

DEMOGRAPHY AND ENVIRONMENT

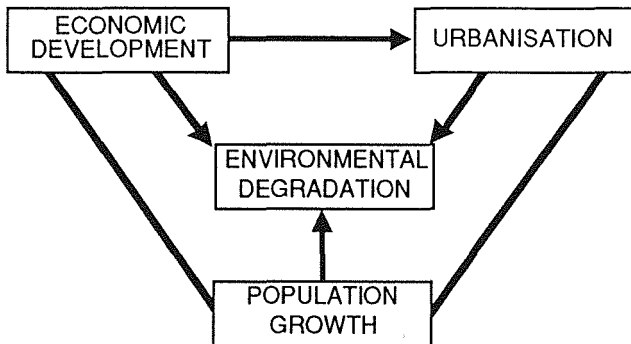
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The twentieth century has been characterised by three important phenomena that are closely inter related, namely: the explosive growth of the world population, massive movements of populations into cities, (urbanisation) and extensive technological development. These three phenomena together have been associated with extensive damage and generalised degradation of the environment. Another related important phenomenon has been the change in the age structure of population and increasing world wide tendency to aging of populations, more evident in developed industrial countries.

Population growth, economic development and environmental changes are linked in complex ways (Figure 1).

Fig. 1. Association between population growth, economic development and environmental changes



Economic development generates resources that can be utilised to improve education and health. These improvements, along with associated social changes, reduce the fertility and mortality rates, which are major factors in the demographic transition that has occurred in developed countries. On the other hand, high rates of population growth, that eat into surpluses available for economic and social progress, can hinder improvements in education and health and so produce the opposite effects. In addition excessive rates of population growth will sooner or later have a degrading effect on the environment.

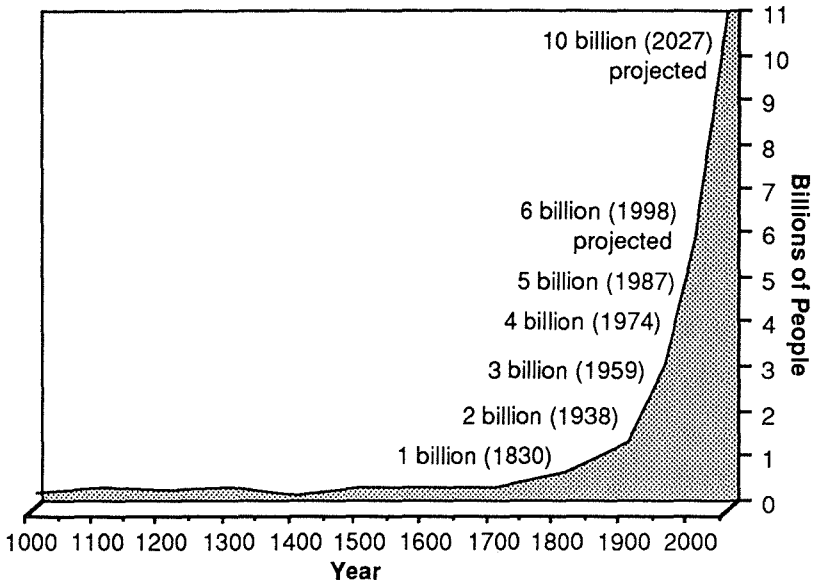
THE GROWTH OF THE HUMAN POPULATION

The human population has one outstanding attribute and advantage on all other species on earth. Humanity is the only organism with a vast culture and a body of information that is not coded into the genes, but rather passed on from individual to individual and from generation to generation by learning and through artifacts. People have used their culture to gain enormous control over their environments and over the environments of all the other species on this planet earth; and in fact, human action has modified very extensively the earth's surface. If nothing else, air and water pollution have altered the chemistry of every portion of the biosphere, the thin envelope at earth's surface that contains and sustains life.

Anthropologists and historians have estimated that before the introduction of agriculture about 10,000 years ago (i.e. 8,000 B.C.) the world could have supported a hunting and gathering culture of about 8 million people (from 5 to 10 million)¹ (Figure 2).

Whatever the size of the initial human population, the rate of growth during man's first 990,000 years about 99% of his history was exceedingly slow. After the introduction of agriculture at about 8,000 B.C. the rate of growth accelerated somewhat, but remained relatively small, until about 1750. It was at about this time that extraordinary modern acceleration of population growth was initiated.

Fig. 2. World population growth



Round about this period of time and thereafter, development and improvement in agriculture facilitated the growth of larger settlements, and later on of cities, and road network communications for transportation of goods and raw materials. Slowly in historical time, but in the blink of an eye in evolutionary time, humanity laid the basis for its explosive population growth and for its exploitation of the planet's resources. The global population had reached half a billion people by 1650 when improvements in European agriculture fueled explosion of the European population which added impetus to a trend towards migration. Not only was the whole population expanding at that time, but those people holding the culture that was to become the most advanced technologically were starting to spread over the entire globe. The spread took about 300 years and by 1950 a technological culture rooted in Europe had in one way or another occupied almost the entire planet and the human population had increased five fold to 2.5 billion people. During these 300 years, the industrial revolution had led to a general improvement of living standards in Europe and North America and a substantial decline in death rates. The population reached 1 billion people around 1850, having doubled in the first 200 years, whilst

the next doubling took only 80 years as improved sanitation and medical advances further depressed death rates in Western Europe. Meanwhile birth rates began to drop thus producing a demographic transition of which I will speak further on. From 1950 to 1974 the growth rate more than doubled from 7.9 per thousand. Estimates of world population published this year have again been revised upwards². The world population is projected to be 5.4 billion in mid 1991 and 6.4 billion by the year 2001, whilst according to the United Nations' medium most likely projection, the world population for the year 2025 at 8.504 billion will be 38 million higher than was anticipated two years ago. As for eventual totals, recent work by the United Nations population division suggests that population growth will stop much later and at much higher levels than previously estimated.

It is important to stress here, that for the foreseeable future, nearly all (ninety five per cent) of this growth will be in developing countries. The largest numerical increase will be in Southern Asia; whilst, the largest relative increase and the highest regional growth will take place in Africa exemplified in Nigeria, which will double its population in twenty years from now. Some of the Arab countries have even shorter doubling times whilst in central and South America more than half the countries will have growth rates of over two per cent. By contrast North America and Europe are expected to have virtually little or no increases in their population during the rest of this century.

URBANISATION

Population growth is linked very closely to migration and urbanisation. As their numbers have grown, formerly self sufficient rural populations have been forced into a downward spiral of poverty and hunger, because of degradation of the lands on which they live. It is estimated that 580 million people are living in absolute poverty on marginal or fragile land. One of the results of this statistic has been mass migration from subsistence farming to the cities. There is at present explosive urban growth in almost all parts of the development world. Over the last ten years more than 85 developing countries have doubled their urban populations; and by the end of the century the urban populations in developing countries will be almost double that of the developed world.

The massive migration and explosive urbanisation in developing countries is leading to a grossly disordered urban growth and slum formation with breakdown of sanitation, collapse of family and social networks and disintegration of the social environment.

Governments are faced with the formidable and often impossible task of providing city services such as housing, water and sanitation, in addition, to supplying food for the urban populations.

The impact of the human population on its resource base and environment is not just a function of the number of people. The impact of populations on the environment should be calculated from the number of people, multiplied by some measure of their level of affluence and that number multiplied by a measure of the specific environmental effects of the technologies used to achieve their affluences (Figures 3 to 6).

Fig. 3. Megacities 2000

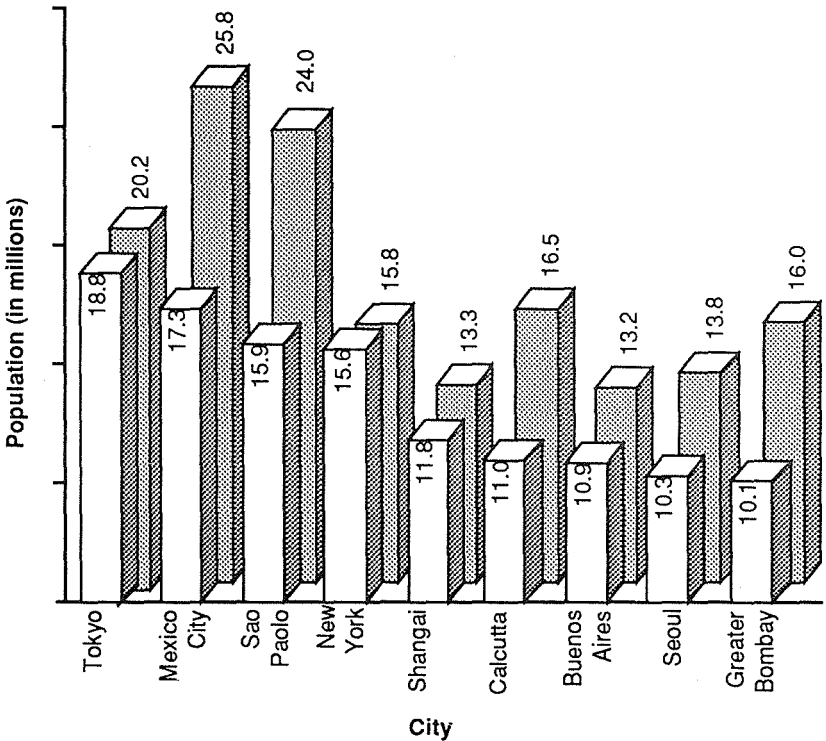


Fig. 4. Assessment of urban air quality by United Nations Environment Programme and World Health Organisation

CLEAN AIR: ALTERNATIVE POLLUTION MEASURES

Data included from 1988

Cities Ranked on whichever of three separately scaled measures would result in lowest score

1. Ozone - O₃
One hour concentrations in parts per million (O₃ ppm)
 2. Suspended Particulate Matter
Number of days with concentrations over WHO health standards (days SPM)
 3. Sulphur Dioxide
Days over WHO health standard (days SO₂)
-

O₃ < 0.02 ppm O₃
SPM > 320 micrograms per cubic metre
SO₂ > 150 micrograms per cubic metre

Fig. 5. Urban living standards

Public safety:	Murders per 100,000
Food costs:	Per cent income spent on food
Living space:	Persons per room
Housing standards:	Per cent homes with water/electricity
Communications:	Telephones per 100 people
Education:	Per cent children in secondary school
Public health:	Infant deaths per 1000 live births
Peace and quiet:	Levels of ambient noise 1 - 10
Traffic flow:	Miles per hour in rush hour
Clean air:	Alternate pollution measures

Source: Population Crisis Committee⁴

Fig. 6. Alternate pollution measures in various cities⁴

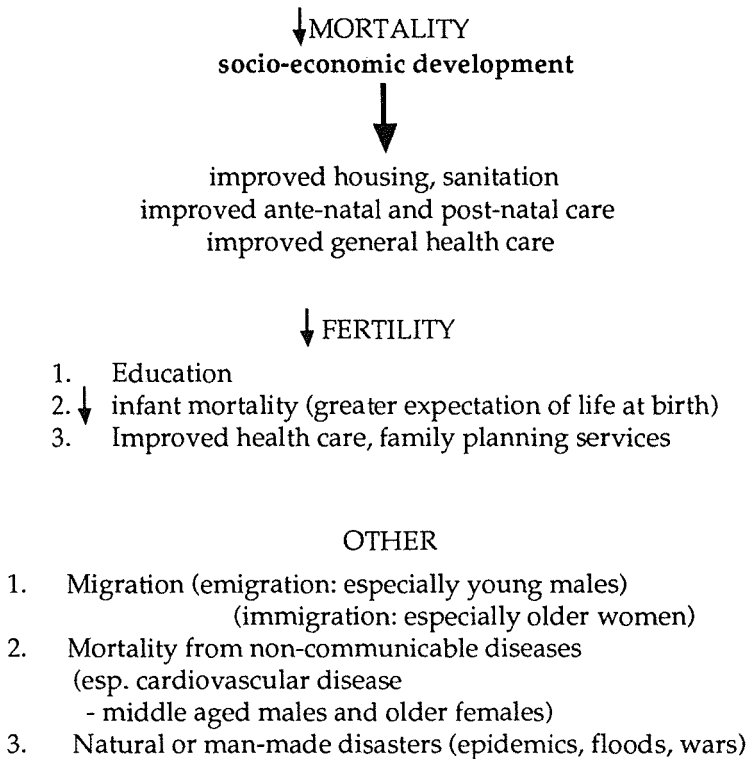
City	Clean Air: Alternate pollution measures	UrbanLiving Standards Score out of 10	Score out* of 100
Tokyo	0.0738 ppmO ₃	7	81
Mexico City	0.4059 ppmO ₃	2	38
San Paolo	0.1549 ppmO ₃	7	50
New York	0.2780 ppmO ₃	5	70
Shanghai	16 days SO ₂ SA	6	56
Calcutta	268 days SPM	1	34
Buenos Aires	0.0560 ppmO ₃	7	55
Seoul	87 days SO ₂	3	58
Greater Bombay	100 days SPM	3	35

* 100-75: Very Good; 74-60: Good; 59-45: Fair; 44 and below: Poor.

Overpopulation then becomes not just an issue of numbers versus space, but of numbers x affluence x technology related to resources and the capacity of environmental systems to absorb damage. Once all factors are considered (Figure 7), it becomes immediately clear that, even slow population growth in rich industrialised countries, can result in greater deterioration of the health of Earth's ecosystems, than quite rapid growth in a very poor country.

In the simplest terms, therefore, one can say that whilst over population in poor nations tends to keep them poverty stricken, affecting only the local environment; over population in rich nations tends to undermine the life supporting capacity of the entire planet. Without fundamental changes in population growth rates and policies of environment conservation; it is likely that the disequilibrium between population, resources and technology will produce an even worsening levels of acid rain, depletion of ozone layer, deforestation and desertification, accumulation of non-degradable chemicals, depletion and loss of top soil, and other permanent damage to the world's ecosystems; and an ever-increasing number of environmental refugees. We should therefore try to stem the tide of such worsening trends or at least minimise the consequences. This is the challenge that must be met by the community of nations and by people everywhere.

Fig. 7. Factors influencing demographic transition



I have attempted to show the negative effects of over population on the environment. I wish to continue on a more positive note.

1. There is now universal agreement that better balance in population growth and distribution is a necessary part of strategy for survival and development. The Amsterdam declaration adopted in 1989 by participants from 79 countries, at the International Forum on Population in the Twenty First Century, expressed concern at the rapid growth in world population, and uncontrolled migration and urbanisation, especially in developing countries resulting in degradation of the environment everywhere. The declaration emphasised "that the population issue is an intrinsic part of general economic and social development".

There are however hopeful signs, in that, the most recent evidence shows for the first time declining fertility rates in all major regions of the world, when compared to the early 1960's.

2. A demographic transition which appears to be related to increased education, (especially of women), social development and greater participation and higher status of women is happening in many countries. The demographic transition of population, refers to the predictable shift from high mortality and high fertility, that has accompanied industrialisation in the developed world (Figures 8 to 10).

Fig. 8. Phases of demographic transition

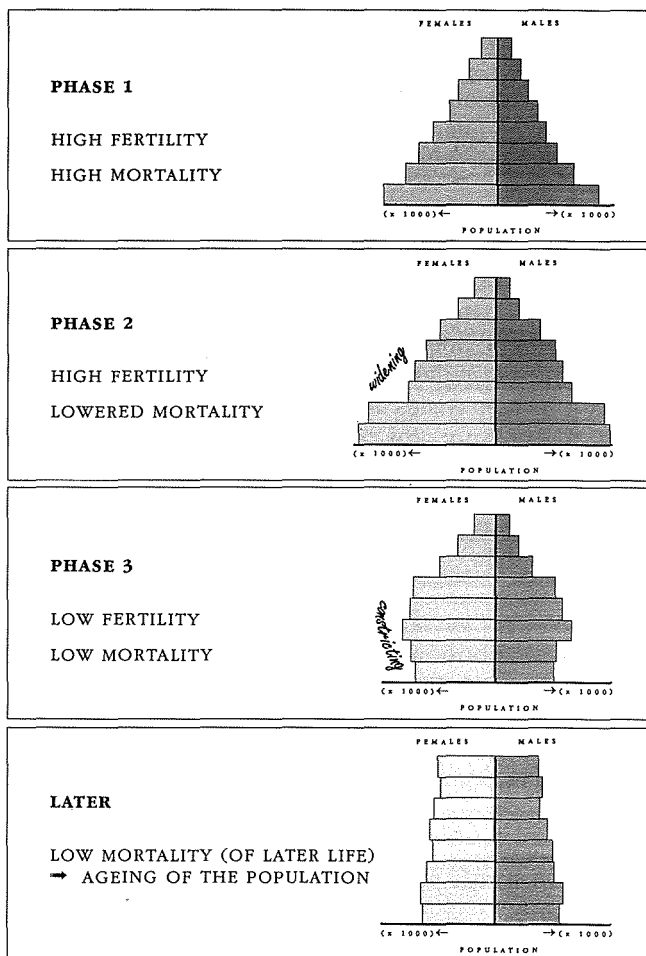


Fig. 9. International time frames of demographic transition

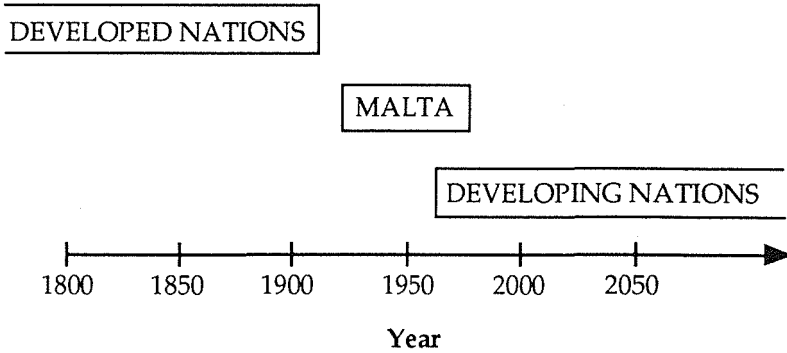
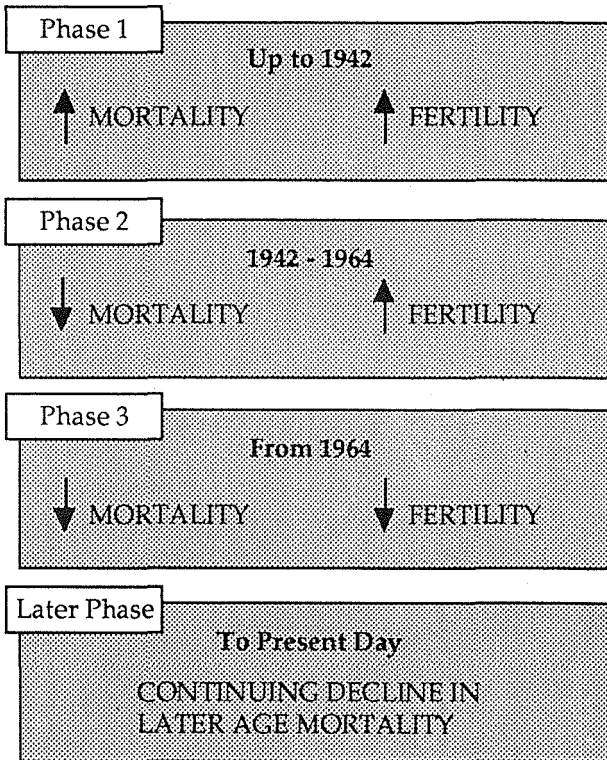


Fig. 10. The Malta Experience



As countries progress through the stages of demographic transition, changes in fertility and mortality produce change in population structure, notably size and age composition, so that by the end of the demographic transition a typical population is both larger and older. Countries that have finished their transition eventually reach another stage of a more stable population with a slower growth rate.

Countries that are beginning their transitions, notably, some African countries (e.g. Nigeria) face rapid growth of their entire populations (initial "younging") on account of lowered infant mortality. Reduced fertility rates, with continued efforts to sustain the mortality declines under way - particularly infant mortality - should be the primary aims of societies beginning the demographic transition.

Demographic transitions are now happening at a much faster rate. In Sweden the transition took over 80 years whilst in France it took over 100 years. Countries like Japan and Malta have taken as little as 26 and less than 20 years respectively. The important lesson to be learned from the Malta experience³ is the fact that education and social development with the promotion of higher status of women and greater participation of women in the economy were the decisive factors bringing about this transition. There were no state programmes on fertility control. The only activity in this regard was the work of a voluntary organisation promoting education and responsible parenthood.

3. What is more important, there is now much greater and more general awareness of environmental changes, and impact by man-made activity that was the case as recently as a decade ago. This awareness is increasingly becoming more generally world wide. Humanity has at last realised that it can no longer consider the earth's environment as an infinite and an indestructible entity. Humanity is now realising that it is in man's interest to safeguard and protect his environment. Many governments have appointed ministers with the specific tasks of protecting the environment and laws have now been enacted for this purpose. Malta is taking a very active interest in the environment both nationally, regionally and at international level. Malta was instrumental in introducing a resolution on the World Climate at the United Nations in 1988 entitled "The Conservation of Climate as part of the Common Heritage of Mankind".

The Brundtland Commission established by the United Nations produced a very comprehensive report on Environment and Development entitled "Our Common Future". This detailed and authoritative report spoke about our common concerns and common challenges, relative to the preservation of the environment and made recommendations on legislation and other measures to be adopted by governments, scientists and non governmental organisations.

The Brundtland Commission makes a direct appeal to the scientific community in general and to private and community groups and NGO's in particular, who must play a central role in reversing unsustainable development and policies, at the national and international level, that require immense efforts to inform the public and secure its support. NGO's and private and community groups can often provide an efficient and effective alternative to public agencies in the delivery of programmes and projects. Moreover they can reach target groups that public agencies cannot.

"Both amongst NGO's and amongst governments, we must find ways to engender a new period of international cooperation. The urgency of our tasks no longer permits us to spill our energies in fruitless and destructive conflict. Whilst we fight our wars of ideology on the face of this planet, we are losing our productive relationships with the planet itself"⁵.

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