

2

THE WORLD POPULATION : TRENDS AND PATTERNS

CHAPTER

Humans occupy the core of human geography. Being producers, creators and consumers of resources, they influence and at times alter the environment. Before we study how do they influence the physical environment through their economic activities, let us know about the human population itself – number, distribution, density, growth and demographic structure. Although distribution and growth of human population are influenced greatly by the physical environment, they have a tremendous capacity to adjust in a variety of environmental conditions. As such, the study of numbers, densities and qualities of population help in analysing the demographic processes and their consequences in an environmental context.

POPULATION DISTRIBUTION AND DENSITY

Humans have inhabited the earth for several thousands of years, but for a long period, their numbers remained limited. It is only during last few hundred years that the human population has increased at an alarming rate (Fig. 2.1).

The world, at the beginning of twenty-first century, recorded over 6 billion population. It had quadrupled from 1.6 billion just in one century. We are adding about 82 million people each year. In fact, human population increased more than ten times during past 500 years.

Human population is spread unevenly across the continents. Why do a few areas support large concentration of human

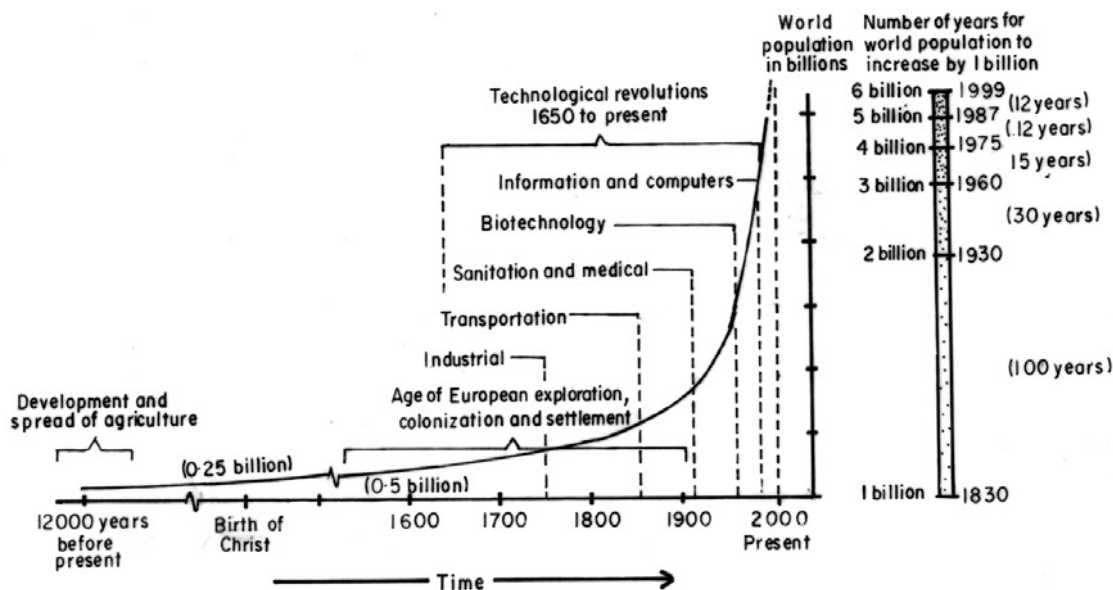


Fig. 2.1 Resource, Technology and Population Growth

population while vast areas support few people or none at all? It is mainly due to a large number of factors that have influenced the distribution and growth of population over the earth's surface.

Factors Influencing Population Distribution

Physical Factors

The physical characteristics play a dominant role in the distribution and density of population on the earth's surface. Relief, climate, soil, natural vegetation, water, mineral resources are some of the important physical factors. Mountainous and rugged terrain are inhospitable to humans. Favourable physical environment has always been preferred. Desert lands of West Asia and Egypt, thousands of years ago, had highly productive agricultural landscapes because of the famous river valleys — the Tigris, the Euphrates and the Nile, which gave rise to early civilisations.

In general, plains, humid climates, fertile soils, and long growing seasons are marked with high density of population, while lands with harsh or difficult climates and poor soil have low density. Human modification of the physical environment has, however, greatly altered the pattern of population distribution.

Cultural Factors

The culture of people also plays an important role in the population distribution. Traditions and behaviours associated with common ancestry, religion and language tend to influence population concentrations and dispersals. For example, the concentration of people of different nationalities such as the Germans, the Spanish, the French and the Chinese in different parts of the USA clearly reflects the preferences of people because of cultural links and associations.

Economic Factors

People may move from an area as a result of one or more *push factors*, such as, difficult economic conditions, unemployment, religious, ethnic or political intolerance, conflicts and

wars. On the other hand, *pull factors*, such as improved economic opportunities, may attract people to a place. A combination of such push and pull factors is evident in the settlement patterns that has emerged in the world today. More than one million Irish migrated to North America after the 1846 potato famine in their homeland. Once immigrants obtained inexpensive farmland or jobs in factories, news of plentiful job opportunities travelled to Europe and Asia through friends and relatives. The stream of immigrants, thus, started. Movement of a large number of computer professionals from India to the USA and other developed countries is also one of such examples.

Political Factors

Today, perhaps more than ever before, economic hardship, political unrest and war result in significant population movements. Events during the past decades, for example, have created tens of millions of refugees. Among the most notable events are the Persian Gulf War; Civil wars in Democratic Republic of Congo (Zaire), Ethiopia, Sudan and Chad; ethnic reprisals and revolutions in Rwanda and Sri Lanka, Military Coups in Haiti; the dissolution of the USSR and the creation of 15 independent nations, and the fragmentation of Yugoslavia and Czechoslovakia into several republics based on ethnic differences; and China's impact on the Tibetan population, etc. Besides, Political control and policies of National Governments have also fostered population growth, decline or migration.

To sum up, we can say that current population patterns are dynamic and they reflect both recent demographic trend, as well as, those that have evolved over long period of time. For example, agriculturally productive valleys and deltas of the great rivers of China, India and Southeast Asia have long supported large populations. The dense urban population of Western Europe and the North eastern United States, on the other hand, emerged as the result of the technological revolutions, economic development and large scale migration during the nineteenth and twentieth centuries. Push and pull factors have been

responsible for the migration of people from rural to urban areas in developing countries like, India and China. There are now more large cities in developing countries than in developed countries. Today, the most rapid population growth is occurring in parts of Africa and Latin America, where death rates have fallen sharply, while birth rates remain fairly high.

Patterns of Population Distribution

The analysis of the pattern of population distribution and density is fundamental to the study of demographic characteristics of any area. The term *population distribution* refers to the way the people are spaced over the earth's surface. Population size of individual countries provides a better understanding of population trends and patterns, as a country is the political and geographical unit, in which decisions relating to population, environment and resources are made. Ten most populous countries of the world together make up nearly 60 per cent of the world's population (Fig 2.2). Six of these ten countries are in Asia and that

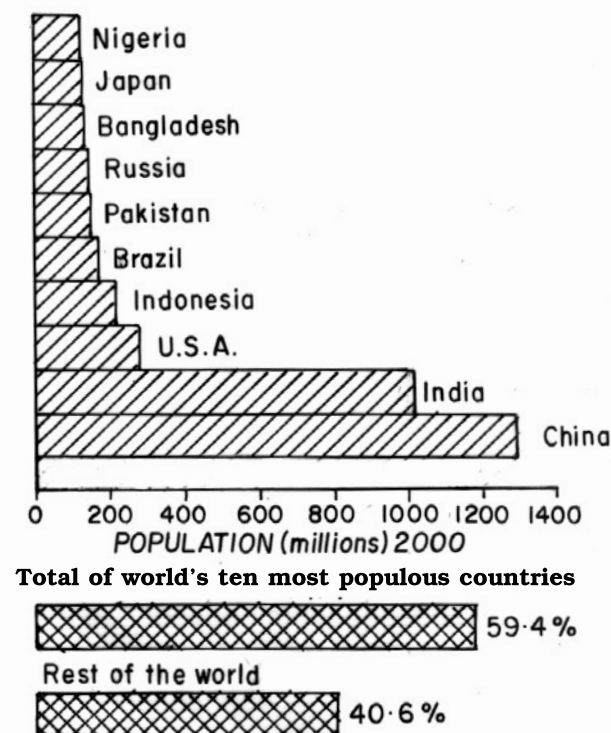


Fig. 2.2 World's Ten Most Populous Countries

1 in every 5 persons in the world lives in China, and 1 in 6 in India.

Population density, another measure to analyse population distribution refers to a ratio between population and land area in a country. The *arithmetic population density*, the number of people divided by the total land area, is the simplest method to understand the degree of concentration of population. Although this method ignores differences in population distribution within a country or a region, it is still better suited to compare population characteristics of different countries. For example, in 2000, the United States was the third most populous nation, but it also had the third largest area, so its population density was relatively low, about 28 persons per sq. km (Fig. 2.3). In contrast, no individual country of Europe is among the 10 most populous countries of the world. Germany with about 82 million people ranks 12. Yet, Europe excluding Russia, has 40 independent countries with a combined population of 582 million, or more than twice that of the USA, living in an area only half the size of the United States. And, thus, Europe has a population density of 104 persons per sq. km, nearly four-times that of the United States.

Compared with simple arithmetic density, *physiological or nutritional density* is a more refined method of calculating man-land ratios. It is a ratio between total population and total cultivated area or cropland. In developing countries where subsistence agriculture remains the most important economic activity, physiological density reflects the intensity of agriculture. In nearly all the populous developing countries in Asia — including India, Indonesia, Pakistan and Bangladesh — there is less than one acre (0.4 hectare) of cropland per person. To be exact, in India 1 hectare of cropland supports 5 persons, in China, each hectare of cropland supports 12 persons, while in the USA it is only 1.5 persons per hectare. In most of these agricultural countries, virtually all the land, suitable for crops, is being cultivated. Thus with population growth, more and more people need to be supported by the existing cropland. Since agricultural productivity varies from place to place,

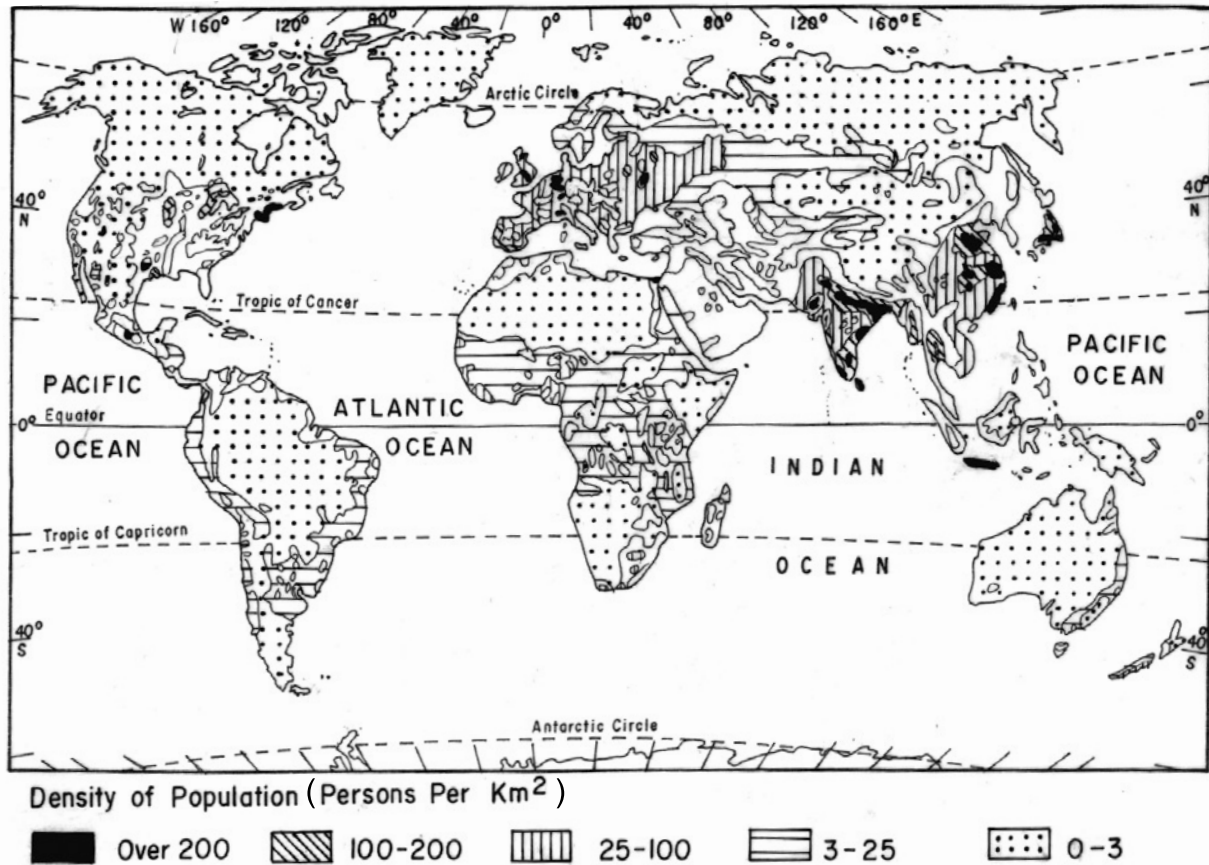


Fig. 2.3 Population Density

physiological density provides only a rough measure of population pressure.

On the basis of the arithmetic population density, two distinct areas can be noticed easily on a world map showing population density. While there are few areas of high population concentration, vast areas have low population density or which are mostly uninhabited.

Areas of High Density of Population

Fertile plains with favourable climate and highly industrialised and urbanised areas are generally, densely populated. There are four major areas of high population density with more than 100 persons per sq. km. These are as follows:

East Asia (China, Japan, Korea and Taiwan);

South and Southeast Asia;

Northwest Europe (UK, France, Germany, Netherlands, Belgium, Luxemburg, Ireland, Denmark, Spain, Italy); and

The Eastern Coast of North America.

In reality, nearly half of the world population is clustered over just 5 per cent of the land, while about 33 per cent of the total land area is virtually uninhabited.

Concentration of population is very high in a few urban areas. Industrialisation and modern technologies have modified settlement and density patterns over the past two centuries. Nearly three — quarters of the population, (more than 75 per cent) in the developed countries now live in urban environments, with many more living in and around major metropolitan areas. Northern and western Europe are among the most urbanised regions with more than 80 per cent of their population living in urban areas. In North America about 75 per cent people are city dwellers. City states such as Hong Kong and Singapore, which have virtually no rural or agricultural hinterlands, have practically all urban population.

While industrialisation and commercialisation processes caused a population shift

from rural to urban areas, technologies created artificial environments in many modern cities. Rising from the deserts of southern California and Arizona, Los Angeles, San Diego, Phoenix and Tucson are sprawling, rapidly growing metropolitan areas that are sustained only by importing water via complex systems of canals and aqueducts.

Low Density Frontier Lands

Current population patterns in most of the countries of the world still reflect the traditional ties to areas where food can be produced.

Hence, areas that are unsuited to agriculture, support relatively few people. These thinly populated or uninhabited non-arable areas which are identified as frontier environments, occupy more than 60 per cent of the earth's land. These include the following:

Dry lands, where lack of precipitation is the limiting factor and where irrigation has not been feasible.

Cold lands at the high latitudes where frigid temperature precludes agriculture.

Major mountain ranges and other mountainous areas where climate is harsh and terrain is too rugged to be cultivated.

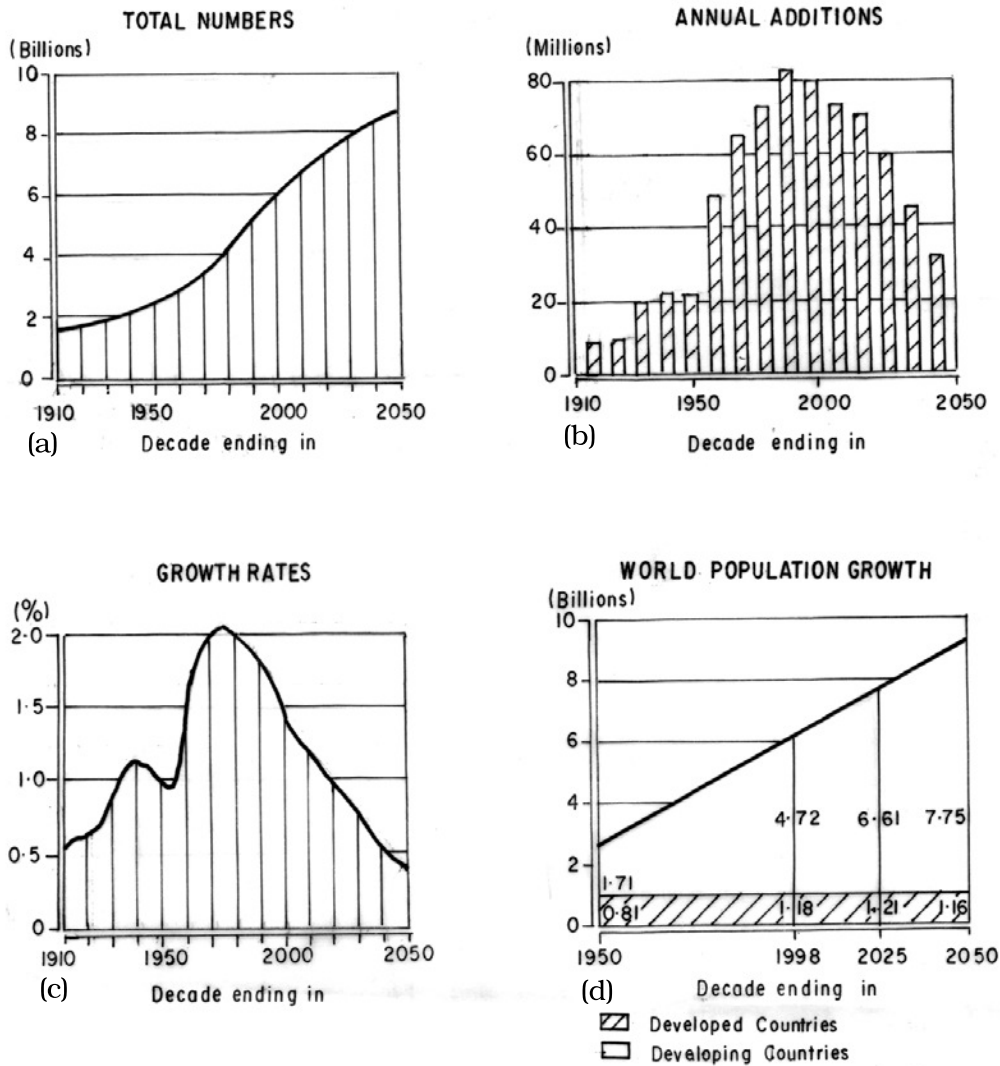


Fig. 2.4 Population Change: (a) Total numbers; (b) Annual Additions; (c) Growth Rates; and (d) World Population Growth

Wet tropics, where heavy precipitation and high temperature combine to produce relatively infertile soils that do not support intensive permanent cultivation, as well as high incidence of debilitating diseases such as malaria.

Remote areas : Over the last century or so, permanent settlements have been established in a few remote and difficult environments also. These were mostly uninhabited prior to the development of locally available mineral or forest resources, which now used latest technology.

Areas of Medium Density of Population

In between high density and low density areas, the population density is in the medium range. Despite unfavourable terrain, climate or soil, other economic opportunities in the form of agricultural, mining or industrial development might attract people. Besides, on the margin of high density areas, population densities are generally in the medium category.

POPULATION GROWTH

What do we mean by population growth? It refers to the change in number of inhabitants of a territory during a specific period of time, say during last decade. This change can be expressed either in terms of absolute numbers or in terms of percentage (Fig. 2.4).

The mechanisms responsible for temporal or spatial population changes are *birth rates*, *death rates*, and *migration*. The number of births and deaths per thousand persons in a year is known as Crude Birth Rate (CBR) and Crude Death Rate (CDR) respectively. The difference in the number of births and deaths during a year determines the annual rate of natural increase or decrease. In Fig. 2.5, crude birth and death rates as well as annual growth of population has been shown for the world and the continents. Migration between countries and continents, which played an important role in demographic changes during the nineteenth and early twentieth centuries, is less important today. Nevertheless, migration within countries continue to produce significant population shifts. If the impact of migration (immigration and emigration) is also taken into account along

with the birth rate and death rate, it is known as *actual growth rate*.

If births exceed deaths, within a given year, there will be a net population increase, and if deaths exceed births, population will decline. If the relationship between deaths and births changes drastically, population can explode or crash over relatively short periods.

Epidemics and prolonged famines may result in a rapid increase in death within a country or a region. On the other hand, widespread inoculation against chronic or communicable diseases, safe supply of drinking water and improved sanitation systems can dramatically lower death rates within a generation.

Migration, the third component of population change may be interpreted as a spontaneous effort to achieve a better balance between population and resources. It is the permanent or semi-permanent change of a person's place of residence. Migration is

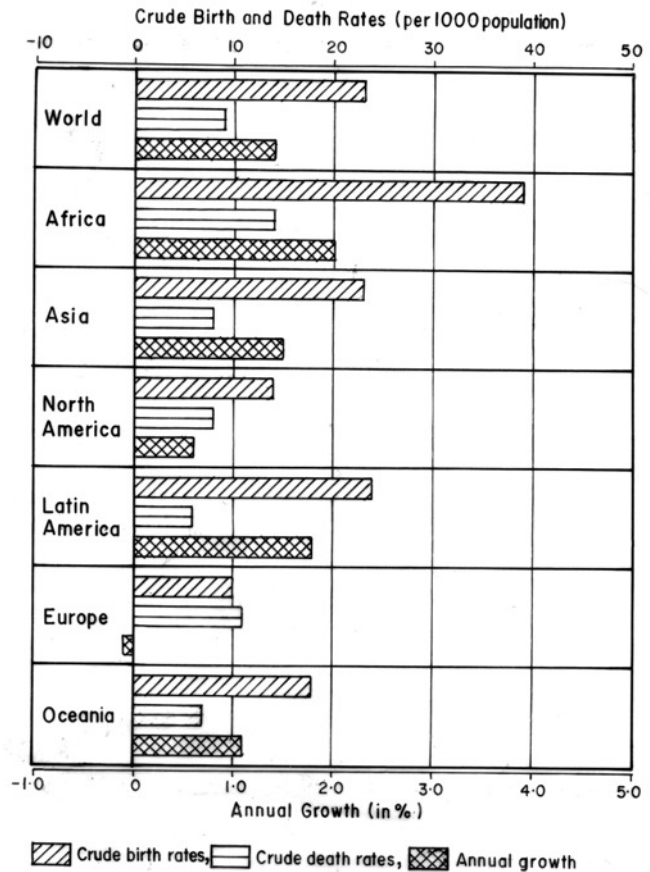


Fig. 2.5 Crude Birth Rate and Crude Death Rate

probably a more important element in determining population structure and change in an area than *fertility* and *mortality*. Pattern of migration have been classified in various ways. From a geographical viewpoint, spatial scale is important and thus migration may be rural to rural, rural to urban, urban to urban, urban to rural, inter-regional and international. On a time scale, migration may be temporary or permanent. Temporary movement may take the form of seasonal migration, usually of agricultural workers, to meet a demand during labour-intensive agricultural seasons. This type of migration also includes periodic migration of workers going away from their permanent homes for some years, during which they send home remittances. In more developed societies, middle – run migration is important. It refers to a movement of people between places for a period of more than one season but less than a lifetime and includes the inter-metropolitan circulation of elites.

International migration refers to movement of people between countries and continents (Fig. 2.6). It plays an important role in changing population patterns over relatively short periods. In recent decades international

migration has again been increasing. For most of the people, voluntary migration offers improved economic or other opportunities. A significant number of people, on the other hand, have to move to other countries as refugees due to civil war, political unrest, or environmental degradation, which is less common. At the beginning of the twenty-first century, the UN estimated that about 120 million people worldwide, were living outside their native countries, including about 15 million refugees.

Internal migration is an even more widespread demographic process. It involves hundreds of millions of people leaving the countryside for cities, or from overcrowded areas to other regions offering better opportunities. The movement of rural population to the growing urban centres is caused by *push* and *pull* factors. The adverse conditions operating in rural areas including poverty, unemployment, poor facilities of education, health, recreation and other services push the population to seek a living elsewhere. Pull factors are the attractions of the city or destination areas, which include high wages, cheap land, better living conditions and opportunities for economic advancements. As

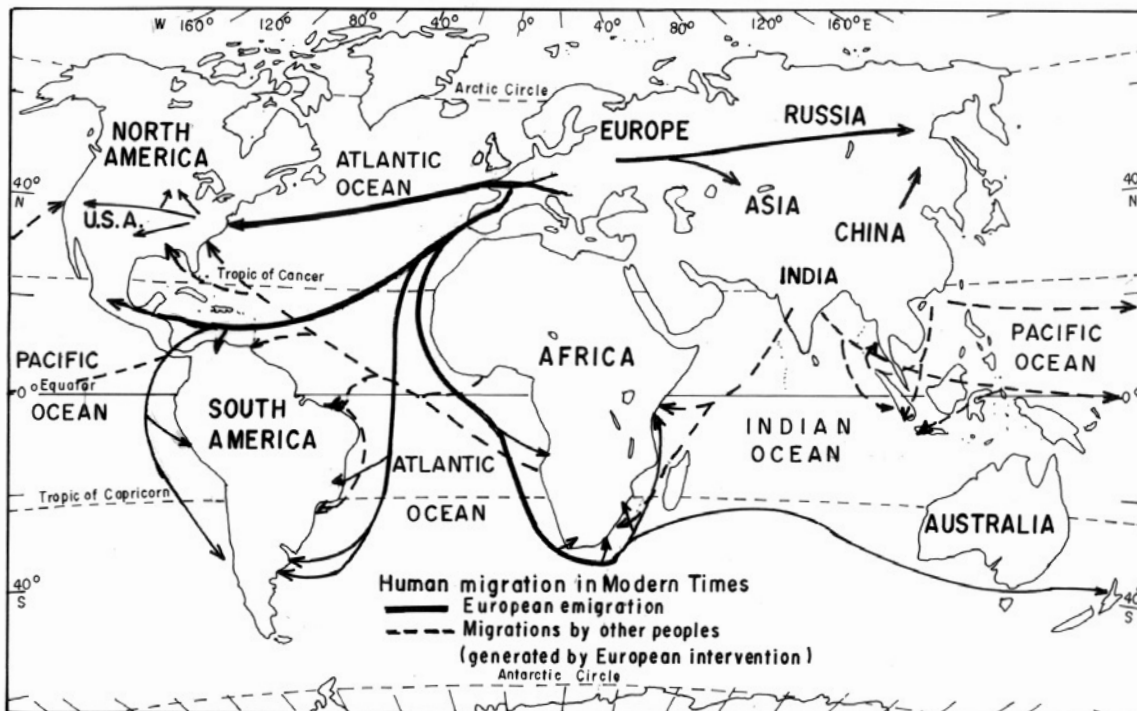


Fig. 2.6 Human Migration in Modern Times

a result of such movement, the bulk of rural migrants eventually find their way to the towns and cities, which in turn, have given rise to a large number of slums among them.

In countries where three-quarters of the total population is urbanised, the bulk of the migrants tend to be inter-urban migrants, frequently moving from one urban centre to another. It has been observed that in certain instances rural folks move into the neighbouring small towns and live there for sometime before moving into the next large town, often termed as *step-migration*. The big cities all over the world have become strong magnets for economically induced urban to urban migration by virtue of their better and diverse employment opportunities and numerous facilities not available to smaller places. Consequently, big cities grow disproportionately while the small towns stagnate.

The movement of population also takes place between one rural tract and the other, particularly in the agricultural countries of the world. Such type of migration flow usually originates from crowded areas of low per capita agricultural productivity and is directed towards sparsely populated areas of new developmental activities, particularly in the field of agriculture, mining, industry, etc. Consequently, a more balanced equilibrium between the rural population and the agricultural resource base develops.

Trends in Population Growth

In the early stages of development, the hunters, gatherers and farmers, used only simple tools and moved from place to place. Even after the agricultural revolution about 12,000 to 8,000 years ago, the size of human population was small and human activities were simple in nature. As such, human impact on environment was insignificant. The population growth was slow which may be ascertained from the fact that the world population in the first century AD was only 250 millions.

The stage for rapid population growth was set by the expanding trade in the sixteenth and the seventeenth centuries. The world population at the dawn of Industrial

Revolution i.e. around 1750 was about 0.5 billion. It, however, exploded in the eighteenth century after the Industrial Revolution. A series of dramatic technological changes rapidly expanded the resource base and provided a foundation for accelerated population growth (Fig. 2.1) that continued for more than two centuries.

The development of steam engine supplemented and then replaced human and animal energy. It provided the mechanised energy of water and wind. Mechanisation improved agricultural and industrial production. Scientific and technological advancements enhanced quality of life in economically developed countries.

Improvement in medical facilities and sanitation changed global population dynamics quickly and dramatically. Inoculation against epidemics and other communicable diseases, suppression or elimination of many disease vectors and improvement in sanitation contributed to the rapid decline in the death rates, in virtually all parts of the world. There has been no looking back since then.

When the Industrial Revolution began, the world population was growing at about 0.12 per cent a year, but the rate accelerated dramatically to 1.0 per cent by 1930 and to 2.1 per cent by early 1960s. The fast growth rate of population was a cause of concern for the world. Many developed countries were quick to respond. The developing countries are gradually trying to check this rapid growth. During past four decades, the growth rate has slowly declined and the current growth rate is 1.4 per cent.

The trend of declining growth rates is likely to continue, though it varies significantly between developed and developing countries. In developed countries, population growth has slowed down to 0.1 per cent a year. In many developing countries also the rate of growth is declining but it is over 1 per cent. It is estimated that the world population will reach 6.8 billion by 2010 and 8 billion by 2025. It is assumed that over 98 per cent of the total population increase (about 2 billion) will take place in the

developing countries during the next 25 years. Accordingly, the developed countries which currently have 20 per cent of world population, will have only 15 per cent by 2025.

Spatial Pattern of Population Change

As discussed earlier, births, deaths and migration are the major components of population change. Commonly, the rate of population growth in different parts of the world is compared to get a world pattern (Appendix I).

Africa's annual population growth (2.4 per cent) is the highest among the major world regions. In Nigeria, which is Africa's most populous country, the annual rate of population growth is 2.4 per cent. At this rate, Nigeria's population (about 123 millions) will double in less than 25 years .

South America, Asia, Oceania and North America have average annual increase of over 1 per cent but less than 2 per cent. Europe with only 0.2 per cent population growth is at the other extreme.

Although annual population change rates seem slow, they can be deceptive for two reasons. First, when a small annual rate is applied to a very large population, it will yield a large absolute change. With the current world population of nearly 6.2 billion, growing at 1.4 per cent, about 82 million people are added in one year, which is nearly the same size as that of Germany. Second, the changes are cumulative for even if the growth rate continues to decline slowly over the years, the base population continues to grow each year.

Several of the largest European countries, including Germany, the most populous in Europe, have experienced small but steady population declines over the last decade or so. Find out from Appendix I, the name of countries experiencing zero growth rate or negative growth rate.

The deteriorating environmental and social conditions in many Republics of the former Soviet Union, have marked a devastating demographic decline. Environmental contamination and degradation persisting for decades in many industrial and mining centres

of the former Soviet Union, coupled with a prolonged post Soviet period of economic instability has resulted in a rapid rise in death rates and a continued decline in birth rates. Life expectancy has dropped sharply. The infant mortality rate has increased as has the death rate during child birth. In the two largest republics, Russia and Ukraine, natural population change is currently minus 0.6 per cent per year. In 2000, infant mortality rates averaged 16 per thousand — nearly twice as high as the European average.

Although these represent the extreme cases of current demographic trends, population change has always been taken seriously in any organised society. It is an important issue both in countries where populations are growing, and where they are declining.

It is generally, agreed that a small increase in population is not undesirable in an expanding economy. However, population growth beyond a certain level may compound the problems in a developing economy. Growing populations are putting greater pressure on land and natural resources. In many places freshwater is already becoming scarce. Forests are disappearing. Soils are being degraded and fisheries over exploited.

Population decline is also a matter of concern because it indicates that resources that had supported a population at a given level have become insufficient to maintain that population. Unless the population decline could be reversed, the basic structure of the society itself might become unstable. Population growth signals societal prosperity and progress as resource base grew. It may, however, be considered a distinct problem if land and other critical resources are scarce.

In developed countries where resource base is sufficient or appears underutilised, policies regarding promotion of population growth such as incentives for natural increase, substantial tax exemption for large families, and accepting immigrants, are taken up. On the other hand, governments enact policies to curb the population growth if it is viewed as a

problem. For example, many developing countries, such as, China and India have sponsored birth control programmes to slow the rate of natural population growth. In 1994, at the United Nations International Conference on Population and Development (ICPD), most nations endorsed a plan to stabilise world population over the next two decades. The World Programme of Action (WPOA) would achieve this goal by expanding the women's role in family planning through literacy, education, and through reproductive-health

and child-healthcare programmes, that would be available to all.

Doubling Time of World Population

Another way of comparing population growth rates is by calculating the time it takes for a population to double using the current annual growth rate. In Table 2.1, the time taken by the World Population as a whole has been given. Note how fast the doubling time is reducing. There is great variation among regions in doubling its population.

Table 2.1: Doubling Time of World Population

<i>Period</i>	<i>Population</i>	<i>Time in Which Population Doubles</i>
10,000 BC	5 million	
1650 AD	500 million	1500 years
1850 AD	1000 million	200 years
1930 AD	2000 million	80 years
1975 AD	4000 million	45 years
2012 AD	8000 million projected figure	37 years

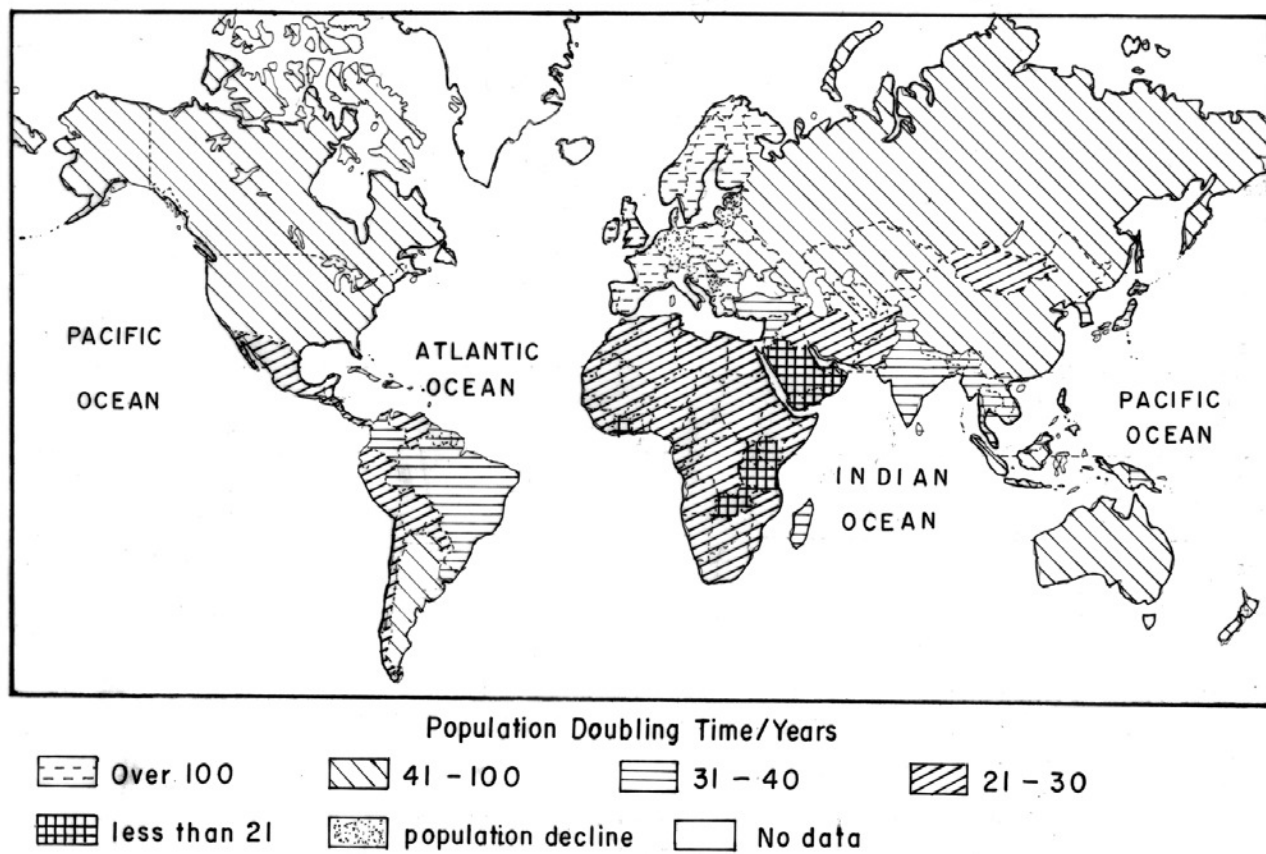


Fig. 2.7 Population Doubling Time

In Table 2.2, doubling time for selected countries and regions at current rate of natural increase has been given. It would be apparent from the given data that developed countries are taking more time to double their population.

double in one or two generations. India provides a sobering example, for if its current 1.9 per cent natural increase continues, its population of over 1 billion would double in 36 years.

The deadly HIV/AIDS epidemics in Africa

Table 2.2 : Population Doubling Time for Selected Countries and Major World Regions

<i>Annual Population Growth (Percentage)</i>	<i>Country/Region</i>	<i>Population Doubling Time (in Years)</i>
3.3	Chad	21
2.8	Iraq, Pakistan	25
2.6	Sub-Sahara Africa	27
2.5	Africa	28
2.0	Egypt	35
1.9	India	36
1.8	Latin America , Bangladesh	38
1.5	Asia , Brazil	46
1.2	World , Sri Lanka	58
1.1	Oceania , Thailand	63
1.0	China, Singapore	70
0.7	Australia	104
0.6	North America , USA	116
0.2	Japan, UK, Finland	318
0.0	Spain, Austria	–
-0.1	Europe , Germany	–
-0.5	Russia	–
-0.6	Ukraine	–

Source : World Population Data Sheet, 1999, Population Reference Bureau

Seventy one countries with current growth rates between 2 and 2.9 per cent, will double their population in 24-35 years, and 14 countries with growth rates between 3 to 4.4 per cent will double in 16 to 23 years. About one-fourth of the world's population live in 90 countries, whose population may

and some parts of CIS (Commonwealth of Independent States) and Asia are measurably slowing population growth (Table 2.3).

Demographic Transition

Current demographic trends reveal that the annual average population increase among the

Table 2.3 : Changes in Death Rates and Life Expectancy (1990-1999) in Some African Countries as a Result of HIV AIDS Epidemic

<i>Country</i>	<i>Percentage of adult Population with HIV -1999</i>	<i>Death Rate Per 1,000 Population</i>		<i>Average Life Expectancy</i>	
		<i>1999</i>	<i>1990</i>	<i>1999</i>	<i>1990</i>
Botswana	36	33	11	40	59
Namibia	20	36	12	42	56
South Africa	20	27	8	58	63
Zambia	20	23	14	37	53
Zimbabwe	25	20	10	40	58

developing countries is more than 20 times than that in the developed world. Although the Crude Death Rates (CDRs) in both groups are low, the average Crude Birth Rates (CBRs) in developing countries are nearly three times more than that of the developed countries. Why is it so? Demographers (F. W. Notestein) recognise a close link between the processes of economic development and those of population growth.

As a rural agrarian society evolves into a technology-based urban society, there are changes in demographic trends. In Fig.2.8, the *Demographic Transition Model* correlating changes in population dynamics with industrialisation, and urbanisation processes associated with economic development has been shown. It is conventionally portrayed as having three stages.

The first stage of the model represents the demographic trends before the processes of economic development began. It portrays the demography of Europe prior to Industrial Revolution, or that of Japan in the mid-nineteenth century, or perhaps a tribal community living in tropical forests in isolation. The common characteristic is that the population is relatively small and stable (net

growth rate of about 1 per cent) over time. Both the birth and the death rates are very high, but the death rate declines during periods of prosperity, and rises during times of famines, diseases or wars.

The Second stage begins with the technological revolutions that characterise the early stages of economic development. In the eighteenth and the nineteenth century Europe and North America, it was the Industrial Revolution that initiated transportation, agricultural and medical revolutions. Together they gave rise to high levels of economic development. Improved diets, public health and medical care led to a sharp decline in death rates. Birth rates, however, remained high in initial periods of prosperity they began to decline later but at a slow pace, as socio-cultural practices concerning family size take time to adjust to changing circumstances. The result is a sharp increase in population growth. In the third stage, death rates even off at a low level, while birth rates are low but fluctuating with net growth rates near zero. In some of the developed European countries, even a fourth stage is being recognised. Low birth rates are combined with rising death rates. Such a trend results in declining populations.

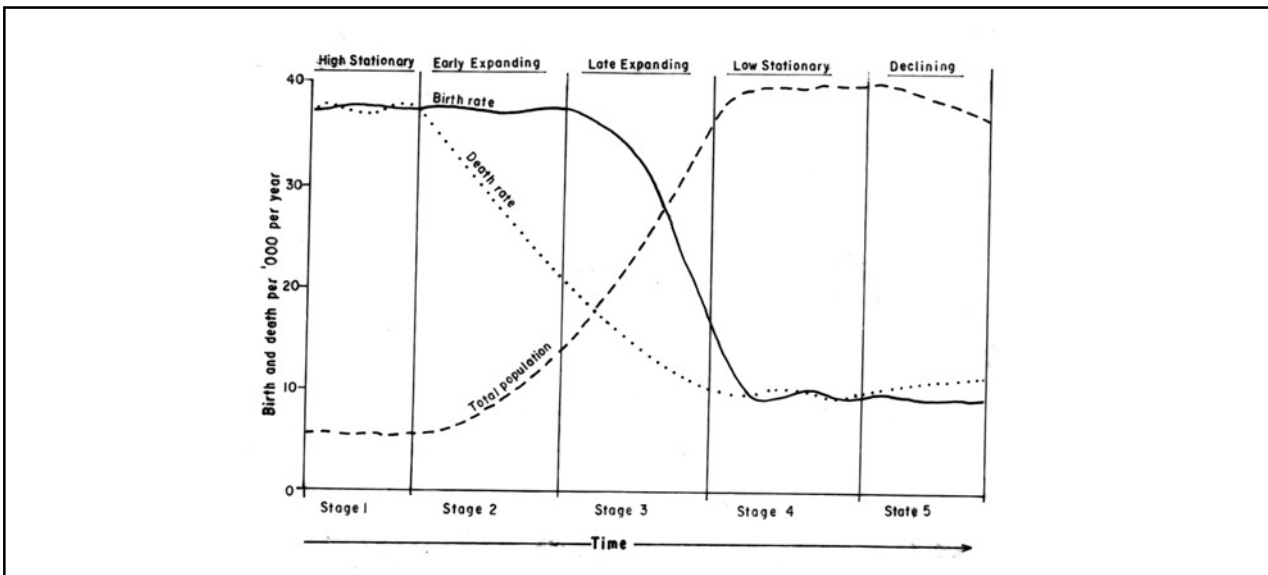


Fig. 2.8 Demographic Transition Model

The second stage may further be divided into three categories — beginning of the critical phase of population explosion, middle of population explosion and on the verge of completing the growth stage. Thus five categories (types) of population growth may be visualised in all (Fig. 2.8) All countries fit into this classification. There are, however, significant differences in the trends of population growth between developed and developing countries.

Demographic Transition

STAGE I

Type 1 : *Primitive Demographic Regime*: High birth and death rates and slow population growth.

STAGE II

Type 2 : *Expanding or Youthful Demographic Regime* : Sharp decline in death rates, high birth rates, rapid population growth.

Type 3 : *Late Expanding Demographic Regime* : Declining birth rate and low death rates, and decline in growth rates of population.

Type 4 : *Low Fluctuating or Mature Demographic Regime* : Low birth and high death rates, declining population.

STAGE III

Type 5 : *Zero Population Growth Regime*: Low birth and death rates, approximately equal, no population growth.

Demographic trends in the developing world do not reflect the same trends as seen in Europe and North America. Population has grown rapidly during the past several decades due to improved health and longevity. But there is a wide variation among the developing countries in the time taken for moving from one phase to the other. In recent years family planning programmes have contributed to the decline in growth rates. The most significant reduction in population growth has occurred in those Asian and Latin American countries, where birth rates have declined in response to economic development, urbanisation and

socio-cultural changes as reflected through the acceptance of family planning. However, most of Africa and some Asian and Latin American countries have remained in the high-growth phase of demographic transition for several decades because cultural tradition of large families and high fertility have remained strong. As such there is no assurance that these countries will experience the economic and societal changes that led to decline in birth rates in the economically developed countries. So far, at least in a significant part of the developing world, the sharp decline in birth rates, that occurred in the last part of Stage II in the demographic transition model is still speculative.

Despite non-resemblance to the demographic transition model, several features remain valid.

- Virtually all nations have experienced a decline in death rates sometimes before birth rates began to fall;
- Until recently, population changes in developing world mainly reflected changes in death rates. Now the average death rate in the developing world stands at about 9 per thousand and more than 90 developing countries with youthful population have death rates, that are currently below the average death rates experienced in the mature population of the developed countries. Birth rate trends in the developing countries will be the main determinant of population size just as they have been for decades in the developed world.

Fertility, Age – structure and population Momentum: Besides birth and death rates, two variables also play an important role in predicting demographic trends: *Total Fertility Rate (TFR)* is the average number of children born to a woman. Today, the TFR average for the developed world is 1.5.

Another factor which directly affects birth rate is *population structure*, especially the age composition of a population. Comparison of birth rates and fertility rates will reveal the importance of this factor. In 1982, for example, Singapore and Spain had similar crude birth rates (17.2 and 15.2 per thousand respectively), but Singapore's fertility rate was

much lower (58) than Spain's (73.1) because her age composition was *youthful*. In other words, areas with a high proportion of young adults may be expected to have high birth rate figures. New towns, pioneer settlements and

regions with high immigration rates tend to fall in this category. We may, thus, conclude that the factors influencing the level of fertility in any area are largely economic, social and cultural rather than physical.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What was the world population at the dawn of twenty-first century?
 - (ii) What factors influence population distribution?
 - (iii) What is population density?
 - (iv) Which are the four major areas of high population density in the world?
 - (v) What is population growth?
 - (vi) Name the three components of population change.
 - (vii) What is the current growth rate of world population?
2. Distinguish between:
 - (i) Arithmetic density and physiological density of population;
 - (ii) Crude birth rate and crude death rate;
 - (iii) Push and pull factors of migration.
3. Write short notes on the following:
 - (i) Doubling time of world population;
 - (ii) Demographic transition.
4. Discuss the factors influencing the distribution and density of population in the world.
5. Discuss the consequences of population growth and decline.
6. Explain why the population growth has been rapid in last few hundred years?

Geographical Skills

7. On an outline map of the world, show the following with suitable shading:
Most densely and least densely populated countries, one each in Africa, Asia, Europe, Latin America and Oceania (You may refer to Appendix I).
8. Prepare a suitable diagram to show the annual growth rate of population (1995-2000) for the following countries :

Bangladesh	UAE	UK
India	China	USA
Thailand	Japan	Germany
Nigeria	Bulgaria	Italy
Rwanda	Uruguay	Australia
Liberia	Mexico	Russia
Guinea	Colombia	

3

CHAPTER

POPULATION COMPOSITION

Population composition, or the demographic structure refers to those characteristics of population which are measurable and which help us distinguish one group of people from the other. Age, sex, literacy, place of residence and occupation are some of the important components, which reflect the composition of population. They also help in setting future agenda for development.

AGE STRUCTURE

The age-structure of a population refers to the number of people in different age-groups. The size of the various age-groups does vary from one population to the other and also over the course of time. If the number of children in the population is high, the dependency ratio will be high. A large size of population in the age-group of 15-59 years indicates the chances of

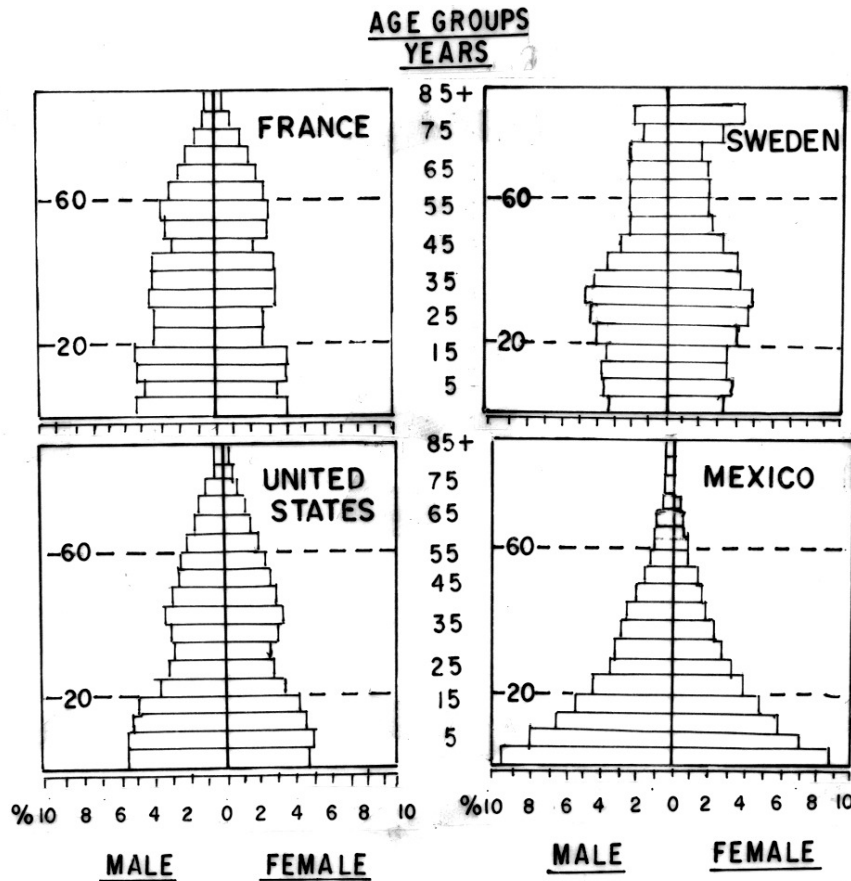


Fig. 3.1 Age-Sex Pyramid of Selected Countries

having a larger working population. Similarly, a growing population in the age group of 60 plus indicates greater expenditure on the care of the aged. If there are large number of young people, and the birth rate is high, the population is youthful, as is the case in many developing countries of Asia, Africa and South America. On the other extreme, if the birth rate is low and the longevity among people is high, the population is said to be ageing (Fig 3.1). This is happening in many European countries, the USA, Canada and Japan. At times, extreme events like wars, and natural calamities can distort the age-structure, because of losing population in certain age-groups.

Generally, population of a country is grouped under three broad age-groups: Children (0-14 years); adults (15-59 years); and aged (60 years and above).

Examination of age-group statistics of different parts of the world reveals that the proportion of adult population is least variable of the three groups. The major regional differences lie in the proportions of children and the aged.

On the basis of the variations, three types of age-structures have been identified :

- (i) *The West European Type*: Children and the aged constitute 30 per cent and 15 per cent population respectively.
- (ii) *The US Type* : The proportion of children and the aged in the population are 35-45 per cent and 10 per cent respectively.
- (iii) *Third World Type*: Children constitute 45-55 per cent of population whereas the aged constitute only 4-8 per cent population.

Age pyramids give a more detailed picture of age structure. For this purpose, 5 or 10 years of age-groups are normally used. Each age-group of a population is represented by a horizontal bar, the length of which is proportional to the percentage of males and females in that age-group. Males are arranged to the left and females to the right of a vertical axis, which is divided either into single or multiple years or intervals. The shape of the pyramid can indicate the history and characteristics of the population portrayed.

Thus three kinds of shapes are associated with three kinds of population situation:

- *A Stationary Population* : A regularly tapering pyramid shows unchanging birth and death-rates over a long period of time.
- *A Progressive Population* : A wide-base and rapid tapering shows an increasing birth rate and high death rate.
- *A Regressive Population* : A narrow base and narrow top pyramid shows declining birth rate and low death.

The age-structure of the world population reveals, the following characteristics:

- (i) World population is more youthful with about 36 per cent population in the age-group below 15 years. There are regional variations though as the corresponding figures for the more developed and the developing regions are 23 per cent and 40 per cent respectively. There is yet, wider variations at a lower level – continents and countries. The proportion of young population ranges from less than 25 per cent in Europe to about 40 per cent in Asia and Latin America and nearly 50 per cent in Africa. Countries that are characterised with high fertility rates have large proportions of young populations and the vice-versa. This age-group is economically unproductive and needs more money to be spent on food, clothing, education and medical facilities.
- (ii) The adult age group (15-59 years) is always higher than others, though it is proportionately more in developing countries. This group is biologically the most reproductive, economically the most productive and demographically the most mobile.
- (iii) Aged people (60 years and more) increases as the population of a country completes its demographic evolution. In the developed countries, the number of females in this age-group is more than that of the males. Increasing population of this age-group has more demands on health and social services.

SEX-COMPOSITION

Sex-ratio is an index of balance between males and females in a given population. It is

measured in terms of number of females per 1,000 males. Sex-ratio has a profound effect on other demographic features like, growth of population, marriage rates, occupational structure, etc.

For reasons unknown, male births exceed female births in almost all the societies. But a number of pre and post-natal conditions, at times, alter this situation very drastically. In developing countries infant mortality is higher among males than the females so that excess of males is cancelled out within one year. Even in developed countries, male mortality is higher than female mortality at all stages of life. As such excess of males at birth is progressively eliminated, until from about the age of 30 onwards there is an increasing dominance of females. In many developing countries, women being given a subordinate role in the society, often suffer high mortality rates in child birth. It leads to unfavourable sex-ratio. Overall sex-ratio in these countries is often unfavourable to females.

Apart from differential birth or death rates among the two sexes, the sex-ratio is also influenced by migration of either males or females, which has serious impact on sex-ratio. In earlier times international and long-distance migration almost always showed a marked predominance of males, thus creating a serious imbalance in the sex-ratio of both the sending and receiving areas. At present the male predominant regions are only such fringe areas as Alaska and the Northern Territory of Australia, both of which have 1,350 men for every 1,000 women.

The degree of sex-selectivity of internal migration appears to be closely related to the technical and economic evolution of a country concerned. In developing countries, especially in Africa and Asia, there is a marked predominance of male migration from villages to towns. Indian towns have an unusually high proportion of males; in Kolkata, for example, there are 570 women for every 1,000 man. In economically advanced nations the reverse is generally true. With the exception of migration to the centres of mining and heavy industries, and military towns, females also migrate from rural to urban areas.

An analysis of the differences in the sex-composition of rural and urban areas in different countries, shows that the migration stream does not produce similar results. It is interesting to note that rural-urban differentials in sex ratios in the United States and in Western European countries are just the opposite of those in Asian countries like India. In the western countries, the males outnumber the females in rural areas and the females outnumber the males in urban areas. In country like India reverse is the case. The excess of females in the urban communities of the USA and the Europe is primarily the result of influx of females from their rural areas to avail of the vast employment opportunities in urban areas. Farming in rural areas remains largely a masculine occupation. By contrast, the sex ratio in Asian cities, especially in India, remains male dominant due to predominance of male migration. Problems of housing, high cost of living, paucity of work opportunities and lack of security in cities discourage women to migrate from rural to urban areas.

RURAL-URBAN COMPOSITION

The division of population into rural and urban is based on the residence and is made at a different size-point in most of the countries. This division is necessary because both of them differ from each other in terms of their livelihood and social environment. The occupational structure, density of population, and level of social and economic growth, vary between the two groups.

People living in the villages and engaged in agriculture or primary activities are categorised as 'rural'. The urban population, on the other hand are engaged in non-agricultural activities. People are attracted to urban areas in search of employment opportunities, better social facilities and higher standard of living. The urban population increases due to natural growth and migration of people from rural areas.

Criteria of labelling a settlement urban vary from one country to another. In USA, an area with a population of less than 2,500, is considered rural, while an area of more than

2,500 inhabitants is called urban. In India, all areas which are not urban, are, by definition, rural.

Percentage of rural population is higher in farm-based agricultural countries, while industrially developed regions have higher share of urban population. Table 3.1 shows the distribution of rural and urban population of different continents in 2000. Only Asia and Africa had more than 60 per cent rural population while 62 per cent of the world's total

population had an urban residence. With about 77 per cent of its population being urban, North America is the most urbanised continent.

The world's urban population is currently growing by 60 million people a year, which is about three times the increase in rural population. In other words, the urban population of the world has been growing more rapidly than the rural population since the emergence of first urban settlement on the

Table 3.1 : Rural-Urban Population By Region-2000

Regions/Continents		Total Population (in Million)	Urban/Rural Population (in Million)		(in %)
1.	Asia	3682	Urban:	1383	38
			Rural:	2299	62
2.	Africa	784	Urban:	295	38
			Rural:	489	62
3.	Europe	729	Urban:	546	75
			Rural:	183	25
4.	Latin America and Caribbean	519	Urban:	391	75
			Rural:	128	25
5.	North America	310	Urban:	239	77
			Rural:	71	23
6.	Oceania	30	Urban:	21	70
			Rural:	9	30

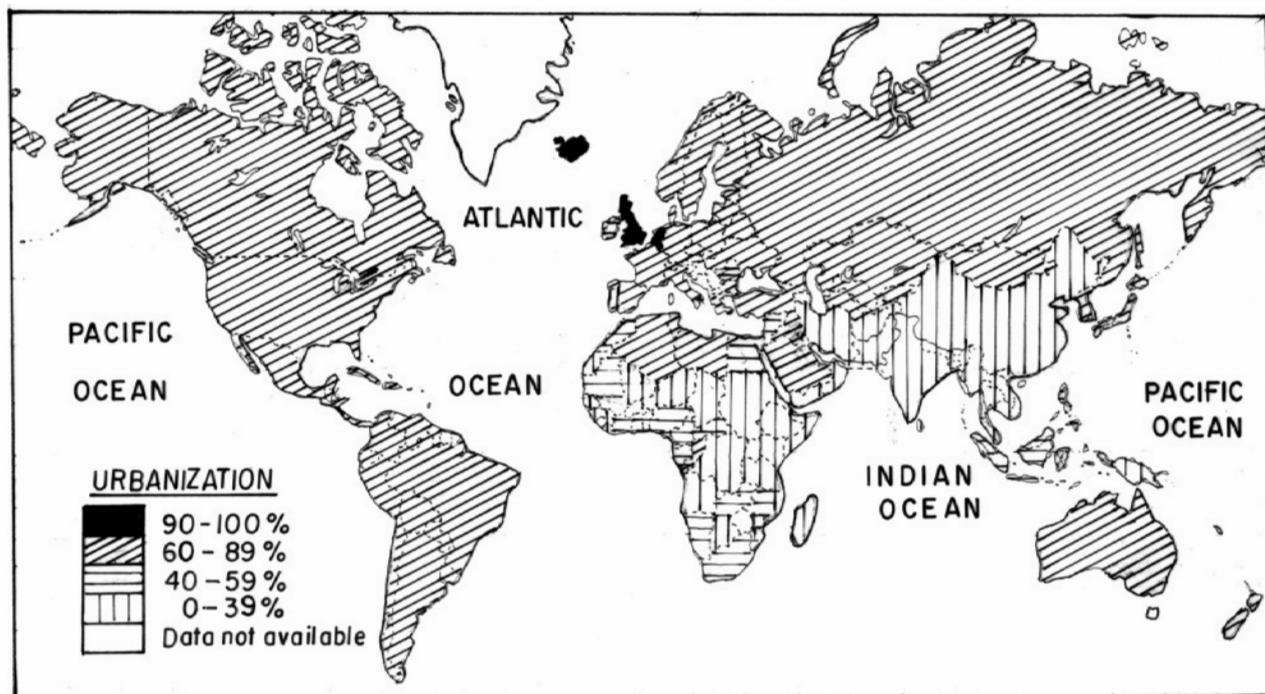


Fig. 3.2 World Urbanisation

world's scene. About two centuries ago (1800), only 2.5 per cent of the world's population was living in urban areas and in 1960, about one-third of the total world population lived in cities. By 1999 over 47 per cent of the world's total population has an urban residence. Most of this urban growth, (about 60 per cent of 60 million) reflects natural increase among current city dwellers, those born in the city; the rest is accounted for by rural-urban migration (Fig. 3.2).

A prominent feature of population redistribution, particularly in developing countries, is the growth of major cities. Almost half the world's population lives in cities. Between 1960 and 2000, the urban population increased more than three times i.e. from 800 million to 2.8 billion. During the same period, the world's total population doubled from 3 billion to 6 billion. It is projected that there will be about 8 billion city dwellers by 2030, and 80 per cent of them will live in developing countries.

The rate of urbanisation of the world's population is accelerating significantly as a result of the global shift to technological, industrial and service-based economies. As a result, few countries would be able to handle the consequent urban population increase which is causing problems on an unprecedented scale. Ten million people die annually in densely populated urban areas from conditions produced by substandard housing and poor sanitation. About 500 million people, worldwide are either homeless or living in housing that is life threatening.

LITERACY

Literacy is that qualitative attribute of population which is a fairly reliable index of the socio-economic development of an area. It reflects that social aspect of population by which its quality can be ascertained. There is a wide variation over the world in the *literacy rates* which denotes the percentage of people age-group 15 and above who can, with understanding, both read and write a short, simple statement in their everyday life. Major factors affecting this rate are levels of economic development, urbanisation and standard of

living, social status of females, availability of educational facilities and the policies of the government. Level of economic development is both a cause and a consequence of literacy. Table 3.2 shows the distribution of adult literates in different regions of the world. The developed and urban economies reflect higher literacy rate and higher standards of education. Low levels of literacy and education indicate rural-farm economies. It is only in the developing countries of the world today, that the literacy revolution is yet to take its shape where such differences occur more.

Table 3.2 : Adult Literacy Rate, 1998

	<i>(% of people in the age-group 15 and above)</i>
All Developing Countries	72.3
Least Developed Countries	50.7
Arab States	59.7
East Asia	83.4
East Asia (Excluding China)	96.3
Latin America and Caribbean	87.7
South Asia	54.3
South Asia/(Excluding India)	50.5
South East Asia Pacific	88.2
Sub-Saharan Africa	58.5
Eastern Europe and the CIS	98.6
OECD	97.4
High Human Development	98.5
Medium Human Development	76.9
Low Human Development	48.9
High Income	98.6
Medium Income	87.8
Low Income	68.9
World	78.8

Human Development Report, 2000, Table 1,

UNDP, Oxford University Press

OECD= Organisation for Economic Cooperation and Development

OCCUPATIONAL STRUCTURE

The economically active section of any population is generally, defined as 'those who are engaged in remunerative occupation and who seek a livelihood in such occupations'. Children below working age, old people, retired persons, housewives and students, who are not engaged in economic pursuits for their livelihood are excluded from the 'active' population. The proportional distribution of this active population under specific economic activities is known as occupational structure. The United Nations has identified the following categories of occupations: agriculture, forestry, hunting and fishing; mining and quarrying; manufacturing industry; construction; electricity, gas, water and health services; commerce; transport, storage and communication services; unclassified occupations.

This classification is essential for international comparisons but each country classifies its population in different occupational categories according to its own needs.

An alternative form of classification reduces the above categories to four major groups : primary activities, including hunting, agriculture, forestry and fishing; secondary activities including manufacturing, power; and tertiary activities, including transport, communication and other services; and quaternary activities including more intellectual occupations, whose task is to think, research and develop ideas.

The proportion of working population engaged in these activities vary significantly among different countries depending upon their levels of economic development. The proportion of working population is very high in primary activities, if the economy is less developed. As it moves forward, the proportion in secondary and then in tertiary increase gradually. In highly industrialised countries, the proportion of people employed in tertiary sector is more than 40-45 per cent. In the USA, it is more than 70 per cent. Statistics are not available for quaternary sector, but it is suggested that though it employs a small

percentage at the moment, it is characterised by the highest income and a high degree of mobility.

POPULATION AND DEVELOPMENT

People are central to the development process and an integral element in all development strategies. There are many different and often conflicting views on the meaning of development. The most appropriate strategies need to be followed at different points of time and in space. Large size population has been viewed by many as a negative factor in the development. However, much depends on its quality.

Relationship between population and food supply has been a subject of study ever since Malthus projected a grim future for humanity, if population continued to rise faster than food production. Given the uneven rate of population growth and technological breakthroughs in food production, there are difficulties in forecasting rates of increase in food supply or how consumption will vary. The fact, however, remains that over use or misuse of the land with a view to increase food production has its serious implications for environment and thus indirectly for food security.

The vital questions to explore are: Are these regional differences in the rate of population growth in consonance with the regional disparities in the supporting capacity of the areas? If not, how far are these differences in growth rate responsible for creating imbalance between the population and the resources? Growth of population, thus becomes a vital element in any assessment of population resource balance. But we can not ignore the fact that high growth of population or the deficiency of the resources alone are not responsible for the imbalance. The nature of social structure, the stage of technological advancement, the characteristics of distribution system and the public policies are the elements that influence the balance between the people and the resources. Thus, the number that a given piece of land can support does not merely depend upon its physical resources, but also upon a set of

social, economic, technological and political conditions. Therefore, in any assessment of balance between the population and means of subsistence all these constitute important elements of the system. This complex relationship has been presented by different scholars/thinkers as models and theories. Presently, we will get introduced to the concept of Human Development which provides an alternative to the view of development equated exclusively with economic development.

Human Development Index (HDI)

The Human Development Report 1990, introduced by the United Nations Development Programme (UNDP), argues that development is not merely an expansion of income and wealth, but a process of enhancing human functionings and capabilities. This perspective of development is termed 'human development'. The concept is defined as "the process of widening people's choices and the level of well-being they achieve". The report states that regardless of the level of development, the three choices for the people are: to lead a long and healthy life, to be knowledgeable, and to have access to the resources needed for a decent standard of living. These are represented by three indicators: longevity as measured by life expectancy at birth, educational attainment, as measured by a combination of adult literacy (two-thirds weight) and the combined gross primary, secondary and tertiary enrolment ratio (one-third weight); and standard of living as measured by GDP per capita (Productivity Per Person US\$).

The Human Development Index (HDI), constructed every year since 1990 by the United Nations, measures average achievements in basic human development in one simple composite index and produces a ranking of countries.

Computing the HDI

To construct the Index, fixed minimum and maximum values have been established for each of the indicators:

- Life expectancy at birth : 25 years and 85 years;

- General literacy rate : 0 per cent and 100 per cent;
- Real GDP per capita (PPP\$) : PPP\$ 100 and PPP\$ 40,000.

Individual indices are computed first on the basis of a given formula. HDI is a simple average of these three indices and is derived by dividing the sum of these three indices by 3.

With normalisation of the values of the variables that make up the HDI, its value ranges from 0 to 1. The HDI value for a country or a region shows the distance that it has to travel to reach the maximum possible value of 1 and also allows intercountry comparisons (Fig. 3.3). A challenge for every country is to find ways to reduce its short fall.

International Comparisons

Of the 174 countries for which HDI was constructed in 2000 AD, 46 were in the high

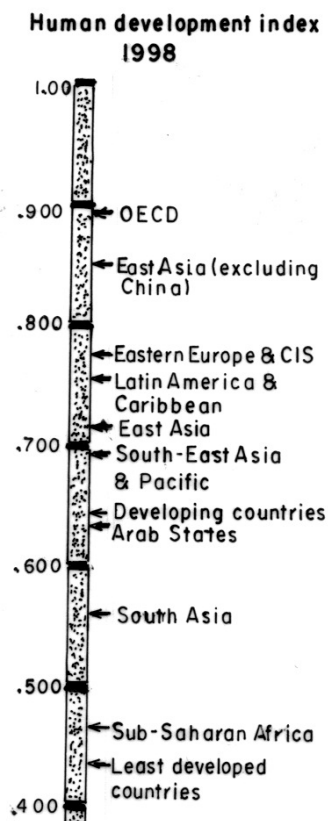


Fig. 3.3 Human Development Variation Among Regions

human development category (with HDI index more than 0.8), 93 in the medium (0.5 to 0.79) and 35 in the low category (below 0.5). Twenty countries have experienced reversal of HD since 1990 as a result of HIV/AIDS, particularly in Sub-Saharan Africa, Eastern Europe and the CIS (former USSR) (Appendix II).

- Canada, Norway and United States rank at the top on the HDI, while Sierra Leone, Niger and Burkina Faso at the bottom.
- Disparities between regions are significant, with some having more ground to cover in making up shortfalls than others. Sub-Saharan Africa has more than twice the distance to cover as Latin America and the Caribbean, South Asia nearly three times as much as East Asia without China.
- Disparities within regions can also be substantial. In SE Asia and the Pacific HDI values range from 0.484 in the Lao Peoples Democratic Republic to 0.881 in Singapore. Among the Arab States they range from 0.447 in Djibouti to 0.836 in Kuwait.
- The link between economic prosperity and human development is neither automatic nor obvious. Of the 174 countries 97 rank higher on the HDI than on GDP per capita, suggesting that they have converted income into human development very effectively. For 69 countries, the HDI rank is lower than the GDP per capita rank. These countries have been less successful in translating economic prosperity into better lives for their people (Appendix II).

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What is meant by population composition?
 - (ii) What is the significance of age-structure as a demographic determinant of a country's population?
 - (iii) What population characteristics are revealed by an age-sex pyramid having a regularly tapering pyramid?
 - (iv) What is sex-ratio?
 - (v) Why is the rate of urbanisation accelerating in developing countries significantly?
 - (vi) What is meant by literacy rate? Why is there a wide variation in the literacy rates among different countries of the world?
 - (vii) What is Human Development Index?
 - (viii) Which regions have experienced reversal of HD since 1990?
2. Distinguish between progressive population and regressive population.
3. Describe the characteristics of world population as revealed by the age-structure.
4. Discuss the factors responsible for imbalances in the sex-ratio found in different parts of the world.
5. Discuss the pattern of rural-urban population in the world.
6. Explain the interrelationship between population and development.
7. Discuss the concept of 'Human Development' as defined by the United Nations Development Programme and the justification for developing Human Development Index.

Geographical Skills

8. Find out the following from Appendix II:
 - (i) What ranking has been given to Canada, Sweden, Germany, Russia, Brazil, Sri Lanka, India, Nepal, Zambia and Ethiopia?
 - (ii) How many countries of Europe belong to each category?
 - (iii) Which countries of Asia belong to high Human Development category?
 - (iv) How many countries of Africa are in the category of low Human Development?
 - (v) What pattern does emerge from the above findings?