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The State of World Population 1988

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SAFEGUARDING THE FUTURE

Introduction

INCREASING human demands are damaging the natural resource base – land, water and air – upon which all life depends. High fertility and rapid population growth are contributing to the process. In developing countries, slower growth and more even distribution of population would help to take pressure off agricultural land, energy sources, vital watersheds, and forest areas, giving time for governments, the private sector and the international community to evolve strategies for sustainable development.

There is urgent need for action. World population, now over 5 billion, will be 6 billion by the end of the century. Nearly all of this growth is in developing countries (Figure 1), by definition those least capable of absorbing it.

In the poorest areas, the "scissors effect" of poverty and increasing population is slicing away at their ability to sustain human life.

Tropical forests are shrinking by 11 million hectares a year. Topsoil is being lost at the rate of 26 billion tons a year. New deserts are appearing at the rate of 6 million hectares a year. Tropical developing countries have seen 160 million hectares of upland watershed grossly degraded over the last three decades. In many areas groundwater is being used faster than it is being replenished, and salinization or waterlogging affect half the world's irrigated croplands. The amount of land available for agriculture may be shrinking even as numbers grow.

Environmental stress is one cause of uneven population distribution, particularly rapid urban growth, in developing countries. By the end of the century, half the world will be living in urban areas. One fifth of these people will live in "mega-cities" of four million or more (Table 1). An uncounted number of people, certainly in the tens of millions, have moved across international boundaries in search of a better life. Almost always, they migrate to the cities, which are already major sources of environmental damage.

Industrialized areas – most though not all in developed countries – also contribute by their demands for resources, their production of waste, and the cumulative effects of their activities on the environment.

The industrialized countries contain less than 25 per cent of the world's population, but they consume 75 per cent of the energy used, 79 per cent of all commercial fuels, 85 per cent of all wood production and 72 per cent of all steel production. One consequence is environmental damage: for example, 31 million hectares of forest in Europe and north America are already affected by acid in the air or the soil. An unknown quantity of toxic and hazardous waste is being transported across national borders. Transportation itself is hazardous: too often, the disposal site is unregulated and unsafe.

In the industrialized countries, urban growth and industrial development had the effect of relieving the pressures of rural poverty and population growth, but at a high cost to the environment. Today, the environmental costs of hazardous industrial technologies are mounting. There are fears that the damage may already be irreversible.

This puts a dual responsibility on industrialized countries, to take the lead in introducing new and safer technologies, and to assist developing countries in their search for safer industrial growth. They also have a responsibility to provide continuing assistance to solve population problems, as part of the search for sustainable development.

The effects of resource use, environmental damage and population growth are not confined within national borders. In order to establish a sustainable relationship between growing human needs and available resources, action will be needed on all levels, from the international to the individual.

Rapid population growth, giant cities and the

tide of international migration are the result of millions of decisions by individuals. Much of the damage to the resource base is also the consequence of individual decisions – to cultivate marginal land for example, to strip hillsides of trees for firewood, to graze land already showing signs of exhaustion. But frequently the agents of destruction have little real choice. They are driven by poverty, or the decisions of others.

Some developing countries have succeeded in slowing population growth. Their experience shows how individual decisions affecting family size respond to national policy. But it also shows the need for national development policy and planning to respond to the needs of individuals and communities – and to put the power of choice in the hands of those making the decisions.

The successful countries are not the richest or most favoured by natural conditions. But they are committed to slower population growth and they are able to translate commitment into policy.

Countries with slower growth generally have a narrower income gap between the richest and the poorest groups in the population. Literacy is higher, infant mortality lower, nutrition better and society in general more stable. They pay more attention to rural development, and to stemming unplanned urban growth, than countries with higher population growth rates.

They tend to demonstrate a commitment to social as well as economic development, particularly as regards women. Women in these countries are generally better educated, are longer in school, and marry later. They are healthier, and so are their children. They have fewer children, but also lose fewer (Figure 2). They are more likely to work outside the home and have more rewarding jobs than their counterparts elsewhere. They are nearer to the mainstream of economic development.

International policies and events affect resource use and population growth and distribution in developing countries. For example protectionist policies in a handful of industrial countries may cost developing countries' agriculture $30 billion a year in foregone earnings – more than 50 times total population assistance. At the other end of the scale, fluctuations in the international prices of primary products – sugar, tea, timber or tin for example – can have quite devastating effects on the poor in the producing countries. Institutionalized poverty undermines the best population strategy.

Methods are now being developed to build into economic status reports and forecasts the true costs of resource use and abuse; the economic effects of population growth and concentration, and their impact on natural resource capital; the availability and condition of critical resources such as arable and range land, potable water, forest cover, wildlife and mineral reserves; and the effect of proposed development activities on all these areas.

The question is urgent, because the planet as a whole is already beginning to pay the price for neglect of this "environmental accounting".

Links between Population, Environment and Resources

IT should be admitted at the outset that not enough is known of the complex relationships between population, resources and the environment. One of the priorities for the future will be action-oriented research into the linkages, to guide national and international development policies.

Nevertheless, it is clear that population growth and concentrations have a distinct impact on the availability and use of common resources. The following broad generalizations can be made:

• In rural areas of developing countries, increasing numbers and concentrations of poor, mostly landless people are being forced to destroy their own resource base. In their search for food, water, fuel, and fodder, they use up wood faster than it is being grown, farm marginal land at non-sustainable levels, deplete water supplies and overgraze rangelands with increasing numbers of animals. For example, fuelwood scarcities already affect about 1.3 billion people in the developing world. This could be 3 billion by the year 2000, according to the Food and Agriculture Organization of the United Nations (FAO).

• Among the important agents of tropical deforestation are slash-and-burn cultivators. Too poor to occupy more fertile areas – sometimes forced out by population pressures or unequal land distribution – they clear and cultivate forest land, which lacks nutrients and is quickly exhausted. Regeneration takes up to twenty years. Under increasing pressure, it is seldom given that long.

• Commercial logging is another important cause of tropical deforestation. It is an example of how demand for raw materials, mainly by industrialized countries, contributes to resource degradation. Developing countries are under pressure to generate foreign exchange to pay off loans and to finance development. Often there is no option but to increase production of timber, minerals and agricultural exports beyond sustainable levels (Box 1).

• As demand for water for irrigation and industrial uses has increased, population growth

Box 1

The Development Treadmill

THE rising cost of development combines with population pressures on developing countries to over-extend their use of natural resources. Unable to live on the income, the poorer nations draw on irreplaceable natural resource "capital" to service old debts and finance new ventures.

Most developing countries are primary producers – their principal exports are raw materials. Over the last 10 years, the prices of major commodities such as copper, iron ore, sugar, groundnuts, rubber, timber, and cotton have fallen significantly. The 1985 terms of trade of sub-Saharan African countries, for example, were 10 per cent below 1970 levels. Many experienced drops of 20 per cent or even more, according to the World Commission on Environment and Development. External shocks such as higher oil prices, fluctuating exchange rates, and higher interest rates added to the burden.

Industrial countries' actions to protect their own manufacturing industries have further cut into the ability of developing countries to diversify their economies and increase exports of manufactured goods.

Handicapped by the international marketplace and unable to extract more favourable terms of trade, developing countries are compelled to increase production for export. Their income does not always increase because over-production pushes the market price down still further: meanwhile they may be using up irreplaceable resources.

For example, the effect of overcutting on tropical forest is permanent, particularly when the cleared land is then used for subsistence farming. Export agriculture demands good land and heavy inputs, and even then may exact a permanent price from the soil.

Developing countries pay another price for their exports – the hidden costs of increased environmental damage. Outmoded production processes exact a heavy toll on the environment. If all exporting industries in developing countries were forced to adopt environmental standards prevailing in the United States in 1980, collectively they would have incurred direct pollution control costs of some $5.5 billion, according to a Commission study. The indirect costs of pollution damage to the resource base in these countries can only be guessed.

has increased the demand for domestic uses. Water shortage in rural areas is one reason for migration. It contributes to disease and premature mortality in both rural and urban areas, especially among infants and children. High infant mortality in turn is connected with poverty, frequent pregnancies and large families.

- Rural poverty and scarcity has produced large-scale migrations of landless peasants to urban areas. The increasing demands for clean water, sanitation facilities, food, fuel, housing, education, medical services, and job creation have already overwhelmed the capacity of many developing countries to cope with their rapidly growing urban populations.
- Among resource/population problems faced by developing countries: farming practices, particularly among the poor, are not changing fast enough to meet increased demand; technologies and techniques suitable for small, slowly growing societies cannot meet the needs of suddenly greater numbers; advanced technologies and techniques, though they offer short-term gains, are frequently not appropriate for sustain-

Box 2

Women as Resource Managers

IN addition to child-rearing, providing health care for the family, running the household, cooking, and earning cash incomes, women in the developing world have another role: that of resource manager.

Women provide most of the food, fuel and water for rural households. They also do whatever environmental protection work is needed and possible – much of the soil conservation in East Africa over the past decade, for example, has been done by women.

Women account for half the food production in developing countries; perhaps 75 per cent of Africa's food is produced by women. Cultivation and harvesting is only the first stage: twice as much time can be taken up by food processing and preparation. The time and energy required for these processes, and for the fetching of fuel and water (which may involve for example a walk of 10 kilometres three days out of four) rarely figure in national labour statistics.

The economic value of the unpaid part of women's "double day" at work and at home, has been estimated at $4 trillion annually. But their central place in resource use and conservation has yet to be fully recognized by governments and international agencies. They do not normally participate, other than in a rather peripheral way, in shaping their countries' economic and social policies.

As policies for sustainable development take shape, still more responsibility for husbanding resources will probably fall on women. Successful policies will secure women's involvement from the outset, but will also ensure that "development" does not merely mean additional burdens for women.

The first step will be to recognize their dual role. The second will be better nutrition, access to education and health care. Nearly half of all women of child-bearing age in developing countries are affected by nutritional anaemia, compared with only seven per cent in the developed world.

When educational standards are raised, women's health improves. More girls are in school than ever before, but boys are still more likely to attend school: there are 80 million more boys than girls in school.

Further needs will be an attack on high fertility and long work days, to help spread burdens and benefits more equally among women and men.

able resource use; family and social structures developed over centuries are not adapted to rapid change; governments and institutions are hard pressed to provide from their own resources health care and education, employment opportunities and adequate housing for increased populations; international resources for development are shrinking in real terms even as demand grows.

• Identical means may be used to solve some environmental and population problems. One essential element is some room to make choices. The utterly poor, for example, have freedom in neither resource use nor family size. The area of choice expands with income, education, access to information and services, and the degree to which individuals and the community can influence external circumstances which affect their lives. Central among these are decisions by local and central governments and by economically dominant individuals and organizations.

• Women have a central role in both population and conservation of resources. As cultivators, suppliers of fuel and water, and preparers of food, they interact most closely with the micro-environment in developing countries. As wives and mothers, they are equally closely concerned with family size. In developing countries they are frequently the more important actors in the rural economy. Successful programmes concerning either population or the environment therefore have women at their centre (Box 2).

Issues

Population Growth

THE rate of world population growth increased from two per cent per thousand years in the prehistoric past to about two per cent a year by the mid-1950s. Approximately one billion people are being added every 12 years. Every minute the global population grows by 150; every day by 220,000; every year by over 80 million. The annual increase in numbers will continue to grow until the 1990s, when it will be about 90 million. By the turn of the century, the world is expected to have 6.1 billion people.

Though growth rates are now slowing, the momentum of population growth ensures that at least another 3 billion people will be added to the planet between 1985 and 2025.

Growth will not stop altogether for perhaps another century, when world population may be over 10 billion, twice its present level. Most of these people will be born in developing countries. The developed world grew from 0.8 billion in 1950 to 1.2 billion by 1985, while the population of developing countries increased from 1.7 billion to 3.7 billion.

Part of this dramatic rise in numbers is the result of widespread improvements in basic health care which have contributed to lower infant mortality (deaths before the age of one year) and longer life spans (See Table 2). But the very success of these interventions now threatens the future.

A country's people should be a resource, not a liability. Problems arise when population growth outstrips a society's capacity to adapt to their needs and equip them to make their contribution.

In Kenya, for example, population growth is running at 4 per cent annually, enough to double the population in less than 18 years.

One of the results is pressure of population on land. The best land has been sub-divided again and again. The amount of land per person has fallen from 0.40 hectares per person in 1969 to 0.20 hectares per person today. Poor farmers are forced to use marginal land, which swiftly deteriorates, or else move to the city. Kenya's capital Nairobi grew 600 per cent between 1950 and 1979. Not surprisingly, one of Kenya's development priorities is slower population growth.

Successful adaptation – including slower population growth – demands political commitment and significant investments of national resources, both human and financial. Several countries have shown that it can be done – among them China, Costa Rica, Cuba, Indonesia, Mexico, the Republic of Korea, Sri Lanka and Thailand, as well as several small island nations.

An important ingredient of their success has been close attention to development at the level of the village or urban neighbourhood. They have not only provided family planning services, for example, but have created the social and economic conditions under which family planning decisions can be made.

Their problems are not at an end, but they show a possible route towards successful adaptation to changes both in population and the environment/resource nexus (Box 3).

Trends in Birth and Death Rates

Overall death rates tend to be low in developing countries because of their high proportion of younger people. In many cases infant mortality is a better guide to the true position:

• Thirty-two per cent of the people of the developing countries live in countries – such as

China and the Republic of Korea – where birth rates are below 25, death rates below 10 and infant mortality is below 50 (per thousand in all cases);

- Forty-one per cent are in countries like Brazil, parts of India, Indonesia, and Mexico, where birth rates have fallen, but not as much as death rates, where infant mortality is moderate (between 50 and 75) and populations are still growing at around 2 per cent each year, sufficient to double it every 35 years;
- The remaining 27 per cent live in sub-Saharan Africa, parts of the Middle East, and much of south Asia, where death rates have fallen, but birth rates (over 30) and infant mortality (over 100) remain high. Their populations' doubling time is 28-23 years.

Many of the poorest countries are thus subject to the highest rates of population growth. Lower infant mortality and slower population growth are priority areas for sustainable development policies in these countries.

Age Distribution

The youthful age structures accompanying rapid population growth mean that a large proportion of the population is supported by those in the economically productive ages. In the industrialized world, for example, there are 4.1 people of working age to support each school-age child, compared to only 2.3 in the developing world.

Some 40 per cent of the people living in developing countries are under 15 years of age. Their fertility as adults will make an enormous difference to population growth rates and consequently to global resources. The United Nations medium projection for population growth, cited earlier, assumes that world fertility will be at replacement level by 2035; a mere 30 year delay could mean an extra 4 billion people.

An additional concern is the growing proportion of elderly people. Life expectancy in many developing countries is now 60-65 years, a success in development terms, but with many implications – not only for dependency rates, but for the future of the family.

Urbanization

Since 1950, the number of people living in cities has almost tripled, and in 1985 reached nearly 2 billion. In the developed world, the urban population doubled from 477 million in 1950 to 838 million in 1985. The urban population of the developing world quadrupled over the same period, from 286 million in 1950 to 1.14 billion by 1985.

By the year 2000, 75 per cent of Latin America's population, 42 per cent of Africa's and 37 per cent of Asia's, will be urbanized.

The number of people living in cities of over

Box 3

Reducing Fertility Levels

FIVE key factors determine family size: women's status in society, maternal and child health care, information and access to family planning services, family income, and education for women.

It is hard to say which of these effects is most important. Recent research supports the observation that they tend to reinforce each other: for example, educated women have a higher status in society and are more likely to live in towns, where access to family planning services is easier; their children are fewer, healthier and are more likely to survive.

Poor people tend to have large families: extra hands can bring in extra money or food, and there is little cost involved. The children share whatever food, shelter and clothing is available. But both mothers and children are much more likely to be undernourished, and more vulnerable to disease. They also live far from medical care or family planning services. High maternal and infant mortality accompanies frequent pregnancy. Women who have completed primary school have fewer children than those with no schooling, and families become smaller as the education level of mothers rises. These differences are found throughout the developing world, and are independent of income level, occupation, religion, and other factors.

Women in most developing countries still derive their status in their community from their positions as wives and mothers. An important contribution to lower fertility will therefore be change in the way women derive their status. Contributing to a change are the legal right to own and inherit property, the right to vote, the right to choice in marriage and divorce, education, acknowledged life options other than childbearing – and of course, access to family planning information and services.

The World Fertility Survey, carried out in 41 developing countries between 1972 and 1984, revealed a striking unmet need for contraception and family planning programmes in developing countries. In Africa, less than a quarter of women not wanting any more births are practising contraception, in Asia 43 per cent and in Latin America 57 per cent. Perhaps a quarter of all pregnancies in developing countries end in abortion, a large number because contraception is not available.

If all women who said they wanted no more children were able to stop childbearing, the number of births would be reduced by 27 per cent in Africa, 33 per cent in Asia, and 35 per cent in Latin America. Maternal mortality could be reduced by half.

It is estimated that some $2 billion is spent on family planning programmes every year in developing countries. This amounts to less than $1 per capita, but because of relatively low rates of use, it amounts to about $21 per user per year. The World Bank estimates that a contraceptive prevalence rate of 25 per cent is attainable in Africa within a decade. (It is now 3 or 4 per cent). It would require increasing family planning expenditure from $100 million at present to about $640 million by the end of the century, but the return would be proportionally much larger than the increased expenditure.

one million has also grown rapidly, from one in 100 in 1940 to one in 10 by 1980. In highly urbanized Latin America that ratio is currently one in four. If the "million-plus cities" continue to grow at current rates (Table 1), transport, communication, health and sanitation systems could be overwhelmed, and political systems threatened. According to the World Commission on Environment and Development, "these projections put the urban challenge firmly in the developing countries. In the space of just 12 years, the developing world will have to increase by 65 per cent its capacity to produce and manage its urban infrastructure, services, and shelter – merely to maintain present conditions."

The city's growing demands for food, water, energy and shelter, and the need to dispose of waste, distort the economy and geography of the surrounding countryside. For example, a study of fuelwood use in one African country by the Beijer Institute of Stockholm found that despite increasing populations rural fuelwood use was mostly sustainable: a far more important contributor to deforestation was the wholesale conversion of wood to charcoal for urban use.

Based on a "global average", it has been calculated, very roughly, that a city of one million inhabitants consumes every day about 625,000 metric tons of water, 2,000 metric tons of food, and 9,500 metric tons of fuel, while at the same time generating 500,000 metric tons of waste water, 2,000 metric tons of solid wastes and 950 metric tons of air pollutants. But there are great differences between cities in different parts of the world. New York City, for example, produces three times as much waste per person per day as Calcutta.

Urban growth eats up arable land, which can be disastrous in a country such as Egypt, where only 4 per cent of the country is cultivable. Between 1967 and 1975, the United States lost some 2.5 million hectares of farmland to urban sprawl.

Cities also absorb national development budgets. Developing countries tend to concentrate limited development resources on industry, and therefore in cities and towns, rather than the rural sector.

Box 4

Bombay's pavement proletariat

A 1985 survey of 6,000 families, nearly 27,000 people, whose only home was the streets of Bombay revealed a high proportion of wage earners – 43 per cent compared to 38 per cent in the population as a whole. But they earned far less than the minimum wage – two thirds of the men and nearly all the women earned less than $1.80 a day.

They listed nearly 90 occupations: one third were unskilled workers, mostly labourers; a fifth were traders or hawkers; 14 per cent were self-employed; 12 per cent were domestic workers; and the remaining 12 per cent were skilled workers.

The survey pointed out that they perform vital tasks for the city, in factories and wayside repair shops, labouring and trading, sorting garbage and recycling metals, plastic and glass. Their very low wages exclude them from even the poorest slums: they live in any shelter they can put together from wood, canvas or cardboard, or without a roof of any kind.

Migration

Migrants are pulled towards the city by the hope of better access to education, health services, and jobs, but they are also pushed by rural poverty. In Metro Manila, for example, some 55 per cent of the city's growth between 1970 and 1980 was a result of migration.

One cause of poverty is an increasingly degraded environment. The total number of "environmental refugees" is impossible to calculate, but it is known that during the first half of the 1980s at least 10 million Africans were forced off their land, largely by extended drought. Most of the survivors ended up in urban squatter settlements or refugee camps.

Those forced off the land are already poor. Cheap food policies in many countries favour the urban consumer at the expense of the rural producer. Land distribution issues add to the problem. In just three countries – India, Bangladesh, and Pakistan – there are over 30 million landless rural households, families who neither own nor lease land. Assuming an average of only 6 people per household, the sub-continent's landless rural population is nearly as large as the total population of the United States. These people depend on seasonal agricultural employment and on jobs generated by agricultural service industries. They are unemployed or under-employed most of the time. Landlessness in itself is often enough to push people into urban areas. Two-thirds of the people covered in a 1985 survey of Bombay's pavement dwellers said they had been landless and underemployed before coming to the city. More than half said that they owned nothing at all before they moved.

Many migrants find themselves in an economic trap. Officially "unemployed", they work 10-15 hour days in unregistered factories and construction firms, sell goods on the streets, make clothes in their homes, or work as servants or guards. Without them – visible on every street corner, but invisible in official accounts – many developing cities would grind to a halt. Their income is only enough for survival. However hard they work they can do no more than perpetuate their poverty (Box 4). They occupy the least desirable parts of the cities, in dustbowls or swamps, high on steep hills, on the banks of polluted rivers or next to garbage dumps. Often their very settlement is a threat to their lives (see Box 5).

One critical fact should not be overlooked: migration from one occupied rural area to another is severely limited. Where it happens the result is often conflict between migrants and the original occupants. "Unoccupied" land is usually too poor to be used successfully, or it may be an environmentally valuable watershed or forest.

Health and the Environment

Health services, whether curative or preventive, rarely reach the very poor in developing countries, in either rural and urban areas. The same applies to the basics of environmental health – clean drinking water and sanitation, adequate food and shelter.

Poverty

The most serious threat to health in developing countries is poverty. Poverty accompanies all the common factors which accompany high incidence of disease. Even in industrialized countries, the children of the poor are twice as likely to die as those in the highest socio-economic groups. The effect is multiplied in the poorer countries.

Water

For the poor, the same water supply often serves for both drinking and sanitation. According to the World Health Organization (WHO), some 1.2 billion people, or 24 per cent of the world's population, lack safe drinking water, and 1.4 billion people have no sanitary waste disposal facilities. Water-borne diseases – cholera, typhoid, diarrhoea, dysentery, malaria, and intestinal worms – claim about 5 million adults a year, mostly in the poorer countries. Parasitic diseases such as onchocerciasis (river blindness) and trypanosomiasis (sleeping sickness) are also spread through contaminated water.

Box 5

Disaster in Rio

THE urban poor sometimes pay a terrible price for their poverty. Authorities in Rio de Janeiro estimate that two-thirds of the city's shanty towns, housing an estimated 3 million people, are perched on steep slopes; a government study of the problem concluded in 1987 that at least $800 million would be needed for essential improvements.

Squatter settlements strip away the vegetation that anchors the soil and protects the watershed. With the bare soil exposed to wind and rain, the hillsides quickly become unstable.

At the end of February 1988, a mudslide following torrential rains claimed the lives of 275 people – mostly women and children – and left over 20,000 homeless. Although many homes and neighbourhoods were flooded, destruction and human suffering was greatest in the squatter settlements and shanty towns.

WHO calculates that by 1983 only 39 per cent of the rural population in 92 countries had access to safe drinking water, compared to 74 per cent of the urban population. Similarly, only 14 per cent of people in rural areas had access to sanitation, compared to 52 per cent of all urban dwellers.

Housing

As the numbers of the urban poor increase, so do their health problems. Squatters and slum-dwellers can expect to see one in four of their children die before the age of five: half the adults suffer from intestinal worms or serious respiratory infections. Tuberculosis, once the scourge of European slums, is increasing among the urban poor in developing countries: so are the infectious diseases which are easily spread in crowded and unsanitary housing conditions. Poor housing increases social stress and disruption: domestic abuse, rape, incest and drug use are more common; sexually transmitted disease and AIDS are more likely to spread among the urban poor.

Childbirth

Women whose health is adversely affected by their environment are much more likely to die as a result of childbirth. Pregnancy doubles the risk of death from common diseases such as pneumonia and influenza, which are more common among poorly-housed and ill-nourished women.

Each year, at least 500,000 women die from pregnancy-related causes, 99 per cent of them in developing countries. Maternal mortality accounts for fully a quarter of all deaths among women aged 15 to 49 in developing countries. An African woman's chances of dying as a result of childbirth are one in 14; in parts of Asia it is one in 18. The comparable rates for industrialized countries range from one in 4000 to one in 7000.

The cost of pregnancy to a woman's health is magnified by malnutrition. Two-thirds of all pregnant women in developing countries suffer from vitamin and mineral deficiencies, and anaemia, which causes between 40 and 50 per cent of all maternal deaths. Anaemic women who suffer from complications at childbirth such as haemorrhaging are in much greater danger than those who are well-nourished.

Infancy

Perhaps a third of all deaths are those of infants and children under five. More than 11 million die every year in the developing world, mostly from diarrhoea and infectious diseases, often complicated by malnutrition. Some 100 million children under five suffer from protein energy malnutrition; about 40 per cent of these children are chronically malnourished.

One study carried out in Bangladesh revealed that each child surveyed suffered on average 6-8 episodes of diarrhoea a year: they were sick for

55 days of the year. Diarrhoea is often complicated by infestation with worms or other parasites.

High infant mortality rates accompany more frequent pregnancies. Second and third children have a much better chance of survival than their younger brothers and sisters. Children born less than two years after an elder sibling are more likely to be underweight and anaemic at birth: they start life with a huge disadvantage.

Combined with poor nutrition, three factors contribute significantly to higher infant and maternal mortality: 1) early and late pregnancies (before the age of 19 and after 35); 2) births spaced less than two years apart; and 3) the effects of repeated pregnancies.

Degradation of Critical Resources

BY definition, the poor have limited access to resources. They are frequently forced to make unsustainable use of the resources they do have – the common land and forest. There are already regions where the land can no longer support present human and animal populations. Rapidly increasing populations make it more difficult to tackle either causes or effects of resource abuse.

Successful population and resource use strategies appear beyond the means of many developing countries. Yet there are many examples of successful land management. When communities are given the power to make critical decisions about how to safeguard and use their resource base; and when they are supported by national policies of sustainable development, the answer to the problem of growing populations and dwindling resources comes within reach.

Loss of Agricultural Land

A global population which levels off at some 10.2 billion by 2100 has profound resource implications. Feeding a five-fold population increase in Africa and a doubling of numbers in Asia, where population is already touching 3 billion, will depend to a great extent on land and water management. Success will also depend on less obvious examples of wise resource use, such as health and family planning programmes in rural areas.

Between 1950 and 1985, world cereal production increased from around 700 million metric tons to over 1.8 billion metric tons; an annual growth rate of about 2.7 per cent. This phenomenal growth in food production was made possible by new seed varieties, more chemical fertilizers, more pesticides, and irrigation.

Yet 730 million people still do not eat enough to lead fully productive lives. Two-thirds of them live in South Asia and one-fifth in sub-Saharan Africa, many on land which cannot support them by subsistence agriculture alone (Figure 3).

There is more bad news: the United Nations Food and Agriculture Organization (FAO) predicts that without conservation measures, soil degradation and erosion will claim 544 million hectares – 65 per cent – of rainfed cropland in Asia, Africa, and Latin America by the year 2100.

The loss of agricultural land can be ascribed to:

- **Mismanagement of land** by over-cropping and over-grazing on poor soils, and excessive fuelwood harvesting. One cause is certainly population pressure.
- **Mismanagement of water** by badly planned and operated irrigation systems. Subsidization of water stocks encourages over-use, a main cause of salinization, waterlogging, and alkalization of prime agricultural areas.

Desertification in sub-saharan Africa

Desert is the last stage of land degradation. Desertification currently threatens about one-third of the world's land surface (48 million square kilometres), and the livelihoods of at least 850 million people. The spread of the desert is one reason for Africa's failure to match overall population growth with food production (see Figure 4).

Population growth in African countries has been running at over 3 per cent a year for the last two decades. At these rates, many African countries will double their populations in 25 years or less.

In sub-Saharan Africa, approximately 65 million hectares of poor but productive land have turned into desert in the last 50 years. In the Sudan, for example, the desert has spread southward at the rate of 100 kilometres in 17 years. About 78 million people may be affected.

At the best of times, two-thirds of the continent face a high risk of drought for two or more years every decade. Even in "normal" years, rainfall tends to be highly erratic. Recent studies in Mali, Senegal, Burkina Faso, and Niger show significantly less rainfall over the past 15 years when compared to the 50 year period 1934-84.

In the past, farmers coped with poor soils and erratic rainfall by rotating crops and allowing the most fragile land to lie fallow for up to 20 years. This system was perfectly sustainable so long as human and animal populations did not exceed the "carrying capacity" of the land.

The pattern of land use which has sustained generations of rural Africans has been broken. Larger populations and lower rainfall have forced more marginal land into production and reduced fallow periods. Without time for the land to recover, yields drop. More land is cleared to increase food production, reducing fuelwood supplies and grazing. Finally, the topsoil itself turns into dust.

Small farmers have no incentive, and no surplus cash, to invest in soil conservation, fertilizers, better seeds, or machinery. Apart from cash cropping – which can have the perverse effect of denying land to subsistence farmers – there has been little rural investment of any kind in Africa. Farm prices have been kept artificially low to provide cheap food to city dwellers, and prices for export crops have dropped over the past decade.

Some attempts at agricultural development have failed because equipment and training have gone to the wrong people. It is only slowly being recognized in official policies that the great bulk of agricultural work, after the heavy clearing, is done by women. Some extension schemes designed with women in mind have been remarkably successful.

Meanwhile, debt service in sub-Saharan Africa rose from 15 per cent of export earnings in 1980 to 31 per cent by 1986. Resource transfers to the area dropped from an estimated $10 billion a year in 1982 to $1 billion in 1985.

Africa's dilemma is the result of rapid population growth, climatic change, the breakdown of traditional, sustainable agricultural practices, and failure to match growing needs with growing investment and modern means of achieving sustainability. The problem is compounded by the workings of the international economic system. Those are some of the causes. One of the results is the advancing desert.

The Silent Enemies: Salinization, Alkalization and Waterlogging

The importance of irrigation, both to feed growing numbers of people and to provide an adequate living for rural populations, cannot be exaggerated. For example, 30 per cent of India's cultivated land is under irrigation, producing 55 per cent of food output; Pakistan has 65 per cent of its agricultural land under irrigation, producing 80 per cent of the food supply; fifty per cent of China's croplands are irrigated, producing 70 per cent of its food. Worldwide, irrigation covers about 271 million hectares and the area is expanding.

FAO estimates that half of this area may be in danger from three "silent enemies", salinization, alkalization and waterlogging.

Every year, somewhere between 1 and 1.5 million hectares of mostly prime agricultural land is lost to salinization. In the United States alone, it is thought that 20-25 per cent of all irrigated land (some 4 million hectares) is affected.

The silent enemies are not easy to detect until they reach a crisis level. Even the best irrigation water contains salts and alkalis. Without proper drainage, the water escapes by evaporation and the salt load gradually builds up. Alternatively, the water level rises until it kills off the crop roots. Eventually the land becomes unusable.

The answer is to use limited quantities of water with proper drainage. But water is often treated as a free or unlimited resource, and there is little financial incentive for farmers not to waste it. Nor do they see any reason for managing flow or drainage.

In a different but related sequence, unsustainable use of groundwater for irrigation has depleted supplies and lowered water tables. The final stage is land subsidence, which is now a major problem in 42 areas around the world. In the Indian State of Tamil Nadu, the water table has dropped 25-30 metres in one decade.

The silent enemies are less of a problem where farmers can afford to rehabilitate damaged croplands. But in developing countries – particularly in Asia and Africa – land restoration is either too costly, or technologically beyond reach. Prevention is the only answer.

Prevention depends on making farmers responsible for the water they use, by pricing or rationing. It demands education, services and training at the community level, to encourage sustainable irrigation systems and to manage them properly once they are in place.

Deterioration of Upland Watersheds

Upland watersheds influence climate and rainfall, regulate water flow downstream, and provide unique habitats. The largest affect billions of people, some of them far away from the watershed itself.

These fragile ecosystems are being systematically destroyed and degraded. For example:

- The Ethiopian highlands have been intensively farmed for thousands of years. In the last two decades the combination of rapidly increasing populations and cash cropping have reduced much of the region to bare and eroded slopes;
- In the uplands of Ecuador and Peru, as agricultural production has spread from the valleys up the slopes, deforestation and slash-and-burn farming have exposed the hillsides to erosion estimated at 1,500 metric tons per square kilometre per year.
- Deforestation in the headwaters of the Niger has reduced the flow downstream. Tributaries have dried up and vast areas are suffering from water shortage and creeping desertification.

Over centuries, upland farmers have developed techniques such as terracing, windbreaks and contour cultivation to preserve their land. New arrivals, lacking experience, strip off trees and

natural vegetation to allow cultivation. With nothing on the slopes to retain water, topsoil is quickly lost to erosion. The effects are felt far downstream, as hydropower reservoirs and irrigation systems begin to silt up. Flash floods alternate with periods of reduced water flow.

The Himalayan region offers an example on a huge scale. The River Ganges, which drains this area – just over 1 million square kilometres of intensively worked farmland and heavily harvested forestland, mainly in India, Bangladesh and Nepal, delivers 1.46 billion metric tons of sediment to the Bay of Bengal every year. By contrast, the Amazon River, which drains a much larger area covering nearly 5.8 million square kilometres, drops only 363 million metric tons of sediment into the Atlantic per year.

Within the last century the Himalayan watersheds have become destabilized; uncoupled, so to speak, from their inherent ecological constraints. Population growth has run for decades at between two per cent and three per cent every year. Rural population densities can reach over 1,500 per square kilometre of cultivated land, or 15 people per hectare. In the same period, its forest has declined by 40 per cent.

Writes Dr. J. Bandyopadhyay, Director of the Doon Valley Ecosystem Project in India, "overexploitation of forest resources, in particular as a source of commercial and industrial wood; expansion of horticulture and cash-crops, often at the cost of the forests; huge expansion of the network of roads without consideration of slope stability; quarrying of minerals without regard for ecological damage; construction of dams in large numbers; and the uncontrolled growth of tourism, have all introduced ecological instability [to the Himalaya] in diverse dimensions and great magnitude."

The upper Himalayan watershed in Nepal offers a complex example of these effects in a crucial area. The steep slopes of the intensively farmed uplands are losing their forest cover. Without protection from the rains, the elaborate terraces crumble, and the land supports fewer farmers. As a result, upland peasants have moved to the more fertile lowlands. With fewer in the hills to maintain the age-old system, it may break down altogether, and bring increasing pressure on lowland areas.

Legal protection for village forest and farmland rights; tools, seed crops and fertilizers; and advice on how to restore the forest, go a long way towards rescuing the hillsides. In the Himalayas, village-level land management has proved highly successful where it has been tried, and is now being extended. It forms part of a spectrum of rural services which include income generation for women, health and family planning services, low-interest loans for farmers' groups and agricultural extension (Box 6).

Tropical Deforestation

The loss of forest and species is not only a national disaster: the future of all of humanity is affected.

Tropical forests regulate water flow and protect watersheds for farmers who grow food for over 1 billion people. They are also important regulators of world climate, provide valuable timber and fuelwood, and harbour irreplaceable genetic resources.

Between 7.6 and 10 million hectares of tropical forest are lost every year and a further 10 million hectares seriously degraded. FAO predicts that 150 million hectares, or 12 per cent of the remaining closed tropical forests, could be lost by the end of the century.

Deforestation is largely the result of encroachment by villages and landless subsistence farmers as populations grow; commercial logging; and planned resettlement programmes. In central America, cattle ranching has destroyed some 20,000 square kilometres of forest a year since the late 1970s, in order to provide cheap beef for North America and Europe.

When the forests go, so too do genetic resources of inestimable value. Science has identified 1.7

Box 6

Reforesting Nepal

OVER the past 25 years Nepal has lost up to 30 per cent of its forest cover, mostly to fuelwood gatherers and subsistence farming. As a result, some 80 million cubic metres of Nepalese soil is washed down to the Bay of Bengal every year; a grim harvest from denuded watersheds. Nepal's increase in rural population is partly responsible. But equally important is rural poverty and the need for land.

Alarmed by the tremendous loss of soil – and with it the livelihood of several million shifting cultivators in the hills – the government launched a community reforestation project in 1980. But even without government help, some communities were able to solve their own problems.

One such village is Amrain, in the central highlands. Ten years ago the steep slopes around the village were devoid of tree cover; only inedible ferns grew between the remains of a once-thriving forest. But the villagers burnt off the ferns, planted saplings on the hillsides and declared the entire area out of bounds for cattle and goats.

"We started the work with a set of rules," explained one villager. "And fines were fixed for animals found grazing in the forest."

The hard work has paid off. Today, the hills around Amrain are covered with a lush forest of young trees. And thanks to new legislation which transfers ownership of state-owned land in the hills to the farming communities, the villagers of Amrain finally have some real incentive to safeguard the land and their stock of trees.

"We would have left the village and migrated to the plains some years ago," states one villager, "now we are going to stay and take care of what we are saving for our grandchildren."

million species of plants and animals, but there could be 10 or even 30 million. Clearing the forest may consign 1 million or more unknown species to oblivion by the turn of the century.

Diminution of genetic diversity could have far-reaching effects, for example on the world's ability to feed increasing numbers of people. There are probably 80,000 species of edible plants, but only 200 have ever been cultivated, and a mere 12 have emerged as important staples. Crop breeders throughout the world are increasingly dependent on wild strains to improve domestic varieties.

It could also have an effect on health. Half of all medical prescriptions have their origins in wild organisms. In the United States, the value of these medicines and drugs has been calculated at $14 billion a year.

By 1985, the world's protected areas and parks totalled over 400 million hectares – an area the size of Western Europe. But conservationists maintain that this area needs to be tripled, if a truly representative sample of the Earth's ecosystems is to be preserved.

The interests of conservation and the demands of growing populations are not incompatible. Sustainable practices which meet the needs of cultivators are being successfully tried. One example is in northeast Thailand, where villages surrounding a protected forest are encouraged to increase yields from their own land and grow their own firewood rather than encroach on the protected area. Drinking water, primary health care and family planning services are part of the package. There are other examples (Box 7).

Box 7

The Greening of Sri Lanka

SUFFERING from the effects of widespread deforestation in its hilly and mountainous regions, Sri Lanka has launched a programme to reforest the most degraded areas using an old method called *taungya*, or community reforestation. Instead of moving in with an extensive state-run reforestation scheme, which would cost millions of dollars, the government has decided to allow landless slash-and-burn (*chena*) cultivators to lease up to three acres of degraded forest land. A condition of the lease is that they not only grow their own subsistence crops, but replant the watershed with seedlings of tamarind, ipil-ipil, acacia, teak and other species provided by the government.

Each *chena* cultivator has legal title to his small piece of land for three years. To encourage them to use the land in a sustainable manner the government pays the farmer 1,200 rupees ($50) for every acre planted with crops. The tree seedlings must also be looked after; the farmer has to replace any tree that dies.

The land is cultivated using age-old techniques. When his time is up, the cultivator is given another piece of degraded forestland to start another three-year lease and repeat the process. Meanwhile, his original three acres is allowed to develop into a forest – no farming or logging is permitted until the seedlings have grown into mature trees and the watershed is re-established. Even then, only limited cropping is permitted.

Between 1983 and 1985 some 575 acres were reforested under this system, and over 1 million seedlings were raised in government nurseries during 1986.

The traditional *taungya* system of reforestation saves more than half the cost of establishing conventional forest plantations with paid labour. In addition, the forests are replanted and tended by the landless poor – people who, because of their need for land and livelihood, are often forced to degrade their own resource base in order to eke out a precarious existence on poor or degraded land. Under this scheme, the forests are restored, and poor farmers given a chance to earn a modest, but adequate living.

Industrial Development: A Response to Population Growth?

Industrialization as the means of meeting increasing human needs, putting an end to hunger and poverty and eventually to slowing population growth seemed to offer the answer to many questions. But it has its own nemesis – the various, often toxic, by-products of industrial processes. Concern is growing for ultra-violet penetration of the atmosphere, for the build-up of radioactivity, for the global warming trend or "greenhouse effect". All of these accompany industrialization: all will have an effect on the future of humanity. Two issues have been selected as representative: acidification and hazardous waste.

The Acidification of the Environment

Too much acid destroys all life in streams and lakes, and acid in the rain or soil damages plant and animal life.

Since it was first noticed in the early 1970s, acid rain has spilled across vast areas of Europe and North America. In one of the worst-hit regions, 20,000 of Sweden's 90,000 lakes are acidified and 4,000 are thought to be totally devoid of fish life. Norwegian authorities claim that fish have been wiped out in more than 13,000 square kilometers of lakes.

In the United States, the National Surface Water Survey discovered acidification in at least 10 per cent of the lakes in the Adirondack region. In Canada, 300 lakes in Ontario Province are seriously affected, and an additional 48,000 lakes (roughly three per cent of the total) designated as "acid sensitive". In Nova Scotia, nine rivers are no longer capable of supporting salmon or trout reproduction.

"Acid rain" is one of the prime suspects in the *Waldsterben* (tree death) syndrome currently affecting 7 million hectares, or 14 per cent, of forestlands in 15 European countries. It has

damaged 52 per cent of the forests in the Federal Republic of Germany. It is thought to be one of the principal culprits in Swiss forests: in the central alpine region, 43 per cent of the conifers are dead or severely damaged. Swiss authorities fear that the loss of tree cover will mean more avalanches and loss of lives.

In North America, high along the spine of the Appalachian Mountains from Georgia to New England, a similar kind of forest decline is killing off conifers, mostly red spruce and Fraser fir. Eastern Canada's sugar maples are dying from acidification of the soil.

Acid deposition is caused when sulphur and nitrogen from coal-and oil-fired power plants, from industrial processes such as metal smelting, and from motor vehicle exhausts, combine in the atmosphere with water vapour, sunlight, and oxygen to form sulphuric and nitric acids.

Most of the airborne pollutants are generated in population and industrial corridors such as the eastern seaboard of the United States, the Ruhr Valley of West Germany, the Silesian Industrial Zone of southwestern Poland and northern Czechoslovakia, and the London-Manchester-Liverpool quadrant in the United Kingdom. Some of the industrializing nations of the developing world now also have acid problems.

Acid rain travels – but it can be fought. The Convention on Long-Range Transboundary Air Pollution was signed in Geneva in November 1979, and has since been strengthened.

The European Community (EC) is moving to reduce pollution. Power plants in member countries will be expected to reduce their sulphur pollution by 60 per cent by 1995, while unleaded gasoline will be introduced throughout the EC by 1989. Catalytic converters will be fitted to all new cars by 1995 to reduce carbon monoxide, nitrogen oxides, and hydrocarbons.

The World Commission on Environment and Development, warned, "Europe may be experiencing an immense change to irreversible acidification, the remedial costs of which could be beyond economic reach." If this is so, then what is the future for industrial development elsewhere?

Controlling Hazardous Waste

Toxic or hazardous waste is another by-product of industrial activity. There are no reliable global estimates of how much is produced. One estimate is 375 million metric tons a year; another for only 19 countries gives a figure around 100 million metric tons higher.

By its nature, it is difficult to dispose of toxic and hazardous waste, since it contaminates whatever environment – air, sea or soil – it enters. Waste also travels. An unknown amount is finding its way to developing countries, where it often ends up in unregulated landfills with few, if any, safeguards for health and the environment. The United Nations Environment Programme has begun preparations for a global convention on international transport of hazardous substances, but there is a long way to go before it will be ready for signature.

Locally-produced hazardous waste is an increasing problem in developing countries. Thousands of small industries largely escape regulation, while major polluters are too important to the economy to have their production costs raised by environmental protection measures. Yet the need is growing as more countries join the industrial race. India has launched a massive clean-up scheme for the Ganges, which should improve the lives and health of millions of people (Box 8).

Box 8

Cleaning Up the Ganges

THE Ganges, one of the most celebrated and revered rivers in the world, is also one of the most polluted. Some 600 kilometres of its total length (2,525 km) are dangerously polluted with human and animal waste, and an increasing amount of toxic and hazardous effluent from industry and agriculture.

Major cities like Hardwar, Kannauj, Kanpur, Allahabad, Varanasi, Patna, and Calcutta, and many smaller ones – over 100 in all – line its banks, dumping millions of tons of untreated sewage into the river each year. Of 132 industrial plants pumping effluents directly into the river, only 12 have waste treatment plants in working order. Many of the cities along the river, like Varanasi, have no sewage treatment plants at all. Normal industrial waste comprises only 20 per cent of the total pollution load of the river; the remaining 80 per cent consists of toxic discharges by industries and small-scale manufacturers, and municipal wastes.

Recognizing the need to protect human health and the ecology of the river, the Government of India has launched a major clean-up programme, called the Ganga Action Plan. Over the next five years, the government has committed Rs 250 crores ($US195 million) for the rehabilitation of the river.

During its initial phase, the following major projects are envisioned:

- Upgrading all existing sewage treatment and pumping plants along the Ganga;
- Renovating the existing sewage systems in all towns and cities along the Ganga;
- Installation of new sewage treatment plants wherever necessary;
- Extending sewage lines into areas not currently covered by the treatment network;
- Construction of large community cattle sheds in urban areas to collect animal wastes for biogas and fertilizer; and
- Regulation of the use and application of pesticides and chemical fertilizers in agriculture in the watershed of the Ganga to minimize surface run-off.

Although this is only a beginning, it is a first step in cleaning up India's most important river, and one of the world's historic waterways.

Elsewhere, the costs of cleaning up are astronomical: $10 billion for West Germany, $1.5 billion for the Netherlands, $20-100 billion for the United States, and $60 million for Denmark (in 1986 dollars). Developing countries cannot afford financial burdens on this scale, but neither can they afford the cost of hazardous waste to their – and the world's – environment.

Agenda for Change: Integrated Policy Responses for Population and Resource Management

THE World Commission on Environment and Development emphasized the need for a new era of economic growth and development based on policies that "sustain and expand the environmental resource base" of the earth.

Speaking for the United Nations system, the Secretary-General said in his 1987 report to the General Assembly: "It must be the common purpose to forge from ... varied, sometimes contradictory, economic, social and political conditions, a global environment of sustained development, social justice, and peace. In the broadest terms this, of necessity, defines the agenda of the United Nations system in the 1990s."

Establishing a sustainable relationship between human numbers and resources will require:

Population

- slowing and eventually stabilizing rapid population growth;
- providing urban alternatives to mega-cities;
- finding settled, safe homes for "environmental refugees";
- planning a safe future for increasing numbers of people.

Environment

- reversing deforestation and erosion in major watersheds;
- checking the spread of deserts;
- introducing sustainable water management;
- reducing acidification and hazardous waste;
- developing and introducing environmentally safe industrial processes.

Resources

- eliminating hunger through sustainable agriculture;
- finding new and renewable sources of energy and increasing energy efficiency;
- protecting species and preventing further loss;
- establishing patterns of consumption which respond to global needs and contribute to sustainable development.

Political and economic agendas must take account of the need to conserve the planet's ecological "capital" and to pay for development from the "interest" – the sustainable husbandry of resources. A first step will be to develop and introduce the concept of "environmental accounting" in all planning and development activities. Second will be to put in place an international economic structure which offers a real possibility of environmentally safe economic and social development.

At the international level, sustainable development implies co-operation in researching and introducing non-hazardous industrial processes. If industrialization continues on a large scale using hazardous technologies, the toxic load will rapidly exceed the environmental capacity to eliminate it.

At the same time, industrialized countries must assist developing countries to reduce their rates of population growth and especially urban growth.

An important ingredient of national policies of sustainable development will be structures which offer communities and individuals a greater degree of control over their lives and their environments, and which respond to their needs.

Population, Environment and Development

Whatever the goals of population policies, the elimination of poverty, measures to improve health, education, and the status of women are essential for their success. They are also essential for sustainable development.

Planning the Global Family

Population policies concern growth, distribution and mobility. There is a solid international consensus on the elements of population policies as part of development programmes. In particular, the right of couples and individuals to choose the number and spacing of their children is protected in a variety of international instruments, including the World Population Plan of Action and the recommendations of the International Conference on Population, 1984; the Forward-looking Strategies for the Decade for Women, and resolutions of the General Assembly of the

International Union for the Conservation of Nature and Natural Resources.

It is important to extend the reach of family planning programmes. There is great unmet need for family planning, both among older women who wish to have no more children, among younger women who wish to postpone or space births, and among an increasing number of men who wish to exercise responsibly their right to parenthood. Nearly all developing countries now have family planning programmes, but the degree of political and economic support, and their effective reach, vary widely.

Delaying the first and spacing subsequent births are important for the health of women and children, apart from their effects on population growth. Maternal and child health care services, of which family planning programmes are an integral part, should be given the same priority in health services as other elements of primary health care.

Over half of UNFPA's programme in developing countries is devoted to family planning in this context and another 15 per cent to information and communication on the subject.

The Future of Urban Growth

Core cities are growing much faster than urban centres in general, with multiplying effects on the environment. Regional development policies and the development of medium cities offer a means both of relieving pressure on the metropolitan areas and of breathing new life into rural hinterlands. A conference on Asian cities organized by UNFPA in August 1987 pointed out that medium cities were "severely neglected in overall development planning" and recommended "close attention to the problems and potential of medium-sized cities."

Integrated approaches are needed which reflect key health and population objectives in areas of development such as food production; water supply and sanitation; industrial policy, particularly with regard to safety and pollution; and the planning of human settlements.

Education

Education is a national development priority in all countries. It takes on additional importance when considering programmes of sustainable development, in which the decisions of individuals and communities will have an important part. It is of great importance for the success of population programmes: a view of the world which extends beyond the immediate horizons also extends the area of choice and prompts decisions based on the future as well as immediate considerations. Accordingly, UNFPA is supporting population education programmes in over 70 countries.

Status of Women

Women are at the heart of economic and social development. They are traditionally responsible for the health and wellbeing of society in their roles as wives and mothers. Less widely acknowledged, but equally important, are their roles as managers of the local environment, and effective controllers of large sectors of the economy. Their economic and environmental roles as well as their social contribution should be specifically recognized in development strategies and specific plans made to enhance their position. One contribution which development agencies can make is to ensure that all projects acknowledge the central importance of women by involving them in project design and management.

Achieving Food Security

To feed adequately both present populations and 1.1 billion additional people by the end of this century, it will be necessary to increase food production by 3 to 4 per cent annually. But increasing food production by unsustainable means will bring worse problems in its train.

Sustainable agricultural growth demands concerted action by governments, international agencies, non-governmental organizations, communities and individuals in favour of:

- protection of the rights of the poorer cultivator;
- agricultural research and extension systems, particularly for women farmers;
- better prices for food crops in developing countries;
- investment in the agricultural resource base;
- rehabilitation of degraded agricultural land;
- sustainable management of upland watersheds;
- environmentally safe fertilizers and pesticides;
- better water and irrigation management;
- alternative fuels;
- halting desertification.

Conserving Tropical Forests and Biodiversity

National and global conservation strategies should balance population pressures with the need to preserve habitats and promote sustainable economic development. The International Union for Conservation of Nature and Natural Resources (IUCN) has begun a major initiative to revise the 1980 International Conservation Strategy. UNFPA will join with IUCN to incorporate population and sustainable development policies in the Strategy.

The Tropical Forestry Action Plan – a collaborative effort coordinated by the FAO, the World Bank, IUCN, the World Resources Institute and the UN Development Programme – is another important initiative deserving greater support.

A "global species convention", is needed to protect the diversity of species as a common resource.

The Importance of Community Action

The chosen method of action shapes its outcome. Successful approaches to problems of population, resources, the environment and sustainable development acknowledge the importance of individuals and communities. While they are strongly influenced by external conditions, population decisions on family size or location are in the end the decisions of individuals. Conservation and sustainable resource use are also often strongly affected by individual or community decisions. National and international policies should acknowledge this, and involve the eventual decision-makers at all stages of the policy process.

Individual, local and group interests must finally align themselves with national policies, but should have an important part in their shape and direction, and play a full part in their execution. This applies equally to population as to conservation policies: voluntary and active co-operation is in the end the only guarantee of success.

Positive Responses to Population/ Resource Crises

Although the overall global response to the population and resources crises does not yet meet the needs, governments and communities have shown the way to successful strategies. In nearly all of the success stories, local communities or interest groups were given some power to control crucial decisions affecting their livelihoods.

- Kenya's national soil conservation programme is generally regarded as one of the most successful in Africa. The programme began in 1974 and by 1984, Kenyans – mostly women – had terraced 365,000 farms, or two out of every five.

The techniques used were developed after extensive research into farmers' problems, felt needs, and existing technical capacities. The resulting methods could be executed with simple hand tools, at little or no cost to the farmer, and with low labour costs.

- Similarly, Zimbabwe's "maize miracle" was the result of a concerted national programme to build up the productivity of small-scale farmers, again mostly women. The results were impressive: maize yields doubled, reaching 2.5-4 metric tons per hectare in the mid-1980s.
- In China, some 4.5 million hectares of denuded watersheds have been reforested since 1978. In addition, along more than 3,000 miles of desert, the advancing sands have been checked by windbreaks and the planting of new forests.
- To combat the effects of acidification, Sweden has spent about $150 million since the late 1970s on adding lime to lakes and rivers. The programme was launched after scientists joined local communities in urging action to protect their heritage.
- Japanese industry responded to rising energy costs by reducing energy demands. Energy use per unit of production is now lower than in the 1960s.

Conclusion

Degradation of the natural resource base and the loss of productive land can be reversed, but only through increased and more effective co-operation between industrialized and developing countries. This will be particularly important in introducing environmentally safe industrial development, and slowing rapid population growth, particularly the growth of giant cities.

Under the stress of increasing numbers and demands, the environment has shown surprising resilience. With care and attention to balanced programmes of conservation and sustainable development on the part of the international community, governments, industry, and all levels of society, the earth is capable of supporting the increasing needs of the next century.

Understanding of the problems continues to grow. Understanding of possible solutions is also growing. It is already clear that no country or group is immune from danger; that all countries, communities and individuals, rich or poor, developed or developing, can be important agents both of conservation or of destruction, depending on the choices they make and the policies they adopt; and finally that, as individuals or as nations, there is no escaping our responsibility. We share a common future.

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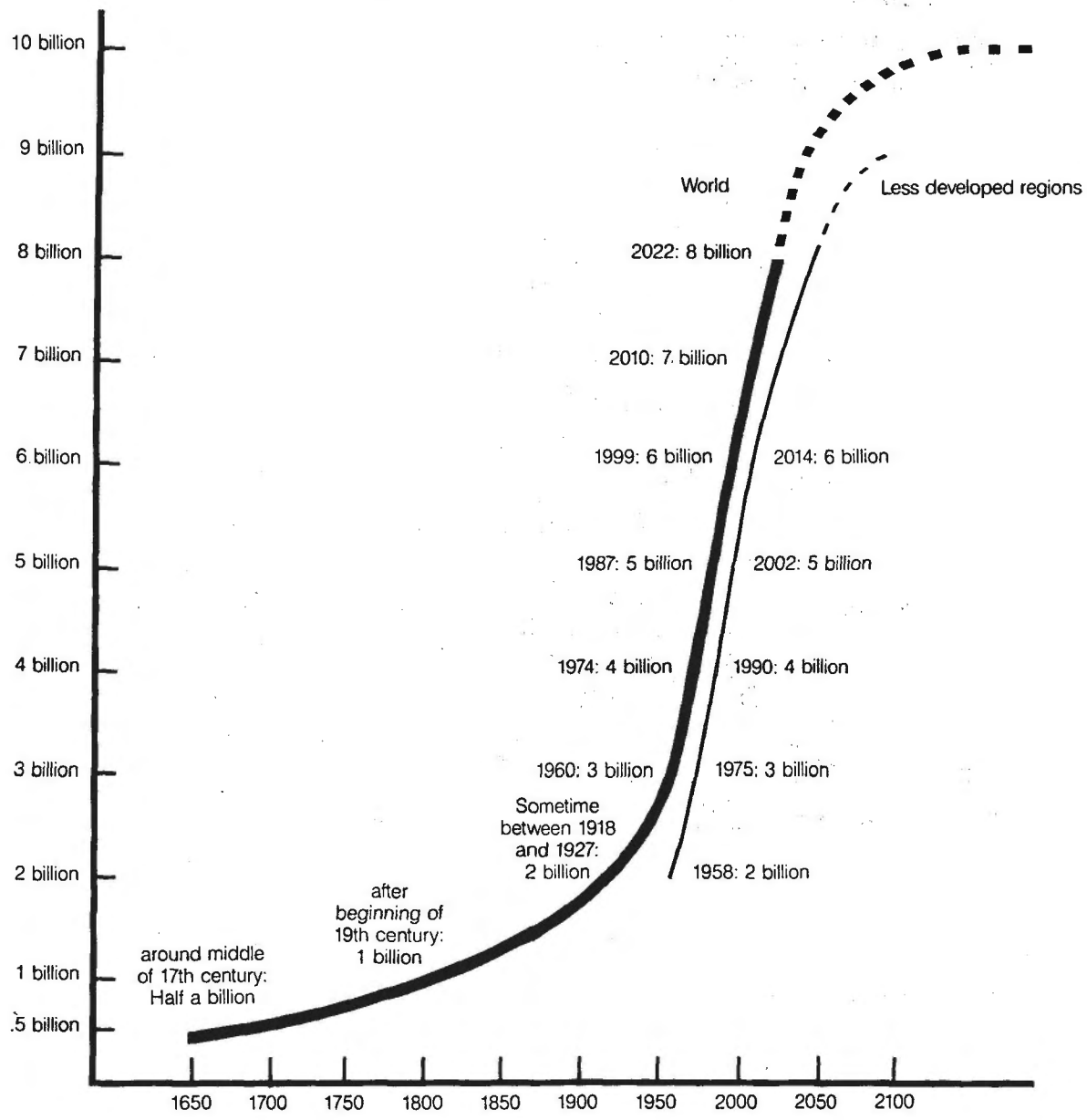
FIGURE 1

Growth of World Population

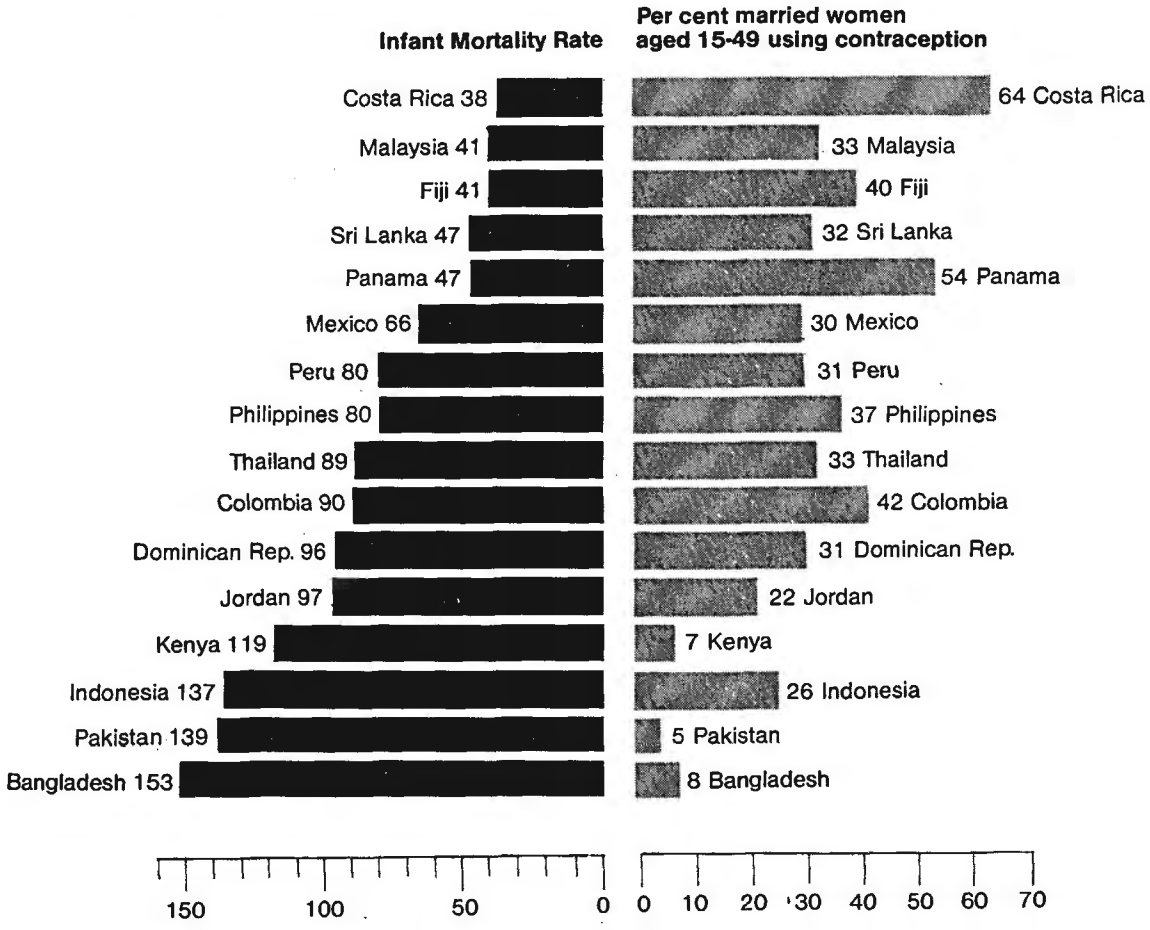


Note: Graph does not necessarily depict what will happen in the future. It only illustrates what could happen under certain assumptions of fertility and mortality. Curves have been manually extrapolated beyond 2025.

FIGURE 2

Contraception and infant mortality

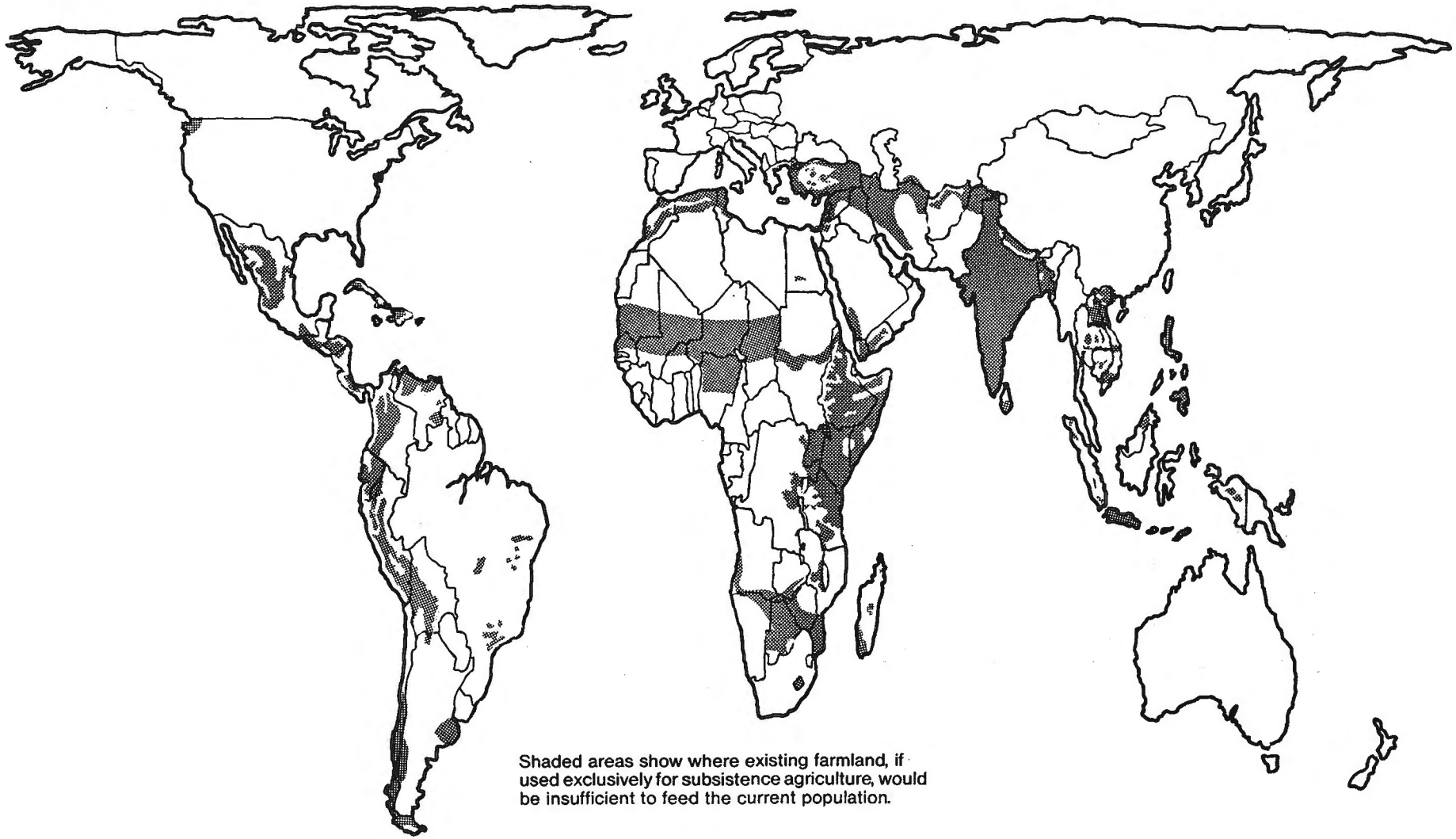
Contraceptive use rises as infant mortality falls. But success in encouraging family planning also helps lower infant mortality.



Source: World Fertility Survey (selected countries)

FIGURE 3

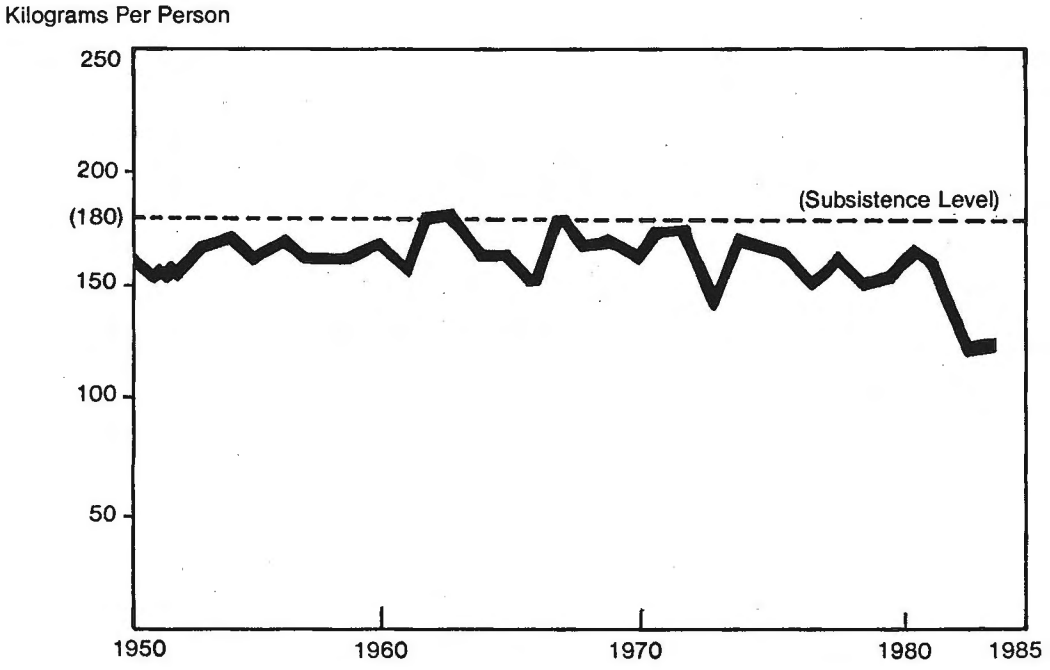
Throughout the developing world and even in some industrialized countries there are now large areas of land which can no longer grow enough food to feed the people who live there.



Shaded areas show where existing farmland, if used exclusively for subsistence agriculture, would be insufficient to feed the current population.

FIGURE 4

Per Capita Grain Production in Africa 1950-84



Source: Brown and Wolf, State of the World, 1985

TABLE 1

Examples of Rapid Population Growth in Cities (in millions)

City	1950	Most Recent Figures	UN Projection For 2000
Mexico City	3.05	17.3 (1985)	25.8
São Paulo	2.7	15.9 (1985)	24.0
Bombay	3.0 (1951)	10.1 (1985)	16.0
Jakarta	1.45	7.9 (1985)	13.2
Cairo	2.5	7.7 (1985)	11.1
Delhi	1.4 (1951)	7.4 (1985)	13.2
Manila	1.78	7.0 (1985)	11.1
Lagos	0.27 (1952)	3.6 (1985)	8.3
Bogota	0.61	4.5 (1985)	6.5
Nairobi	0.14	0.83 (1979)	5.3
Dar es Salaam	0.15 (1960)	0.9 (1981)	4.6
Gter. Khartoum	0.18	1.05 (1978)	4.1
Amman	0.03	0.78 (1978)	1.5
Nouakchott	0.0058	0.25 (1982)	1.1
Manaus	0.11	0.51 (1980)	1.1
Santa Cruz	0.059	0.26 (1976)	1.0

Source: Recent census data used whenever possible: if none available, an estimate by the city government or a local research group has been used. UN projections for the year 2000 from Department of International Economic and Social Affairs. Estimates and Projections of Urban, Rural and City Populations 1950-2025..

Other data from J. E. Hardoy and D. Satterthwaite, Shelter: Need and Response (Chichester, UK: John Wiley & Sons 1981), with some figures updated with more recent census data.

TABLE 2

Health Indicators

	Life Expectancy at Birth (years)		Infant Mortality Rates (deaths per 1,000 live births)	
Region	1950-55	1980-85	1960-65	1980-85
World	49.9	64.6	117	81
Africa	37.5	49.7	157	114
Asia	41.2	57.9	133	87
South America	52.3	64.0	101	64
North America	64.4	71.1	43	27
Europe	65.3	73.2	37	16
USSR	61.7	70.9	32	25
Oceania	61.0	67.6	35	39

Source: United Nations World Population Prospects as assessed in 1984.