

Global Science Panel on Population & Environment

Population in Sustainable Development

Analyses, Goals, Actions, Realities

In 2001 IIASA, the IUSSP (International Union for the Scientific Study of Population), and the UNU (United Nations University) started a joint initiative to prepare a comprehensive scientific assessment of the role of population in sustainable development strategies, with the aim of producing a science-based policy statement as input to the 2002 Johannesburg World Summit on Sustainable Development. The Global Science Panel comprises over 30 distinguished scientists from various disciplines and comes under the joint patronage of Maurice Strong and Nafis Sadik. It is coordinated by Wolfgang Lutz and Mahendra Shah, and receives financial support from the UNFPA (United Nations Population Fund), the government of Austria, and the MacArthur Foundation. Initial discussions were held at a meeting at NIDI (Netherlands Interdisciplinary Demographic Institute) and at General Conferences organized by the IUSSP and IHDP (International Human Dimensions of Global Environmental Change Program). Drafts were also discussed at two cyber seminars organized by the IUSSP/IHDP Population Environment Research Network (PERN). Full documentation of these seminars can be found at www.populationenvironmentresearch.org.

Panel Members

Patrons:

Maurice F. Strong
Nafis Sadik

Coordinators:

Wolfgang Lutz
Population Project
International Institute for Applied Systems
Analysis
Institute for Demography
Austrian Academy of Sciences
Austria

Mahendra Shah
Land-Use and Land-Cover Change Project
International Institute for Applied Systems
Analysis
Austria

Ex Officio:

Hans J.A. van Ginkel
United Nations Under-Secretary-General
United Nations University
Japan

Jacques Vallin
International Union for the Scientific Study of
Population
Institut National d'Etudes Démographiques
France

Arne Jernelöv
International Institute for Applied Systems
Analysis
Austria

Members:

Alaka M. Basu
Harvard Center for Population and Development
Studies
Harvard University
USA

Richard E. Bilson
Carolina Population Center
University of North Carolina—Chapel Hill
USA

John Bongaarts
Research Division
The Population Council
USA

Partha DasGupta
Faculty of Economics
Cambridge University
UK

Barbara Entwisle
Dept. of Sociology
University of North Carolina—Chapel Hill
USA

Günther Fischer
Land-Use and Land-Cover Change Project
International Institute for Applied Systems
Analysis
Austria

Brigida Garcia
El Colegio De Mexico
Mexico

Daniel J. Hogan
Cidade Universitaria "Zeferino Vaz" Campinas
Brazil

Zhenghua Jiang
People's Congress of China
People's Republic of China

Robert W. Kates
Independent Scholar
USA

Sanjaya Lall
Queen Elizabeth House
Oxford University
UK

Landis MacKellar
Social Security Reform Project
International Institute for Applied Systems
Analysis
Austria

P.K. Makinwa-Adebusoye
Nigeria Institute of Social and Economic
Research
Nigeria

Anthony J. McMichael
National Centre for Epidemiology & Population
Health
The Australian National University
Australia

Vinod Mishra
East-West Center
University of Hawaii
USA

Norman Myers
Consultant in Environment & Development
Oxford University
UK

Nebojsa Nakicenovic
Transitions to New Technologies Project
International Institute for Applied Systems
Analysis
Austria

Sten Nilsson
Forestry Project
International Institute for Applied Systems
Analysis
Austria

Brian C. O'Neill
Population Project
International Institute for Applied Systems
Analysis
Austria

Peng Xizhe
Institute of Population Research
Fudan University
People's Republic of China

Harriet B. Presser
Dept. of Sociology
University of Maryland—College Park
USA

Warren Sanderson
Depts. of Economics and History
State University of New York—Stony Brook
USA

Gita Sen
Indian Institute of Management
India

Barbara Torrey
Population Reference Bureau
USA

Dirk van de Kaa
Netherlands

Meryl Williams
ICLARM—The World Fish Center
Malaysia

Brenda Yeoh
Asian MetaCentre for Population & Sustainable
Development Analysis
Centre for Advanced Studies
Faculty of Arts & Social Sciences
National University of Singapore
Singapore

Huda Zurayk
Faculty of Health Sciences
American University of Beirut
Lebanon

Cover based on a design by Anka James
DTP by Marie Tweed

Additional research by Isolde Prommer and
Koko Warner

Edited by Brian O'Neill
Printed by Remaprint, Vienna

Introduction

The human population matters for sustainable development in two critical ways. First, it is an agent of change, inducing many of the environmental, economic, and social changes in the world that give rise to our concern about the sustainability of our current development paths. Second, the human population and its living conditions are the ultimate objects of development, with long-term human health, well-being, and survival serving as criteria for judging whether development is sustainable or not. It is the human population and its individual members that ultimately will suffer the consequences of unsustainable paths of development.

For these reasons, the systemic integration of population in sustainable development is essential if we are to meet the needs of present generations without sacrificing the livelihoods of future generations. The scientific, knowledge-based assessment needed for such integration requires an interdisciplinary analysis of the interrelationships of population and society, environment and natural resources, and economics and governance institutions.

Ten years ago at the Earth Summit in Rio de Janeiro, the world community of nations adopted and made a commitment to Agenda 21, a common framework for action toward sustainable development. Eradicating poverty and ensuring access to basic human needs such as food, water, energy, health care and services, safe shelter and security, and

education and knowledge empowerment are fundamental, both now and in the future, to achieving sustainable development. These issues have been on the international political and development agenda for over three decades. At conference after conference bringing together politicians and decision makers, goals have been set to improve human well-being and conserve nature and the environment. The dawn of the 21st century is an era of unprecedented economic growth and technological change, and yet it is a time when over one-fifth of humanity exists in demoralizing poverty and suffering.

In September 2000, political leaders from around the world took an unprecedented step toward deciding time-bound target dates for a global partnership to resolve the major issues of our time, including poverty and hunger, the lack of universal access to primary education, gender inequality, child mortality, poor maternal health, diseases including HIV/AIDS and malaria, and unsustainable use of natural resources and environmental degradation. Turning these goals into concrete actions is the central challenge of achieving sustainable development in the 21st century and beyond.

This report presents the results of a joint initiative by the International Institute for Applied Systems Analysis (IIASA), the International Union for the Scientific Study of Population (IUSSP), and the United Nations University (UNU). This initiative, the



Mahendra Shah and Wolfgang Lutz briefing the WSSD PrepCom III Event.

Global Science Panel, has brought together some 30 distinguished scientists from around the world working in various disciplines to prepare a comprehensive scientific assessment of the role of population in sustainable development, in the form of a science-based policy statement as input to the 2002 Johannesburg World Summit on Sustainable Development.

This report also highlights the decisions made and goals set at various international conferences over the past three decades and presents a graphical assessment of the progress, or lack thereof, in selected aspects of the major issues of population, education, health, poverty, and hunger that are at the core of achieving sustainable development. This analysis highlights the need to move from rhetoric and political goals to real action for sustainable development—an imperative at the Johannesburg World Summit on Sustainable Development in August 2002.

Wolfgang Lutz
Mahendra Shah
GSP Coordinators

Population in Sustainable Development

If we do not put the human population at the core of the sustainable development agenda, our efforts to improve human well-being and preserve the quality of the environment will fail. The Johannesburg Summit must heed the first principle of the 1992 Rio Declaration—that “human beings are at the centre of concern for sustainable development”—by taking full account of how population and society interact with the natural environment.

Sustainable development aims at improving human well-being, particularly by alleviating poverty, increasing gender equality, and improving health, human resources, and stewardship of the natural environment. Because demographic factors are closely linked to these goals, strategies that consider population have a better chance of success.

The International Conference on Population and Development in Cairo in 1994 recognized that population policy should be oriented toward improving social conditions and expanding choices for individuals. The key recognition was that focusing on people—their rights, capabil-

ities, and opportunities—would have multiple benefits for individuals, for society, and for their sustainable relationship with the environment.

Hence in Johannesburg, consideration of sustainable development policies must include population growth and distribution, mobility, differential vulnerability, and the empowerment of the people, especially women.

A demographically diverse world

We live in a world of unprecedented demographic change. Global population increased by 2 billion during the last quarter of the 20th century, reaching 6 billion in 2000. Despite declining fertility rates, population is expected to increase by another 2 billion during the first decades of the 21st century. Nearly all of this growth will occur in developing countries and will be concentrated among the poorest communities and in urban areas.

We also live in a world of unprecedented demographic diversity. Traditional demographic groupings of countries are breaking down. Over the next 25 years increases in population in sub-Saharan Africa, South Asia, and the Middle East are expected to be larger than in the past quarter century, and growth in North America will be substantial as well. In contrast, in most European countries and in East Asia, population growth has slowed or stopped, and rapid population aging has become a serious concern. Mortality also varies widely across regions, with the burden of infectious disease, including HIV/AIDS, being particu-

larly heavy in Africa. In addition, levels of mobility, urbanization, and education differ substantially among and within regions, affecting economic and health outlooks.

This diversity presents different challenges requiring differentiated responses. The most urgent of these occur where rapid population growth, high levels of poverty, and environmental degradation coincide.

Population matters to development and environment

Research has shown that changes in population growth, age structure, and spatial distribution interact closely with the environment and with development. Rapid population growth has exacerbated freshwater depletion, climate change, biodiversity loss, depletion of fisheries and other coastal resources, and degradation of agricultural lands. Fertility decline in high-fertility countries, by slowing population growth, can make many environmental problems easier to solve. It can also have important economic benefits by reducing the number of children relative to the working-age population, and creating a unique opportunity to increase investments in health, education, infrastructure, and environmental protection.

In high-income countries, the environmental impact of population growth and distribution must be considered jointly with high consumption rates. Even in countries where little growth is envisioned, unsustainable patterns of consumption have global implications for the environment and human well-being, and





must be addressed with appropriate policies.

Before the end of this decade, the majority of the world's population will live in urban areas. Urbanization can improve people's access to education, health, and other services. But it also creates environmental health hazards, such as water and air pollution, and by increasing consumption levels, it can have environmental impacts in distant rural areas as well.

The mobility and spatial distribution of populations, especially at local and regional scales, are a significant determinant of sustainability. Where the population lives and works relative to the location of natural resources affects environmental quality. The expansion of the agricultural frontier and other human activity is encroaching on fragile ecosystems in many parts of the world.

Policy must account for differential vulnerability within populations

Deteriorating environmental conditions and extreme events do not affect all countries, populations, or households in the same way. Even within a household, the effects may differ by age and gender. Consideration of vulnerability must therefore focus not only on countries but also on the most vulnerable segments of the population within countries.

Many factors contribute to vulnerability, including poverty, poor health, low levels of education, gender inequality, lack of access to resources and services, and unfavorable geographic location. Populations that are socially disadvantaged or lack political voice are also at greater risk. Particularly vulnerable populations include the poorest, least empowered segments, especially women and children. Vulnerable populations have limited capacity to protect themselves from current and future environmental hazards, such as polluted air and water and catastrophes, and the adverse consequences of large-scale environmental change, such as land degradation, biodiversity loss, and climate change.

Vulnerability can be reduced by promoting empowerment, investing in human resources, and fostering participation in public affairs and decision-making.

Empowerment through education and reproductive health benefits people and the environment

Two policies have multiple benefits for individual welfare, for social and economic development, and for the environment. One is investment in voluntary family planning and reproductive health programs. Since research has shown that many women in high-fertility countries have more children than they actually want, these programs allow couples to have the number of children they desire, thus reducing unwanted childbearing and lowering fertility rates. Lower fertility leads to slower population growth, allowing more time for coping with the adverse effects of that growth, and easing stress on the environment.

The other top policy priority is education. Education enhances

For more information about the Global Science Panel, see www.iiasa.ac.at/gsp/

individual choice, fosters women's empowerment, and improves gender equality. Better-educated people are in better health, and often contribute to greater environmental awareness. The increased economic productivity and technological advance that education induces can lead to less pollution-intensive production. It may also reduce vulnerability to environmental change by facilitating access to information and the means to protect oneself. Furthermore, in countries with rapid population growth, the fertility-depressing effect of education contributes to reducing the scale of human impact on the environment.

These two policies—education and reproductive health programs—are in high demand by individuals almost universally because their multiple benefits are clear. They also empower individuals to make informed choices. Efforts to achieve sustainable development should give them the highest priority.

Strengthening interdisciplinary training and research

To facilitate the joint consideration of population, development, and environment, more interdisciplinary research and education addressing these topics is necessary at all levels. The different disciplines should also conduct their studies in ways that make the results mutually accessible. Training about the nature of these interactions is a priority issue for the policy-making community, media, and scientists.

Note: This statement on Population in Sustainable Development reflects the views of the Global Science Panel and does not necessarily reflect those of the institutions that have co-sponsored the process leading to this statement.

Global Science Panel Meeting Highlights

In March 2002, members of the Global Science Panel on Population and Environment along with additional outside experts met at the International Institute for Applied Systems Analysis in Austria to finalize the Statement on Population in Sustainable Development. Discussions took into consideration feedback from a series of international meetings and online seminars held over the previous months.

Papers were presented on a range of topics to inform the process, including case studies of population–environment interactions in specific contexts. Highlights from those papers are summarized here, focusing on education, vulnerability and the urban poor, and migration and land use.

Education

Education is valued for its own sake as an important part of becoming a complete person and a full member of society. Extensive research attests to the importance of education to health, fertility, poverty reduction, and other aspects of well-being, as well as to economic growth at the national level.

Education improves health in many ways:

- Better nutritional knowledge
- Greater likelihood of demanding and using health services
- Better knowledge of disease transmission prevention

- Female education makes mothers more effective health care providers for their children

Education also tends to lead to lower fertility:

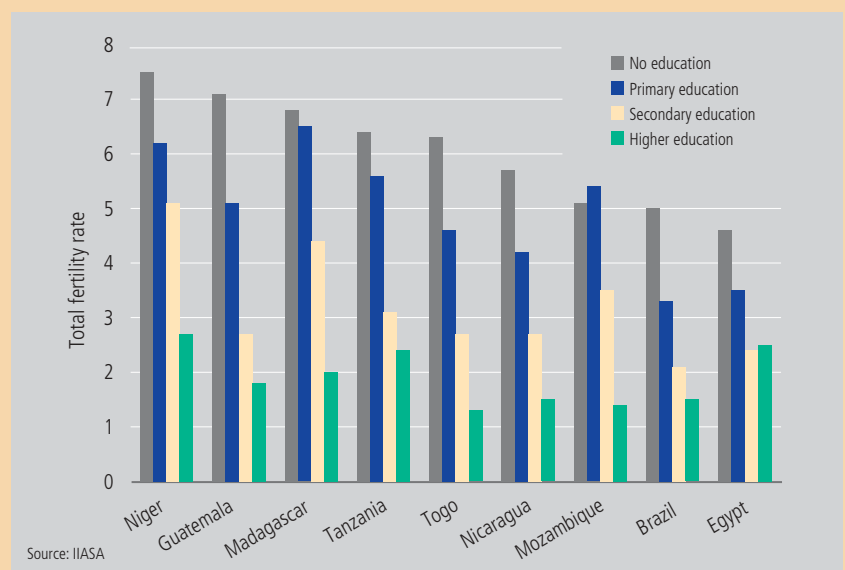
- Changes in aspirations and new opportunities for work outside the home
- Better understanding of contraceptive use
- Delay in marriage, decline in number of children desired
- More effective planning of child-bearing

Primary education has been found to be especially important: it provides basic abilities and is the entry point to higher levels of education. Furthermore, it makes important contributions to economic growth, particularly in agriculture.

However, secondary and tertiary education are now seen to be of growing importance in some countries because of skill shortages and the lack of administrative/management capacity. It is not low-cost labor but low-cost *skilled* labor that gives the edge in much of international competitiveness today.

Fertility by education in selected countries

Education is an important goal in its own right. Additionally, since women with higher levels of education tend to have fewer children, improving education will lead to lower fertility.



Vulnerability and the urban poor

Social and economic conditions predispose some individuals or groups to greater susceptibility to environmental hazards. The urban poor are particularly vulnerable to a number of stresses that contribute to poor health, including environmental hazards arising from poor air and water quality. Cities can be among the most health threatening of all human environments as disease-causing agents and disease vectors multiply, as the large concentration of people living in close proximity to one another increases the risk of disease transmission, and as health care systems become unable to respond rapidly and effectively. Poverty contributes to vulnerability in many ways:

- Riskier and more hazardous jobs
- Lower-quality housing that offers little protection against environmental hazards
- Unfavorable locations of homes
- Lack of provision of public services
- Lack of assets to cope with illness or injury
- Airborne infections are aided by the overcrowding and inadequate ventilation that is common in housing used by low-income groups.
- Indoor air pollution from open fires or inefficient stoves, often considered a rural issue, is known to be a serious problem in particular cities.

The urban poor experience a wide variety of health problems, which are not only a burden themselves but are also a major contributor to poverty:

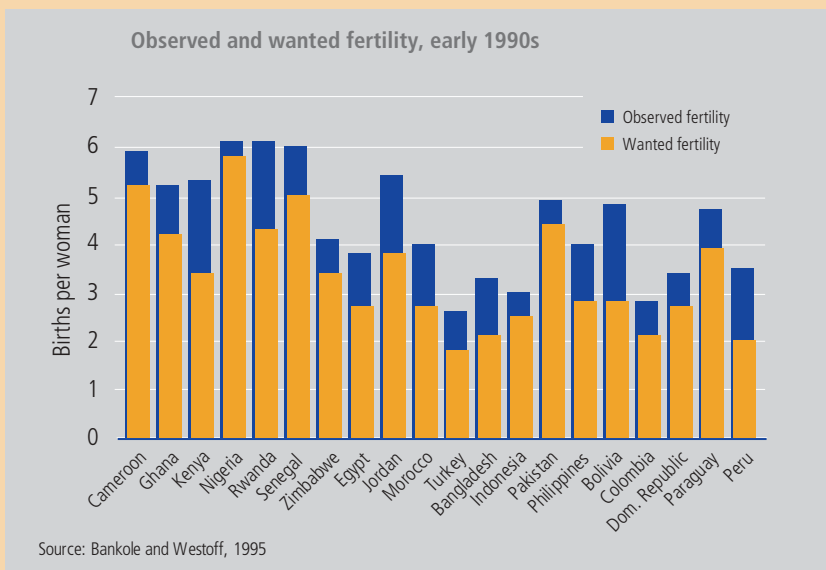
- Close to half the urban population in developing countries suffers from one or more of the main diseases associated with inadequate provision of water and sanitation, including insect-borne diseases such as malaria, dengue fever, or filariasis.

Public policy has successfully addressed such problems in some cases. In Porto Alegre, Brazil, virtually the entire population has piped water and regular garbage collection, and most have good provision for sanitation. The city's inhabitants have an average life expectancy of 74 years; infant mortality rates are below 20 per 1000 live births. However, there are hundreds of urban centers where only a small proportion of the population has piped water and adequate provision for sanitation, and where the urban authorities have very little capacity to address any environmental problems. For example, in Lagos, Nigeria, most residents survive under conditions of extreme poverty, with about 75 percent of households located in slums or in substandard housing.

The combination of the fast pace of urbanization and increasing poverty is putting enormous pressure on available physical and social infrastructure and public services, and straining the capacity of local and state governments to provide even the most basic services such as water, electricity, housing, urban transport, and sewerage. About 1 in 30 households in Lagos has refuse-disposal facilities, about 1 in 10 has toilet facilities, and 1 in 8 has piped water. Lagos is unable to manage an efficient solid-waste system, and an acute housing shortage has forced poor people to move to unplanned shanties and blighted areas on the urban periphery and along waterfronts.

Observed versus wanted fertility in selected countries

Women in many countries have more children than they desire. Investments in voluntary family planning and reproductive health programs can help couples achieve their childbearing goals and will also lead to lower fertility.



Migration and land use in Ecuador

The Amazon lowlands in Ecuador, along with those east of the Andes in southern Colombia and Peru, are one of the world's 11 "hot spots" of high biodiversity. Much of this extraordinary region in Ecuador is suffering rapid deforestation following the large influx of people—mainly from low-income, land-scarce rural areas—after it was opened up by roads built by petroleum companies to lay pipelines and extract oil. Almost half the region's population was born elsewhere. As a result of this high migration combined with high fertility, the population of the region has grown at over double the national rate during the past few decades.

Research confirms that population growth in the region is an important contributor to deforestation. However, it also demonstrates that the story is not a simple one. Many other factors matter as well:

- Land tenure is potentially important, since more secure titles tend to lead to more sustainable forms of land use, which may mean less

The complete text of the background papers is available online at <http://www.iiasa.ac.at/gsp>.

land clearing. Having a title is also related to access to credit, since credit usually requires collateral. Therefore, national policies that affect the size and tenure status of plots and the provision of credit can impact land use.

- Technical assistance affects land clearing and land use but has been drastically cut over the past decade, leading to a decline in, for example, the promotion of new seed varieties, which can affect crop choice and land clearing.
- Access to markets is also a key factor in land use. Road infrastructure has improved, cutting the average walking distance from the farm to the road by half over the past decade and reducing the distance to the nearest markets. These changes facilitate travel to markets for selling crops and purchasing food, and have a strong effect on land clear-

ing, land use, agricultural production, and farm incomes.

- The background of the head of the household may affect land use, including place of origin and previous agricultural experience.
- The size of the plot is fundamental, larger plots being harder to clear.
- Finally, natural resource endowments affect land use. Soil quality varies widely in the area, as does topography. Flatter land and better soils are expected to lead to more intensive land use.

These factors interact in ways that make the causes of deforestation in Ecuador different from those in many other Latin American countries, where forest loss often results from a switch from relatively intensive forms of land uses such as crops to extensive forms of land use such as cattle raising. In the Amazon region of Ecuador, cattle raising has declined over time, apparently owing to the process of plot fragmentation that has eventually made many farms too small to support such land-intensive activity. Heads of households subdivide their plots for various reasons, including selling portions for cash, giving away part as an early inheritance for children, lending parcels to recently immigrated family members looking for land, and renting out parcels to seek additional income through rent. The change in plot size—driven in part by population growth—has been associated with a change in labor patterns. Whereas initially households with mainly large plots hire outside labor, after subdivision many households with smaller plots work off the farm, a shift in activity that affects overall rates of forest loss.

Thus, although the overall pattern of increasing cultivated area at the expense of forest cover is driven in part by population growth,



changes in land use are driven by a complex mix of factors related to individuals, households, institutions, and policies. A number of policy responses are possible. There is a large unmet demand for

family planning in the Amazon among settler women; meeting this need would result in lower fertility. Levels of education are improving but are still low. In addition, policies could be di-

rected at the root causes of migration to the Amazon, including rural poverty, extreme inequality of land distribution, and, therefore, lack of access to land for the vast majority of the rural population.

Early investment in human capital formation and the status of women pays:

The success stories of Finland and Mauritius

During the 19th century, Finland was one of the poorest regions in Europe. It had no natural resources except for wood, which grew more slowly than farther south on the continent. During the late 1860s, Finland experienced a major famine that killed more than 10 percent of the total population and more than half of all infants. This was probably the last major “natural” famine in Europe. Unusually cold weather conditions had resulted in almost complete crop failure and vulnerability to diseases. Other northern European countries managed to cope better with these weather conditions than did Finland.

Today, Finland is one of the world’s leading industrialized countries and, according to a recent United Nations study, it has the world’s most competitive economy. What caused it to change from being one of Europe’s most backward regions to a model of efficiency, competitiveness, and human well-being? One thing that distinguishes Finland from many other European countries is that it was one of the first countries in the world to reach universal literacy of its population. This is mostly due to the efforts of the Lutheran Church of Finland, which put a lot of emphasis on improving the literacy skills of the rural population and at some stage even made it impossible for young people to marry unless they could read. After New Zealand, Finland was the second country in the world to grant women the right to vote. Subse-

quently, massive efforts in the secondary education of women were made, and already by the 1970s more girls than boys had passed the matriculation examinations in Finland. Although there have been other economic and political reasons for the recent impressive performance of the Finnish economy, there is little doubt that these strong early investments in human capital formation and the status of women were among the decisive factors.

The Indian Ocean island of Mauritius started its demographic transition almost a century later than Finland. Up to the 1940s, birth and death rates on Mauritius were very high and resembled the pattern typical of pre-modern societies, with high annual fluctuations. After the end of World War II, however, mortality started a precipitous decline owing to the eradication of malaria and the spread of modern medicine, with antibiotics playing a major role. Birth rates continued to stay at a high level, or even increased, owing to the better health status of women. Hence, during the 1950s Mauritius experienced population growth rates of more than 3 percent per year and was frequently used as a textbook case of an island stuck in the vicious circle of poverty and high population growth, each assumed to reinforce the other. But during the 1960s the government started a strong but strictly voluntary family planning program in which even the influential Roman Catholic Church coop-

erated with the government by advocating “natural” contraceptive methods together with the need for smaller families. From 1963 to 1973, fertility rates on Mauritius declined from more than six children per woman to about three, one of the world’s most rapid national fertility declines. Why were these family planning efforts on Mauritius so successful while similar efforts in other parts of the world showed little success during that time? Again, the answer can be found in the almost universal literacy of young women in Mauritius, a result of early investments in human capital formation even under conditions of extreme poverty. Already by 1962, more than 80 percent of all young women could read and write, a factor that both brought down desired family size and increased access to family planning. Subsequently, Mauritius experienced something that later was called the “demographic bonus” in Southeast Asia and Korea; namely, a decline in youth dependency with still very low old age dependency, resulting in a period of economic growth and investment in infrastructures. In Mauritius the young and educated women postponing their childbirths clearly were a major factor in facilitating the rapid expansion of the textile industry. Today, the former textbook example of a country stuck in poverty is leading the African region in terms of quality-of-life indicators and is already being compared to the Asian tigers.

Population Size and Structure

Key determinants of population size and structure are fertility, life expectancy, and migration. In the conferences from the 1970s to the late 1990s, the center of concern shifted from population growth as a threat to environmental and socioeconomic development to poverty and social and gender inequality between and within nations.

Third World Conference on Women (Nairobi, 1985)

“In a general manner, an improvement in the situation of women could bring about a reduction in mortality and morbidity as well as better regulation of fertility and hence of population growth, which would be beneficial for the environment and, ultimately, for women, children and men.”

United Nations Conference on Environment and Development (Rio de Janeiro, 1992)

“Human beings are at the centre of concerns for sustainable development.”

“Demographic trends and factors and sustainable development have a synergistic relationship.”

Policies should “combine environmental concerns and population issues within a holistic view of development...”

United Nations World Population Conference (Bucharest, 1974)

The World Population Plan of Action deemed as important “The interrelations of population trends and conditions and other social and economic variables, in particular the availability of human resources, food and natural resources, the quality of the environment, the need for health, education, employment, welfare, housing and other social services and amenities, promotion of human rights, the enhancement of the status of women, the need for social security, political stability, discrimination and political freedom...”

International Conference on Population (Mexico, 1984)

“Population trends must be co-ordinated with trends of economic and social development.”

Of “primary concern” are the following challenges and problems: “The annual increments in population, which are projected to grow larger throughout the decade;...The rate of population growth...; Changes in population structure,...aging...,and the growth of the working-age populations in developing countries...; The persistence of fertility rates substantially higher or lower than those desired...; The disequilibrium between rates of change in population and changes in resources, environment and development...”

United Nations International Conference on Population and Development (Cairo, 1994)

“Efforts to slow down population growth, to reduce poverty, to achieve economic progress, to improve environmental protection, and to reduce unsustainable consumption and production patterns are mutually reinforcing.”

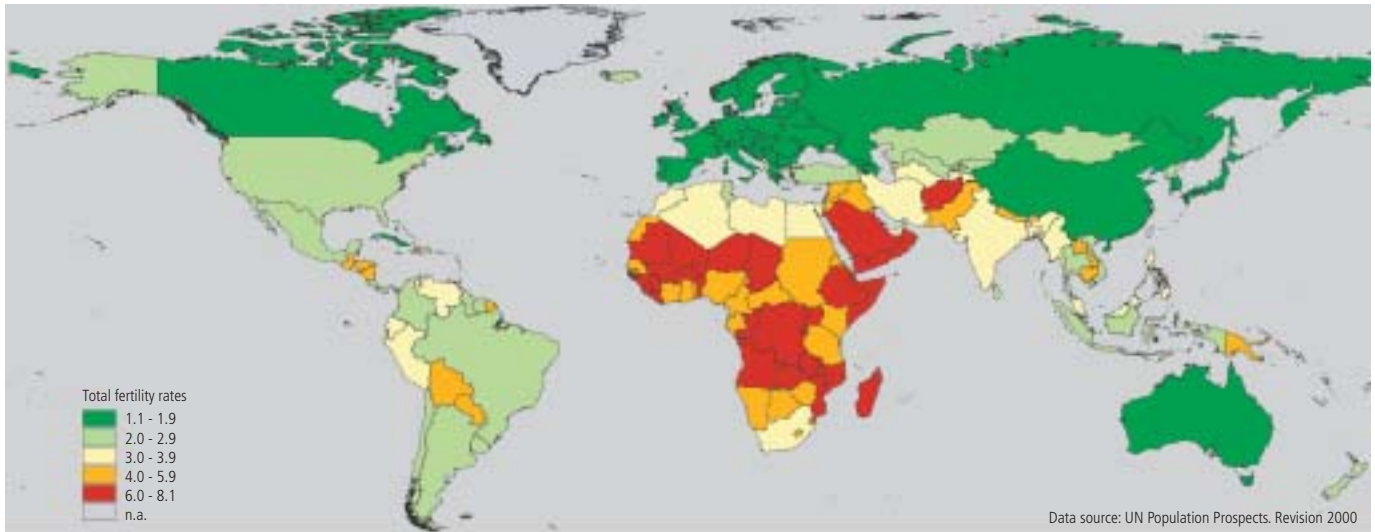
Facilitating the demographic transition “will contribute to the stabilization of the world population, and, together with changes in unsustainable patterns of production and consumption, to sustainable development and economic growth.”

“Countries that have not completed their demographic transition should take effective steps in this regard within the context of their social and economic development and with full respect of human rights. These steps include ... universal access to quality primary education and primary health care, including reproductive health and family-planning services, and educational strategies regarding responsible parenthood and sexual education.”

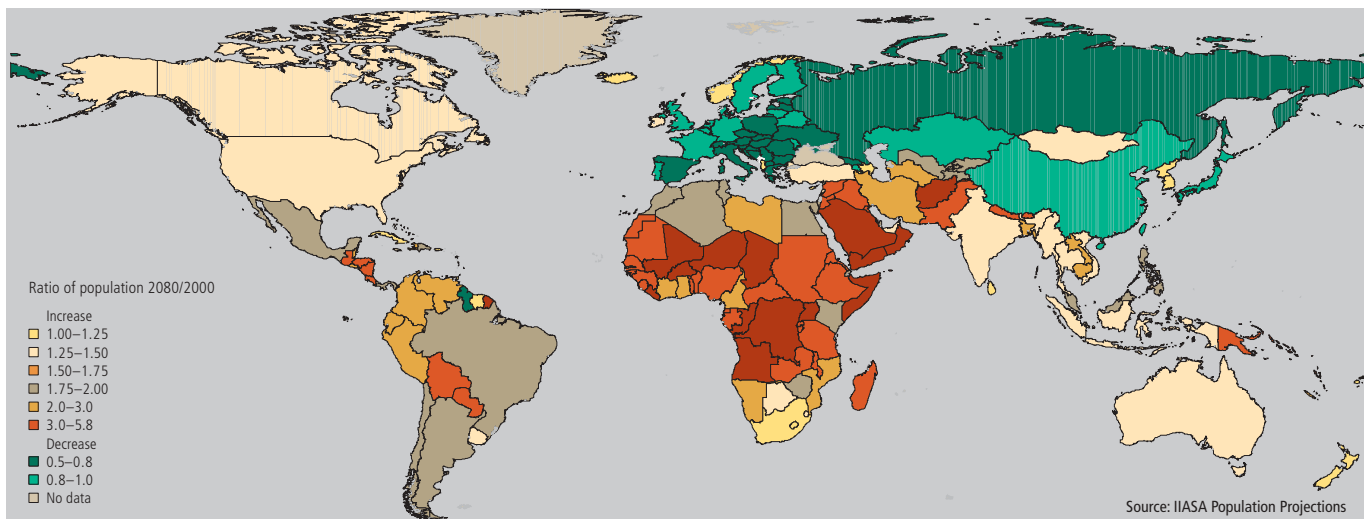
Second United Nations Conference on Human Settlement (Habitat II) (Istanbul, 1996)

“The quality of life and the activities of all human beings within human settlements are closely interrelated with population change, demographic patterns, including growth, structure and distribution of population, and development variables such as education, health and nutrition, the levels of use of natural resources, the state of the environment and the pace and quality of economic and social development.”

Total fertility rates, 1995 – 2000

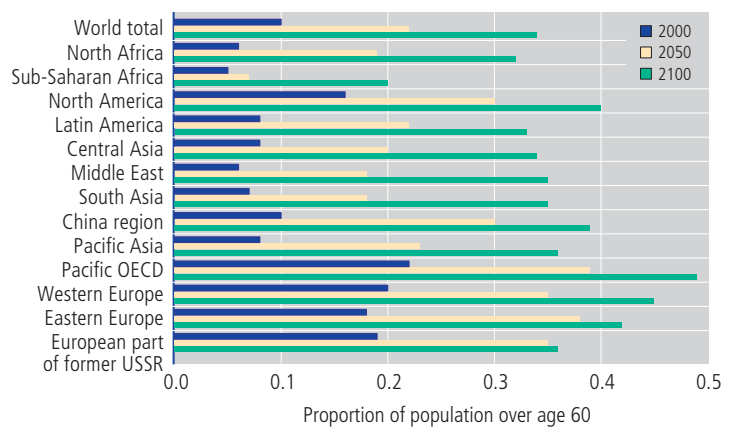
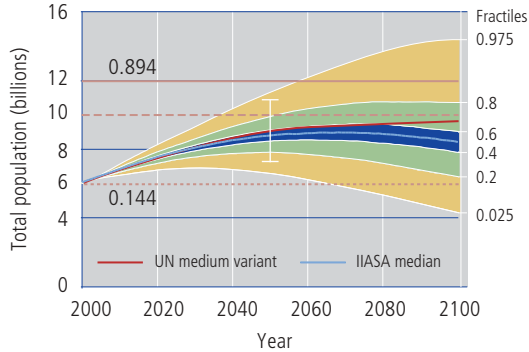


Expected population growth and decline between 2000 and 2080



Projected population growth and aging

Uncertainty distribution of IIASA's world population projections. Blue line gives median of IIASA projections; red line gives medium variant of the UN's 1998 long-term projections.



Education For All

UNESCO's 1960 Convention Against Discrimination in Education states that "every person has the right to education" and asserts the "principle of non-discrimination." Many conferences have underlined the central role of education as a key to sustainable development, the fulfillment of fundamental human rights, and the improvement of living standards.

Universal access to primary school and basic education

World Conference on Education for All (Jomtien, 1990)

Countries should aim for "Universal access to, and completion of, primary education (or whatever higher level of education is considered as 'basic') by the year 2000..."

United Nations International Conference on Population and Development (Cairo, 1994)

"All countries should further strive to ensure the complete access to primary school or an equivalent level of education by both girls and boys as quickly as possible, and in any case before the year 2015."

World Summit for Social Development (Copenhagen, 1995)

"By the year 2000, universal access to basic education and completion of primary education by at least 80 per cent of primary school-age children;...universal primary education in all countries before the year 2015."

Reduction of adult illiteracy

Third World Conference on Women (Nairobi, 1985)

"By the year 2000, illiteracy should have been eliminated..."

World Conference on Education for All (Jomtien, 1990)

Countries should aim for a "Reduction of the adult illiteracy rate... to, say, one-half its 1990 level by the year 2000..."

World Education Forum (Dakar, 2000)

Countries should aim to achieve "a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults..."

Closing the gender gap in education

United Nations Fourth World Conference on Women (FWCW) (Beijing, 1995)

"[C]lose the gender gap in primary and secondary school education by the year 2005.... Provide universal access to, and seek to ensure gender equality in the completion of, primary education for girls by the year 2000; Eliminate the gender gap in basic and functional literacy..."

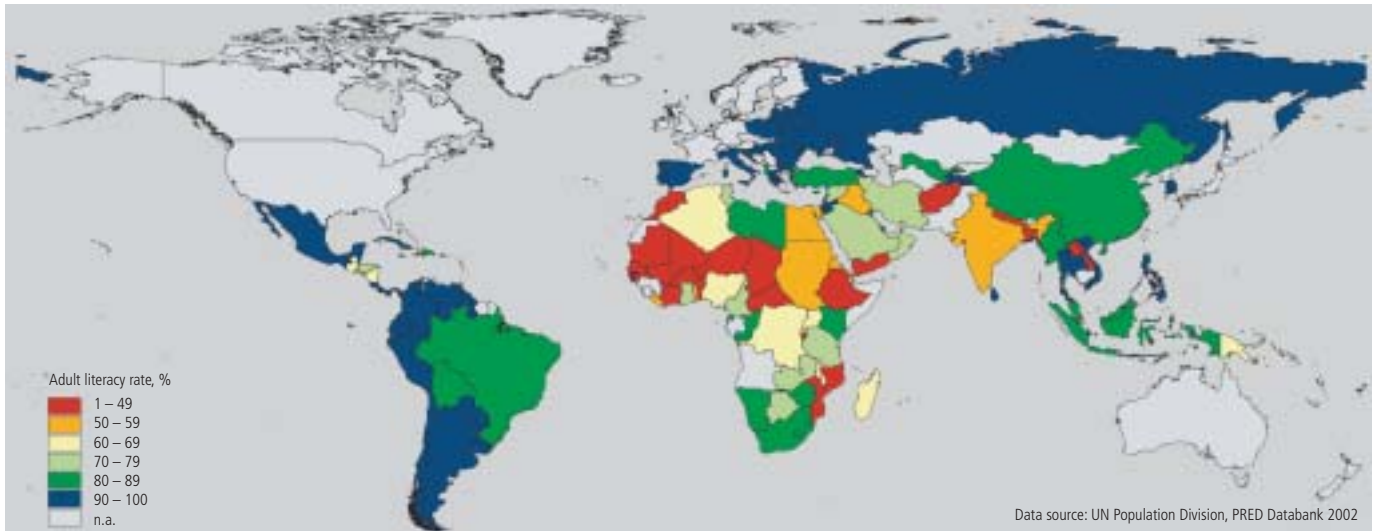
World Education Forum (Dakar, 2000)

Goals include "eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality..."

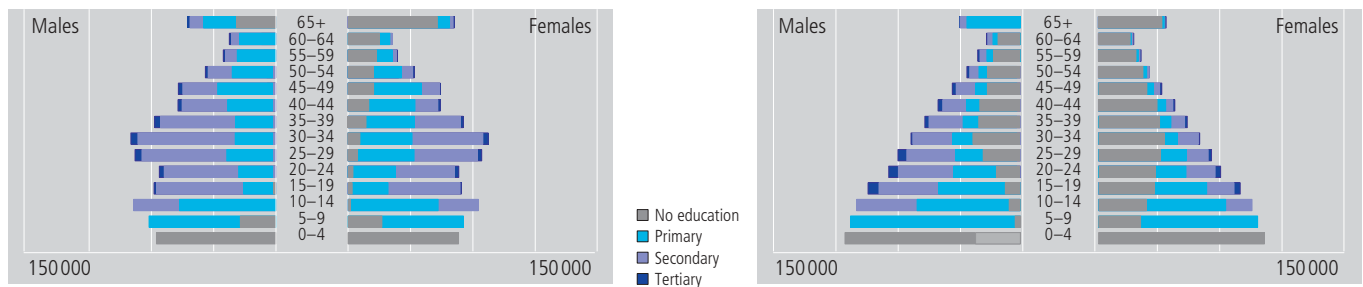
Millennium Summit (New York, 2000)

"Eliminate gender disparity in primary and secondary education preferably by 2005, and to all levels of education no later than 2015..."

Adult literacy rate, both sexes, 2000

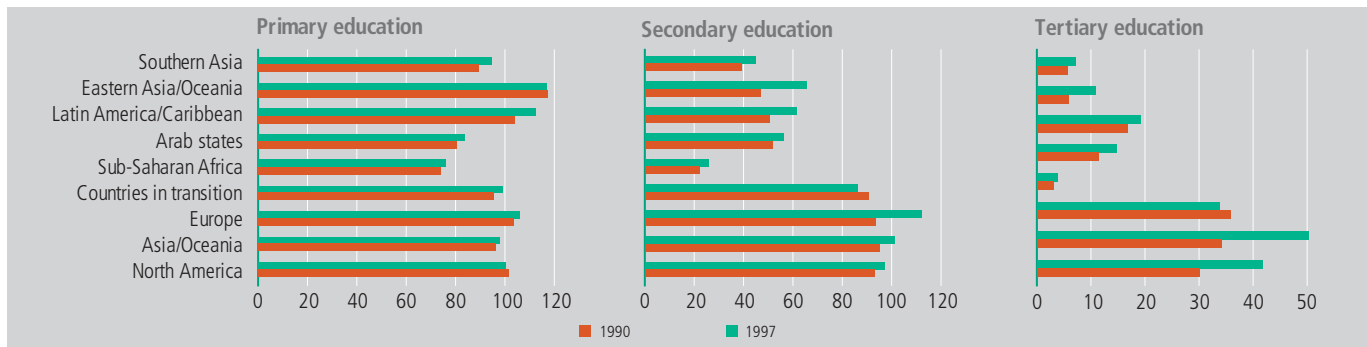


Gender gap in education



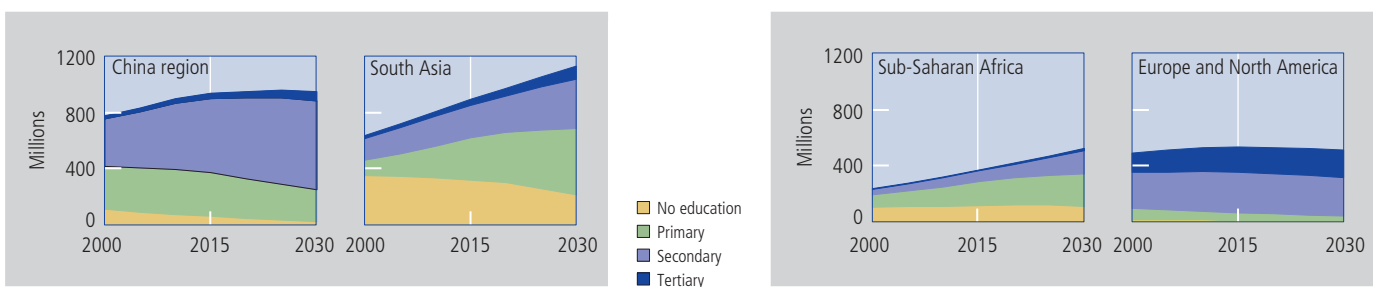
Age and education pyramids for (left) the China region and (right) South Asia in 2000. Source: IIASA

Gross enrolment ratio,* in percent



*Total enrolment in primary education, regardless of age, divided by the population of the age group which officially corresponds to primary schooling. Source: UNESCO

Education projections



Projected population aged 20 to 64, millions, by level of education if education goals set at the International Conference on Population and Development (1994) are met. Source: IIASA

Health

Reduction of child and maternal mortality rates

United Nations World Population Conference (Bucharest, 1974)

“Countries with the highest mortality levels should aim by 1985 to have...an infant mortality rate of less than 120 per thousand live births.”

International Conference on Population (Mexico, 1984)

“Countries with higher mortality levels should aim to achieve...an infant mortality rate of less than 50 per 1,000 live births by the year 2000...” and “to reduce maternal mortality by at least 50 per cent by the year 2000, where such mortality is very high...”

Millennium Summit (New York, 2000)

Goals include reducing “by two thirds, between 1990 and 2015, the under-five mortality rate” and “By the year 2015, to have reduced maternal mortality by three quarters, and under-five child mortality by two thirds of their current rates...”

Communicable diseases

United Nations Conference on Environment and Development (Rio de Janeiro, 1992)

Countries should aim, by the year 2000, “To institute anti-malaria programmes in all countries where malaria presents a significant health problem and maintain the transmission-free status of areas freed from endemic malaria”

Millennium Summit (New York, 2000)

Goals include to have “halted by 2015 and begun to reverse the incidence of malaria and other major diseases...”

Primary and reproductive health care

United Nations Conference on Environment and Development (Rio de Janeiro, 1992)

“The global objective is to achieve a 10 to 40 per cent improvement in health indicators by the year 2000.... These include the development of quantitative objectives for infant mortality, maternal mortality, percentage of low birth weight newborns and specific indicators (e.g. tuberculosis as an indicator of crowded housing, diarrhoeal diseases as indicators of inadequate water and sanitation...)”

United Nations International Conference on Population and Development (Cairo, 1994)

“All countries should make access to basic health care and health promotion the central strategies for reducing mortality and morbidity.”

“All countries should take steps to meet the family-planning needs of their populations as soon as possible and should, in all cases by the year 2015, seek to provide universal access to a full range of safe and reliable family-planning methods and to related reproductive health services...”

World Summit for Social Development (Copenhagen, 1995)

“By the year 2000, attainment by all peoples of the world of a level of health that will permit them to lead a socially and economically productive life, and to this end, ensuring primary health care for all...”

Life expectancy at birth

United Nations World Population Conference (Bucharest, 1974)

“Countries with the highest mortality levels should aim by 1985 to have an expectation of life at birth of at least 50 years...”

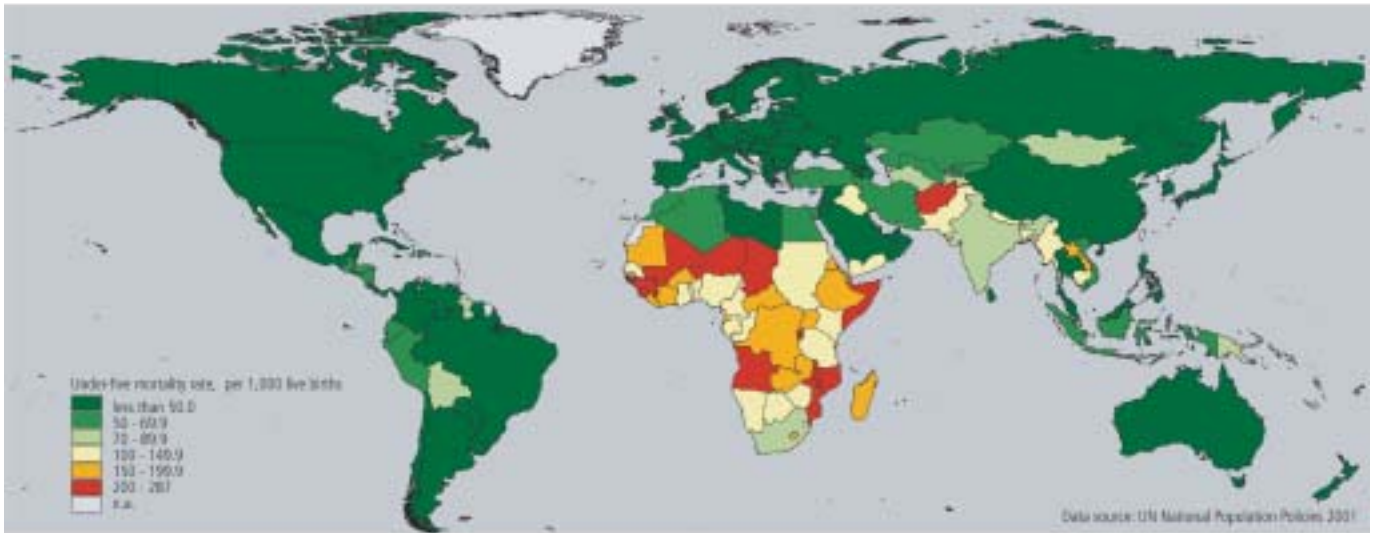
International Conference on Population (Mexico, 1984)

“Countries with higher mortality levels should aim for a life expectancy at birth of at least 60 years...by the year 2000.”

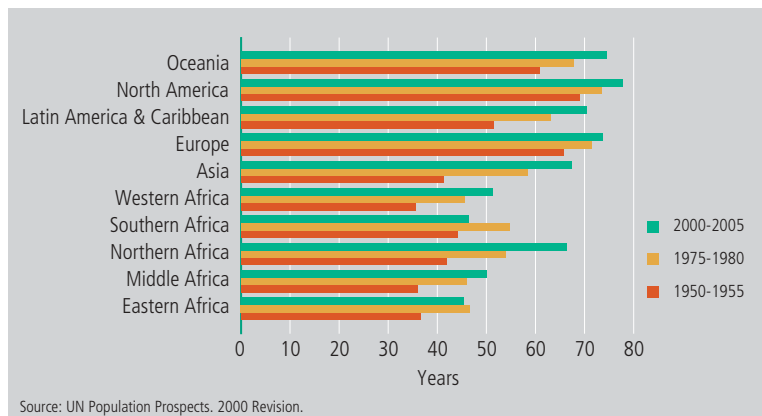
United Nations International Conference on Population and Development (Cairo, 1994)

“Countries with the highest levels of mortality should aim to achieve by 2005 a life expectancy at birth greater than 65 years and by 2015 a life expectancy at birth greater than 70 years.”

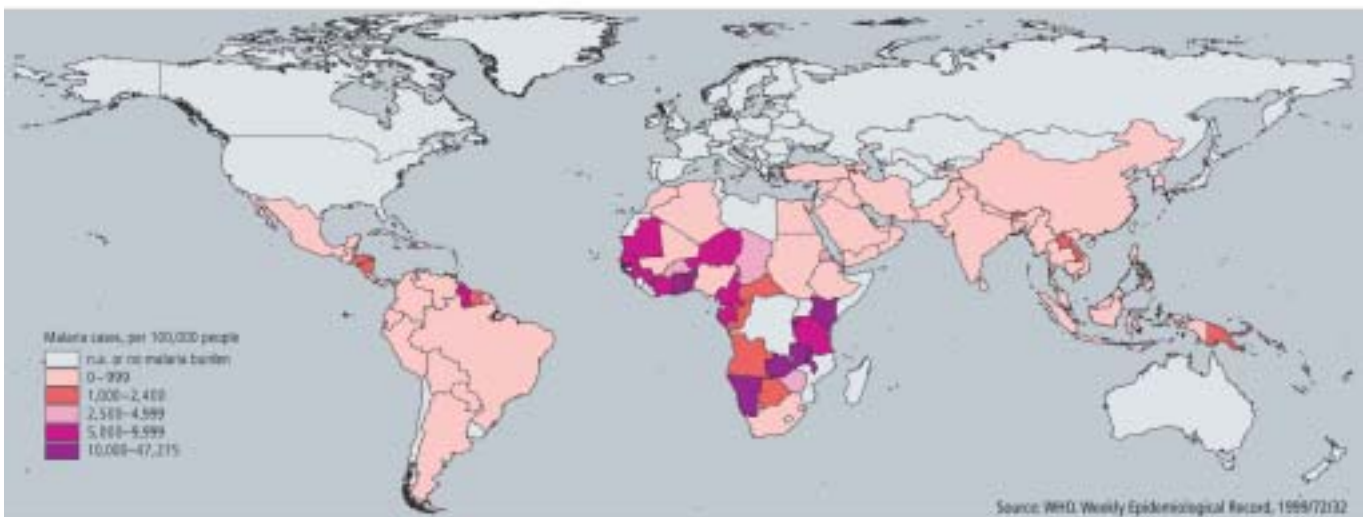
Under-five mortality rate, 2000



Life expectancy at birth, 1950-1955, 1975-1980, and 2000-2005



Reported malaria cases, endemic countries only, 1995



Poverty

Universal Declaration of Human Rights (New York, 1948)

“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services...”

United Nations Conference on the Human Environment (Stockholm, 1972)

“Economic and social development is essential for ensuring a favorable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.”

World Summit for Children (New York, 1990)

“We will work for a global attack on poverty, which would have immediate benefits for children’s welfare.”

World Summit for Social Development (Copenhagen, 1995)

“We commit ourselves to the goal of eradicating poverty in the world, through decisive national actions and international cooperation, as an ethical, social, political and economic imperative of humankind....Special priority will be given to the needs and rights of women and children, who often bear the greatest burden of poverty.”

World Food Summit (Rome, 1996)

“Poverty eradication is essential to improve access to food. The vast majority of those who are undernourished either cannot produce or cannot afford to buy enough food....We will ensure an enabling political, social, and economic environment designed to create the best conditions for the eradication of poverty and for durable peace, based on full and equal participation of women and men, which is most conducive to achieving sustainable food security for all.”

G8 Summit (Okinawa, 2000)

“It is a key objective to take a forward-looking approach in a strategic and intensive manner, in order to assist these countries in their efforts to attain sustained poverty reduction and economic development, and achieve the International Development Goal of a reduction by one half of the proportion of people living in extreme poverty by 2015.”

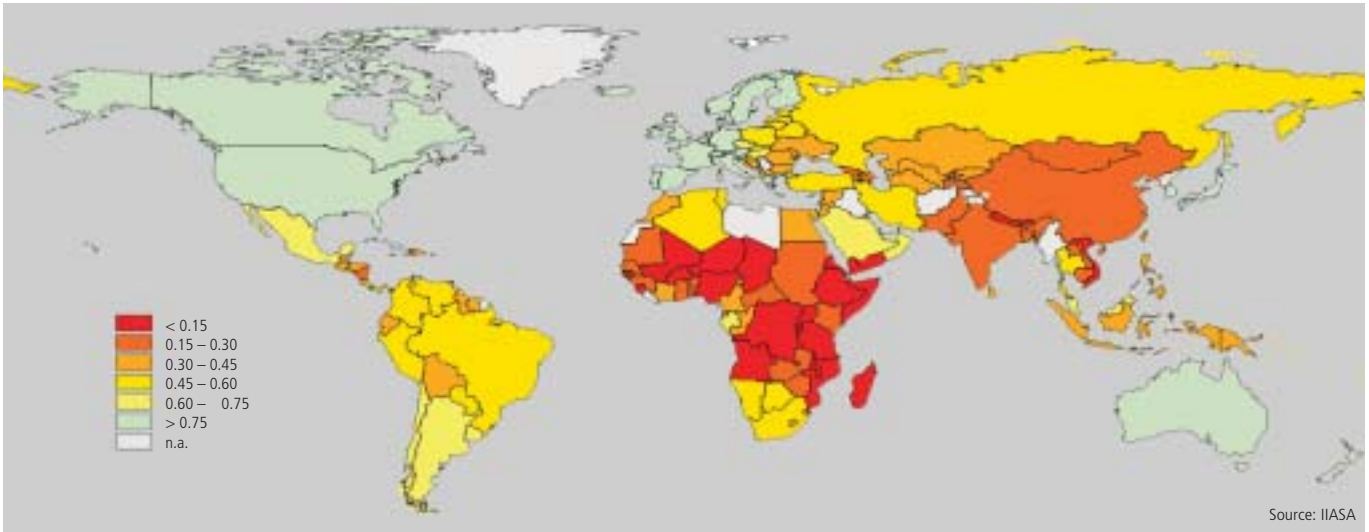
Recommendations of the Secretary-General to the Millennium Summit (New York, 2000)

“I call on the international community at the highest level—the Heads of State and Government convened at the Millennium Summit—to adopt the target of halving the proportion of people living in extreme poverty, and so lifting more than 1 billion people out of it, by 2015. I further urge that no effort be spared to reach this target by that date in every region, and in every country.”

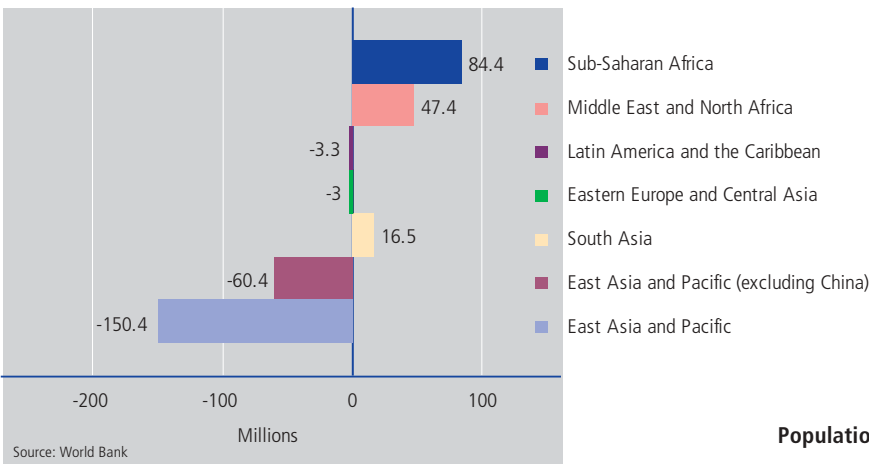
Millennium Development Goals (2000)

“Eradicate extreme poverty: Halve, between 1990 and 2015 the proportion of people whose income is less than one dollar a day.”

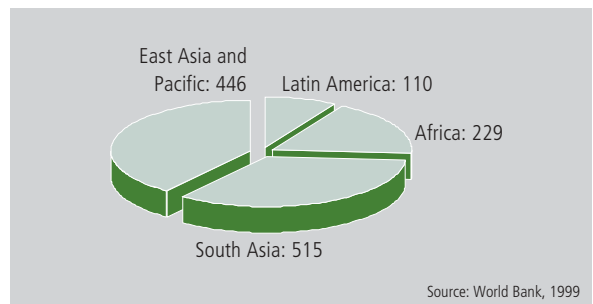
Per capita GDP index



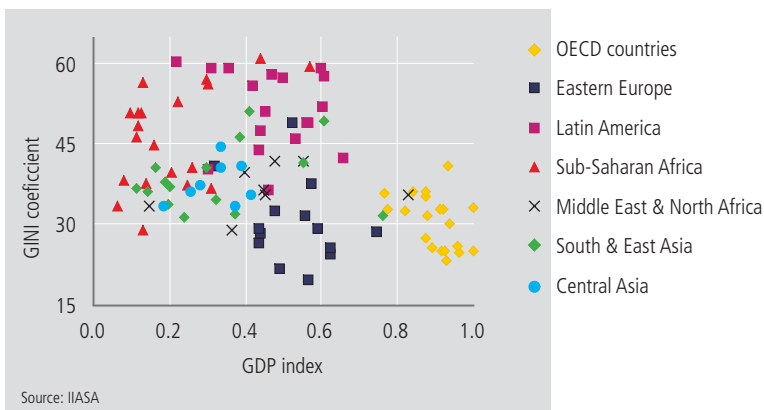
Change in number of people living below US\$1 per day, 1987-1998



Population living below US\$1 a day, millions



Income distribution versus per capita gross domestic product



Hunger

United Nations Conference on the Human Environment (Stockholm, 1972)

“It is recommended that the United Nations agencies should focus special attention on the provision of assistance for combating the menace of human malnutrition rampant in many parts of the world.”

United Nations World Population Conference (Bucharest, 1974)

“In order to increase the production and distribution of food for the growing world population it is recommended that Governments give high priority to improving methods of food production, the investigation and development of new sources of food and more effective utilization of existing sources.”

World Food Conference (Rome, 1974)

“Every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties...”

World Summit for Children (New York, 1990)

The Plan of Action calls for a “Reduction of severe and moderate malnutrition among under-5 children by one half of 1990 levels...” by the year 2000.

International Conference on Population (Mexico City, 1984)

“National and international efforts should give high priority to ... the eradication of mass hunger and the achievement of adequate health and nutrition levels...”

World Food Summit (Rome, 1996)

World Summit for Social Development (Copenhagen, 1995)

A priority should be “Developing and strengthening emergency food reserves as a means to prevent acute food shortages and stabilize prices, with facilities for food storage, transportation and distribution during emergencies...”

Countries should strive for, “By the year 2000, a reduction of severe and moderate malnutrition among children under five years of age by half of the 1990 level...”

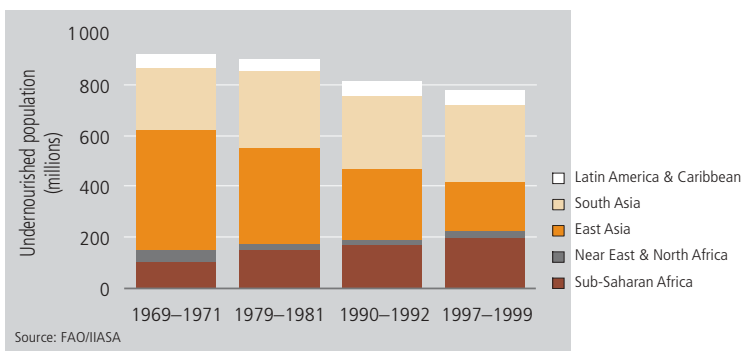
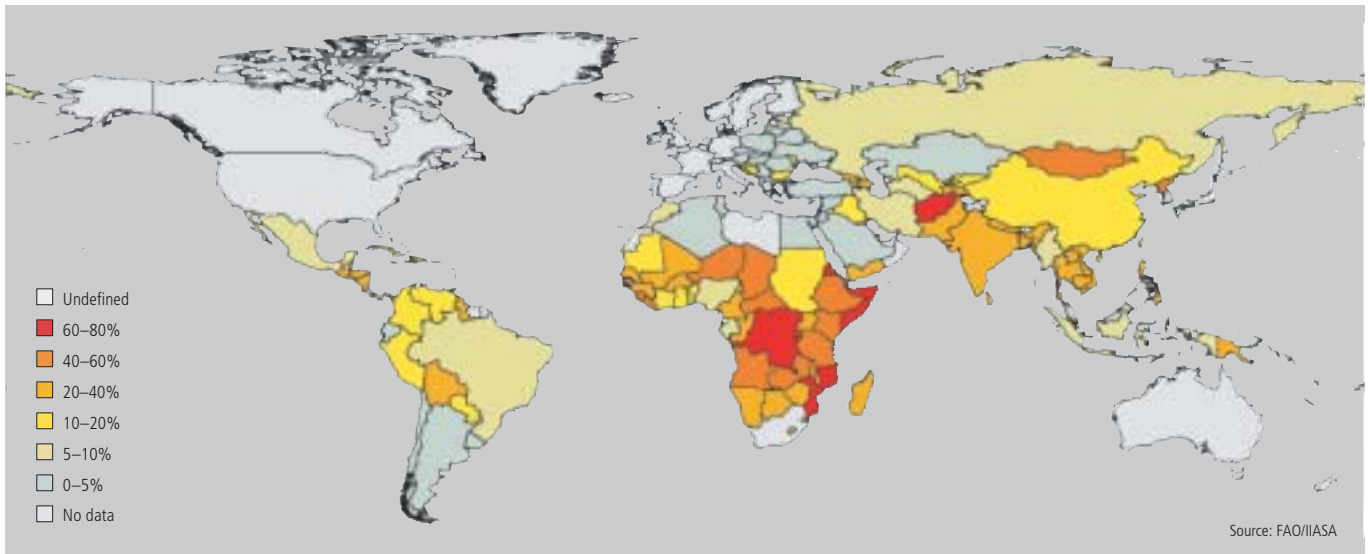
Governments should aim “to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015.”

“[W]e will endeavour to prevent and be prepared for [natural disasters and man-made emergencies and to meet transitory and emergency food requirements in ways that encourage recovery, rehabilitation, development and a capacity to satisfy future needs.”

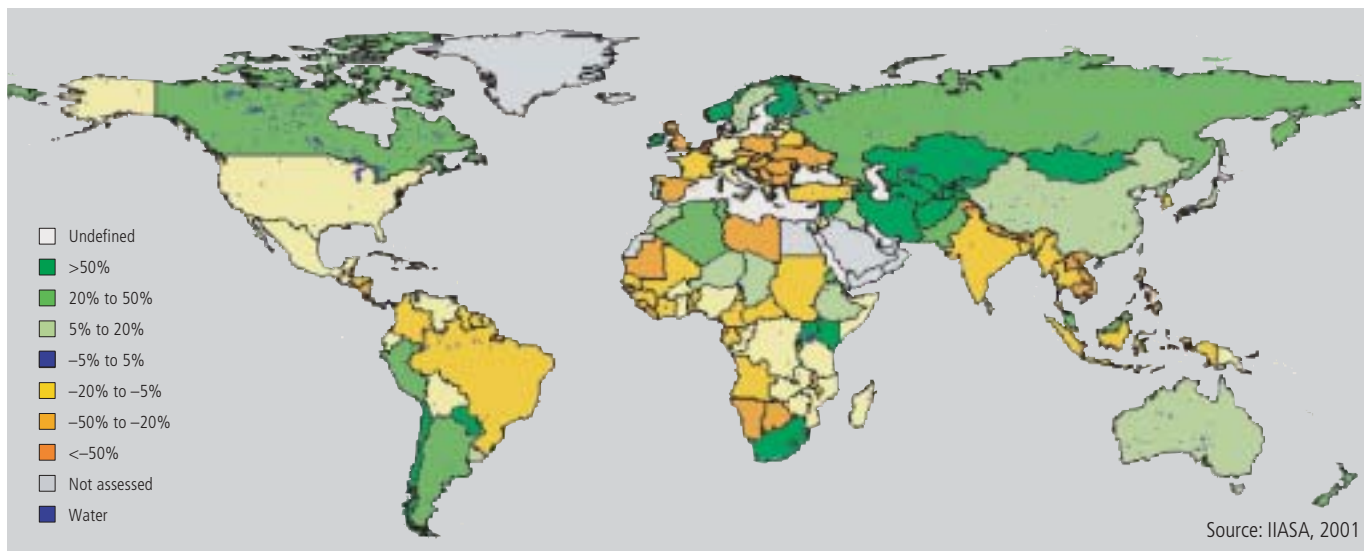
World Food Summit (Rome, 2002) Millennium Development Goals (2000)

“Halve the number of hungry in the world not later than 2015, as reaffirmed by the United Nations Millennium of the Declaration...”

Undernourished population



Climate change impact on cereal production



From *Nature*, July 4th 2002

Population should be on the Johannesburg agenda

Sir— On 26 August, the United Nations (UN) World Summit on Sustainable Development in Johannesburg will consider strategies with a far broader mandate for action than the UN Conference on Environment and Development in Rio de Janeiro in 1992. Population as a key component of sustainable development should figure prominently on the Johannesburg agenda. Yet, after four preparatory meetings for Johannesburg, the topic is still absent.

If we do not put the human population at the core of the sustainable-development agenda, our efforts to improve human well-being and preserve the quality of the environment will fail.

The Johannesburg Summit must heed the first principle of the 1992 Rio Declaration—that “human beings are at the centre of concern for sustainable development”—by taking full account of how population and society interact with the natural environment. This is one of the basic conclusions of the Global Science Panel on Population and Environment, an independent body of experts organized by the International Institute for Applied Systems Analysis (IIASA), the International Union for the Scientific Study of Population and the United Nations University.

Sustainable development aims at improving human well-being, particularly through alleviating poverty, increasing gender equity, and improving health, human resources and stewardship of the natural environment. Because demographic factors are closely linked to these goals, strategies that take population into account have a better chance of success.

The International Conference on Population and Development in Cairo in 1994 recognized that population policy should be oriented towards improving social conditions and expanding choices for individuals. The key recognition was that focusing on people—their rights, capabilities and opportunities—would have multiple benefits for individuals, for societies and for their sustainable relationship with the environment. Therefore, in Johannesburg, consideration of sustainable-development policies must include population growth and distribution, mobility, health impacts of environmental change, differential vulnerability, and the empowerment of people, especially of women.

Fertility decline in high-fertility countries, by slowing population growth, can make many environmental problems easier to solve. It can also have important economic benefits through reducing the number of children relative to the working-age population, creating a unique opportunity to increase investments in health, education, infrastructure and environmental protection.

In high-income countries, the environmental impact of population growth and distribution must be considered jointly with high consumption rates. Even in countries where little growth is envisioned, unsustainable patterns of consumption have global implications for the environment and human well-being, and must be addressed with appropriate policies.

Hence, on the way from Rio to Johannesburg we must go through Cairo. Two key policies are needed: first, investment in voluntary family planning and reproductive-health programmes; and second, education and empowerment, especially of women, in order to reduce fertility, enhance individual choice, contribute to greater environmental awareness and reduce vulnerability to environmental changes.

Wolfgang Lutz, Mahendra Shah
Coordinators, Global Science Panel on Population
and Environment (GSPPE), IIASA, Schlossplatz 1,
A-2361 Laxenburg, Austria

Other signatories of this letter are the panel members of the GSPPE:

R. E. Bilborrow, J. Bongaarts, P. DasGupta, B. Entwisle,
G. Fischer, B. Garcia, D. J. Hogan, A. Jernelov, Z. Jiang,
R. W. Kates, S. Lall, F. L. MacKellar, P. K. Makinwa-Adebusoye,
A. J. McMichael, V. Mishra, N. Myers, N. Nakicenovic, S. Nilsson,
B. C. O'Neill, X. Peng, H. B. Presser, N. Sadik, W. C. Sanderson,
G. Sen, M. F. Strong, B. Torrey, D. van de Kaa, H. J. A. van Ginkel,
B. Yeoh, H. Zurayk.

Full address details and affiliations are available on the panel's
website at www.iiasa.ac.at/gsp