Development Goal (MDG) of universal completion of basic education for all school-age boys and girls by 2015.

Trend Scenario: Assumes plausible continuations of recent trends in all parameters. Due to the slow pace of recent fertility declines, replacement level fertility under this scenario will only be reached in 2035, and fertility will then continue to decrease to 1.7 by 2050.

As can be expected, the difference among the three scenarios increases over time. Figure 3 shows that after 2020, the constant scenario is on a much higher trajectory of population size than the others. If all rates (including fertility) stay at their current levels, the population of Egypt would increase to 150 million by 2050 and an unimaginable 350 million by 2100. The more realistic trend scenario reaches 128 million in 2050, and if continued to the end of the century, it will peak at around 140 million and then start a slight decline. The goal scenario results in 120 million by 2050, followed by a slight decline thereafter. The latter is a consequence of the further improvement in the educational composition of women.

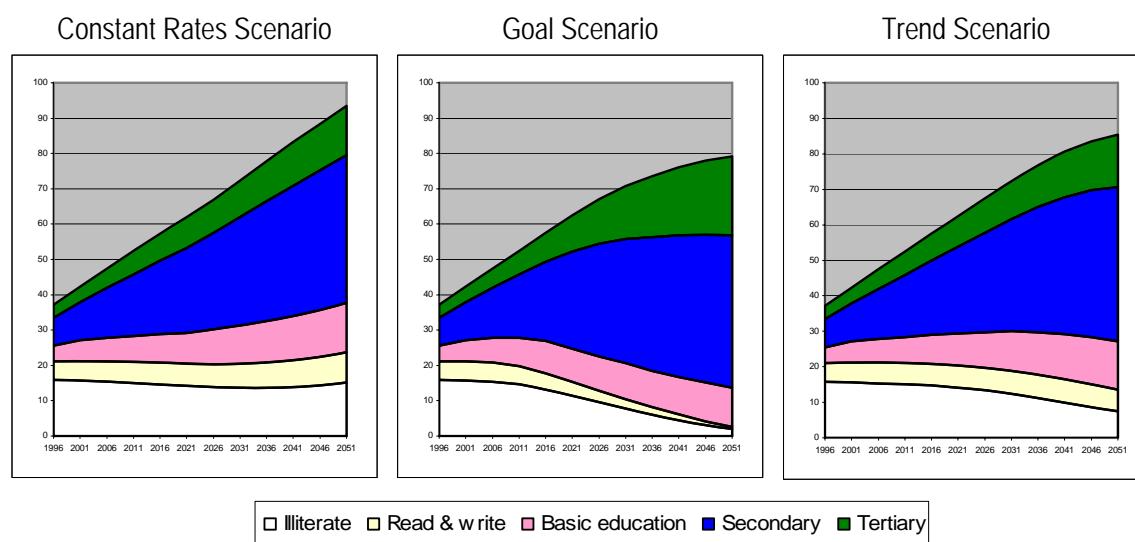


Figure 3. Trends in the size of the working-age population (men and women aged 15-64 in millions) by level of educational attainment according to the three scenarios for the whole of Egypt.

Comparing the three scenarios in terms of their consequences for the educational composition of the population, Figure 3 clearly shows that the population with secondary education will expand strongly in all three cases. The fact that this is happening even under the constant scenario is due to the great momentum of improvements in the stock of human capital. Education policies can only influence the school enrolment rates of young people; it then takes decades until the better-educated youngsters slowly move up the age pyramid to replace the less well-educated previous cohorts. In this sense much of the future trend in the educational attainment of the labor force is already embedded in today's age

structure by level of education and is, hence, a consequence of past education efforts. This great momentum of improvements in human capital is important to be kept in mind when assessing the returns to investments in education.

The difference between the three scenarios is most visible at the lower end of the education spectrum. While even under the constant scenario the proportion of illiterate adults decreases, the absolute number remains nearly constant as a consequence of population growth. For the goal scenario it is interesting to see that despite the assumed universal basic education by 2015, an illiterate population of working age will still exist until 2050, although much reduced. Again, these are the people who were of school age before universal basic education is assumed to be achieved.

Differing Trends by Governorates

The full project report provides the kinds of analyses presented above for the whole of Egypt for all individual governorates, but this is too much information to be summarized here. Figure 4 shows the great heterogeneity with respect to the projected growth in the total size of the working-age population. The pillars show the factors by which the sizes of the total work-force populations are expected to increase between 2001 and 2051. While for the whole country the working-age population is expected to double under the trend scenario, in Cairo and Alexandria it only increases by around 40 percent. By far the highest growth is expected in Upper Egypt, where in some governorates the factor of increase is more than three.

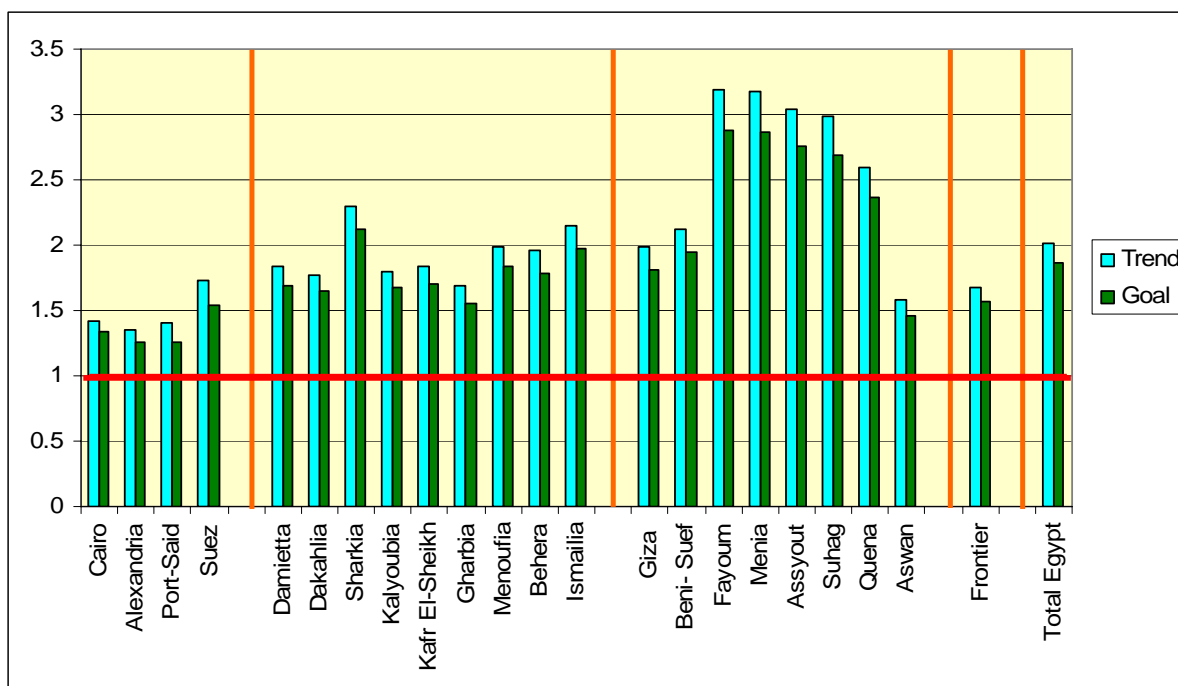


Figure 4. Factors by which the working-age population (aged 15-64) increases between 2001 and 2051 according to the trend and goal scenarios in individual governorates.

Conclusions and Implications

The following conclusions and policy implications can be drawn from the study:

- **Fertility rates** which are still rather high and showed only slight declines over the past years are the main determinants of the future course of population growth. In comparison to other countries, better-educated Egyptian women have relatively high fertility levels, which implies that an increase in the number of educated women by itself will not bring down overall fertility significantly. In order to achieve the official national goals in terms of fertility decline and moderating population growth, it seems to be necessary to strengthen efforts in the fields of reproductive health, family planning, and communicating the benefits of smaller families in the Egyptian context.
- Due to the high fertility rates in the 1980s, **large cohorts of young** and better-educated adults (sometimes called a “youth bulge”) are now entering the labor market. If the labor market frustrates the rather high aspirations of these young people, this can constitute an element of political unrest and instability. It is hence important to make serious efforts for **facilitating job creation** which not only helps to avoid such frustrations, but also utilizes the substantial human capital of these people to the benefit of national economic growth.
- Over the coming decades Egypt will benefit from the so-called demographic **window of opportunity** which results from a high proportion of the total population being of working age (with the young-age dependency reduced through fertility decline and the old-age dependency being not yet significant). Many countries, e.g., in Southeast Asia, could utilize this window for significant economic growth along with strong investments in infrastructure and human capital formation. Egypt must actively take advantage of this window, which will close again in the future.
- In the field of education, a dual strategy seems to be necessary to avoid unemployment for the more educated and to enhance the overall human capital: 1) The **quality of education** needs to be emphasized, together with the direction of education, so that the skills are being produced that are demanded by the economy. 2) The prevalent **imbalance of education** needs to be reduced by pursuing the MDG goal of universal basic education which may also help to create demand for the skills of the more highly-educated within a fully literate society.
- Egypt has great **regional imbalances** in population density, population growth rates, and prospects for future human capital under current trends. This requires differentiated regional development policies, possibly including migration.
- All these policies 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 industries is the challenge of the day.