

FUNDAMENTALS OF HUMAN GEOGRAPHY

Textbook for Class XII

Authors

Hira Lal Yadav
Savita Sinha

Editor

R.P. Misra



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
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Unit I

INTRODUCING HUMAN GEOGRAPHY

1

CHAPTER

NATURE AND SCOPE OF HUMAN GEOGRAPHY

We learnt earlier that Geography is 'the study of the earth as home of humans'. Its nature is interdisciplinary and integrative. Geography looks at the earth's surface from two different but interrelated perspectives, known as systematic and regional. Accordingly, it has two broad branches: systematic geography and regional geography. Human geography is a branch of systematic geography. It studies the locational and distributional aspects of cultural phenomena, resulting from ever changing human-nature interaction.

Before we know more about human geography, it would be useful to understand its nature and scope. In the following pages, we will study its emergence as a branch of geography, its scope, approaches and present status.

EMERGENCE OF HUMAN GEOGRAPHY AS A FIELD OF STUDY

Age of explorations from approximately the later half of the fifteenth century to the eighteenth century led to appreciable advances in techniques of map making and accumulation of vast information through expeditions undertaken to different parts of the world. The information on geographic facts thus collected were examined, classified and organised by the professional geographers on scientific lines. A good example of this scientific approach is the work of Bernhard Varenus. His *Geographia Generalis* divides the subject of geography into two parts: the general and the special. The former considers the earth as a whole and explains its properties, whereas the latter focuses on the constitution of

individual regions. This idea of division of geography has been in existence since the time of early Greeks. In his treatise on regional geography, Varenus outlined its contents under three sections: Celestial properties, Terrestrial properties and Human properties.

During the nineteenth century, with the rapid development of scientific methods, attempts were made to restrict the scope of geography. The major emphasis was on the study of relief features. It was, perhaps, easier to describe the relatively stable features of the earth than the more variable cultural features. Relief features were measured and tested in various ways, and through this activity a special branch of geography developed. It was originally called *physiography*, but later modified as *geomorphology*. This field of physiography/geomorphology was cultivated at the cost of other sub-fields of geography. Partly as a reaction against this school of geography, which overemphasised physical features, scholars began to examine the relationship between humans and their natural environment. Thus originated the school of human geography.

The development of human geography as a special branch of geographic study was stimulated in the later half of the nineteenth century with the publication of Charles Darwin's *Origin of Species* in 1859. Buckle in *History of Civilisation of England* (1881) supported this new field by devoting a considerable portion of the book on the dependence of humans upon their environment. Friedrich Ratzel's book *Anthropogeographie* is considered a landmark in history for giving human-centric orientation

to geography. Ratzel, known as the father of modern human geography, defined it as the synthetic study of relationship between human societies and the earth's surface. Similarly, Ellen C. Semple, disciple of Ratzel, defined human geography as the study of 'the changing relationship between the unresting man and the unstable earth'. French geographer Vidal de la Blache's classic work entitled *Principles de Geographie Humaine* emphasised that human geography provides a new understanding of 'interrelationship between the earth and the man'. It synthesises the knowledge of the physical laws governing our earth and the relations between the living beings inhabiting it.

The role of humans vis-à-vis nature is both active and passive. Humans continue to act and react. The story of human progress both in space and time, is a process of humans' adaptation to their geographical milieu. E. Huntington defined human geography as the study of relation of geographic environment to human activities and qualities. Thus, human-environment relationship is dynamic rather than static. Jean Brunhes, another French geographer, paraphrased it as retrogression and progression of human phenomena, which like all terrestrial phenomena, never remains stationary. So, we must study them in evolution.

Human geography has been defined by different scholars at different times. The early scholars, such as Aristotle, Buckle, Humboldt, and Ritter focused on the influence of land upon history. Later on, in the works of Ratzel and Semple, the thrust shifted to examination of the question how physical environment influenced the human activities? Blache viewed ecological and terrestrial unity as the two principles of human geography. Huntington emphasised upon the influence of climate upon society, culture and history. It can be seen from the above discussions that in all the works the major thrust has been on the study of human society in relation to its habitat/environment.

SCOPE OR SUBJECT MATTER

Human geography is a very vast subject. It has its origin in some countries from the social

sciences, studying people in relation to space and place, and in others from physical sciences and in still others from earth sciences focusing on its links with the physical environment. The American geographers, Finch and Trewartha, divided the subject matter of human geography into two broad sections: physical or natural environment and cultural or man-made environment.

Physical or natural environment consists of the physical or natural features and phenomena such as surface configuration climate, drainage and natural resources, such as soils, minerals, water and forests. *Cultural environment* includes man-made features and phenomena on the earth such as population and human settlements as well as features associated with agriculture, manufacturing and transportation etc.

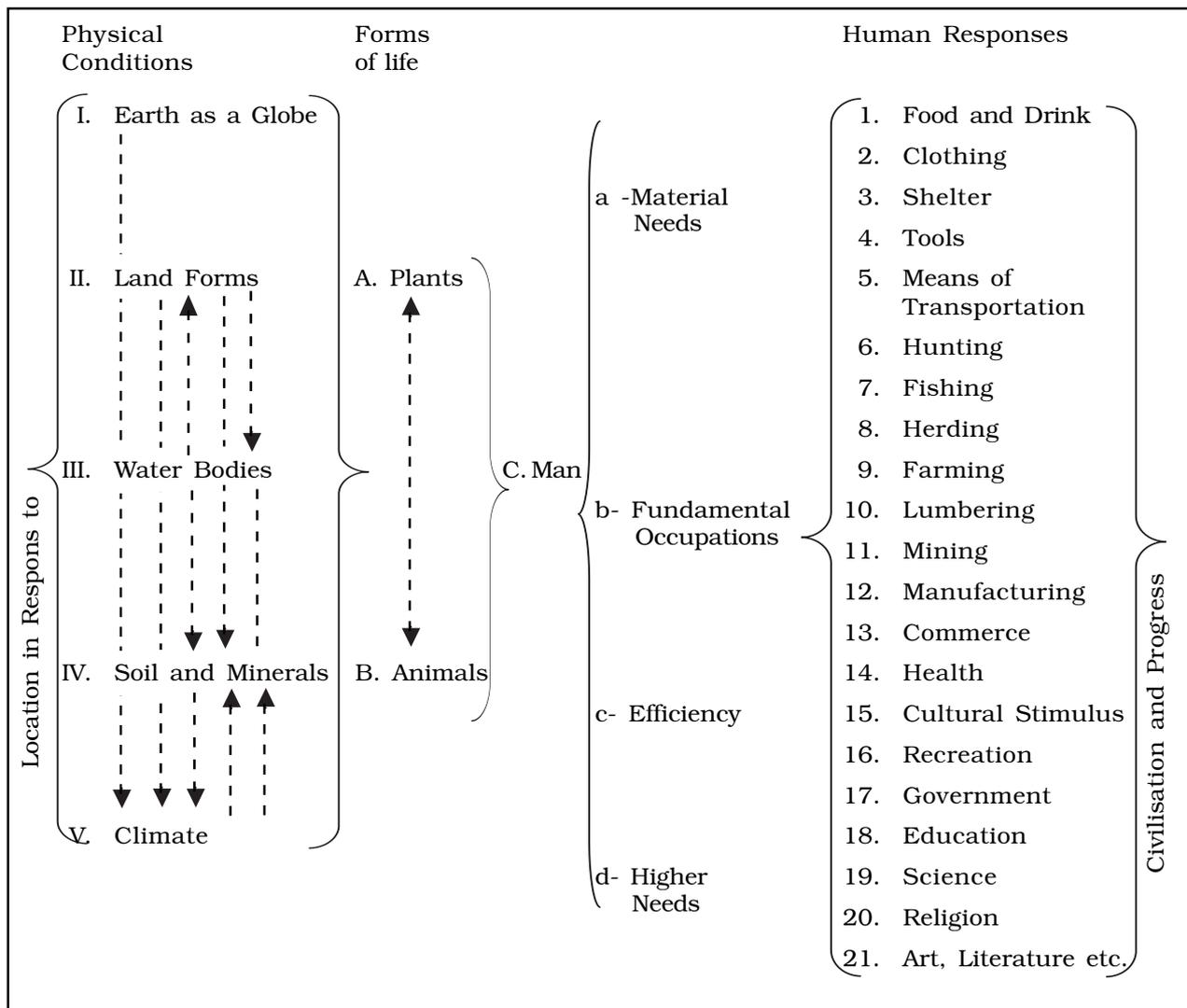
According to Ellsworth Huntington (1956), human geography is concerned with the physical conditions and the human responses to the physical environment (Table 1.1).

Vidal de la Blache's work on human geography deals with the world-wide distribution of population and settlements; types and distribution of elements of civilisation and development of various forms of transportation. All these elements profoundly modify the landscape. Jean Brunhes in his book divided human geography into a study of three groups and six types of essential facts : those connected with the unproductive occupation of the soil – (i) *houses*, and – (ii) *highways*; those connected with the conquest of the plant and animal worlds – (iii) *cultivated plants*, and – (iv) *domesticated animals*; and those pertaining to destructive occupation of the soil – (v) *destruction of plants and animals*, and – (vi) *exploitation of minerals*.

Besides, the above stated essential facts, human geography is also concerned with the study of the following aspects of human environment.

Geography of the First Vital Necessities: Fundamental physiological needs — food, shelter and clothing.

Table 1.1 : Elements of Human Geography According to Huntington



Note : The arrows and their dotted extension indicate the chief ways in which the physical conditions influence one another; climate, for example, is influenced by the earth's spherical shape, by the form of the land, and by bodies of water such as oceans. It in turn influences the form of the earth's surface, the quality of the soil, and the nature of mineral deposits. It also influences bodies of water ... but this relationship and certain others have been omitted to avoid crowding.

Geography of the Utilisation of the Earth Resources : The material things which satisfy the prime needs of human life — agricultural, pastoral and industrial activities.

Economic and Social Geography : Production, transportation and exchange of goods and services and geography of the culture.

Political Geography and Geography of History: Frontiers, territories, routes, groups of states etc.

The subject matter of human geography continues to grow and has widened considerably over the period. From an earlier thrust on cultural and economic aspects in the early twentieth century, several new branches emerged out of it to study emerging issues and problems like political dimensions, social relevance, urbanisation and urban systems, health and social well-being, gender, inequality, and public policy, to name a few.

In doing so, human geography has become not only more integrative and inter-disciplinary in nature but has also incorporated several new approaches into its fold. It gives to other social sciences the necessary spatial and systems viewpoint that they otherwise lack. At the same time, human geography draws on other social sciences in the analysis identified with its sub-fields, such as behavioural, political, economic or social geography.

Human geography, in line with geography as a whole, has three closely linked tasks to perform:

- (i) The spatial or locational analysis of man-made phenomena on the earth's surface. It refers to numbers, characteristics, activities and distributions. These aspects are effectively expressed through maps. Factors that lead to particular spatial pattern are explained. Alternative spatial patterns of greater importance and having higher equity or efficiency are proposed. The focus is on the spatial variations between areas (horizontal bonds). The relationship can be seen in two ways, that is the impact of people on regional habitat (land), as well as of land on people.
- (ii) Ecological analysis, where the focus is on studying human-environment linkages (vertical bonds) within a geographical region.
- (iii) Regional synthesis wherein the spatial and ecological approaches are fused. Regions are identified. The aim is to understand the internal morphology, ecological linkages and external relations.

This relationship is explored at different spatial scales, ranging from macro level (i.e. major world regions) through meso scale to micro level i.e. individual or groups and their immediate surroundings. Its emphasis is on people. Where are they? Why are they there? What they are like? How they interact over space? and What kind of cultural landscapes they create upon the natural landscapes they occupy? The answers to various questions are to be derived from the fundamental approach of a geographer: Who is Where, and How and Why did it get there? And, of course, we also

want to know what it means to us, to our children and to the future generations?

APPROACHES TO STUDY HUMAN GEOGRAPHY

The human-environment relationships, the main focus of human geography, has been interpreted in several ways. The post Darwinian period has witnessed several new approaches adapted to examine this relationship. Over time, approaches to study the subject matter of human geography have been changing. These changes are not exclusive to human geography but are in tune with the changes taking place within the overall domain of geography. These trends are discussed below.

Determinism refers to the point of view supporting environmental control on human action. Accordingly, history, culture, life-style and stage of development of a social group, society or nation are exclusively or largely governed by the physical factors (like, terrain, climate, fauna and flora) of the environment. The determinists generally, consider humans as passive agents, influenced by the environmental factors, which determine their attitude, decision making and life style. The first attempts to explain the physical features and the traits of various ethnic groups and their cultures with reference to the influence of natural conditions were made by the Greek and the Roman scholars including Hippocrates, Aristotle, Herodotus and Strabo.

The deterministic concept in geographic literature on human geography continued through the works of scholars, such as Al-Masudi, Al-Idrisi and Ibn-Khaldun, Kant, Humboldt, Ritter, and Ratzel well up to the early twentieth century. This concept grew widespread particularly in the United States from the writings of E.C. Semple and Ellsworth Huntington, who were considered its great exponents.

The philosophy of determinism was attacked mainly on two grounds. First, it had become clear under definite conditions and circumstances that similar physical environments do not produce the same

responses. For example, the Greek and the Roman civilisations flourished in the Mediterranean climate. But similar civilisation did not develop in similar climatic conditions in Australia, South Africa, Chile or California. Second, although environment influences humans, they also influence the environment, and the cause and effect relationship of determinism is too simple to explain this.

Consequently the idea that humans are controlled by nature was rejected and other geographers stressed the fact that humans were free to choose. When the emphasis is firmly placed on humans rather than nature, and humans are seen as an active force rather than a passive one, the approach is that of *possibilism*. Lucian Febvre, the first to use the word *possibilism*, wrote that "there is no necessities, but every where possibilities; and man as master of these possibilities is the judge of their use". Although the concept of possibilism had become quite popular after the World War I, it was Vidal de la Blache who advocated and developed systematically the school of possibilism. He opined that the life styles of people were the product and reflections of a civilisation, representing the integrated result of physical, historical and social influences governing human's relations with his habitat. He tried to explain differences between groups in identical or similar environment and pointed out that these differences were not the product of the dictates of physical environment but the outcome of other factors, such as variations in attitudes, values and habits. This concept became the basic philosophy of the school of *possibilism*. The supporters of possibilism saw in the physical environment a series of possibilities for humans to exploit it for their benefits. It was realised that the cultural context and technological advancement of humans determined how they will use the environment. The regions of extreme climate and terrain were perhaps excluded from it.

Although the nature has offered humans a lot of scope for development, it has also set the ultimate limits, crossing of which would mean a point of no return. Hence, the possibilistic

approach invited criticism from many of the contemporary thinkers. Griffith Taylor, while criticising the possibilism, put forward the concept of neo-determinism. He stressed that a geographer's role is essentially that of an advisor and not to interpret the nature's plans.

RECENT CHANGES

The post World War II period has witnessed rapid developments in all fields including the academic world. Geography, in general, and human geography, in particular, has responded by way of addressing the contemporary problems and issues concerning the human society. The conventional approaches were found to be inadequate to comprehend the new issues pertaining to human welfare, such as poverty, inequalities both social and regional, social well-being, and empowerment. As a result, the new approaches were adopted from time to time. For example, *positivism* appeared as a new approach in the mid-fifties, which laid stress on the use of quantitative techniques to induce greater objectivity in analysing the geographical pattern of various phenomena under study. Scholars such as B.J.L. Berry, David Harvey and William Bunge are among some of the proponents of this approach. This approach was later on criticised for laying excessive emphasis on so called "sterile" quantitative techniques rather than analysing such aspects of people, such as decision-making, beliefs and fears. As a reaction of positivism emerged *behavioural* approach, a concept borrowed from psychology. In this approach emphasis was placed on cognitive power of human beings.

The growing inequalities among different regions of the world and within countries along with different social groups especially under the impact of capitalism led to the emergence of *welfare* approach in human geography. Issues like poverty, regional inequalities in development, urban slums, and deprivation became the focus of geographical studies. D. M. Smith and David Harvey are some of the well known advocates of this approach. The focus of the welfare approach is on "who gets

what, where and how”? The “who” refers to the area under review, what refers to the various goods (and bads) enjoyed or endured by the population in the form of commodity, services, environmental quality and so on. The “where” reflects the fact that living standards differ according to area of residence. The “how” refers to the process whereby the observed differences arise. The welfare approach now has merged with other lines of inquiry.

Humanism is yet another approach in human geography that lays emphasis on the

central and active role of humans in terms of human awareness, human agency, human consciousness and human creativity. In other words, this approach is on the self of a human being.

The rapid emergence of new approaches in human geography in the last four decades is mainly due to a dramatic shift in human geography from description of the pattern of human phenomena to the understanding of the processes working behind these patterns. In the process human geography has become more humane.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) Who wrote *Geographia Generalis*?
 - (ii) When did human geography emerge as a special branch of geographic study?
 - (iii) Why Friedrich Ratzel's book *Anthropogeographie* is considered a landmark?
 - (iv) Name the French geographer, who wrote *Principles de Geographie Humaine*.
 - (v) Which six types of essential facts in human geography were mentioned by Jean Brunhes?
 - (vi) What approach was followed by Lucian Febvre and Vidal de la Blache to study human geography?
2. Distinguish between:
 - (i) Determinism and Possibilism;
 - (ii) Positivism and Humanism.
3. Discuss the development of human geography ever since its appearance as a distinct field of study.
4. Explain how human geography in the early twentieth century has become more integrative and interdisciplinary?
5. “Human geography in the post World War II period has responded to the contemporary problems and issues of the human society.” Explain.

Unit II

THE PEOPLE

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

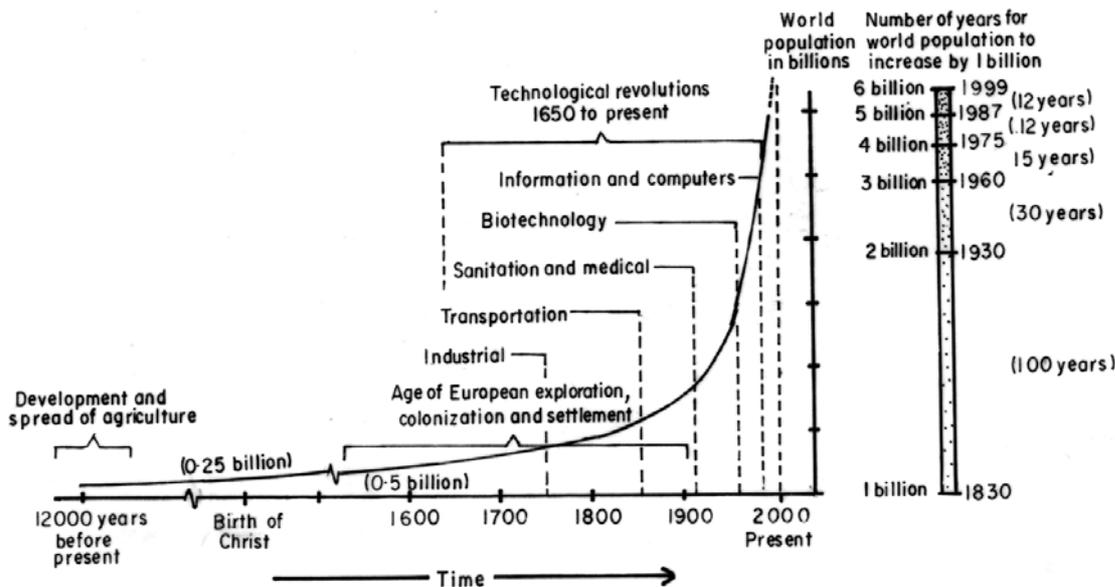


Fig. 2.1 Resource, Technology and Population Growth

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

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,

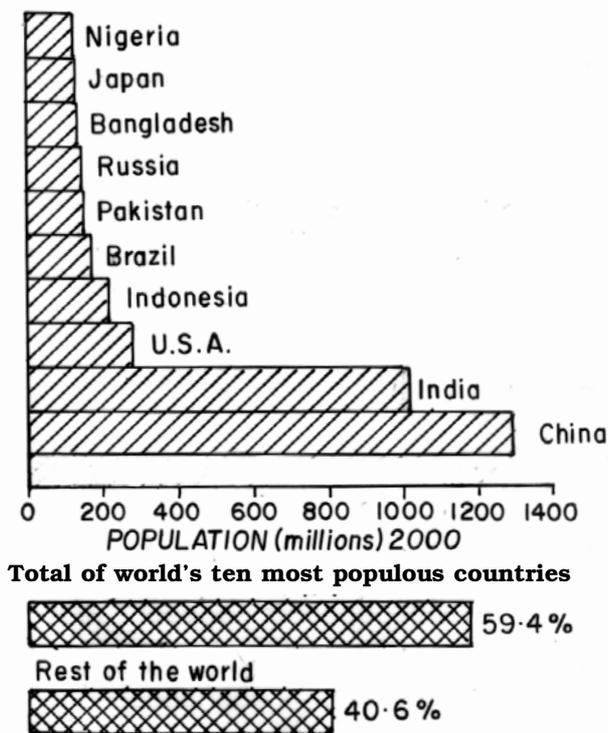


Fig. 2.2 World's Ten Most Populous Countries

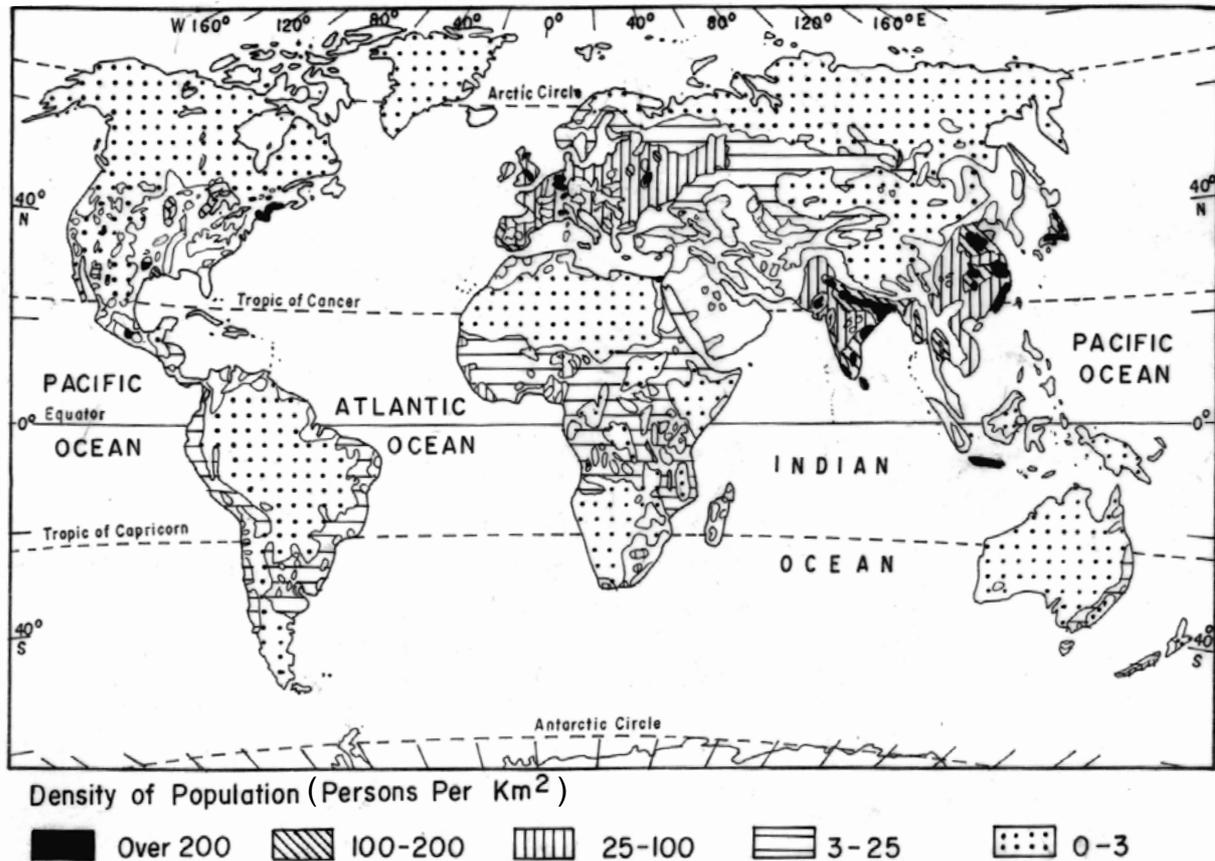


Fig. 2.3 Population Density

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 aquaducts.

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.

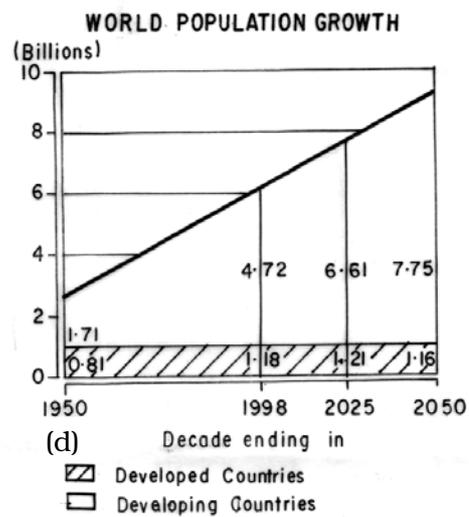
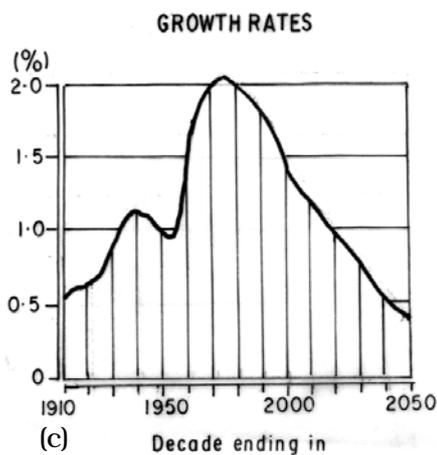
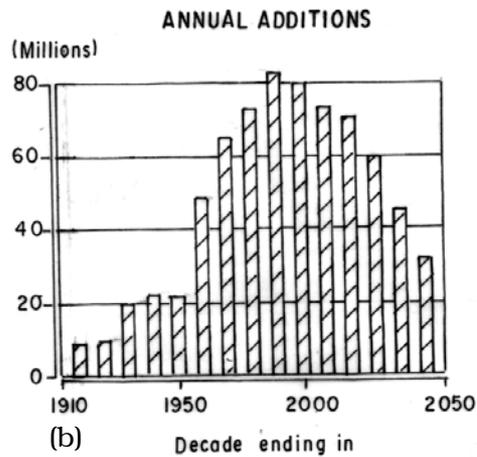
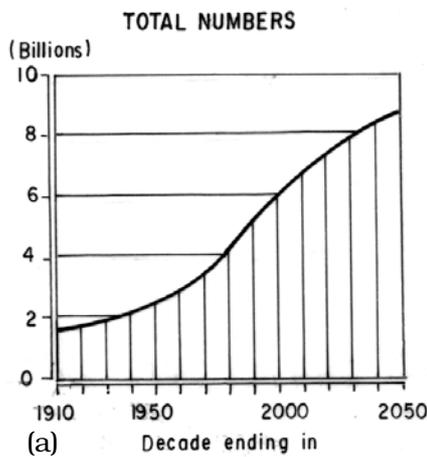


Fig. 2.4 Population Change: (a) Total numbers; (b) Annual Additions; (c) Growth Rates; and (d) World Population Growth

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

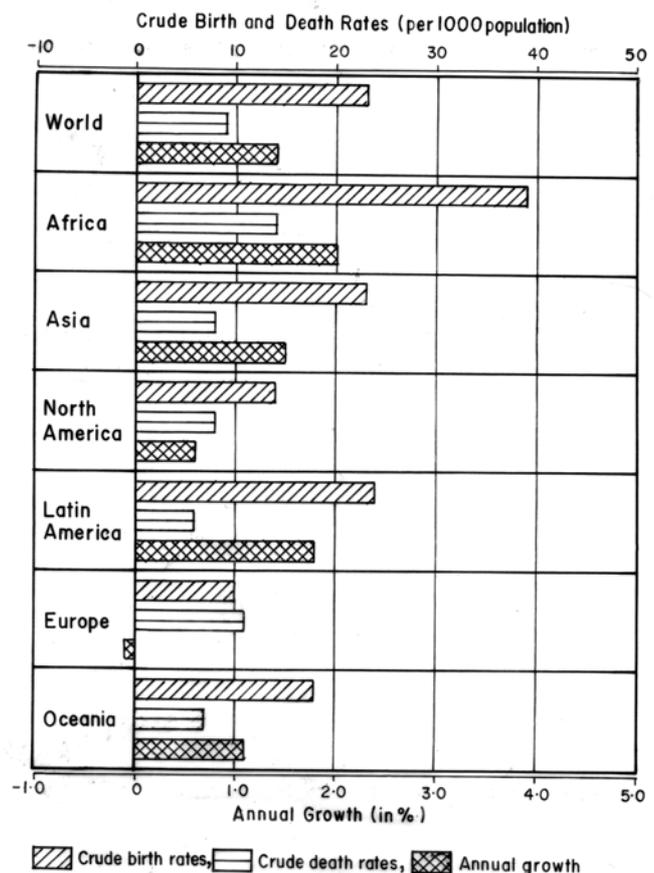


Fig. 2.5 Crude Birth Rate and Crude Death Rate

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

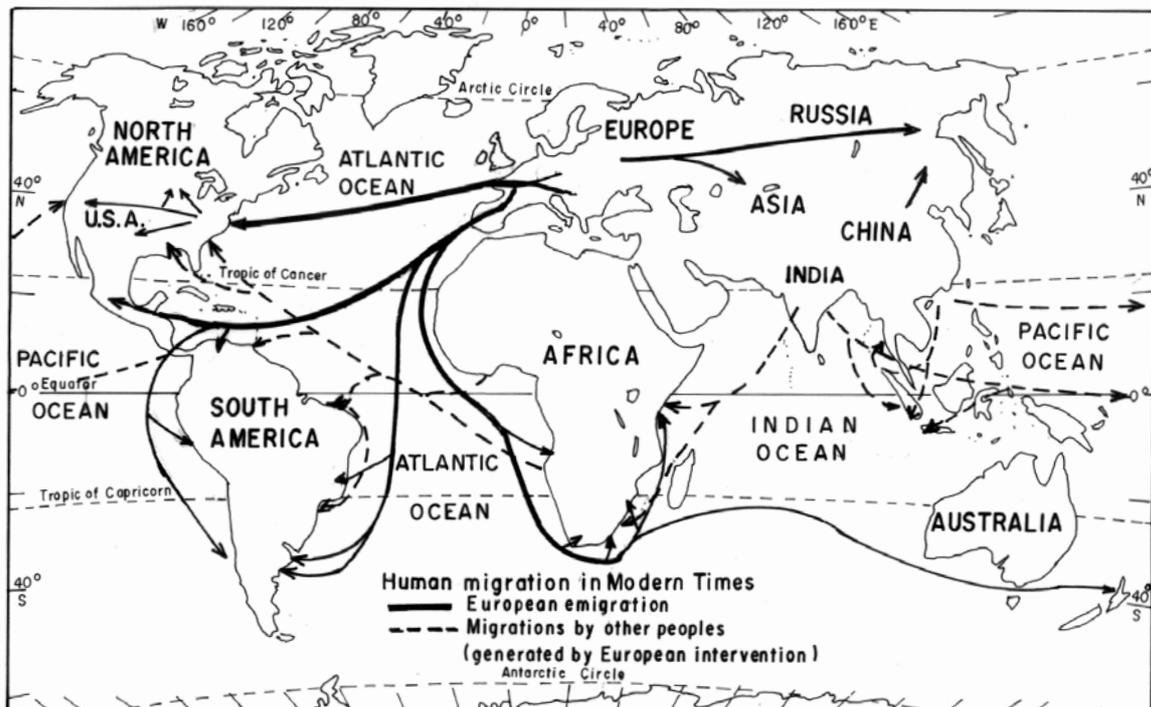


Fig. 2.6 Human Migration in Modern Times

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

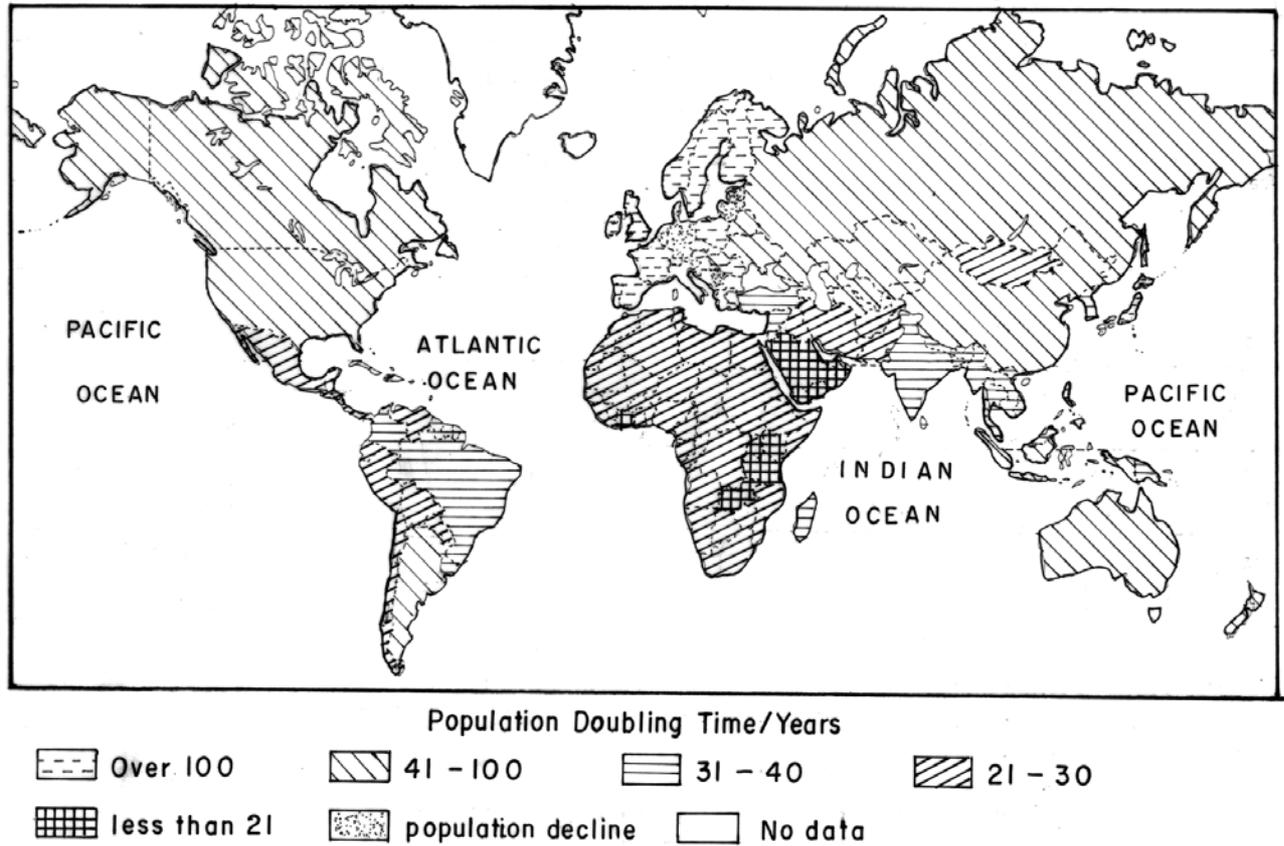


Fig. 2.7 Population Doubling Time

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.

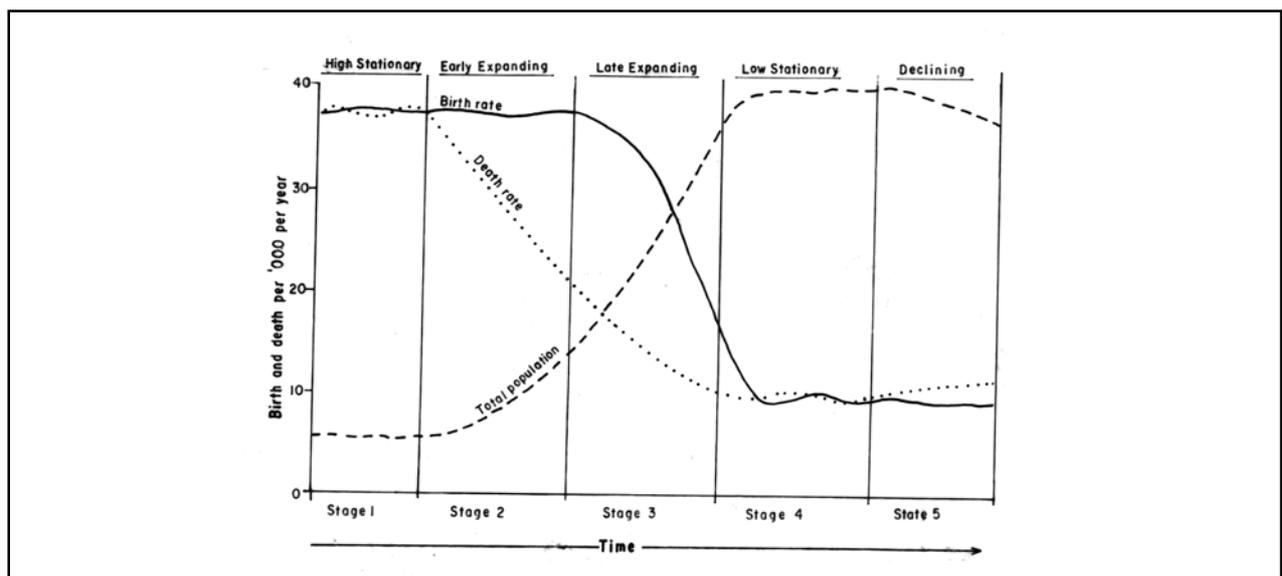


Fig. 2.8 Demographic Transition Model

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 :	<i>Primitive Demographic Regime</i> : High birth and death rates and slow population growth.
STAGE II	
Type 2 :	<i>Expanding or Youthful Demographic Regime</i> : Sharp decline in death rates, high birth rates, rapid population growth.
Type 3 :	<i>Late Expanding Demographic Regime</i> : Declining birth rate and low death rates, and decline in growth rates of population.
Type 4 :	<i>Low Fluctuating or Mature Demographic Regime</i> : Low birth and high death rates, declining population.
STAGE III	
Type 5 :	<i>Zero Population Growth Regime</i> : 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

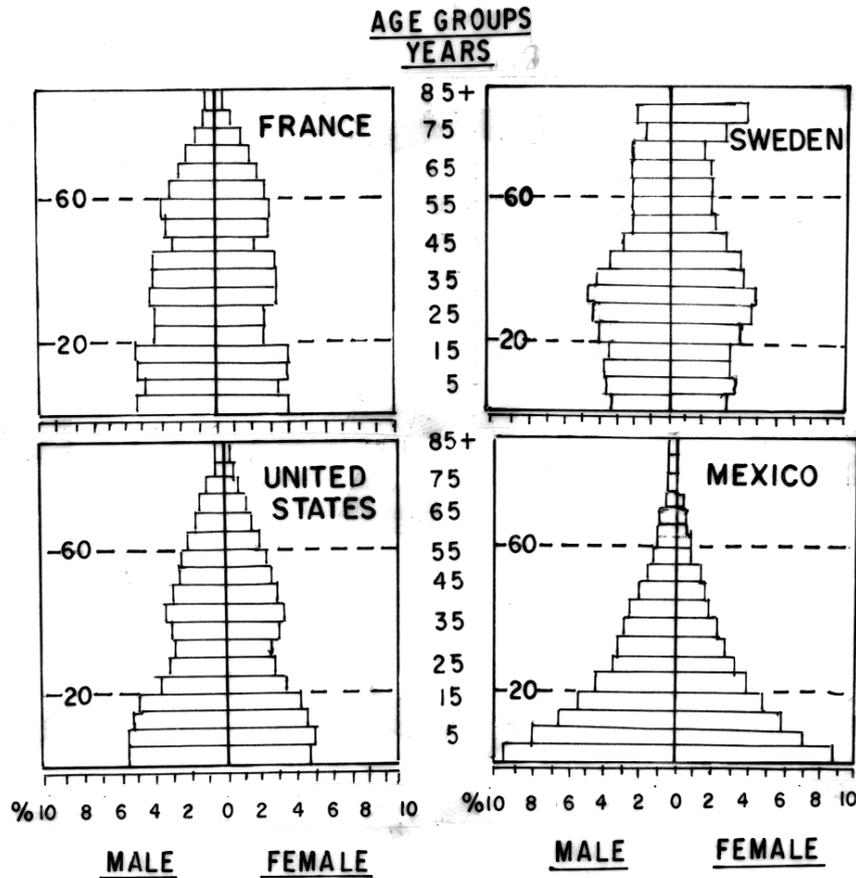


Fig. 3.1 Age-Sex Pyramid of Selected Countries

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

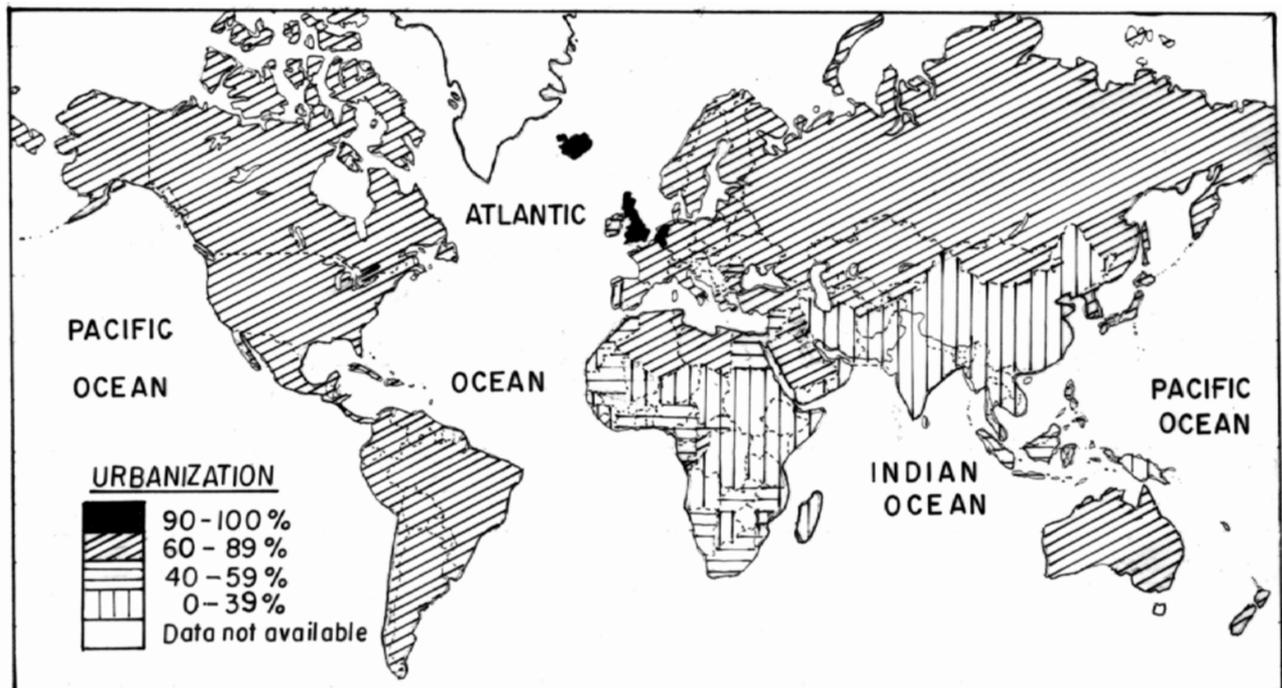


Fig. 3.2 World Urbanisation

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

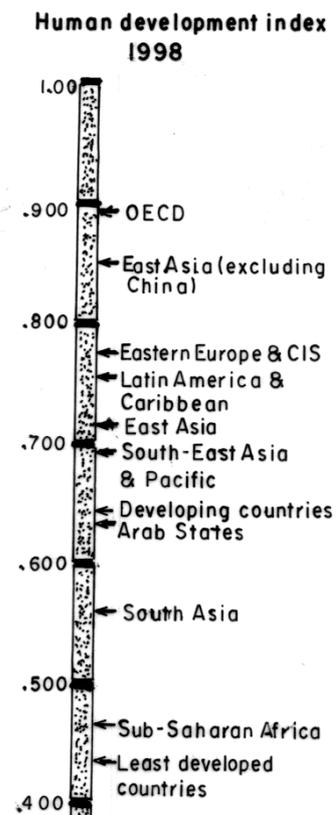


Fig. 3.3 Human Development Variation Among Regions

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?

Unit III

HUMAN ACTIVITIES

4

CHAPTER

HUMAN ACTIVITIES — PRIMARY

Human beings are engaged in various kinds of economic activities that pertain to the production, exchange or distribution and consumption of goods and services. With the evolution of human society, the nature of economic activities has changed and has become more and more complex.

HISTORICAL PERSPECTIVE

Humans, ever since their appearance on the earth, have depended on the physical environment for their survival and development. Even today, we depend on the nature for many of our material and aesthetic needs. Without sunshine, rocks, minerals, soil, water, vegetation and animals, our very existence will be impossible.

The early humans led a simple, though arduous life. Their needs were limited. They moved from place to place in search of food and water. They hunted animals and gathered fruits, nuts, roots, stems and leaves of edible plants to satisfy their hunger. The subsistence of people based on hunting of animals and gathering of wild plant foods and fishing without domestication of plants and animals is known as *foraging*.

Use of fire for cooking and heating, domestication of animals, cultivation of crops and living in the permanent villages triggered off *agricultural revolution*. All these developments did not occur simultaneously, nor did they occur in isolation. They were interrelated, each acting as a cause as well as the effect of the rest.

When did the agricultural revolution take place? It is difficult to answer this question,

though it may be stated categorically that it took place at different times in various regions of the world. According to the available archaeological evidences, agricultural revolution was experienced in the river valleys, where ancient civilisations flourished.

Agricultural revolution changed the lives of people enormously as they had more time for other functions. Artisanal activities in support of agriculture as well as to meet other basic needs and aesthetic tastes grew. Trade in agricultural and artisan products led to the opening of transport routes. Villages increased in size to form small and then large towns. Some 5,000 years ago, the Nile Delta in Egypt, the river valleys of the Euphrates and the Tigris in Mesopotamia and the Indus in India witnessed the blossoming of well developed cities and towns. But the base of all these cities was agriculture and related activities.

After the elapse of several millennium, a revolutionary change in human civilisation took place in Europe during the eighteenth century. At that time, Europe was agriculturally less developed due to unfavourable climatic conditions. The *industrial revolution*, which started with the invention of steam engine, however, changed the course of development. While the agricultural revolution was triggered off by a better and more organised way of using the biological products of nature, the industrial revolution relied on the use of energy stored in nature in the form of coal, and later petroleum. It helped people avoid the drudgery of manual labour and produce non-agricultural commodities on a mass scale. It also had its

impact on education, health, transport and trade.

Industrial revolution had its adverse effects too. The European countries used its power to improve the life of their people. They had limited natural resources and hence, limited scope for development. They ventured out of their own countries to colonise people in other continents. The overseas colonies not only gave them ample natural resources but also vast market to sell their industrial goods. It is reflected through the transport routes that developed in these colonies during that period. Development of port cities and their linkages with the hinterland in several colonies explain this design. Consequently, the situation reversed. Europe which was underdeveloped became developed, and other continents specially Asia which were more developed became less developed.

By the middle of the twentieth century, signs of fatigue became clearly visible in the industrial apparatus of the world. The two world wars and several localised conflicts aroused the human conscience against unbridled industrialisation in producing arms and ammunitions. Environmental crises forced the people to think of an alternative sustainable development model. Growing poverty in the three continents of Asia, Africa and South America in the midst of increasing income in the industrial world, shook the faith of people in industrialisation as the panacea for all ills.

Before the thinking on a human model of development could take a concrete shape, the industrial world faced a challenge from within. The role of information increased and by 1980s, the production and transmission of knowledge became a major preoccupation in the west. A third major change in human civilisation, popularly known as *information revolution*, became a reality by the turn of the twentieth century. The Industrial Era still lingers on; but the signs of its early demise are clear and obvious.

Information revolution has potentials of sweeping the whole world — developed as well as developing — for obvious reasons that human potentials are not as unevenly

distributed as the natural resources. Moreover, the use of information technology in various sectors of our life and living world has opened up new and greater opportunities for development and if handled judiciously, without enlarging the gulf between the rich and the poor.

TYPES OF ECONOMIC ACTIVITIES

With this background, we may now identify different kinds of economic activities such as hunting and gathering, pastoralism, mining, fishing, agriculture, manufacturing (industries), and various types of services—trade, transport, education, health care and administration. These are broadly grouped as primary, secondary, tertiary and quaternary activities.

Primary activities pertain to extraction of raw materials from the earth's surface. These include hunting and gathering, pastoralism, fishing, forestry, mining and agriculture.

Secondary activities include industries that transform raw materials into finished goods having higher value. For example, manufacturing cotton textiles from cotton, and iron and steel from iron ore come under secondary activities.

Tertiary activities include all kinds of services provided to people such as education, health, trade and transport.

Quaternary activities represent a special type of service, which is related to high intellectual activities e.g. research and development, high order of professional and administrative service, information generation, processing and transmission.

While labeling human activities as primary, secondary, tertiary, and quaternary, let us not think that they are independent of each other. Their boundaries are often overlapping. With advancements in science and technology, the nature of production in all fields has changed so greatly that all these sectors have become interdependent.

PRIMARY ACTIVITIES

Primary activities in economically developed nations account for less than 5 per cent of

employment but in many developing countries of the world, they still employ a major segment of labour forces. In any case, primary activities are almost the only source of food supply and raw materials for industries. Among these activities are included some of the most primitive activities like hunting and gathering, which sustained human beings for more than 95 per cent of their existence on the earth. Also included are the modern agricultural systems. In this chapter, we propose to discuss only the primitive agricultural activities and mining.

Hunting and Gathering

Until 12,000 years ago, all humans lived as hunters and gatherers. They occupied nearly all the liveable space on the planet. At present, not more than 1 in 100,000 persons (less than 0.0001 per cent) live mainly this way; probably none does so entirely without any contact with the modern world.

Historically, this form of economy involved frequent migration in search of food. People lived in small groups, having virtually no private property. Simple implements like spears, bows and arrows were used for hunting. Locally available materials were used for their clothing and shelter.

The foragers were very successful in occupying a wide variety of habitats having different climates and biological resources. Fish and mammals from the sea provided subsistence to the people inhabiting the harsh landscapes of the polar coast. On the other extreme, the hunting – gathering people successfully colonised the tropical rainforests. By and large, the foragers simply live off the land without changing the natural ecosystem in a major way.

The hunting-gathering people have exhibited a great resistance. As recently as A.D. 1500, they occupied about one-third of the globe, including whole of Australia, most of North America and large tracts of South America, Africa and North-east Asia. Since, then their numbers have declined (Fig. 4.1). The twentieth century has witnessed profound changes in their ways of living. Their land and resources shrank as industrialisation and

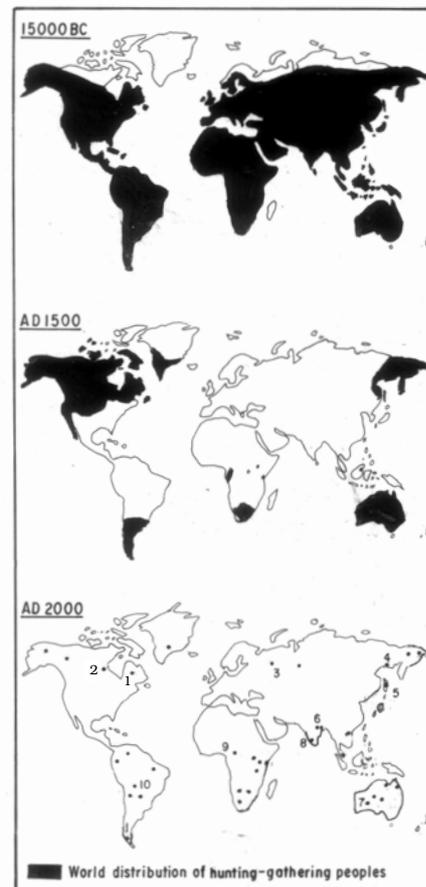


Fig. 4.1 World: Distribution of Hunters and Gatherers

(1) Innuit; (2) Inuit; (3) Khanti; (4) Evenki; (5) Ainu; (6) Birhor; (7) Pintupi; (8) Paliyan; (9) Pygmie; (10) Toba

Source : Scarre, C.(ed.), 1988: *Past Worlds: The Times Atlas of Archaeology*. London: Times Book.

urbanisation progressed. Present day hunters-gatherers are confined to a few pockets in Australia, Africa, Asia, North America and South America. The Arctic Inuit; Pygmies and Kalahari San of Africa; Aboriginal Australians such as Pintupi; Paliyan of South India; and Semang of Malaysia are some examples of the foragers, who represent the oldest adaptation to human environment.

Pastoralism

The domestication of animals was one of the early steps in the development of civilisation (Fig.4.2). People living in different climatic conditions selected and domesticated animals



Fig. 4.2 The Likely Distribution of the Ancestors of Domesticated Animals

found in those regions e.g. cattle and horses in the grasslands, sheep and reindeer in the tundra regions, camel in the tropical deserts, and llama and yak in the high altitudes of the Andes and the Himalaya respectively. These animals were the chief sources of milk, meat, wool and hides. In the tropical and temperate

grasslands of the world, livestock herding and rearing continues even today either as traditional nomadic herding, also known as pastoral nomadism or commercial livestock rearing (ranching).

Pastoral Nomadism : It is a subsistence activity depending on animals. Since these people do not live a settled life, they are called *nomads*. Each nomadic community occupies a well-defined territory. These people are aware of the seasonal changes in the availability of pasture and water supply within the area occupied by them. The animals depend entirely on natural vegetation.

Cattles are reared in grasslands receiving more rain and having soft and long grasses. Sheep are reared in low rainfall areas with short grasses. Goats are common in the rugged terrain with scanty grasses. There are six widely distributed species reared by pastoral nomads: sheep, goats, camels, cattle, horses and donkeys.

In some parts of the world, the movement of herders follows the change in seasons. For

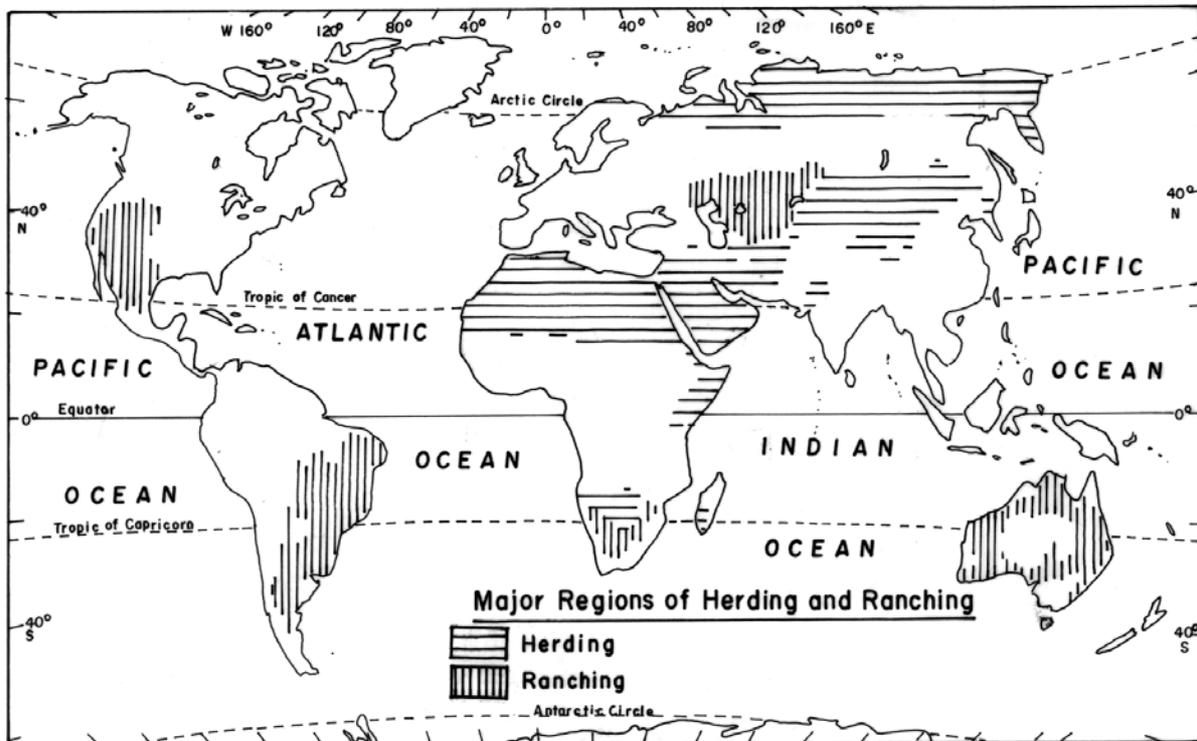


Fig. 4.3 Areas of Nomadic Herding and Commercial Livestock Rearing

example, in the mountainous regions such as the Himalaya, *Gujjars*, *Bakarwals*, *Gaddis* and *Bhotiyas* migrate from the plains to the mountains in summers and from mountains to the plains in winters. Similarly, in the tundra region, the nomadic herders move from south to north in summers and from north to south in winters. Such seasonal migration of people with their animals is known as *transhumance*.

Pastoral nomadism is associated with seven distinct areas : high latitude Sub-Arctic; Eurasian steppe; mountainous south-west Asia; Saharan and Arabian deserts; Sub-Saharan savannas; the Andes; and the Asian high altitude plateaus. These may broadly be grouped under three broad regions. The largest region extends over nearly 13,000 km, from the Sahel and Sahara in Africa to Mongolia and Central China. The second region includes the southern border of the tundra region in Eurasia. The third region comprises of south-west Africa and the western part of Madagascar. These areas have either too hot and dry or too cold climates. In these regions, the social status of a person is measured on the basis of the number of cattle heads he possesses. International border restrictions and other developments are forcing nomads to abandon traditional migration routes and grazing lands. Today, nomadic herding supports only 15-20 million people in the world.

Pastoralism is a distinctive form of ecological and cultural adaptation to certain types of ecosystem in which humans and animals live in a symbiotic community typified by a fierce independence and self-determination.

Commercial Livestock Rearing : In modern times, the rearing of animals is being undertaken scientifically. Instead of depending upon natural grasslands, fodder crops and grasses are cultivated over extensive areas, and special breeds of animals are reared to give maximum yields of milk or meat. Emphasis is laid on genetic improvement, disease control and health care of animals. Cultivation of fodder crops, processing of milk and, meat, and packaging of animal products is carried out mechanically and on scientific lines.

The large-scale livestock rearing (ranching) on a commercial basis is typical in developed countries.

Mining

The mining and quarrying of rocks and minerals is an age — old economic activity, though its nature and form has changed in many ways. Use of minerals by the early humans was probably restricted to picking up a rock and using it as a tool for crushing seeds or hunting animals. Gradually, humans switched over from tool-using to tool-making. The progressive and increasingly sophisticated use of mineral resources is marked with different stages of human civilisation. From flint spear head to clay pots, to copper dagger, to bronze vessels, to iron chains, and so on, humans have moved on discovering and using new minerals. On the basis of the mineral-use, eight ages of the human civilisation are usually identified. (Table 4.1)

Table 4.1 : Minerals and Human Civilisation

<i>Age</i>	<i>Approximate Date of Beginning</i>
Paleolithic (Old Stone)*	500,000 B.C.
Neolithic (New Stone)	8,000 B.C.
Copper	5,000 B.C.
Bronze	3,000 B.C.
Iron	1400 B.C.
Coal	A.D. 1,600
Petroleum	A.D. 1,850
Nuclear	A.D. 1,950

* Use of Stone Tools

Mining probably began about 100,000 B.C. In simple terms, it means removing the rock materials from the earth's surface for processing, so that they are made more beneficial. It can be as simple as shoveling sand or as complex as drilling tunnels, blasting rock and lifting ore from thousands of metres deep beneath the ground.

Nature of mining activity has undergone many changes over the years. In the early days of the feudal period, mining was a work of

prisoners and slaves. Greeks and Romans in the ancient time operated their mines with captive armies or indigenous peoples under their control. By the Middle Ages, mining was considered a noble profession. Mining guilds in England and Germany were powerful organisations as they controlled the production of metals needed for arms and coinage. In modern times, mining is no longer a major employer. Mechanisation has increased efficiency and productivity and hence only a small percentage of work force is required in this kind of activity now compared to earlier times.

Globally, the mineral use has increased over time. Since the industrial revolution, associated technological developments and growing population, have increased the use of minerals at very high rates. During last century, mineral use increased 13 times or more.

Minerals : Types and Importance

As we have read, mining refers to the extraction of minerals. What are minerals? Why are they important ? Where are they found?

Minerals consist of one or more elements and have specific chemical composition. They

Table 4.2: Minerals : World Reserves, Uses and Major Producers

<i>Mineral Resources</i>	<i>Uses</i>	<i>World Reserves (Metric Tons)^a</i>	<i>Major Producing Countries</i>
Bauxite	Ore of aluminium	21,559,000	Australia, Guinea, Jamaica, Brazil
Chromium	Alloys, electroplating	418,900	South Africa, CIS ^b , India, Turkey, Zimbabwe
Copper	Alloys, electric wires	3,21,000	Chile, USA, Canada, CIS
Gold	Jewellery, circuitry in computers, communications equipment, dentistry	42	South Africa, USA, CIS, Australia, Canada
Iron ore	Iron and steel	64,648,000	CIS, Brazil, Australia, China, Canada, Venezuela, Mauritania
Lead	Storage batteries, solder, pipes	70,440	CIS, USA, Mexico, Canada, Peru
Manganese	Iron and steel production	812,800	CIS, South Africa, Gabon, Australia, Brazil, France.
Nickel	Stainless steel	48,660	CIS, Canada, New Caledonia, Norway, Dominican Republic
Silver	Jewellery, photography, dentistry	780	Mexico, USA, Peru, CIS, Canada
Tin	Coating on metal, tin cans, alloys, solder	5,930	China, Brazil, Indonesia, Malaysia
Titanium	Alloys; white pigment in paint, paper, and plastics	288,600	Australia, Norway, CIS
Zinc	Iron and steel, alloys, rubber products, medicines	143,910	Canada, Australia, CIS, China, Peru, Mexico, Spain

^(a) One metric equals approximately 1.102 British tons.

^(b) Commonwealth of Independent States (includes much of the former Soviet Union).

are one of the most valuable resources of the earth because of their various uses. They are exhaustible or non-renewable. Besides, they are distributed very unevenly. They are generally found in the form of ores, which contain several impurities. Minerals are separated from the ores involving a number of distinct processes.

Minerals occur in different types of formations e.g. igneous intrusions, sedimentary ore deposits, alluvial deposits and oceanic deposits. Many important mineral deposits are contained within igneous intrusions and are found at different depths as they solidified at different temperatures. As such some of them are often found in association with the other such as silver with lead and zinc because they solidify at a similar temperature. Other minerals may be found at different levels e.g. tin is found at a greater depth than copper.

Minerals are broadly divided into two groups : metallic and non-metallic. *Metallic minerals* are those which yield metals such as iron, copper, silver and gold. They are indispensable to the contemporary society. All other minerals such as salts, sulphur, coal and petroleum belong to the non-metallic group. Majority of the minerals are inorganic in nature. Coal and petroleum or mineral oil owe their origin to the fossils of plants and animals (buried vegetation and animals) and hence are organic in nature. Since they are used as fuel, they are also known as *fossil fuels* or *mineral fuels*.

Minerals are distributed unevenly. Commercially viable mineral deposits are found only in selected places. However, because of the extensive use, many of the world's richest mineral deposits have either been depleted or are on the verge of depletion. Minerals found in insufficient concentration are not worth extraction because of high production cost. Economically important minerals include iron, manganese, lead, aluminium (bauxite), copper, nickel, tin and zinc.

Distribution and Production of Some Minerals

We will now discuss the distribution and production of a few important mineral resources (Table 4.2). While iron, copper and bauxite are metallic minerals, coal and mineral oil are fossil fuels.

Iron

Iron is one of the most important metals, which is used most widely because of its certain qualities — hardness, strength, durability, malleability and above all the possibility of its conversion into different forms. Iron is found in the form of iron ores. They are of different types: haematite, magnetite, limonite and siderite. The metallic content of iron in these ores is highly variable. If the iron content of an iron ore is more than 30 per cent, only then it is worth extraction.

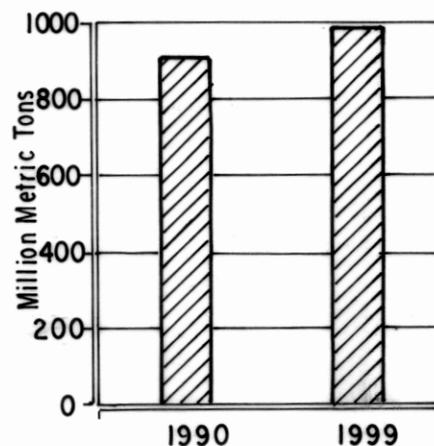


Fig. 4.4 World : Production of Iron Ore

Like several other metals, iron ore deposits are associated mainly with the major igneous intrusions. Good quality iron ore is found in Russia, Ukraine, China, the USA, Canada, Sweden, France, Germany, Spain, the UK, Liberia, South Africa, Brazil, India and Australia. Russia has the largest proven reserves of iron ore in the world. China emerged as the biggest producer of iron ore in the world in 1999, followed by Brazil, Australia, India and Russia. Find out the trend in the production of iron ore from Fig 4.4.

Copper

Copper as a metal has been in use since ancient time. It is malleable and corrosion resistant. It is used mainly in the electrical industry because it is a good conductor. However, in recent years, the increasing use of glass fibres has reduced the pressure on copper.

Copper is used for making different kinds of alloys. For example, copper is mixed with tin to make bronze. Similarly, copper and zinc are mixed to make brass.

Copper is found in Chile, Peru, Mexico, the USA, Canada, Russia, Poland, Congo Democratic Republic, Zambia, Australia, Indonesia and India. Chile is the largest producer of copper. India's contribution in the world production of copper is negligible. Compare the production of copper with that of bauxite (Fig 4.5 and 4.6).

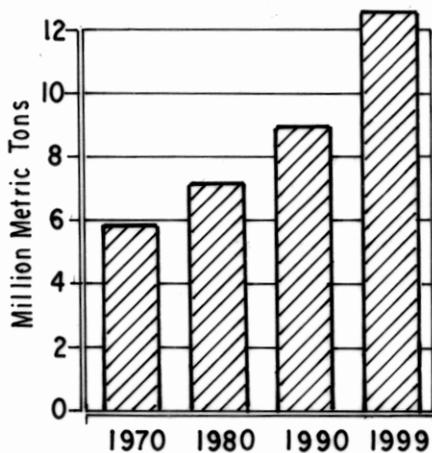


Fig. 4.5 World : Production of Copper

Bauxite

Bauxite is the ore of aluminium. Like iron, it is being used widely in a variety of ways — machine tools, electricals, utensils, aeroplanes, packing and construction. Extraction of aluminium from bauxite requires large amount of electricity. It is, therefore, called an energy intensive industry. Many major dams in the world have been constructed to supply cheap hydro-electricity for smelting aluminium. The Hoover dam on the river Colorado in the USA and the Akosombo dam

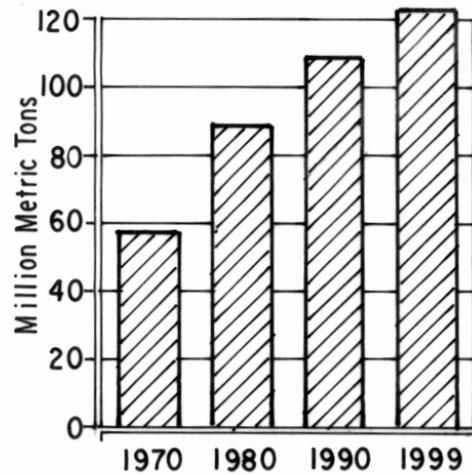


Fig. 4.6 World : Production of Bauxite

in Ghana are such examples. Large deposits of bauxite are found mainly in the tropical regions — Australia, Surinam, Jamaica, Venezuela, Guyana, Malaysia, Indonesia and India. They are also found in China, Yugoslavia, the USA, Greece and Hungary.

Aluminium production is, however, concentrated mainly in the developed countries, where electricity is cheap and abundant. Bauxite, if not available locally, is imported from outside.

Coal

It is one of the most important sources of energy. It formed the basis of industrial revolution, though its importance has declined after the entry of mineral oil and natural gas later on. Still, it is the world's most abundantly used fuel sources.

Coal is found in seams of sedimentary rocks, mostly belonging to the carboniferous period. The quality of coal is judged by the amount of the carbon content. With age, the carbon concentration in the coal seams increases, while the moisture content decreases. Newly formed coal is of the most inferior quality for this reason.

There are three types of coal. Anthracite (more than 90 per cent carbon) is the best quality of coal. It is very hard, shiny, free of impurities, and less smoky, when burnt. It burns well and leaves little ash. This type of

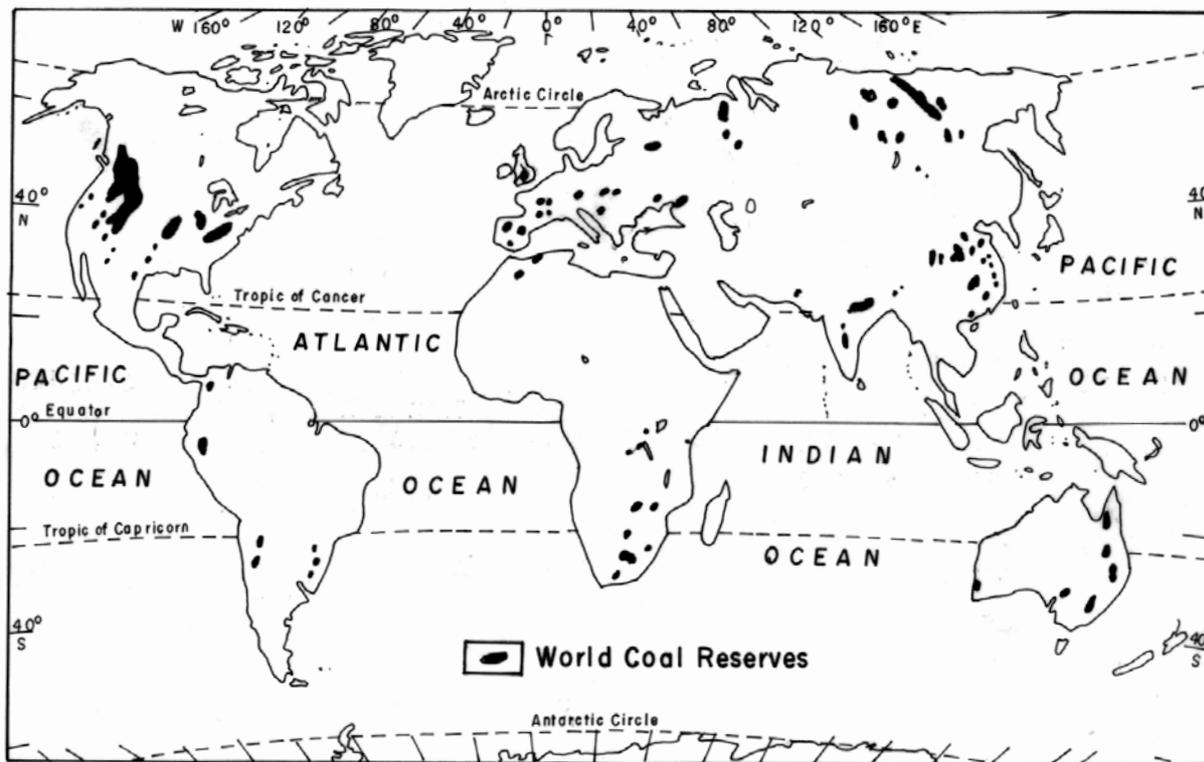


Fig. 4.7 World : Major Coal Reserves

coal has comparatively small reserves. Bituminous coal containing 70-90 per cent of carbon, is black and shiny. When it is burnt, it gives smoke and leaves much ash. It yields bitumen or tar and hence called bituminous. Coal reserves of this type are quite large. Lignite or brown coal contains 45-70 per cent of carbon. It gives out highly smoky flames

because of the presence of more moisture compared to bituminous and anthracite coals. It is, therefore, of the lowest grade.

Coal is found in large quantities in the UK, France, Germany, Belgium, Poland, Ukraine, Kazakhstan, Russia, China, South Africa, India, and Australia (Fig. 4.7).

China and the USA, together contribute about 60 per cent of the total coal production in the world. Coal production has been fluctuating over the years (Fig. 4.8).

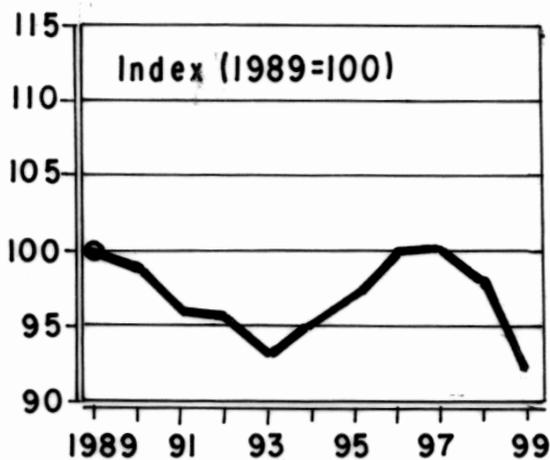


Fig. 4.8 World : Production of Coal

Mineral Oil

Mineral oil is of great economic importance because of its efficiency and versatility. One unit weight of oil gives more energy than the same weight of coal.

Mineral oil is generally, formed in the dome-shape structures of the sedimentary rocks. Invariably natural gas and mineral oil are found together (Fig.4.9 and 4.10). Though sedimentary rocks are widely distributed on the earth, all of them do not contain mineral oil. Only a few regions in the world have very rich mineral oil resources.

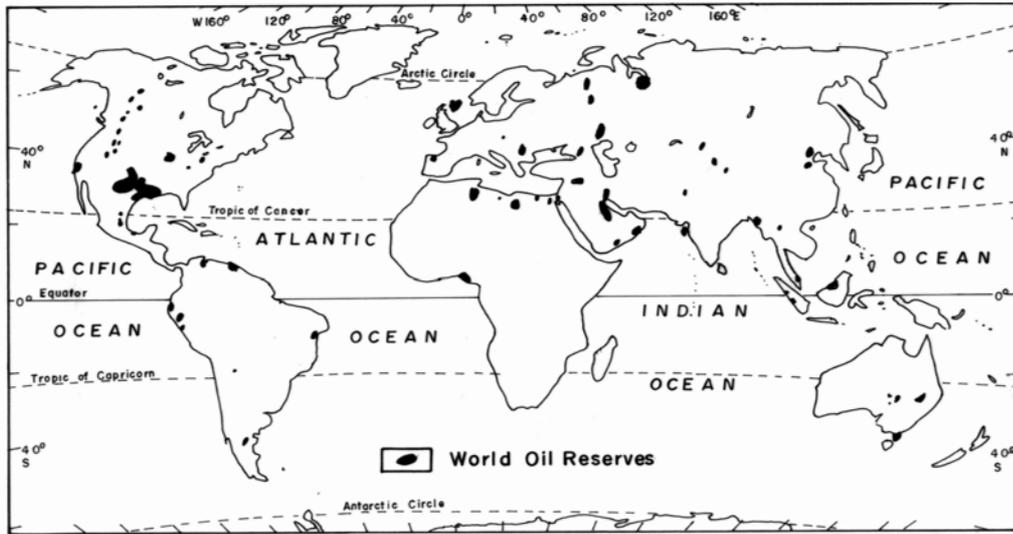


Fig. 4.9 World : Major Mineral Oil Reserves

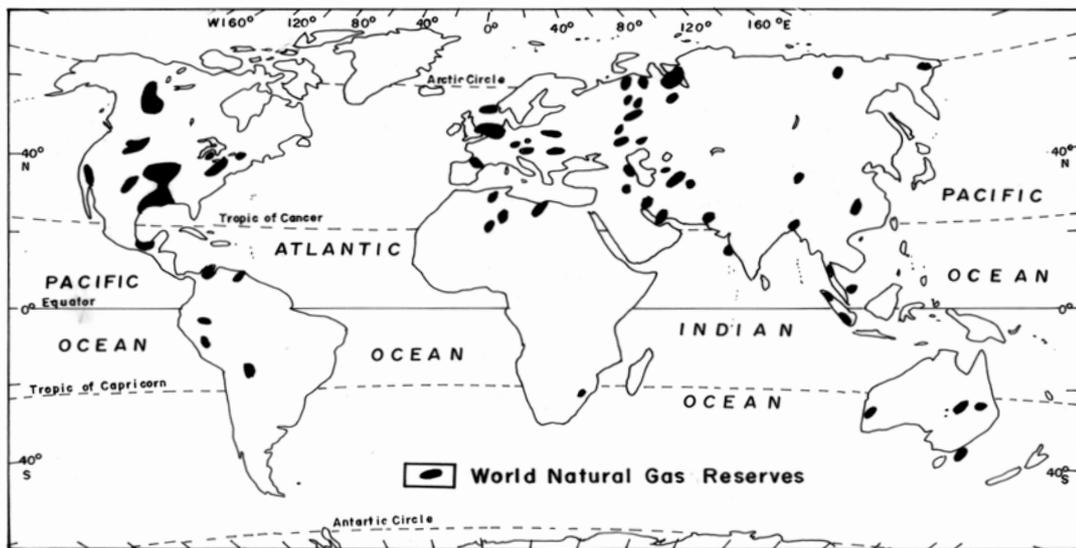


Fig. 4.10 World : Major Natural Gas Reserves

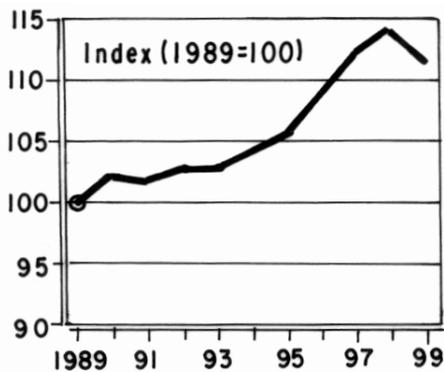


Fig.4.11 World : Production of Mineral Oil

Iraq, Saudi Arabia, Kuwait, Iran, United Arab Emirates, Qatar and Bahrain are the most important oil producing regions of West Asia. The United States of America, Venezuela, Mexico, Russia, Georgia, Armenia, Azerbaijan, the North Sea (shared by the UK, Norway, Denmark, Germany and the Netherlands), China and India have extensive oil reserves. Saudi Arabia is the largest producer of mineral oil, followed by the USA and Russia. There has been a steady rise in the mineral oil production in the world (Fig. 4.11).

Types of Mining

Depending upon the location of mineral ores, mining is of two types: surface and underground. The *surface mining*, which is also known as open cast mining or quarrying, is easier. At present about 90 per cent of all mines and 99 per cent of non-metallic mines are surface mines. The mode of occurrence and the nature of the ore determine the method of extraction. Sedimentary or bedded ores lying close to the surface are called *open cast mines*.

Underground mining, in contrast to the open cast mining, is inherently risky. Poisonous gases, fires, floods and cavings lead to fatal accidents. In this kind of mining, vertical or inclined shafts and horizontal tunnels are made and connected with underground galleries. Rocks are extracted and transported to surface through these passages. It requires specially designed lifts, drills, haulage vehicles and ventilation system for safe and efficient movement of people and materials.

Factors Influencing Mining Activity

The mining activity is influenced by both physical and economic considerations. Mere existence of minerals in the earth is not a sufficient condition for mining activity. The physical characteristics of ore formation — size,

depth and quality, are important factors as they determine the cost of working. Desirable knowledge and technology available for the use of minerals, sufficient demand for the ore, adequate supply of labour and capital to develop the requisite infrastructure as well as the mines are the major economic consideration.

Mineral production is extremely important in the economies of many developing countries. Several countries in Africa and a few in South America and Asia have over 50 per cent of their export earnings from minerals alone.

Mining employs millions of artisan miners across the world. In Latin America, about 1 million artisan miners are engaged in gold mining alone. Mining ‘rushes’ whether involving artisan or corporations quite often cause social conflicts. Much of the mining activity in today’s world is dominated by the Transnational Corporations (TNCs). They serve the global markets through intense exploitation of mining areas, frequently at the cost of environment and local people. The Akosombo dam in Ghana, built in the 1960s to provide hydropower to smelt bauxite for an US company, flooded more than 5 per cent of the country. It displaced 80,000 people to create the largest artificial lake on the earth.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What is foraging?
 - (ii) How did agricultural revolution change the lives of people?
 - (iii) What triggered agricultural revolution?
 - (iv) Name the four broad categories of human activities.
 - (v) What is mining?
 - (vi) Why is iron used most widely?
 - (vii) What are the uses of bauxite?
 - (viii) Which is the largest artificial lake on the earth and why was it built?
 - (ix) What is the basis of judging the quality of coal?
2. Distinguish between:
 - (i) Industrial revolution and information revolution;
 - (ii) Primary activities and secondary activities;
 - (iii) Pastoral nomadism and commercial livestock rearing;
 - (iv) Metallic minerals and non-metallic minerals.

3. Write short notes on the following:
 - (i) Hunting and Gathering;
 - (ii) Factors influencing mining activity.
4. Discuss the positive and negative impacts of industrial revolution.
5. Describe the main features of pastoral nomadism and the areas associated with it.
6. Explain why mining still continues to be an important human activity and what kind of changes it has undergone over the years.

Geographical Skills

7. On an outline map of the World, show the following:
 - (i) area inhabited by the Arctic Inuit, Australian Pintupi, Paliyan of South India and Pygmies of Africa;
 - (ii) two iron ore producing areas — one each in Europe and Asia;
 - (iii) one coal field each in China, Ukraine and the USA.

5

CHAPTER

AGRICULTURE

Among all primary activities, agriculture is the most important. Nearly half of the world population is still dependent on it. In developing countries, the proportion of people dependent on agriculture is over 65 per cent.

About 12,000 years ago, the first farmers selected their crops and animals for domestication from the existing flora and fauna, particular to the world's biomes, and began the cultivation of plants. Different crops and animals were domesticated in different parts of the world, some in more than one place simultaneously.

Despite all the developments since then, humans are still dependent basically on the choices made by people in particular climatic regions thousands of years ago. Only about 20 crops out of several thousands species of wild plants are grown the world over as the major food sources. It is clear from the brief description below that the initial selections were influenced by the climate and the natural vegetation. The distribution of biomes reflects the distribution of solar radiation, temperature and rainfall resulting in the spread of vegetation types from equatorial forest to the tundra of the sub-Arctic and the high

mountains. This broad climatic framework is still the main influence on the pattern of agriculture, though the limits of growing particular crops have now changed under human influence.

With the beginning of agriculture, the nomadic herding gave way to a comparatively settled life. The most primitive form of agriculture is known as *shifting cultivation*, which still persists in some parts of the world. It is mainly practiced in the tropical forests. Trees are cut and burnt to make a clearing in the forests. Using simplest tools, fields are prepared for planting crops. After a few years of crop production, the soils get exhausted. These fields are then left fallow and new clearings are made in the forest. This kind of cultivation is known by different names in different parts of the world e.g. as *Jhuming* in the north-east India, *Chengin* in Philippines, *Roka* in Brazil and *Masole* in Democratic Republic of the Congo. Though, shifting cultivation is also migratory in nature, it allowed people to stay in a place for a longer duration.

Subsequently, *sedentary agricultural systems* with permanent fields and villages emerged in areas of favourable climate and

Although plants and animals were domesticated at a number of places on the earth's surface, few areas are particularly important:

- South-west Asia and the Eastern Mediterranean Region: Wheat, barley, lentils, peas, figs, olives, dates, garlic, almond; cattle, sheep and goats.
- South-east Asia: Mango, vegetable culture i.e. cutting and planting parts of the growing plant such as yam, sago and bananas; pig, chicken and duck.
- China: Rice, millet, soyabeans, tea, onion, spinach and the mulberry; pig, chicken, duck.
- India: Rice, gram, brinjal, pepper, lemon, jute and indigo; cattle, buffalo, chicken.
- Africa: Yam, oil palm, coffee, sorghum.
- Americas: Maize, and beans in Central America, cassava and cocoa in the Amazon basin and potatoes in the Andes; Llama .

fertile soils. Great civilisations were built on the foundation of sedentary agriculture in the fertile river valleys – the Euphrates, the Tigris, the Nile, the Indus, the Huang He and the Chang Jiang, about 6,000 years ago. Gradually, the sedentary system of agriculture spread over most parts of the world.

The industrial revolution, which took place in the eighteenth century in Europe, influenced Asia, Africa and Latin America indirectly. It boosted agricultural production in Europe and changed the cropping pattern in the Asian, African and Latin American colonies. These colonies specialised in the production of crops such as cotton, sugarcane, rice, tea, coffee and rubber, which were processed in the European factories. As demands for these crops grew in Europe, the large-scale commercial farming of some of these crops, commonly known as *plantation agriculture*, was started. Large estates of monocrop were established. They were managed scientifically with the sole objective of export or trading for earning money.

One of the effects of colonisation was worldwide diffusion and exchange of several species of plants and animals. For example, potatoes, a native of the Andes, flourished in the cool damp environment of the northern Europe and soon became a world crop. Similarly, corn (maize) spread across the world to become the third most widely grown grain after rice and wheat.

The industrial revolution in Europe provided more efficient and more specialised agricultural implements such as plough, reaper, threshing machines, harvesters, tractors and milking machines. They changed the character, scale and geography of agricultural production. In North America, mechanisation enabled farmers to expand and specialise in the production of commodities that could be sold for the maximum profit. Thus *specialised commercial agricultural systems* emerged there, which gave rise to distinct crop regions—wheat belt, cotton belt, corn belt, dairy farming and truck farming (fruits and vegetables) regions. In other parts of the world also, similar technological revolutions brought power driven machines. In addition, adoption

of hybrid seeds, chemical fertilisers and pesticides increased the yield of crops dramatically in many areas, though at varying rates.

Plant dispersal and industrialisation of agriculture improved agricultural production profoundly. Large number of people were freed to pursue other economic activities because high yields could be achieved with less number of people and using scientific and technological innovations. The industrialised countries of the world, therefore, witnessed a perceptible shift of population from primary activities to secondary and tertiary activities in a sequential manner viewed as a sign of economic development, though in developing countries employment structure has moved directly from primary to tertiary sectors.

CROP DISTRIBUTION : A GLOBAL PATTERN

Physical environment, which includes climate, soil and relief, imposes certain broad limits within which particular crops may be successfully cultivated (Fig. 5.1) or certain types of livestock profitably reared. Besides, socio-economic institutions are also important factors in crop production.

Climate

Temperature and rainfall are the two most important climatic factors in limiting the areas for the growth of a particular crop.

Temperature

It is an important determinant of the distribution of crops because suitable temperature conditions are essential for the successful germination of seeds and plant growth. On the basis of the temperature requirements, crops may be divided into two categories : crops adapted to the high temperature conditions of the tropics, and those adapted to the lower temperature conditions of the sub-tropical and temperate areas.

Tropical crops, adapted to high temperature conditions (31°C - 37°C) may be damaged, if temperature falls below 0°C and

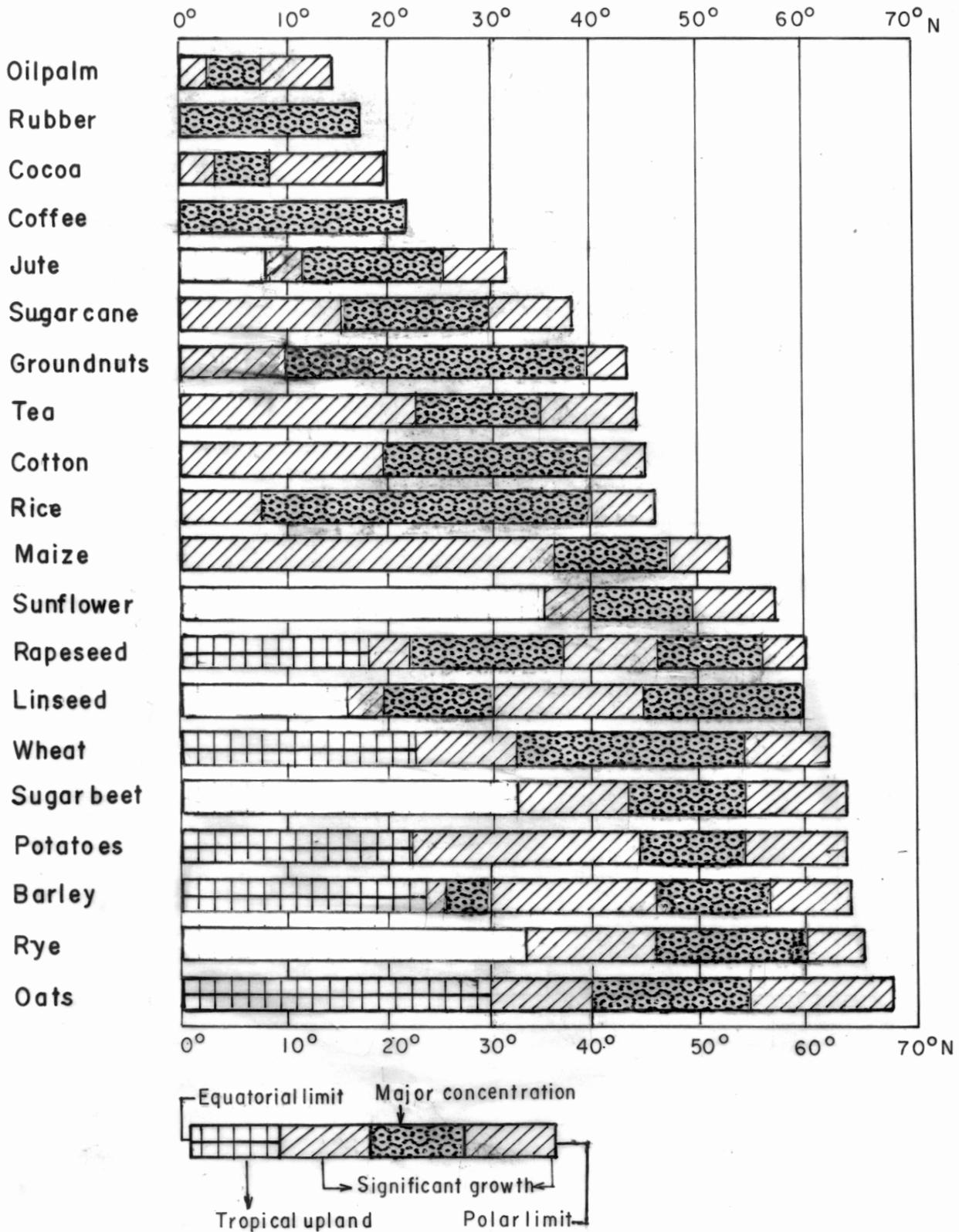


Fig. 5.1 Latitudinal Spread of Major Crops

Source : Lydolph, P.E., 1985, *The climate of the Earth*, Rowman and Littlefield.

frosts occur. A few of them are so susceptible to cold that they will die at a temperature below 10°C. However, some of the temperate crops can be grown in the tropics at higher altitudes such as apples, wheat and oats.

Crops grown in the sub-tropics and the temperate regions are adapted to lower temperature. The *growing season* (between the last frost in winter and the first frost in autumn) is very crucial for the growth of plants in these regions. As one moves towards the poles, this period gets smaller. As such, the number of crops that can be grown polewards, also declines. North of the Arctic Circle only rye and oats have some significance.

Similarly, many crops also have limits towards the equator. Some of them need a cold period to trigger growth and cannot withstand high rainfall. They are also susceptible to diseases found in the tropics. There are a few crops e.g. flax and olives that are grown in a very narrow zone due to such climatic limitations. Despite varying temperature requirements, most of the crops need 5°C -7°C temperature during seed germination.

Rainfall

It provides moisture to the soil that is essential for crop growth. Every plant has a root system with an enormous total surface area to draw water from the soil. Water-need of plants varies. While wheat requires about 1,500 kg of water to produce 1 kg of wheat, for the same amount of rice, 10,000 kg of water is required.

In the absence of sufficient amount of water, the plants cannot grow. It, however, does not mean that crop yields will increase proportionally with increasing amount of water supply. In contrast, if the supply of water is more than the plant's requirement, there will be decline in the crop yield. There is an optimum amount of water for every crop and this requirement varies significantly from one crop to the other. Rubber and tea, for example, need over 150 cm of annual rainfall. Wheat, on the other hand, can be grown in regions having the annual rainfall between 25 and 100 cm. Since more than 50 per cent of the land surface on the earth receives the annual rainfall

between 25 cm and 100 cm, wheat is the most widely grown crop. About 10 per cent of the land has more than 178 cm of annual rainfall and only 5 per cent of the land receives over 254 cm. As such tea and rubber, have a much more restricted distribution.

The deficiency in the rainfall can be overcome with the help of irrigation either from groundwater or from rivers and tanks. The amount of water available in the soil for the crop also depends on the rate of evaporation, which increases with temperature. Hence, crops in the tropics need higher rainfall than in the temperate zone.

Soil

Soil is the essential material upon which all agriculture is based. Soil characteristics are largely the product of the climate. In addition to temperature and rainfall, plants need nutrients, which are mostly obtained from the soil. We have already read about the soil formation process in earlier classes. As we know, interaction and mixing of weathered rock with organic (plant and animal) matter along with groundwater produce the soil in which the plants grow. They contain minerals, which are essential for plant growth. The soil forming process makes the original elements of the rock more mobile so that plants could use them as nutrients.

There are six major nutrient elements. They are: nitrogen, phosphorus, potassium, calcium, magnesium and sulphur. Besides, iron and small quantities of trace elements such as boron and iodine are also required by plants. The capacity to provide nutrients varies greatly among different soils depending on the composition of the original rocks and the climatic factors — temperature and rainfall of the region. In tropical regions, the nutrients are easily leached out because of high rainfall. In temperate regions, the soils have more nutrients. Desert soils have high concentration of nutrients but the lack of water makes them immobile and unavailable.

The nutrients are replaced in the soil naturally through decomposition of plant and

animal organisms. It is a slow process. Hence, for faster nutrient replacement, chemical fertilisers, mainly nitrogen, phosphorus, and potassium are added to the soil.

Loamy soils are generally, considered ideal for agriculture because of their richness in plant nutrients, good drainage and ease in working. Heavier clay soils with adequate drainage are more suitable to certain crops. Sandy soils are usually infertile, although they may be used for cultivation after heavy application of fertiliser.

Relief

Three elements of relief — altitude, orientation of slope to sunlight and gradient, influence the pattern of agricultural activities. In middle latitudes, high altitudes restrict the number and types of crops that may be grown. In the tropics, on the other hand, increased altitude provide some relief from the excessively high temperature and humidity of the lowland plains.

On a local scale, orientation of the slope is an important element of relief. In the northern hemisphere, south-facing slopes receive more intensive sunshine for a longer period than their north-facing counterparts. The gradient of slopes affects the type of agriculture as well as methods of cultivation. Steep gradient restricts the use of heavy machineries. Besides, the risk of soil erosion is also greater here.

Socio-Economic Institutions

While factors of physical environment impose basic limits upon agricultural production,

they alone will not adequately explain patterns of agricultural land use. The scale, intensity and extent of production within physical limits is determined by *social and economic conditions* such as farm size, type of tenure (freehold ownership, various forms of tenancy and state ownership), consumer demand, transport and marketing facilities, the availability of capital, and government subsidies and support policies. The physical limits of production are relatively stable and can be extended only within narrow limits. But the economic margin of production fluctuates according to demand. Hence, within any particular environment many choices and options are normally open to the farmer. The actual farming pattern is determined by the farmer’s evaluation of the possibilities offered by the physical environment as well as various social and economic factors.

AGRICULTURAL LAND USE

The land under cultivation in the world is rather limited. Constraints of climate, slope, soil and pests continue to limit the arable land use to a comparatively small percentage of all land uses (Fig 5.2). Much larger areas are useable as pasture and forests.

If we compare the three major land uses at the global scale during last three centuries (Table 5.1), it would be evident how humans have increased croplands by encroaching on forests and grasslands.

Presently, 32 per cent of the total land area of the world is under forests, 26 per cent under pasture, 1 per cent under permanent crops,

Table 5.1 : Global Land Use Changes (Area in Million Hectares)

<i>Broad Land Uses</i>	1700	1850	1920	1950	1980	2000*
Forests	6214	5965	5678	5389	5053	3454
Grasslands	6860	6837	6748	6780	6788	3427
Croplands	265	537	913	1170	1501	1512

Source: Richards, J. F. 1990: Land Transformation. In Turner, B.L. et.al (eds). *The Earth Transformed by Human Action*, Cambridge, Cambridge University Press.

*UN

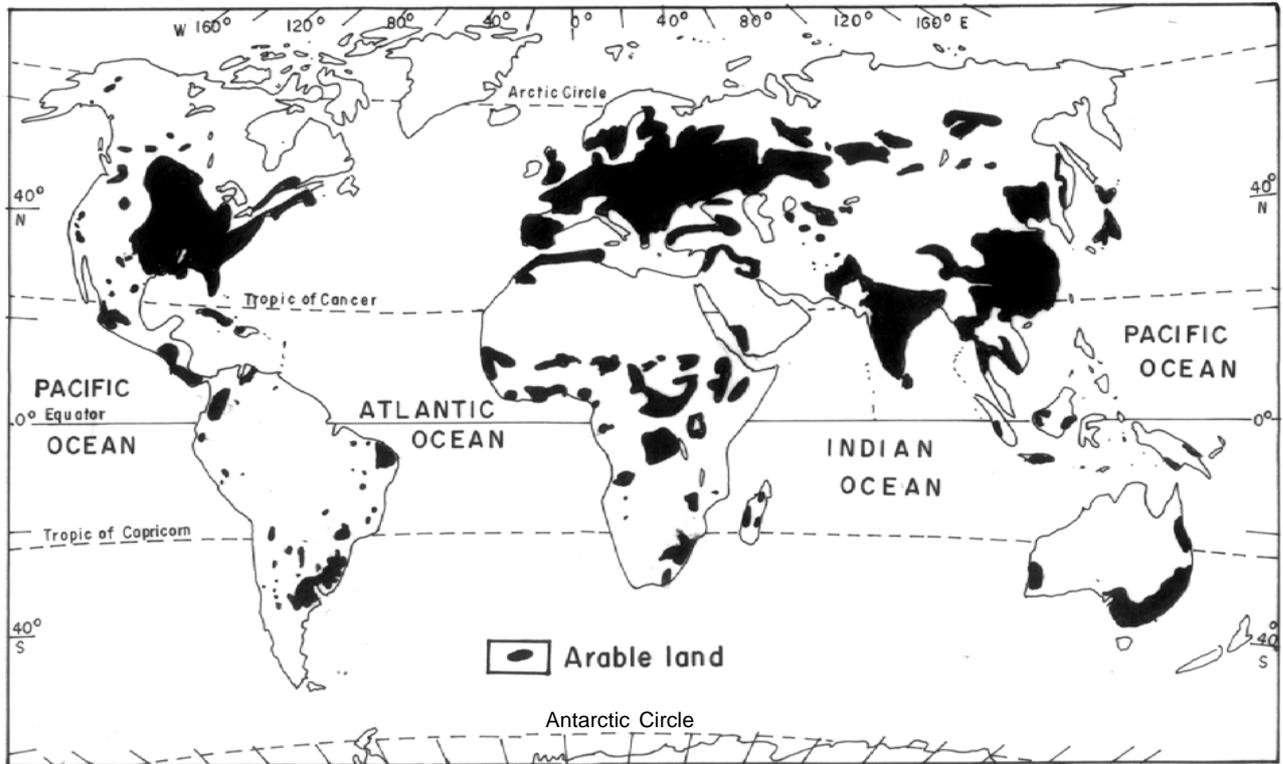


Fig 5.2 World : Distribution of Arable Land

10 per cent is arable and 31 per cent is under other uses.

Crops are generally, categorised on the bases of their various uses such as cereals, pulses, oilseeds, fibres and beverages. The other way is to group them under food crops and non-food crops. Few crops have been selected for a detailed study keeping in view their importance and area under their cultivation. In our discussion we will be covering mainly food crops – their distribution pattern, production and sustainability (Table 5.2).

FOOD CROPS

Food for the world's population is obtained almost entirely from plants. Of the immense varieties of plants, only a few were domesticated thousands of years ago and they still continue to be the major food sources. These species have three common characteristics: high production per unit of land; high food value; and storage ability.

It is interesting to note that the world's food supply is dominated by five crops. Of these, three are cereal grains : wheat, rice and maize (corn), and the other two : potatoes and cassava, are tubers. All of them share the above mentioned qualities. In combination they provide the staple food to nearly all the humans on the earth (Table 5.2).

The production characteristics of these staple crops as given in Table 5.2 reveals differences in the areas under each crop as well as in the average yield in developed and developing countries.

The difference in the area of the five major food crops is mainly because of the climatic requirements of the crop, which limit their cultivation. The developing countries in comparison to the developed countries have higher per hectare yield due to their relative access to agricultural technology such as the

Table 5.2 : Staple Food Crops — Production Characteristics (1999)

<i>Crop</i>	<i>Area Harvested (Million Ha)</i>	<i>Annual Production (Million Metric Tons)</i>	<i>World Average Yield (Tons /Ha)</i>	<i>Average Yield in Developing Countries (Tons/ Ha)</i>	<i>Average Yield in Developed Countries (Tons /Ha)</i>
Wheat	215.27	583.6	2.71	2.70	2.72
Rice	155.13	596.5	3.85	3.78	6.19
Maize	139.21	600.4	4.31	2.93	7.08
Potatoes	17.99	294.3	16.36	16.09	16.57
Cassava	16.58	168.1	10.10	10.01	n.a.
All cereal grains	679.88	2064.2	3.04	2.76	3.55

Source : *FAO Statistics*, United Nations, Food and Agricultural Organisation, Statistics Division, 2000.

range of pesticides, fertilisers, hybrids and machineries.

Rice

It is suggested that rice originated in the foothills of the eastern Himalayas in north-east India, Indo-China and south-west China perhaps on the basis of the large concentration of several perennial species. Based on the archaeological evidences, the earliest date of rice cultivation is supposed to be 7,000 years ago in the Chang-Jiang delta. Its cultivation spread to the remaining southern and eastern Asia over the next 6,000 years. While its cultivation was originally carried out in swamps, it spread to new areas, which meant its adaptation to a wide range of environmental conditions — temperature, day-length, rainfall and different soil types. As a result, the range of rice varieties is very broad, varying from the less humid upland conditions to the varieties of 'floating' rice, which can be grown in water upto 5 metres deep. There are more than 65,000 local varieties of rice grown the world over.

Rice is mainly the crop of the monsoon Asia, having hot and humid climate (Fig 5.3). Traditionally, rice was grown in the well-watered river valleys and deltas. However, with the help of irrigation it is now grown even on

uplands and dry areas. The rice-plant (paddy) requires high temperature (27°-30°C) and high rainfall (about 100 cm) during its growth period. In fact, in the initial stages, the plant needs more of stagnant water. Hence, the paddy fields are flooded with 10-25 cm of water. On hill slopes, rice is grown in terraced fields. Claye loam soil is best suited for its cultivation because it can retain water.

Rice is a labour intensive crop. Most of the farming operations are done manually — uprooting the seedlings from nurseries transplanting them in the flooded fields, removing weeds from time to time and harvesting.

The nutritional value of rice is good especially when the outer layer containing important vitamins is not removed in the processing. Ninety per cent of the worlds' rice is grown in East and South Asia. It is the principal food crop for half the population of the world.

Wheat

It is mainly a crop of the temperate region. But it is now the most widely grown of all the cereal grains because of its adaptability. There is hardly any country which does not grow some amount of wheat. With fair amounts of protein as well as carbohydrates, it is one of the most

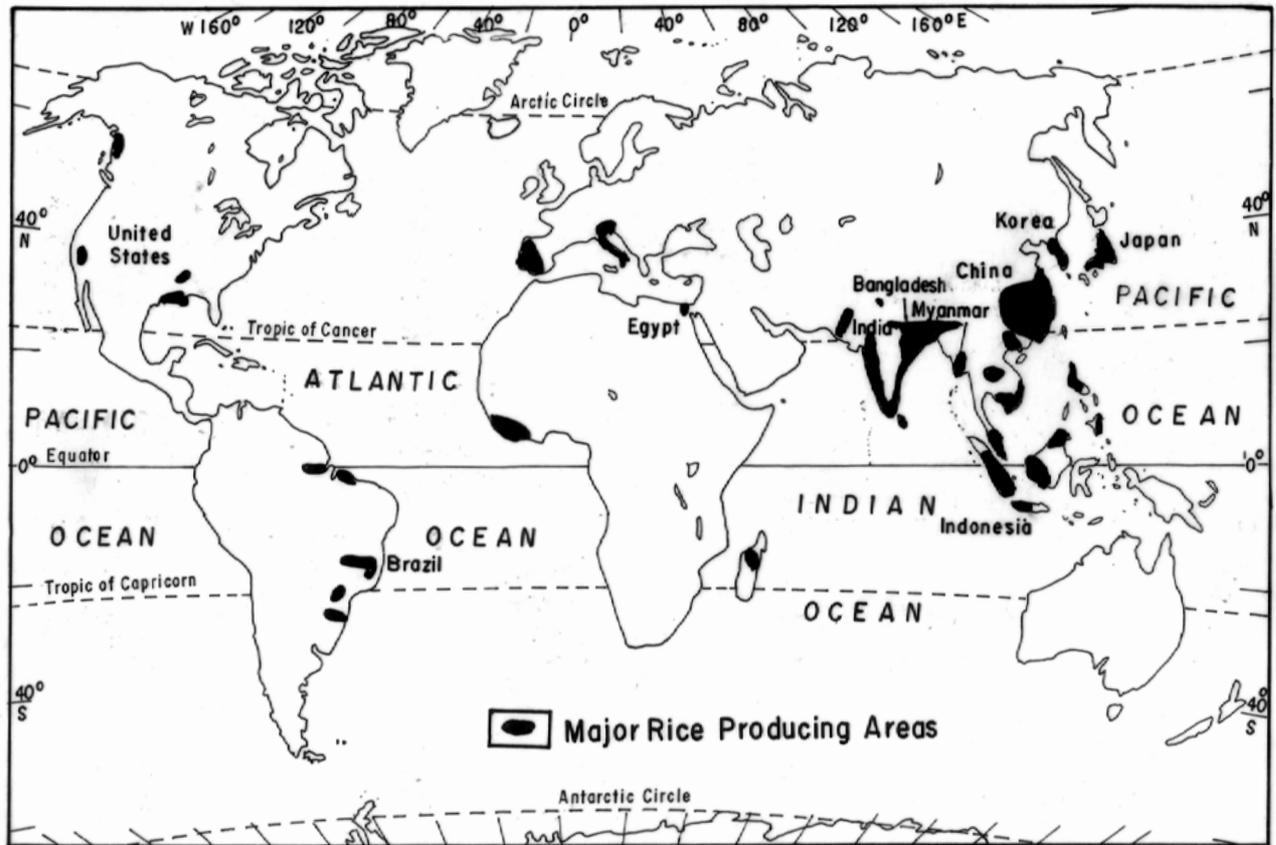


Fig.5.3 World : Major Rice Producing Areas

nutritious grains. It is the staple diet of people in a large part of the world. Although wheat is hardy, it does not grow well under conditions of high temperature and humidity. At the time of germination, it requires cool weather and sufficient moisture in the soil. The annual rainfall should be between 40-75 cm. An average temperature of 16°C and clear sky are required at the time of ripening. Loam and chernozem soils are best suited for wheat cultivation.

On the basis of the climate, there are two types of wheat : winter wheat and spring wheat.

Regions with mild winters grow winter wheat, whereas those with severe winter grow spring wheat. Wheat is also divided into two types on the basis of its quality i.e. soft and hard wheat. They are grown in humid and dry regions respectively.

Although yields are highest in the humid mid-latitudes, the major wheat belts are in the

drier semi-arid climates (Fig 5.4). The areas of greatest production are the Great Plains of the United States, and Canada, the Steppe region of the Commonwealth of Independent States (CIS) and the North China Plain. Wheat is cultivated under intensive as well as extensive farming. Large-scale commercial production also occurs in Australia and on the Pampas of South America. Wheat is grown in almost every country of Europe but most of it is consumed locally. France is the largest producer and the only exporter of wheat among these countries.

Maize (Corn)

It is another new world crop that has spread over the world from its origin in Central America to all over the world. It is a fairly high-yielding crop. It grows best where summers are warm and humid. Its nutritional value is less than

Table 5.3 : Major Areas of Rice, Wheat, Maize and Potato Production

Rice	Area %	Wheat	Area %	Maize	Area %	Potato	Area %
Asia	91	Asia	38	N. America	48	Europe	31
Africa	3	Europe	24	Asia	25	Asia	26
S. America	3	N. America	17	S. America	11	South America	4
N. America	1.5	CIS	16	Europe	10	CIS	27
Europe	<1	S. America	2	Africa	5	North America	9
Oceania	<1	Oceania	2	CIS	1	Africa	3
		Africa	1	Oceania	<1		

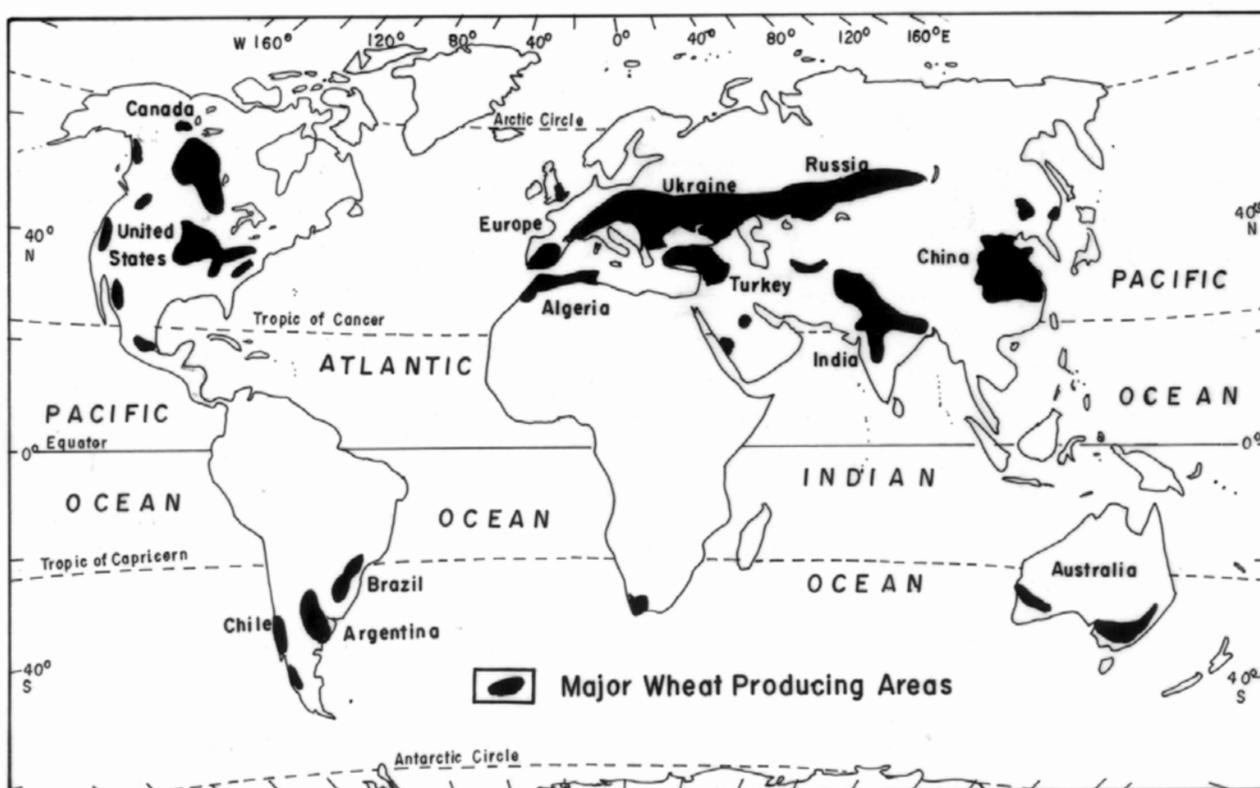


Fig. 5.4 World : Major Wheat Producing Areas

wheat and rice as it does not contain as much protein. It is an important food crop in Central America, South America, Africa and to a lesser degree in India and China (Fig 5.5). About half of the world’s maize is grown in the United States, but 80 per cent of it is used for animal feed and corn oil and not for direct human consumption.

Potatoes

It is an important food crop that grows best in a mild and humid climate. It is now grown throughout the humid mid-latitudes. Eastern

European countries and the CIS produce more than 50 per cent of the world’s crop. United States, Peru , China, India and Japan are the other major producers.

Cassava

It is strictly a crop of the tropical region, which originated in South America. Compared to the other four food crops, it is deficient in protein and minerals. However, there are several compensating advantages. It grows under a variety of tropical conditions where other crops cannot be grown. Besides, it is relatively

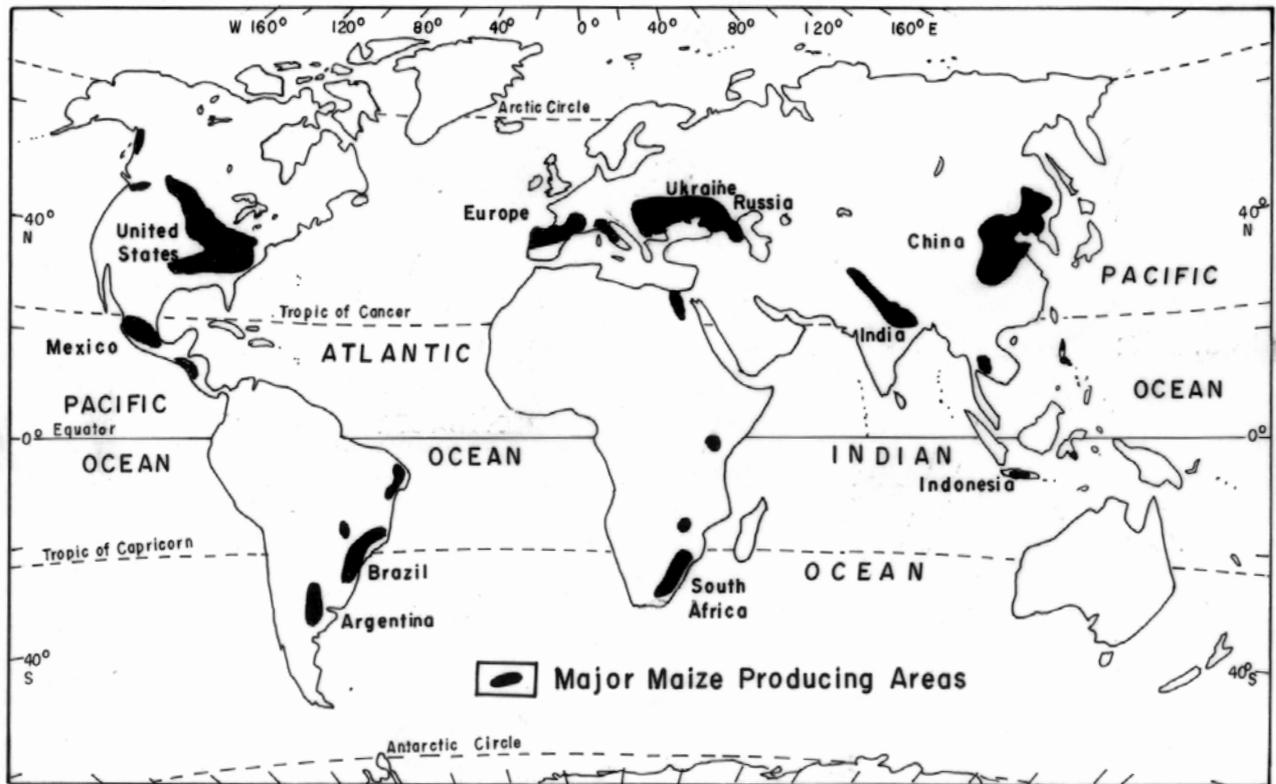


Fig. 5.5 World : Major Maize Producing Areas

immune to most of the pests that affect food crops. Ripe tubers can be left in the ground for long periods without any deterioration. It is an extremely advantageous attribute in a tropical region.

Dry tubers are pounded to make flour. For these reasons, it is a staple crop for a large number of people in Southeast Asia, Central Africa and tropical South America.

In addition to the above mentioned five major staple food crops, there are many other food crops such as cereals (barley, rye), pulses, oil seeds, sugarcane and sugar beet, beverages (tea and coffee), vegetables and fruits, which come under this category. Pulses include lentils, black gram, peas, soybeans and several other kinds of beans.

Most of these crops are of local and regional importance only. Oil seeds refer to a wide variety of seeds, which are the sources of the edible oil e.g. sesame, mustard, rape seed, groundnut, coconut, sun-flower, olives and

maize. Like pulses, there is a great regional variation in oil seeds grown in different parts of the world.

Sugarcane

It is a tropical crop, which is an important source of sugar. In temperate countries, however, sugar beet is the main source of sugar.

Sugarcane requires hot and humid climate. Temperature ranging between 20°C and 27°C and a rainfall between 75-120 cm are ideal. At the time of ripening, a low temperature, but not falling below 20°C, and dry weather enhance the sucrose content of the crop. Once cultivated, crop can give yield for at least three years.

Deep soil with high moisture retention capacity is most suited. Loam, clay, alluvial and black soils are good for sugarcane cultivation. Compost manures and chemical fertilisers are necessary for maintaining soil fertility.

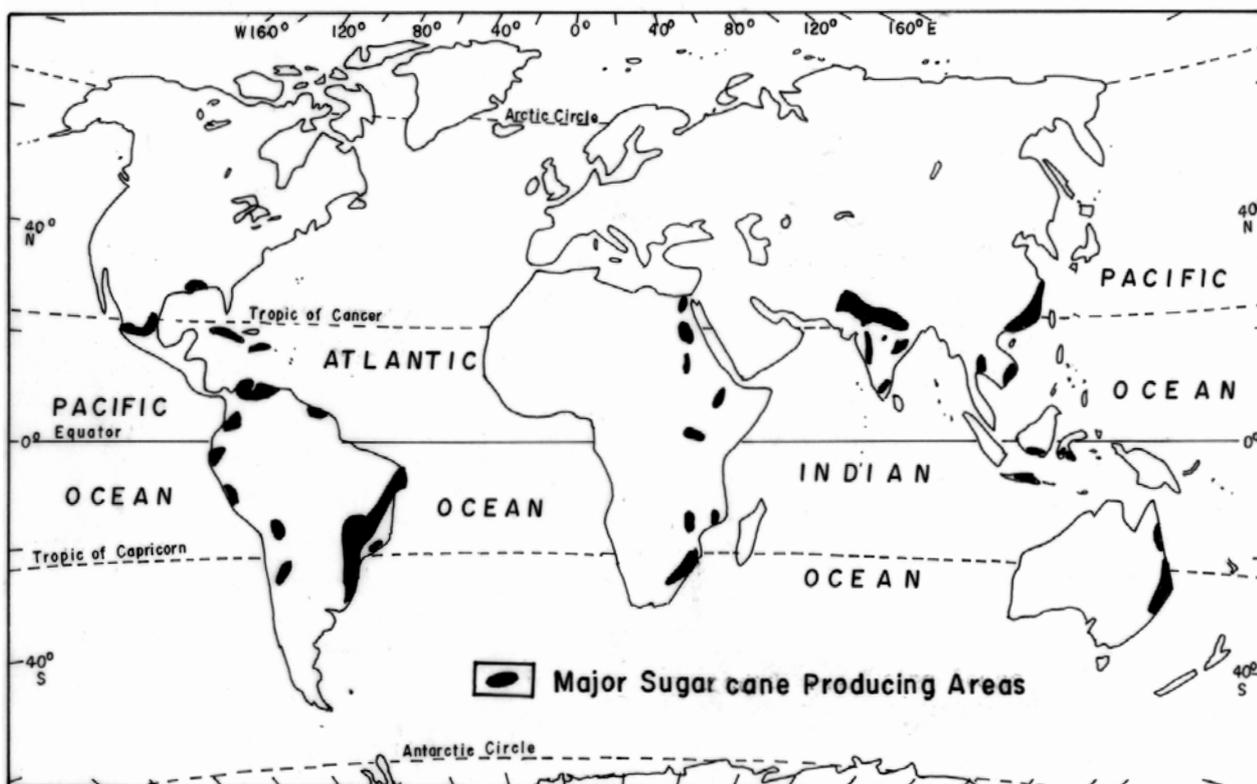


Fig. 5.6 World : Major Sugarcane Producing Areas

Brazil, Cuba, Mexico, India, Pakistan, China, Thailand, Indonesia and Australia are main producers of sugarcane (Fig 5.6).

Tea

It is a very popular beverage obtained from the tender leaves of an evergreen bush. It requires warm and humid climate but water should not stagnate near the roots. It is, therefore, grown mainly in a region between 27° south and 43° north latitudes on hill slopes, where annual rainfall is between 125 and 750 cm. Tea plants need fertile soils with high humus.

Tea is a plantation crop. It is grown in large tea — estates. Tea plant is not allowed to grow beyond a height of 40-50 cm. The total life span of a tea plant is about 40-50 years. Application of nitrogen fertilisers is essential to maintain soil fertility. Tea leaves are picked up by hand. As such availability of cheap labour is an essential factor.

India, China, Sri Lanka, Bangladesh, Japan, Indonesia, Argentina and Kenya are the main tea producing countries (Fig 5.7).

Coffee

It is also a plantation crop, which grows in the tropical highlands at an altitude between 500 and 1,500 metres above the sea level. Coffee plant cannot tolerate frost. It is, therefore, grown under shady trees. It requires high humidity and hence, grows well in the areas having rainfall between 160 and 250 cm. It is, generally grown in deep, porous and water retentive soil with high humus content.

Brazil, Colombia, Venezuela, Guatemala, Haiti, Jamaica, Ethiopia and Indonesia are major producers. In India, coffee is grown mainly in Karnataka (Fig 5.8).

NON-FOOD CROPS

Fibre crops such as cotton and jute, rubber and tobacco are the major non-food crops. Cotton and jute are the crops of the tropical region. However, the climatic conditions i.e., temperature and rainfall, for their growth are totally different. Rubber tree is found widely in the Amazon and Congo basins. Its

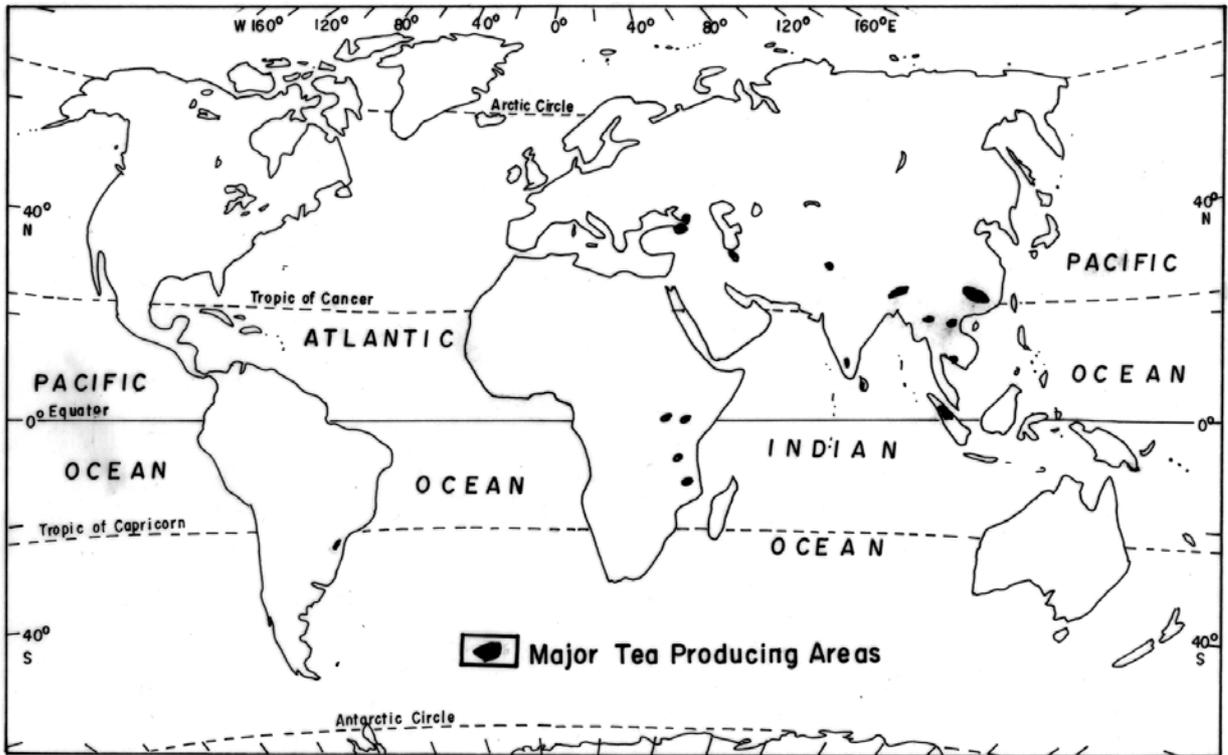


Fig. 5.7 World : Major Tea Producing Areas

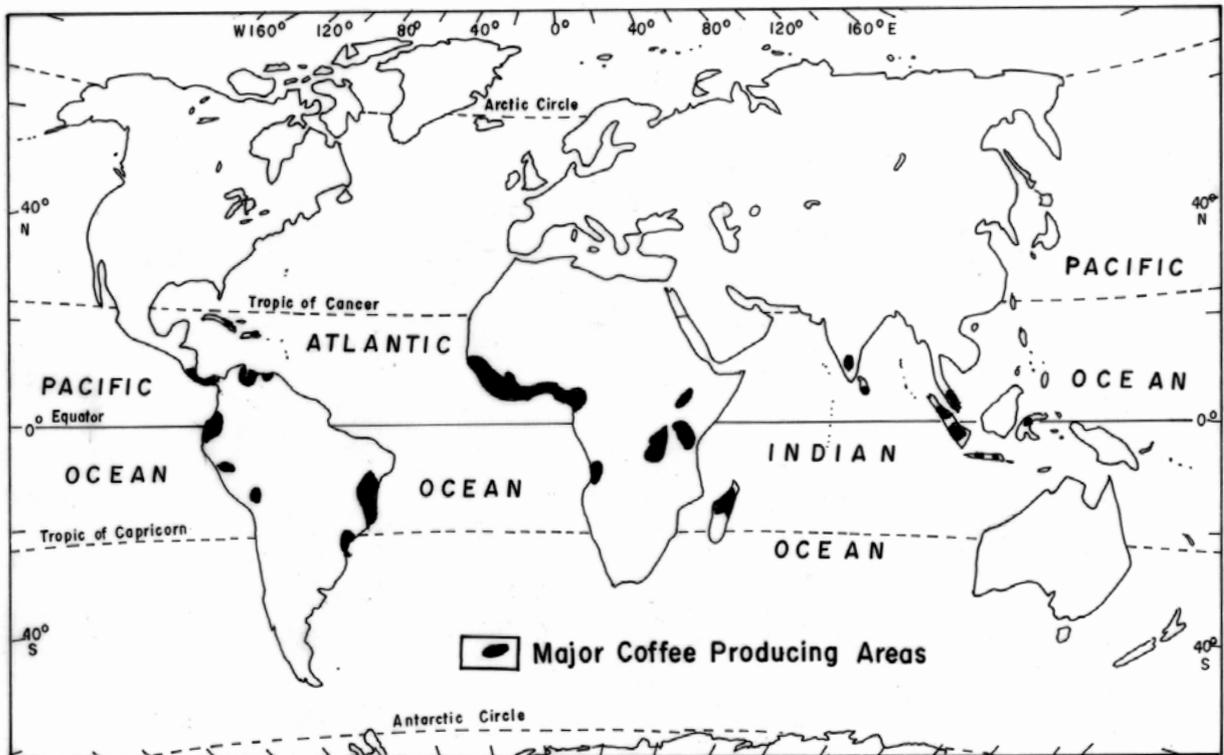


Fig. 5.8 World : Major Coffee Producing Areas

plantations in South-east Asia, India, China, Sri Lanka and Kenya have also been successful.

Cotton

It is one of the most important fibre crops. The quality of cotton is judged on the basis of the length of its staples. The best quality of cotton has a long staple, more than 5 cm. This variety of cotton is grown on the south-eastern coast of the USA and in the West Indies. The medium variety of cotton having a staple length between 3.75 to 5 cm is produced in the Nile Basin, the USA and Central Asian Republics of Tajikistan, Kazakhstan, Turkmenistan and Uzbekistan, and the USA. The small stapled cotton having a length of less than 2.5 cm is grown in India and Brazil.

Cotton is a tropical crop. It can tolerate high temperature, but ideally it should be between 21°C and 27°C during its growth-period. Its plant cannot tolerate temperature below 21°C and frost. A rainfall of 50 cm is enough, but it should be distributed evenly during its growth

period. Cloudless sky at the time of the ripening of the cotton balls is essential. A well-drained soil is suitable for its cultivation. Volcanic, black and alluvial soils are good for it.

In addition to the countries mentioned earlier, cotton is grown in China, Pakistan, Sudan and Turkey (Fig 5.9).

Agricultural Regions

One of the earliest but one of the most satisfactory classifications was proposed by D.Whittlesey in 1936. He employed five criteria to classify agricultural regions of the world: crop and livestock combination; intensity of land use; processing and marketing of farm produce; degree of mechanisation; and types and associations of buildings and other structures associated with agriculture. In this scheme, 13 main types of agricultural regions were identified as follows:

- (i) Nomadic herding;
- (ii) Livestock ranching;
- (iii) Shifting cultivation;
- (iv) Rudimental sedentary tillage;

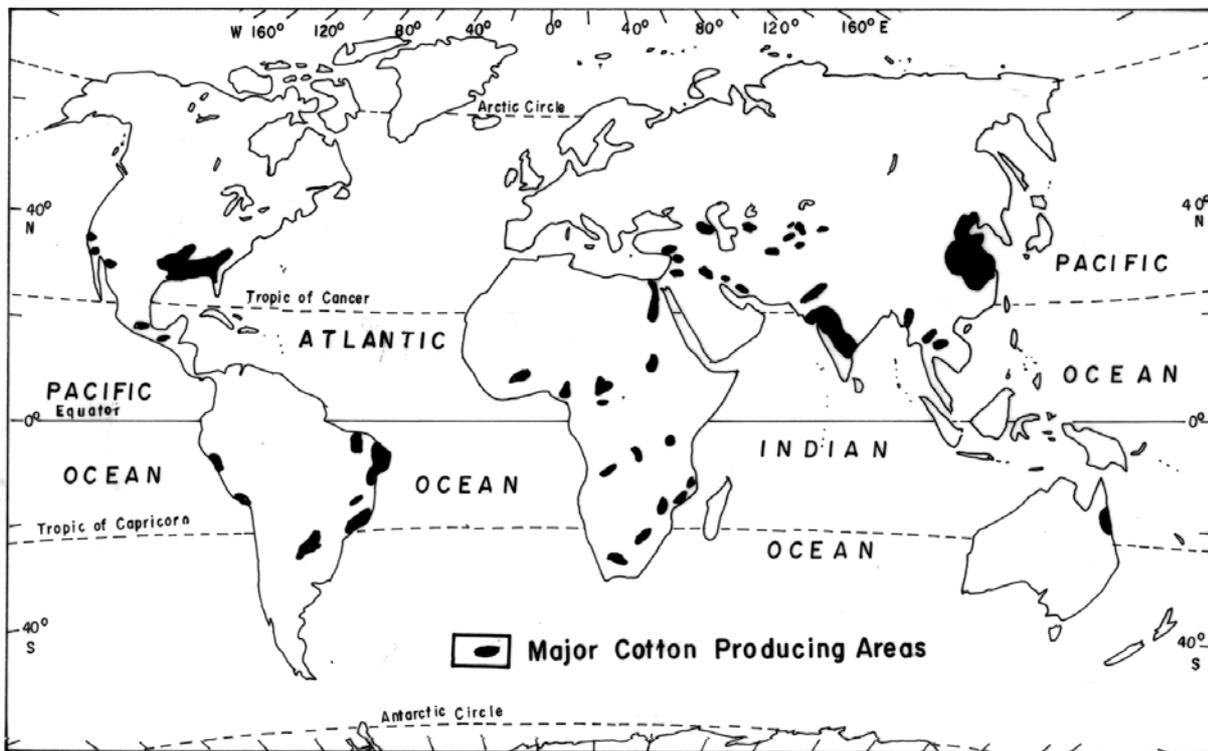


Fig. 5.9 World : Major Cotton Producing Areas

- (v) Intensive subsistence, rice dominant;
- (vi) Intensive subsistence, without rice;
- (vii) Commercial plantation;
- (viii) Mediterranean agriculture;
- (ix) Commercial grain farming;
- (x) Commercial livestock and crop farming;
- (xi) Subsistence crop and livestock farming;
- (xii) Commercial dairy farming; and
- (xiii) Specialised horticulture.

The above mentioned regions have been simplified in Fig 5.10.

Assessment of the factors selected for the above classification seems to be subjective rather than quantitative. In spite of this, Whittlesey's classification provides the foundation for latter attempts in this direction.

On the basis of the main characteristics of the farming practices and the production characteristics, agricultural systems of the world can be broadly grouped into subsistence agriculture and commercial agriculture, though the distinction between the two, at times is quite blurred.

Subsistence Agriculture

It is the most widespread form of agricultural production. It is a way of life for almost half of the world's population i.e. some 2.9 billion people. In most of the developing countries, food production is so important that a majority of the people in the work force are subsistence farmers. The sole objective of the farmer is to sustain her/his family. Typically, the production units (farms, fields or livestock

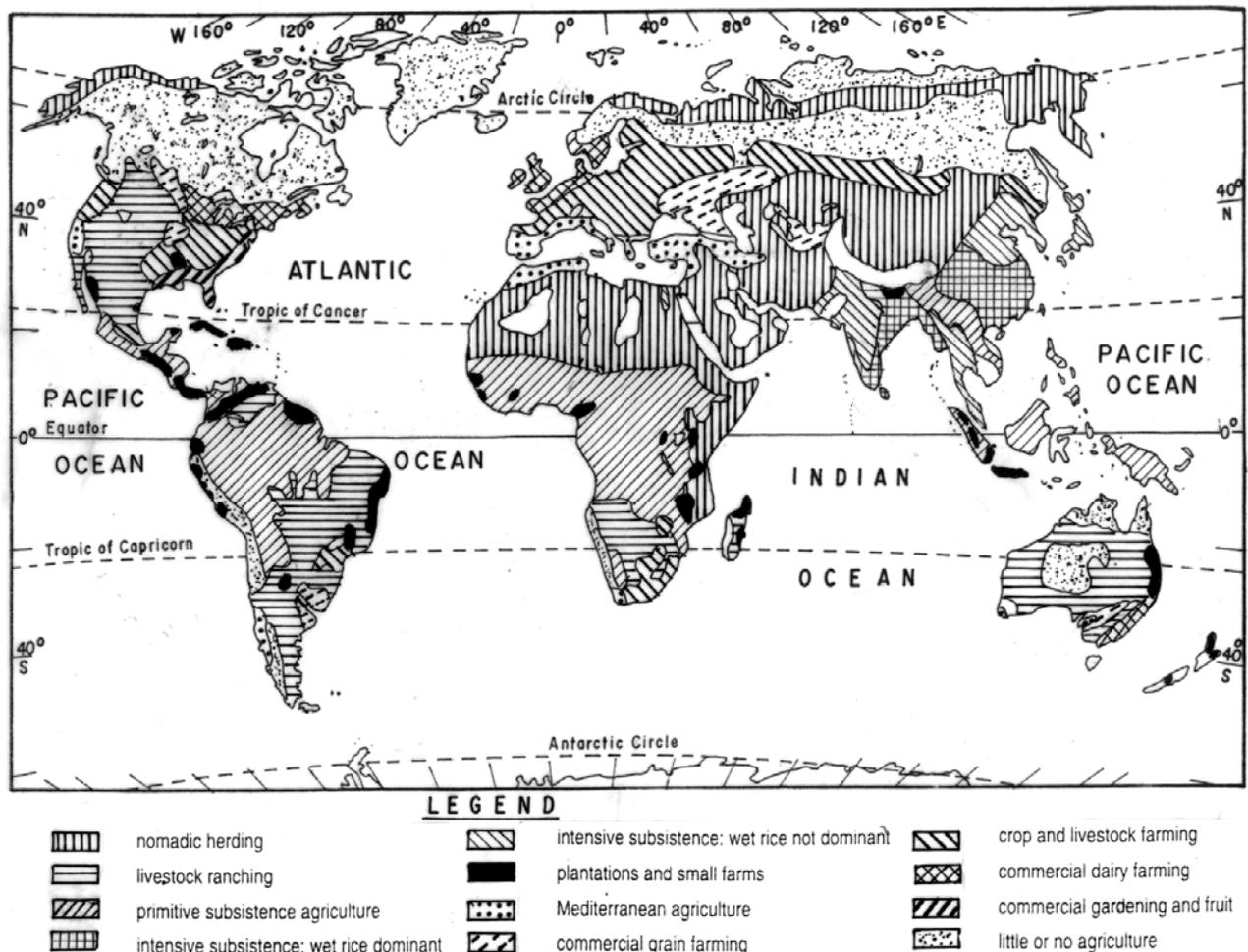


Fig. 5.10 World : Major Agricultural Regions

herds) are small and relatively self sufficient, so that in good years basic needs of the family are met leaving a small surplus for storage or trade. Three traditional subsistence systems are : nomadic herding, shifting agriculture and intensive subsistence agriculture. We have already discussed nomadic herding and shifting agriculture earlier. Here, we will look at the main characteristics of the intensive subsistence agriculture.

More than 2.4 billion people are supported by intensive subsistence agriculture. In the densely populated countries of Monsoon Asia such as India and China, it provides the economic base. It produces relatively high yields per unit of agricultural land as a result of heavy input of labour. Rice is the principal crop in areas with long, warm and rainy growing seasons. Wheat, upland rice and other grains are the staple crops in the regions having cooler and drier climates. The specialisation of crops is not possible because the farmers like to grow as many crops as required by the household and are possible to be grown. *Multiple cropping*, which produces two or even three crops in a year on the same field is, therefore, common especially in areas where soils and climates (temperature and rainfall) are most favourable. Such intensive food production is also illustrated by vegetables and fruits, *intercropped* or grown along paddy dykes and by fish raised in the flooded rice fields. Poultry, cattle and other livestock are also raised as they are required by the household. Over the last two decades or so, the productivity has increased significantly in those areas where hybrid varieties of rice and wheat have been adopted. In addition, with the use of chemical fertilisers, pesticides, insecticides, and irrigation facilities, the traditional subsistence form of agriculture in certain areas has developed some characteristics of commercial agriculture.

Commercial Agriculture

In contrast to the subsistence agricultural system, commercial agricultural system emphasises on specialised production of crops and livestock for sale. Most commercial farms

are relatively large. They utilise specialised machinery, seeds, fertilisers, and other products to increase production efficiency. Through commercial farming, a single farmer can produce enough food to feed a large number of people. As such less than 10 per cent of the population of developed countries are directly engaged in farming. For example, each US farmer produces enough to feed more than 60 additional people.

The production efficiency is realised in two ways. Improved inputs such as seeds, fertilisers and pesticides promote higher yield. Specialised machinery speeds up production and reduces the human labour required for cultivation, irrigation, harvesting and other farming operation. In the USA, agricultural output has doubled over the past half – century, while its agricultural work force has declined more than three times. At the same time the number of farmers has dropped from 6.5 million to just over 2 million, with less than 500,000 full time farmers today.

Reduction in the number of farms and farmers and increase in food production reflect the trend towards large size of farms, fields and livestock herds. It thus creates more savings in labour and production costs. The full time commercial farm in the developed countries is more like a business enterprise than a traditional way of life as in developing countries. Agricultural operations and management strategies must consider production costs and market prices that are driven by the interplay of economic, political and institutional forces at work in the national and global economies.

World Hunger, Malnutrition and Food Security

Despite significant increase in agricultural production, more than 1 billion people, about one out of every six persons suffer from chronic hunger and nutrient deficiencies. *Hunger* means that the daily diet does not provide the quantity and type of food needed to maintain health, normal growth and productive work. For estimating global hunger, four indicators are used: starvation, undernutrition; micronutrient deficiencies; and nutrient

depleting diseases and parasites. Widespread starvation most often occurs as a consequence of *famines* — the acute shortage or absence of food within a region due to crop failure or destruction or by withholding or blocking food shipments into a country or a region. Although famines are associated with widespread crop failure, most are the result of social or political processes that disrupt traditional agricultural production strategies. *Food security* refers to the access by all people at all times to the food required for a healthy life.

In Sub-Saharan Africa in the 1970s and 1980s, famines caused widespread sufferings and deaths. These famines were associated with recurrent droughts and subsequent failure of crops and lack of forage for livestock. Changes in the traditional agricultural practices prompted by the government policies to increase production of non-food crops for export, resulted in the shortfall of the subsistence food crops for local consumption during the string of dry years. Besides, the

ongoing military conflicts and civil unrest in some areas aggravated the famine situation further. As a result, hundreds of thousands starved in Sudan, Ethiopia, Somalia, Angola and Rwanda. Today, about 15-35 million people are at the risk of starvation in any given year.

In Fig. 5.11, areas affected by malnutrition and hunger have been shown. Why are so many million hungry and malnourished when there is more than enough food produced in the world each year, and which is adequate to feed everyone? There are a number of social, economic, political and environmental reasons. War, the ownership of land and the structure of agriculture, commercialisation, poverty, the geography of food production and food aid are some of the important reasons. The hungry throughout the world have one common trait that they are poor. The landless and unemployed do not have means or money to acquire food. Commercialisation is aimed at exports, rather than providing subsistence food

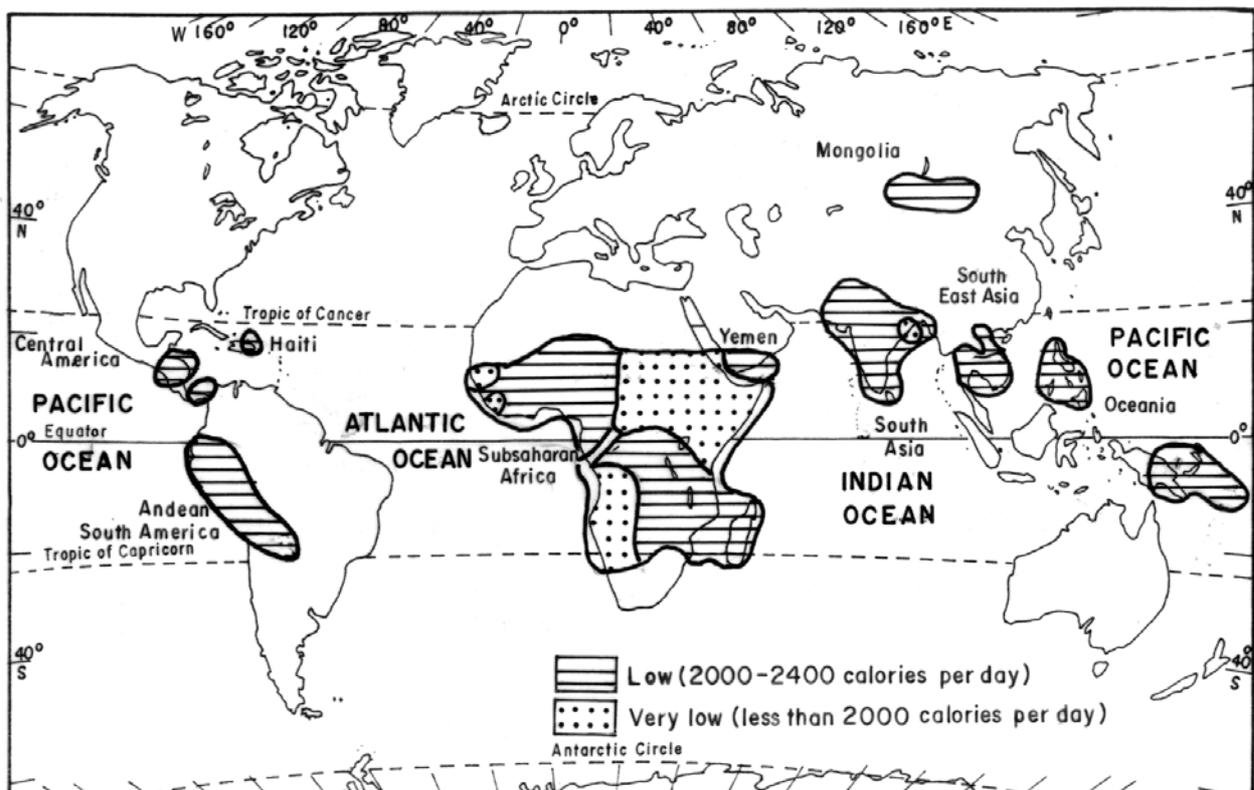


Fig. 5.11 World : Hunger and Malnutrition

for the local people. It also means growing non-food crops having more market value in place of traditional food crops. The poor obviously cannot compete for food in the global market place.

The world's food supply is unevenly distributed. Only a few regions produce large grain surpluses — North America, Western Europe and Australia. These developed regions sell their grains at world market price. The poor developing countries hardly can afford to buy grains at the world market prices. Only a small fraction of the grain entering international trade is given as *food aid*. It is often provided to suit the foreign policy rather than given where and when it is needed most. For example, in 1980s when Sub-Saharan Africa was struck by the famine, USA shipped nearly four times more food to its political allies — Central American countries than the entire famine-ravaged Africa.

Grain stockpile is often used as a measure of *food security*. The fast rate of growth in food production started with the introduction of the hybrid varieties of rice and wheat to subsistence agricultural economies, nearly 50 years ago. It ushered an era of green revolution. It has now started slowing down. Since 1990, world grain yields have risen only about 0.5 per cent annually compared to over 2 per cent annually between 1950 and 1990. As a result, the stock pile of grain has declined. New strategies are, therefore, required to improve the sustainability of food production and to increase food security.

Most likely the greatest potential for expanding food production will be in the areas that already are the granaries and bread-baskets of the world. Plant breeders are currently exploiting the long over looked genetic resources of seed banks –repositories

that contain more than 6 million varieties of the seeds of some 100 crop species and their wild ancestors. One such experiment in China has produced rice varieties that may yield 20-40 per cent more than current hybrids by using genes from uncultivated rice varieties.

New strategies also focus on the most efficient use of the limited resources coupled with the traditional intercropping method that have sustained land productivity for centuries. It is advantageous both environmentally and economically compared to monoculture i.e. single crop cultivation. Sharing of certain crops enhance soil fertility, control soil erosion and increase the crop yield. Besides, the risk of total crop failure is also reduced. In areas of shifting agriculture, *agro-forestry* and nutrient recycling increase the productivity of the soil. For example, in Sahel region of Africa, shifting cultivation system is being modified to an agro-forestry system in which nitrogen-fixing acacia tree are intercropped with traditional millet and sorghum crops. The trees improved the productivity of the soil in several ways. Similarly nutrient-recycling cropping system has been developed in the Peruvian-Amazonian region to suit its infertile acid soils. High-yielding acid — tolerant rice and nitrogen-fixing cowpea varieties are rotated without fertilisers, lime or tillage. Crop residues are returned to fields and human labour is used to control weed. After several satisfactory harvests, a cover of tropical Kudzu (a local plant) is planted to choke the invading weeds. After one year, this cover is buried and the nutrients of soil are restored.

In recent years, genetic engineering has systematically altered the genetic structure of plants and animals. It is still in the early stages of development and it is difficult to assess its impact on human society.

EXERCISES

Review Questions

1. Answer the following questions briefly:
 - (i) Why is agriculture the most important primary activity?
 - (ii) Which factors impose limits on crop cultivation?
 - (iii) Name the five staple food crops of the world?
 - (iv) Which of the staple food crops has the highest average yield?
 - (v) Why are tea plants grown on hill slopes?
 - (vi) Which criteria were used by D. Whittlesey to classify agricultural regions of the world?
 - (vii) What is food security?
2. Distinguish between :
 - (i) Shifting cultivation and sedentary agriculture;
 - (ii) Subsistence and commercial agriculture;
 - (iii) Hunger and malnutrition.
3. Give reasons:
 - (i) Rice is a labour intensive crop.
 - (ii) Wheat is the most widely grown cereal.
 - (iii) Although the USA produces about half of the world's maize, 80 per cent of it is not directly used for human consumption.
 - (iv) Despite being deficient in protein and minerals, cassava is a staple food of a large number of people in South-east Asia, Central Africa and South America.
 - (v) Cloudless sky is essential for the cotton plants at the time of ripening.
 - (vi) World food production is enough to feed everyone, yet there are millions of people hungry and malnourished.
4. Discuss the major trends and shifts in agricultural development process.
5. Explain how physical environment affects the crop distribution pattern in the world.
6. Classify crops on the basis of their uses. Explain why only a few varieties of plants domesticated several thousands years ago still continue to be the major food sources.
7. Describe the geographical conditions necessary for the cultivation of wheat and rice in the world and their distribution pattern.
8. Discuss the geographical condition of growing tea and coffee and their distribution pattern.
9. Describe the major agricultural regions of the world.
10. Discuss the problem of hunger and malnutrition in the world and the ways of ensuring food security.

Geographical Skills

11. Study Fig.5.1 and answer the following :
 - (i) Which crops can be grown only in a very narrow zone and why?
 - (ii) Which crops can be grown widely and why?
 - (iii) Name the crops which are grown mainly in the tropical regions.
 - (iv) Name the crops grown mainly in the temperate regions.

6

CHAPTER

SECONDARY ACTIVITIES — MANUFACTURING

With industrial revolution, the use of inanimate power by harnessing the energy of water, coal, and petroleum brought tremendous changes in the primary sector. It helped in the evolution of large manufacturing system, which utilised products of the primary sector and hence, called secondary. Production of raw materials for both domestic and industrial uses grew. As a result, the purchasing power of the people engaged in primary activities increased and it led to the growth in the demand for manufactured goods. It thus, promoted growth of the secondary activities.

At the outset, it would be useful to explain what do we mean by the terms 'industry' and 'manufacturing'. We, very often, use terms like film industry, fishing industry, steel industry and tourism industry, but each of these represents a different kind of economic activity. However, geographers usually use the term 'industry' to describe those activities which are concerned with processing, fabricating and manufacturing of primary products obtained from agriculture, forestry, fishing and mining. Industry is called a secondary activity to distinguish it from primary activities.

Manufacturing literally meant 'making by hand', but now it also includes goods made by machines. It is a process, which involves transformation of raw materials into finished goods of higher value. For example, cotton is an agro-product. It is used as a raw material in the manufacture of cotton textiles, which may further be transformed into garment. Cotton textiles and garments are products of manufacturing.

The United Nations defines *manufacturing* as 'the mechanical and chemical transformation of inorganic or organic substance into new products, whether the work is performed by power-driven machinery or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold wholesale or in retail.' This is, however, a very broad definition. Usually modern *manufacturing industry* is characterised by complex organisation, specialised labour, use of machinery and inanimate power and mass production.

CLASSIFICATION OF INDUSTRIES

Industries can be classified in many ways: size, nature of products and raw materials, and ownership.

Classification by Size

The amount of capital invested, number of people employed and the volume of production determine the size of an industry. Accordingly, industries may be classified into the following groups: cottage or household, small scale and large scale industries.

Cottage or household industries are the smallest manufacturing units. The craftsmen or the artisans with the help of their family members manufacture goods within their homes using local raw material and simple tools. The skills of production are passed on from one generation to the other. The scale of operation is small. The tools and equipments are ordinary. The goods produced are generally, sold locally. Thus potters, carpenters, weavers and blacksmiths produce

goods in the household sector. In many countries of Asia and Africa, this sector is quite important and some of the handicraft items are in great demand in the developed countries.

Small scale industries are differentiated from the former by the technique of production. They use modern power driven machines and employ labour as well. The raw materials are also obtained from outside, if not available locally. These industries are larger in size than cottage industries. Their products are sold through traders beyond local markets. In many developing countries, the role of these industries are crucial as they provide employment to a large number of people. In countries like India and China, a large number of goods such as clothes, toys, furniture, edible oil and leather goods are produced by small scale industries.

Large scale industries include mainly heavy and capital intensive industries, which use heavy machineries, employ large number of workers and produce goods for a bigger market. The management is hierarchy-based and complex. Emphasis is laid on quality control and production specialisation. Such industries require a very large resource base and hence, raw materials are obtained from various places. The production of goods is also on a large scale, which is sent to distant markets. These industries, therefore, require good infrastructure facilities such as roads, railways, and power supply. Iron and steel industry, petro-chemicals, textiles and automobiles fall under this category.

Some geographers prefer to divide manufacturing industries on the basis of size of operation and the nature of products together. Accordingly, there are two classes. *Heavy industries* are of large-scale. They deal in bulky products and are heavily dependent on the raw materials and hence, tend to be located near the source of raw material e.g. iron and steel industry. *Light industries* are usually small-scale in operation. They deal in lighter and compact products. For them, accessibility is the most important factor. The electronics is one example of this kind.

Classification by Outputs

Industries whose products are used to produce other goods are called *basic industries*. Iron and steel industry is one of the basic industries because steel produced by this industry is used in many other industries as a raw material. Some basic industries produce machines which are used to produce other goods.

Industries which produce goods for direct consumption such as tea, bread, soap and television are known as non basic or *consumer goods industries*.

Classification by Inputs

Depending upon the raw materials used for the industries, they may be classified as agro-based, forest-based, mineral-based industries, and chemical industries.

Agro-based industries are those which utilise agricultural products as raw materials. Cotton Textiles, tea, sugar and vegetable oil industries are its examples. *Forest-based industries* are those which utilise forest products as raw materials e.g. paper and furniture industry. *Mineral based industries* are those which use minerals as raw materials. Industries based on metals are known as *metallic industries*. These are further divided into ferrous and non-ferrous industries. Industries based on metals having iron content are called ferrous industries e.g. iron and steel industry. On the other hand, industries based on metals without iron content fall into the category of non-ferrous industries e.g. copper and aluminium. Industries based on chemicals are called *chemical industries* e.g. petro-chemicals, plastics — synthetic fibres and pharmaceuticals. Some of these industries use raw materials found naturally e.g. minerals such as mineral — oil, salts, sulphur and potash, and vegetable products. Some chemical industries use the by-products of other industries.

Classification by Ownership

On the basis of the ownership pattern and management practices, industries can be classified into government or public, private

and joint sectors. When the ownership and management of an industry is in the hands of the state, it is called a *public sector* industry. The state establishes and runs these units. Industries owned and managed by an individual or a corporate body belong to the *private sector*. Individuals invest their own capital to establish these industries and they manage them as private enterprise. Sometimes individuals join together under partnership to establish industries. The share of partners, both in the capital investment and profits, is pre-decided. Industries are also established by corporations. Such a body is formed by individuals or organisations to fulfill pre-determined objectives and goals. Capital for the industry is collected by selling shares. The large multinational corporations such as Pepsi, Hindustan Lever and General Electric have set up industries in several countries across the globe. An industry own and managed jointly by the state and private initiatives falls in the *joint sector*.

THE LOCATION OF INDUSTRY

The location of industry at a particular place is governed by many factors. Traditionally, these were grouped under geographical and non-geographical factors. While geographical factors included relief, climate, raw materials, energy sources, labour market and means of transportation, non-geographical factors comprised of governmental policies, capital, market and management.

This view is highly deterministic because location cannot be explained in absolute terms. For example, the location of cotton textile in Lancashire (UK) cannot be explained only in terms of the presence of the humid climate, soft water, abundant coal and the position of Liverpool in the Atlantic trade. Similar conditions were present at many other places including South Wales. Lancashire, therefore, had the relative rather than the absolute advantage of time and space. To get over this shortcoming, industrial location is now explained in terms of factors associated with assembly, processing and distribution, government policies, environment, industrial inertia and the human factor. These factors do

not operate in isolation, but in a complex system of interrelationships. The relative importance of these factors varies with time, space, type of industry and also the economy. It is important to remember that not all factors at a particular time are favourable, and that most of the good locations have been those where the number of favourable factors have outweighed the unfavourable ones. In fact, an optimum location is a relative term.

Assembly, Processing and Distribution Factors

A number of factors associated with the assembly, processing and distribution of materials and products are crucial in the location of an industry.

Distance

It is one of the most important factors explaining the location of industries. It is not simply a question of physical distance in terms of km, although it is not unimportant. It is a question of cost and time involved in moving goods. It is, therefore, appropriate to talk in terms of *economic distance*, which is determined by the mode of transport, the type of commodity and freight rates. The prime concern of a manufacturer is to reduce the economic distance and hence, transport plays a crucial role in location of industries.

Raw Materials

All industries use *raw materials* which should be available economically. In early times, location of industries was tied to the location of raw materials. With improvements in transportation and handling facilities, the movement of raw materials has become easier. Industries are becoming more and more specialised and complex. As a result, fewer and fewer firms are directly based on crude and bulky raw materials. In countries like USA and Japan, most of the manufacturing industries use semi-produced products. Technological advancements have intensified the use of raw materials by reducing waste in manufacturing and also improving them at the source itself so that they can be easily transported.

Nevertheless, there are certain industries in which raw materials play an important role. For example, industries which lose either bulk or weight in the manufacturing process such as copper smelting, or in industries where the raw material is perishable such as fruit canning, the processing takes place near the raw material.

Energy Sources

Historically, *energy sources* have had considerable effect on the location of industry. Even today there is a strong correlation between industry and coalfields. Industries using large amount of energy such as electro-chemical and electro-metallurgical industries, are still located near the sources of electricity generation. But it is declining in importance as a location factor because fuel efficiency has been improving considerably. While in the eighteenth century, more than 8-10 tonnes of coal were required for smelting 1 ton of pig iron, today less than 1 ton is needed. Besides, development of electric grids, and oil and natural gas pipelines has made the energy source as a locational factor less important.

Water

It is used in most industrial plants for processing, steam raising or cooling. As such, water supplies both in terms of quantity and quality, are important in considering the location of industry. Water requirement of industries varies considerably. While some need more such as iron and steel industry (200,000 litres to produce one ton of steel), others like electronics need less. Yet, shortage of water in an area can be a serious deterrent for locating an industry.

Access to Labour Market

It is also an important locational factor. Differences are found not only in the quantity of labour available but also the quality of labour as represented by the skills that an area can offer. For example, diamond cutting and polishing need skilled workers. It explains the concentration of diamond cutting and polishing in Surat (India).

Access to Good Management

It is an important factor in the choice of sites. For example, it is vital to know whether the selected site will be able to attract good managers.

Capital

It is yet another important locational factor because it is less mobile internationally. Unstable areas with high risk and uncertain returns are likely to be less favoured. However, with the development of banking services money capital has become much more mobile within a country.

Government Policies

Governments encourage or restrict developments in certain areas. Economic and social considerations are important factors influencing the government's decision. It is the duty of a government to ensure that the country's resources are used to the best advantage and that there are no great inequalities in the distribution of wealth. Similarly, political and strategic considerations also have strong influence on industrial location. In order to reduce regional imbalances, many countries and regions demarcate certain areas for location of industries.

Environment

Physical attraction of an area is an important factor. Congenial living conditions are preferred while setting up industries. For example, in the USA, the aircraft industry has moved to the southwestern part of the country because of climatic advantage. Due to warm climate, hangar heating costs are less in this region.

Industrial Inertia

Many industries remain at a particular location even after the disappearance of initial advantages. Availability of infrastructure facilities such as transport and services, and immobile physical capital such as building encourage inertia and new industries are attracted. Some industries are location leaders,

either because they provide raw materials for other industries, or because they require specialist firms to supply parts.

The Human Factor

Among several considerations, the ultimate decision is taken by the humans. Their personal choices thus, influence locational decisions.

Some Major Industries of the World

Manufacturing contributes significantly to the world economy. More than fifty per cent of the world's total manufactured goods is shared by the USA, Japan and Germany (Fig 6.1). Iron and steel, textiles, automobiles, petrochemicals and electronics are some of the world's most important manufacturing industries. We will be examining the distribution pattern of the iron and steel and petro-chemical industries.

Iron and Steel Industry

Iron is a relatively dense metal having distinctive magnetic properties. It is one of the most abundant metal on the earth, but is rarely

found as a free metal. It is extracted from the iron ore by smelting the ore with carbon (coke) and limestone in a blast furnace.

The molten iron, after being separated from the ore, is either cooled and moulded to form pig iron or is used for making steel. Iron, in its pure form is soft and generally not useful as an engineering material. By adding small amount of carbon (upto 2 per cent) and other strengthening elements such as nickel or manganese, it is converted into steel, which is very strong and malleable. It enhances its utility, making it the most widely used material for building the world's infrastructure and industries. It is used to fabricate everything from sewing needles to rail sheets, tubes, wires, huge machines and tankers. Its importance can be assessed from its production which is around 800 million tons, while the production of the next most important engineering metal, aluminium is about 20 million tons.

The iron and steel industry provides the base for all other industries and, therefore, it is called a basic industry. It may also be called a heavy industry because it uses bulky raw materials in large volumes and its products are also heavy.

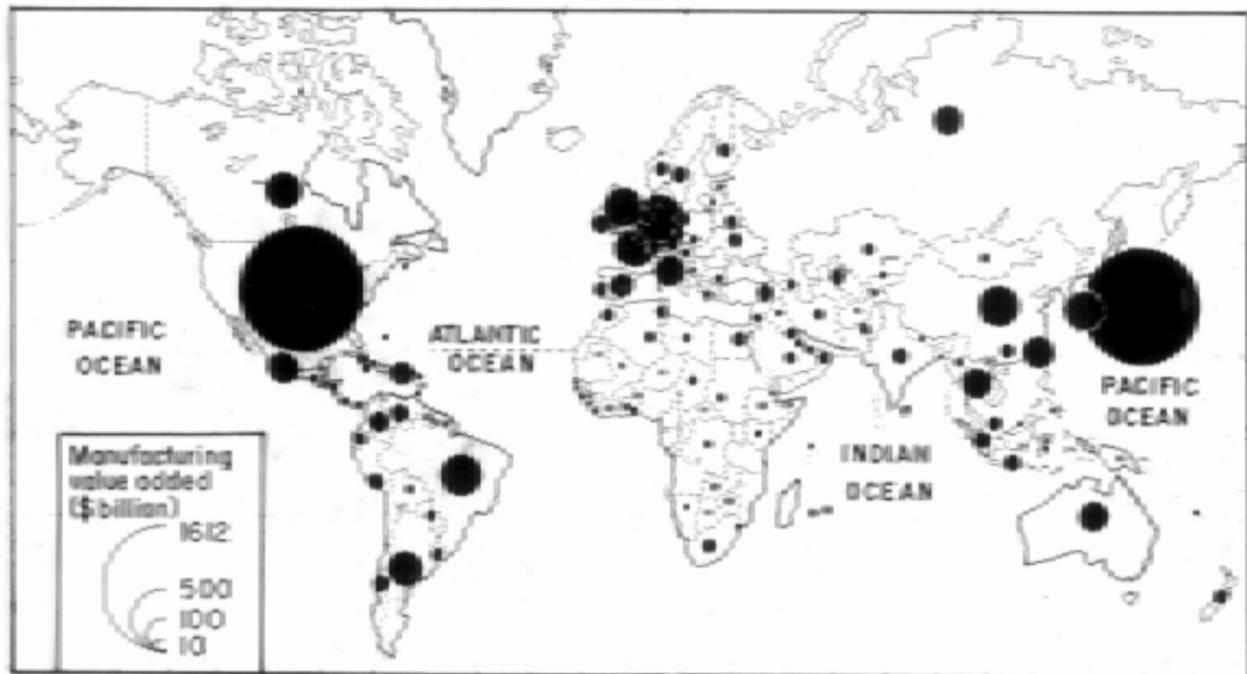


Fig 6.1 World : Distribution of Manufacturing

The industrial revolution led to a fast development of iron and steel industry because of the relative low cost of the metal and the wider utility as an engineering material. Since the industry was based on heavy and bulky raw materials — coal, iron ore, manganese and limestone, this industry developed mostly in and around the mining areas, or at a place where the raw materials could be easily brought.

The Great Lakes region and the Atlantic coast in the United States; the northern, north-eastern and central parts of the UK; France — Belgium, Loraine — Luxemburg — Saar and Ruhr in Western Europe; Ukraine; the Ural region of Russia, and the Chhotanagpur region in India are some of the important iron and steel producing areas of the world. The location of the industry in these areas is attributed mainly to the presence of important mineral ores.

In advanced economies, traditional industries such as iron and steel are declining very fast. Manufacturing employment centring around iron and steel reduced by about 1,30,000 jobs during 1956-82 and coal mining by 1,20,000.

Petro-Chemicals Industries

Along with the refining of mineral oil, a large number of industries based on petroleum have developed around these centres which utilise the infrastructure facilities available there. Generally, such complexes are huge and they are located near the market or the ports. Fertilisers, plastic and artificial fibres such as rayon are some of the common industries located near the mineral-oil refineries.

The development of petro-chemical industries has taken place in North America and Europe after the World War II. Most of these complexes in the USA are located near the coast as oil is mostly imported from Latin American countries and West Asia. Mineral oil is transported through pipelines and tankers to inside locations. Chicago, Toledo, Philadelphia, Delaware and Los Angeles have large petro-chemical complexes.

The European petro-chemical complexes are located mainly near the market. The major

complexes are located on the coasts of southern North Sea and English Channel (Antwerp, Rotterdam and Southampton), Ruhr region in Germany, and Le Havre-Roven-Marseilles region in France. There are a number of petro-chemical complexes in the Central Asian Republics, Russia, West Asia (Abadan in Iran, Ras Tanura in Saudi Arabia and Mina-el-Ahmadi in Kuwait), and in India (Trombay, Vadodara and Bongaigaon).

Changing Trends

Locational factors, discussed earlier are not equally significant for all industries. Over the years these factors have become less and less important especially in industrialised developed world. Energy and materials efficiency through waste avoidance, recycling, substitution and alternatives in recent years have contributed positively towards enhancing environmental sustainability in these regions. Logging, mining and heavy industries like iron and steel are already far less important today than they were once for economic growth.

Modern industrial activity and its spatial distribution has changed in many ways. It can be understood better in the context of the development process. W. Alonso (1980) talked of 'five bell shapes in development'. He observed that during a period of development several features moving in the same direction rise to a peak and then subside. These features are : (a) the economic growth rate; (b) the level of social inequality; (c) the level of regional inequality ; (d) the level of spatial or geographical concentration (urban-industrial growth in a few centers); and (e) the population growth rate in demographic transition. All these five features do not rise and fall simultaneously, though they are interconnected. According to him geographical concentration was the first process followed by economic growth and then by social and regional disparities.

As such, concentration has a positive value in the process of development. With the progress of economy and scientific and technological advancements, structure and form of industries change. For example, textile industry in Federal Republic of Germany

Deindustrialisation

Deindustrialisation is the term given to the decline in manufacturing industries both in term of employment and industrial output. Deindustrialisation in the developed countries has resulted from:

- machinery replacing people in most manufacturing industries;
- competition from countries abroad producing manufactured products at much cheaper prices;
- prices of products being too high, due to low labour productivity (output per person) and a lack of investment in new machinery;
- highly qualified people preferring jobs in the tertiary and quaternary sectors;
- high interest rates making products expensive to be bought abroad.

witnessed constant growth since World War II till late seventies. It declined with the shift of whole textile industry to less developed countries where labour costs were low and labour laws were less rigid.

Accordingly, industries with sophisticated parts are kept in advanced countries and those with low technology, labour-intensive units are exported to poor countries. This kind of change observed by the early eighties was known as 'new international division of labour'. This meant that while there was a continuous technological change and new industries were in the centre, some less demanding industries could be located in the periphery. If, in the past, Germany made steel and Brazil produced iron ore for it, now Brazil might make steel and Germany would work these into engineering products such as cars.

The other change is noticed in terms of large factories giving way to smaller units dispersed over a large area. Some of the nineteenth century factories were spread over very large areas and they employed several thousands people e.g. Douglas's Long Beach aircraft plant employed 100,000 and steel mill complex at Tienshan, China held over 200,000 workers.

Instead, mini steel plants are in vogue today.

New trends can be observed for certain kinds of industrial production which are organised in more flexible ways. There are two broad types of flexibility: flexible production and flexible specialisation. Both of these allow smaller volumes of production to be handled economically, enabling rapid changes in matters such as design or even the process used in manufacturing. It is popularly known as 'post-Fordism' in advanced countries of the world, which is in contrast to 'Fordism'. Henry Ford endorsed the use of mass production lines, the excessive division of labour and the manufacture of highly standardised products in developing the North American car industry. It served as a model for many industries for a long time, and was known as 'Fordism'.

Flexible production involves the use of automation in order to be able to programme designs and rapid changes of design (computer-aided design or CAD). The machines used in manufacturing may be computer controlled and hence, flexible. One well-known form of flexible production is the system entitled 'Just in time'. Components are not stocked at the factory but brought in from

Reindustrialisation

Reindustrialisation refers to the growth of some sectors of new industries in places and areas where classical industries have declined. Reindustrialisation in highly developed countries has the following characteristics:

- the growth of high-technology firms — these are firms that produce very advanced products with a great deal of scientific research and development e.g. pharmaceuticals and micro-electronics;
- such new firms that set up manufacturing often having only a small, highly skilled labour force;
- the new firms are located in the less industrialised areas or peripheries of the metropolitan cities.

near by factories on demand to meet the requirements of production for the next few hours. Toyota car manufacturing plant at Toyota City is a typical example of this kind of production.

The system has the advantage of little waste, since faulty products may be identified immediately and their supply stopped. Quality control is, therefore, easy. Besides, flexibility of output, in types and quantities and low inventory cost are other advantages. Such a system clearly depends on a closely linked network of factories, with good transport and communication links.

Such a system has a definite spatial form with subsidiaries and support activities constituting a kind of industrial district.

In recent decades the Japanese model has been transferred to other countries. In order to establish a new work pattern and work ethic, new industrial space adjacent to old industrial belts are preferred. In the USA, for example, industrial relocation by General Motors, Ford and Chrysler to outer Mid West has become an important feature. However, Toyota pattern is not being followed by all companies. Many countries specialise in the production of components which could be put together in a number of final assembly plants.

While flexible production is related to

vertical linkages i.e. first level producers of components to second — level assemblers, *flexible specialisation* refers to a more complex, horizontal inter firm network of linkages. In this system, many firms in one kind of industry are involved in the production of specialised items. Further flexibility in such a system is endowed by moving the work amongst the different specialist firms. If a normal run of business is disrupted by a sudden demand for a large quantity, flexibility in cooperation allowed the contracting firm to share the order with several firms in the same business, or to subcontract some of the business to outside firms.

New Industrial Spaces

In past few decades, high-technology activities are expanding fast. Highly sophisticated products are developed involving a great deal of scientific research and development. These industries improve their products very fast to suit the market demand and employ highly skilled labour. Such industries are referred to as *footloose industries* as they have relatively free choice of location.

The growth of some industries has been explosive. Employment in computer software in the United States has increased about four times during 1970-2000.

Footloose Industries — Factors that Favour Free Choice of Location

- light industries that often do not use raw materials but component parts;
- power requirements, usually only electricity — available from the national grid;
- end product is small and often cheaper and easier to move;
- employs a small labour force;
- non-polluting industries which can be located near residential areas;
- accessibility; needs to be near a road network.

Examples of High Tech Industries

Electronic Equipment

- computers;
- telecommunicators;
- industrial control system;
- testing and measuring equipment;
- office equipment;
- aerospace and military equipment;
- incorporation in consumer products, e.g. automobiles, washing machines, ovens, etc.

Consumer Electronics

- colour and monochrome television receivers;
- radio receivers;
- video cassette recorders;
- audio-tape recorders;
- record players;
- hi-fi equipment (tuners, amplifiers);
- pocket calculators;
- electronic games.

Technopoles

The locational impact of these high-tech activities is already emerging in advanced industrialised countries. The most noticeable phenomena is the emergence of new technology — oriented complexes or technopoles. A *technopole* is a planned development within a concentrated area, for technology innovative, industry related production. Technopoles include science or technology parks, science cities, and other high-tech industrial complexes.

High-tech Industrial — States and Technology Parks : Footloose industries tend to be attracted to purpose — built industrial estates or technology parks on the edge of towns and cities as is the case with London or Tokyo. These places offer a number of advantages over inner city locations:

- space for single-storey factories and future expansion;
- cheaper land values on edge-of-city;
- accessibility to main roads and motorways;
- pleasant environment (often located on a greenfield site);
- labour supply from nearby residential areas and commuter village.

Silicon Valley — A Technopolis : The silicon valley is located in the north - western part of Santa Clara County of California. In 1930s, F. Terman, a professor and later, Vice-President of Stanford University at Palo Alto encouraged his students in electrical engineering to

establish their own companies. One of the first companies was set up by William Hewlett and David Packard in a garage near the University campus. Today, it is one of the world's largest electronic firm. By the end of 1950s, at the persuasion of Terman, Stanford University developed a special industrial park for such new high-tech firms. It created a hot house of innovation and generated a significant specialised work force and producer services. It has sustained the continued agglomeration of high-tech electronics and has also attracted other high-tech industries. For example, nearly a third of all employment in biotechnology in the USA is located in California. Of this, over 90 per cent is located in the San Francisco Bay area. Stanford University has been receiving increasing amount of donations from grateful companies, which runs into millions of dollars annually.

The linkage between the research in universities and high-tech activity is key to the success of these industries. While the new industries thrive on a symbiotic relationship with one another and university research departments, key workers also tend to favour technology complexes associated with top ranking universities. It provides them a job market and abundant socio-cultural activities. It soon acquires a reputation as 'the right place to be'.

Such techno-poles have also emerged in other countries. But except Germany, most of them are centred around big metropolitan cities such as London, Paris, Milan Tokyo, Shanghai, Taipei, Moscow, Singapore and Sao Paulo.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What are secondary activities and why are they called secondary?
 - (ii) What are manufacturing industries?
 - (iii) What are the bases of classifying industries?
 - (iv) Give two examples each of basic and consumer industries.
 - (v) Why iron and steel industry is considered a basic industry?
 - (vi) Why petro-chemical complexes in the USA are located mostly on the coast?
 - (vii) What is a technopole?

2. Distinguish between:
 - (i) Cottage and large scale industries;
 - (ii) Metallic and non-metallic industries;
 - (iii) Deindustrialisation and reindustrialisation;
 - (iv) Flexible production and flexible specialisation.
3. Write short notes on the following:
 - (i) Small scale industry;
 - (ii) Silicon Valley.
4. Discuss the major factors influencing the classical location of industries.
5. Describe the distribution of iron and steel and petro-chemical industries in the world.
6. Discuss the major trends of the modern industrial activities especially in advanced industrial countries.
7. Explain why high-tech industries in many countries are being attracted to the peripheral areas of major metropolitan areas.

Geographical Skills

8. With the help of an atlas, locate the following places on an outline map of the world:
 - (i) the iron and steel centres in the Great Lakes region,
 - (ii) the petro-chemical complexes at Antwerp, Rotterdam and Southampton
 - (iii) the Silicon Valley

7

CHAPTER

TERTIARY AND QUATERNARY ACTIVITIES

As discussed earlier, *tertiary activities* revolve round the intangible outputs which encompass a diversity of services ranging from that of a technician or a plumber to that of a restaurant chef or a lawyer, a teacher or a computer operator. Services are usually defined as 'activities,' which are relatively detached from material production and hence, are not directly involved in the processing of physical materials. Thus, they stand in contrast to manufacturing, the product of which can be seen in the form of goods. But how can we measure the output of a plumber or a lawyer? It is impossible to measure these outputs except indirectly in terms of wages and salaries. However, there are some services, which can generate tangible output e.g. a fast-food franchise. Nevertheless, measuring outputs in services in general cannot be based on nature of output. The main difference between manufacturing and service products thus, seems to be that the expertise provided by services relies much more directly on work-force skills, experience and knowledge than on physical techniques embodied in machinery or process of production.

SERVICES

Services are an important constituent of modern economic development, which include retailing and the sale of goods to the people, the provision of services of all kinds — education, health and welfare, leisure, recreation and business services. *Business services* refer to those services that enhance the productivity or the efficiency of other firms' activities or that enable them to maintain their specialised roles e.g. advertising, recruitment and personnel training.

This sector was not given as much attention earlier as was given to the production of goods. In advanced economies, service-based development has been very rapid. As statistical data show, employment shifts continuously into services in these countries.

In developing countries too, the service sector is growing faster than the manufacturing sector. Its contribution to national wealth is also increasing. But the services are still very poorly accounted because many people are engaged in unorganised services, often referred to as informal sector. The informal sector in cities offers employment to a large number of rural migrants, who are poorly paid especially if they are unskilled. Then, there are housewives and child labourers whose services are not accounted.

During the development process, a normal course of events takes place in most countries over a period of time. There is a transition from dominance of the primary sector, to the secondary sector, and in the later stages, to the tertiary and quaternary sectors. In some countries, there is a tendency to delay the decline of their manufacturing. Japan and Germany, for example, are still able to manufacture successfully for world markets from a home base. Even in such countries, the importance of manufacturing, in employment and also as a proportion of GNP, declines eventually. It is balanced by concomitant rise of the service sector. This deindustrialisation shift can be seen at the regional level too. In the USA, this decline was first observed in New England in 1950s and 1960s. Later in 1970s, the middle Atlantic States of Virginia, Maryland and Delaware were affected by this decline. The

industrial Mid-West faced it in 1980s. It is supposed to be a predictable process, which leaves behind a well of human skills, organisations and offices.

The growing importance of services has now given it an independent status as a productive sector in the economy. Instead of being an accessory to manufacturing or to the people at large, it is an exporter. The competitive advantage of some countries such as Switzerland and the UK, and of some regions or cities is in service provision.

Under the old thinking, there was a special geographical pattern of industrial locations, while services were distributed evenly matching population distribution. As such there was a precise geography of iron and steel making, but banking might be found in every market town even with a small population. These services also organised in a hierarchy, placing higher order services in the large city, and lower order services in small areas. There was little need for these services to agglomerate for interaction among themselves. Now, however, there are major concentrations of services. Some of them are catering to new industrial structures and needs such as advertising and marketing. They have distinctive spatial patterns. One of the most distinctive pattern is that of global cities, located in relation to the international economy. We will learn more about them later in this chapter.

The major components of services may broadly be grouped as the following:

- (i) Business services include advertising, legal services, public relations, and consulting.
- (ii) Finance, insurance and real estate include savings and investment banking, insurance and real estate (commercial as well as residential).
- (iii) Wholesale and retail trading links the producers with consumers. Personal services such as maintenance services, beautician and repair work are also included in this.
- (iv) Transport and communications include railways, roadways, shipping and airline services and post and telegraph services.

- (v) Entertainment such as television, radio, film, and literature.
- (vi) Government at different levels — local, state and national includes bureaucracies, police and army, and other public services.
- (vii) Non-governmental agencies include those organisation which have been set-up by individuals or groups for charity on non-profit social activities concerning education, healthcare, environment, rural development etc.

Employment in the service sector has increased steadily in the developed countries during the twentieth century despite low population and significant job losses in manufacturing (Figs 7.1 and 7.2). Compared to manufacturing sector, it employs large number of women. In general, the increase in the services employment throughout the world is attached to various reasons.

Rising per capita income in the developed countries has generated proportionately larger increases in the demand for many kinds of services especially healthcare, entertainment and transport. The increasing value of time has led to more household functions being accomplished outside the home.

Similarly medical services as a proportion of gross national product (GNP), have increased steadily in Europe, North America and Japan. It is mainly due to the changing demographic composition of the population in

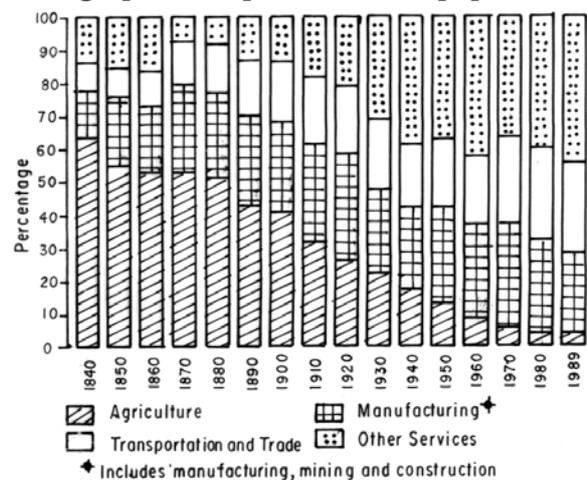


Fig. 7.1 Employment Shares by Economic Sector in the USA

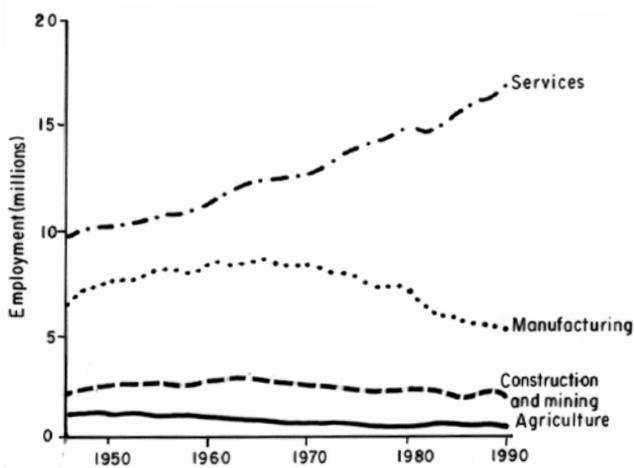


Fig. 7.2 *Employment Shares by Economic Sector in the UK*

highly industrialised countries. The demand for medical care is more from the elderly population. There is also a rise in demand for educational services at all levels with the increasing demand for literacy, mathematical and computer skills at workplaces.

The growth of services reflects the increasing proportion of non-direct production workers. Most manufacturing companies also need administrative set-up to collect and process information and make strategic decisions. As such clerical staff, sales people, researchers, advertisers, public relations experts, accountants, financial experts, and lawyers provide assistance in a complicated decision-making process.

Despite globalisation, liberalisation and privatisation, the size and role of the public sector has been increasing. The government is usually the largest employer because it provides innumerable services to the people such as defence, education, health, sanitation and law and order. In developed countries, rising levels of service exports within and among nation have also led to the growth of services. Many nations derive a substantial amount of their aggregate revenues from the sale of services to clients located elsewhere. Services are extensively traded on a global basis, contributing about 20 per cent of international trade.

Advanced Services, Information Flows and the Global City

The information based global economy especially in highly industrialised societies, has given rise to specialised activities, which are fairly advanced. They include finance, insurance, consulting, information gathering, management of information services, as well as research and development, and scientific innovations, which are at the core of all economic activities. All of them can be reduced to knowledge generation and information flows.

Due to advanced telecommunication systems, it is possible for these activities to have a scattered location around the globe. Yet, they reveal dispersal and concentration simultaneously. While a number of activities are dispersing widely, those belonging to the upper tier still reflect concentration in few countries. In fact, there is a hierarchy between tiers of urban centres, with the higher level of functions in terms of both power and skill being concentrated in a few major metropolitan areas. For example, New York, London and Tokyo together cover the world for the purposes of financial trading and work largely as a unit in the same system of endless transactions. They jointly dominate in international finance, and in most consulting and business services of international scope.

Some of the services are managed from within the firm. Thus, some of the legal works, advertising or accounting are conducted within the firm, often at the head office or offices attached to it. This is indexed by the number of major firms that have head offices in specific cities. Among the top 500 biggest global firms, Tokyo is home to 34, New York to 59, London to 37, and Paris to 27. Mexico City, the world's largest city today, has only one such firm. There is no such firm in any Indian City.

As the global economy expands, new units join the system and new linkages get established. New regional centres of processing of service activities have emerged in the USA (e.g. Phoenix, Wichita), in Europe (Barcelona, Nice, Stuttgart), and in Asia (Mumbai, Bangkok, Shanghai). However, decentralisation

of such activities are concerned mainly with 'back offices'. It means mass processing of transactions that only execute the strategies decided and designed in the corporate centres and headquarters located in a few global cities. For example, within one country, the UK, of the top 500 company headquarters, 198 re-located within London. These activities employ the bulk of semi-skilled office workers, many of them replaceable as technology evolves. The significance of this spatial system of advanced service activities lies in the versatility of its network based on the information flow. The growing megalopolis of Hongkong – Shenzhen – Guangzhou – Zhuhai – Maccau is expected to be a major financial and business hub in the early twenty-first century in Asia.

QUATERNARY ACTIVITIES

In recent years, economic activities have become much more specialised and complex. As a result, a new category called *quaternary* has come into use now. Activities concerning knowledge such as education, information, research and development (R&D) are recognised as a different class of services even among intangible outputs and hence, placed under this category. The term quaternary basically refers to the 'more intellectual occupations, whose task is to think, research and develop ideas'. As such, this sector is especially concerned with research and development. In the most economically advanced nations, the quaternary activities involve a small but growing proportion of the population, characterised by the highest incomes and a higher degree of mobility in the process of career advancement.

In recent years, revolution in information technology has given rise to knowledge-based industries. There has been a remarkable growth in the science and technology based industrial complexes called Science and Technology Parks in places such as Boston, Massachusetts, and California in the USA. Development of softwares is an example of such activities.

What do we mean by Information Technology and how has it helped in the development of quaternary activities? It refers to a converging set of technologies in microelectronics, computing (machines and software), telecommunications, broadcasting and optoelectronics. Around the nucleus of information technologies, a number of major technological breakthrough e.g. genetic engineering has taken place in the last two decades of the twentieth century. These have application in various fields such as energy medicine, health care, transportation and manufacturing. In other words, the core of the transformation refers to technologies of information processing and communication i.e. they are process-oriented. An important characteristic of the current technological revolution is the application of knowledge and information to knowledge-generation and information-processing devices. The Information Age has revolutionised the technical elements of industrial society. As a result, economic activities of today are overwhelmingly dominated by the production of such intangibles in which knowledge information and communications are critically important. You have read about them in earlier pages.

The vast majority of employment in industrialised nations of the world — particularly well — paying, white collar employment — consists of information collection, processing, and transmission in one form or another. These functions have increased in importance with declining cost of computers and their increasing power. At the same time, accelerated technological changes, shortened production — time, and growing competition and uncertainty in the investment and job markets due to liberalisation and globalisation, have made the production and marketing of goods and services more information-intensive. Therefore, the geography of world economy rests heavily upon invisible flow of data and capital, binding places unevenly to the world system. Economic activities have stretched over ever-larger distances, at times, across different continents and hence, closely tied to the deployment and

use of telecommunication systems. With the digitisation of information in the late twentieth century, telecommunication steadily merged with computers to form integrated networks, most spectacularly through the internet. It has helped professionals to move away from the congested city centres or offices, and work at home, where they can conduct most of their business on line without face-to-face contact. Banks, insurance companies and securities firms, which are highly information-intensive economic activities, have been at the forefront of developing extensive world wide network of leased and private communication networks. Electronic funds transfer systems form the nerve centre of the international financial economy, allowing banks to move capital around at a moment's notice.

One of the most significant repercussions of the internationalisation of financial markets has been the growth of global cities, notably London, New York and Tokyo. Though a number of other cities such as Paris, Toronto, Los Angeles, Osaka, Hongkong and Singapore, are also important in a global economy, the role of the trio — New York, London and Tokyo in the production and transformation of international economic relations in the late twentieth century has been the most significant. They act as the command and control centres of the world system by providing home to massive complexes of financial firms,

business services and corporate headquarters of Transnational Corporations (TNCs). They create opportunities for interaction through face-to-face contact, political connections and cultural activities.

In short, the telecommunications today tend to reinforce the agglomeration of high-wage and high-value-added, white collar functions. At the same time, they promote decentralisation of low-wage and low-value-added, blue or pink-collar jobs. They have a variety of impacts upon cities and regions, both positive and negative. Electronic systems are of great use in everyday life, including credit cards, visa, passports, tax records, medical report, telephone and crime statistics. But they also reinscribe the social categories of wealth and power and geographical categories of core and periphery. For example, inequalities in access to internet internationally, measured in terms of hosts per 100,000 people reflect the long standing division between the developed and developing countries. The best connected nations are Scandinavia, Canada and Australia. Countries such as the UK, Germany and Japan are next in rank. The USA, surprisingly is ranked relatively low, reflecting its sizeable, poorly served population. Yet 90 per cent of all international internet traffic is either to or from the USA. The vast majority of the world's people in Asia, Africa and South America have little or no internet access.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What are tertiary activities?
 - (ii) Why did manufacturing decline in advanced economies?
 - (iii) What are the major components of services?
 - (iv) What is a global city? Name three global cities.
 - (v) What are quaternary activities?
 - (vi) Name the world's three best connected nations through internet.
2. Discuss the importance and growth of service sector in the modern economic development.

3. In what ways the service sector in developing countries is different than those in the advanced countries? Explain.
4. Why specialised activities of the advanced economy such as finance and insurance have a scattered location around the globe? How are they managed?
5. Discuss the nature and growth of quaternary services in the world.
6. 'The global cities act as the command and control centres of the world system'. Elaborate

Geographical Skills

7. On an outline map of the world show the following:
 - (i) One global city each from North America, Europe and Asia
 - (ii) The growing megalopolis of Hongkong – Shenzhen – Guangzhou-Zhuhai – Maccau.

Unit IV

TRANSPORT, COMMUNICATION AND TRADE

8

CHAPTER

TRANSPORT AND COMMUNICATION

Natural resources, manufacturing enterprises and markets for products are rarely located at the same place. Transport, communication and trade link areas of production of goods and services with areas of consumption. Distance in modern times is being progressively reduced with each improvement in transport and communication facilities. The world economy today will rather grind to a halt but for an efficient transport and communication system. In earlier days, the means of transport and communication were the same. But with the advancement in science and technology, both have acquired specialised and distinct forms.

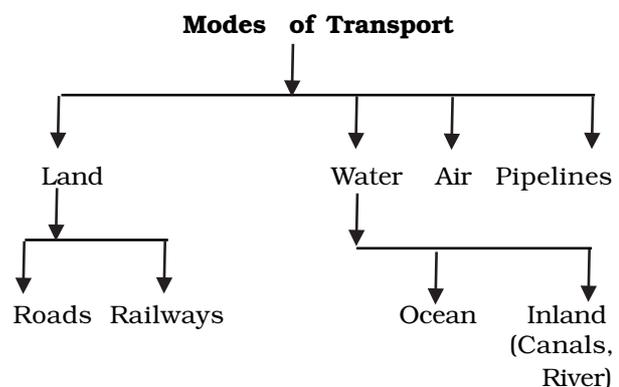
Transport refers to the carriage of goods and passengers from one place to another using humans, animals and different kinds of vehicles. Such movements take place through land, water and air. Roads and railways form part of the land transport. Waterways and airways are the other two modes. Pipelines are used to carry liquids like water and petroleum, and natural gas. Transport thus includes transport arteries, vehicles to carry people and goods, and the organisation to maintain arteries and to handle loading, unloading and safe delivery.

Communication means conveyance of information from the place of origin to the place of destination through a channel. Postal services, telephone, telegraph and fax services, internet and satellites are some of the major means of communication.

Trade means exchange of goods and services through market channels among places in response to differences in prices or demand and supply. It thus, refers to the flow

of goods and services being exchanged between places.

It is now apparent that transport, communication and trade facilitate the movement and exchange of people, goods and services. Transport and communication provide the network of routes, channels and carriers, through which trade takes place. In this chapter, we will discuss about transport and communication. Trade will be taken up separately in the next chapter.



TRANSPORTATION

As we have read earlier, transportation of people, goods and services takes place using different modes — land, water, air and pipes. Each mode of transport has its own importance. Which mode should be used depends on the type of goods and services to be transported, transportation cost and the means of transport available. For example, it is economical to move bulk materials using waterways. International movement of goods in general is handled by ocean freighters. Waterways however, restrict transshipment of

goods from ports to inland destination and they are slow. Road transport is cheaper for small distances and is faster too. It renders door to door service. But if one has to move large volume of bulky materials over long distances especially within a country, railways are most suited. Perishable light and precious goods, on the other hand, can be best moved by air. In a well managed transport-system, the various modes supplement and complement each other.

Land Transport

Most of the movement of goods and services takes place over land. In early days, humans themselves were carriers. In some parts of the world *human portage* is still important, e.g. in thickly — forested regions or rugged mountains where roads are difficult to be constructed. Later, horses, mules and other animals were used as beasts of burden. With the invention of wheel, the use of animal driven carts and wagons, came into prominence. Horse has been the most popularly used animal for riding, carrying load or drawing carts and carriages. The use of animals improved the speed and efficiency of transport, but it was still slow and arduous when compared with the modern standards.

The revolution in land transport was witnessed only after the invention of steam engines in the eighteenth century. Although, the pathways and unmetalled roads have been used for transportation since the earliest times, development of internal combustion engine brought significant changes in the quality of roads and vehicles plying on them. The first railway line was built in 1830, which increased accessibility and connectivity. It opened continental interiors for commercial mining, manufacturing and agriculture.

Among the latest developments in land transportation are ropeways, cableways and pipelines. Ropeways and cableways have been developed in rough and difficult terrain especially the mountainous regions. Liquids like mineral oil, water, sludge and sewers are transported through pipelines.

Roads and Highways

Roads are the most economical means for relatively short distances. Freight transport by road is becoming increasingly important in comparison to rail transport particularly because it offers door to door service. In developed countries, good quality roads are universal and they provide long-distance link in the form of motorways, autobahn, and interstate highways systems facilitating rapid movement. Lorries of increasing size and power carrying very heavy loads are very common now. In developing countries, despite, the lack of good quality roads, the growth of road transport in recent years has been phenomenal.

Highways are metalled roads connecting distant places. Such roads are constructed in a manner that vehicles could ply in an unobstructed manner. As such, these roads are wide as much as 60 metres, smooth and often dual-carriageways with several traffic lanes, bridges, flyovers and embankments are en route to allow uninterrupted traffic flow.

In developed countries, number of vehicles is large and road network is dense. Every city and port town in Europe is linked through highways. In Russia, Moscow is linked by road to eastern city of Vladivostak. In North America, highways link cities located on the eastern and western coasts as well as towns of Canada in the north and those of Mexico in the south. Trans-Canadian-Highway links Vancouver in British Columbia (west coast) and St. John city in Newfoundland (east coast). Likewise Alaskan Highway links Edmonton in Canada and Anchorage in Alaska.

A large part of Pan-American highway has been constructed, which would connect the countries of South America, Central America, and the United States of America. Australia's one of the major road links is Trans-Continental Stuart Highway. It connects Darwin in the Northern Territory and Melbourne in Victoria via Tennant Creek and Alice Spring.

In China, cities in the north and the south, as well as those in the east and the west have been linked through highways. For example,

Tsungtso city located near the Vietnamese boundary in the south is linked with Beijing. Similarly, Shanghai has been linked with Guangzhou in the south and Beijing in the north through highways. A highway has been constructed recently to join Lhasa and Chengdu.

In India, there are a number of highways connecting important towns and cities. National Highway No 7, linking Varanasi with Kanyakumari, is the longest in the country. A golden quadrangle is being developed to connect our metropolitan cities of Delhi, Mumbai, Chennai and Kolkata.

In Africa, a highway joins Algiers across Atlas mountains and Sahara desert, with Conakry in Guinea. Similarly Cairo has also been connected with Cape Town. The construction of good, long distance roads has assisted tourism in many countries. Some of the major roads of this kind have been built in South America. Attempts have also been made to connect the ports with their hinterlands.

The quality of the roads varies greatly between developed and developing countries because construction and maintenance of good roads require heavy expenditure.

Railways

Railways are comparatively cheaper and more convenient mode of transport than roadways in moving goods in bulk over a long distance.

With the opening of the first public railway between Stockton and Darlington in northern England in 1825, railways became most popular and fastest form of transport for both passengers and goods during the nineteenth century. The growth of the railways was brought about by two interrelated factors. Firstly, the steam engine was developed and applied not only to industry but also to transport. Secondly, the rapid rise of industry made it necessary to improve existing transport systems. Railways were the cheapest and fastest carriers of bulky goods a large number of passengers, over a long distances. Commuter trains have become very popular in Britain, the USA, Japan and India. They carry thousands of people every day from one part of the city to the other within no time.

World Railway Patterns : The competitiveness of railways as a form of transport varies greatly from one country to another, because of the high cost of maintenance. Usually they are managed by the government as they come under essential services. Steam engines have been replaced by diesel and electric engines. Speed of trains has increased tremendously. Special services for passengers such as airconditioning, night births, reclining seats and restaurant services are provided for comfortable journey. Freight services have also been improved by introducing wagons with cooling facilities for perishable goods and tankers and containers. Containers can be unloaded directly from ships on to special rail wagons cutting out several loading and packing operations. However, railways all over the world are experiencing severe financial difficulties.

In Asia, railway network is good in India, Japan and China. India with about 93,000 km of railways cover 63,000 route km and more than 7,000 stations. It has the densest network in Asia. In Japan, the total length of railway is 28,000 km. China has more then 35,000 km route length. Other countries of Asia have relatively few rail routes. West Asia is least developed in rail transport because of vast deserts and sparsely populated regions.

In South America, the rail network is particularly dense in the Argentina's Pampas and the coffee-growing region of Brazil. Nearly forty per cent of the total route length of South America is concentrated in this region. There is only one trans-continental railway in South America linking Buenos Aires (Argentina) with Valparaiso (Chile) through the Uspallata Pass across the Andes located at a height of 3,960 metres above mean sea-level. Of the remaining countries only Chile has a considerable length of railway lines, running from Iquique to Puerto Montt, with branch lines that link coastal ports with mining sites in the interior. The railway routes of the other Andean states, e.g. Peru, Bolivia, Ecuador, Colombia and Venezuela, are short and consist mainly of single lines from ports to the interior with no inter-connecting links.



Fig. 8.1 Trans-Siberian Railway

Australia has about 40,000 km of railways, of which a quarter is found in New South Wales. There is one trans-continental line running from Perth to Sydney; passing through such towns as Kalgoorlie, Adelaide, Canberra and Melbourne. A major North-South line links Adelaide and Alice Spring but as yet this has not been joined to the line from Darwin to Birdum.

New Zealand's railways are mainly in the North Island linking the main towns of farming areas.

Africa, despite being the second largest continent, has only 40,000 km of railways. Some of the more important routes include the Benguela Railway through Angola to Katanga-Zambia copper belt; the Tanzania Railway from the Zambian copper belt to the sea at Dar-es-salaam, and the railway through Botswana and Zimbabwe linking the landlocked central African states to the South African system. Elsewhere, as in Algeria, Senegal, Nigeria, Kenya, Ethiopia, railway lines run from coastal ports to inland centres but do not form a good network or link with lines in other countries. South Africa, with 18,000 km of railways has

the densest rail network because of the gold, copper and diamond mining activities.

One of the densest rail network in the world is found in Europe. There are approximately 4,40,000 km of railways, most of which are double or multiple tracked. Important railheads are : Paris, Berlin, London, Brussels, Milan, Warsaw and Moscow. Industrial regions of Western Europe exhibit greatest railway densities. Belgium has the greatest density with one km of railway for every 6.5 sq. km of the country. Passenger transport by rail is more important than freight in many European countries. Underground railways are important in London, Paris and Moscow.

Trans-continental railway lines of Europe have now lost their importance with evergrowing quicker air transport and more flexible roadways.

North America has at present the most extensive network of railways making up nearly 40 per cent of the world' total. The railway network today is used extensively for the transport of bulky freight like minerals, grains, timber and manufactured product over long distance. It, however plays an



Fig. 8.2 Canadian Pacific Railway

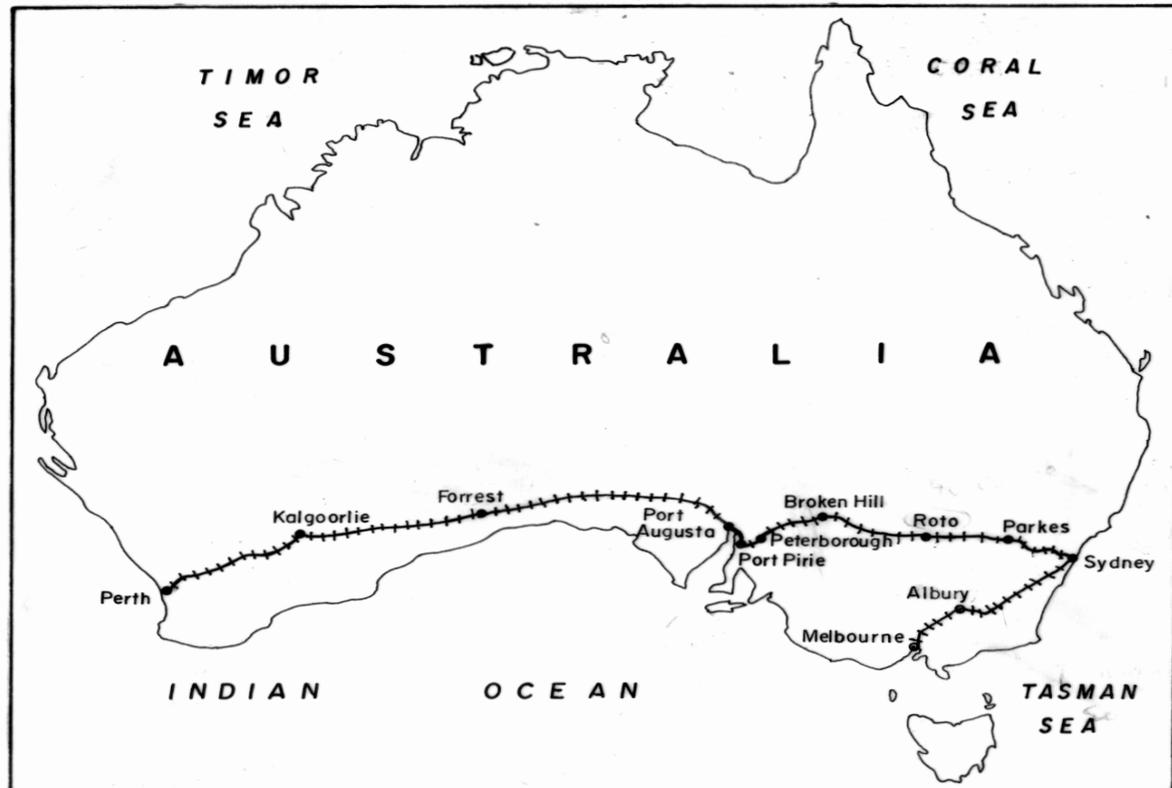


Fig. 8.3 Australian Trans-Continental Railway

unimportant role in passenger transport because more passengers prefer to travel by automobiles or aeroplanes than by railways.

The densest railway network is found in the east-central USA and southern Canada, south of the Great Lakes, and on the Atlantic coast.

The high level of economic development coupled with high urbanisation are the main reasons for the concentration of rail network in the eastern United States of America.

Trans-Continental Railways : Railways running across the continent and linking its two ends are called trans-continental railways. They were constructed for economic and political reasons.

The most important trans-continental railway in Asia is the Trans-Siberian Railway (Fig. 8.1). It runs in Russia from St. Petersburg in the west to Vladivostak in the east. It is a double-track route and runs for a distance of about 9,332 km. Some of the main stations en route are Moscow, Ufa, Novosibirsk, Irkutsk, Chita and Khabarovsk. It has connecting links to the south to Odesa in the Ukraine, Baku the Caspeian Sea, Tashkent in Uzbekistan, Ulan Bator in Mongolia, Shenyang (Mukden) in Manchuria and Beijing in China.

Canadian Pacific Railway connects Vancouver on the west coast and Halifax on the east coast of North America (Fig.8.2). It was constructed in 1886. It's total length is 7,050 km. Initially this railway line was built as a part of an agreement to make British Columbia join the Federation of States. It, however, assumed economic importance later on because it connected Quebec-Montreal industrial region with softwood forest region in the north and wheat region of the prairies. Thus, each region became complementary to the other. A loop line from Winnipeg to Thunder Bay, located on the northern shores of the Lake Superior, connects this railway line with one of the important waterways of the world. Wheat from the prairies could be brought through the waterways. This railway line thus became the economic artery of Canada.

Australian Trans-Continental Railway connects Sydney on the east coast with Perth

on the west coast. It runs through the southern part of the continent. Main stations on this route are Broken Hill, Port Augusta, and Kalgoorlie (Fig. 8.3).

There is a proposal to build a trans-Asiatic railway linking Constantinople in Turkey with Bangkok in Thailand via Saudi Arabia, Iran, Pakistan, India, Bangladesh and Myanmar.

Water Transport

One of the great advantages of water transportation is that it does not require route construction. The oceans are linked with each other and they are negotiable by ships of various sizes. All that needs to be done is to provide port facilities at the two ends. It proves to be cheap because the friction of water is far less than the friction of land or air. And hence, the energy cost of transportation is lower.

The waterways are divided into two groups: inland waterways and oceanic routes.

Inland Waterways

Rivers, canals, lakes and coastal areas have been important inland waterways from time immemorial. Boats and steamers are used as means of transport. They carry cargo as well as passengers. Rivers are the only means of transport in dense forests. Very heavy cargo like coal, cement, timber, metallic ores can be transported by waterways. In India, riverways were the main highways of transportation in ancient times. But they lost importance because of several reasons such as construction of railways, lack of water in rivers as they were diverted into canals for irrigation, making them unsuitable for navigation; and poor maintenance of inland waterways.

The development of inland waterway is dependent on several factors such as width and depth of the channel, continuity in the flow of water and transport technology in use.

Despite inherent limitations, inland water transport has developed in many parts of the world. In these regions, many rivers have been greatly modified to enhance their navigability. Building of dams and barrages for regulating the flow of water and dredging i.e. removal of silt from channel beds for maintaining a

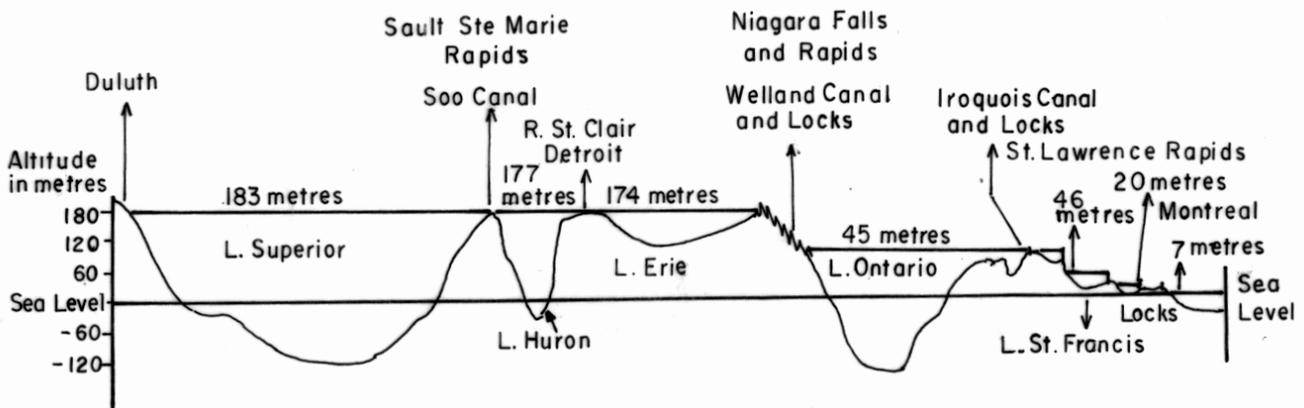


Fig. 8.4 Ship Movement in Great Lakes — St. Lawrence Waterway

constant depth of water, does help overcome many problems mentioned earlier. The river banks are stabilised in areas where shifting of channels is a problem. Some of the major inland waterways are discussed below:

There are two major inland waterways systems in North America : (i) the Great Lakes – St. Lawrence waterway, and (ii) the Mississippi waterway.

The Great Lakes–St. Lawrence Waterway : It is an unique waterway in the northern part of North America. The ports located on this route have developed just like ocean ports — with all facilities. As such large ocean freighters are able to navigate deep inside the continent, upto 3,760 km, through the estuary of St. Lawrence below Qubec. This waterway has helped in the industrial and economic growth of the region (Fig. 8.4).

The Mississippi Waterway: The Mississippi-Ohio waterway connects the interior part of the USA with the Gulf of Mexico in the south. Large steamer can go through this route upto Minneapolis.

There are a large number of navigable rivers and canals in western and central Europe and western Russia.

The world’s densest network of inland waterways is found in France and Germany. Rivers Seine, Rhine and Elb together with their tributaries flow into the North Sea. Most of the rivers are interconnected through canals. One may travel in this part almost through rivers and canals from the Mediterranean Sea to the North Sea.

Rhine Waterway: The Rhine is the most important channel of navigation in this region. It is the world’s most heavily trafficked waterway. Rotterdam is located at its mouth in the Netherlands. Its hinterland stretches up the Rhine and includes Belgium, France, Germany and Switzerland (Fig. 8.5).

Volga Waterway : Russia has a large number of developed waterways. The Volga is one of the most important waterways. The Volga river system discharges its water in the

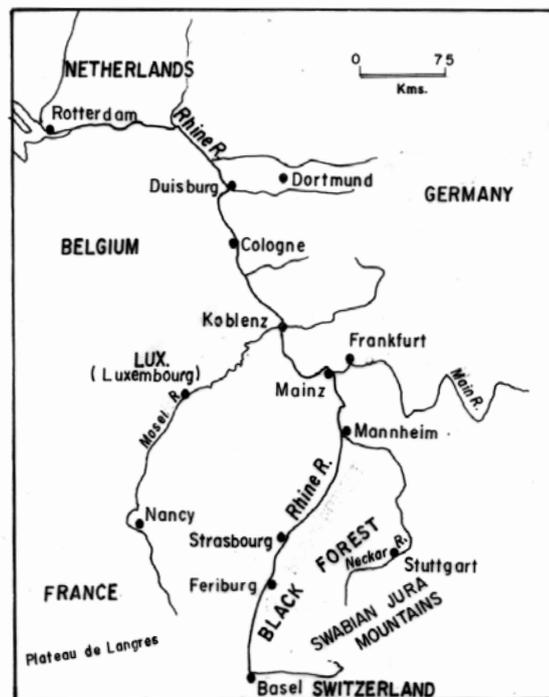


Fig. 8.5 : Rhine Waterway

Caspian Sea. It provides a navigable route of 11,200 km. The Volga — Moscow canal connects it with the Moscow region. It is linked with the Black Sea through the Volga — Don Canal.

In many countries of southeast Asia, rivers play an important role in carrying people and goods. But inland waterways of eastern China and India are comparatively more important in terms of volume.

China has many large rivers but some of them, especially in the eastern part, are more developed for water transport. The Huang, the Chang Jiang and the Xi rivers are navigable. The densely populated Sichuan region is linked with the Chang Jiang delta, where a dense network of canals has developed. Ocean vessels can reach upto Hankow through this route.

River Ganga in India is navigable upto Patna. There is a regular steamer service between India and Bangladesh through Sundarbans. Kerala is another state where inland water transport through the backwater is prospering. India has a long coast line. There are coastal services to carry passengers and goods.

Although the Amazon in South America is the longest river in the world and is also navigable upto Iquitos in Peru, which is 3,680

km from the Atlantic coast in the east, it has not yet developed due to sparse population and low economic development of the region.

Parana-Paraguay Waterway: It is the most important riverway in South America. This river system discharges its water in the Atlantic Ocean through the estuary of Rio de la Plata. As such large ships can enter the waterway. Parana is navigable for ocean vessels upto Santa Fe, located at a distance of 240 km. Paraguay provides accessibility to river steamers upto Asuncion. This waterway has a well developed hinterland and connects the productive interior to the Atlantic coast.

Ocean Transport

Ocean transport is the cheaper means of haulage (carrying of loads) than land and air. The oceans offer a free highway traversable in all directions with no maintenance cost. Ocean-going ships are capable of carrying far larger loads than any other carrier. The introduction of refrigerated chambers for transporting perishable goods such as meat, fruits, vegetables and dairy products, and the development of tankers and other specialised ships has greatly improved the efficiency of

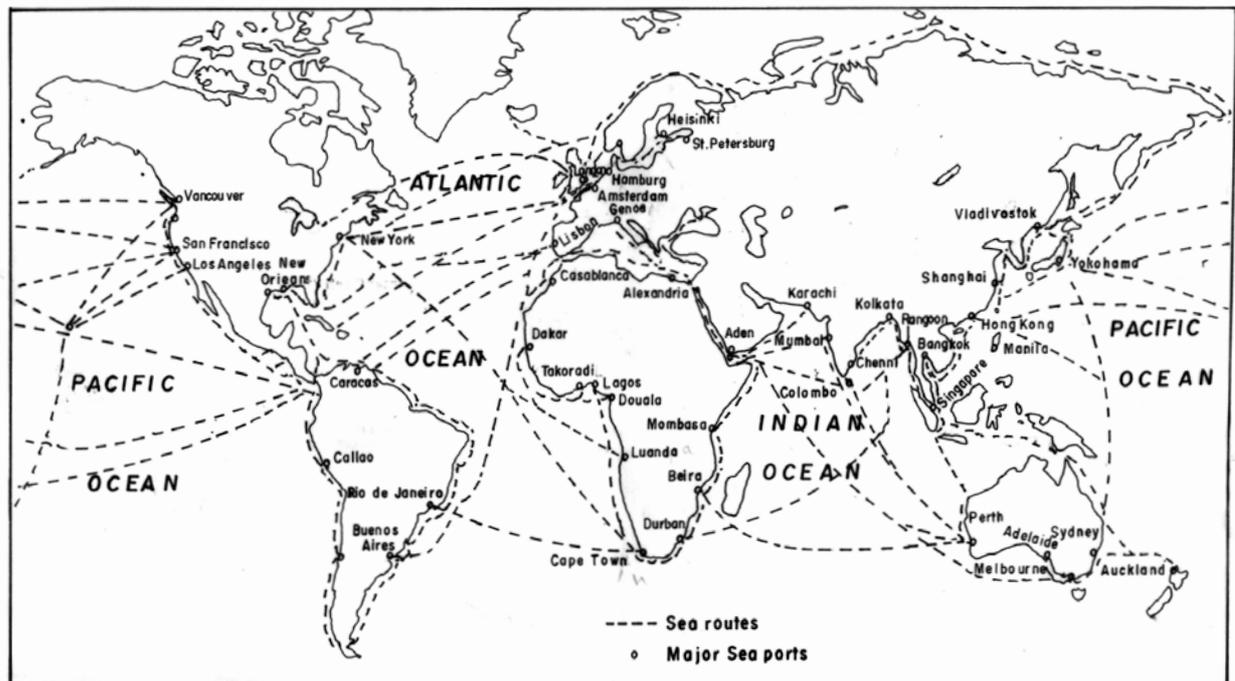


Fig. 8.6 Major Ocean Trade Routes and Sea Ports

ocean transport. The use of containers has not only made cargo handling easier but has eased the transfer of goods to land transport by rail or road at the world's major ports. Modern passenger liners and cargo-ships are equipped with radar, wireless and other navigation aids. As such they are little hindered by storms and bad weather and can cross the ocean at moderate speed reaching their destinations on schedule.

The ocean trade routes are shown in Fig.8.6. Some of the important ocean routes have been discussed in the following pages.

North Atlantic Route : It connects two most developed regions of the world, eastern part of Canada and the USA with the Western Europe. It is, therefore, the most important and busiest route. Both the coasts have good port and harbour facilities. Rich agricultural, commercial, and industrial regions of Europe export large quantities of manufactured items — textiles, chemicals, machinery, fertilisers, steel and wine to the United States and Canada. Bulky and large quantities of food grains and raw materials, like wheat, woodpulp, copper as well as iron and steel, transport equipment etc. are sent to the Western Europe through this route. The foreign trade of the North Atlantic Region is greater than that of the rest of the world combined.

The Mediterranean and the Indian Ocean Route : Industrially developed countries of Europe are connected with East Africa, South Asia and Southeast Asia through the Mediterranean Sea, the Red Sea and the Indian Ocean route. In fact, all ocean bound traffic from Europe to Africa, Asia and Australia passes through this route. The east bound cargo mainly consists of machinery and industrial products. The west bound cargo includes mineral oil and agricultural products such as cotton, rubber, tea, coffee and sugar. Port Said, Aden, Mumbai, Kochi, Colombo and Singapore are some of the important ports on this route.

The Suez Canal : It is a man-made waterway in Egypt which was constructed to link the Mediterranean Sea with the Red Sea (Fig. 8.7). It is a sea-level canal without locks. The opening of the Suez canal in 1869 reduced

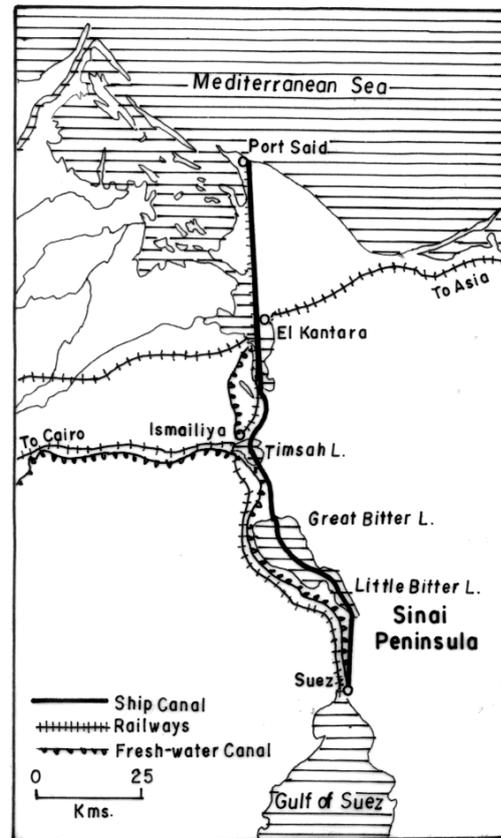


Fig. 8.7 Suez Canal

direct sea-route distances between western Europe and South east Asian countries by about one half. A number of ports have emerged enroute such as Port Said and Port Faud in the north and Port Suez in the south.

The Cape of Good Hope Route : This route was once the subsidiary alternative to the Suez. This route is 6,400 km longer between Liverpool and Colombo. It provides link between Western Europe and West African countries, South Africa, Southeast Asia, Australia and New Zealand. The ships coming from Europe directly head towards the Cape of Good Hope. With the increase in the tempo of economic development in the recently independent African nations and the exploitation of their rich natural resources such as gold, copper, diamond, tin, chromium, manganese, cotton, oil palm, groundnuts, coffee and fruits, the volume of traffic round the Cape of Good Hope and from ports in both East and West Africa is on the increase.

The South Atlantic Route : This sea route connects West European and West African countries with ports of Brazil, Argentina and Uruguay in South America. The ocean traffic in the South Atlantic is far less than that in the North Atlantic because South America is comparatively less densely populated and has limited economic development. Only south-eastern Brazil, the Plata estuary and parts of South Africa have large-scale industrial development. There is also very little trade on the east-west route between Rio de Janeiro and Cape Town, because both Africa and South America have similar products and resources. Coffee and cocoa from Brazil, and wheat, meat, wool and flax from Argentina are sent to the industrial countries of North America and Western Europe in return for manufactured and semi-finished commodities.

The North Pacific Route : It links the ports on the western coast of North America such as Vancouver, Seattle, Portland, San Francisco and Los Angeles with the ports in Asia – Yokohama, Kobe, Shanghai, Hongkong, Manila and Singapore. Trade across the vast North Pacific Ocean goes by several routes which converge at Honolulu. The direct route farther north on the great circle links Vancouver and Yokohama, reduces the traveling distance (about 2,480 km) by half. Wheat, timber, paper and pulp, fish, dairy products and manufactured goods are the

main exports from North America. The trade from Asia mainly consists of manufactured goods such as textiles, electrical equipment from Japan, Hongkong, South Korea and Taiwan, and tropical raw materials from Southeast Asia, e.g., rubber, copra, palm oil, tea and tin.

The South Pacific Route : It connects Western Europe and North America with Australia, New Zealand and the scattered Pacific islands via the Panama canal. This route is also used for reaching Hongkong, Philippines and Indonesia. Goods transported are mostly wheat, meat, wool, fruits, dairy-products and manufactured articles. The distance covered between Panama and Sydney is about 12,000 km. Honolulu is an important port on this route.

The Panama Canal : It connects the Atlantic Ocean in the east and the Pacific Ocean in the west. It has been constructed across the Panama isthmus, and therefore, separates the landmass of North America from that of South America. With the construction of Panama canal, the distance between the eastern and western coasts of North and South Americas has come down substantially. It also provides a shorter route between countries of Far East and Southeast Asia on the one hand and those of the Western Europe on the other (Fig. 8.8).

Panama canal has a lock system. Ships cross different levels of the canal through three locks before entering into the Gulf of Panama. The economic importance of Panama canal is comparatively less than that of the Suez.

Air Transport

It is the fastest mode of transport, as well as the costliest. The manufacturing of aircrafts and their operation require elaborate arrangements — hangar, landing, fueling and maintaining facilities. As such air transport is used only for high value goods and passengers. Air traffic is adversely affected in bad weather.

It has certain advantages too. Valuable cargo can be moved rapidly on a worldwide scale. Being fast, it is preferred for long-distance travel by passengers. Air transport is often the only way to reach difficult areas.

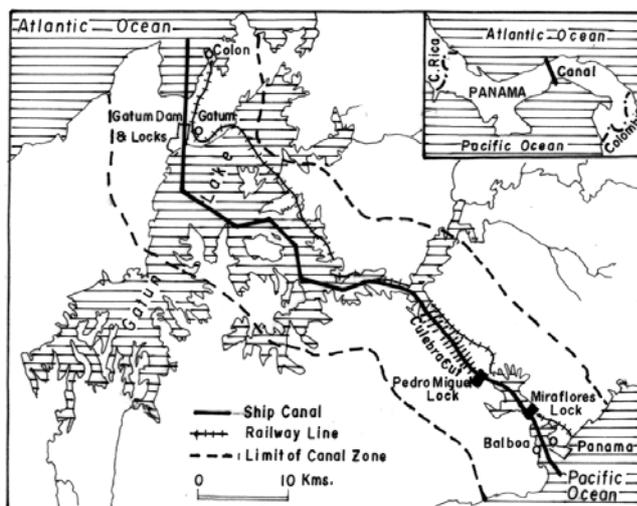


Fig. 8.8 Panama Canal

Recent developments may change the future course of air transport. Supersonic aircraft such as *Concorde*, had been developed, which could cover the distance between New York and London within three and a half hours.

A very dense network of air routes exists in Western Europe, Eastern United States of America and Southeast Asia. There are some nodal points where the air routes merge or radiate in all directions e.g. — London, Paris, Rome, Moscow, Karachi, New Delhi, Mumbai, Bangkok, Singapore, Tokyo, San Francisco, Los Angeles, Chicago, New York and Rio de Janeiro etc. Soviet Asia and Africa lack air services. There is a distinct belt of air routes from east to west in the Northern Hemisphere (Fig. 8.9).

Airports require wide ranging facilities for the passengers, goods and the aircrafts. The construction of airports is very expensive. Hence, they develop in areas where there is sufficiently large volume of traffic London, Paris, Rome, New York, Chicago, Tokyo and Singapore are some of the busiest airports of the world.

Pipelines

Pipelines are used extensively to transport liquids and gases such as water, mineral oil

and natural gas for an uninterrupted flow. We are familiar with the supply of water and mineral oil through pipes. Even cooking gas or LPG is supplied through pipelines in many parts of the world. Pipelines can also be used to transport coal mixed with water. In the USA, there is a dense network of pipelines for carrying petroleum from the regions of production to the regions of consumption. A famous pipeline of the USA, known as the 'Big Inch' which carries mineral oil from the wells of the Gulf of Mexico to the north-eastern part. About 17 per cent of all freight per tonne-kilometres is carried through pipelines in the USA.

In Europe, West Asia(Fig 8. 10), Russia and India, pipelines are being used to connect oil wells to refineries and to ports or internal markets. It is also popular for carrying natural gas. One of the longest pipeline, called COMECON, is 4,800 km long. It connects oil wells of the Ural and the Volga regions to the countries of East Europe.

COMMUNICATION

Humans used different means of communication ever since they appeared on the earth, but the pace of change has been rapid during modern times. Long distance

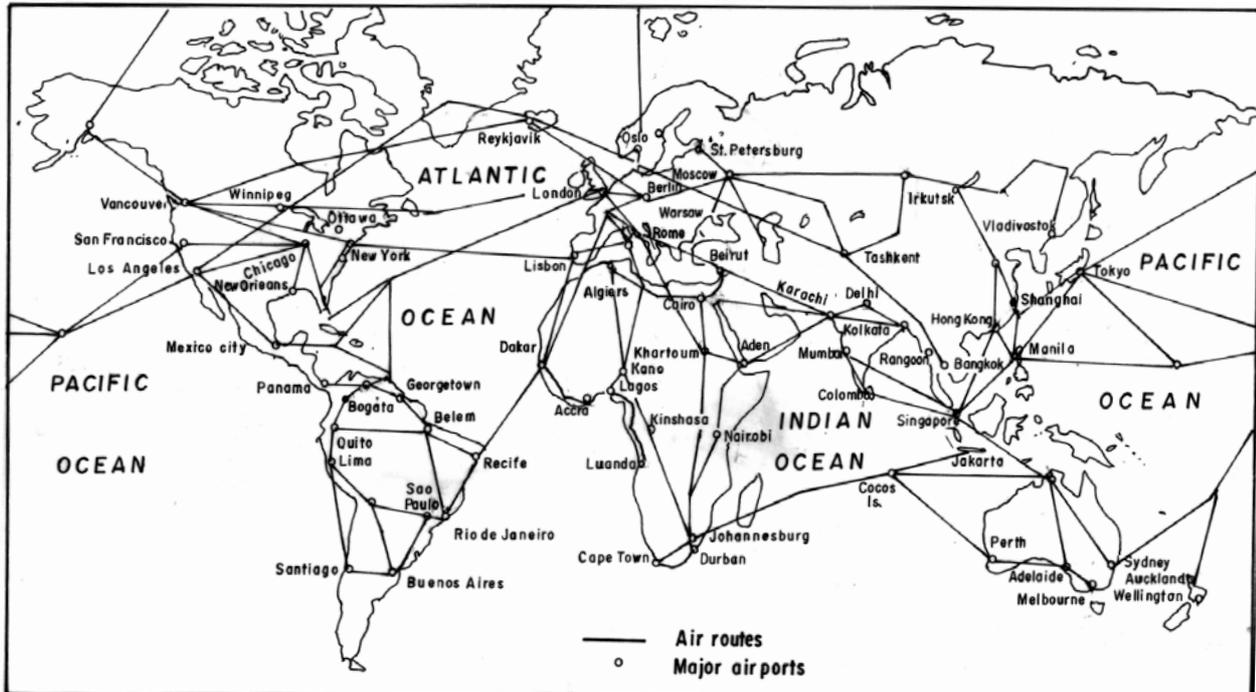


Fig. 8.9 Major Air Routes and Airports

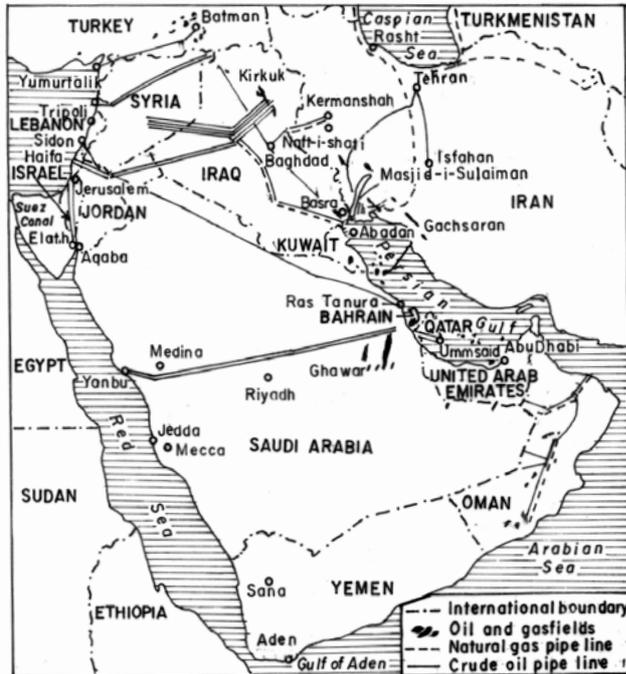


Fig. 8.10 West Asia : Pipelines

communication has been made far easier than ever before without physical movement of either the communicator or the receiver. The first major breakthrough in communication system was the telecommunication. Telegraph was instrumental in the colonisation of the American West in the late nineteenth century. Telephone was a critical factor in the urbanisation of America, enabling firms to have centralised functioning at their headquarters and locate their branches in smaller towns. Even today the telephone remains by far the most commonly used form of telecommunications.

Radio, television, fax and internet make communication more accessible to more people cutting across all barriers of time and space. Modern communication system more than the transport system, has converted the world into a global village. The contemporary social and economic space is closely tied to modern communication system.

During the early and mid twentieth century, the American Telegraph and Telephone Company (AT&T) enjoyed a monopoly over the US telephone industry. Faced with mounting competition, telephone

companies have steadily upgraded their copper cable systems to include fiber-optic lines, which allow large quantities of data to be transmitted rapidly, securely, and virtually error free.

With the digitisation of information in the late twentieth century, telecommunication steadily merged with computers to form integrated networks through the internet. Today internet is the largest electronic network on the planet, connecting an estimated 100 million people in more than 100 countries.

Popular access systems of the internet allow any individual with a micro-computer and modem to plug into cyberspace, the world of electronic computerised spaces encompassed by the internet and related technologies such as the World Wide Web (WWW). Cyberspace may exist in an office, a sail-boat, or virtually anywhere.

As millions of new users log on to the internet each year, cyberspace has expanded rapidly in size and in use and importance, including e-mail and electronic commerce. Thus, cyberspace exists 'everywhere'. In short, telecommunication revolution has expanded the human, social and economic space considerably.

Satellite Communication

The United States of America and former Soviet Union have been pioneers in space research. Artificial satellites, successfully placed in the earth's orbit have brought revolutionary changes in the areas of communication. The satellite communication system deployed since the early 1970s have rendered the unit cost and time of communication invariant with respect to distance. It costs the same to communicate over 500 km as it does over 5,000 km via satellite. India, too, has made great strides in space research. Aryabhata was launched on 19 April, 1975 from the Soviet Union with the help of its Intercosmos rocket. Bhaskar-1 was sent into the space on 7 June, 1979 and on 18 July, 1980, Rohini was launched from the Indian Cosmodrome at Shri Harikota.

On 19 June, 1981, APPLE (Arian Passenger Payload Experiment) satellite was launched

through Arian rocket. Bhaskar-2 was sent into the space on 20 November, 1981, which was also a remote sensing satellite. INSAT 1-A was launched on 10 April, 1982 but in September the same year it stopped working. On 30 August, 1983 INSAT 1-B was sent to space through space shuttle, Challenger. INSAT 1-B has made radio, television, and long distance communication very efficient and effective. Now we receive information about the weather on television and forecasting about storm etc., is done effectively.

Remote sensing is the gathering, storing and extracting of geographic information from great distances when the gatherer makes no physical contact with the target. The process usually covers the large areas.

The best known satellite images have come from NASA series of Landsat satellites. The first, originally called the Earth Resources

Technology Satellite (ERTS) was launched in 1972. The launch of Landsat, which will be operated jointly by NASA and the US Geological Survey, took place in April 1999. The satellites have provided a wealth of information about the earth to scientists as well as to map makers.

As the US and Russian Governments drop security restrictions on data gathered from reconnaissance satellites, private companies are increasingly using this information for non-military applications such as seeking potential energy sources, monitoring pollution, and analysing building sites, besides predicting weather, locating areas of deforestation and mineral deposits, identifying hundreds of other physical patterns and processes. As the technology develops, government, academia and business are continuing to find new applications for these images.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) Name the three important modes of transport.
 - (ii) Differentiate between transport and communication.
 - (iii) Why pipelines are used extensively to transport commodities such as mineral oil and natural gas?
 - (iv) What are highways?
 - (v) What factors contributed to the growth of railways?
 - (vi) What is a trans-continental railway?
 - (vii) What are the advantages of water transport?
 - (viii) Name the two major inland waterways of North America.
 - (ix) Which major ports are linked by the North Pacific Ocean route?
 - (x) Which are the three major regions of the world having a very dense network of airways?
 - (xi) What is an internet?
2. Write short notes on:
 - (i) Trans-Siberian Railway;
 - (ii) Inland Waterways of Europe;
 - (iii) Suez Canal;
 - (iv) Satellite Communication.
3. Describe the distribution of roads and highways in the world.
4. Discuss the importance of railways as a means of transport and its distribution pattern.
5. Describe the Atlantic Ocean routes.

Geographical Skills

6. On an outline map of the world show the following:
 - (i) The Suez Canal;
 - (ii) The Panama Canal;
 - (iii) Trans Australian Railway;
 - (iv) The North Pacific route between Vancouver and Hongkong;
 - (v) New York, London and Singapore.

9

CHAPTER

INTERNATIONAL TRADE

Trade refers to the movement of goods and services from areas of surplus to areas of deficit. When exchange of goods and services takes place between two countries, it is called *international trade*. Throughout history, trade routes have played significant roles in cultural diffusion. You must have heard or read about the old 'silk route' between China and Southwest Asia. The caravans travelling on this south-land route used to trade in silk, iron wares, and condiments. Trading between different parts of the world, especially between Asia and Europe has a very long history. The chance discovery of America by Columbus was prompted by trade. The Indians, the Chinese, the Arabs, the Romans, the Dutch and the British — all have contributed in promoting trade relations.

Trade in modern time is no less important. In fact it is now the base of all world economies. Why do we trade and how does it contribute to the national economy? You will get answers to these questions in the following pages.

BASE OF INTERNATIONAL TRADE

The need for trade arises mainly from regional difference in production and productivity. There are great variations in the location and distribution of different kinds of natural resources on the earth's surface. All countries do not possess all resources in the same amount. Besides, the degree of utilisation of these resources also varies from country to country. A number of factors such as availability of resources, required capital, technology and skills, domestic and international demand and government policies influence and determine the production of

various commodities and services. As a result, there are regions which have surplus in certain commodities while deficit in others. Hence, countries export goods and services that are in surplus and import those that are in deficit.

Specialisation in the production of certain goods and services, by some countries is another factor that gives rise to international trade. Some countries are known for specialised skills in the production of certain goods in great demand globally. For example, Chinese silk, Iranian carpets and Indian spices have formed part of international trade since ancient times. Today, Swiss watches and chocolates, Japanese camera and electronic goods, American Boeing aircrafts and West Asian petroleum are in demand internationally.

Production of any commodity in large volumes does not ensure that it will be a part of international trade. If the production exceeds local consumption level and is in short supply elsewhere, then alone it enters international trade channels. Certain food crops do not enter the world trade even if they are surplus, in order to regulate prices internally. For example, trading in rice is limited as most of its production is needed within the region, where it is grown at a price within the reach of the people.

There are cases where surplus production is destroyed or thrown in the ocean, to keep prices high enough to maintain production level. For example, maize production is quite high in the USA, so is the coffee production in Columbia and Brazil in South America. In order, to maintain world prices, the surplus production of these crops in certain years is thrown away instead of selling it at a lower

price. Among the food crops wheat is the most important trading item.

Several countries in Africa are heavily dependent on a limited range of primary products — agricultural and mineral commodities, such as coffee, cocoa, cotton and copper for foreign exchange to buy other goods. For example Mauritania, Zambia and Rwanda earn more than 95 per cent of their foreign exchange from a few primary products. In a few countries, a single product dominates export earnings e.g. copper in Zambia and coffee in Uganda provide more than 90 per cent of their foreign exchange.

The smooth flow of goods and services between different parts of the world is dependent on a number of factors. Peace and political stability in the producing region is a primary condition for it. One of the reasons for fluctuating petroleum prices is periodic disturbance in West Asia — Iranian Revolution, Palestinian-Israeli conflict and Iraq-Kuwait war. Conflicts and wars disrupt production and transportation of goods and services.

COMPONENTS OF INTERNATIONAL TRADE

There are three important components of international trade, that set the world pattern. They are : volume of trade; composition of trade; and direction of trade.

Volume of Trade

The volume of trade may be measured in terms of the actual tonnage of goods traded, but tonnage is rarely an indicator of value and hence, the trade of a country is usually measured by the *total volume* and the *value of goods exchanged*. Sometimes, however, it is measured on a *per capita* basis, that is how much trade (by value) is carried on per head of the population.

World trade has been changing constantly. Except for a few sudden dips during economic recession, the growth rate has been accelerating during the post World War II period. The volume of trade between countries differs markedly depending upon the nature of goods and services produced, bilateral agreements and trade restrictions.

Composition of Trade

The types of goods and services entering the world trade are also changing. The importance of manufactured goods has increased over the years. It is the largest and fastest growing component of trade. It has been possible due to fast growth of manufacturing industry in the later half of the twentieth century and reduction in tariff barriers especially under General Agreement on Trade and Tariffs (GATT) and now under the World Trade Organisation (WTO). A number of primary products such as coal, cotton, rubber and wool have lost importance in recent years. Petroleum occupies one of the most important places in the world trade now.

Direction of Trade

Until the eighteenth century, manufactured and high value sophisticated goods were exported from present day developing countries to Europe. The direction of trade changed in the nineteenth century. Manufactured goods from Europe were exchanged for the food stuffs and raw materials from three southern continents. In the first half of the twentieth century, much of the trade in manufactured goods was mainly between the USA and Western Europe. Japan, in that period, became another important trading country. In the second half of the twentieth century, the old pattern has started changing. The developing countries are now able to compete with developed countries in manufactured goods too. Emphasis is now laid on trade in technology.

TYPES OF INTERNATIONAL TRADE

International trade may be of two types. *Bilateral trade* is the exchange of commodities between two countries. It happens if the economies of the two countries are complementary. One country provides raw materials or energy in exchange for manufactured goods. This is possible only to a limited extent for certain commodities. *Multilateral trade*, on the other hand, is the exchange of goods and services among a number of countries.

BALANCE OF TRADE

The difference in value between imports and exports is referred to as *the balance of trade*. If exports exceed imports, a country is said to have a *favourable balance of trade*, while if imports exceed exports it has an unfavourable or *adverse or negative balance of trade* (Fig. 9.1).

INTERNATIONAL TRADE — THE CHANGING SCENARIO

Trade has undergone fundamental changes over time, both in quality and quantity. Economic value and the major types of commodities accounting for most of the value-added in international trade have proceeded through distinctive eras over time, with technology as a constant driving force.

In the *first phase*, primary commodities i.e. raw materials, minerals and food products dominated. In the *second phase*, beginning with the Industrial Revolution, manufacturing goods accounted for the largest share of international trade, and was the most lucrative sector. Trade in primary commodities during this phase still took place, but the technological upgrading of products made manufacturing trade of standardised products more attractive. In the *third phase*, services became global

commodities, accounting for a growing share of international trade.

Twin technological revolutions in information and transportation have fueled the growth and upgrading of commodities in trade. Transport costs have continued to fall throughout the twentieth century. Advances in communications technology — telephone, fax, electronic mail, and video conferencing have facilitated the coordination and monitoring of production in diverse locations. Improvement in trans-Atlantic cable capacity and the corresponding increasing capabilities of global communication have also facilitated more interactions among firms in different countries.

Emerging Sectoral Composition of Trade

It has changed significantly in recent years showing high growth in capital goods, especially machinery and transportation and commercial services (Table 9.1). By contrast trade in primary commodities continue to fall, and its relative share of trade has been declining, especially over the last 30 years. It is mainly because of the cyclic decline of commodities price relative to manufacture and services trade. Manufacturing trade still predominated, but this market is becoming

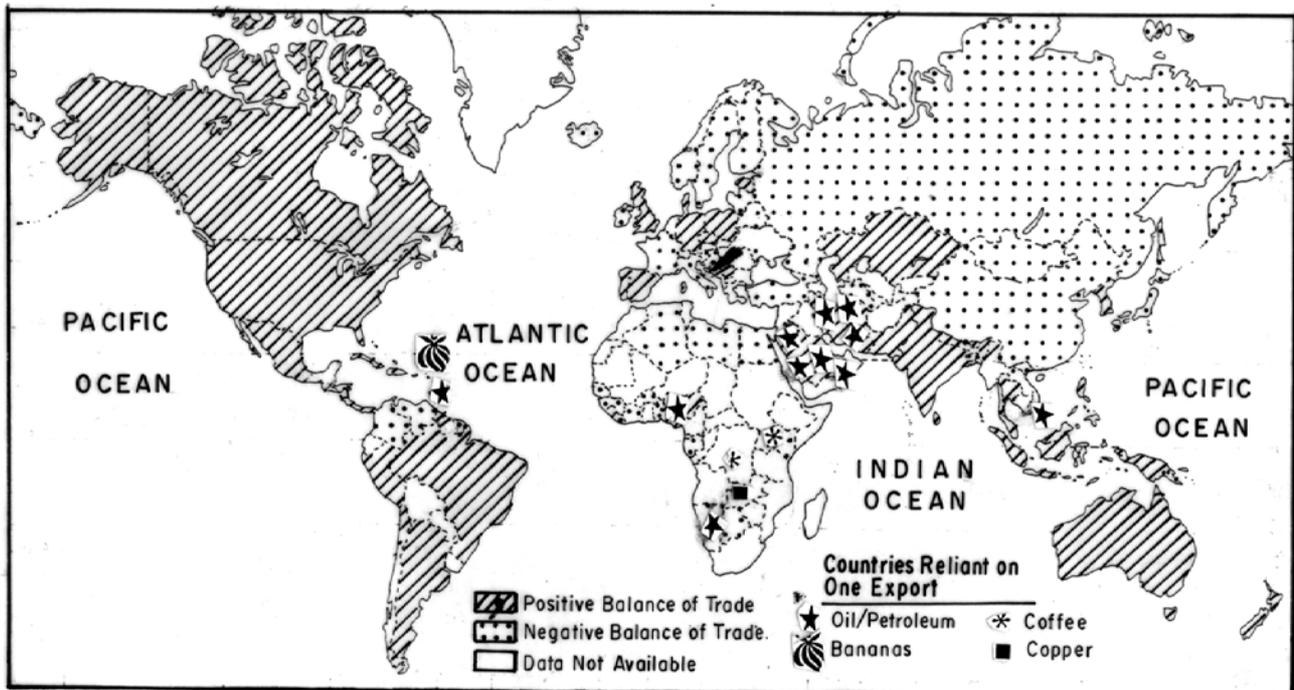


Fig. 9.1 World : Balance of Trade

Table 9.1 : Composition of World Trade 1965-96

GATT/WTO Breakdown* Shares of Total World Trade	1970	1980	1990	1996
Merchandise				
Agriculture	16.5	12.5	10.0	11.4
Mining	12.0	22.0	11.5	11.2
Manufacturing	50.0	45.5	57.0	73.2
(Not Specified)	2.5	3.0	2.5	3.0
Capital Goods	29.5	26.5	37.0	39.0
Services**	19.0	17.0	19.0	24.6
World Bank Breakdown				
Shares of Total World Merchandise Imports	1965	1979	1990	1995
Food	18.0	12.0	9.0	12.2
Fuels	10.0	20.0	11.0	9.0
Other Primary Commodities	17.0	9.0	8.0	7.7
Manufacturing	55.0	58.0	73.0	72.0
Machinery Transports	23.0	25.0	34.0	30.9

* GATT 1992: Table 2; 1990: Table 8; 1989: Table 9; WTO; 1997: Table 11.2

** Services include shipping, transport, travel and private services

more differentiated due to the customised delivery of products to seek new competitive advantages. Until 1960, most TNCs were either of from the USA or the UK. In recent years, Japanese, German and other companies have become important on global scene. The power and influence of TNCs continue to grow with liberalisation.

Changing Sectoral Components

The strong growth registered for services is a recent phenomena. Services account for 25 per cent of global export by 1996. Service trade is qualitatively different from manufacturing trade in that services are infinitely expansible and potentially weightless, many people can use them at the same time, and once the goods are produced, they can be replicated at a low cost. For some companies, such as IBM, more profits are generated from providing services than from producing goods in the traditional sense.

In twenty-first century, it is predicted that commodity trade will be further upgraded and that the highest rewards from trade will involve the selling of lifelike interactive or virtual reality experiences globally. The recent globalisation of production also has altered the type of commodities that are traded. For instance, a significant proportion of trade is now constituted as component parts rather than

finished goods. Vertical specialisation takes place where countries acquire expertise in particular stages of the production process. A country may import certain goods from another country to use them for the production of its own goods and then export that to some other country. The sequence only ends when the final goods reach their destination. *Vertical trade* involves, for example, the skill intensive design and manufacturing of a *microchip* in one country and its labour-intensive assembly onto a mother board in another, whereas *horizontal trade* entails completing all stages of computer manufacturing in a single country (Table 9.2).

Table 9.2 : Trade Specialisation in Selected Countries

<i>Country</i>	<i>Vertical Trade (%)</i>	<i>Horizontal Trade (%)</i>
Australia	13	87
Canada	44	56
Denmark	27	73
France	28	72
Germany	19	81
Japan	3	97
The Netherlands	47	53
UK	30	70
USA	12	88

Global Pattern of Trade

International trade has become very complex with a high degree of specialisation in agricultural and industrial production. It has become an important component of the world economy. Global trade has grown much more rapidly over the past 25 years. Between 1985 and 1995, the average annual growth rate of the value of world exports was twice that of production. It was several times greater than that of world population growth. Today, roughly 25 per cent of the world's total output is traded among nation-states.

The fundamental structure of international trade has been based on a few *trading blocs* i.e. groups of countries with formalised systems of trading agreements. Most of the world's trade has been taking place within these blocs. Membership of these trading blocs is the result of the effects of (i) distance; (ii) the legacy of colonial relationship; and (iii) geopolitical alliances.

For most of the period during 1950-2000, international trade was dominated by :

- Western Europe, together with some former European colonies in Africa, South America, Asia, the Caribbean, and Australia;
- North America together with some Latin American countries;
- The countries of the former Soviet Union;
- Japan together with other East Asian Countries and the oil-exporting Countries of Saudi Arabia and Bahrain

Regional Trading Blocs

It is being recognised by most countries that protectionist barriers to trade are detrimental to national economies. Therefore, most governments, have reduced tariffs and quotas on import. Many countries have simple bilateral agreements with trading partners minimising or eradicating trade barriers on a product-by-product basis.

Since World War II, the primary vehicle for serving this purpose on the global level has been the General Agreement on Tariffs and Trade (GATT). Through series of negotiations, it has systematically lowered tariff rates worldwide. This has contributed to global

economic boom in the post World War II period. Originally GATT membership was almost exclusive to developed nations. It soon expanded to include the developing world. Most countries of the world are now its members.

In 1995 the GATT metamorphosed into World Trade Organisation (WTO), a permanent rather than ad hoc organisation in Geneva that also settles trade disputes. The WTO regulates trade in services too, but has yet to include important non-tariff barriers, such as export restraints, inspection requirements, health and safety standards, and import licensing which inhibit imports.

In addition to these broad global agreements many nations have joined regional trading blocs, which were designed to reduce protectionism and enhance economic relations among member states.

European Union (EU)

Originally it was founded in 1957 by six members — Italy, France, Federal Republic of Germany, Belgium, the Netherlands, and Luxemburg. It was called the *European Economic Community (EEC)*. Later it expanded to include most of the western Europe.

The EEC contributed significantly to help Europe recover from the 1970s petro-shocks and slow economic growth. In 1992 the EEC launched an ambitious plan to eliminate several trade barriers among its members.

The EEC changed into the European Union (EU) in 1995. It has harmonised several production and trade regulations. A common currency, the euro, was launched in early 1999 for effectively binding diverse countries into a single economy. With 400 million people, the EU is the largest single market in the world.

European Free Trade Association (EFTA)

In 1960 seven countries i.e. United Kingdom, Austria, Denmark, Norway, Sweden, Portugal and Switzerland joined together to form EFTA with the objective of bringing cooperation in the field of trade. They abolished the tariff

between different member countries. In December 1972 United Kingdom and Denmark abandoned their membership and joined EEC while Iceland joined this association and Finland accepted its co-membership. Now again there are seven members.

North American Free Trade Agreement (NAFTA)

Compared to the EU, NAFTA is considerably more modest. NAFTA's origins lay in the 1988 US — Canada Free Trade Agreement, which gradually, eliminated trade restrictions between the world's two largest trading partners. In 1994 NAFTA was expanded to include Mexico. For the first time a developing nation was included in the trade bloc having developed nations as members. NAFTA has now been extended to include Latin American countries too. It has thus created a free trade zone extending from Alaska to Tierra del Fuego.

Organisation of Petroleum Exporting Countries (OPEC)

The 13 member countries of OPEC are — Algeria, Ecuador, Gabon, Indonesia, Iran, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela. This organisation was formed by the petroleum producing countries in 1960 to decide policies regarding crude oil prices.

Association of South East Asian Nations (ASEAN)

It was formed in 1967. Indonesia, Malaysia, Thailand, Philippines and Singapore are its members. Tariffs between ASEAN and the rest of the world is growing faster than within the region. ASEAN also helps its members by presenting a joint negotiating stance when dealing with Japan, EU and Australia and New Zealand. India has now become an associate member.

South Asian Association for Regional Cooperation (SAARC)

The South Asian countries, (India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka,

Maldives, have formed SAARC. One of its objectives is to trade among the member nations. The progress on the trade front has been marred due to Indo-Pak relations.

SEA PORTS

Sea ports play an important role in international trade and hence, known as 'Gateways of International Trade'. Ocean routes are most economical for carrying bulk and heavy commodities in large quantity. *Port* is that place on the coast where cargo is received from other countries as import and sent out to other countries as export. It thus, acts as a point of entry and exit.

The quantity of cargo handled by a port is an indicator of the level of development of its hinterland. The importance of a port is judged by the size of cargo and the number of ships handled. The ports have arrangements for loading and unloading of cargo. Thus, the ports provide facilities of docking, loading, unloading and the storage facilities for cargo. In order to provide these facilities, the port authorities make arrangements for maintaining the navigable channel, arranging tugs and barges, and providing labour and managerial services.

Types of ports

Ports are classified in two ways: on the basis of their location such as inland ports and outports; and on the basis of the specialised tasks performed such as passenger ports and commercial ports. Most ports are, however, multipurpose.

Passenger Ports

These are the ports of passenger *liners*. They are concerned with passenger traffic. Mumbai, London and New York are the examples of such ports.

Commercial Ports

These are the ports which basically handle the goods for imports and exports.

Oil Ports

These ports deal in the processing and shipping of oil. Some of these are *tanker ports* and some

are *refinery ports*. Maracaibo in Venezuela, Esskhira in Tunisia, Tripoli in Libya are tanker ports. Abadan on the Gulf of Persia is a refinery port.

Ports of Call

These are the ports which originally developed as calling points on main sea routes where ships used to anchor for refuelling, watering and taking food items. Later on they developed into commercial ports. Aden, Honolulu and Singapore are its good examples.

Packet Stations

These are also known as *ferry ports*. These packet stations are exclusively concerned with the transportation of passengers and mail across water bodies covering short distances. These stations occur in pairs located in such a way that they face each other across the water body e.g. Dover in England and Calais in France across English Channel.

Out Ports

These are deep water ports built away from the actual ports. These serve the parent ports

by receiving those ships which are unable to approach them due to their large size. Classic combination, for example, is Athens and its outport Piraeus in Greece.

Entrepot Ports

These are collection centres where the goods are brought from different countries for export. Singapore is an entrepot for Asia, Rotterdam for Europe, and Copenhagen for the Baltic region.

Naval Ports

These are the ports which have only strategic importance. These ports serve the warships and have repair workshops for them. Kochi and Karwar are the examples of such ports in India.

Inland Ports

These ports are located away from the sea coast. They are linked with the sea through a river or a canal. Such ports are accessible to flat bottom ships or barges. For example, Manchester is linked with a canal; Memphis is located on river Mississippi; Rhine has several ports like Mannheim and Duisbvr; and Kolkata is located on River Hoogly, a branch of river Ganga.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What is international trade?
 - (ii) What is the need for trading?
 - (iii) Name the world's five greatest trading nations.
 - (iv) What are the three important components of international trade?
 - (v) What is balance of trade?
 - (vi) What are trade blocs?
 - (vii) Name the countries constituting OPEC.
 - (viii) Why are seaports called 'gateways of international trade'?
2. Distinguish between:
 - (i) Bilateral trade and multilateral trade;
 - (ii) Imports and exports;
 - (iii) Vertical trade and horizontal trade;
 - (iv) Out ports and inland ports.

3. Discuss the main bases of international trade.
4. Describe the changing pattern of international trade and growing importance of TNCs.
5. Discuss the major changes in the sectoral composition of trade in the present day world.
6. Explain the growing importance of regional trade blocs in international trade with special reference to EU, OPEC and ASEAN.

Geographical Skills

7. On an outline map of the world label and shade the following:
 - (i) The world's five greatest trading nations;
 - (ii) Member countries of the EFTA;
 - (iii) Member countries of OPEC;
 - (iv) Member countries of ASEAN.

Unit V

HUMAN SETTLEMENTS

10

CHAPTER

HUMAN SETTLEMENTS

One of the basic human needs is shelter. It may be in the form of a hut, a house, an apartment or a big mansion. *Settlement* refers to an organised colony of human beings together with the buildings in which they live or use and the paths and streets over which they travel. It includes the temporary camp of the hunters and herders; the permanent settlements called villages; and large urban agglomerations. Human settlements may consist of only a few dwelling units (*hamlets*), or they may be as large as megalopolis with a big cluster of buildings accommodating millions of people.

Settlements can be studied in terms of their site, situation, size buildings, form, function, internal structure, external linkage, and roles in the national and global economy. *Site* refers to the actual piece of ground on which the settlement is built. *Situation or Position* refers to the location of the village or town in relation to surrounding areas. The site and situation of the settlements and the type of building may be studied in relation to the physical environment and cultural heritage. For example, a village may be sited on a hill or a river bank. Such a site will determine its access to water and the likely inundation in rainy season. The form of settlement in any particular region also reflects human perception of the natural environment.

The functions, linkages and roles reveal the nature of hinterland from which the settlement gets sustenance and the level of overall development. Settlements have evolved to the present form over a long period of time. Throughout history, each new innovation in agricultural and industrial techniques has had

its effect on settlement structure and patterns in all parts of the world: developed or developing. In the agricultural era, rural settlements predominated. The Industrial Revolution gave rise to urban settlements both small and big. Changing cultural and social nodes are clearly reflected in the structure and functions of settlements.

SETTLEMENT TYPES: RURAL AND URBAN

Settlements are most commonly classified on the basis of size and functions. Accordingly, settlements are divided into *rural and urban or villages and towns*. The terms rural and urban are relative. There is no universally acceptable criteria to distinguish rural from urban. Different countries have evolved their own criteria to suit their own requirements. In fact, one finds a continuum of settlement ranging from hamlets to megalopolises. Rural settlements, are chiefly concerned with primary activities, be they agriculture, fishing, mining, forestry etc. On the other hand urban settlements are nodal in character having secondary and tertiary activities.

In Canada, settlements less than 1,000 persons are classified as rural, while in the United States, the upper limit is 2,500 persons. In India, a settlement with a population upto 5,000 persons is rural, while in Japan, settlement having a population upto 30,000 is rural. In some countries, size is not the basis for differentiating rural from urban rather it is the economic status or function. The basic difference is that while in villages most of the people are engaged in agricultural work, in towns the chief occupation of the people is non-agricultural i.e. industry, trade and services.

Some occupations are found in both villages and towns such as fishing, lumbering or mining. Such villages can, however, be distinguished from towns by the smaller scale of their activities.

The size and functions of settlements are often related to their sites and situations, which themselves are also determined by their *functions*. Villages dominated by agricultural or farm workers will grow in fertile agricultural areas. Towns may grow for several reasons often closely related to factors of site and situation, e.g. mining towns are sited near mineral resources and fishing ports are sited by sheltered anchorages. Industrial town, on the other hand, may be situated at *nodal points* where all the raw materials for manufacturing goods can be obtained.

The major functions of towns are trades and commerce, transport and communication, mining, manufacturing, defence, administration, cultural and recreation activities. In many cases a town may have more than one major function and it is then said to be a diversified town.

Rural Settlements

Rural settlements are most closely and directly related to land. They are dominated by primary activities such as agriculture, animal husbandry, fishing etc. Settlements size is relatively small. As discussed earlier, these settlements may be studied in terms of form, internal structure and functions.

Form

Distribution of rural settlements on a world map reveals two distinct patterns: clustered or compact and dispersed or scattered.

Compact Settlements : In these settlements, houses are built in close vicinity to each other. Initially it may begin as a small hamlet at the intersection of two footpaths or near a water body. As new households are added, the hamlet expands in size. Such settlements are commonly seen in river valleys and fertile plains. The houses are closely spaced and streets are narrow. Socially, the people are closely knit.

Most of the river plains of monsoon Asia present compact settlements. In the plains of India, China and Thailand, large nucleated village is the prevailing type. In the Irrawaddy delta, one can see the linear settlements along with nucleated small villages. The Kwanto plain of Japan has the largest concentration of compact settlements. In southern Arabia, human settlements are concentrated close to the coast, where water and good soil are available.

In Europe, compact settlements are typical in the river valley plains of Volga and Danube. The Rhine hilltops are also dotted with compact settlements, leaving plain areas for farming.

Scattered Settlements : These are generally, found over hills, plateaus and highlands. They consist of one or two dwelling units knitted together in a common bond by a cultural feature such as a church, a mosque or a temple. In Africa, scattered settlements of this kind are common. In India such settlements are found in hilly terrain such as northern Karnataka, Himachal Pradesh, Sikkim and northern West Bengal. Isolated hamlets are found in mountainous regions of China.

Structure

The arrangement of the streets, houses and other functions in rural settlements is related to its form, environment and culture. Generally, three patterns are most common. They are: linear, circular and square, and cross shaped. Many other variations may be seen (Fig. 10.1) .

Linear : These settlements are very common and are found along either side of roads, rivers or canals. The flood plains of rivers in the hilly terrains are also occupied by linear settlements. In the low-lying areas of western Europe, villages are often positioned on dykes and levees forming linear patterns. In India, such patterns are found all along the major roads and rivers.

Circular or Square : These types of settlements develop in flat level lands, around a pond, tank, crater, hill top or a cattle corral.

For example, in West Bengal, settlement around a village tank is a common feature. In Africa and Europe, circular villages may be seen. At times because of physical barriers or other obstructions on one or two sides, settlements take a square form.

Cross Shaped : This type of settlement begins as a small hamlet at the intersection of roads. Gradually, it grows along the roads on all sides and appears as a cross or a star depending upon the number of roads joining at a junction.

Functions

Practically, all rural settlements are related to agriculture but within agriculture there is a specialisation. Some settlements

specialise in dairying, some in fishing, some in farming and some in agro-processing. Besides, some rural settlements are primarily engaged in production, but a few may develop specialised services in repairing agricultural implements and machineries, credit facilities, selling of fertilisers and handloom clothes. Some large villages have a few small shops which sell the goods against the payment of money as well as grains. All the villages in India have *panchayats* which perform administrative functions.

Urban Settlements

As discussed earlier, there are different bases of classifying settlements among rural

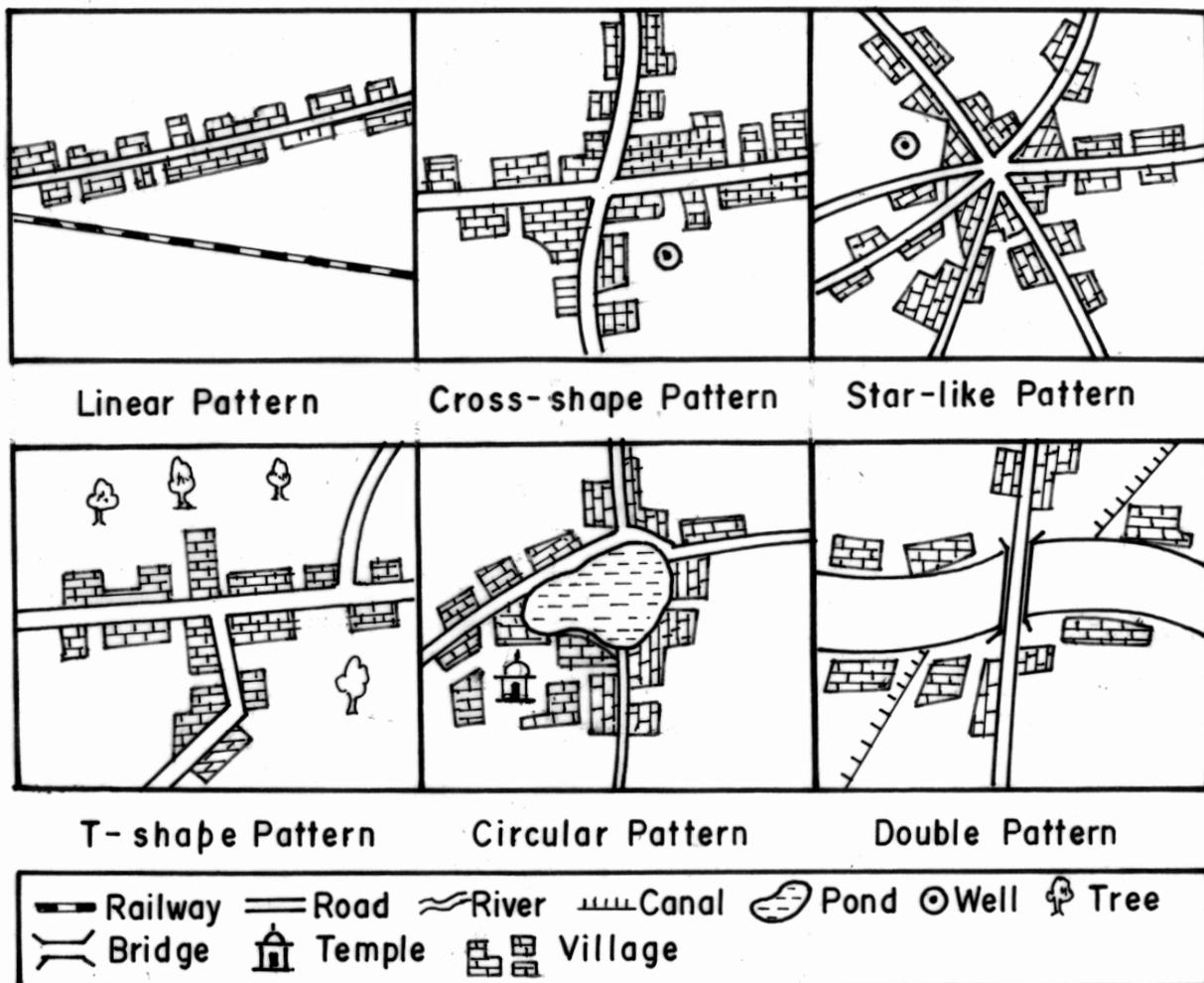


Fig. 10.1 Rural Settlement Types

and urban. Some of the common bases of classification are size of the population, occupational structure, and administration.

Population Size

It is the most important criteria used by almost all countries of the world to designate a settlement as urban. There are, however, wide differences in the exact number that differentiates urban from rural. Countries with low density of population may choose a lower number as the cut off figure compared to a densely populated country. For example, in Denmark, Sweden and Finland, all places having more than 250 persons are called urban. In Iceland, the minimum size of population for a city is 300, whereas in Canada and Venezuela, it is 1,000. In Colombia the lower limit is 1,500, in Argentina and Portugal 2,000 persons, in USA and Thailand 2,500 persons, in India 5,000 persons and in Japan 30,000 persons. In India, besides the size of population, its density is also an additional condition, which is about 400 persons per sq. km.

Occupational Structure

In addition to the size of population, some countries such as India take into account the major economic activities as a criterion for designating a settlement as urban. In Italy, a settlement is called an urban, if more than 50 per cent of the economically productive population are engaged in non-agricultural pursuits. In India, more than 75 per cent of the work force of the settlement should be engaged in non-agricultural activities, to be called urban.

Administrative Decision

In some countries, the administrative set-up is a criterion for classifying a settlement as urban. For example, in India even a settlement with less than 5,000 population can become urban if it has a municipality, cantonment board or a notified area. In many Latin American countries, such as Brazil and Bolivia, any administrative centre is called an urban irrespective of its size.

Location and Form Criteria

Depending upon its location, an urban settlement may be linear, square, star or crescent shaped. The architecture and style of buildings depict historical and cultural influences. By and large, the shape of a town is dependent on the site and situation.

The towns and cities of developed and developing countries reflect marked difference in planning and development. While most of the towns and cities in developed countries are well-planned and have regular shapes, the urban settlements of developing countries, except for a few, have grown haphazardly giving them irregular shapes. For example, Chandigarh is a well-planned city, while Patna has grown haphazardly.

Function

Towns perform a number of functions. In some towns, one particular activity is predominant and the town is known for that function. For example, Oxford is known as an educational town, Varanasi as a religious centre, and Washington D.C. as an administrative town. Thus on the basis of functions, towns and cities are classified into the following groups:

Administrative Towns : Headquarters of the administrative departments of Central Governments, such as New Delhi, Canberra, Moscow, Beijing; Addis Ababa, Washington, D.C., Paris and London are National Capitals. Jaipur, Bhopal, Patna and Bangalore in India are examples of administrative headquarters of states.

Defence Towns : Centres of military activities are known as defence towns. They are of three types: Fort towns, Garrison towns (bases of army contingents) and Naval bases. Jodhpur is a fort town; Mhow is a garrison town; and Kochi is a naval base.

Cultural Towns : Cultural towns are either religious, educational or recreational towns. Jerusalem, Mecca, Ayodhya, Hardwar, Madurai and Varanasi have religious importance, hence, they are called religious towns. Some places are known for educational institutions e.g. Varanasi, besides being

religious centre, has also been an important seat of learning. Cambridge and Allahabad are famous for their educational institutions. There are also recreational towns such as Las Vegas in the USA, Pattaya in Thailand and Darjeeling in India.

Industrial Towns : Mining and manufacturing towns have developed in mining and manufacturing regions. Kalgoorlie, Coolgardie, Dhanbad and Khetri are examples of mining towns. Towns which have developed due to setting up of industries such as Jamshedpur, Kanpur, Durgapur, Birmingham, Pittsburgh and Youngstown etc. are called industrial towns.

Trade and Transport Towns : Many old towns were famous as trade centres. Dusseldorf in Germany, Winnipeg in Canada, Lahore in Pakistan, Baghdad in Iraq and Agra in India have been important trade centres. Some towns have developed as transport towns. Two modes of transport have been responsible for the development of such towns. Port Towns are the centres of imports and exports and are located on the sea coasts e.g. Rotterdam in the Netherlands, Aden in Yemen and Mumbai in India.

The junctions of rail routes often develop into urban centres. Mughalsarai and Itarsi are examples of such towns in India.

Problems of Urban Settlements in Developing Countries

Cities are viewed as engines of economic growth. But rapid growth of urban population

also brings problems along with opportunities. The process of urbanisation has far reaching consequences on both the rural and the urban settlements. *Urbanisation* is often defined as the process of change from rural to urban population. But it is not only a process of demographic growth of villages leading to formation of towns and cities, it involves many other social and economic changes, both quantitative and qualitative.

The new millennium is primarily urban. While in 1950, only 16 per cent of the world population was urban, today almost half of the world's people (47 per cent) live in cities. The rate of urbanisation is much more higher in developing countries than developed countries. It is expected to continue as shown in Fig 10.2.

The temporal and spatial distribution of large cities of the world has also changed rapidly. While in 1920s, there were only 24 million plus cities in the world, the number rose to 198 in 1980s (Table 10.1). Today there are 350 cities with more than one million population.

While industrialised countries are already mostly urban, developing countries are rapidly becoming urban with 40 per cent urban population. By 2020, 52 per cent of people in these areas will be living in cities. The growth of urban population in developing countries has been rapid since 1945. Besides, there has also been a rapid increase in the number of very large cities or mega-cities in these countries since 1975. Following the United Nations definition, cities with more than 8

Table 10.1 : The World Distribution of Million Cities (>1,000,000 Inhabitants)

<i>Year</i>	<i>No. of Million Cities</i>	<i>Mean Latitude N or S of Equator</i>	<i>Mean Population</i>	<i>Percentage of World Population Living in Million Cities</i>
Early 1920s	24	44°30'	2.14	2.06
Early 1940s	41	39°20'	2.25	4.00
Early 1960s	113	35°44'	2.39	8.71
Early 1980s	198	34°07'	2.58	11.36

Source : Potter, R.B. and Unwin, T. (eds) (1992) *Teaching the Geography of Developing Areas*, Monograph 7, Developing Areas Research Group of the Institute of British Geographers

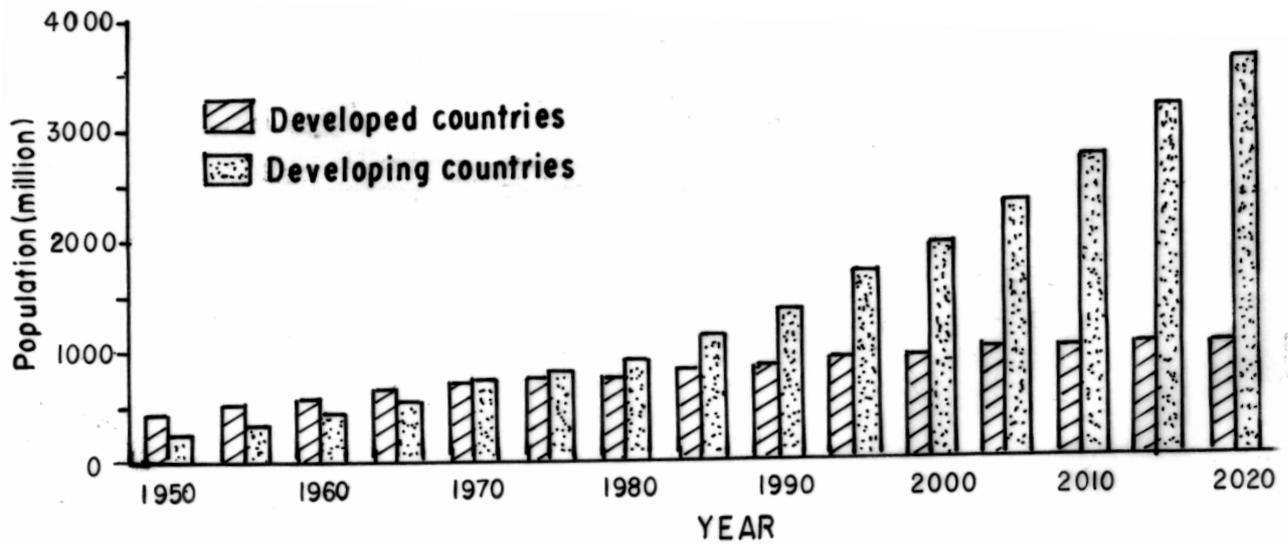
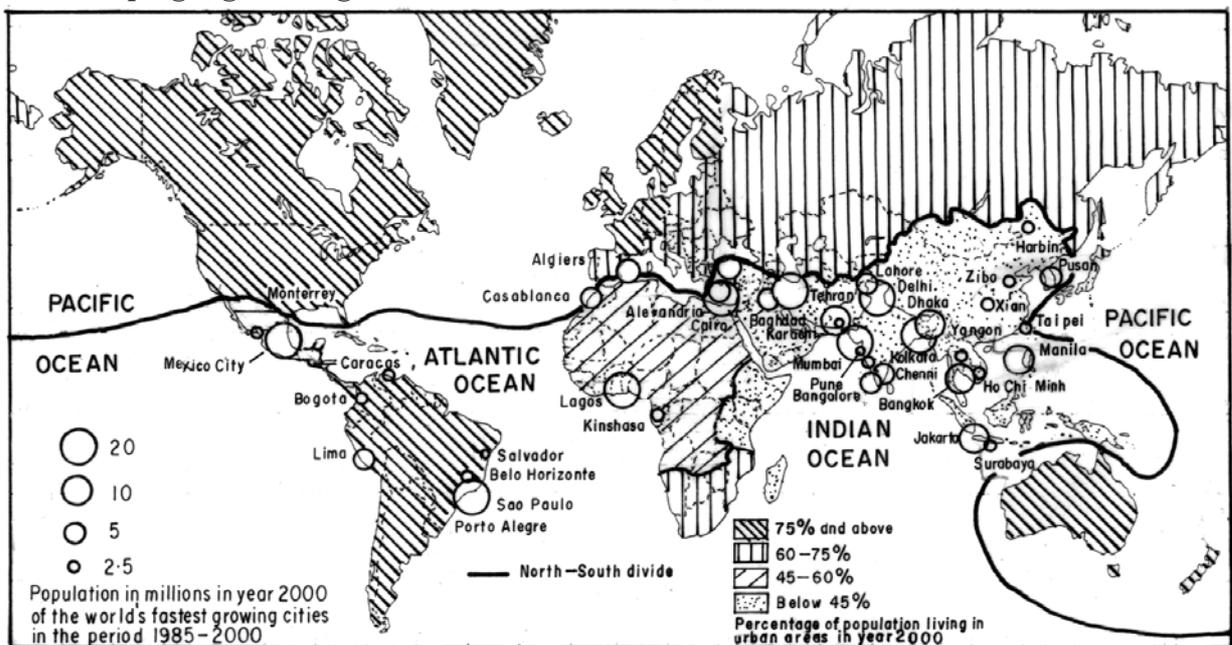


Fig. 10.2 Urban Population in Developed and Developing Countries

million population are known as mega-cities. In 1990, 6 mega-cities were in developed countries and 14 in developing countries. There are wide variations in the size of urban population, rate of urbanisation and growth of mega-cities, even among the developing countries.

The most important aspect of world urbanisation is the striking difference in the emerging trends between the world's developed and developing regions (Fig. 10.3).

Asia provides some of the most dramatic examples of this trend. From a region of villages, Asia is fast becoming a region of cities and towns. Its urban population in 2000 was 1.3 billion. It was nearly a fivefold increase during last five decades. Already, Asia has more than 36 per cent of the world's urban population and 16 of the 30 largest cities in the world. By 2030 half of Asia's 4.9 billion projected population (53.4 per cent) will be living in urban areas. Almost all developing



10.3 World's Fastest Growing Cities

Table 10.2 : Largest Cities in the World : 1950, 2000

Rank (1950)	City	Population (Million)	Rank (2000)	City	Population (Million)
1	New York	12.3	1	Mexico City	31.0
2	London	10.4	2	Sao Paulo	25.8
3	Rhine -Ruhr	6.9	3	Shanghai	23.7
4	Tokyo	6.7	4	Tokyo	23.7
5	Shanghai	5.8	5	New York	22.4
6	Paris	5.5	6	Beijing	20.9
7	Buenos Aires	5.3	7	Rio de Janeiro	19.0
8	Chicago	4.9	8	Mumbai	16.8
9	Moscow	4.8	9	Kolkata	16.4
10	Calcutta (Kolkata)	4.6	10	Jakarta	15.7
11	Los Angeles	4.0	11	Los Angeles	13.9
12	Osaka	3.8	12	Seoul	13.7
13	Milan	3.6	13	Cairo	12.9
14	Bombay (Mumbai)	3.0	14	New Delhi	12.7
15	Mexico City	3.0	15	Buenos Aires	12.7

countries, are experiencing high rates of urbanisation at an unprecedented rate. Karachi in Pakistan, with 1.1 million population in 1950 is estimated to have 20.6 million in 2015. Likewise, Cairo, Mumbai, Sao Paulo, Lagos, etc. are projected to have populations in excess of 20 million by 2015. It is estimated that by 2015, 153 of the world's 358 cities with more than one million population will be in Asia. It is expected that of the 27 mega-cities (with more than 10 million population) of the world in 2015, 15 will be located in Asia.

Urban growth processes in the world's developing regions have been different from those in developed regions. In the developed countries urban growth was accompanied by industrialisation. In developing countries demographic growth has preceded economic development. The unprecedented urban growth in these regions has been driven by lack of employment opportunities in rural areas rather than the pull of prospective jobs in towns and cities. London took 190 years to grow from a city of half a million population to 10 million and New York took 140 years; by contrast, Mexico City, Sao Paulo, Kolkata, Seoul and

Mumbai all took less than 75 years to grow from half a million to 10 million. *Over urbanisation* or uncontrolled urbanisation has given rise to slums and squatter settlements making urban life miserable world over. Over 600 million people live under life threatening situations in cities and 300 million live in extreme poverty.

The emerging urban scenario in developing countries has robbed the rural areas of its able labour force. Ecological degradation and social pollution has sapped their energy. At the same time, the urban settlements too have suffered from shortage of housing, transport, health and other civic amenities. Both these places are devoid of quality-life. In Africa, only one-third of all households are connected to potable water. In Asia Pacific, only 38 per cent of urban households are connected to sewerage system. In many cities in the developing countries, an increasing proportion of the population lives in substandard housing or on the streets. In most of the million plus cities in India, one in four inhabitants live in illegal settlements, which is growing twice as fast as the rest of the cities.

Even in the Pacific Asia, which is marked with economic successes, it was estimated that

by turn of the twentieth century some 60 per cent of the region's urban population lived in squatter settlements or slums.

Squatter settlement in general, is a residential area in an urban locality inhabited by the very poor who have no access to tenured land of their own, and hence 'squat' on vacant land, either private or public. Nature of such settlements and their names vary from one country to the other. Commonly they are also referred to as shanty towns or informal settlements. In many countries, they are known by different local names such as : *Ranchos* in Venezuela ; *Favelas* in Brazil ; *Kevettits* in Myanmar and *Bustee* or *Jhuggi - Jhopri* in India. They comprise of communities housed in self-constructed shelters under conditions of informal or traditional land tenure. They are common features of developing countries and are typically the product of an urgent need for shelter by the poor. They are characterised by a dense proliferation of small, make shift shelter built from diverse materials, degradation of the local ecosystem and by severe social problems. They occur when the current land administration and planning fail to address needs of the whole community. These areas are characterised by

rapid, unstructured and unplanned development. On a global scale, they are a significant problem.

A squatter settlement has three defining characteristics : physical; social; and legal.

Physical Characteristics: Due to inherent 'non-legal' status, a squatter settlement has services and infrastructure below the adequate minimum levels. As such water supply, sanitation, electricity, roads, drainage, schools, health centres, and market places are either absent or arranged informally.

Social Characteristics : Most of the squatter households belong to lower income group. They are predominantly migrants, but many are also second or third generation squatters.

Legal Characteristics : Such settlements lack land ownership.

Quite often squatter settlements and slums are used as synonyms, while they are different terms. *Slums* are defined as residential areas that are physically and socially deteriorated and in which satisfactory family life is impossible. A major index of slum condition is bad housing, which means such dwellings that have inadequate light, air, toilet and bathing facilities; that are damp and in bad repair; that do not afford opportunity for family privacy;

Box 10.1: Dharavi-Asia's Largest Slum

"...Buses merely skirt the periphery. Autorickshaws cannot go there, anomalously, Dharavi is part of central Bombay, where threewheelers are banned.

Only one main road traverses the slum, the miscalled '90-foot road', which has been reduced to less than half that for most of its length. Some of the side alleys and lanes are so narrow that not even a bicycle can pass. Whole neighbourhood consist of tenement buildings, two or three storeys high with rusty iron stairways to the upper part, where a single room is rented by a whole family, sometimes twelve or more people; it is a kind of tropical version of the industrial dwelling of Victorian London's East End.

But Dharavi is a keeper of more sombre secrets than the revulsion it inspires in the rich, a revulsion, moreover, that is in direct proportion to the role it serves in the creation of the wealth of Bombay. In this place of shadowless, treeless sunlight, uncollected garbage, stagnant pools of foul water, where the only non-human creatures are the shining black crows and long grey rats, some of the most beautiful, valuable and useful articles in India are made. From Dharavi come delicate ceramics and pottery, exquisite embroidery and zari work, sophisticated leather goods, high-fashion garments, finely wrought metalwork, delicate jewellery settings, wood carvings and furniture that will find its way into the richest houses, both in India and abroad...

Dharavi was an arm of the sea, that was filled by waste, largely-produced by the people who have come to live there: Untouchables, or Scheduled Castes as they are now known, and poor Muslims. It comprises rambling buildings of corrugated metal, 20 metres high in places, used for the treatment of hides and tanning. There are pleasant parts, but rotting garbage is everywhere..."

(Seabrook, 1996, pp. 50, 51-52)

that are subject to fire hazard and that overcrowd the land leaving no space for recreational use. Dharavi (Mumbai) in India is Asia's largest slum.

Thus *squatter* refers to legal position of the settlement and *slum* refers to the condition of a settlement.

An UNCHS report points out that about 30 to 60 per cent of residents of most large cities in developing countries live in informal settlements. South Africa has a high rate of population growth that is impacting city in the form of squatter settlements. One such settlement is Imizamo Yethu in the Hout Bay

area of Cape Town. The improvement of living condition in such settlements is one of the most complex and pressing challenges before developing countries. In view of the changing needs, contemporary governance involve multiple stakeholders, interdependent resources and actions and shared purposes between the public and private, formal and informal sectors. For example, changes in housing finance policy is required in developing countries so that small finance schemes are made available to local communities and they are supported in constructing houses and other facilities.

Exercises

Review Questions

1. Answer the following questions briefly:
 - (i) What is a settlement?
 - (ii) What are the bases of classifying settlements?
 - (iii) What are rural settlements?
 - (iv) What is urbanisation?
 - (v) What is the number of million plus cities in the world today?
2. Distinguish between:
 - (i) Site and situation of settlements;
 - (ii) Compact and scattered settlements;
 - (iii) Administrative and cultural settlements;
 - (iv) Squatter settlements and slums.
3. Describe the distribution pattern of rural settlements in the world.
4. How does a rural settlement pattern reflect the influence of environmental conditions: physical and cultural? Explain.
5. Discuss the criteria used by different countries for designating settlements as urban.
6. Discuss the functional classification of towns giving suitable examples from each type.
7. 'Distribution of urban population and its growth rate is very uneven in the world.' Explain
8. Discuss the problem associated with the urban settlements in developing countries.

Geographical Skills

9. On an outline map of the world show the locations of all the 15 cities of 1950 and 2000 as listed in Table 10.2 and label them.
10. Study Table 10.2 and answer the following question:
 - (i) How many cities are common in both years i.e. 1950 and 2000?
 - (ii) Which cities of 1950 do not find place in the list for 2000?
 - (iii) Which are the new entrants in 2000?
 - (iv) Classify cities according to continents for 1950 and 2000.
 - (v) What are your findings on the basis of the answers given above and how would you explain them?

APPENDICES

I

WORLD POPULATION : SELECTED DATA, 2000

APPENDIX

<i>Region/Country</i>	<i>Surface Area (Thousand Sq. Km)</i>	<i>Population 2000 (Million)</i>	<i>Density of Population (Per Sq. Km)</i>	<i>Growth 1990-95</i>	<i>Rate 1995- 2000</i>
(1)	(2)	(3)	(4)	(5)	(6)
World	-	6,055	-	1.7	1.3
Africa	-	784.4	-	2.9	2.4
Algeria	2,382	31.5	13	2.7	2.3
Angola	1,247	12.9	11	3.7	3.2
Benin	113	6.1	57	3.1	2.7
Botswana	582	1.6	3	2.9	1.9
Burkina Faso	274	11.9	41	2.8	2.7
Burundi	28	6.7	265	2.9	1.7
Cameroon	475	15.1	32	2.8	2.7
Central African Republic	623	3.6	6	2.6	1.9
Chad	1,284	7.7	6	2.7	2.6
Congo, Democratic Republic of	2,345	51.7	22	3	2.6
Congo, Republic of	342	2.9	9	-	2.8
Cote d'Ivoire	322	14.8	50	3.7	1.8
Egypt	1,001	68.5	64	2.2	1.9
Eritrea	118	3.9	41	-	3.8
Ethiopia	1,104	62.6	64	3.1	2.5
Gabon	268	1.2	5	3.3	2.6
Ghana	239	20.2	85	3	2.7
Guinea	246	7.4	30	3	0.8

(1)	(2)	(3)	(4)	(5)	(6)
Guinea-Bissau	36	1.2	43	2.1	2.2
Kenya	580	30.1	53	3.4	2
Lesotho	30	2.2	67	2.5	2.2
Liberia	111	3.2	32	3.3	8.2
Libyan Arab Jamahiriya	-	5.6	-	3.5	2.4
Madagascar	587	15.9	27	3.3	3
Malawi	118	10.9	110	3.3	2.4
Mali	1,240	11.2	9	3.2	2.4
Mauritania	1,026	2.7	3	2.9	2.7
Mauritius	2	1.2	584	1	0.8
Morocco	447	28.4	64	2.4	1.8
Mozambique	802	19.7	23	2.8	2.5
Namibia	824	1.7	2	3.2	2.2
Niger	1,267	10.7	9	3.3	3.2
Nigeria	924	111.5	32.7	3.1	2.4
Rwanda	26	7.7	345	3.4	7.7
Senegal	197	9.5	49	2.7	2.6
Sierra Leone	72	4.9	70	2.7	3
Somalia	638	10.1	14	3.2	4.2
South Africa	1,221	40.4	35	2.4	1.5
Sudan	2,506	29.5	13	2.8	2.1
Togo	57	4.6	83	3.2	2.6
Tunisia	164	9.6	62	2.1	1.4
Uganda	241	21.8	113	3	2.8
United Republic of Tanzania	-	33.5	-	3.4	2.3
Zambia	753	9.2	14	2.8	2.3
Zimbabwe	391	11.7	33	3	1.4
Asia	-	3,682.60	-	1.8	1.4
Afghanistan	652	22.7	41	6.7	2.9
Bangladesh	144	129.2	1,007	2.4	1.7
Bhutan	-	2.1	-	2.3	2.8
Cambodia	181	11.2	68	2.5	2.3

(1)	(2)	(3)	(4)	(5)	(6)
China	9,598	1,277.60	135	1.4	0.9
Democratic People's Republic of Korea	-	24	-	1.9	1.6
Hongkong, China	-	6.9	-	0.8	2.1
India	3,287	1,013.70	342	1.9	1.6
Indonesia	1,905	212.1	116	1.8	1.4
Iran (Islamic Republic of)	1,633	67.7	39	2.7	1.7
Iraq	438	23.1	53	3.2	2.8
Israel	21	6.2	302	4.7	2.2
Japan	378	126.7	348	0.4	0.2
Jordan	89	6.7	55	3.4	3
Kuwait	18	2	111	-5.8	3.1
Lao People's Democratic Republic	-	5.4	-	3	2.6
Lebanon	10	3.3	423	2	1.7
Malaysia	330	22.2	71	2.4	2
Mongolia	1,567	2.7	2	2.6	1.7
Myanmar	802	45.6	23	2.1	1.2
Nepal	147	23.9	161	2.5	2.4
Oman	212	2.5	11	3.6	3.3
Pakistan	796	156.5	179	2.7	2.8
Philippines	300	76	253	2.1	2.1
Republic of Korea	-	46.8	-	0.8	0.8
Saudi Arabia	2,150	21.6	10	3.4	3.4
Singapore	1	3.6	6,587	1	1.4
Sri Lanka	66	18.8	300	1.3	1
Syrian Arab Republic	185	16.1	88	3.6	2.5
Thailand	513	61.4	119	1.3	0.9
Turkey	775	66.6	85	2	1.7
United Arab Emirates	84	2.4	35	2.3	2
Vietnam	332	79.8	241	2	1.6
Yemen	528	18.1	33	3.5	3.7

(1)	(2)	(3)	(4)	(5)	(6)
Europe	–	728.9	–	0.3	0
Albania	29	3.1	124	0.8	-0.4
Austria	84	8.2	98	0.4	0.5
Belgium	30	10.2	331	0.1	0.1
Bosnia & Herzegovina	51	4	78	–	3
Bulgaria	111	8.2	74	-0.2	-0.7
Croatia	–	4.5	–	–	-0.1
Czech Republic	79	10.2	133	–	-0.2
Denmark	43	5.3	126	0.2	0.3
Estonia	45	1.4	32	-0.2	-1.2
Finland	338	5.2	17	0.3	0.3
France	552	59.1	107	0.4	0.4
Germany	357	82.2	230	0.4	0.1
Greece	132	10.6	82	0.3	0.3
Hungary	93	10	109	-0.2	-0.4
Ireland	70	3.7	55	-0.2	0.7
Italy	301	57.3	196	0.1	0
Latvia	65	2.4	38	-0.3	-1.5
Lithuania	65	3.7	57	0.2	-0.3
Macedonia (Former Yugoslav Republic of)	26	2	80	–	0.6
Netherlands	42	15.8	470	0.7	0.4
Norway	324	4.5	15	0.5	0.5
Poland	323	38.8	127	0.3	0.1
Portugal	92	9.9	109	0	0
Romania	238	22.3	97	0.3	-0.4
Slovakia	–	5.4	–	–	0.1
Slovenia	20	2	99	–	-0.1
Spain	506	39.6	79	0.2	0
Sweden	450	8.9	22	0.5	0.3
Switzerland	41	7.4	182	0.7	0.7
United Kingdom	243	58.8	248	0.2	0.2
Yugoslavia	102	10.6	108	0.3	0.1

(1)	(2)	(3)	(4)	(5)	(6)
North America	–	309.6	–	1.1	0.9
Canada	9,971	31.1	3	1.4	1
United States of America	9,629	278.4	31	1	0.8
Oceania	–	30.4	–	1.5	1.3
Australia	7,741	18.9	2	1.4	1
New Caledonia	–	0.2	–	–	2.1
New Zealand	271	3.9	14	0.9	1
Papua New Guinea	463	4.8	11	2.3	2.2
Vanuatu	–	0.2	–	–	2.4
Latin America and Caribbean	–	519.1	–	1.8	1.6
Argentina	2,780	37	14	1.2	1.3
Belize	–	0.2	–	–	2.4
Bolivia	1,099	8.3	8	2.4	2.3
Brazil	8,547	170.1	20	1.6	1.3
Chile	757	15.2	20	1.6	1.4
Colombia	1,139	42.3	41	1.7	1.9
Costa Rica	51	4	75	2.4	2.5
Cuba	111	11.2	102	0.9	0.4
Dominican Republic	49	8.5	173	2	1.7
Ecuador	284	12.6	46	2.3	2
El Salvador	21	6.3	303	2.2	2
Guatemala	109	11.4	105	2.9	2.6
Haiti	28	8.2	289	2	1.7
Honduras	112	6.5	57	3	2.8
Jamaica	11	2.6	243	1	0.9
Mexico	1,958	98.9	51	2.1	1.6
Nicaragua	130	5.1	42	3.7	2.7
Panama	76	2.1	38	1.9	1.6
Paraguay	407	5.5	14	2.7	2.6
Peru	1,285	25.7	20	2	1.7
Puerto Rico	9	3.9	442	0.9	0.8
Trinidad and Tobago	5	1.3	254	1.1	0.5

(1)	(2)	(3)	(4)	(5)	(6)
Uruguay	176	3.3	19	0.6	0.7
Venezuela	912	24.2	27	2.1	2
USSR (former)					
Armenia	30.0	3.5	104	2.3	- 0.3
Azerbaijan	87.0	7.7	94	0.8	0.5
Belarus	207.6	10.2	48	0.1	- 0.3
Georgia	70.0	5.0	75	0.1	- 1.1
Kazakhstan	2717.0	16.2	6	0.8	- 0.4
Kyrgyzstan	199.0	4.7	25	1.3	0.6
Rep. of Moldova	34.0	4.4	127	0.0	0.0
Russian Federation	17,075.0	146.9	9	0.2	- 0.2
Tajikistan	143.0	6.2	43	2.5	1.5
Turkmenistan	488.0	4.5	10	2.5	1.8
Ukraine	604.0	50.5	82	0.2	- 0.4
Uzbekistan	447.0	24.3	56	-	1.6

II

HUMAN DEVELOPMENT INDEX, 1998

APPENDIX

HDI Ranks

High Human Development

1. Canada
2. Norway
3. United States
4. Australia
5. Iceland
6. Sweden
7. Belgium
8. Netherlands
9. Japan
10. United Kingdom
11. Finland
12. France
13. Switzerland
14. Germany
15. Denmark
16. Austria
17. Luxembourg
18. Ireland
19. Italy
20. New Zealand
21. Spain
22. Cyprus
23. Israel
24. Singapore
25. Greece
26. Hong kong, China (SAR)
27. Malta
28. Portugal
29. Slovenia
30. Barbados
31. Korea, Rep. of
32. Brunei Darussalam
33. Bahamas
34. Czech Republic
35. Argentina
36. Kuwait
37. Antigua and Barbuda
38. Chile
39. Uruguay
40. Slovakia

41. Bahrain
42. Qatar
43. Hungary
44. Poland
45. United Arab Emirates
46. Estonia

Medium Human Development

47. Saint Kitts and Nevis
48. Costa Rica
49. Croatia
50. Trinidad and Tobago
51. Dominica
52. Lithuania
53. Seychelles
54. Grenada
55. Mexico
56. Cuba
57. Belarus
58. Belize
59. Panama
60. Bulgaria
61. Malaysia
62. Russian Federation
63. Latvia
64. Romania
65. Venezuela
66. Fiji
67. Suriname
68. Colombia
69. Macedonia, TFYR
70. Georgia
71. Mauritius
72. Libyan Arab Jamahiriya
73. Kazakhstan
74. Brazil
75. Saudi Arabia
76. Thailand
77. Philippines
78. Ukraine
79. Saint Vincent and the Grenadines
80. Peru
81. Paraguay

- | | | | |
|------|-----------------------|------|------------------------------|
| 82. | Lebanon | 129. | Ghana |
| 83. | Jamaica | 130. | Zimbabwe |
| 84. | Sri Lanka | 131. | Equatorial Guinea |
| 85. | Turkey | 132. | Sao Tome and Principe |
| 86. | Oman | 133. | Papua New Guinea |
| 87. | Dominican Republic | 134. | Cameroon |
| 88. | Saint Lucia | 135. | Pakistan |
| 89. | Maldives | 136. | Cambodia |
| 90. | Azerbaijan | 137. | Comoros |
| 91. | Ecuador | 138. | Kenya |
| 92. | Jordan | 139. | Congo, The Republic of the |
| 93. | Armenia | | Low Human Development |
| 94. | Albania | 140. | Lao People's Dem. Rep. |
| 95. | Samoa (Western) | 141. | Madagascar |
| 96. | Guyana | 142. | Bhutan |
| 97. | Iran, Islamic Rep. of | 143. | Sudan |
| 98. | Kyrgyzstan | 144. | Nepal |
| 99. | China | 145. | Togo |
| 100. | Turkmenistan | 146. | Bangladesh |
| 101. | Tunisia | 147. | Mauritania |
| 102. | Moldova, Rep. of | 148. | Yemen |
| 103. | South Africa | 149. | Djibouti |
| 104. | El Salvador | 150. | Haiti |
| 105. | Cape Verde | 151. | Nigeria |
| 106. | Uzbekistan | 152. | Congo, Dem Rep. of the |
| 107. | Algeria | 153. | Zambia |
| 108. | Vietnam | 154. | Cote d'Ivoire |
| 109. | Indonesia | 155. | Senegal |
| 110. | Tajikistan | 156. | Tanzania, U. Rep. of |
| 111. | Syrian Arab Republic | 157. | Benin |
| 112. | Swaziland | 158. | Uganda |
| 113. | Honduras | 159. | Eritrea |
| 114. | Bolivia | 160. | Angola |
| 115. | Namibia | 161. | Gambia |
| 116. | Nicaragua | 162. | Guinea |
| 117. | Mongolia | 163. | Malawi |
| 118. | Vanuatu | 164. | Rwanda |
| 119. | Egypt | 165. | Mali |
| 120. | Guatemala | 166. | Central African Republic |
| 121. | Solomon Islands | 167. | Chad |
| 122. | Botswana | 168. | Mozambique |
| 123. | Gabon | 169. | Guinea -Bissau |
| 124. | Morocco | 170. | Burundi |
| 125. | Myanmar | 171. | Ethiopia |
| 126. | Iraq | 172. | Burkina Faso |
| 127. | Lesotho | 173. | Niger |
| 128. | India | 174. | Sierra Leone |

Source : *Human Development Report, 2000*, UNDP, Oxford University Press, Delhi