Slowing population growth for wellbeing and development

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A growing number of findings from different disciplines show that human wellbeing is increasingly threatened by unsustainable population growth. These threats occur at different levels. At the global level, population size is a crucial factor in consumption of resources. Technological advances have brought about huge increases in both the extraction of raw materials and in the efficiency of production and consumption, but stocks of raw materials are not infinite. The situation is much the same for food production; the two past agricultural revolutions (domestication of plants and technological innovations) enormously increased land productivity, and the ongoing third revolution (further technological innovation and biotechnology) will provide additional productivity gains. But a multiplication of the yield per hectare seems unrealistic and the possibilities to expand the area of land used for agriculture are very limited—certainly if people want to preserve ecologically valuable areas such as rain forests.

The key question is whether the earth and human behaviour and technology will be capable of providing enough food and resources for the growing population, taking into account that a substantial part of this population currently has many unmet basic needs. The Global Footprint Network[1] calculated the average ecological footprint (the area of biologically productive land and water that a population uses to generate the resources it consumes and to absorb its wastes under prevailing technology) of the global population at 2·7 global hectares per capita, and the biocapacity (the capacity of ecosystems to produce useful biological materials and to absorb carbon dioxide generated by human beings, with present management schemes and extraction technologies[2]) at 1·8 global hectares per capita. This means that people are overexploiting both land and sea, thereby destroying habitats and harming biodiversity, and taking the means of existence from future generations.

These calculations are based on 2007 data, with a world population of 6·7 billion. In the meantime, the human population has increased to 7 billion, and is projected to grow further to 9·3 billion by 2050 and to 10·1 billion by 2100.[3] Decreasing the average environmental footprint is certainly an option, but to distribute the present global environmental footprint equally across the world population, inhabitants of high-income countries would have to reduce their ecological footprint per capita by a factor of 2·5, which is hardly imaginable without technological, and probably also economic and political, revolutions.

Important as it is to decrease the environmental footprint of high-income countries for sustainability reasons, it is also necessary to boost economic development in low-income countries for humanitarian and ethical reasons. Here too, population growth is an obstacle. Economic growth in many sub-Saharan African countries is partly offset by the growing population, resulting in growth in gross domestic product (GDP) per person that is well below GDP growth at country level. In some countries, per-person growth is even negative, meaning that the country gets richer but its inhabitants get poorer.[4]

At the individual level, reproduction is still an important cause of mortality; the number of women who die every year as a result of pregnancy or delivery is estimated to be about 300 000.[5,6] Many of these deaths are easily avoidable: an average of 40% of pregnancies in sub-Saharan Africa (70 million) are unintended, either unwanted or mistimed. Studies suggest that avoiding these pregnancies could result in a reduction of 150 000 maternal deaths every year, including over 50 000 deaths due to unsafe abortions.[7] The cost of fulfilling the present unmet needs in family planning amounts to an additional US$3·1 billion annually. This amount is the same as the average annual aid budget for HIV and AIDS during the past 10 years. In other words, if governments and other organisations can succeed in putting the same effort into family planning as they did in the fight against HIV and AIDS, then they would have the means to avoid every unwanted pregnancy worldwide.

Provision of universal access to modern family planning methods is absolutely necessary and urgent—also from a women's rights perspective—and it will certainly have an inhibiting effect on population growth, but additional efforts will be needed to push back global fertility to replacement level or below. In addition to the recent Rio+20 conference, two important worldwide

events will put population and family planning-related issues on the global agenda: the International Conference on Population and Development +20 follow-up in 2014, and the expiry of the Millennium Development Goals in 2015. In this context, scientists, policy makers, and civil society organisations will have to work together to find ways to slow down population growth while fully respecting democracy, human rights, and cultural integrity.

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Getting wet, clean, and healthy: why households matter

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See Online for appendix

The adverse effects of population growth on progress towards the Millennium Development Goals (MDGs) are largely unquestioned.[1] WHO and UNICEF identify population growth as a major impediment to progress toward MDG target 7c: "To reduce by half, between 1990 and 2015, the proportion of people without access to safe drinking water and basic sanitation".[2] Although evidence suggests that slower population growth enables faster progress for most MDG targets than does rapid growth,[1] this relation is uncertain for drinking water and sanitation. This uncertainty arises because such services provide the greatest benefits and are most often delivered to individual households, rather than through public wells, public latrines, and other resources that are shared by many households.[3] Therefore, number of households is more important than is population.

The average number of people per household (household size) is declining worldwide, resulting in a rapidly growing number of households.[4] Decreasing fertility slows population growth, but was also the main cause of declining household size recorded in Europe and North America in the 20th century.[5] Worldwide, the number of households will roughly triple from 1·3 billion to 3·6 billion between 1990 and 2050, an increase that will far outstrip population growth. In fact, the number of households is projected to be much the same, irrespective of whether the population doubles (UN high variant fertility scenario), increases by more than 70% (medium variant), or increases by 50% (low variant scenario).[6,7]

The number of households will increase in nearly all countries, irrespective of their fertility rate (figure; appendix). For example, France, like most wealthy countries, has near total household-level drinking water and sanitation coverage (ie, piped water and sewerage). Despite population ageing and slow growth, the number of households in France will increase by about 80% between 1990 and 2050.[7,8] The Dominican Republic is a middle-income country that has made progress in provision of water and sanitation and in transitioning from community-level to household-level coverage since 1990.[2] While fertility will decline and population growth will slow in the Dominican Republic in coming decades, household size will decrease more rapidly, resulting in a 280% increase in the number of households between 1990 and 2050.[7,8] Ethiopia is one of many developing countries undergoing population growth and decreasing household size, while also transitioning from community-level to household-level drinking water and sanitation. The number of households in Ethiopia is expected to grow over 300% from 1990 to 2050, diverging from population growth as fertility declines.[7,8]