

## Population Growth, Environment and Food Security: What Does the Future Hold?

The apparent link between unchecked population growth and the unsustainable use of finite resources is not new. What is new, however, is the rate at which these resources are being depleted as human consumption rises. Increased consumption levels (which contribute to environmental and food insecurity) can be determined due to the predictable nature of population growth. Climate change and other environmental problems also ensure that many geographical regions are unable to meet the demand for such resources. To address these problems international collaboration, greater investment in, and application of, technological solutions and even, some argue, checks on population growth, will be required.

### Population Growth

Human population growth is perhaps the most significant cause of the complex problems the world faces; climate change, poverty and resource scarcity complete the list (Foresight, 2009b). By 2050, the world's population will have grown by 2.7 billion to 9 billion. Most of this increase will be in Asia and Africa, which, along with the rest of the globe, will face increased strain on already insufficient resources. Sustained population growth, aggressive economic competition and increased consumption will result in intensive exploitation and pressure on resources (UNEP, 2009; OECD, 2003; DCDC, 2007).

Features of this population growth will include:

#### **Urbanisation**

Most people will live in cities (OECD, 2003). By 2035, 60 percent of the world population will live in urban

areas. Most cities in developing countries already experience difficulties providing basic services such as transport and waste treatment. New urban residents will increasingly inhabit areas that defy nature, such as low-lying coastal regions, and will be at significant environmental risk (DCDC, 2007).

#### **Changing demographics**

Although the global population is currently very young (half of the world's peoples are below 28 years of age), the overall global population is ageing. Most are found in developed countries; however, a third of the developing country population will be aged over 60 by 2050 and by 2050 nearly 80 percent of older people will live in developing countries (Millennium Project, 2008a). Some developing regions and countries, on the other hand, will witness an increasingly young population. Both trends will mean a shrinking working population, significantly altering the

balance between economically-active and -inactive members (DCDC, 2007; OECD, 2003).

#### **Persistent international migration**

The number of people living outside their country of origin is likely to grow to 230 million from the current 175 million by 2050 (DCDC, 2007). Migration will mostly occur between developing countries and will increase in response to environmental pressures, extreme poverty and natural disasters (OECD, 2003).

These factors will be aggravated by the consequences of climate change, environmental changes, uneven distribution of wealth, the effect of disease and the inability of authorities to respond (DCDC, 2007). The availability and flow of energy, food and water will be critical. Resource challenges will intensify in areas where population expansion has the greatest impact, relative to local resources and economic growth.

#### **About this series**

The *Horizon* series is produced by IDS Knowledge Services. *Horizon* highlights emerging issues, synthesises the latest research on development trends and predictive 'futures', and summarises the policy implications. It draws on peer-reviewed research from multiple sources and aims to highlight critical issues confronting development and practice. This first issue of *Horizon* considers the links between population growth, environment and food security from a 'futures' perspective.

Understanding our future, and being able to strategically plan for it, has become a significant area of research. 'Futures' research and horizon scanning extrapolates from trends and historical data, makes probability-based assessments, evaluates alternative scenarios, and makes use of expert opinion, among other methods. The aim is to develop intelligent forecasts and help policymakers cope with uncertainty.

Sub-Saharan Africa's population is likely to grow by 81 percent by 2035, 15 percent of which is likely to be under-nourished (ibid.). Competition for resources of all kinds will intensify and the risk of humanitarian catastrophe will increase, in most vulnerable regions, because of climate change.

### Environment

Population growth and human activity is placing unprecedented and,

intensity of extreme weather events, such as heat waves, droughts, storms and floods (OECD, 2003; Millennium Project, 2008b).

These changes will affect projected food production as some regions will be unable to grow current food staples. Furthermore, fish stocks will diminish or migrate; and there will be increased pressure on water supplies and associated industries (DCDC, 2007).

Climate change is also having an effect. The loss of biodiversity and renewable natural resources reduces stability and resilience, and leads to fragmentation, species loss, and the loss of ecosystem quality. All are vital for economic growth and human well-being.

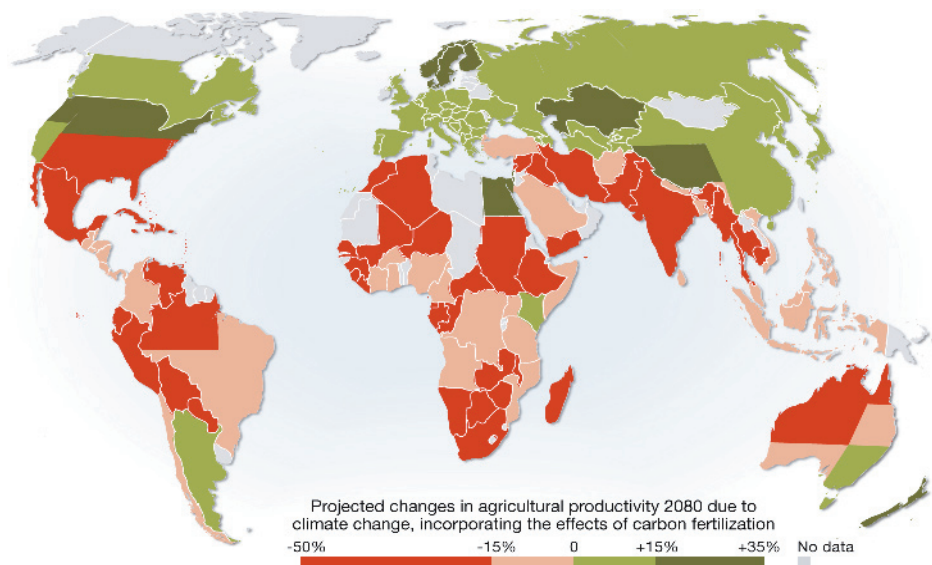
### Food security

Massive population growth, rising incomes and growing consumption of meat are driving the demand for food. Food production has increased substantially over the past century sustained by increasing yields due to irrigation, fertiliser use and expansion into new lands. But there has been little consideration of food energy efficiency or the ability to minimise the loss of energy from food during the harvesting, processing, consuming and recycling stages (UNEP, 2009).

Over the past ten years, however, the production of cereals has stabilised and the establishment of fisheries declined, due to lack of investment. This is despite the need for an estimated 50 percent increase in current food production levels by 2013 to keep up with demand (Millennium Project, 2008a). The effects of population growth, climate change, land degradation, crop and cropland losses to non-food production, water scarcity, desertification, resource-depleting subsistence strategies and urban expansion means food production could be as much as 25 percent less than demand by 2050 (UNEP, 2009). Subsequently, world food prices, which recently reached crisis level, are expected to increase by a further 30 to 50 percent.

Agriculture accounts for 70 percent of human use of fresh water. However, less than half of the world's land is suitable for irrigation and the amount of irrigated land area is falling because of soil erosion, salination, acidification, and nutrient depletion. By 2020, 30 percent of arable land may be salinated and as much as 50 percent by 2050 (Foresight, 2009a).

Genetic and scientific modification of food is likely to be necessary, for human and animal consumption, and for biofuel production (DCDC,



*'Projected agriculture in 2080 due to climate change', UNEP/GRID-Arendal Maps and Graphics Library, 2008. Retrieved 20 April 2009 from <http://maps.grida.no/go/graphic/projected-agriculture-in-2080-due-to-climate-change> © Hugo Ahlenius, UNEP/GRID-Arendal*

some experts argue, unsustainable demands on the natural environment. Increasing demand for natural resources, the intensification of agriculture, the production of hazardous waste, a rapidly growing and globalising economy, and urbanisation, all contribute to environmental degradation (DCDC, 2007). These changes may reduce the fertility of, and access to, arable land, and affect air quality.

### Climate Change

Greenhouse gas emissions are expected to grow by 52 percent by 2050 (Millennium Project, 2008a). Progressive climate change will reduce land for habitation, as some regions experience desertification and others permanent flooding from rising sea levels (DCDC, 2007). Regional weather patterns will be subject to change, with increased frequency and

### Water

Water is increasingly scarce. If current trends continue, 90 percent of freshwater supplies will disappear by 2030 (OECD, 2003). Already, 700 million people face water scarcity. By 2025, this number could grow to 3 billion, with two-thirds of the world's population facing water-shortages (Millennium Project, 2008a; OECD, 2003).

### Energy

World energy demands could double in 20 years. Oil demand is projected to grow nearly 40 percent from 2006 to 2030 (Millennium Project, 2008a).

### Biodiversity

Changes in land-use are affecting biodiversity. Activities include draining wetlands, clearing forests and infrastructure expansion (OECD, 2003; Millennium Project, 2008b).

2007). New agricultural methods such as better rain-fed agriculture and irrigation management, genetic engineering for higher-yielding crops, and precision agriculture and aquaculture should be considered. To reduce the strain on freshwater agriculture and land the viability of saltwater agriculture on coastlines should also be assessed (Millennium Project, 2008a).

## Policy implications

The interrelated nature of environmental problems is clear. Although the world has the resources to address our common challenges, coherence and direction are lacking. Long-term global social conflict seems inevitable without more serious collaborative policies, useful scientific breakthroughs and the adoption of preventive measures:

### Collaborative/International efforts

- Set up a global system for identifying, assessing and managing possible risks and consequences, linked to national and regionally-integrated information systems.
- Develop synergies between the public and private sectors and replicate successful community-scale projects.
- Keep the general public informed

and involved.  
(For detailed recommendations, see [Chapter 6 of OECD, 2003](#))

### Population-specific policies

Donor agencies need to promote family planning, and increase access to family planning commodities. The UN estimates that at least 350 million women worldwide lack access to relatively cheap family planning commodities. Moreover, family planning needs will continue to grow as both population and demand increase. Family planning has declined from 60 percent of all population-related assistance in 1995 to only 6 percent in 2006. The lack of contraceptives contributes to more abortions and unwanted births, which together account for over one-third of all pregnancies in developing countries.

### Environment-specific policies

- Levy environmental taxes on international travel, carbon and urban congestion, and introduce selective water pricing.
- Convert wastelands and products, such as degraded or abandoned farmlands to forest and grasslands, reforest, and undertake the treatment of effluents.
- Research and develop new technologies, such as cost-effective, energy-efficient

buildings, transport and energy supplies.

- Construct eco-friendly dams, pipelines and aqueducts, and import food, rather than pursue inefficient irrigation projects.
- (For detailed recommendations, see [Millennium Project, 2008a](#))

### Food-specific policies

- Regulate the prices of commodities and larger cereal stocks and provide food 'safety nets' – direct and indirect transfers, such as micro-finance, to boost small-scale farming activities.
- Remove subsidies for first generation biofuels to promote a shift to biofuels based on waste.
- Support farmers to develop resilient eco-agricultural systems.
- Reduce trade barriers and improve infrastructure to increase trade and improve market access.
- Promote climate-friendly agricultural production systems and land-use policies.
- Minimise the loss of food energy during harvest, processing and consumption, and through recycling: recycling waste and using fish discards instead of cereal in animal feed could free up food energy for over 3 billion people.

(For detailed recommendations, see [UNEP, 2009](#))

## References

This issue of *Horizon* is based on the following sources. The links below lead to a summary of each document on the Eldis website, from where the full document can be accessed.

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## Adapting to change: experiences from southern Africa

Patricia Masanganise, Agriculture, Natural Resources and Food Security Practice Manager at Khanya-African Institute for Community-Driven Development in South Africa  
[www.khanya-aicdd.org](http://www.khanya-aicdd.org)

More than 60 percent of Africans live in rural areas. Most people rely on land, forests and water for their livelihoods but these resources are increasingly unable to support them. Problems include:

- repeated sub-division of land into units which lack the capacity to support agricultural-based livelihoods
- 'tragedy of the commons': over-grazed, and inadequately managed, communally-owned land

- deforestation and soil erosion, resulting from excessive use of forest resources
- erratic rainfall, which further constrains agriculture's ability to provide adequate livelihoods
- unreliable and ineffective farmer-support services: extension, marketing, credit and institutional policies
- widespread food insecurity due to low agricultural productivity.

These problems are worsened by:

- unequal access to and control of land
- inadequate agricultural knowledge and skills
- lack of agro-industry and manufacturing
- insufficient social services and infrastructure development
- ill health, particularly HIV and AIDS.

In southern Africa, Khanya-aicdd uses sustainable livelihoods and community-driven development approaches to empower smallholder farmers and facilitate community-based planning.

Working with government departments, community-based organisations and non-governmental organisations, we help communities identify sustainable development interventions. This includes promoting:

- appropriate technologies for natural resource management, conservation and agriculture
- access to agricultural inputs and effective service delivery
- improved food security practices
- community development practitioners and farmers' organisations.

## Views and opinions

"It's the great taboo of environmentalism: the size and growth of the human population... Some insist acting to influence population growth infringes on human rights... (however) the methods with the best track records of reducing population growth are respectful of human rights. They include educating girls and women in developing countries to help empower them... to make them aware of alternatives regarding family sizes and family planning."

*Dr John Feeney, environmental writer, writing in BBC Viewpoints*

<http://news.bbc.co.uk/2/hi/science/nature/7865332.stm>

"... the evidence from recent 'peak energy' research... suggests that by the middle of the present century humanity could be faced with a global population of some 9 billion, struggling to maintain... some semblance of modern (first-world) civilization on but one quarter to one third of the oil and gas the world currently produces."

*Professor Ken Smail, Kenyon College, Ohio*

[http://culturechange.org/cms/index.php?option=com\\_content&task=view&id=168&Itemid=1](http://culturechange.org/cms/index.php?option=com_content&task=view&id=168&Itemid=1)

"Our food reserves are at a 50-year low, but by 2030 we need to be producing 50 percent more food. At the same time, we will need 50 percent more energy, and 30 percent more fresh water... a major technological push is needed to develop renewable energy supplies, boost crop yields and better utilise existing water supplies."

*The Guardian interview with Professor John Beddington, the UK government's chief scientist*

[www.guardian.co.uk/science/2009/mar/18/perfect-storm-john-beddington-energy-food-climate](http://www.guardian.co.uk/science/2009/mar/18/perfect-storm-john-beddington-energy-food-climate)

## Have your say

What do you think about the ideas expressed in *Horizon*?

Write, telephone or email us your views and comments:

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