

THE STATE OF WORLD POPULATION

1992



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EXECUTIVE DIRECTOR

STATE OF WORLD POPULATION 1992

A world in balance

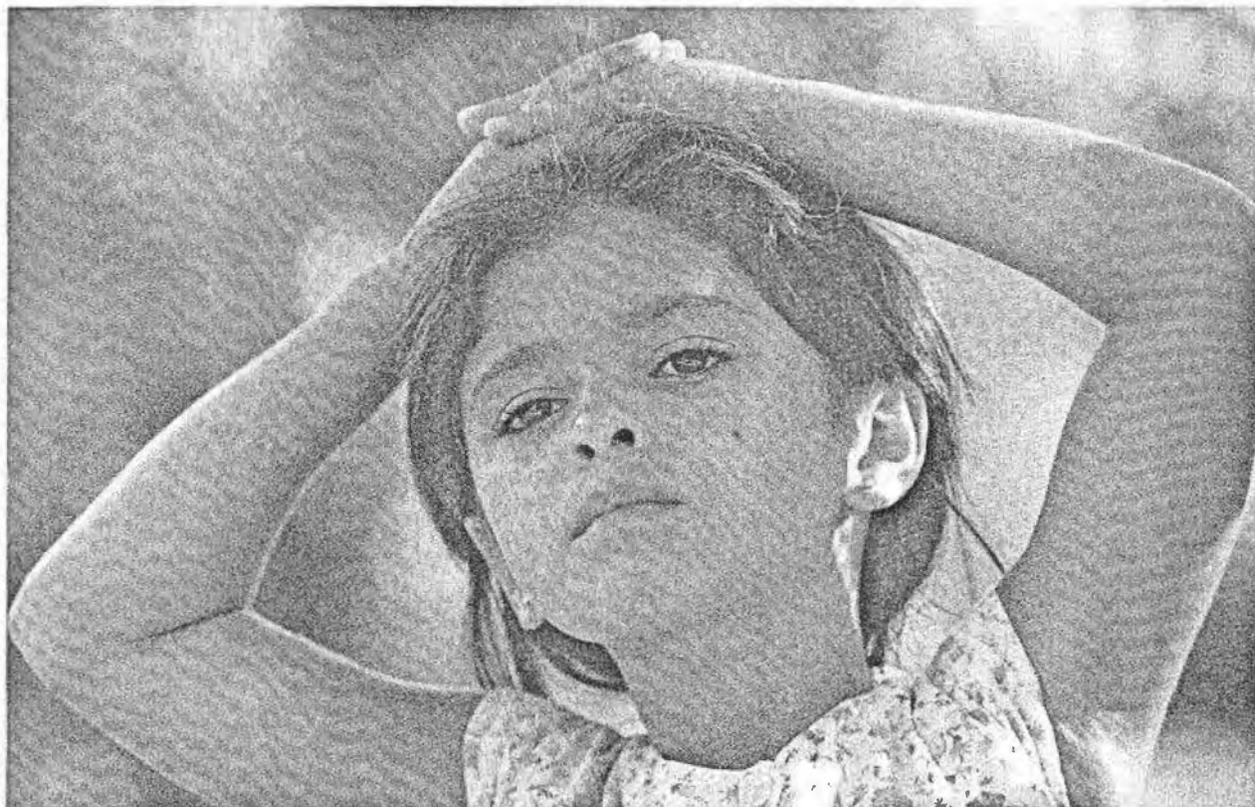


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SUMMARY

This year's *State of World Population* Report calls for immediate and determined action to balance population, consumption and development patterns; to put an end to absolute poverty, provide for human needs and yet protect the environment.

Growth

The Report publishes revised long-range population projections from the United Nations Population Division, the first such figures for ten years. They reveal that:

World population in mid-1992 will be 5.48 billion. It will reach 6 billion in 1998. Annual additions to world population in the next decade will average 97 million, the highest in history. Nearly all of this population growth will be in Africa, Asia and Latin America. Over half will be in Africa and south Asia.

The medium, or most likely, projection of population growth implies a near doubling of world population to 10 billion in 2050. Growth will probably continue for another century after that, to 11.6 billion in 2150.

On the most optimistic assumption, total population could peak in mid-century, and would begin to fall thereafter.

But growth could go the other way, reaching 12.5 billion in 2050, and heading towards 20.7 billion a century later.

Much depends upon action to reduce family size during the next decade. **Delay could make a difference of up to four billion to the size of the world's population in 2050 — equal to the whole of world population in 1975.**

Migration

Some 83 per cent of population growth in the next decade will be in urban areas. Cities have grown faster

where national populations are growing faster.

As many as 70 million people, mostly from developing countries, are working (legally or illegally) in other countries. Over one million people emigrate permanently to other countries and close to that number seek asylum each year. The number of refugees rocketed from 2.8 million in 1976 to the record level of 17.3 million in 1990. During the 1980s eight million legal immigrants settled in the United States, Canada and Australia.

The labour force in north America will not increase between now and 2025 except through immigration. In central America it will increase by 50.5 million. Western Europe's labour force will fall by 14.5 million; north Africa's will increase by 56.6 million.

Population, poverty and economic growth

World resources are adequate for the sustained development of the planet, if they are carefully used, says the Report. The requirements will be to improve conditions for the world's 1.1 billion poorest people; to meet the legitimate aspirations of the three billion who are neither rich nor very poor; to cut the environmental cost of development and distribute its benefits more equitably.

Progress towards these goals calls among other things for *slower population growth, smaller overall totals, and more balanced population distribution*, within and between countries.

So far progress has been mixed. Developing countries have improved living conditions for increasing proportions of their populations. But the numbers of the poor, illiterate and malnourished have continued to climb.

However, countries which succeeded in slowing population growth saw the benefit in the 1980s:

- During the 1980s countries with

Summary

slower population growth saw their average incomes per person grow 2.5 per cent a year faster than those with more rapid population growth.

- Slower population growth in the 1965-80 period also helped income growth in the 1980s.

- Countries with slower population growth tended to have higher savings and investment ratios.

Developing human resources

Ending absolute poverty, improving health and education and raising the status of women will contribute to slower, more balanced population growth. The Report calls for "a sustained and concerted programme, starting immediately". The aim should be to bring future population growth towards the United Nations lower population projection, 1.5 to 2 billion less than the medium and 4 billion less than the high projection by the year 2050. Special attention within such a programme should be given to Africa and south Asia, where more than half of the increase in population and the majority of the world's absolute poor are found.

- Women's access to better education, health care and family planning, and work at a fair wage raises personal incomes, speeds economic development and reduces family size.

- A reduction in family size can make a direct contribution to better education, health and nutrition: children from smaller families are healthier and better nourished, stay longer in school and do better there than children from large families.

- Avoiding births to mothers under 20 could cut deaths of under fives by 17 per cent.

- Avoiding births spaced closer than two years apart could cut under-five mortality by the same amount.

- Eliminating both these types of poor timing could reduce maternal mortality by 40 per cent.

Equalizing women's access to education should be a top priority,

says the Report. It contributes to their personal development, to smaller families and to better health for mothers and children.

Developing natural resources

Balanced development, between urban and rural areas, and between countries, is an essential component of sustainable development.

"Fixed" or "non-renewable" resources have so far adjusted to meet demand. New reserves and new technologies have been found. But the simultaneous explosion of population and consumption per person might overwhelm adjustment mechanisms.

The Report says that, paradoxically, the immediate threat might be to "renewable" or "unlimited" resources, including land, water and other species.

Expansion of farm land has been slowing down. At current rates, the average person in developing countries will have only 0.11 hectares of land in 60 years' time – one fifth of today's level in developed countries.

Water shortages due to rising populations and consumption levels will impose severe constraints on development.

Some 4.5 million km² of additional wildlife habitat will have to be converted to human uses. This is equivalent to four-fifths of the total area of nature reserves in the world in 1990.

Population growth is a major factor in environmental impact. In developing countries it is responsible for around 79 per cent of deforestation, 72 per cent of arable land expansion, and 69 per cent of growth in livestock numbers.

Getting there

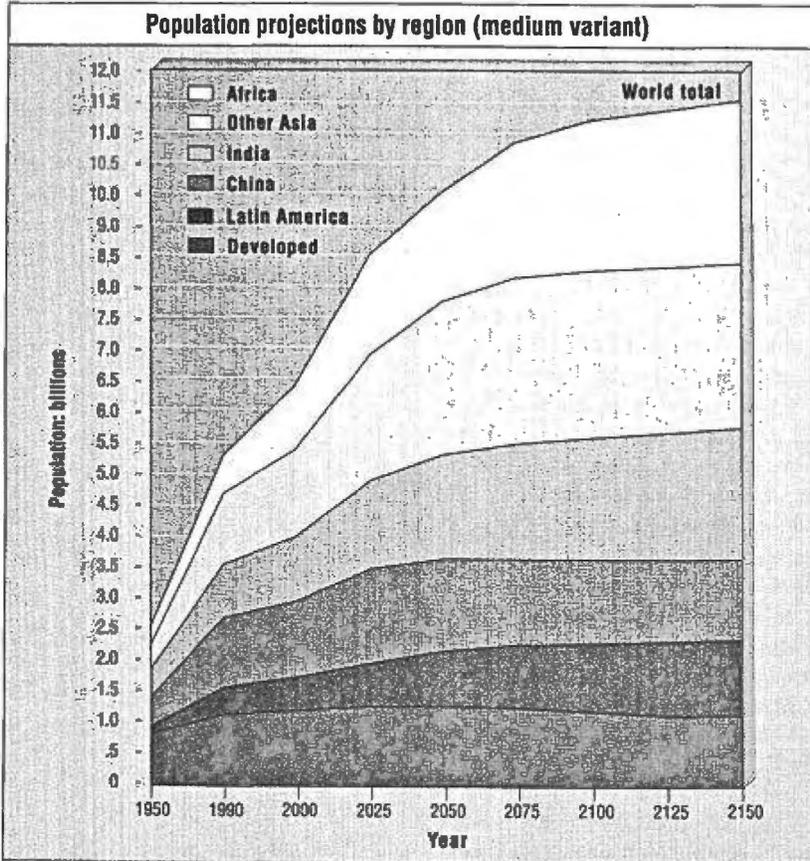
Experience in the last two decades has shown that fertility patterns can change in as little as a decade and that voluntary policies and programmes can be highly effective in

encouraging the change.

Access to information and the means of deciding the size and spacing of the family has been accepted as a human right for over 20 years. Yet 300 million women in developing countries did not have ready access to safe and effective means of contraception in 1990.

Just over one birth in five in developing countries may be unwanted. Enabling women simply to avoid unwanted births would help both them and their families.

INTRODUCTION



The medium variant is considered the most likely.
Source: United Nations Population Division.

HISTORY is at a turning point. The end of the cold war has brought a new climate for peace and cooperation; but this moment is unique in another, less promising way.

The fastest-ever growth in human numbers is compounded by widespread poverty and deprivation. The fastest-ever growth in human consumption of resources is compounded by political and economic systems unaware of any limits to growth. Together, they present the most serious threat to local and global environments since the human species evolved. The possibility of ecological catastrophe is the nightmare of the 1990s.

The resources exist to end poverty, achieve meaningful social and economic development for the world's majority, protect the environment and at the same time maintain the amenities and advantages which modern technology has brought. Sufficient progress has been made to show that it can be done: it has to be done to protect ourselves and those who have no voices – future generations of human beings, and species apart from our own.

This Report focusses on the role played by population issues in the problems, and in the potential solutions. It discusses numbers, and all the factors that lie behind them, including the relationship between population and economic growth: access to health care, family planning, water and sanitation; women's education, literacy, property rights and access to the labour market; and the unbalanced development that fuels migration.

The Report shows that all of these have an impact on sustainability; and suggests that attention to population issues can help to eliminate absolute poverty, to sustain economic growth, and to achieve ecological balance.

Sustainable development: a glossary of definitions

● Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. . . . Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability.

Brundtland Commission, 1987.

● Sustainable development . . . involves providing a bequest to the next generation which is at least equal to that inherited by the current generation.

Blueprint for a Green Economy, 1969.

● Development that distributes the benefits of economic progress more equitably, protects both local and global environments for future generations, and truly improves the quality of life.

Our Own Agenda, Inter-American Development Bank, 1990.

● Sustainable development means improving the quality of human life while living within the carrying capacity of supporting ecosystems. A "sustainable economy" maintains its natural resource base. It can continue to develop by adapting, and through improvements in knowledge, organization, technical efficiency, and wisdom.

Caring for the Earth, IUCN, UNEP and WWF, 1991.

1. SUSTAINING DEVELOPMENT

SOcial and economic development has been the goal of the international community since 1960. There have been some successes; but development will have little meaning unless it can be sustained – unless human numbers are in balance with their demands on global resources.

Sustainable development is therefore the internationally accepted goal for the 21st century. Definitions of sustainable development vary, but there is broad agreement about what will be needed to achieve it.

The first requirement is *the elimination of absolute poverty*. This means ensuring that the world's 1.1 billion poorest people can produce or buy adequate food, clothing, and housing for health and self-respect. It means ensuring access to services such as education, primary health care, family planning, clean water and sanitation. It means securing legal and political rights and equal opportunities regardless of class or gender. Ending poverty is a goal in itself, but it will also have an effect on population size; poverty and rapid population growth are found together, in families and countries alike.

But development means more than the elimination of destitution. It should also *meet the legitimate aspirations of the majority*, the middle three billion who are neither very poor nor rich. Those aspirations vary from time to time and from place to place: yesterday's luxuries become tomorrow's social expectations.

In today's world the one billion relatively affluent satisfy their aspirations with little regard for sustainability. Future generations will pick up the bill. The aspirations of five or six or ten billion people cannot be met in this way – the bill would be too big to pay.

Sustainable, balanced development, therefore requires some attention to *cutting the environmental cost of development*. It also calls for

a *fairer distribution of the benefits of development* – a principle of equity, or balance, within countries and between countries.

It will mean *slower population growth, smaller overall totals, and more balanced population distribution, within and between countries*. This will reduce total future environmental impact – a principle of equity between generations.

Balance implies a duty of care toward other species. It is impossible to predict which species will be valued or essential in future; as much as possible of present biodiversity must therefore be preserved.

Sustainability means development for all, but it must also mean development without bankrupting the future.

A new time perspective

Sustainable development demands a new time perspective. Individuals – as far as they can – plan for the long term. They provide for old age 40 to 50 years ahead. They provide for their children, and through them invest in the future.

Societies, on the other hand, work on the assumption that the future will be much like the past. Only recently has some effort been made to plan seriously for possible different futures. *Sustainable development demands a perspective of decades rather than years*.

One of the critical factors will be the future size and distribution of human populations.

Recently the United Nations has looked far into the future, with a new set of population projections up to the year 2150. These long-range projections – the first since 1980 – are useful pointers to the problems and potentials that lie ahead.¹

The *medium* projection is considered the most probable. It assumes that the number of children born to the typical woman in developing



Photo: Mark Edwards/Sill Pictures

Sustainability means development for all, but without bankrupting the environment for future generations.

Sustaining development

countries will decline gradually, stabilizing between 35 and 55 years from now. On this projection the world's population is expected to increase from 5.48 billion in 1992 to 10 billion in 2050, and a plateau of just over 11.6 billion in 2150. The plateau total is 1.4 billion higher than the 1980 projection.

Ahead lie four decades of the fastest growth in human numbers in all history. Additions will average 97 million a year till the end of the century, and 90 million each year until 2025. The following 25 years to 2050 will see annual additions averaging almost 61 millions a year. Only after 2050 will there be a significant slowdown.

Geographically, this future growth will be heavily tilted towards Asia, Africa and Latin America. Some 97 per cent of the increase from 1990 to 2050 will be in today's developing countries. Indeed 34 per cent of world population growth will be in Africa alone, with another 18 per cent in south Asia.

The world's 2050 population will be almost double today's. Africa's will be three and a half times its present population, and by 2150 almost five times.

Alternative outlooks

The medium projection assumes that fertility will fall to the level at which couples replace themselves, and no further. But in most developed countries and six developing countries (the "four tigers" of south-east Asia, Cuba, and Barbados) fertility has already fallen below this level. This is the result of changes in society: increasing familiarity with and use of contraception; later marriage and first birth, and increasing participation of women in the workforce.

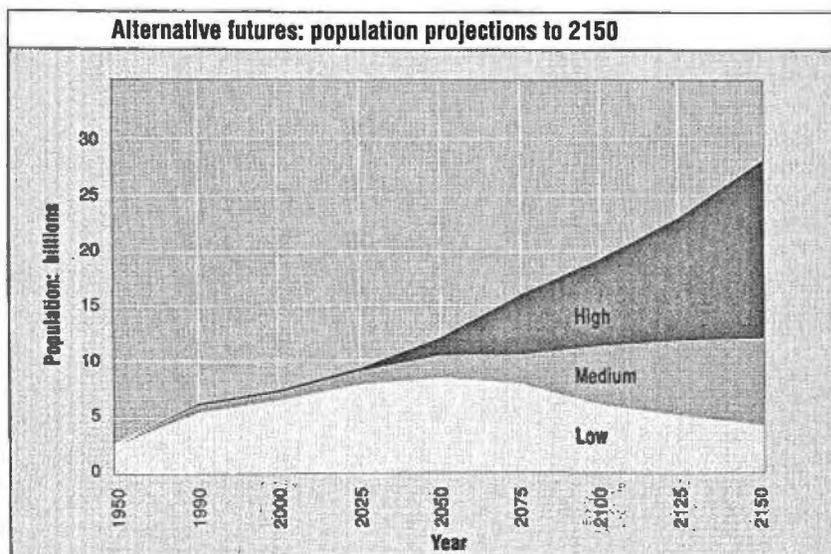
No-one really knows whether fertility will remain at such low levels: there is no historical precedent. In a few countries of northern Europe, and in the USA, there have recently been small fertility increases, which may be partly due to higher fertility among immigrants. But there is no end in sight to the overall trends that have produced low fertility.²

If low fertility persists and spreads – the assumption of the *low* projection – then world population would rise to a peak in 2050, and would begin to fall thereafter.³

But there can be no guarantee that fertility in all countries will drop below replacement level. In an insecure world, riddled with pockets of persistent poverty and conflict, it might stay high enough in enough countries to keep the world average above the replacement level.

If this happens, the prospects are grim indeed, as the UN *high* projections spell out. The world's population would go on rising indefinitely. If women continued to have an average of 2.2 children each, population would reach 12.5 billion by 2050 and 20.8 billion a century later. If they had 2.5 children each, then the human race would number no less than 28 billion by 2150. In both cases, population would keep on growing thereafter.

United Nations, low, medium and high population projections. By 2050 there is a difference of 4 billion between high and low projections – about the size of world population in 1975.
Source: United Nations Population Division.



2. POPULATION AND DEVELOPMENT

THE range of the new projections is daunting – but also challenging. The pattern for the next decade or so is already set – the medium projection for the year 2000 is 6.26 billion with a possible variation of only about 160-165 million between high and low – but the further future is wide open.

The low projection offers the possibility of only six decades of continued increase, and a decline to more manageable levels thereafter. But during those six decades of growth human numbers, consumption and technology could still do massive and irreversible damage to local and global ecosystems.

The high projection offers the prospect of indefinite population growth, with the inevitable accompaniments of overcrowding, pollution and continuing poverty on a huge scale.

This breadth of range shows that the future is not pre-determined. What happens depends on decisions, individual and social. As far as population is concerned, many of the most important decisions will be taken in the next decade. Because of the inertia of population growth, even the most determined action will have its full effect only in the next generation. For example, even if from this moment couples produced only enough children to replace themselves, world population would still go on increasing. By 2050 it would be bigger by almost half than today's population.

How does population growth affect the prospects for sustainable development? The question is best answered by considering the goals of sustainable development one by one.

The fight against absolute poverty

Three decades of development have seen undeniable economic progress. Per capita incomes in developing

countries increased by an average of 2.5 per cent a year between 1965 and 1989. This was very slightly faster than the average for developed countries of 2.4 per cent a year. Only in sub-Saharan Africa have incomes stagnated over this whole period.⁴

Yet this progress has been paradoxical. The *proportion* of poor has declined in most parts of the world. But because of the growth in total population their *numbers* have increased.

A recent United Nations survey of the world social situation estimates that the percentage of people in poverty in developing countries fell from 52 per cent in 1970 to 44 per cent in 1985. Yet because of population growth over this period the actual numbers of the very poor rose from 944 million to 1,156 million – an extra 212 million people living on the very edge of existence.⁵

The numbers increased in every region: most steeply in Africa, where they rose by almost two thirds, from 166 million to 273 million. Asia had the biggest share of the world's poor, with 737 million. This was 75 million up on 1970, despite a drop in the proportion of poor, from 56 per cent to 43 per cent.

A separate analysis for Latin America showed that the numbers of poor have risen steadily, from 130 million in 1970, to 144 million in 1980, and an estimated 204 million in 1990. The projections to the year 2000 show a total of 232 million. Here, as in Africa, the 1980s saw an increase in the percentage in poverty, from 41 per cent to 47 per cent of the population.⁶

Malnutrition is the most crushing symptom of absolute poverty. Again, we find *perversity of progress*. The average person's diet in developing countries has seen sustained improvement. Calorie intake rose from only 1,930 per person per day in 1961-63 to 2,474 in 1987-89. Protein intake improved over the

*Population and development***Population pressure, poverty and disaster in Bangladesh**

Poor people, desperate to survive, fill every niche on Hatia Island, Bangladesh. They farm, and fish, and hack down mangroves along the shoreline. They pull razor-toothed mudfish from the slime.

The Island is a long low hump out in the Bay of Bengal. If Bangladesh had ample land no-one would live here. It is only the pressure of population on the mainland which brought people here, and keeps them here. In 1950 Bangladesh had 312 persons per square kilometre. By 1990 this had risen to 860 — twice the density of Europe's most crowded country, the Netherlands. In the year 2025 it will have reached 1,755.

Hatia is a dangerous place. It lies in the killing path of cyclones, averaging one or two each year. The catastrophic 1970 cyclone killed 25,000 people on Hatia, one person in ten. The 1991 cyclone killed 4,000.

Life on the island is hard at the best of times. Only one crop a year can be grown, because tubewell irrigation is impossible. During the monsoon rains there are freshwater floods. Spring tides bring saltwater floods that ruin crops.

Hatia stands athwart the main outlet of the Lower Meghna river, which is like a hosepipe pumping silt straight at Hatia's northern shore, eroding it at a terrifying rate. Since 1970 some 60

square kilometres have been washed away. At least 10,000 of the island's 40,000 families have been made landless and homeless.

The impact has been harsh. Three out of every four of these families have seen their incomes fall by half or more. Population growth compounded by river erosion has created a pool of surplus labour, so wage rates are low, varying from 10 taka per day (30c) in winter to 35 (\$1) at harvest time.

Most of the erosion victims have been dispossessed many times. Shakina Hossein, 45 year-old mother of five sons and three daughters, was making her eleventh move with her husband Shujayet. Each move devours the family savings, and thrusts them deeper into poverty.

Shakina's three grown-up children have their own problems and cannot help their parents. One son has left altogether. Another moved to the southern end of Hatia. Their eldest daughter, 22-year-old Rukiya, was abandoned by her husband while pregnant with their second child. After prolonged complaints that he couldn't afford to feed his family, he disappeared one night and has not been heard of for a year. Such abandonments are increasingly common in Bangladesh.

The Hosseins' new site is just 70 metres

inland, on the earth embankment that protects farmland to the rear. They know they'll have to move again next year, but they have nowhere else to go. Hundreds of families have built flimsy homes here, which will be washed away as soon as a flood overtops the wall.

The river erosion has a reverse side. To the south, where the river flow has slowed down, new land builds up from silt. After a few years it rises above high tide level. As soon as salt levels decrease enough for farming, settlers move in.

The most recent addition to Hatia is Nijhum Dwip, off the southern tip. It emerged from the sea in the 1940s. By 1969 there were 60 or 70 families, supplementing their meagre yields by fishing and gathering mangrove branches for sale.

Nijhum Dwip was only a few feet above sea-level. The houses were flimsy constructions of mangrove wood and thatch. The 1970 cyclone killed every one of the 500 inhabitants, save for one old woman, now 90, who clung desperately to a tree.

Fully aware of the risk, but forced to run it, new settlers began to move in soon after. By early 1991 there were over 300 families, about 2,500 people, settled on Nijhum Dwip. The cyclone of April 1991 killed half of them.

Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.

same period, from 49 grams per day to 60 grams.⁷

The *proportion* of people who were malnourished dropped from 27 per cent in 1969-71 to 21.5 per cent in 1983-85 — the latter figure would have been even lower but for famine in Africa. Yet at the same time there was an increase in their total *numbers*, from 460 million to 512 million. In the mid-1980s 52 million more people were chronically hungry than at the end of the 1960s. Nor was this merely an effect of the African famine. The numbers also rose in Asia by 10 million, and in Latin America by four million.⁸

Housing supply also fell behind swelling numbers. In developed countries, for every 100 new households, 143 new permanent dwelling units were built in 1985-89. In developing countries, only 53 were built in 1975-79. Ten years later the figure had fallen to 38. Thus in the latter half of the 1980s, 62 out of every 100 new families in developing countries made do with shanty-type housing.⁹

Health and education: the moving goalposts

Progress has also been mixed in the basic services on which the poor rely; which provide the foundation of economic growth and largely determine the quality of life — schools, teachers, health care staff and facilities, wells and standpipes. The needs of additional numbers have to be met before there can be any improvement in the proportion of the population served.

There has been progress, and it has been impressive and dramatic. In the field of education, school enrolment expanded everywhere. In 1970 there were 311 million children in primary school. By 1986 there were 480 million. The growth at secondary level was even faster. Pupil numbers more than doubled from 80 million to 192 million.¹⁰

The struggle to keep pace with population growth became harder in the harsher economic climate of the 1980s. The proportions of children of primary and secondary age who

Population and development

were at school continued to improve. But the growth rate in the numbers enrolled fell by half compared with the 1970s.

Africa especially faced rapidly growing school-age populations and shrinking government resources. For the first time the primary enrolment rate actually fell. In 1980, 80 per cent of primary age children were enrolled; in 1986 only 76 per cent.

And despite all this enormous effort and achievement, because of the sheer pace of population growth, *the total number of children who were not attending school in developing countries increased between 1970 and 1985.*

Only in Africa was there an increase in out-of-school children at primary level – from 34 million to 37 million. But at secondary level there was a large increase in Asia too. In 1970 some 223 million children aged 12 to 17 were not in secondary school in developing countries. Fifteen years later their numbers had mounted to 283 million. Only Latin America managed a slight reduction in out-of-school secondary children. In 1985, despite 15 years of undeniable progress, children not in secondary education were 60 million more than in 1970 – another 60 million under-educated adults in the next century.¹¹

The same paradox applies in the battle for literacy. The illiteracy rate in developing countries was cut back from 55 per cent in 1970 to 39 per cent in 1985. In all regions the proportion of illiterates dropped. Yet because of population growth the total number of illiterates rose from 842 million to 907 million. The numbers increased in all regions except eastern Asia – where population growth was slowest. Eastern Asia managed to cut its total number of illiterates by 29 millions.¹²

So, at the end of 15 years of progress, there were an extra 65 million people who could not read or

write. An extra 65 million who could not read instructions on a seed packet or a public notice; an extra 65 million who could not fully assert their legal and political rights.

In health care the data do not allow a strict comparison of numbers at different time periods. But in 1990, it is estimated that around 1.5 billion people had no access to safe water and modern health care, while 2.3 billion did not have adequate sanitation.

Some 300 million women of fertile age did not have access to modern methods of family planning – which, with average family sizes in developing countries, again represents a population of 1.5 to 2 billion.

Often these numbers refer to the same people, multiply deprived: poor in income or assets, illiterate, malnourished, badly housed, with poor access to education, health care, family planning, clean water, or sanitation.

The attack on poverty through improving public services would have been more effective with slower population growth, allowing a reduction in the numbers of the absolutely poor as well as the proportion.

Population and economic development

To improve general standards of living it will be important to raise the overall level of economic growth – not only for private consumption, but also for improved public services.

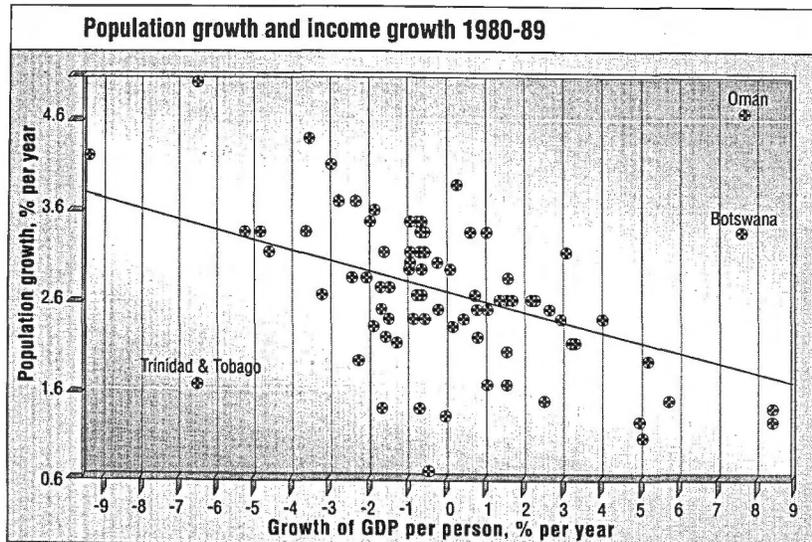
The links between population growth and economic growth have been the subject of intense controversy for more than two decades.

In 1968 Robert McNamara, on becoming President of the World Bank, called population growth the “greatest single obstacle to economic and social advancement in most of the societies of the developing world”. On the other hand, writers such as Julian Simon and Ester



Photo: Caroline Pean/Oxfam

In developing countries, school enrolment has expanded and illiteracy fell from 55 per cent in 1970 to 39 per cent in 1985. Yet because of population growth the total number of illiterates rose from 842 to 907 million in the same period.

Population and development

The chart plots the growth rate in incomes against population growth rates for 1980-89. Each point represents one country (see p. 7).
Source: World Bank.

Boserup have asserted that population growth is beneficial, or even essential, to long-term economic growth.¹³

So far the record of history has told a mixed story.

In Europe, before 1800, living standards of the majority usually fell in periods of population growth; on the other hand, large-scale population declines were followed by periods of improved living standards for the survivors.¹⁴

This suggests that the productive limits of cultivable land had largely been reached; that population growth could be combined with improved living standards only if technology – to produce more food, housing, goods and services from the same amount of land – advanced; and that technology did not, as a rule, move fast enough to keep pace.

That changed with the industrial revolution, which substituted fossil fuel for land as the basis for energy, technology and therefore development. In England between 1700 and 1780, just before the industrial revolution, incomes and population both grew slowly. In the following century, with coal succeeding wood as an energy source and rapidly growing

incomes, there was a surge of population growth.¹⁵

Most studies of today's *industrialized countries* over the past two centuries have found no relation, either negative or positive, between population growth and income growth. France had slow population growth with fast income growth between the 1840s and 1960. Australia saw fast population growth with slow income growth in the century from 1860.

Canada and the United States managed to combine relatively fast population growth with sustained economic growth, fuelled by waves of migration into the unexploited territories.¹⁶

Europe's population growth never reached even half the rates experienced by today's developing countries. There was more time for adjustment to larger numbers, and the Americas, Australasia and southern Africa provided a safety valve for surplus population. At its peak between 1881 and 1910 net emigration took more than 14 per cent of Europe's population increase. The United States absorbed 35 million Europeans between 1820 and 1930.¹⁷

Most studies of today's *developing countries* found no connection between the growth rates of population and of per capita incomes up to around 1975.

Later data, however, do show a significant negative link: demographer Didier Blanchet suggests that rapid population growth may have become much more difficult to cope with at a time of world recession and net resource outflows from developing countries to developed.¹⁸

Research for this report has confirmed the link: *over the past decade and a half, there has been a tendency for income growth to be slower in countries with faster population growth.*

Between 1965 and 1980 rapid population growth appeared to pose

Population and development

no visible problems for economic growth. The period saw fast growth in incomes as measured by Gross Domestic Product (GDP) per person. In a sample of 82 developing countries, the average was 2.4 per cent a year. In 36 there were rises of 3 per cent or more and only 13 saw incomes fall.¹⁹ The 41 countries with slower than average population growth had only slightly faster income growth. Their average incomes grew at 2.5 per cent a year, against 2.3 per cent for the 41 countries with faster population growth. But there was no significant correlation, either negative or positive, between population and economic growth. The fastest 41 for income growth and the slowest 41 both registered average population growth rates of 2.7 per cent.

In the 1980s the picture changed radically. Income per person in the average developing country registered no growth at all. Average incomes per person declined in 46 of the 82 countries and in only 12 did annual growth exceed 3 per cent.

In the 41 countries with slower population growth in the 1980s incomes grew on average by 1.23 per cent a year. In the 41 countries with faster population growth, incomes fell by 1.25 per cent a year – a difference between the groups of almost 2.5 per cent per year.

In the 41 countries with slower income growth, population grew on average by 3 per cent a year: in the 41 with faster income growth population grew by only 2.4 per cent a year.

Taking the whole sample of 82 countries, the correlation²⁰ between population growth and economic growth during the 1980s was negative ($r = -0.42$). Correlations are easily distorted by exceptional cases – and here three of the five smallest countries, Botswana, Oman, and Trinidad and Tobago, all three with populations of 1.5 million or less, lie far outside the rest of the group and

greatly distort the results. For the remaining 79 countries, the negative link is much stronger ($r = -0.63$). The probability of this link occurring by chance is considerably less than one in a thousand.

Did economic growth lead to slower population growth? If so, economic growth in 1965-80 should be correlated with population growth in the 1980s. Yet there was *no* significant correlation.²¹

By contrast, slower population growth in the 1965-80 period was related to better economic performance in the 1980s. Indeed the 41 countries with slower population growth in 1965-80 saw their average incomes grow at 0.9 per cent a year during the 1980s. The 41 countries with faster population growth in 1965-80 saw their average incomes decline by 0.9 per cent a year in the 1980s.

In the 1980s, incomes in countries whose populations had grown more slowly in the 1965-80 period grew 1.8 per cent a year faster than in countries with faster 1965-80 population growth. The strength of the population factor can be judged by comparing it with the most obvious alternative explanation for slow income growth in the 1980s, high debt levels. There is no correlation at all in the 82 countries between debt levels in 1980 and growth in incomes over the 1980s.²²

The statistical link is probably an expression of several factors. One is the way in which rapid population growth commandeers a large share of investment merely to maintain the same amount of capital per person, leaving less over to improve capital per person.

More widely, the link almost certainly expresses the impact of other factors that contribute both to slower population growth and faster economic growth, especially higher levels of education and health in the workforce, and increased access of

Population growth, savings and investments

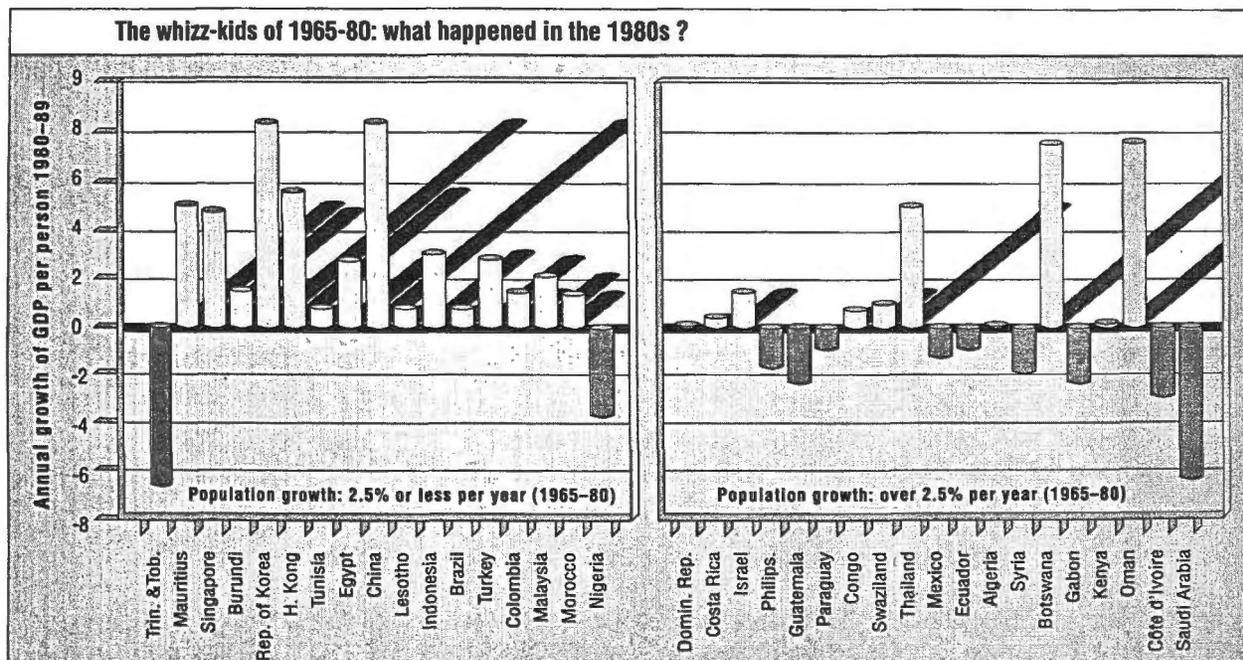
The precise mechanisms by which population growth affects economic development are highly complex.

One route is through its effect on savings and investment. In poor countries, having additional children is a form of saving in itself: parents forego present income in order to provide for their old age, just as people in richer countries put money aside for pensions. But there is a cost: funds spent on children are not available for other types of investment.

A study of 70 countries prepared for the United States' National Research Council found that, at average economic growth rates, a shift from a high- to a low-childbearing pattern was associated with an increase in the net national savings rate by 50 per cent.²³

Data examined for this report from 76 countries showed that in the 38 countries with slower population growth during the 1980s savings ratios averaged 18.5 per cent of Gross Domestic Product in 1989; in the 38 with faster population growth savings ratios averaged only 12 per cent. Investment ratios were also lower in the group with faster population growth: 18 per cent of GDP, compared with 21 per cent for the slower group.²⁴

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The chart shows growth in incomes per capita in the 1980s for the 36 countries whose incomes grew at three per cent or more over the 1965-80 period. The countries are displayed in order of their annual population growth rate between 1965-80, with the slowest rates starting on the left.
Source: World Bank.

What happened to the economic whizz-kids of 1965-80?

The years from 1965 to 1980 were favourable to economic growth. Over that period 36 nations saw their average GDP per person grow at more than 3 per cent a year.

Of these "economic miracles" 17 had population growth rates of 2.5 per cent a year or less, while 19 had rates higher than that. In the 1965-80 period there was no correlation, negative or positive, between economic and population growth rates. The average growth rate of incomes in countries with slower and faster population growth was almost identical, at 4.8 per cent and 4.6 per cent a year respectively.

But the fortunes of the two groups diverged widely in the harsher climate of the 1980s.

Out of the 19 whose populations were growing faster than 2.5 per cent a year between 1965 and 1980, only 10 achieved positive income growth in the 1980s. Four of them — Algeria, Dominican Republic, Costa Rica, and Kenya — barely managed to do so, with incomes growing at 0.5 per cent or less.

The average income growth rate in this group

was only 0.2 per cent a year in the 1980s. Only five grew faster than 0.5 per cent per year. One was Thailand, which even during the early period began one of the world's fastest drops in birth rates ever. Three others were the very small countries of Swaziland, Botswana and Oman, exporters of primary commodities. Botswana in any case ranks among the lowest fertility and infant mortality rates, and the highest levels of female education, in sub-Saharan Africa. The fifth was Israel.

By contrast, the 17 countries where population growth was growing slower than 2.5 per cent a year in 1965-80 saw much better growth in incomes in the 1980s. Their average income growth rate was 2.4 per cent per year. No fewer than 15 had positive growth in incomes of at least 0.8 per cent a year. Only two saw per capita incomes decline. One of them was Nigeria, where oil revenues fell drastically and population growth apparently speeded up considerably in the 1980s. The other was Trinidad and Tobago, which was also very badly affected by declining oil prices.

women to the labour market.

Faster population growth is a handicap, like extra weight carried by a racehorse. It is not an insuperable obstacle. For any particular level of population growth, there is always a big gap between the best and worst economic performance. Good economic and trade policies can combat adverse circumstances. Bad ones can fail even in a favourable situation.

But the recent figures on economic and population growth do suggest, at the very least, that rapid population growth since 1965 may have created problems for economic development in the more difficult climate of the 1980s. Good management diminished the population effect, to some extent. Where management was poor, rapid population growth magnified other difficulties.

Conversely, slower population growth since 1965, and the factors associated with it, especially better education and health, brought substantial and sustained economic benefits.

Population and development

Human resources

The benefits for economic growth derive not just from slower population growth itself, but from all the factors associated with it, including improvements in education, health, access to family planning, women's status and women's access to the labour market.

a. The education effect.

In today's technological world, skills and education are much more important to economic growth than the sheer quantity of labour power.

The World Bank recently examined some of the reasons behind differences in economic performance in developing countries. The role of population growth was not directly considered. Two other factors proved significant. One was the degree of policy distortion in the economy – produced by, for example, an overvalued exchange rate.²⁵

The second was education. In countries with low policy distortions, the education effect was very strong. Where an average adult had more than three and a half years' schooling, the country's GDP grew at 5.5 per cent a year between 1965 and 1987. Where the average schooling level was less than that, GDP grew at only 3.8 per cent a year. The education effect was smaller, but still noticeable, in countries with high economic distortion.

Overall, increasing the average level of schooling by three years was associated with a 27 per cent increase in the country's rate of economic growth. Increasing education by six years lifted economic growth rates by 39 per cent.

Education – especially for women – is also associated with lower fertility: it is the link between economic growth and slower population growth.²⁶

Education begins its economic impact at the level of individual families and enterprises. Education

broadens horizons beyond habit and tradition, encouraging innovation and entrepreneurship. Literate people can read information and instructions; they can calculate doses of fertilizer or pesticide, and keep track of expenses and income.

One extra year's schooling in developing countries has been found to increase wages by anything from 7 to 25 per cent. It can even boost farm output by 2 to 5 per cent. In Nepal's lowland Terai region, farmers with six years' schooling achieved wheat yields over 25 per cent higher than those with less.²⁷

Smaller families, better education.

Education, especially for women, affects family size. But the converse is also true: many studies, in developed and developing countries, show that children from small families tend to have more years of schooling and perform better at school than those from larger families.²⁸

One explanation is that large numbers of children stretch the family's education budget. Schooling may be free, but books, paper, uniforms and travel are not, and there may be a loss of income from child labour. Just under half of small families in one survey cited lack of funds as the reason why a child stopped studying – as against 82 per cent of families with six or more children.²⁹

Parents' time and attention is also a limited resource. Time spent with parents, one-to-one, improves a child's intelligence and later school performance. In smaller families parents can spare more time for each child.³⁰

In a major recent study of United States data, demographer Judith Blake found that the difference between small and large families amounted to two years of schooling. Children from smaller families also tended to score better on tests of verbal ability. Blake argues that the shift to smaller families may also improve social mobility because

Education and family size

Children of small families in rural Thailand are very much more likely to stay on at school than those from large families. Primary school is compulsory, so there is no difference in enrolment between small and large families. The differences begin at lower secondary school. A study found that children from one or two-child families are five and a half times more likely to start this level than children from families with six or more children. They are six times more likely to go on to upper secondary school.

The differences apply even in higher income families, where children from families with one or two children are twice as likely to start lower secondary school than those with six or more children. In poorer families, where total resources are more limited, children from smaller families have a seven times better chance of starting lower secondary school than those from large families.

This is not the result of parental commitment to education. The survey found that parents of small and large families had very similar beliefs as to how much education was desirable.³²

As the overall number of children per family in Thailand drops, the proportion sent to school rises. Thailand's fertility decline alone could have accounted for increasing the share of children going on to lower secondary school from 20 per cent to 36 per cent of the age group. And it would have almost doubled the share going on to upper secondary school, from 13 to 24 per cent.³³

*Population and development***Fertility decline boosts schooling and incomes in Thailand**

Thailand's economic growth averaged 4.2 per cent a year in the 25 years to 1989 — seventh fastest in the world. Manufacturing output grew by an average 10 per cent a year between 1965 and 1989. Agriculture prospered: cereal production has grown by an average of 3.2 per cent a year since 1961. Thailand is the world's biggest rice exporter.

Thailand's human development has prospered too. The infant mortality rate was down to 28 per 1,000 live births in 1989, and life expectancy reached 66 years. Some 91 per cent of adults were literate.

Thailand has also seen one of the fastest fertility declines in the world. The average number of children per woman plummeted from 6.14 in

1965-70 to only 2.2 in 1987, primarily the result of increasing use of contraceptives, which reached 66 per cent of women in 1987.

Declining fertility has meant better health and more education for Thailand's children, contributing to the country's success in other fields as they become adults.

Education has been central to Thailand's economic success. Just one year's extra schooling was found to improve farmers' output by 3 per cent. Farmers with four years of schooling were three times more likely to use new chemical inputs than farmers with one to three year's schooling. An extra year of primary school also produces a 13 to 17 per cent improvement in wages in later life.⁴³

children from smaller families do better at school than children from the same economic background but larger families.³¹

b. Nutrition benefits

Education, health and nutrition all interact to determine individual quality of life, achievement and potential contribution to society.

Malnutrition means lack of energy for work, play, or interest in life. It also magnifies other aspects of poverty, affecting basic intelligence, attention, and resistance to disease.

Rapid population growth combined with poverty has direct effects on nutritional status. When families are large and births more closely spaced, the mother's capacity to sustain an optimum pregnancy may be impaired, and the child may be starved and stunted even in the womb. In 15 out of 18 countries covered by recent Demographic and Health Surveys (DHS), children born less than 24 months after the last birth were more likely to be below average height for their age.³⁴

The effect of large families continues throughout childhood. One study in São Paulo found that low income families with only two children spent 73 per cent more per child on milk, eggs and meat than families with six children, and 135

per cent more than those with nine or more. The difference applied at all income levels. Spending where there was only one child was four to six times more than where there were nine.³⁵

A recent DHS study of data from Brazil found that, in families with six or more children, 45 per cent of children were severely stunted, against only 21 per cent in families with three or less. The difference in Colombia is similar.³⁶

In large families, later arrivals may be especially disadvantaged. A recent Philippines study found that the average height-for-age of seventh children was very much lower than for first-born. The gap was wider than that between mild and moderate malnutrition, or between moderate and severe. There was a systematic decline in height-for-age with increasing birth order, even in wealthier families. The study concluded that family planning could help to reduce the numbers of children who are severely disadvantaged by malnutrition.³⁷

Nutrition also has a strong effect on success in school. *Present* malnutrition, indicated by below average weight-for-height, affects attention and learning. Underfed children are more easily distracted and have shorter attention spans. In the Philippines children with low weight-for-height performed worse in maths tests, which require close attention.³⁸

Long-term malnutrition from an early age — often in the womb — has deeper and longer lasting effects. It impairs brain development and can lower basic intelligence over a lifetime. Children who show signs of prolonged malnutrition measured by height-for-age performed significantly worse in school and in intelligence tests in studies from many countries, including China, India, Thailand, Philippines, Guatemala, and Kenya. In Nepal, height-for-age

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was the most important factor after family income in explaining enrolment and attainment.³⁹

Smaller families, higher incomes per person.

Some of the gaps in nutrition and education between smaller and larger families can be explained by the economic problems created by larger families.

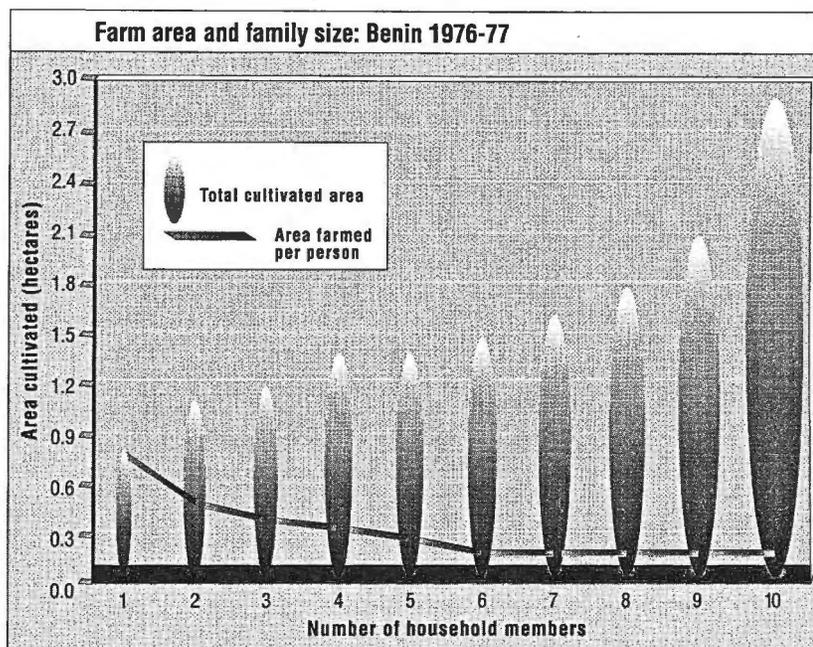
Families evolve. Their income or farm production per person changes at different stages. The larger family is under heavier economic pressure at the most crucial stages of development for the third, fourth and fifth child; family income is static and demands on it steadily rising. The ratio of consumers to producers stays higher for longer.⁴⁰

The parents in the larger family may compensate by working longer hours, but they then have less time to devote to each child.

Comparing families with similar parental incomes, expenditure per person in the large family is usually lower than in the small. A Population Council study from Ghana found that in male-headed households with six children, average expenditure per person (adjusted for age) was 19 per cent lower than in families with two children. In female-headed households per capita expenditure was 42 per cent lower.⁴¹

The effect is found even with farm families. In densely settled regions where there is no spare land, the family cannot expand its holding. As the number of children grows, the area of land available to feed each member shrinks, and so does each child's inheritance. With each passing generation, family holdings grow smaller.

Where there is still unclaimed land, as in parts of Africa, parents' labour power is the limiting factor. They can expand the area they farm, but it may not be enough to keep up with increasing family size. One



study in Benin found that the average overall farm size rose from 1.35 hectares for a four-member family, to 2.93 for one with ten or more members – but the area cultivated per person dropped, from 0.34 to 0.22 hectares. The two-child family had almost 50 per cent more land per person than the family with six children or more. Surveys in Central African Republic, Congo and Chad have found similar results.⁴²

c. The health benefits of smaller families

Good health has an intrinsic value – but it brings economic benefits, too. Illness causes family poverty or makes it worse. In agricultural areas the worst period for health is the rainy season, which is just when labour is most needed in the fields for planting, weeding or harvesting.

In the industrial sector sickness means lower productivity and lower wages. An average adult worker in Ghana, Côte d'Ivoire or Mauritania can expect to lose 1.3 to 1.6 days' work a month to illness, and stands to forfeit more than six per cent of

The ovals show the total area farmed, the ribbon the area farmed per person. Bigger families increase total area farmed, but not the area per family member.
Source: *Population and the Labour Force in Rural Economics*, FAO, 1986.

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normal earnings.⁴⁴

Better health and lower infant mortality help to slow population growth. Lower fertility in turn improves child survival and health. Large families in crowded conditions encourage the spread of diseases such as tuberculosis. Some studies have found that children from larger families are more likely to have serious accidents requiring hospital treatment. The reason may

be that in large families older siblings are often used as child minders, and are not as attentive or as careful as parents.⁴⁵

Mothers with big families have children early and often. Both are dangerous for mother and child. Recent DHS surveys from 25 countries show that, on average, children born to mothers below age 18 are 46 per cent more likely to die before age five than those of mothers aged 20 to 34. Children of 18 and 19 year-olds are 16 per cent more likely to die. Avoiding births to mothers younger than 20 could cut deaths of under-fives by 17 per cent on average.⁴⁶

Closely-spaced births also threaten life and health. Pregnancy and breastfeeding drain a woman's nutritional resources. If births are too closely spaced, she does not have enough time to recover from one pregnancy to the next. Children born within 18 months of the last birth are more than twice as likely to die before age five than when there is a two or three year interval — and three times more likely than if the gap is four to six years. Spacing all births two to three years apart could cut child mortality by 17 per cent.⁴⁷

Close spacing may also have a health effect on the previous child, who may be prematurely weaned if the mother gets pregnant again too early.

Eliminating pregnancy too early and too often could cut child deaths by an average of 24 per cent across the 25 countries studied. In Brazil family planning could have reduced child deaths by 39 per cent, and in Egypt by 42 per cent.⁴⁸

Most women do not choose closely-spaced pregnancies. Almost nine out of ten women in the DHS surveys would have preferred to space their births two years apart or more — but only two thirds managed to do so. Indeed 46 per cent of women said they would prefer birth intervals of four years or more — but only

Women and development in the two Indias

India, the world's second most populous nation, will by 2025 overtake China if United Nations projections prove correct. Progress in improving the quality of life has been slower than might have been expected.

Yet India is not one country but several. The national experience is the outcome of very diverse trends at the level of individual states, whose governments control much of the policy and spending in education, health, and many other matters.

The most dramatic contrast is between the southern state of Kerala, and the five northern states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar and Orissa, which between them make up more than 40 per cent of the national population. Where Kerala has matched the human resource development of the very best performers among developing countries, the five northern states have been among the worst. And the place of women is central to the difference.

Kerala's female literacy rate of 66 per cent is almost double that of its nearest rival. In the five northern states only 11-21 per cent of women can read.

Kerala has the lowest infant mortality rate in India, only 26 per 1,000 live births. In the northern states infant mortality is between four and five times higher.

Kerala's fertility rate has fallen to the astonishingly low level of 2.3 children per woman — lower than Thailand or China, the former USSR or Ireland. Contraceptive prevalence is three times the national rate.

Yet Kerala has not suffered economically. The state has performed well in eradicating poverty. Although its per capita incomes in 1987 were only 71 per cent of the Indian average, only 27 per cent of its population were in poverty. In the northern states the poverty rate ranged from 34 to 49.5 per cent.

Kerala's low average incomes are the heritage of the past, rather than the result of diverting investment into human resources — incomes in Kerala have grown at similar rates as in other states. Slower population growth rates may have helped the poor by lowering labour

supply and raising wages. Between 1970-73 and 1982-85, real wages rose at over 3 per cent a year — against less than 2 per cent in 15 out of 16 districts of the northern states. Incomes per person in the five Northern states in 1986-7 were all lower than in Kerala, despite the presence of the national capital, Delhi, and many other industrial towns.

Kerala has more roads in relation to its area than any other state, and is the only Indian state where all villages are connected to all-weather roads. It has the highest newspaper circulation in India, the highest rate of hospital beds to population. A high educational level has helped Kerala to attract industrial jobs — in 1980 it had more factory jobs per 1,000 urban population than any other state in India. And women made up the highest proportion of the workforce in India — 35 per cent overall, 45 per cent in the private sector.

Kerala does not appear to have sacrificed its natural environment to industrial development. Although it has the highest population density of any state — 655 persons per square kilometre — forest still covers 29 per cent of its area, third highest ratio among the large states, and well ahead of other states with half its population density.

Two factors explain Kerala's success in human development. One is the priority given by the state government to spending on education and health, continuing a tradition that reaches far back into colonial times. Spending has also been equitably distributed — Kerala is the only state in India (and one of the few in the developing world) where the rural death rate is lower than the urban. A far-reaching land reform from the 1960s has benefited three million tenants and landless.

The second factor, whose roots reach even further into history, is the status of women. In Kerala — unlike the north — women inherit land. In Kerala the husband's family pays a brideprice to the wife's family on marriage: women are considered an asset. In the north they are seen as a burden; in reality they are a wasted asset. The waste of that asset has immense human costs, and has led to economic stagnation and rapid population growth.⁴⁹

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16 per cent achieved such gaps. If women could achieve the birth spacing they preferred, up to half of maternal mortality – perhaps 200,000 deaths a year – could be avoided. British demographer John Hobcraft calculated that overall child mortality could also be reduced by an average of 21 per cent.⁴⁹

The great majority of children from badly timed births do survive – but a significant proportion of them may be handicapped or physically and mentally stunted for life.

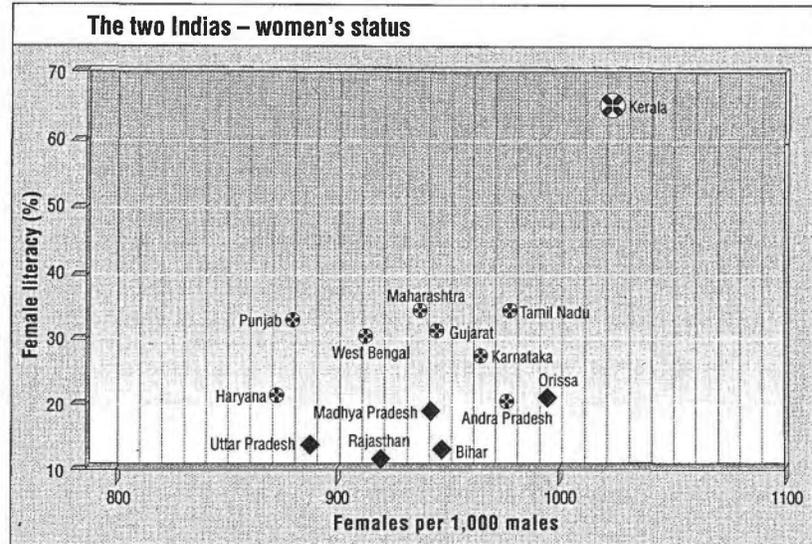
Women – the wasted asset

The principle of equity within the present generation, of spreading the benefits of development to all, demands better treatment for women as of right. But it is a requirement, too, for equity towards future generations. There can be no sustainable development for anyone without development for women.

The connection between the status of women and the pace of development is becoming increasingly clear. Economic growth and improvement in the quality of life have been fastest in those areas where women have higher status, and slowest where they face the greatest disadvantages.

This is not coincidental. Women chiefly determine the quality of children – both male and female. Women's health and nutritional status during pregnancy and breastfeeding affect the health and growth of the foetus and the infant. Women's education and awareness, and their degree of control over family resources, determine children's nutrition and mental and physical development. Through these, it affects their success in school, and their health and productivity in later life.

Yet women often take last place in the distribution of family power, food or resources. The favoured male may imagine that his wife's



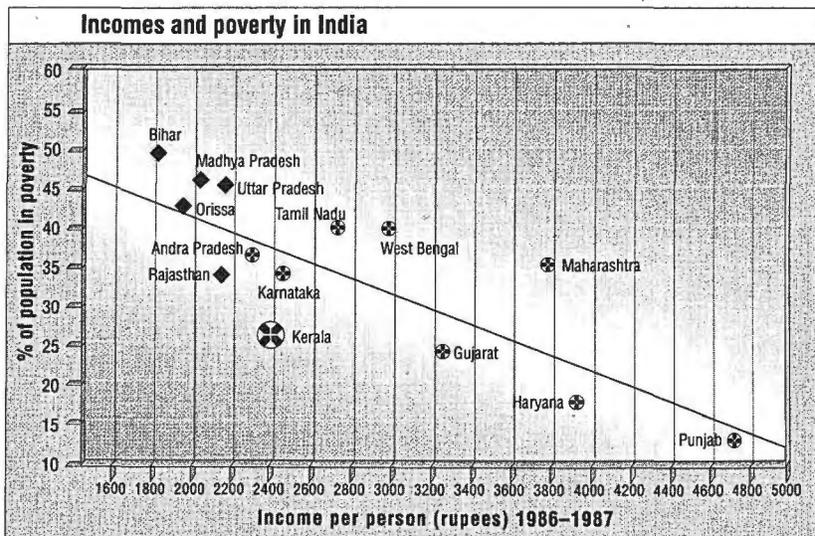
loss is his gain. But his own sons – and still more likely, his daughters – may be physically or mentally stunted as a result.

This chart shows female adult literacy and the number of females per 1,000 males. When this figure is below 1,000, it indicates the lower status of women, expressed in poorer access to food and health care.
Source: Ministry of Health, New Delhi.

Women's education

It has been estimated that in developing countries each extra year of education for a mother reduces her children's mortality risk by an average of 7-9 per cent. Better education for mothers also reduces the incidence of stunting and underweight

With a relatively low income level, Kerala has a lower incidence of poverty than all but three Indian states.
Source: Ministry of Health, New Delhi.



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in children. Better educated mothers are more likely to have had tetanus immunization, and many times more likely to use ante-natal care.⁵⁰

Yet women are still at a grave disadvantage educationally in many parts of Africa and Asia. The situation has improved significantly since 1970, but there is still a very long way to go. Even at primary level there were only 73 girls for every 100 boys in south Asia in 1987, 77 in the Arab states, and 80 in Africa. At secondary level the discrepancies were far worse: south Asia's secondary schools had only 57 girls per hundred boys, Africa's only 47.

The gender gap shows up again in adult literacy. In 1987, while 83 per cent of women were literate in Latin America and 66 per cent in east Asia, in the Arab states the female literacy rate was only 38 per cent. In Africa it was 36 per cent and in south Asia a mere 32 per cent. Out of the world's 949 million illiterates in 1985, 592 million – almost two thirds – were women. Women's inability to read instructions on a packet of contraceptive pills or a diarrhoea remedy, a seed catalogue or an invoice, a will or a newspaper, bars them from the full benefits of development and prevents them from making their full contribution.⁵¹

Where women's status and education are good, use of family planning is higher and fertility is lower. Family planning and lower fertility also help to improve women's status and education. When girls leave school early for marriage and child-bearing, as they often do in south Asia and Africa, it perpetuates the cycle of low status and high fertility. Pregnancy outside marriage is a major cause of girls dropping out of school in Latin America and Africa.

Women and the labour market

Women make an enormous economic contribution. In almost all countries, when unpaid and informal

work is taken into account, they work more hours per week than men. But this is rarely credited, either in equal pay, or in national accounts. And this undervaluing of women fuels continued discrimination.⁵²

Official statistics on women's participation in the labour force do not give an accurate picture of their real role in most developing countries. But they do suggest the extent to which women's potential contribution is used – or wasted – in the formal economy.

Female participation in the official labour force is lowest in the Moslem world. In north Africa only 19 per cent of women work, and 37 per cent in west Asia. In south Asia their participation rate is only 39 per cent.⁵³

The value of women's full participation in the workforce is clear from east Asia's record of economic growth and human resource development. Here no less than 78 per cent of women are active in the labour force – even higher than the 67 per cent average for developing countries.

Women's access to the labour market brings multiple benefits. It works to lower fertility by delaying the age of marriage. After marriage, it provides women with an independent income which will improve their power and status in the family.

It helps children directly, because far more of women's income than men's goes into the welfare of the children. Recent research shows that the proportion of children in poverty is much lower where the mother does cash work.⁵⁴

3. POPULATION GROWTH AND BALANCED DEVELOPMENT

UNBALANCED development leads to migration, as people act to improve their lives. They move from poor areas to richer; from land-poor areas to districts with land to cultivate; from impoverished countryside to city; from countries with high unemployment and under-employment, to countries where there are jobs. By moving, they seek to restore economic balance.

After three decades of development, the division of the world's wealth has grown more, not less, unbalanced. In 1965 high-income countries accounted for 70 per cent of global Gross National Product (GNP), and developing countries for 19 per cent.⁵⁶ There was a slight improvement up to 1980, but the 1980s reversed the trend; net transfers flowed from the poor South to the rich North. By 1989 the division was 73 per cent – 16 per cent.⁵⁷ Meanwhile the proportion of the world's population living in developing countries had risen from 70 per cent in 1965 to 78 per cent in 1990.

Among developing countries, patterns of growth have been diverse. East Asia has grown faster than any other region in the world: average income per person grew by 5.2 per cent a year between 1965 and 1989. But in south Asia and Latin America income grew by only 1.8 per cent – and in sub-Saharan Africa by a mere 0.4 per cent.

Within nations, development has also been uneven, particularly between rural and urban areas. In the late 1980s, rural areas in developing countries had, on average, only 45-62 per cent of urban areas' access to health care, clean water and sanitation. Urban incomes are often double those in rural areas.⁵⁸

Internal migration

Some migration still occurs *between* rural areas in developing countries, but most of the good land has already



Photo: Mark Edwards/Siri Pictures

been occupied. The remaining vacant areas may be difficult to work, infertile, or unhealthy. They are usually ecologically sensitive, prone to rapid erosion or degradation.

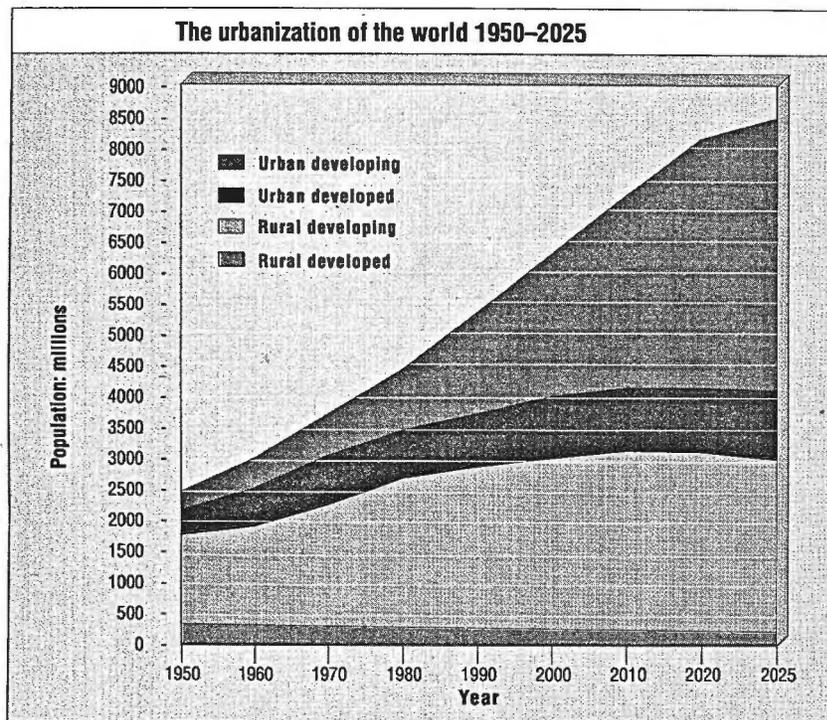
In east Africa there is a move from the well-watered but densely populated hills to the emptier but drier plains. In west Africa there has also been a drive into drier areas. Dry land soon deteriorates under intensive cultivation.

In Bangladesh people from the overcrowded coast have moved inland to farm the Chittagong Hill Tracts, once covered in dense forest. This move uphill can be found everywhere, on to steeper land which quickly erodes once it is cleared for cultivation.

This type of migration poses a double threat to sustainable development; the land is worked to exhaustion, and when it is finally abandoned there will be further migration. Slower population growth in sending areas could help

Both between and within countries, unbalanced development leads to migration as people move from poor areas to richer seeking a better life for their families.

Population growth and balanced development



Urban and rural populations, 1950-2025, medium projection.
Source: United Nations Population Division.

to reduce migration both now and later, and preserve forest cover, watersheds and wildlife habitats.

The future is urban

Most migrants within developing countries now head for towns and cities. Urban areas swell not only with their own population increase, but with the overflow of people from rural areas.

At times migration has accounted for much of population change. The United Nations estimated, on the basis of census data from the 1960s and 1970s, that about a third of rural population increase in Africa and Asia, and 58 per cent in Latin America, was lost to migration or reclassification of rural settlements as urban. Urban areas, in turn, owed much of their growth to in-migration and swallowing of rural areas: between 36 per cent (in Latin America) and 47 per cent (in Asia).⁵⁹

Cities have traditionally been the heart of trade, science, and culture.

But wherever cities grew rapidly or passed a certain size threshold there have been costs, in crime, congestion, and pollution.

Modern towns and cities pose a wider challenge to sustainability. They produce little or none of their own food, fuel or water. They use immense quantities of energy and raw materials for transport, communication and construction, as well as production and packaging. They generate vast amounts of solid waste and dangerous concentrations of air and water pollutants. In many developing countries the sheer pace of urban growth has outrun all attempts to provide housing, water, sanitation and roads, and produced few of the expected benefits.

In 1950 only 29 people in every 100 lived in cities. All the urban areas in the world had only 734 million inhabitants, and only two cities – London and New York – housed more than eight million people.⁶⁰

By 1990 the world's urban population had more than trebled, to 2,390 millions, and 45 people in every 100 lived in towns or cities. There are now 20 hyper-cities with more than eight million people each. Fourteen of these are in the developing world, where in 1950 there were none. Developing countries, which in 1950 had only 39 per cent of the world's urban population, by 1990 had 63 per cent.

The future looks even more urban. Over the 1990s no less than 83 per cent of the world's population increase is expected to take place in towns and cities – 81 million people every year, equivalent to around 10 extra cities the size of Moscow, Delhi, Paris or Lagos. Annual additions to overall world population are expected to peak in the 1990s, but urban increments will go on growing – reaching 95.5 million per year between AD 2020 and 2025.

The primary engine driving urban growth is the growth of employment

*Population growth
and balanced development.*

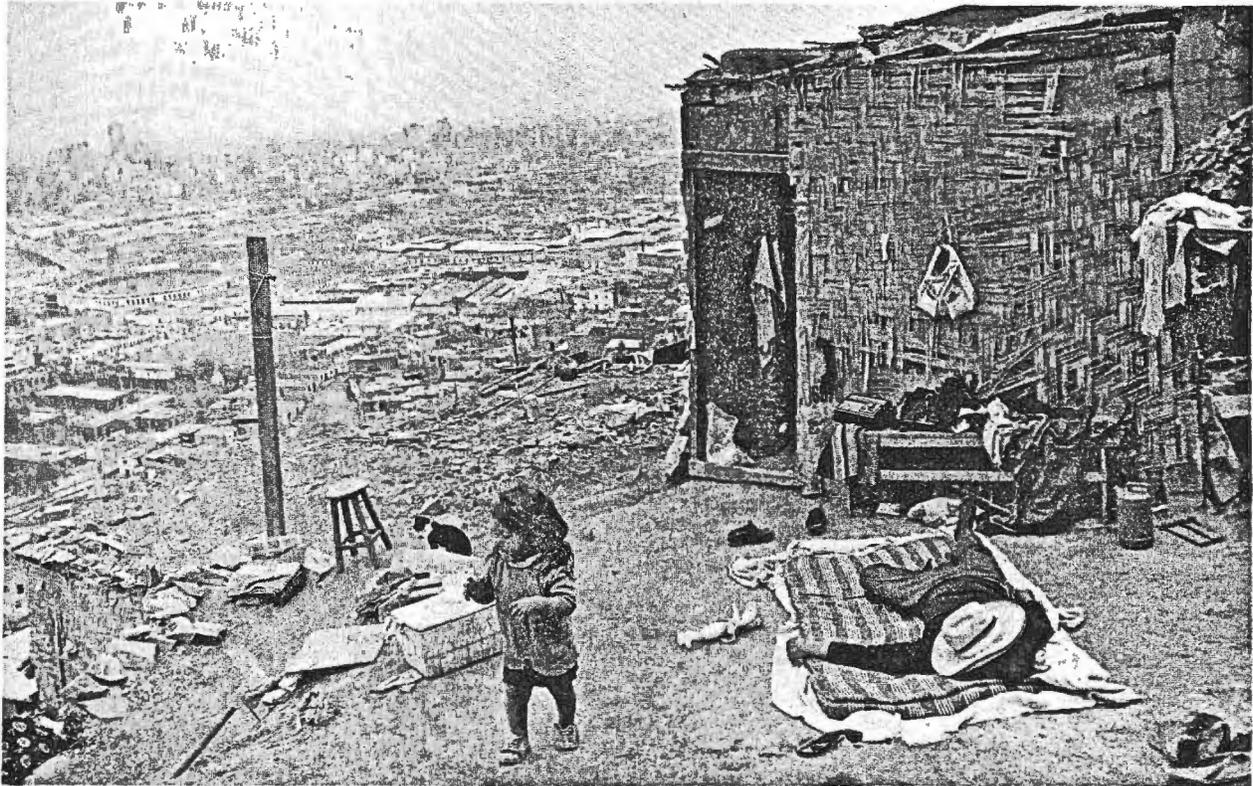


Photo: Mark Edwards/Sill Pictures

in cities. But the rate of national population growth also has a strong impact. A study of 97 developing countries for this report found that, in the 48 countries with faster national population growth, urban areas were growing at an average of 6.1 per cent a year. In the 49 countries with slower overall population growth, cities were growing at only 3.6 per cent a year.⁶¹

There was a high correlation between growth of urban populations, and growth of national populations. In statistical terms, the national rate of population growth explained 45 per cent of the differences in urban growth over the 1975-80 period. The United Nations found that national population growth rates explained 47 per cent of the variations in growth of megacities between 1970 and 1980.⁶²

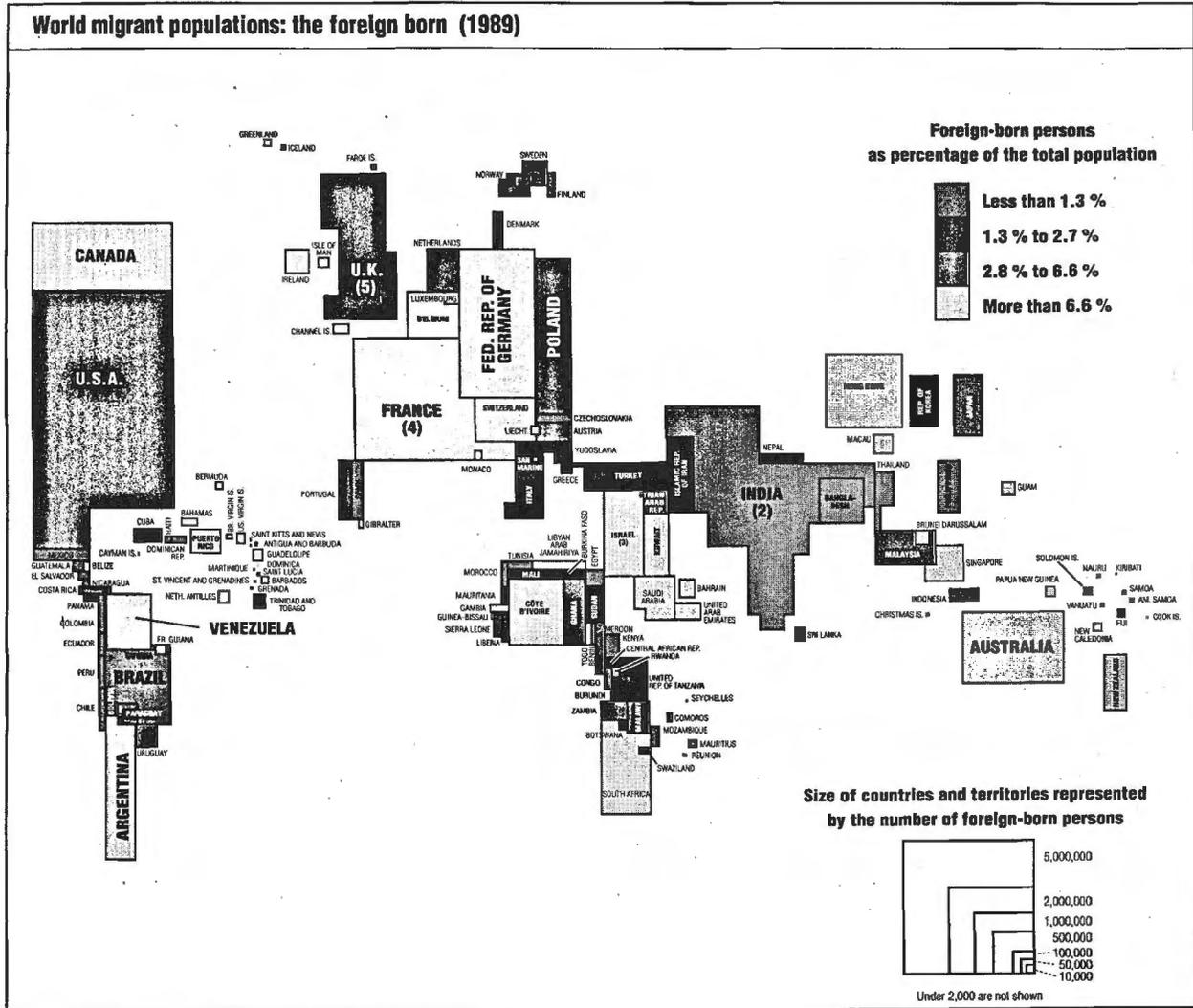
National population growth rates also seem to have some effect on the rate at which a country becomes

more urban than rural. The urban share of total population increased by an average of 2.8 per cent a year in the 48 countries with faster population growth. In the 49 slower-growing countries the urbanization rate was only 1.8 per cent.

The environmental problems of cities in developing countries, from air and water pollution to squatter settlements, are all too familiar. They are not all the result of population growth. City governments often spend very little on housing or services for the poor, either because there is low economic return on such services or because cities do not wish to encourage settlement. Building standards may be set too high for the poor. Planning regulations may be bypassed so that, for example, polluting industries are set up in residential areas. Treatment of effluents may be inadequate because clean technology is too expensive. Cheap fuel may be highly polluting.

In the 1990s, over 83 per cent of the world's population increase is expected to take place in towns and cities — 81 million people every year, equivalent to around ten new cities the size of Moscow, Delhi, Paris or Lagos.

Population growth
and balanced development



Source: United Nations Population Division.

Notes

In some cases, foreign population is displayed instead of foreign-born.

(2) The total population includes an estimate for Assam; the foreign-born includes Assam.

(3) Jewish population only.

(4) The foreign-born population includes all those born outside of metropolitan France.

(5) The total population refers only to usual residents born in the Channel Islands and the Isle of Man.

The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Population growth and balanced development

But for any given level of technology, management or governance, faster population growth means worse housing and environmental conditions. Slower population growth cannot solve urban problems – but it can help alleviate them, and give breathing space to tackle them.

International migrants – the rising tide

Migrants are crossing national boundaries in growing numbers. International migration can bring benefits for both sending and receiving countries, but in the 1990s it is fast becoming a major international issue. As many as 70 million people, mostly from developing countries, are working (legally or illegally) in other countries. Over one million people emigrate permanently to other countries and close to that number seek asylum each year.⁶³

International migration reached record levels in the late 1980s. The world's traditional home for the "huddled masses", the United States, was taking in an average of 603,000 permanent immigrants a year in the late 1980s – the highest in history except for the 1900-1920 period. Migration to Canada and Australia doubled between 1984 and 1988. Between them, these three countries admitted over eight million settlers during the 1980s.

Asia, not Europe, is the main source of these migrants. In the USA the European share dropped from 53 per cent in 1960 to only 12 per cent in 1984. The Asian share rose from eight per cent to 44 per cent.⁶⁴

Migration from east to west Europe has also become a factor, though so far the only European country to take in large numbers of migrants from the east is Germany. The former West Germany took in a million immigrants between 1984 and 1988. In 1989 alone 720,000 ethnic Germans from eastern Europe

Migration and population pressure in the Sahel

The Yatenga province of Burkina Faso has been an exporter of people for many decades, but the pressure to migrate has never been stronger. Population growth combines with climate change and land degradation to cut the land's ability to provide food, at the same time as population goes on growing at 2.7 per cent a year.

Since the drought of 1973-74 villages have lost land at an alarming rate. Vegetation, weakened by drought, was killed by overfarming and overgrazing. The exposed soil formed an impervious crust. Rains washed away down gullies, rather than filtering into the soil to feed crops. Women's burdens increased: they had to go further for firewood, and the wells dried up earlier.

Kalsaka villager Jean-Marie Sawadogo remembers, in his boyhood, good rains, full granaries, long fallows, rich wildlife.

"But my grandfather had seven sons, and each of them had three or four sons. So gradually more and more forest had to be cleared around the compounds. Each clearing joined up with the next and created the great openness you see now. Now we have to farm the same fields year after year. Year after year the rain has got less. A piece of land that used to fill two granaries would not even fill one now. Last harvest it would not even fill half a granary. The hills are bare. The only animals we see are hares."

To halt desertification, farmers now build low lines of stones along the contours. These dam back the rainwater and give it time to filter in. But still the province cannot feed its population. The crops may get enough water when the rains are good, but they are not getting enough

fertilizer. Research has not yet come up with a Green Revolution for the Sahel.

Every family in Kalsaka has to have other ways of earning money to buy the food for their family that their land cannot produce. Jean-Marie's nephew, Bukaré, weaves blankets, knits woolly hats, and pans for gold.

But many are forced to leave. Some 25,000 people each year move from one area to another inside Burkina Faso. Another 40,000 leave the country—mostly to Côte d'Ivoire to the south. Two of Jean-Marie's brothers have moved to Abidjan in Côte d'Ivoire. So have two of his sons, and Jean-Marie relies on their remittances.

Jean-Marie's brothers live in houses they have built for themselves, amid a dense clutter of shanties, in the shadow of Abidjan's scrapyards. Precarious towers of battered car bonnets and doors lean over the rust-roofed houses. It is a miniature suburb of Kalsaka: here live Jean-Marie's brothers Ninsabia, mechanic, Siddiqi, taxi-driver; Amadou Zélé, nightwatchman; Adama Belem, brick maker; and Amadou Yampa, nightwatchman, and their families.

Abidjan has grown at the astonishing rate of 9 per cent a year since 1930. Some two thirds of that growth is due to migrants like the Sawadogo family. One or two million Burkinabé – no one knows the exact number – live in Côte d'Ivoire. That is equivalent to 10 or 20 per cent of the Burkina population, 8 to 17 per cent of Côte d'Ivoire's population.

So the poverty and population growth of the Sahel will continue to swell the shanty towns of the coastal cities.

arrived – not counting those from former East Germany.⁶⁵

Before 1973, Europe had been a magnet for temporary "guest-workers". But the oil price rises of 1973 changed everything. New worker migration stopped and earlier migrants were encouraged to return home – in former West Germany a net inflow of 209,000 workers a year in the early 1970s turned into an outflow of 75,000 a year in the early 1980s.⁶⁶

Oil exporters on the other hand had an acute labour shortage and the means to fill it. Migrant workers in the oil states of the Arabian peninsula almost trebled, from 2.8 million in 1975 to 7.2 million a decade later. The four countries of south Asia were sending 451,400

Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.

Population growth and balanced development

The refugee explosion

Over the past decade and a half there has been an alarming increase in refugees in the world (see chart). The total rose from 2.8 million in 1976, to 8.2 million in 1980, and 17.3 million in 1990. Africa's refugees rose from 1.2 million in 1976 to 5.6 million in 1990. Asia's increase over this period was much more rapid — from a mere 180,000 to 8 million. In the Americas the numbers more than trebled, from 770,000 to 2.7 million. Europe saw the smallest increase, from 570,000 to 894,000.⁷²

International law defines a refugee as someone, outside their own country, who has a well-founded fear of persecution on account of their political or religious beliefs or ethnic origin, and who cannot turn to their own country for protection. Most refugees are genuine by this definition.

The increase reflects in part fall-out from the cold war. Ethiopia, Mozambique and Angola accounted for almost half of Africa's refugees; Afghanistan alone for three quarters of Asia's total. They fled, for the most part, from one poor country into another, where they added to shortages of land and fuelwood, and intensified environmental pressure. Malawi, one of the poorest countries in the world, is sheltering perhaps 750,000 refugees from the war in Mozambique.

But among them — especially among those

who turned to the rich countries for asylum — were an increasing number of people who were not suffering political persecution. Driven out of their homes by the collapse of their environment or economic despair, and ready to take any means to get across borders, they are a new category — economic and environmental refugees.

The most spectacular attempts hit the TV screens: the Vietnamese boat people, ships festooned with Albanians. Behind the headlines there was a growing tide of asylum seekers. The numbers rose tenfold in Germany from 1983 to 1990. In Switzerland they multiplied by four times. In Europe as a whole they grew from 71,000 in 1983 to an estimated 450,000—550,000 in 1990.⁷³

In 1990, the numbers threatened to swamp reception systems. There was a growing phenomenon of "asylum shopping" — people turned down by one country applying to another, and another. The cost of supporting applicants on welfare while their claims were processed was rising — in 1990 there were some 800,000 foreigners in Germany whose claims were under consideration.⁷⁴ The pressure has led to a tightening up and speeding up of procedures, and some political refugees have been wrongly refused asylum as a result.

workers a year in 1980-84.⁵⁷

Then the economic tides shifted again. Oil prices began to fall in the mid-1980s, and with them the demand for labour in the Middle East. Migrant workers from south Asia dropped to less than 300,000 a year. Finally, the Gulf war sent over 600,000 Asian migrants home.⁵⁸

Other host countries were affected by falling oil prices — Nigeria expelled a million Ghanaians in 1983.

There has been a very slight recovery in labour migration from developing countries to western Europe, but it is to fill a need for highly skilled workers. Others face increasingly tight restrictions.

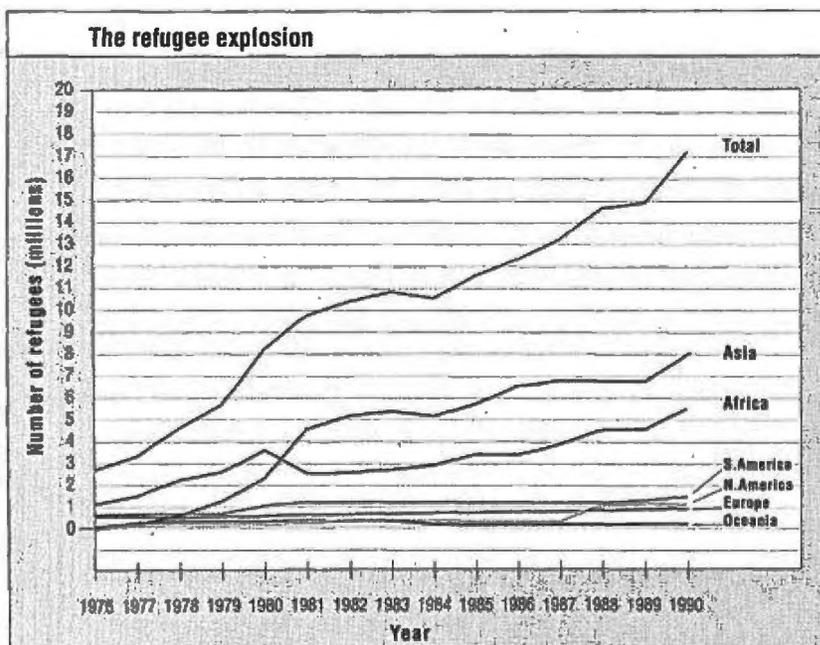
There is an increasing amount of migration between developing countries. Much of this is informal or illegal, and poorly documented. There are, for example, perhaps one million Indonesians working in Malaysian plantations and building sites. Over two fifths of Hong Kong's population was foreign born in 1981.⁵⁹

In Latin America, Mexico, Colombia and Cuba were the largest exporters of workers — mainly to the United States.

In west and central Africa there were a total of 2.74 million foreign-born residents according to censuses in the 1970s, but the true total was probably much higher. Nigeria alone had an estimated two to three million migrant labourers during its oil boom up to 1982. Côte d'Ivoire has attracted as many as two million migrants, mainly from the poorer Sahelian countries to the North. In 1975 almost a quarter of the population of Côte d'Ivoire was foreign born — mainly from Burkina Faso, Mali and Guinea.

Migration has created tensions in many parts of the world. In Europe migrants from developing countries have concentrated in inner cities, where they compete for housing and low-paid jobs with the poorest of the indigenous population. They often

Number of official refugees in the world by region, 1976-90.
Source: United Nations High Commission for Refugees.



Population growth and balanced development

come off worst. In the Netherlands in 1988, when unemployment among the Dutch was 13 per cent, it was 27 per cent among Surinamese and 44 per cent among Turks living there. Disadvantage in the labour market has not protected them from becoming the targets of violent racist attacks in several European countries.⁷⁰

European governments have responded by tightening regulations. In the late 1980s 57 governments out of 169 in the world had policies to reduce immigration. They included 42 governments of developing countries. Yet few borders are secure enough to stop the determined.⁷¹

Future pressures

Current population trends will increase the pressures to migrate. Greater numbers in the South will be matched by falling natural increase in the North. Like a gradient between high and low pressure in the atmosphere, the result could be a rising wind of migration, circling towards the North.

The aging North

In industrialized countries declining fertility rates – already well below replacement level – will lead to smaller and smaller cohorts of young people. At the same time rising life expectancies will increase the numbers of the elderly. This process was already well under way by 1990, when developed countries had only 23 per cent of the world population, but no less than 44 per cent of the over-60s.⁷⁵

In 1980, in western Europe, there were nine people over 60 years old for every ten between 15 and 24. By the year 2025, there will be 28. Half the population will be over 45.⁷⁶

The pensions, health care and welfare costs of increasing numbers of retired people in industrialized countries will thus depend on the productivity of a shrinking labour

force. Meanwhile, in developing countries, the labour force will be growing rapidly.

The intensity of future pressures can best be seen by looking at individual regions. Between 1990 and 2025 the labour force in crowded central America is expected to increase by 50.5 million. In north America it will not increase at all, except by migration.⁷⁷

Over the same period the labour force in northern and western Europe plus Italy is projected to decline by 14.5 million, or 11 per cent. The drop will be most marked in potential new entrants to the labour force. The number of 15-24 year-olds will fall from 44.2 million to 32.5 million, a 26 per cent decline. Meanwhile, north Africa's labour force will grow by 56.6 million.⁷⁸

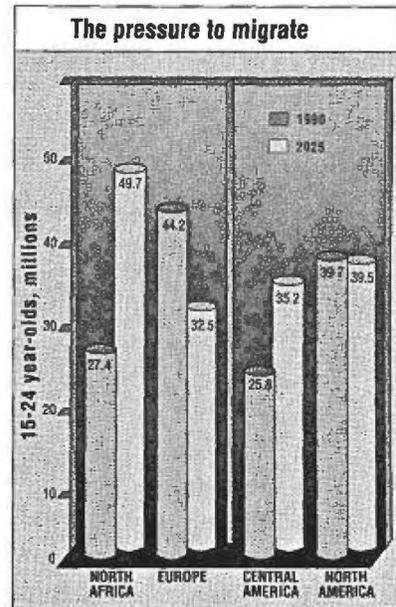
Instead of encouraging immigration, governments may choose other ways of dealing with the labour shortage, such as raising retirement ages or relaxing rules about pensioners working. But this can only be a partial solution, and the administrative and human costs will be high.

Faster economic growth and slower population growth in the South, if the process began now, would help to ease the pressures of the next 30 years. Better-balanced development must be part of the answer.

Environmental refugees

The number of environmental refugees will increase in the next 35 years. Some indication of the underlying problem can be gained from the Food and Agriculture Organization's (FAO) study of population carrying capacity. The study identified the "critical zones" whose land resources could not sustainably feed even their 1975 populations. For the most part these were also zones liable to, and already undergoing, severe land degradation.⁷⁹

Some 2,453 million hectares – 38 per cent of the overall land area



Over the next 35 years the number of young people will increase dramatically in some regions, fall in others.
Source: *World Population Prospects, 1990*, United Nations Population Division.

Population growth and balanced development

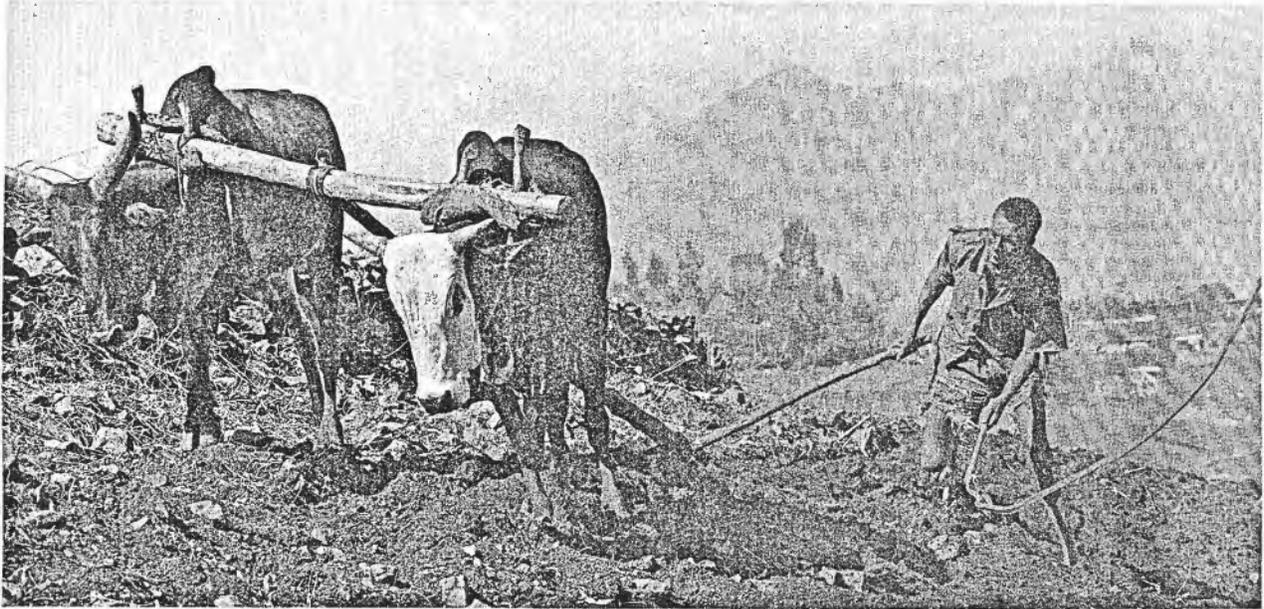


Photo: Mark Edwards/Skill Pictures

Some people become environmental refugees, moving because the land they work becomes degraded and the soil impoverished. Such land is often in marginal areas – mountainous or semi-arid – and cannot support the burgeoning populations.

studied – could not support even their 1975 populations using low levels of farming inputs. The total population of these areas was 1,165 million people – 60 per cent of the population of all the countries studied. Of these, the critical zones could sustainably support only 600 million at low inputs.

These critical zones are generally low-input areas. Most are marginal: either mountainous, like the spine of Latin America, the east African highlands, the ranges between Turkey and Afghanistan, and the mountain regions of Indochina; or semi-arid like north-east Brazil, the Sahel, the Horn of Africa, the dry corridor from Namibia to southern Mozambique, the Yemen, and the Deccan in India.

In west Asia, central and south America these zones could produce enough food, on a long-term basis, for only one third as many people as were living there in 1975. In Africa they could feed two fifths, and in south and southeast Asia three fifths. These results are for 1975 – future populations could not be predicted on a district basis. But by 2025 the populations will have at least doubled and may have trebled.

Global warming may throw up further waves of environmental refugees. Sea-levels are projected to rise between 30 and 100 centimetres over the next century, threatening low-lying wetlands and river deltas on every continent. Some 16 per cent of Egypt's population could be made homeless, and 10 per cent of Bangladesh's. Both these countries are already very densely populated. Where will the refugees of global warming go?

Environmental refugees flee from areas where they cannot survive: yet they do not qualify as refugees under the present definition. In the short term the international community must find ways of accommodating these forced migrants of environmental change – but long-term sustainability demands that ways are found to minimize human impact on the environment and on such creeping dangers as climate change. One way will be to minimize additions to human numbers.

4. POPULATION GROWTH AND SUSTAINABILITY

SUSTAINABILITY is perhaps the trickiest ingredient in the recipe for sustainable development. We do not always know in advance what is sustainable and what is not. So far, the method of choice has been trial and error: go too far and then pull back and try to repair the damage. But there are ways to make intelligent guesses about future effects of present actions.

Human beings interact with the environment in three main ways:

- **As space for living.** Our presence automatically excludes competing species.

- **As a bank of resources;** food, water, energy and materials.

- **As a sink for wastes,** solid, liquid and gaseous. That includes everything we use up and throw away and the unintended by-products of all our activities.⁸⁰

The traditional debate on population and environment has focussed on use of the environment as a resource bank. The neo-Malthusian position, typified by the 1972 *Limits to Growth* study, predicted that continued growth of population and consumption would exhaust resources. Catastrophic population collapse would follow.

Critics point out the adaptability and inventiveness of humans. They say that the price of most mineral resources and of food has come down in real terms, and if prices are low there can be no shortage of resources.

Mineral resources – the first paradox

It used to be thought that “renewable” resources such as water, land, or vegetation, were essentially unlimited. The resources most likely to run out were “fixed” or non-renewable – minerals or fossil fuels.

But so far world reserves of many minerals have actually increased, despite increasing use. Reserves of copper, for example, grew from 91 million tonnes around 1950, to 500 million tonnes in the first half of the 1980s. Over the same period aluminium reserves grew from 1,605 to 22,335 million tonnes.⁸¹

The paradox is explained by advances in technology and the workings of the market, which makes exploration and exploitation relatively cheaper at times of high prices; increased supply brings prices down again.

But this process may not go on indefinitely. The population explosion parallels an explosion in consumption; more people are consuming more than at any time in history.

Experience of mass consumption by vast numbers of people is brief indeed. The consumer society dates back to the second decade of this century. Recession and war delayed its spread outside the US till after 1945. In Britain, for example, only one in twenty-five households had a washing machine in the late 1940s,

Future resource demands – a statistical scenario

It is the year 2050, and world population is 10 billion (the United Nations “medium” estimate). The whole world is consuming resources at the rates of the United States in 1988.

World consumption of aluminium is over ten times the 1988 level; copper nine times, and zinc six times. The total 1988 world reserves of aluminium will be used up in only 20 years instead of 224. Copper reserves will disappear in four and a half years instead of 41. Zinc reserves will be used up in three and a half years instead of 21.⁸⁵

Fossil energy is equally critical. Consuming energy at United States 1988 rates, the world is using seven times more coal than in 1988, nine and a half times more oil, and 20 times more natural gas. The whole world’s 1987 oil reserves will be burned up in four and a half years. Coal reserves will be gone in 51 years.⁸⁶

Discovery of new reserves or replacement materials is hard put to keep up with consumption. Mining and distributing known reserves on such a huge scale, to say nothing of disposing of

waste products, make their own environmental demands. The effort to keep up with the direct and indirect environmental effects is straining national and international economic and political systems.

Renewable forms of energy offer some alternatives but also have environmental costs. Hydro-electric dams are unpopular and most suitable sites are already occupied. Even wind farms provoke protests. The prospect of unlimited solar, geothermal or fusion energy offer savings; but research and development were not pressed in the late 20th and early 21st century, because fossil fuel was still cheap. They are still in the future.

Such a scenario is, of course, only a statistical exercise, not a real prospect. But it does show the need for long-term thinking about economic growth and development. Human numbers and consumption of resources cannot continue growing in the future as they have in the past.

Population growth and sustainability

and one in fifty had a refrigerator.⁸²

At that time the human population numbered only 2.5 billion – less than half today's population. There are now almost 5.5 billion of us. On the medium projection we will be 6.3 billion by the end of the century, 7.2 billion in 2010, 8.5 billion in 2025, 10 billion in 2050.

Consumer durables are much cheaper in real terms than they were 40 years ago. Ownership in developing countries reaches higher levels, at lower incomes. In the mid-1980s, 13 per cent of even the poorest households in Kuala Lumpur, Malaysia, owned a fridge. In the second lowest income band, one family in two. In the Chinese capital, Beijing, almost two thirds of *all* families owned a fridge.⁸³ China's 1.1 billion people, almost equal to the population of all the high- and upper-middle income countries put together – are already on the path of rapid growth and industrialization taken by Japan and the Republic of Korea.⁸⁴

The demand for non-renewable resources could easily double in two decades if incomes grow at 1965-89 rates and if populations grow as projected.

Renewable resources – the second paradox

Over the next few decades, overuse of "renewable" resources is a more immediate threat to sustainability than exhausting "fixed" resources. Renewable resources are being used faster than they can be replaced: they are fast becoming non-renewable. We are discovering the limits of unlimited resources.

a. Land and food

Malthus's original question related to land and food. The worst predictions of apocalyptic famines have been proved wrong so far: at global level, food production has risen in

step with population. Average consumption has increased, both in quantity and quality.

But progress has not been evenly spread. Food production per person has in fact gone down in all regions of the developing world except Asia. In Latin America, cereal production per person fell by 5 per cent from 1970 to 1989, in west Asia by 18 per cent, in Africa by 20 per cent.⁸⁷

*Between 1978 and 1989 food production lagged behind population growth in 69 out of the 102 developing countries for which data are available.*⁸⁸

Growth in all the inputs needed for agricultural production have been slowing down. During the 1980s the cultivated area in developing countries grew at less than half the 1960s rate. Growth in world fertilizer use slowed from 16 per cent a year in the 1960s to only 6 per cent a year in the 1980s. Over the same period, expansion of the irrigated area slowed from 2.2 per cent a year to half that rate.⁸⁹

What are the prospects for the year 2050, when world population will have almost doubled?

The degradation threat

The first threat is land degradation: desertification of semi-arid areas, salinization of irrigated areas, soil erosion everywhere. A rough estimate of the loss of potential through degradation comes from agronomist Harold Dregne. He estimates that in the mid-1980s some 44 per cent of the land area of Asia had lost more than 10 per cent of its productive potential. The proportion affected in Africa was 40 per cent, and in south America 27 per cent. *Severe* degradation – where more than 50 per cent of yield potential is lost – affected 17 per cent of the land area of Africa, 16 per cent in Asia and 10 per cent in south America. In *developed* regions less than 7 per cent was severely degraded.⁹⁰

Population growth and sustainability

Despite this attrition, yields have increased almost everywhere. Yet we know from field tests that erosion removes the most fertile upper soil layers first, and depresses crop yields very severely.⁹¹

The apparent contradiction of rising erosion and rising yields is explained by increasing use of chemical fertilizers. Fertilizers are compensating for, and masking, the underlying loss of fertility and productivity.

This practice may not be sustainable over the long term. Chemical fertilizers run off into and pollute water supplies. In the Netherlands, for example, this has led to stringent limitations on the use of nitrogenous fertilizers.

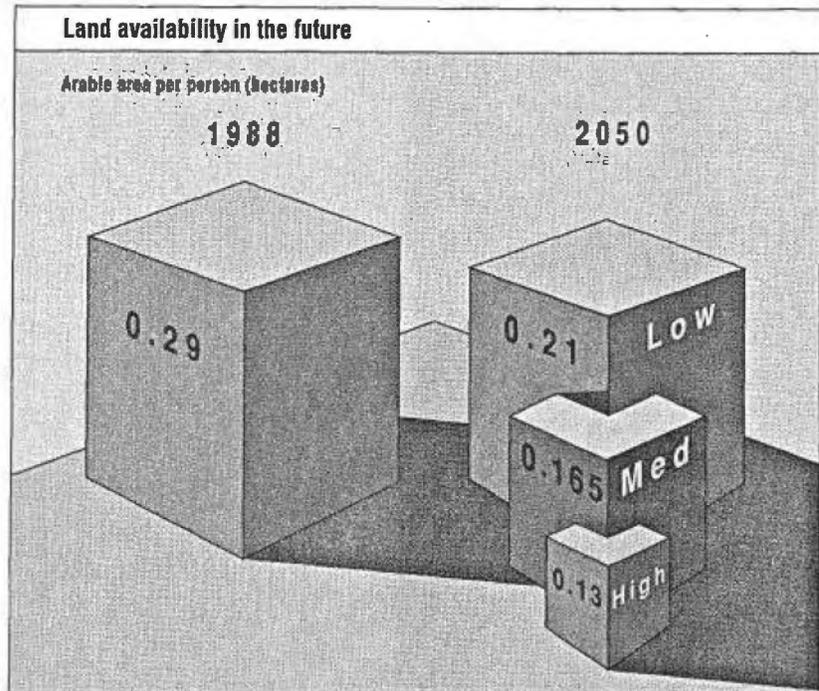
Where insufficient fertilizer is used, the soil is progressively impoverished: every tonne of rice removes 20 kg of nitrogen, 11 kg of potassium and 30 kg of phosphorus. Other trace elements are also depleted, including sulphur, zinc, iron, manganese, and boron.

A recent FAO study warned that African farmers were mining soil nutrients at such a rate that serious declines in crop production were inevitable within the next ten years. In 38 sub-Saharan African countries, 22 kg of nitrogen were being drained from each hectare every year. Annual losses of potassium were running at 18 kg per hectare, and of phosphorus at 6 kg. Nutrient deficiencies are now very widespread in Asia.⁹²

The shrinking land base

The second major concern is land, to meet the food and livelihood needs of growing populations.

Already in 1988, arable area per person was only 0.29 hectares: developing countries had only 0.21 hectares of farmland per person, while developed countries had two and a half times as much, 0.55 hectares. If the arable area continues



to expand at the same rate as in the 1980s, and world population grows according to the medium projection, then by 2050 the average person will have 0.165 hectares – a square with sides of 41 metres. In a developing country each person will have only 0.11 hectares of farmland at their disposal, or a square with sides of 33 metres.⁹³

In Africa, which is mistakenly supposed to have no land availability problem, the 2050 population is expected to be almost four times the 1988 figure. The arable area per person, assuming expansion at 1980s rates, will by 2050 have shrunk from the present 0.31 hectares per person to the near-Chinese level of little more than 0.1 hectares per person.

The space implications of these future land needs are very considerable. Projecting 1980s growth rates, an extra 1.76 million km² would be used for crops worldwide by 2050. Some 1.6 million km² of these will be in developing countries.

Non-agricultural land demands

The chart shows the arable area available per person in the world in 2050, if it expands at 1980s rates. Under the high projection there will be 37 per cent less than under the low projection.

Source: FAO and UN Population Division.

Population growth and sustainability

Photo: Sally and Richard Greenhill

The total extra land needed to provide for the additional population between now and 2050 is 4.5 million km² – 56 per cent more than the 1988 arable area of developing countries.

will be greater still. The FAO's study of population carrying capacity found that an average of 0.056 hectares per person were needed for houses, roads, factories, offices and so on. On this basis non-agricultural land will have to grow by 2.75 million km² by 2050 – all of that in developing countries.⁹⁴

Now since human settlements grow in farmland, rather than in deserts or forests, farmland in developing countries will have to expand by an extra 2.75 million km² to compensate.

The total additional land area required to meet the needs of population growth between now and 2050 will therefore be 4.5 million km². This represents an increase of 56 per cent on the 1988 arable area of developing countries.

If crop yields grow more slowly than in the recent past, then even larger areas will be needed.

Expansion on this scale will accelerate land degradation. In many parts of Asia, the Sahel, east and north Africa the limits of suitable land have already been approached or exceeded. Additional land will be

marginal, semi-arid, mountainous, or rainforest. Such soils are poor and the land easily degraded.

Slower population growth could ease this situation considerably. If the world could achieve the low population projection, the arable land available per person in the world in AD 2050 would be 0.21 hectares instead of 0.165 following the medium projection.⁹⁵

b. Water

Water is the most abundant yet the most critical of all resources. It is the most likely to impose limits on human development in many parts of the world.

It is crucial for food production – rainfed as well as irrigated; for industry and energy production; and for human health and amenity. Its use is increasing rapidly, threatening serious shortages in the future.

Water shortages bite harder as countries use an increasing percentage of their supplies. Countries using less than 10 per cent of their annual renewable water resources usually have no supply problems. Between 10 and 20 per cent, there may be regional difficulties. Over 20 per cent there are serious problems with storage, large scale transfers, and so on, often involving supply rationing.⁹⁶

In the late 1980s out of 113 developing countries, 14 were using 10-20 per cent of their resources. China and most of south Asia fell into this band. Another 25 countries were using more than 20 per cent.⁹⁷

Out of 20 countries in the Middle East and north Africa, eleven are already using more than half their water resources.

Africa also faces dangerous shortages, according to Swedish hydrologist Malin Falkenmark. In 1982 only six countries, with a total population of 65 million, faced water stress or scarcity. But by the year 2025 the number of countries affected may

Population growth and sustainability

rise to 21, with 1,100 million people – two thirds of the population of the continent.⁹⁹

At national level shortages mean competition between uses. Agriculture, industry and home uses are all essential to development – yet it may not be possible to satisfy all demands.

For many west Asian and African countries water will set a development ceiling. It will constrain improvements in agriculture, industry, home use, or all three. Water resource development and water treatment for re-use will eat up a rising proportion of national income.

Population and climate change

History shows that technology can increase the earth's ability to provide resources – its productive carrying capacity. But the environment when used as a sink for waste also has a carrying capacity, beyond which overloaded natural systems begin to collapse. This "waste carrying capacity", has already been exceeded in many areas.

"Forest death", the massive die-off of trees first noticed in central Europe, indicates excess sulphur dioxide and nitrogen oxides. The "ozone hole" is the result of excess chlorofluorocarbons (CFCs).

"Eutrophication" of lakes through dissolved nitrogen and "red tides" of algae indicate an excess of fertilizers and phosphates leaching into the water.

Overtaxing global waste-carrying capacity may reduce productive-carrying capacity by destroying resources. In addition, polluted air and water directly increase health risks. We risk leaving a poisoned legacy to future generations.

The greatest challenge to sustainability is climate change, to which human activities contribute directly.

Global warming brings with it the prospect of rising sea-levels, reduced

Population growth and deforestation in Madagascar

Madagascar's forests have been reduced to a narrowing strip along the eastern escarpment. Of the original forest cover of 11.2 million hectares, only 7.6 million hectares remained in 1950. Today this has been halved to 3.8 million hectares—which means the habitat for the island's unique wildlife has been halved, in just forty years. Every year some 3 per cent of the remaining forest is cleared, almost all of that to provide land for populations expanding at 3.2 per cent a year.

The story of one village, Ambodiaviavy, near Ranomafana, shows the process at work. Fifty years ago the whole area was dense forest. Eight families, 32 people in all, came here in 1947, after French colonials burned down their old village.

At first they farmed only the valley bottoms, easily irrigated by the stream running down from the hilltops. There was no shortage of land. Each family took as much as they were capable of working.

Over the next 43 years, the village population swelled ten times over, to 320, and the number of families grew to 36. Natural growth was supplemented by immigration from the overcrowded plateaux, where all cultivable land was occupied.

The valley bottom lands had filled up completely by the 1950s. New couples started to clear forest on the sloping valley sides. They moved gradually uphill until, today, they are two thirds of the way to the hilltops.

There was a parallel decline in the size of each family's paddy holding—also fuelled by population growth. When children marry, parents have to subdivide their own land and give them a plot. So holdings in the irrigated valley bottoms have dwindled. Today only a few are big enough to feed a family.

The more children in a family, the smaller their share as adults will be. The village chief lives in a small mud hut, looking out over a val-

ley which he once owned entirely. Since then he has had 10 children, and given parcels away to each. Though he is the wealthiest man in the village in cattle, his sons are among the poorest. They have only half a hectare of paddy each. They moved from prosperity to pauperdom in a single generation.

Zafindraibe's small paddy field feeds his family of five for only four months of the year. In 1990 he felled and burned two hectares of steep forest land to plant hill rice. The next year cassava would take over. After that the plot should be left fallow for at least six or seven years.

Now population growth is forcing farmers to cut back the fallow cycle. As land shortage increases, a growing number of families can no longer afford to leave the hillsides fallow long enough to restore their fertility. They return more and more often. Each year it is cultivated, the hillside plot loses more topsoil, organic matter, nutrients. No-one here uses fertilizer.

I came upon Marie Rasoanirina burning the stumps of last year's pineapple plants on a quarter-hectare field. This year she would plant beans and cassava. Then she would leave it fallow for two years, instead of the six it needs. Her husband is a landless immigrant from the high plateau, even more overcrowded than here. Marie's own parents haven't enough irrigated land to survive, let alone to give her. They are selling it off to get money to live on.

Eventually the fallow period is suppressed altogether. Vola has a tiny plot of paddy, about a tenth of a hectare, and half a hectare of hillside land. She was planting rice that year, to be followed by cassava. After that, instead of fallow, she would plant bananas and keep them for three years. Then rice again. Her husband died nine months earlier, when the logging lorry he worked on crashed. With four children to feed, she couldn't afford to leave the land fallow even for one year.

Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.

food security and increased loss of species. It is an international problem – air and water know no boundaries. Agreement has been reached on reducing CFCs. In the case of most of the "greenhouse gases" which trap warmth in the atmosphere, agreement will be much more difficult.

Population growth is a major contributor to greenhouse gases and thus to global warming, but its precise contribution varies widely. Where consumption and technology are changing slowly, population growth accounts for much of any

Population growth and sustainability

Assessing the population impact

The debate on population and environment has usually been conducted in anecdotal or dogmatic terms. But it is much more helpful to look at concrete data, to see whether we can put figures to the population impact.

Our direct impact on the environment is determined by the interaction of three factors: how many people there are, how much each person consumes, and how many resources are used or waste emitted for each unit of consumption. This latter factor is determined by the prevailing technology.

Impact = Population x Consumption per person x Technology effect or impact per unit of consumption. This is determined by the prevailing level of technology (eg using a bicycle has less environmental impact than using a car to travel the same distance).

Although this familiar formula, $I = P \times C \times T$, is normally used simply to draw attention to the main elements involved, it can be used to calculate the relative share of the three elements in environmental damage.

At any one point in time, it can help to illustrate the impact of each person's consumption on the environment. And if we take the annual rate of change in each factor, we can assess the relative

responsibility of population growth for increasing resource use or pollution output.

Social analyst Barry Commoner applied the formula to pollution in the United States between 1949 and 1968. He found that the amount of nitrogen applied per tonne of crops produced (the technology factor) increased by 8.9 per cent a year between 1949 and 1968. But population grew by only 1.55, and food consumption per person by a mere 0.55 per cent.⁹⁹

Each of these figures can be taken to represent the change that would have occurred in the total amount of nitrogen fertilizer used, if the other two factors had been held constant. We can assign responsibility between them by adding them up and scoring each one out of 100 per cent.

So we can say that population growth accounted for only 14 per cent of the combined increase, and consumption for only 5 per cent. The change in technology was responsible for 81 per cent of the impact.

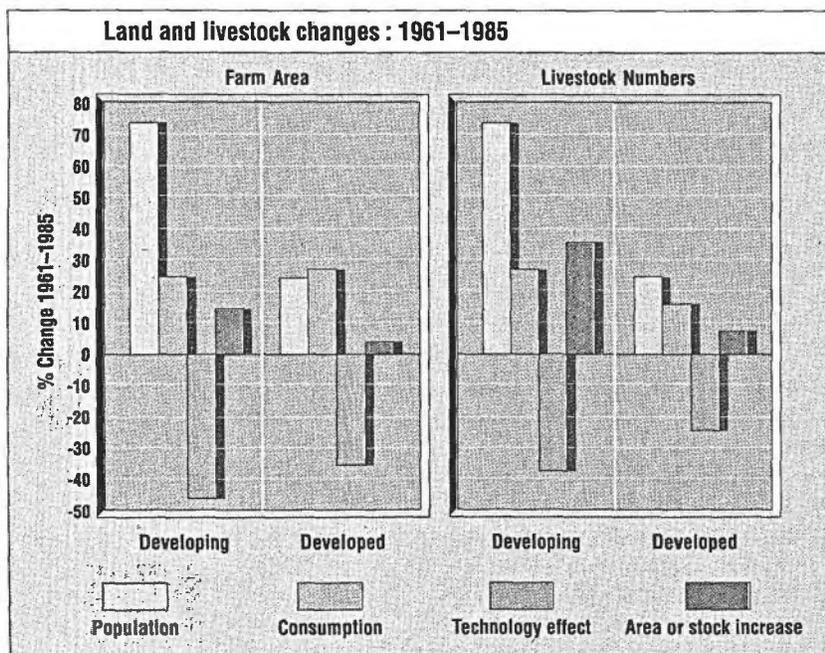
In a more recent study Commoner looked at three factors in 65 developing countries: pollution from cars, from commercial energy use, and from nitrogen fertilizers. In two of these cases average consumption per person fell, so consumption was a negative influence. Out of the

positive factors, population growth was responsible for between 25 and 31 per cent of the upward pressure.¹⁰⁰

Commoner concluded from his results that environmental quality was largely governed, not by population growth, but by the nature of the technologies of production. Yet even his own figures for developing countries show that population growth is by no means unimportant. In almost every case he looked at, the impact of population increase outweighed the impact of consumption increases.

The examples he considered were almost all cases of rapid technological change. But there were other kinds of change where the population impact was much more significant. The expansion of arable land is a key factor in deforestation and loss of wetlands. And as these habitats retreat, many of the species that live there are lost. Between 1961 and 1985, population growth accounted for no less than 72 per cent of the expansion in arable area in developing countries. Increased agricultural production per person was responsible for 28 per cent. Since yields were increasing, technology in this case was a downward pressure on the amount of land needed for each unit of agricultural production.¹⁰¹

The chart shows (left) the percentage changes in arable area, human populations, consumption, and yields. The right hand section shows changes in livestock and human numbers, meat and milk consumption, and yield per animal. The "technology effect" means impact per unit of consumption (see box above).
Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.



increase. Population growth, for example, accounted for 68 per cent of the increase in sub-Saharan Africa's carbon dioxide (CO₂) output between 1980 and 1988. It was responsible for 76 per cent in the case of Brazil, and 42 per cent in Indonesia.¹⁰²

Methane is an important greenhouse gas, produced by rice paddies and livestock, among other sources. Population growth accounted for 69 per cent of growth in livestock numbers in developing countries; increased consumption of milk and meat for 28 per cent. Technology – production per animal – was a downward pressure.¹⁰³ Other things being equal, slower population growth would also be a downward pressure – it would allow greater consumption for less methane production.

Slower population growth could help in slowing the greenhouse effect. By the year 2050, for example, if the low population projection could be achieved, CO₂ emissions from the energy sector alone would

Population growth and sustainability

be 3.4 billion tonnes less than the medium projection, and 7.4 billion tonnes less than the high projection. For comparison, *total* world emissions from the energy sector in 1985 were only 5.15 billion.¹⁰⁴

Loss of biodiversity

Humans directly exploit many natural species. In the future many more might be of economic or medicinal use. And we depend on the indirect contributions of infinitely many more, which maintain the stability of local and global ecosystems. Even the humblest insects and fungi have functions as pollinators, decomposers, or food sources for others.

It is perhaps utopian to imagine that growth of human population and consumption in the next four decades could be accommodated without loss to other species. But we can limit the damage.

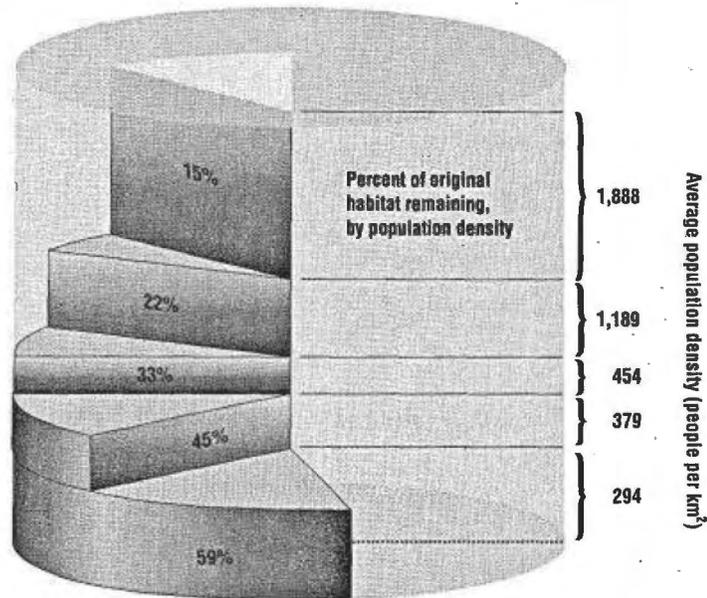
About 1.5 million species have been named and described. Estimates of the total range from five to over 30 million. Since the beginning of the 17th century only 724 extinctions have been officially recorded, but the true total is probably several orders of magnitude greater. One in every hundred bird species, and one in fifty mammals, have been extinguished in the past 400 years.¹⁰⁵

The list of species in danger lengthens every year. In 1989 they totalled 21,806. One in every thirteen species of plants are threatened. Of mammals and birds, one in ten. Recent scientific predictions of future losses vary between 2 per cent and 11 per cent of all species per decade.¹⁰⁶

There is no simple or single source of danger. But population growth plays a role in almost all of them.

Wild species are usually hunted or collected, not farmed, so it is difficult to increase their productivity. Human offtake is determined by population multiplied by consumption per per-

Population and loss of wildlife habitat



son. When it exceeds potential productivity, numbers decline. This has already happened with whales, north Atlantic cod and herring.

The principal risk is loss of habitat. As the size of a habitat shrinks, so does the diversity of species within it. Wildlife habitats are under threat all over the world. Since 1900 the world may have lost half its wetlands to drainage for agriculture, clearance for forestry, urban and tourist development. Asia is thought to have lost as much as 60 per cent of its original wetland area, Africa almost 30 per cent.¹⁰⁷

There is a clear statistical link between population density and wildlife habitat loss in 50 Asian and African countries studied by the International Union for the Conservation of Nature. The 20 per cent of countries which lost most habitat – an average of 85 per cent – had average population densities of 1,888 persons per square kilometre. In

The diagram, based on figures from 50 countries, shows how countries with lower population density have lost a much lower proportion of their original wildlife habitat. The countries were grouped in quintiles, ranked by percentage habitat loss.

Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.

*Population growth and sustainability***No place to hide for wildlife**

The land needs of growing human populations are a direct threat to other species.

Even on the medium population projection, an extra 4.5 million km² will be needed to meet farm and non-farm land needs up to the year 2050. This will be taken from forests, wetlands, savannahs and mountain areas.

On the high projection, the potential loss would be 5.9 million km².

To give some idea of the significance of this loss, the entire world's natural protected areas amounted in 1990 to 6.5 million km².¹¹¹

The low projection, by comparison, would involve the loss of 3.3 million km² – 1.2 million km² less than the medium and 2.63 million km² less than the high.

Perhaps the greatest threat of all is from global warming, which will shift the boundaries of suitable habitats towards the poles, and on mountains uphill.

the 20 per cent which lost least habitat – an average of only 41 per cent – population density averaged only 294 people per square kilometre.¹⁰⁸

Tropical forests harbour a large proportion of the world's species. A number of studies have found strong negative links between population growth or density, and forest cover. Put simply, the more people there are in a given area, the less forest.¹⁰⁹

Between 1973 and 1988 some 1,450,000 km² of forest were cleared. Of this, non-agricultural land – for towns, roads and so on – accounted for 59 per cent. This was almost entirely due to the requirements of population growth. Arable land expanded by 400,000 km², of which 72 per cent was due to population growth (see box). This amounts to 288,000 km² – another 20 per cent of forest loss. The total share of deforestation attributable to population growth is therefore around 79 per cent. The rest was increased consumption of agricultural products per person, and to ranching in Latin America.¹¹⁰

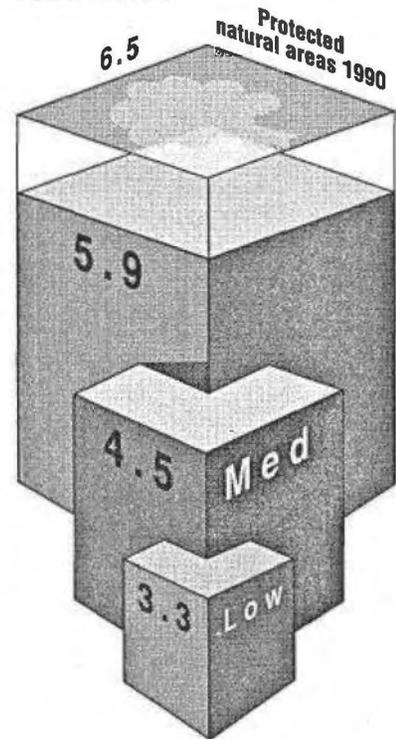
An increasing array of national legislation and international agreements imposes limits on fish catches, on use of chlorofluorocarbons, on emissions of gases contributing to acid rain and city air pollution. A few countries have begun to set limits on fertilizer use to prevent water pollution. Sooner or later binding international agreements will be needed to limit emissions of greenhouse gases to slow global warming.

The resource problem of the next decades will not be so much of shortage, as of enforced abstinence. There are sufficient resources for development but if they are used as in the past, development will be brief and the consequences calamitous.

Future land expansion 1988–2050

For farm and non-farm needs
Area expansion (million km²)

1988–2050



The cubes show the area of wildlife habitat that will be cleared for farming, roads and settlements by 2050, by the three United Nations population projections. The area cleared under the high projection would nearly equal all the world's protected areas in 1989.

Source: Paul Harrison, *The Third Revolution*, I.B. Tauris, 1992.

5. TOWARDS SUSTAINABLE DEVELOPMENT

HUMANS have reached their present position of dominance by their adaptability. They adjust to scarcity by shifting to other resources, or stretching out their use by constantly changing technology.

The pace is decisive to success or failure. The faster the growth of population and consumption, the faster technology and institutions must change – and the less likely they are to change before serious human and environmental damage has been done.

The scale of adjustment required over the next three or four decades is perhaps the most formidable challenge humans have ever faced.

We must attempt to defeat poverty at a time when population growth is constantly moving the winning post.

We must preserve the natural resources on which our long-term survival depends.

We must preserve as much species diversity as possible, in the interests of our own descendants as well as those of the species themselves.

We must try to do all of these in the knowledge that growing populations and growing material expectations will place heavier and heavier demands on the environment, in terms of space, as a source of resources and as a sink for all our wastes.

If we do not succeed in reconciling these conflicting trends, at the very least the world will be a poorer, uglier place. It could become unlivable.

We may avert catastrophe. But progress is not merely a question of averting catastrophe. We should aim higher than that.

The basic requirements

The elimination of poverty in all its aspects is perhaps the central task. There is broad agreement that it can be done, and even on the mechanisms for doing it – but only if rich



Photo: Claude Stangnet

and poor countries both accept that it is a priority.

Overall economic growth in developing countries must be part of the strategy. For this, a fairer international economic order is required, including wide-ranging trade agreements that do not discriminate unfairly against developing countries.

In the late 1980s, because of stagnant aid and credit to developing countries, and rising debt repayments, resources actually flowed in net terms from developing countries to developed. Some solution for the debt crisis is urgently needed.

The policies of developing countries themselves are crucial for development. Research shows clearly that realistic exchange rates and free markets help speed growth. Spending priorities can be reordered, redistributing military spending into education, health and family planning.

Growing populations will place heavier and heavier demands on the environment both as a supply of resources such as water and as a sink for our wastes.

Towards sustainable development

Economic growth in developing countries has not prevented an increase in the total numbers of the poor. Direct action to address the problem of poverty is needed.

There is general agreement that the first requirement is to provide the means for self-help. Poor people need better access to land, capital or inputs with which to produce their own income, or to jobs paying enough money to buy their basic needs. This means land reform, and programmes to extend credit to vulnerable groups – including land and credit for women. It means eliminating economic distortions, such as overvalued exchange rates or subsidized loans, which for example make it cheaper to use machinery than to employ people, and which discriminate against small farmers and entrepreneurs in favour of big city interests.

Balanced development has its own set of requirements. It requires a better distribution of government spending between urban and rural areas, and between big cities and smaller urban centres. A more equitable world economic system will also reduce the pressures fuelling international migration. Trade in products is preferable to trade in people.

Making development sustainable

These measures will go a long way towards ending poverty; but they will not by themselves make development sustainable. The problem is to reconcile economic growth, increases in consumption for the poorest billion and the middle three billion, with preservation of the environment. And the record so far is poor.

Since average world consumption per person is likely to increase rather than decrease, action will be needed to reduce the environmental impact of consumption. The technology required, from recycling to

solar energy to agroforestry, is already known, but it is not spreading fast enough to avoid environmental damage.

Political and economic institutions, evolved for a world apparently without limits, must be adjusted so they can identify and adjust to ecological imperatives. More environmental monitoring, more environmental education is needed. Those most directly affected by environmental damage – such as women who walk further for water and fuel, shanty dwellers who live by smokestack industries and open sewers – need not only protection but power to change their own circumstances.

Economic mechanisms are needed to translate environmental signals into free market prices: for example, changes in natural resource capital must be included in national accounts, so that depletion and degradation are not mistaken for an increase in wealth. Institutions are needed to manage the common international heritage – the seas and the atmosphere.

This report has shown how increasing human numbers are contributing to increasing demands on mineral resources: they imply an increasing demand for land and water, and a parallel loss in wildlife habitat; and rising outputs of solid, liquid and gaseous wastes. These demands will be hard to sustain beyond the next half-century.

Slower population growth, and lower eventual total populations, will contribute to sustainability in two ways. First through slower growth in demand for “fixed” and “renewable” resources and for additional space which must be bought at the expense of other species, and second, through slower growth in output of wastes and pollutants of all kinds. Slower population growth will buy time in which the battle for sustainability can be won.

Towards sustainable development



Photo: Tina Teakade

Human resources – the heart of sustainable development

Achieving slower population growth is more than promoting family planning. Family planning services are important in their own right. But improvements in preventive and curative health care; education; women's status and access to the labour market, working together with family planning, produce a far bigger impact on family size (and hence population growth) than any element working alone.

This package, the core of what is known as human-centred development, holds the key to sustainable development.

Improvements in education, health, the status of women and access to family planning services, make a triple contribution to sustainable development:

- They make their own independent contribution to the quality of life and the eradication of absolute poverty.

- They contribute to economic growth by raising the quality and

skills of the work force and reducing the ratio of workers to dependents.

- At the same time, as the principal factors in slowing down population growth, they reduce the burden on the environment and improve sustainability.

Reducing growth rates by extending rights

Family formation concerns us all intimately, in the deepest sexual, social and political aspects of our being. For that and other reasons, population has been the most sensitive topic in development. The whole area was accordingly avoided by policy-makers until quite recently.

Experience in the last two decades has shown first, that there can be extensive changes in fertility patterns over a period as short as a decade and second, that voluntary policies and programmes can be highly effective in encouraging the change. In 1965 the typical Thai woman was having 6.3 children. By 1987 she was having only 2.2. Dramatic drops have occurred in China, Cuba, Republic of Korea, Indonesia, Tunisia and other countries.

There can be dramatic changes in fertility patterns over a short period. In 1965 a typical Thai woman had 6.3 children; by 1987 she was having only 2.2 children. Access to education and family planning played a key role in this decline.

Towards sustainable development

Such changes can only be achieved with the voluntary acceptance and active participation of the men and women concerned. Coercion is not only incompatible with democratic values and human rights, but is ineffective in the long term.

Access to information and the means of deciding the size and spacing of the family has been accepted as a human right for over 20 years. Yet there is widespread denial of women's reproductive rights: as many as 300 million women in developing countries did not have ready access to safe and effective means of contraception in 1990.¹¹²

This denial of adults' rights also affects children. On average, just over one birth in five in developing countries may be unwanted. Unwanted births mean family sizes that exceed parents' abilities to provide for their children, and reduce family resources available per child. Enabling women simply to avoid unwanted births would help both them and their families. It could bring birth rates down by 7 to 13 per cent in African countries. In Latin America it could reduce birth rates by 29 per cent in Brazil, and up to 44 per cent in Peru.¹¹³

It was once thought that urbanization and growth of real incomes was a precondition of lower fertility. But fertility drops can occur at unexpectedly low levels of urbanization and income, as, for example, Kerala, Sri Lanka and Thailand have proven.

The developing countries most successful in reducing fertility have in common their emphasis on the human rather than the purely monetary aspects of development. They have stressed education, especially for women, and health care, especially for mothers and children. They have either inherited a traditionally high status for women, or created it by legislation and policy backed by effective action. They

have ensured that family planning is widely accessible, with a wide choice of methods.

Nor has this strategy involved any sacrifices of conventional economic growth. Indeed, the countries with slower population growth have tended to enjoy better economic growth and higher rates of savings and investment. Through better education and health levels, and greater availability of female labour freed from premature childbearing, they have been best placed to attract foreign investment, and best placed to move rapidly up the ladder of industrial development.

And because population growth is at the root of so much deforestation and loss of species, countries with rapid slowdowns in population are best able to preserve more of their natural heritage intact.

The high price of delay

The cost of delay in implementing these measures could be high. Even if, by some miracle, fertility were to fall to replacement level everywhere, tomorrow, the world's population would still increase by 2.5 to 3 billion people, because today's children (the largest age-group in history) will grow up and have children of their own. This is an addition equal to the world's total population in 1960.¹¹⁴

Increases of this order will happen whatever we do, and governments must plan for it.

But the scale of *additional* growth depends entirely on future action.

The medium projection assumes that by AD 2000, women in developing will be having an average of around 3.3 children each. This will not happen of itself: it requires continued efforts.

In family planning alone, reaching the medium projection means increasing the numbers of couples

Towards sustainable development

practising contraception from 381 million in 1990 to at least 567 million by the year 2000. The cost of doing so will involve a doubling of resources devoted to population activities, from \$4.5 billion to \$9 billion. This is a relatively modest sum, just four days' military expenditure by the industrialized countries.¹¹⁵

If efforts are not maintained, and it takes an extra 10 years to get down to 3.2 children per woman, then we would be on course for the *high* projection. *The cost of a 10-year delay would be an additional 2.5 billion people on earth by the year 2050, equivalent to the whole world population in 1950.*¹¹⁶

However, if all governments, North and South, devote adequate resources to a broad strategy centred on all aspects of human resource development in developing countries, it might just be possible to come closer to the *low* projection. Additional special efforts should be focussed on Africa and south Asia, where over half of all future growth in world population is likely to occur.

If we increase family planning availability and use, and take all those measures in education, health and women's rights, which work synergistically to increase family planning use and reduce birth rates, we could achieve a global population in 2050 of perhaps 8 to 8.5 billion – 1.5 to 2 billion less than the medium projection. This is why the 1990s are so decisive.

The degree of our success or failure in this decade will make a difference of up to four billion in the world's population just 58 years from now – as many people as were alive on earth in 1975.

The precautionary principle has rightly been advocated in environmental matters. If some human activity is harming the environment, and can be changed in ways that



Photo: Mark Edwards/Still Pictures

may also bring other benefits, then we should not hesitate to take the necessary steps. Energy conservation, for example, may slow global warming tomorrow – and save money today.

The measures that slow population growth are all beneficial in their own right. They will improve the quality of life for women and children. They will also help reduce damage to the environment and achieve sustainable development. They must not be delayed.

The measures that slow population growth are beneficial in their own right, improving the quality of life, especially for women and children.

RECOMMENDATIONS



Photo: Mark Edwards/Sail Pictures

Sustainable social and economic development calls for a direct attack on the roots of poverty. Improvements in health, education and nutrition; voluntary family planning services; better status of women – these are the core of human-centred development.

A strategy of human-centred development forms the core of policies leading to sustainable, balanced development. The population policy measures which will help to end poverty, stimulate social and economic development, protect the environment, slow population growth and balance population distribution are also beneficial in their own right.

1. Sustainable social and economic development calls for a direct attack on the roots of poverty. Strategies adopted by the international community for the Fourth International Development Decade should be implemented without delay.

2. Population is an essential component of strategies for sustainable development, and should be integrated in every aspect of research, policy and programmes at every level.

3. At the international level, the United Nations medium projection for population growth is currently accepted as a desirable goal.

4. At the national level, countries should adopt population policies adapted to national situations, aimed at achieving balance between population and resources for development. Population policies should recognize that the interaction of population and the environment helps determine sustainability. Governments should take steps:

- To assess the environmental implications of population growth and distribution, and take appropriate action;

- To assess the environmental impact of their use of resources and prevailing technology, and take appropriate action.

5. Human-centred development measures should have priority in development policies and programmes. They include as essential elements measures to improve health, education and the status of women.

6. Measures to raise the status of women include:

- Establishing women's property rights and access to the labour market;

- Equalizing educational opportunities and literacy rates between men and women;

Recommendations

- Reaching the 300 million women who do not have ready and easy access to modern, safe and effective means of family planning.

7. Measures to improve health include access to family planning policies and services. Population programmes should aim to reduce the proportion of mothers under 18 and over 35; and to extend the interval between births to more than 24 months.

8. Measures to improve education include ensuring universal female enrolment in primary education by the year 2000 and raising female secondary enrolment and women's literacy.

9. The following goals for the health and development of women and children are common to WHO, UNICEF, UNDP and UNFPA:

- Between 1990 and the year 2000, reduction in maternal mortality by at least 50 per cent;

- Between 1990 and the year 2000, reduction of infant and under-5 child mortality rates in all countries by one-third or to 50 and 70 per 1,000 live births respectively, whichever is less;

- Access by all couples, especially women, to family planning information and services so as to avoid pregnancies that are too early, too late, too many or too frequent during a woman's reproductive cycle;

- Enable virtually all women to exclusively breast-feed their child for four to six months and to continue breastfeeding with complementary food well into the second year;

- By the year 2000, universal access to and completion of primary education by at least 80 per cent of primary school-aged children, and reduction of adult illiteracy rate (the age group to be determined in each country) to at least half its 1990 level, with emphasis on female literacy;

- The most urgent priority in education is to ensure access to, and improve the quality of, education for girls and women, and to remove obstacles that hamper their active participation.

10. Social development should equally be given priority in programmes of international assistance, and protected against economic retrenchment. The international community should make every effort to reach the goals for population assistance adopted by the International Forum on Population and Development (the Amsterdam Declaration). These include a doubling of population assistance to developing countries from \$4.5 billion annually to \$9 billion annually by the end of the decade. Countries should strive to increase the proportion of international assistance earmarked for population programmes, currently only one per cent of the total.

FOOTNOTES

- 1 United Nations Population Division, *Long-Range World Population Projections*, ST/ESA/SER.A/125, United Nations, New York, 1991.
- 2 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991, pp96-144.
- 3 See note 1.
- 4 Income and distribution data calculated from World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991.
- 5 United Nations, *1989 Report on the World Social Situation*, United Nations, New York, 1990.
- 6 United Nations Development Programme, *Towards Development Without Poverty in Latin America and the Caribbean*, Report of the Second Regional Conference on Poverty, Quito, 1990.
- 7 Food and Agriculture Organization, *FAO Production Yearbook 1990*, FAO, Rome, 1991.
- 8 Alexandratos, Nikos, ed., *Agriculture: Toward 2000*, Belhaven Press, London and New York, 1988.
- 9 United Nations Population Division, *World Population Trends and Policies: 1989 Monitoring Report*, United Nations, New York, 1989.
- 10 UNESCO, *A Review of Education in the World: A Statistical Analysis*, ED/BIE/CONFINTED 41/Ref.1, UNESCO, Paris, 1989.
- 11 UNESCO, *Trends and Projections of Enrolment by Level of Education and by Age, 1960-2025*, Paris, UNESCO, 1990.
- 12 UNESCO, *Compendium of statistics on illiteracy*, no 31, 1990 edition, UNESCO, Paris, 1990.
- 13 McNamara, Robert, Annual Address to Board of Governors of the World Bank, 1977; Simon, Julian, *The Ultimate Resource*, Princeton University Press, 1981; Boserup, Ester, *The Conditions of Agricultural Growth*, Allen and Unwin, London, 1965.
- 14 Abel, Wilhelm, *Agricultural Fluctuations in Europe*, Methuen, London, 1980; Lee, Ronald, An Historical Perspective on Economic Aspects of the population explosion, in Easterlin, R.A., ed., *Population and Economic Change in developing countries*, University of Chicago Press, 1980.
- 15 Wilkinson, Richard, *Poverty and Progress*, Methuen, London, 1976.
- 16 Kuznets, Simon, *Modern Economic Growth*, Yale University Press, 1966, pp64-65.
- 17 Jones, Huw, *Population Geography*, Chapman, London, 1990; Appleyard, Reginald, *The Impact of International Migration on Developing Countries*, Organization for Economic Cooperation and Development, Paris, 1989.
- 18 Blanchet, Didier, Estimating the Relationship between Population Growth and Aggregate Economic Growth, in United Nations Population Division, *Consequences of Rapid Population Growth in Developing Countries*, Taylor & Francis, New York, 1991.
- 19 The 82 countries were chosen solely on the basis of availability of data on income growth for the two periods 1965-80 and 1980-89. They include all but 22 of the low and middle income countries, plus Saudi Arabia, Kuwait, Israel, Hong Kong and Singapore. Population figures from World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991; per capita GDP figures supplied by David Cieslikowski, Socio-Economic Data Division, World Bank. Average figures quoted in the text are simple averages of country results, not weighted according to country populations. This is because what we are interested in is the typical country experience.
- 20 A correlation – which can be positive or negative – measures the strength of a relationship between two sets of figures. A strong correlation suggests, though it does not prove, cause and effect.
- 21 The correlation between income growth in 1965-80 and population growth in 1980-89, for all 82 countries, was -0.13 and not significant ($p = 0.13$, which means the connection had a one in eight possibility of arising by chance). By contrast the correlation between population growth in 1965-80 and income growth in 1980-89 was -0.31 and highly significant ($p = 0.003$ - a one in 300 possibility of occurring by chance).
- 22 Debt levels were measured by debt service ratio – that is, repayments of capital and interest as a percentage of exports. Data source: *World Development Report 1991*, World Bank, Washington DC, 1991.
- 23 Mason, Andrew, National Savings Rates and Population Growth, in Johnson, D. Gale and Lee, Ronald, *Population Growth and Economic Development*, University of Wisconsin Press, 1987, pp 523-560.
- 24 Data on population growth, savings and investment ratios from World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991, tables 9 and 26.
- 25 World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991, p47.
- 26 *Ibid.*, p45.
- 27 World Bank, *World Development Report 1982*, World Bank, Washington DC, 1982, p80.
- 28 King, Elizabeth, The Effects on Family Size on Family Welfare, in Johnson, D. Gale and Lee, Ronald, *Population Growth and Economic Development*, University of Wisconsin Press, 1987.
- 29 Knodel, John et al, Family Size and the Education of Children, *Population and Development Review*, 16 (1): 31-62, 1990.
- 30 Walker, Kathryn and Woods, Margaret, *Time Use*, American Home Economics Association, 1976, analyzed in Robinson, Warren, The Time Cost of Children and Other Household Production, *Population Studies*, vol 41 no 2, 313-323, 1987.
- 31 Source: Blake, Judith, *Family Size and Achievement*, University of California Press, Berkeley, 1989.
- 32 Knodel, John et al, Family Size and the Education of Children, *Population and Development Review*, 16 (1): 31-62, 1990.
- 33 Knodel, John et al, Family Size and the Education of Children, *Population and Development Review*, 16 (1): 31-62, 1990.
- 34 Sommerfelt, A. Elisabeth, *Comparative Analysis of the Determinants of Children's Nutritional Status*, Proceedings of the Demographic Health Surveys World Conference, Washington, August 1991, IRO/Macro International, Columbia, MD, 1992 (in press).
- 35 Kogut, Edy Luiz and Langoni, Carlos, Population Growth, Income Distribution and Economic Development, *International Labour Review*, April 1975, 221-233.
- 36 Desai, Sonalde, *Children at Risk*, Working Papers no 28, Population Council, 1991.
- 37 Susan Horton, Birth Order and Child Nutritional Status, *Economic Development and Culture Change*, 36 (2): 341-353, 1988; Lloyd, Cynthia and Desai, Sonalde, *Children's Living Arrangements in Developing Countries*, Working Paper no 31, Population Council, 1991, table 1.
- 38 World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991.
- 39 Lockheed, Marlaire and Verspoor, Adriaan, *Improving Primary Education in Developing Countries*, World Bank, 1989, and Pollitt, E., The Impact of Poor Nutrition and Disease on Educational Outcomes, UNESCO, Paris, 1990.
- 40 Food and Agriculture Organization, *Population and the labour force in rural economies*, FAO Economic and Social Development Paper 59, FAO, Rome, 1989.
- 41 Cynthia Lloyd, personal communication, based on data base for Lloyd, Cynthia and Brandon, Anastasia, *Women's Role in Maintaining Households*, Working Paper no 25, Population Council, 1991.
- 42 Food and Agriculture Organization, *Population and the labour force in rural economies*, FAO Economic and Social Development Paper 59, FAO, Rome, 1989.
- 43 World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991.
- 44 World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991, p. 54.
- 45 Bijur, Polly et al, Child Accidents, Family Size and Birth Order, *Social Science and Medicine*, vol 26, no 8, pp. 839-843, 1988.
- 46 Hobcraft, John, *Child Spacing and Child Mortality*, Proceedings of the Demographic Health Surveys World Conference, Washington, August 1991, IRO/Macro International, Columbia, MD, 1992 (in press).
- 47 *Ibid.*
- 48 *Ibid.*
- 49 *Ibid.*
- 50 Cleland, J. C. and Van Ginneken, J. K., *Maternal Education and Child Survival in Developing Countries*, *Social Science and Medicine* 27(12): 1357-1368, 1988; Bicego, George and Boerma, J. Ties, *Maternal Education and Child Survival*, Demographic and Health Surveys Conference.
- 51 UNESCO, *Education de Base et Alphabétisation*, Statistical Office, UNESCO, Paris. 1991; UNESCO, *Compendium of Literacy Statistics 1990*.
- 52 United Nations, *The World's Women 1970-90*, ST/ESA/STAT/SER.K/8, United Nations, New York, 1991;
- 53 Participation rates from: United Nations Population Division, *World Demographic Estimates and Projections 1950-2025*, United Nations, New York, 1988.
- 54 Lloyd, Cynthia and Desai, Sonalde, *Children's Living Arrangements in Developing Countries*, Working Paper no 31, Population Council, 1991, table 1.
- 55 Statistics: Ministry of Health and Family Welfare, *Family Welfare Yearbook 1988-89*, Government of India, New Delhi, 1990; *Statistical Outline of India*, Tata Services, New Delhi 1990; Forest Survey of India, *The State of Forest Report 1989*, Government of India, 1991.
- Women's status: Miller, B., *The Endangered Sex*, Cornell University Press, New York 1981; Dyson, T. and Moore, M.P., Kinship Structure, Female Autonomy and Demographic Behavior, *Population and Development Review*, 9 (1), 35-60.
- 56 World Bank, *World Development Report 1991*, World Bank, Washington DC, 1991.
- 57 *Ibid.*
- 58 United Nations Development Programme, *Human Development Report 1991*, Oxford University Press, Oxford, 1991.
- 59 United Nations Population Division, *Patterns of Urban and Rural Population Growth*, United Nations, New York, 1980.
- 60 World urbanization data from United Nations Population Division, *World Urbanization Prospects 1990*, United Nations, New York, 1991.
- 61 Urban data from United Nations Population Division, *World Urbanization Prospects 1990*, ST/ESA/SER.A/121, United Nations, New York, 1991.

Footnotes

- 62 *World Urbanization Prospects 1990*, ST/ESA/SER.A/121, United Nations, New York, 1991, pp. 31-3.
- 63 *International Migration: Challenge For The Nineties*, Appleyard, Reginald, IOM, Geneva, 1991.
- 64 United Nations Population Division, *World Population Monitoring 1997*, United Nations, New York, 1991; composition: Appleyard, Reginald, *The Impact of International Migration in Developing Countries*, Organization for Economic Cooperation and Development, 1989, pp 24-6.
- 65 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991.
- 66 Kuijsten, Anton, *International Migration in Europe*, United Nations Economic Commission for Europe, Informal Expert Group Meeting on International Migration, Geneva, June 1991.
- 67 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991.
- 68 ESCWA Gulf Task Force: Informal Paper, New York, June 1991.
- 69 Third World migration data from United Nations Population Division, *World Population Monitoring: 1987, 1989 and 1991 Reports*, United Nations, New York.
- 70 Coleman, David, *International Migrants in Europe*, United Nations Economic Commission for Europe, Informal Expert Group Meeting on International Migration, Geneva, June 1991, p23a.
- 71 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991.
- 72 United Nations High Commission for Refugees.
- 73 Kuijsten *op. cit.*
- 74 Kuijsten *op. cit.*
- 75 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991, p37.
- 76 United Nations Population Division, *World Population Monitoring 1991*, United Nations, New York, 1991, p 25.
- 77 Labour force figures from United Nations Population Division, *World Demographic Estimates and Projections, 1950-2025*, United Nations, New York, 1988.
- 78 Labour forces: *op. cit.* Age composition: United Nations Population Division, *World Population Prospects 1990*, United Nations, New York, 1991.
- 79 Higgins, Graham, et al., *Potential Population Supporting Capacities of Lands in the Developing World*, FAO, Rome, 1982.
- 80 This section draws substantially from Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992.
- 81 Crowson, P., *Mineral Handbook 1988-89*, M. Stockton Press, New York, 1988.
- 82 Cortley, Thomas, *Domestic Electrical Appliances*, Cape, London, 1966, pp16, 19.
- 83 Imran, Mudassar, and Barnes, Philip, *Energy Demand in Developing Countries*, World Bank Staff Commodity Working Paper no 23, World Bank, Washington DC, 1990, p15-16.
- 84 *Populations by income group from World Bank, World Development Report 1991*, World Bank, Washington DC, 1991.
- 85 Calculations from Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992; based on: 1988 mineral reserves and US consumption rate from World Resources Institute, *World Resources 1990-91*, World Resources Institute, Washington DC, 1990, pp. 322-3.
- 86 Fossil fuel reserves from World Energy Conference, *1989 Survey of World Energy Resources*, London, 1989.
- 87 FAO, *Country Tables 1990*, FAO, Rome, 1990.
- 88 Food and Agriculture Organization, *FAO Production Yearbook 1989*, FAO, Rome, 1990.
- 89 Figures from Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992; data sources: area and irrigation changes: FAO, *Country Tables 1990*, FAO, Rome, 1990. Fertilizer growth, *ibid.* plus FAO, *Fertilizer Yearbook 1989*, FAO, Rome, 1990.
- 90 Quoted in United States Department of Agriculture, Economic Research Service, *World Agriculture Situation and Outlook Report*, Washington DC, 1989.
- 91 Lal, Rattan, *Soil Erosion and Productivity in Tropical Soils*, in El-Swaify, *op. cit.*, p244.
- 92 Smaling, Eric, *Two Scenarios for the Sub-Sahara*, *Ceres*, 126, November 1990, pp19-24.
- 93 These calculations are based on data from FAO, *Country Tables 1990*, FAO, Rome, 1990, and the medium projections from United Nations Population Division, *Long-range World Population Projections*, United Nations, New York, 1991.
- 94 Higgins, Graham, et al., *Potential Population Supporting Capacities of Lands in the Developing World*, FAO, Rome, 1982.
- 95 UN projections beyond 2025, other than the medium, are not broken down by region.
- 96 Falkenmark, Malin et al, *Macro-scale water scarcity requires micro-scale approaches*, *Natural Resources Forum*, November 1989, pp258-267.
- 97 Percentage use levels from World Resources Institute, *World Resources 1990-91*, World Resources Institute, Washington DC, 1990, pp330-31.
- 98 Falkenmark, Malin, *The Massive Water Scarcity Now Threatening Africa*, *Ambio*, 18 (2): 112-118.
- 99 Commoner, Barry, *The Environmental Cost of Economic Growth*, *Chemistry in Britain*, Vol 8, pp 52-55, 1972.
- 100 Commoner, Barry, 'Rapid Population Growth and Environmental Stress, in *Consequences of Rapid Population Growth in Developing Countries*, Proceedings of a United Nations Expert Group Meeting, New York 1988, ESA/P/WP.110, 1989, pp 231-63.
- 101 Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992.
- 102 Calculated on the basis of CO₂ output figures from United Nations Environment Programme, *Environmental Data Report*, Basil Blackwell, Oxford, 1991, with figures for GDP growth and population growth from World Bank, *World Development Report 1990*, World Bank, Washington DC, 1990.
- 103 Calculations based on numbers of cattle, goats and sheep, and on production per person of meat and milk, from FAO Economic and Social Policy Department, *1990 Country Tables*, FAO, Rome, 1990.
- 104 The calculations are based on per capita figures given in: International Panel on Climate Change, *IPCC First Assessment Report*, Policymakers' Summary, WGIII, p8. Population figures are taken from United Nations Population Division, *World Population Prospects 1990*, United Nations, New York, 1991, and for 2050 from United Nations Population Division, *Long-Range Populations Projections*.
- 105 Wilson, E. O., ed, *Biodiversity*, National Academy Press, Washington DC, 1988; McNeely, Jeffrey, et al, *Conserving the World's Biological Diversity*, IUCN, Gland, 1990 p42.
- 106 Total number from unpublished data supplied by the World Conservation Monitoring Centre, Cambridge, November 1990. Proportion threatened based on McNeely, Jeffrey, et al, *Conserving the World's Biological Diversity*, IUCN, Gland, 1990, p41, compared with total species number from Wilson, E. O., ed, *Biodiversity*, National Academy Press, Washington DC, 1988, pp4-5. Loss predictions summarized in Reid, Walter and Miller, Kenton, *Keeping Options Alive*, World Resources Institute, Washington DC, 1989, p. 38.
- 107 Wetlands loss: Maltby, Edward, *Waterlogged Wealth*, Earthscan, London 1986 pp 10 and 90; Asian and African losses: MacKinnon, John and Kathy, *Review of Protected Areas System in the Afrotropical Realm*, and *Review of the Protected Areas System in the Indo-Malayan Realm*, both from International Union for the Conservation of Nature, Gland, 1986.
- 108 Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992. Calculated from McNeely, Jeffrey, et al, *Conserving the World's Biological Diversity*, IUCN, Gland, 1990, pp46-7 (habitat loss), and World Resources Institute, *World Resources 1990-91*, World Resources Institute, Washington DC, 1990, pp268-9 (population density). Countries for which data on habitat loss related to only part of the country were excluded, as were those for which population density was not available. The correlation for 50 countries is $r = 0.486$, $p < 0.001$. The Spearman rank correlation was 0.6 ($p < 0.0001$). rank correlation was .6 (p110 Mather, Alexander, *Global Trends in Forest Resources*, *Geography*, 72, 1: pp. 1-15, 1987; Palo, Matti and Mery, G., *18th IUFRO Congress Report*, Ljubljana, 1986, pp. 552-85; K. D. Singh et al, *A Model Approach to Studies of Deforestation*, Forestry Department, FAO, 1990.
- 109 Mather, Alexander, *Global Trends in Forest Resources*, *Geography*, 72, 1: pp. 1-15, 1987; Palo, Matti and Mery, G., *18th IUFRO Congress Report*, Ljubljana, 1986, pp. 552-85; K. D. Singh et al, *A Model Approach to Studies of Deforestation*, Forestry Department, FAO, 1990.
- 110 Calculations from Harrison, Paul, *The Third Revolution*, I. B. Tauris and St Martin's Press, London and New York, 1992; based on land use figures from Food and Agriculture Organization, *FAO Production Yearbook 1989*, FAO, Rome, 1990.
- 111 United Nations Environment Programme: *Environmental Data Report*. Blackwell, Oxford, 1991. The projected land needs assume that arable area continues to grow as in 1980-88 and that 0.056 ha. per person are needed for roads, settlements, etc. (see note 94)
- 112 Access: calculated from the population-weighted percentage with access, quoted in United Nations Population Division, *Levels and Trends of Contraceptive Use as Assessed in 1988*, United Nations, ST/ESA/SER.A/110, 1989, p. 67; applied to numbers of women of reproductive age in developing countries from United Nations Population Division, *World Population Prospects 1990*, United Nations, New York, 1991.
- 113 Bongaarts, John, *The Measurement of Wanted Fertility*, *Population and Development Review*, 16(3): 487-506, 1990.
- 114 United Nations Population Division, *Long-Range World Population Projections*, ST/ESA/SER.A/125, United Nations, New York, 1991.
- 115 Sadik, Nafis, *The State of World Population 1991*, United Nations Population Fund, New York, 1991.
- 116 Fertility assumptions of the medium and high projections – United Nations: *World Population Prospects 1990*, United Nations, New York, 1991. ST/ESA/SER.A/120.

POPULATION INDICATORS

	Population (in millions)		Average growth rate (%) 1990-95	Gov't appraisal pop growth 1990†	Birth rate per 1,000 1990-95	Death rate per 1,000 1990-95	Life expectancy 1990-95	Infant mortality per 1,000 1990-95	Per cent urban 1990	Urban growth rate (%) 1990-95	Fertility rate per woman 1990-95
	1990	2025									
World Total	5,292.2	8,504.2	1.7	..	26	9	66	63	45	3.0	3.3
More developed regions (-)	1,206.6	1,353.9	0.5	..	14	10	75	12	73	0.8	1.9
Less developed regions (+)	4,085.6	7,150.3	2.1	..	30	9	63	70	37	4.2	3.7
AFRICA	642.1	1,596.9	3.0		43	13	54	94	34	4.9	6.0
Eastern Africa¹	196.9	542.5	3.3		48	15	53	103	22	6.4	6.8
Burundi	5.5	13.0	3.0	H	47	16	50	110	6	5.8	6.8
Ethiopia	49.2	126.6	3.0	H	48	18	47	122	13	5.5	6.8
Kenya	24.0	79.1	3.7	H	47	10	61	64	24	6.9	6.8
Madagascar	12.0	34.0	3.2	S	45	13	56	110	24	5.8	6.5
Malawi	8.8	24.7	3.6	H	55	19	49	138	12	6.3	7.6
Mauritius ²	1.1	1.4	1.1	S	17	6	70	20	40	1.1	1.9
Mozambique	15.7	35.4	2.7	S	44	17	49	130	27	7.6	6.2
Rwanda	7.2	18.8	3.5	H	50	16	51	112	8	7.5	8.0
Somalia	7.5	18.7	2.4	S	47	18	47	122	36	4.4	6.6
Uganda	18.8	53.1	3.7	H	51	14	53	94	10	6.3	7.3
Tanzania, United Republic of	27.3	84.9	3.8	H	50	13	55	97	33	8.0	7.1
Zambia	8.5	26.3	3.8	H	50	12	55	72	50	5.6	7.2
Zimbabwe	9.7	22.6	3.1	H	40	9	61	55	28	5.4	5.3
Middle Africa³	70.1	192.3	3.1		46	14	52	89	38	5.1	6.2
Angola	10.0	24.7	2.8	S	47	19	47	127	28	5.4	6.3
Cameroon	11.8	36.5	3.4	H	47	13	55	86	41	5.6	6.9
Central African Republic	3.0	7.9	2.9	H	45	16	51	95	47	4.6	6.2
Chad	5.7	13.2	2.5	S	43	18	48	122	30	5.5	5.8
Congo	2.3	6.6	3.3	L	46	13	55	65	40	4.7	6.3
Gabon	1.2	2.9	3.3	L	43	16	54	94	46	5.1	5.3
Zaire	35.6	99.4	3.2	S	45	13	54	75	39	4.8	6.1
Northern Africa⁴	140.6	274.4	2.5		34	9	61	69	45	3.9	4.6
Algeria	25.0	52.0	2.8	H	35	7	66	61	52	4.3	4.9
Egypt	52.4	90.4	2.2	H	31	9	62	57	47	3.7	4.0
Libyan Arab Jamahiriya	4.5	12.8	3.6	S	43	8	63	68	70	4.7	6.7
Morocco	25.1	45.6	2.4	H	33	8	63	68	48	3.9	4.2
Sudan	25.2	59.6	2.9	S	43	14	52	99	22	4.6	6.3
Tunisia	8.2	13.6	2.1	H	27	6	68	44	54	2.8	3.4
Southern Africa	40.9	80.1	2.3		32	9	62	67	55	3.5	4.4
Botswana	1.3	3.4	3.5	H	44	9	61	58	28	8.3	6.4
Lesotho	1.8	4.4	2.9	H	40	11	59	89	20	6.3	5.8
Namibia	1.8	4.7	3.1	S	42	11	59	97	28	5.2	5.7
South Africa	35.3	65.4	2.2	H	31	9	63	62	59	3.2	4.2
Western Africa⁵	193.7	507.5	3.2		47	15	51	102	33	5.3	6.7
Benin	4.6	12.6	3.2	S	49	18	48	85	38	4.8	7.1
Burkina Faso	9.0	23.7	2.9	S	47	17	49	127	9	5.9	6.5
Cote d'Ivoire	12.0	39.3	3.8	S	50	13	54	88	40	5.3	7.4
Ghana	15.0	35.4	3.2	H	44	12	56	81	33	4.4	6.3
Guinea	5.8	15.3	3.0	S	51	20	45	134	26	5.7	7.0
Guinea-Bissau	1.0	1.9	2.1	H	43	21	44	140	20	4.4	5.8
Liberia	2.6	7.2	3.3	H	47	14	55	126	46	5.5	6.7
Mali	9.2	24.8	3.2	S	51	19	46	159	19	4.9	7.1
Mauritania	2.0	5.1	2.9	S	46	18	48	117	47	5.7	6.5
Niger	7.7	21.5	3.3	H	51	19	47	124	19	6.6	7.1
Nigeria	108.5	280.9	3.3	H	46	14	53	96	35	5.5	6.6
Senegal	7.3	17.0	2.8	H	44	16	49	80	38	4.2	6.2
Sierra Leone	4.2	10.0	2.7	H	48	22	43	143	32	5.0	6.5
Togo	3.5	9.8	3.2	S	45	13	55	85	26	5.9	6.6
NORTHERN AMERICA⁶	275.9	332.0	0.7		14	9	76	8	75	1.0	1.8
Canada	26.5	31.9	0.8	S	13	8	77	7	77	1.0	1.7
United States of America	249.2	299.9	0.7	S	14	9	76	8	75	0.9	1.9

POPULATION INDICATORS

	Population (in millions)		Average growth rate (%)	Gov't appraisal pop growth	Birth rate per 1,000	Death rate per 1,000	Life expectancy	Infant mortality per 1,000	Per cent urban	Urban growth rate (%)	Fertility rate per woman
	1990	2025	1990-95	1990†	1990-95	1990-95	1990-95	1990-95	1990	1990-95	1990-95
LATIN AMERICA	448.1	757.4	1.9		27	7	68	48	72	2.6	3.2
Caribbean¹	33.7	50.5	1.4		24	8	70	46	60	2.3	2.9
Cuba	10.6	13.0	0.9	S	17	7	76	13	75	1.6	1.9
Dominican Republic	7.2	11.4	2.0	H	28	6	68	57	60	3.3	3.3
Haiti	6.5	13.2	2.0	H	35	12	57	86	28	4.0	4.8
Jamaica	2.5	3.5	1.2	H	22	6	74	14	52	2.3	2.4
Puerto Rico	3.5	4.6	1.0	..	18	8	76	13	74	1.7	2.1
Trinidad and Tobago	1.3	2.0	1.4	H	23	6	72	14	69	2.5	2.7
Central America²	117.7	213.2	2.2		29	6	69	39	66	2.9	3.5
Costa Rica	3.0	5.3	2.3	H	26	4	75	17	47	3.3	3.0
El Salvador	5.3	11.3	2.5	H	36	7	67	53	44	3.5	4.5
Guatemala	9.2	21.7	2.9	S	39	8	65	48	39	3.9	5.4
Honduras	5.1	11.5	3.0	H	37	7	66	57	44	4.8	4.9
Mexico	88.6	150.1	2.0	H	27	5	70	36	73	2.7	3.1
Nicaragua	3.9	9.2	3.2	H	39	7	66	50	60	4.2	5.0
Panama	2.4	3.9	1.9	S	25	5	73	21	53	2.8	2.9
South America³	296.7	493.7	1.9		26	7	68	52	75	2.6	3.2
Argentina	32.3	45.5	1.2	L	20	9	71	29	86	1.5	2.8
Bolivia	7.3	18.3	2.8	L	41	12	56	93	51	4.2	5.8
Brazil	150.4	245.8	1.9	S	26	7	66	57	75	2.7	3.2
Chile	13.2	19.8	1.6	S	23	6	72	19	86	1.9	2.7
Colombia	33.0	54.2	1.9	S	26	6	69	37	70	2.6	2.9
Ecuador	10.6	19.9	2.4	H	31	7	67	57	56	3.8	3.9
Guyana	0.8	1.2	0.8	S	24	7	65	48	35	2.7	2.4
Paraguay	4.3	9.2	2.7	S	33	6	67	39	47	4.0	4.3
Peru	21.6	37.4	2.0	H	29	8	65	76	70	2.8	3.6
Uruguay	3.1	3.7	0.6	L	17	10	72	20	85	0.8	2.3
Venezuela	19.7	38.0	2.4	S	28	5	70	33	90	2.8	3.5
ASIA	3,112.7	4,912.5	1.8		27	8	65	64	34	4.2	3.3
Eastern Asia¹⁰	1,335.6	1,736.9	1.3		20	7	72	26	39	4.3	2.2
China	1,139.1	1,512.6	1.4	H	21	7	71	27	33	5.4	2.3
Hong Kong	5.9	6.5	0.9	..	12	6	78	6	94	1.1	1.4
Japan	123.5	127.5	0.4	S	12	8	79	5	77	0.5	1.7
Korea, Democratic People's Republic of	21.8	33.1	1.9	L	25	5	71	24	60	2.4	2.4
Korea, Republic of	42.8	51.6	0.9	H	15	6	71	21	72	2.3	1.7
Mongolia	2.2	4.8	2.7	S	34	8	64	60	52	3.1	4.7
Southeastern Asia¹¹	444.8	726.0	1.9		28	8	63	55	30	4.1	3.3
Cambodia	8.2	14.0	2.2	L	37	15	51	116	12	4.2	4.4
Indonesia	184.3	285.9	1.8	H	27	8	63	65	31	4.6	3.1
Lao People's Democratic Republic	4.1	8.6	2.9	L	44	15	51	97	19	6.0	6.7
Malaysia	17.9	30.1	2.3	S	28	5	71	20	43	4.1	3.5
Myanmar	41.7	72.6	2.1	S	30	9	63	59	25	3.2	3.7
Philippines	62.4	111.5	2.3	H	30	7	65	40	43	3.6	3.9
Singapore	2.7	3.3	1.1	S	16	6	74	8	100	1.1	1.8
Thailand	55.7	80.9	1.4	H	20	7	67	24	23	4.0	2.2
Viet Nam	66.7	117.5	2.2	H	30	8	64	54	22	4.2	3.7
Southern Asia¹²	1,200.6	2,161.8	2.3		33	11	59	91	27	4.0	4.4
Afghanistan	16.6	40.5	6.7	H	52	22	43	162	18	8.5	6.8
Bangladesh	115.6	235.0	2.7	H	41	14	53	108	16	6.1	5.1
Bhutan	1.5	3.1	2.3	L	38	16	50	118	5	5.9	5.5
India	853.1	1,442.4	2.1	H	31	10	60	88	27	3.8	4.1
Iran, Islamic Republic of	54.6	113.8	2.0	S	33	7	67	40	57	3.2	4.7
Nepal	19.1	35.0	2.3	H	36	13	54	118	10	6.5	5.5
Pakistan	122.6	267.1	2.9	H	42	11	59	98	32	4.5	5.9
Sri Lanka	17.2	24.6	1.3	H	21	6	72	24	21	2.2	2.5

POPULATION INDICATORS

	Population (in millions)		Average growth rate (%)	Gov't appraisal pop growth	Birth rate per 1,000	Death rate per 1,000	Life expectancy	Infant mortality per 1,000	Per cent urban	Urban growth rate (%)	Fertility rate per woman
	1990	2025	1990-95	1990†	1990-95	1990-95	1990-95	1990-95	1990	1990-95	1990-95
Western Asia¹³	131.8	287.8	2.8		34	7	66	60	63	4.1	4.7
Iraq	18.9	50.0	3.4	L	40	7	66	56	71	4.0	5.9
Israel	4.6	6.9	1.5	L	21	7	76	10	92	1.7	2.8
Jordan	4.0	9.9	3.3	H	39	5	68	36	68	4.3	5.5
Kuwait	2.0	3.8	2.8	S	26	2	74	15	96	3.0	3.5
Lebanon	2.7	4.7	2.2	S	30	8	67	40	84	2.7	3.4
Oman	1.5	4.8	3.7	L	43	6	68	34	11	7.4	7.1
Saudi Arabia	14.1	44.8	3.8	L	42	6	66	58	77	4.6	7.1
Syrian Arab Republic	12.5	34.1	3.6	S	43	6	67	39	50	4.6	6.3
Turkey	55.9	87.7	1.9	H	27	7	66	62	61	4.2	3.3
United Arab Emirates	1.6	2.7	2.2	H	20	4	71	22	78	2.2	4.3
Yemen ¹⁴	11.7	34.6	3.6	..	50	14	53	107	29	6.4	7.3
Democratic Yemen	2.5	6.4	3.2	..	46	14	53	107	43	4.8	6.5
Yemen	9.2	28.2	3.7	S	51	14	53	107	25	7.1	7.6
EUROPE	498.4	515.2	0.2		13	11	75	11	73	0.7	1.7
Eastern Europe	113.2	122.9	0.3		14	11	72	16	65	1.0	1.9
Bulgaria	9.0	8.9	0.1	L	12	12	73	14	68	0.9	1.8
Czechoslovakia	15.7	17.2	0.3	S	14	11	72	13	77	1.1	2.0
Hungary	10.6	10.2	-0.1	L	12	13	72	17	61	1.0	1.8
Poland	38.4	45.1	0.5	S	15	10	72	17	62	1.1	2.1
Romania	23.3	25.7	0.5	S	15	10	71	19	53	1.4	2.0
Northern Europe¹⁵	84.2	88.3	0.2		13	11	76	7	84	0.4	1.8
Denmark	5.1	4.9	0.1	S	11	11	76	6	87	0.4	1.5
Finland	5.0	5.1	0.2	S	12	10	76	5	60	0.4	1.7
Ireland	3.7	5.0	0.9	S	18	8	75	8	57	1.4	2.4
Norway	4.2	4.5	0.3	S	13	11	77	6	75	0.8	1.7
Sweden	8.4	8.6	0.2	S	13	12	78	6	84	0.3	1.9
United Kingdom	57.2	59.7	0.2	S	14	11	76	8	89	0.3	1.8
Southern Europe¹⁶	144.1	147.8	0.3		12	10	76	13	66	1.0	1.6
Albania	3.2	5.0	1.6	S	22	6	73	32	35	2.5	2.7
Greece	10.0	10.1	0.2	L	12	10	77	13	62	1.0	1.7
Italy	57.1	53.0	0.0	S	11	11	76	9	69	0.5	1.4
Portugal	10.3	10.9	0.3	S	13	10	74	13	34	1.9	1.7
Spain	39.2	42.3	0.4	S	13	9	77	9	78	0.9	1.7
Yugoslavia	23.8	26.0	0.5	S	14	9	73	21	56	2.1	1.9
Western Europe¹⁷	156.9	156.3	0.2		12	11	76	8	81	0.4	1.6
Austria	7.6	7.3	0.0	S	11	12	75	9	58	0.8	1.5
Belgium	9.8	9.4	0.0	S	12	11	76	8	97	0.1	1.7
France	56.1	60.4	0.4	L	13	10	77	7	74	0.6	1.8
Germany ¹⁸	77.6	70.9	-0.06	L	11	12	76	8	86	0.2	1.5
German Democratic Republic	16.2	15.8	0.0	L	11	12	75	8	77	0.2	1.7
Germany, Federal Republic of	61.3	55.1	-0.1	L	11	12	76	8	87	0.2	1.4
Netherlands	15.0	16.8	0.6	S	13	9	78	7	89	0.7	1.6
Switzerland	6.6	6.8	0.2	S	12	10	78	7	60	0.9	1.6
OCEANIA	26.5	38.2	1.4		19	8	73	23	71	1.4	2.4
Australia-New Zealand	20.3	27.2	1.1		15	8	77	7	85	1.2	1.8
Australia ¹⁹	16.9	23.0	1.2	S	14	8	77	7	85	1.3	1.8
New Zealand	3.4	4.1	0.8	S	16	8	76	9	84	0.9	1.9
Melanesia ²⁰	5.3	9.7	2.2	..	32	10	58	49	20	3.9	4.5
Papua New Guinea	3.9	7.3	2.3	H	33	11	56	53	16	4.6	4.8
Union of Soviet Socialist Republics²¹	288.6	352.1	0.7	S	17	10	71	20	66	0.9	2.3

SOCIAL INDICATORS

	Family Planning Users (%) 1980s	Gov't support†	Adult literacy M/F 1990	Secondary school enrolment M/F 1986-89	Births attended by health worker (%) 1983-90	Access to health services (%) 1985-90	Access to safe water 1985-88	Food production per capita (1979-81=100) 1987-89	Agricultural population per hectare arable land 1987	GNP per capita (US\$) 1989	Health/ education as % of GNP 1987
AFRICA											
Eastern Africa¹											
Burundi	9	Y	61/40	6/3	19	61	38	98	3.4	220	3.9
Ethiopia	..	Y	..	18/12	14	46	19	91	2.4	120	5.5
Kenya	27	Y	80/59	27/19	28	..	31	101	7.2	360	9.1
Madagascar	..	Y	88/73	23/19	62	56	22	93	2.8	230	4.9
Malawi	7	Y	..	5/3	45	80	56	85	2.5	180	5.1
Mauritius ²	75	Y	..	53/53	85	100	95	100	2.4	1,990	5.2
Mozambique	..	Y	45/21	7/4	28	39	24	83	3.9	80	5.8
Rwanda	10	Y	64/37	7/5	22	27	50	77	5.3	320	4.0
Somalia	..	Y	27/9	..	2	27	37	97	5.3	170	0.8
Uganda	5	Y	62/35	16/9	38	61	21	87	2.0	250	1.8
Tanzania, United Republic of	..	Y	93/88	5/3	60	76	56	90	3.8	130	4.7
Zambia	..	Y	81/65	..	39	75	60	97	1.0	390	5.5
Zimbabwe	43	Y	74/60	49/42	60	71	66	90	2.2	650	14.3
Middle Africa³											
Angola	..	Y	56/29	17/9	15	30	35	84	1.8	610	4.0
Cameroon	2	Y	66/43	32/21	10	41	44	96	1.0	1,000	3.6
Central African Republic	..	Y	52/25	17/6	66	45	12	90	0.9	390	6.2
Chad	..	Y	42/18	10/2	24	30	..	101	1.3	190	2.6
Congo	..	Y	70/44	37/14	..	83	38	98	1.6	940	7.5
Gabon	..	N	74/49	..	80	90	68	81	1.6	2,960	8.7
Zaire	..	Y	84/61	32/14	..	26	33	94	3.3	260	3.6
Northern Africa⁴											
Algeria	36	Y	70/46	61/53	15	88	71	97	0.8	2,230	11.3
Egypt	38	Y	63/34	79/58	47	..	73	109	8.2	640	7.0
Libyan Arab Jamahiriya	..	N	75/50	..	76	..	94	109	0.3	5,310	12.7
Morocco	36	Y	61/38	43/30	29	70	61	120	1.1	880	6.6
Sudan	5	Y	43/12	23/17	60	51	46	87	1.2	..	4.4
Tunisia	50	Y	74/56	46/38	68	90	68	96	0.4	1,260	7.6
Southern Africa											
Botswana	33	Y	84/65	31/36	78	89	54	68	0.6	1,600	13.0
Lesotho	5	Y	..	20/30	40	80	48	80	4.2	470	6.0
Namibia	..	Y	..	..	..	..	..	95	1.0	1,030	3.6
South Africa	48	Y	..	..	..	..	..	90	0.4	2,470	5.4
Western Africa⁵											
Benin	9	Y	32/16	23/9	45	18	54	114	1.5	380	5.8
Burkina Faso	..	Y	28/9	8/4	30	49	69	115	2.3	320	4.0
Cote d'Ivoire	3	Y	67/40	26/12	20	30	..	96	1.8	790	7.7
Ghana	13	Y	70/51	49/30	55	60	57	109	2.5	390	4.6
Guinea	..	Y	35/13	13/4	25	47	32	90	3.1	430	4.0
Guinea-Bissau	..	Y	50/24	9/3	..	..	25	137	2.2	180	..
Liberia	6	Y	50/29	..	87	39	55	95	4.5	..	5.8
Mali	5	Y	41/24	9/4	27	15	41	97	3.4	270	4.0
Mauritania	0.8	Y	47/21	23/10	20	40	66	88	6.2	500	7.8
Niger	..	Y	40/17	8/3	47	41	61	86	1.6	290	3.9
Nigeria	5	Y	62/40	28/18	40	66	..	96	2.1	250	1.7
Senegal	11	Y	52/25	19/10	41	40	54	106	1.0	650	5.6
Sierra Leone	..	Y	31/11	23/11	25	..	42	89	1.4	220	1.9
Togo	34	Y	56/31	36/12	15	61	71	89	1.6	390	8.2
NORTHERN AMERICA⁶											
Canada	73	Y	..	104/104	99	..	..	103	..	19,030	13.9
United States of America	74	Y	..	98/99	99	..	..	92	..	20,910	9.9

SOCIAL INDICATORS

	Family Planning Users (%) 1980s	Gov't support††	Adult literacy M/F 1990	Secondary school enrolment M/F 1986-89	Births attended by health worker (%) 1983-90	Access to health services (%) 1985-90	Access to safe water 1985-88	Food production per capita (1979-81=100) 1987-89	Agricultural population per hectare arable land 1987	GNP per capita (US\$) 1989	Health/ education as % of GNP 1987
LATIN AMERICA											
Caribbean⁷											
Cuba	70	Y	95/93	85/96	99	..	..	106	0.6	..	9.2
Dominican Republic	50	Y	85/82	..	90	80	63	94	1.8	790	3.1
Haiti	10	Y	59/47	20/17	40	50	36	93	4.2	360	3.2
Jamaica	55	Y	98/99	62/68	90	90	71	92	2.8	1,260	8.0
Puerto Rico	70	..	..	..	..	..	..	..	..	..	..
Trinidad and Tobago	53	Y	..	80/85	98	99	98	86	0.8	3,230	8.9
Central America⁸											
Costa Rica	70	Y	93/93	40/43	97	80	92	89	1.4	1,780	9.5
El Salvador	47	Y	76/70	27/31	50	56	48	90	2.6	1,070	3.0
Guatemala	23	Y	63/47	21/19	34	34	61	103	2.4	910	3.4
Honduras	41	Y	76/71	28/36	66	66	73	88	1.5	900	8.2
Mexico	53	Y	90/85	54/53	94	78	71	98	1.1	2,010	4.4
Nicaragua	27	Y	..	29/58	41	83	54	63	1.1	..	11.2
Panama	64	Y	88/88	56/63	89	80	84	92	1.0	1,760	11.1
South America⁹											
Argentina	..	Y	96/95	69/78	..	71	65	91	0.1	2,160	3.4
Bolivia	30	N	85/71	40/35	42	63	53	102	0.9	620	3.3
Brazil	66	Y	83/80	32/42	95	..	97	115	0.5	2,540	5.1
Chile	..	Y	94/93	72/78	98	97	89	107	0.3	1,770	6.8
Colombia	65	Y	88/86	55/56	71	60	88	102	1.7	1,200	3.4
Ecuador	53	Y	88/84	55/57	56	75	58	106	1.2	1,020	5.4
Guyana	31	Y	..	..	..	..	..	70	0.5	340	14.0
Paraguay	45	Y	92/88	30/29	30	61	34	115	0.9	1,030	1.6
Peru	46	Y	92/79	68/61	78	75	61	101	2.1	1,010	4.2
Uruguay	..	Y	97/96	68/76	97	82	73	106	0.3	2,620	4.0
Venezuela	49	Y	87/90	48/59	69	..	90	88	0.6	2,450	7.4
ASIA											
Eastern Asia¹⁰											
China	71	Y	84/62	50/37	94	90	74	128	7.7	350	4.1
Hong Kong	81	..	..	71/76	100	99	100	61	10.0	10,350	..
Japan	56	Y	..	95/97	100	..	..	97	1.9	23,810	10.0
Korea, Democratic People's Republic of	..	Y	..	100/100	100	..	..	108	3.2	..	..
Korea, Republic of	77	Y	99/94	91/83	89	93	79	96	5.0	4,400	4.3
Mongolia	..	N	..	88/96	99	..	65	91	0.5	..	..
Southeastern Asia¹¹											
Cambodia	..	N	48/22	45/20	47	53	3	146	1.8	..	..
Indonesia	48	Y	84/62	53/43	49	80	46	124	3.8	500	3.9
Lao People's Democratic Republic	..	N	..	23/22	..	67	29	116	3.1	180	..
Malaysia	51	Y	87/70	59/57	82	..	79	142	1.2	2,160	8.4
Myanmar	..	Y	89/72	25/23	57	33	33	120	1.9	..	2.7
Philippines	44	Y	90/90	66/71	57	..	81	86	3.5	710	2.7
Singapore	74	Y	..	70/71	100	100	100	86	10.0	10,450	6.3
Thailand	68	Y	96/90	32/28	71	70	74	104	1.7	1,220	4.7
Viet Nam	..	Y	92/84	44/41	95	80	42	111	6.1	..	..
Southern Asia¹²											
Afghanistan	2	Y	44/14	10/7	9	29	21	88	1.0	..	..
Bangladesh	31	Y	47/22	24/11	5	45	81	93	8.2	180	2.6
Bhutan	..	Y	51/25	7/2	7	65	32	121	10.0	..	..
India	34	Y	62/34	50/29	33	..	75	113	3.0	340	4.4
Iran, Islamic Republic of	..	Y	65/43	57/44	70	80	89	87	1.0	3,200	4.4
Nepal	14	Y	38/13	35/17	6	..	37	107	7.0	180	3.6
Pakistan	8	Y	47/21	26/11	40	55	56	103	2.9	370	2.4
Sri Lanka	62	Y	93/84	63/74	94	93	60	87	4.6	430	5.4

STATE OF WORLD POPULATION 1992

SOCIAL INDICATORS

	Family Planning Users (%) 1980s	Gov't support†	Adult literacy M/F 1990	Secondary school enrollment M/F 1986-89	Births attended by health worker (%) 1983-90	Access to health services (%) 1985-90	Access to safe water 1985-88	Food production per capita (1979-81=100) 1987-89	Agricultural population per hectare arable land 1987	GNP per capita (US\$) 1989	Health/ education as % of GNP 1987
Western Asia¹³											
Iraq	15	N	70/46	60/37	50	93	92	98	0.7	..	5.4
Israel	..	Y	..	79/87	99	..	..	106	0.5	9,790	8.3
Jordan	27	Y	89/70	80/78	83	97	99	117	0.5	1,640	7.6
Kuwait	..	N	77/67	86/79	99	100	100	..	7.1	16,150	8.1
Lebanon	53	Y	88/73	57/56	..	..	..	107	0.9	..	..
Oman	..	N	..	46/34	60	91	47	..	12.0	5,220	7.5
Saudi Arabia	..	N	73/48	52/35	88	97	94	249	4.5	6,020	11.0
Syrian Arab Republic	20	Y	78/51	69/47	61	75	70	86	0.5	980	5.1
Turkey	63	Y	90/71	57/34	77	..	78	97	0.9	1,370	3.1
United Arab Emirates	..	N	58/38	55/68	99	90	..	..	2.4	18,430	3.2
Yemen ¹⁴	..	..	47/21	42/7	12	38	38	..	..	650	..
Democratic Yemen	..	..	47/21	42/7	12	38	38	83	6.6	650	8.5
Yemen	1	Y	47/21	42/7	12	38	38	98	3.5	650	6.5
EUROPE											
Eastern Europe											
Bulgaria	76	Y	..	75/76	100	..	..	100	0.3	2,320	8.6
Czechoslovakia	95	Y	..	27/49	100	..	..	121	0.3	3,450	7.9
Hungary	73	Y	..	69/70	99	..	..	113	0.3	2,590	6.6
Poland	75	Y	..	78/82	100	..	..	106	0.5	1,790	8.6
Romania	58	Y	..	79/80	100	..	..	109	0.4	..	3.1
Northern Europe¹⁵											
Denmark	63	Y	..	106/107	100	..	..	120	0.1	20,450	13.2
Finland	80	Y	..	98/114	100	..	..	101	0.2	22,120	11.8
Ireland	..	N	..	91/101	..	..	..	105	0.5	8,710	14.4
Norway	71	N	..	92/97	100	..	..	109	0.3	22,290	14.0
Sweden	78	Y	..	90/92	100	..	..	94	0.1	21,570	15.9
United Kingdom	83	Y	..	82/85	100	..	..	105	0.2	14,610	10.2
Southern Europe¹⁶											
Albania	..	N	..	80/71	99	..	..	..	..	..	..
Greece	..	Y	98/89	89/80	97	..	..	100	0.6	5,350	6.7
Italy	78	Y	98/96	76/76	..	..	..	100	0.3	15,120	9.8
Portugal	66	Y	89/82	47/56	87	..	..	100	0.7	4,250	8.4
Spain	59	Y	97/93	97/107	96	..	..	111	0.2	9,330	7.5
Yugoslavia	55	Y	97/88	82/79	86	..	..	98	0.7	2,920	9.9
Western Europe¹⁷											
Austria	71	Y	..	78/81	..	..	..	109	0.3	17,300	11.6
Belgium	81	Y	..	99/100	100	..	..	116	0.3	16,220	10.7
France	68	Y	..	89/96	99	..	..	105	0.2	17,820	12.0
Germany ¹⁸	..	Y	..	92/88	99	..	..	..	0.3	..	..
German Democratic Republic	..	Y	..	92/88	99	..	..	114	0.3	..	6.4
Germany, Federal Republic of	77	Y	..	92/88	99	..	..	112	0.3	20,440	10.7
Netherlands	76	Y	..	105/103	100	..	..	110	0.7	15,920	13.8
Switzerland	71	N	..	..	99	..	..	102	0.6	29,880	9.8
OCEANIA											
Australia-New Zealand											
Australia ¹⁹	..	Y	..	96/99	99	..	..	95	..	14,360	10.8
New Zealand	70	Y	..	84/86	99	..	97	107	0.6	12,070	12.2
Melanesia ²⁰	..	..	..	..	..	..	..	..	..	..	..
Papua New Guinea	..	Y	65/38	16/10	20	96	34	97	6.7	890	8.0
Union of Soviet Socialist Republics²¹	..	Y	..	..	..	..	..	112	0.2	..	8.5

SELECTED INDICATORS FOR LESS POPULOUS COUNTRIES

	Population (in millions)		Av. growth rate (%)	Life expectancy	Infant mortality per 1,000	Per cent urban	Urban growth rate (%)	GNP per capita (US\$)	Adult literacy rate	Gov't support for FP
	1990	2025	1990-95	1990-95	1990-95	1990	1990-95	1989	1985-90	1990
Bahrain	0.5	1.0	3.1	72	12	83	3.4	..	77	Y
Barbados	0.3	0.3	0.3	76	10	45	1.7	6,350	98	Y
Cape Verde	0.4	0.9	3.4	68	37	29	5.6	780	37	Y
Comoros	0.6	1.7	3.6	56	89	28	5.6	460	48	Y
Cyprus	0.7	0.9	0.9	77	10	53	2.2	7,040	89	Y
Djibouti	0.4	1.1	2.9	49	112	81	3.4	..	12	N
East Timor	0.7	1.1	1.9	45	150	13	4.7	..	..	..
Equatorial Guinea	0.4	0.8	2.6	48	117	29	3.8	330	50	N
Fiji	0.8	1.1	1.5	66	24	39	2.2	1,650	79	Y
Gambia	0.9	1.9	2.7	45	132	23	5.2	240	27	Y
Guadeloupe	0.3	0.4	0.6	75	12	48	1.9	..	..	..
Iceland	0.3	0.3	0.8	78	5	91	1.1	21,070	..	Y
Luxembourg	0.4	0.4	0.2	75	9	84	0.6	24,980	..	N
Malta	0.4	0.4	0.4	74	9	87	0.7	5,830	88	N
Martinique	0.3	0.4	0.6	76	10	75	1.3	..	..	..
Micronesia ²²	0.4	0.6	1.5	67	38	47	3.3	..	..	..
Polynesia ²³	0.6	0.8	1.3	72	22	37	2.9	..	..	..
Qatar	0.4	0.9	3.4	70	26	89	3.7	15,500	76	N
Reunion	0.6	0.9	1.5	72	12	64	2.6	..	..	..
Suriname	0.4	0.7	1.8	70	28	47	3.0	3,010	95	Y
Swaziland	0.8	2.2	3.6	58	107	33	7.0	900	55	Y

NOTES:

All indicators are based on data compiled prior to 1 January 1991.

Data for small countries or areas, generally those with population of 300,000 or less in 1985, are not given separately. They have been included in regional population figures.

(*) More developed regions comprise northern America, Japan, all regions of Europe, Australia-New Zealand and the former Union of Soviet Socialist Republics.

(+) Less developed regions comprise all regions of Africa, all regions of Latin America, all regions of Asia excluding Japan, Melanesia, Micronesia and Polynesia.

1 Including British Indian Ocean Territory and Seychelles.

2 Including Agalesa, Rodrigues, and St. Brandon.

3 Including São Tome and Principe.

4 Including Western Sahara.

5 Including St. Helena.

6 Including Bermuda, Greenland, and St. Pierre and Miquelon.

7 Including Anguilla, Antigua and Barbuda, Bahamas, British Virgin Islands, Cayman Islands, Dominica, Grenada, Montserrat, Netherlands Antilles, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, and United States Virgin Islands.

8 Including Belize.

9 Including Falkland Islands (Malvinas) and French Guiana.

10 Including Macau.

11 Including Brunei Darussalam.

12 Including Maldives.

13 Including Gaza Strip (Palestine).

14 On 22 May 1990, Democratic Yemen and Yemen merged to form one sovereign State under the designation "Yemen". Since aggregated data is not yet available for all indicators, the original entries for the two former States are listed in addition to the new data.

15 Including Channel Islands, Faeroe Islands, and Isle of Man.

16 Including Andorra, Gibraltar, Holy See, and San Marino.

17 Including Liechtenstein and Monaco.

18 With effect from 3 October 1990, the Federal Republic of Germany and the German Democratic Republic united to form one sovereign State under the designation "Germany". Since aggregated data is not yet available for all indicators, the separate entries for the two former States are listed in addition to the new data.

19 Including Cocos (Keeling) Islands, Christmas Island, and Norfolk Island.

20 Including New Caledonia, Solomon Islands, and Vanuatu.

21 All data for the Union of Soviet Socialist Republics are based on the national structure of the State as it existed at the time these indicators were compiled.

22 Comprising Guam, Kiribati (which also includes Canton and Enderbury Islands), Nauru, Pacific Islands (comprising the Caroline, Mariana, and Marshall Islands), Johnston Island, Midway Islands, and Wake Islands.

23 Comprising American Samoa, Cook Islands, French Polynesia, Niue, Pitcairn, Samoa, Tuvalu, Tokelau, Tonga, and Wallis and Futuna Islands.

† Government appraisal of population growth: L = too low; S = satisfactory; H = too high.

†† Government support for family planning (FP): Y = government provides direct or indirect support; N = no support provided or access limited.

SOURCES:

Adult literacy rates: United Nations Educational, Scientific and Cultural Organization (UNESCO)

School enrolment: United Nations Educational, Scientific and Cultural Organization (UNESCO)

Percentage of births attended by trained health personnel: World Health Organization (WHO)

Percentage of population with access to health services: United Nations Children Fund (UNICEF)

Percentage of population with access to safe drinking water: World Health Organization (WHO)

Food production per capita: Food and Agriculture Organization of the United Nations (FAO)

Agricultural population density: Food and Agriculture Organization of the United Nations (FAO)

GNP per capita: World Bank

Government expenditures of health and education as percentage of GNP: Ruth Leger Sivard, *World Military and Social Expenditures 1989*

All other statistics are provided by the United Nations Population Division.