Population Growth in the Nile Basin

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Pre-1950 estimates from HYDE database, 1950-2015 data from UN Population Prospects
Low mortality and high fertility result in rapid population growth

Adapted from Gwatkin and Brandel, 1982
The rate of reduction in fertility is key to reducing population
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UN Population Prospects, 2017 Revision
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![Graph showing the effects of fertility and life expectancy on population growth. The graph illustrates a steady increase in total population (in millions) from 1959 to 2100, with a projection line and a dashed line indicating no increase in life expectancy.](image-url)
Fertility is the critical factor in population growth
Age structure determines built-in population momentum
Population momentum will add 100 million people to the region by 2050.
Not 100 million, but 200 million more people are expected by 2050.
Ethiopia receives the largest fraction of the increase, but all three countries grow substantially.
An addition of 200 million people results in all countries in a state of absolute water scarcity.

The total renewable water resources estimates used to calculate water per capita were taken from FAO’s AQUASTAT database. Population projections from the UN.
Girls education and access to family planning are recognized ways to reduce fertility
Ethiopia’s fertility rates decline sharply with education

DHS Surveys, 2014-2016 (most recent in each country)
Sudan’s relationship between fertility and education is likely more like Ethiopia’s than Egypt’s.
Sudan and Ethiopia could experience meaningful reductions in fertility by increasing access to schooling.
Increased contraception prevalence could reduce fertility in all countries, though ease of increase will vary.
In summary...

1. The UN estimates a likely increase in population of 200 million in the region by 2050 (from 250 million to 450 million)
2. Due to population momentum, the best-case scenario of instantly reducing fertility to replacement level will still add 100 million people to the region by 2050
3. These additions in population will result in significant additional strain on water resources in the region
4. The rate of decline in fertility is the key determining factor in future population growth
5. Increased access to education for girls and family planning/contraception are linked to decreases in fertility
   • Ethiopia and Sudan have much to gain by focusing on education
   • Egypt has made progress in recent decades—remaining reductions in fertility are limited primarily by cultural factors.
References and additional slides for questions
References


Impacts of rate of decline in fertility

Population in the Region
Assuming Different Declines in Fertility

Total Population (Millions)

Year

UN Population Prospects, 2017 Revision
Fertility declines necessary for population increase to not exceed 200 million by 2050

Assumed Fertility Rates Under UN Medium Projection Variant

- Ethiopia
- Egypt
- Sudan

UN Population Prospects, 2017 Revision
Medium projection growth rates

Growth Rates Under UN Medium Projection Variant

Growth Rate (%) vs. Year

Year: 1955, 1980, 2015, 2030, 2050, 2080, 2100

Countries: Sudan, Egypt, Ethiopia

UN Population Prospects, 2017 Revision
Momentum projection growth rates

Growth Rates Under UN Medium Projection Variant

- Sudan
- Egypt
- Ethiopia

Year

Growth Rate (%)

UN Population Prospects, 2017 Revision
The effects of education on fertility

• Delays maternal age (Ali and Gurmu, 2016)
• Provides economic and employment opportunities, increasing the “opportunity cost of childbearing” (Osili and Long, 2007)
• Provides knowledge of family planning and modern methods of contraception (Osili and Long, 2007)
• Increases child health and reduces child mortality, so fewer children are necessary to obtain a desired family size (Osili and Long, 2007)
China’s economic rise was preceded by a reduction in fertility