

Education - a key determinant of population growth and human well-being

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Future trends in global population growth could be significantly affected by improvements in both the quality and quantity of education, particularly female education. Projections of future population trends that do not explicitly include education in their analysis may be flawed, according to research published today in the journal *Science* (July 29 2011).

The study uses a novel “multi-state” population modeling approach to incorporate education attainment level, along with age and sex. The integration of education in the analyses adds a “human quality” dimension to projections of fertility, mortality and migration. As education also affects health, economic growth, and democracy, these projections provide a more comprehensive picture of where, how, and under what conditions human well-being is increasing.

The research reinforces earlier findings that the level of formal education achieved by women is, in most cases, the single most important determinant of population growth. More educated women generally have fewer children, better general health, and higher infant survival rates. Education also appears to be a more important determinant of child survival than household income and wealth. The study also found that if concerted efforts were made to fast track education, the global population could remain below 9 billion by 2050. Thus the global population outlook depends greatly on further progress in education.

Researchers Wolfgang Lutz and Samir K.C. from the International Institute for Applied Systems Analysis (IIASA), the Vienna Institute of Demography (VID) of the Austrian Academy of Sciences (ÖAW) and the Vienna University of Economics and Business (WU), evaluated the effect of education on population growth to 2050 using four alternative education scenarios*. The scenarios are based on identical sets of education-specific fertility, mortality, and migration rates. They differ only in terms of their assumptions about future school enrolment rates.

“The most ambitious, or ‘fast track’ (FT) scenario we apply assumes all countries expand their school system at the fastest possible rate—this is comparable with past, best performing countries, Singapore and South Korea, says co-author Samir K.C. “The most pessimistic scenario of ‘constant enrollment numbers’ (CEN), assumes no new schools are built and the number of people attending schools remains constant, which, under conditions of population growth, means declining enrolment rates.”

“Under these two extreme scenarios, population size in 2050 could vary by as much as 1 billion—with 8.8 billion people expected under the fast track scenario and as many as 9.9 billion under the constant enrolment numbers scenario, as can be seen in figure 1. The effect is greatest in countries with current high fertility rates and high education differentials,” he stated.

Kenya’s population, as an example, would increase from 31 million in 2000, to 85 million in 2050, under the optimistic FT scenario. Under the pessimistic CEN scenario with no new schools, Kenya’s population could increase to 114 million. The difference of 30 million between these extremes is equivalent to the size of Kenya’s population in 2000. As the scenarios only consider the individual-level effects, not the broader community-level impacts

that education can have such as better availability of reproductive health services, the results are likely to be an underestimate of potential population change.

The authors emphasize that the effect of better education on population growth may not be obvious for some time. This is because the effect on fertility of girls entering school now may not be evident for about 15 years, when they enter their prime child bearing years. The study supports earlier findings by IIASA and the VID regarding the level of educational attainment needed to bring about changes in fertility, with secondary education bringing greater reductions in fertility than primary education alone.

The research highlights the strong link between economic growth and 'human capital' – the combination of health status and the education levels achieved by adults. Better education affects many aspects of human development, including health, economic growth, and democracy.

The study by Wolfgang Lutz and Samir K. C., from the International Institute for Applied Systems Analysis, the Vienna Institute of Demography of the Austrian Academy of Science, and the Vienna University of Economics and Business (all three institutions have merged their scientific strengths and collaborate in the Wittgenstein Centre for Demography and Global Human Capital) is published in the latest issue of *Science*.

Reference: Global Human Capital: Integrating Education and Population. **Science** July 29 2011. Lutz W. and Samir K. C.

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About IIASA:

IIASA is an international scientific institute that conducts research into the critical issues of global environmental, economic, technological, and social change that we face in the twenty-first century. Our findings provide valuable options to policy makers to shape the future of our changing world.

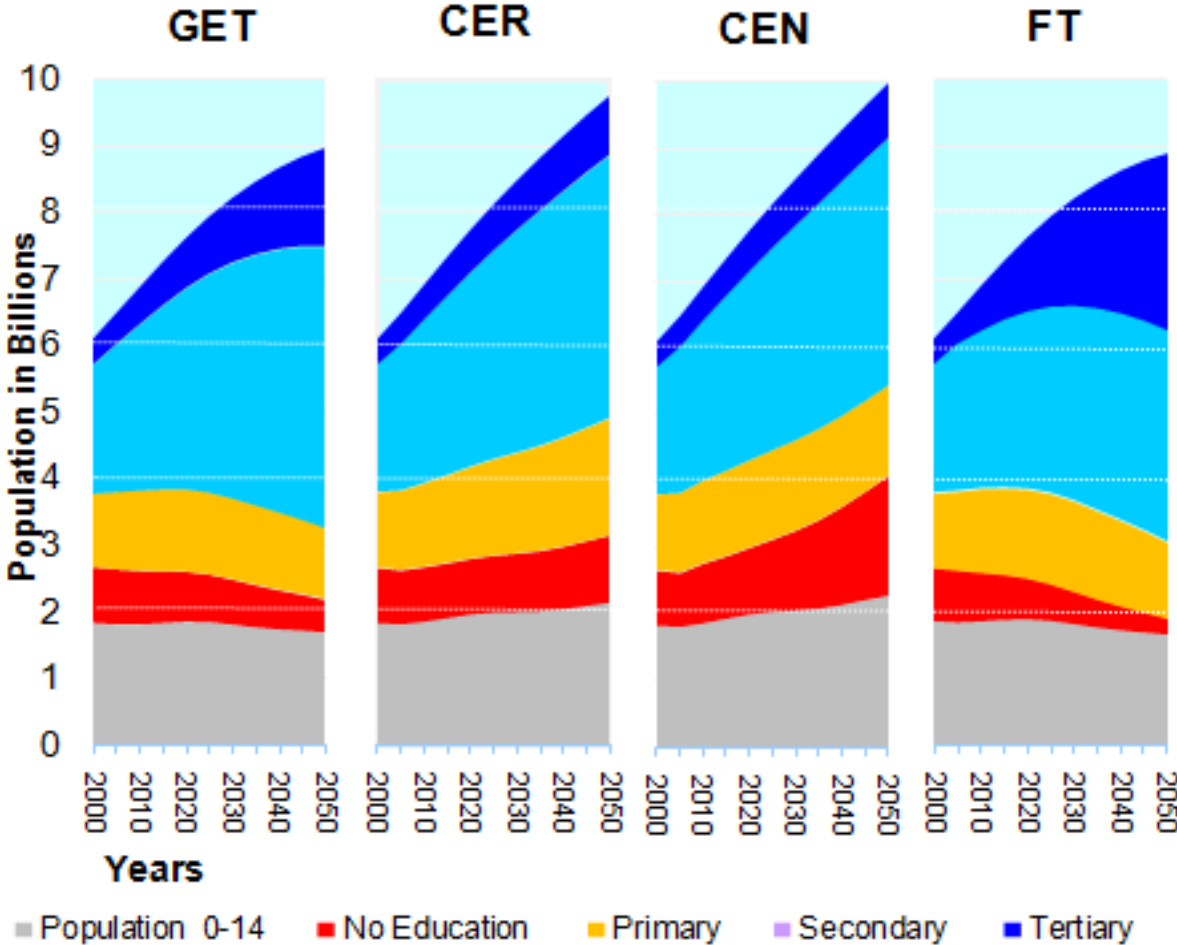
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About the Vienna Institute of Demography: The Vienna Institute of Demography strives for the combination of scientific excellence with proactive relevance in analyzing and projecting demographic trends and in evaluating the social and economic consequences of population ageing. Thus the VID combines innovative methodological work with empirical analysis and communication of scientifically based insights. It gives special attention to the demography of Austria and to European comparative analysis. The Institute is embedded in the structure of the Austrian Academy of Sciences. <http://www.oeaw.ac.at/vid/index.html>

About the Vienna University of Economics and Business: The WU–Vienna, University of Economics and Business, Europe's biggest business school, is currently seeking to strengthen its research component and graduate teaching in strategic areas; it recently opened a new section on demography and a research institute on "Human Capital and Development." <http://www.wu.ac.at/>

About the Wittgenstein Centre for Demography and Global Human Capital: By pooling the scientific strengths of IIASA, VID and WU in the Vienna area, the Wittgenstein Centre aims to become a leading global research centre that deals with the interdependence of demography and education as well as their consequences for society and economy – a central challenge for the future of humankind.

Figure 1. World population by level of educational attainment projected to 2050 on the basis of four different education scenarios



***Reference scenarios:** The four alternative education scenarios used in the study are based on identical sets of education-specific fertility, mortality, and migration rates; they differ in terms of their assumptions about future school enrollment rates. The fast track (**FT**) scenario is extremely ambitious; it assumes that all countries expand their school system at the fastest possible rate, which would be comparable with best performers in the past such as Singapore and South Korea (29, 30). The global education trend (**GET**) scenario is more moderately optimistic and assumes that countries will follow the average path of school expansion that other countries already somewhat further advanced in this process have experienced. The constant enrollment rate (**CER**) scenario assumes that countries only keep the proportions of cohorts attending school constant at current levels. The most pessimistic scenario, constant enrollment numbers (**CEN**), assumes that no more schools at all are being built and that the absolute number of students is kept constant, which under conditions of population growth means declining enrollment rates. The resulting global population projections by level of education on the basis of these four alternative education scenarios is shown in Fig. 1 above.

Country	Period*	Under-five mortality rate (per thousand live births)				Total fertility rate (number of live births per woman)			
		No education	Primary	Secondary or higher	Overall	No education	Primary	Secondary or higher	Overall
Bangladesh	2007	93	73	52	74	3	2.9	2.5	2.7
Benin	2006	143	121	78	136	6.4	5.2	3.7	5.7
Bolivia	2008	134	87	44	76	6.1	4.7	2.6	3.5
Cambodia	2005	136	107	53	106	4.3	3.5	2.6	3.4
Congo (Brazzaville)	2005	202	134	101	123	6.2	6.3	4	4.8
Congo DR	2007	209	158	112	155	7.1	7.1	5	6.3
Egypt	2008	44	38	26	33	3.4	3.2	3	3.0
Ethiopia	2005	139	111	54	132	6.1	5.1	2	5.4
Ghana	2008	103	88	67	85	6	4.9	3	4.0
Guatemala	2008	65	40	20	45	5.2	3.8	2.3	3.6
Guinea	2005	194	172	92	188	6.2	5.1	3.3	5.7
Haiti	2005-06	123	97	65	102	5.9	4.3	2.4	3.9
Honduras	2005-06	55	40	20	37	4.9	3.8	2.2	3.3
India	2005-06	106	78	49	85	3.6	2.6	2.1	2.7
Indonesia	2007	94	60	38	51	2.4	2.8	2.6	2.6
Liberia	2009	164	162	131	158	7.1	6.2	3.9	5.9
Mali	2006	223	176	102	215	7	6.3	3.8	6.6
Nepal	2006	93	67	32	79	3.9	2.8	2.2	3.1
Nicaragua	2006	67	40	26	41	4.4	3.2	2	2.7
Niger	2006	222	209	92	218	7.2	7	4.8	7.0
Nigeria	2008	210	159	107	171	7.3	6.5	4.2	5.7
Pakistan	2006-07	102	85	62	93	4.8	4	2.8	4.1
Philippines	2008	136	47	30	37	4.5	4.5	3	3.3
Rwanda	2007-08	174	127	43	135	6.1	5.7	3.8	5.5
Senegal	2008-09	112	74	33	100	5.6	4.5	3.1	4.9
Sierra Leone	2008	170	187	130	168	5.8	5.1	3.1	5.1
Swaziland	2006-07	150	106	95	106	4.9	4.5	3.4	3.9
Uganda	2006	164	145	91	144	7.7	7.2	4.4	6.7
Zambia	2007	144	146	105	137	8.2	7.1	3.9	6.2

Table 1. The magnitude of empirically measured child mortality differentials in a selection of developing countries. The indicators for the less than 5 years mortality rates are compiled from DHS www.measuredhs.com * Under-five child mortality refers to the period of 10 years prior; Total fertility rate refers to the period of 3 years prior.