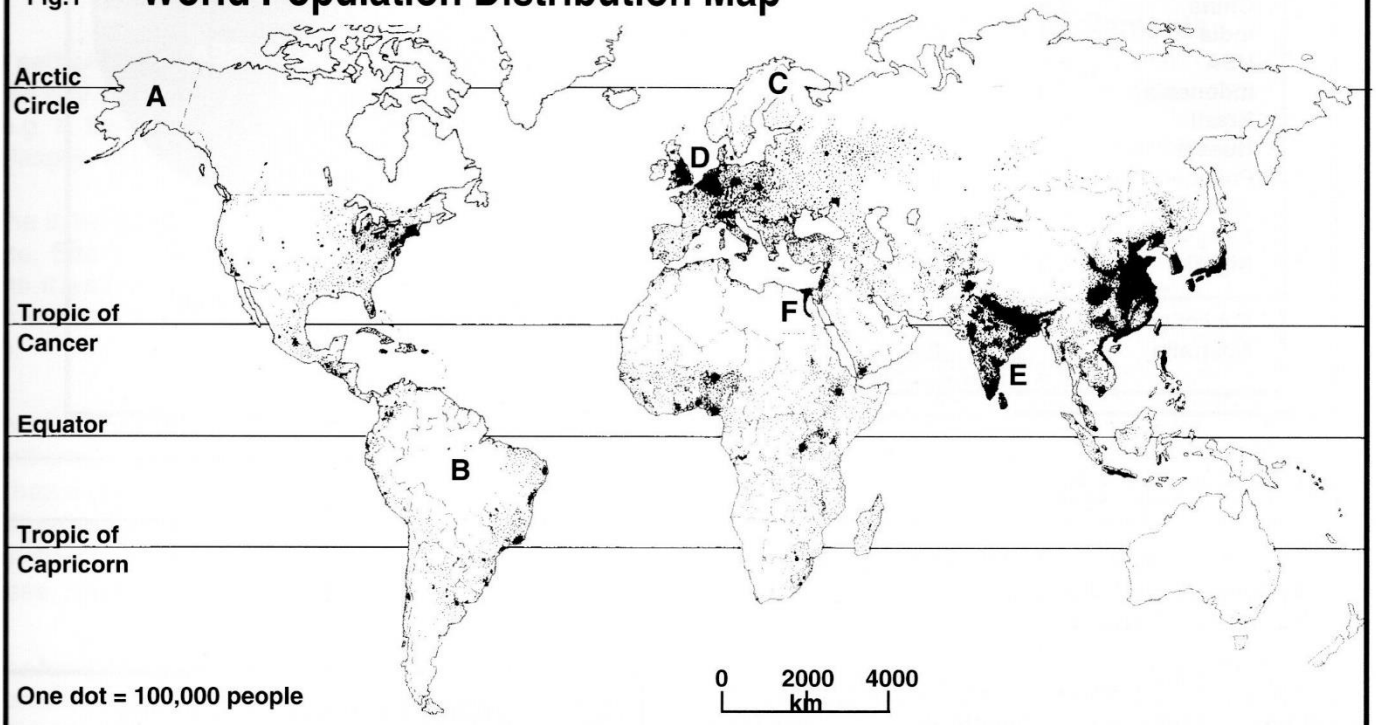
POPULATION: Distribution & Density

Fig.1 **World Population Distribution Map**



People are distributed in a very uneven way across the world's surface and there are many variations in population density.

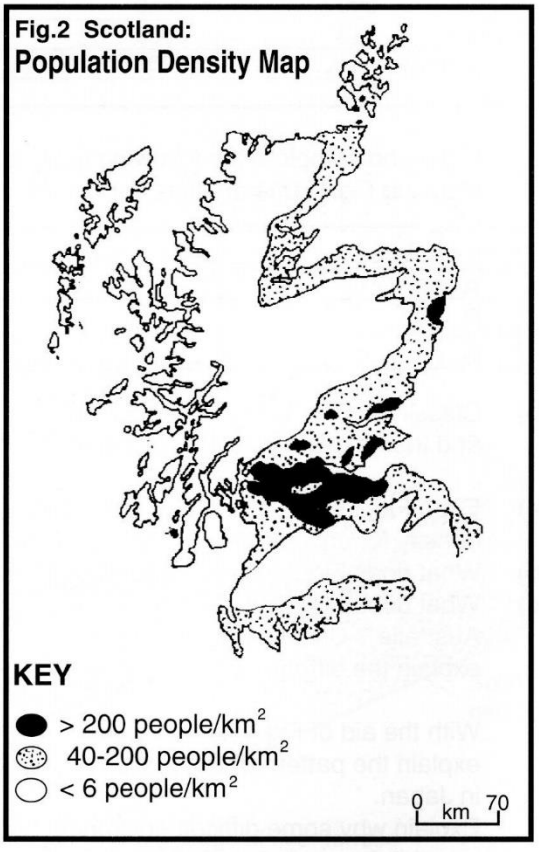
Population Distribution describes the way in which people are spread out across the Earth's surface. The world map (Fig.1) illustrates World Population distribution where each dot represents a given number of people. The map clearly shows both concentrations of people, for example in Eastern China and North East USA, and areas which are almost uninhabited, for example Siberia or Greenland.

Population Density describes the number of people living within a given area. Density is usually expressed as the number of people per square kilometre and can be shown in the form of a choropleth map such as the Population Density Map of Scotland (Fig.2). A formula used to calculate population density is:

$$D = \frac{P}{A}$$ where **D** = Population Density, **P** = Population and **A** = Area

Areas of high population density are obviously crowded. Those of low population density are said to be sparsely populated. People live in areas easily suited to everyday life and avoid areas of difficulty. 71% of the earth's surface is water and only 29% is land - about one-fifth of the land is too cold to live in, another fifth is desert and another fifth is mountainous. The remaining two-fifths could be farmed but only a third of this is actually developed (Fig.3). This means that most of the world's population lives on only about 4% of the Earth's surface.

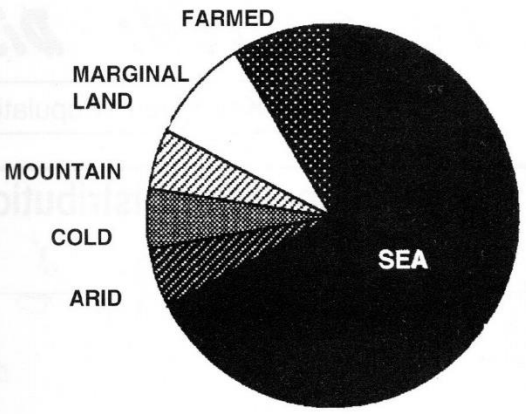
Fig.2 Scotland:
Population Density Map



Scotland's population of 5.3 million is very unevenly spread over the whole country. Some areas of the Highlands have less than 6 people per km ^{2} whereas much of the Central belt has more than 200 people per km^2.

Fig.3 Population, Area and Cultivation 2020

	Area (m.km^3)	Cult.(%)	Popn (m)
WORLD	137	11	7791
MORE DEVL. (N. AMERICA,EUROPE, OCEANIA)	78.7	10	1157
LESS DEVEL. (ASIA, AFRICA, SOUTH & CENTRAL AMERICA)	55.3	12	6634
Top 10 People Powers			
CHINA	9.6	11	1439
INDIA	3.3	52	1380
USA	9.4	20	331
INDONESIA	2.0	10	273
PAKISTAN	0.8	25	221
BRAZIL	8.5	9	213
NIGERIA	0.9	33	205
BANGLADESH	0.1	63	165
RUSSIA	16.4	10	146
MEXICO	1.9	12	129
For comparison			
AUSTRALIA	7.7	6	25



The Earth's Surface : Water/Land Environment

Assignment One

1. Explain the meaning of each of the following:
   Population Distribution
   Population Density

2. Copy and then complete the following table.

Country	Area in 000's/km	Population in 000's	Population Density
Norway	365	5421	
France	548	65273	
Bangladesh		164690	1265
U.K.	242		281

3a) Copy and complete the following table by studying Fig.1. Use an atlas to help you.

Area	Name	Area	Name
A		D	
B		E	
C		F	

3b) Classify **A-F** in terms of population and then explain your classification.

4a) From Fig.3 carefully work out the population density for each of the top 10 people powers.

4b) What does Fig.3 tell you about Bangladesh ?

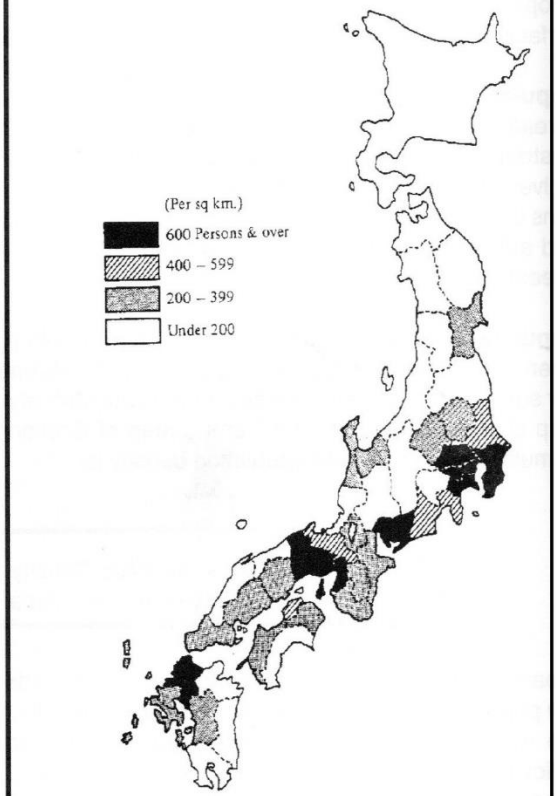
4c) What does Fig.3 tell you about Australia ? Use an atlas to help you explain the differences.

5. With the aid of Fig.4 and an atlas, explain the pattern of Population Density in Japan.

6. Explain why some difficult environments" are able to support pockets of dense population.

7. Quoting examples, explain why the average population density, for a country, can sometimes be misleading.

Fig.4 Japan's Population Density



POPULATION DENSITY

Study carefully the map above.

1. (a) Explain the meaning of the term 'population density'
   (b) Calculate the population density of the countries listed below, using the following equation.

$$\text{Population density} = \frac{\text{Number of people}}{\text{Land area (km}^2\text{)}}$$

   (i) France: population density **65** million; area 544 000 km².
   (ii) Australia: population density **25** million; area 7 500 000 km².
   (c) If the population density of an area is 400 people/km² and its area is 10 000 km², how many people live there?

2. (a) Areas A, B, C and D on the map are 'difficult' areas for people to live in. Match each one to the correct environment listed below.

Choose from: Mountain Savanna Rainforest Arctic Hot desert Ice cap

   (b) For any **two** of these areas, explain why the population density is very **low**.

3. Name **two** areas which, for different reasons, have high population density. For each area explain why the population density is high.

4. (a) Describe the distribution of areas of high population density.
   (b) Explain why an average population density (in people/km²) can be **misleading**. Give examples to support your answer.

POPULATION: Measuring change

Fig.129

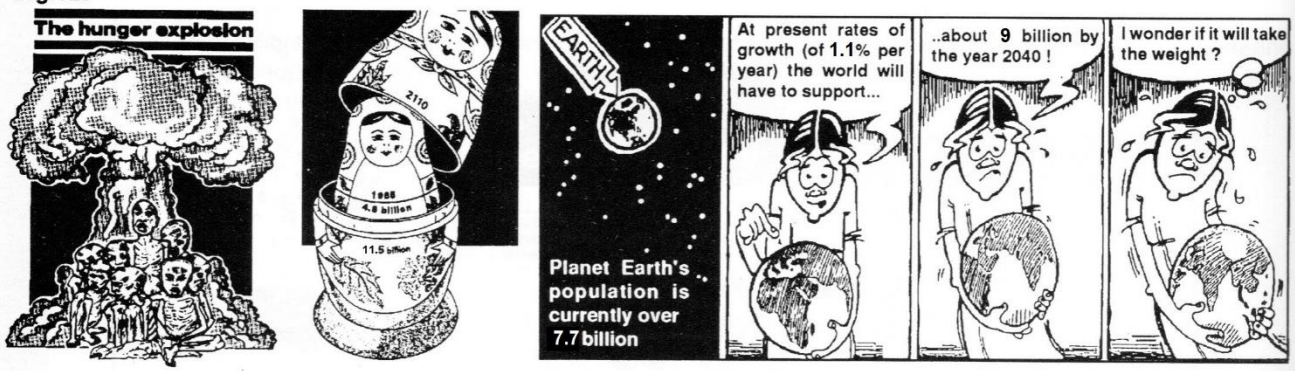


Figure 129 illustrates what many geographers and population experts (demographers) consider to be the most serious problem facing the world today. The growth of the world's population - the number of people inhabiting our small planet - has been steadily increasing both in terms of numbers and the rate of growth (Fig.130).

Demographers have calculated that the world population increases by an average of over **9420** every hour; by **17**million more people each month and by **204** million each year. The world's population has been growing for many centuries. In 1750, the population was less than 1 billion. By 1930 it doubled to 2 billion. The next billion was added by 1950 (despite WW2) and the fourth billion by 1970. Currently, the planet houses over **7.7** billion and it is estimated that **eleven** billion will be reached by about **2100**. In other words the **rate of natural increase** has increased rapidly. The natural increase of a population is the difference between the **birth** and **death rate** (Fig.131).

Demographers use various types of population information in studying population change. This information is collected by governments and international organisations such as the U.N.O. (United Nations Organisation) by a regular count or **census** in countries every ten years. The latest census of the U.K. population occurred in 2001; the next will take place in 2021. The census is a very expensive and time-consuming exercise, often fraught with problems, but very necessary for planning future developments, social welfare and government policy. Census information provides statistics about a country's population and the ways in which it is changing.

Fig.130

WORLD POPULATION GROWTH 1750-2100

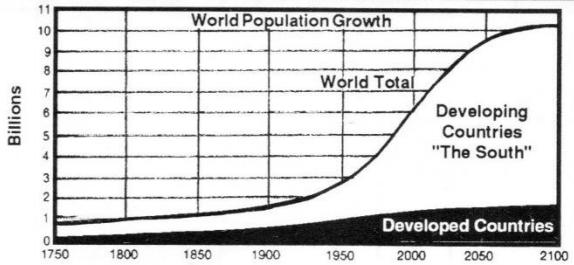


Fig.131

POPULATION INFORMATION

Population Census	A count of the total number of people living within a country's boundaries.
Birth Rate	The number of babies born in a year for every 1000 people in the population.
Death Rate	The number of deaths in a year for every 1000 people in the population.
Infant Mortality	The number of infants under 1 year old who die each year out of every 1000 babies born alive.
Life Expectancy	The average life span of the population of the country.
Dependency Ratio	The %age of the population not earning an income and are dependent on others. The Ratio is calculated thus: $\text{Dep.Ratio} = \left(\frac{\text{Children (0-14) + Aged (65+)}}{\text{Adults (15-64)}}\right) \times 100$

Fig.132

POPULATION STRUCTURE

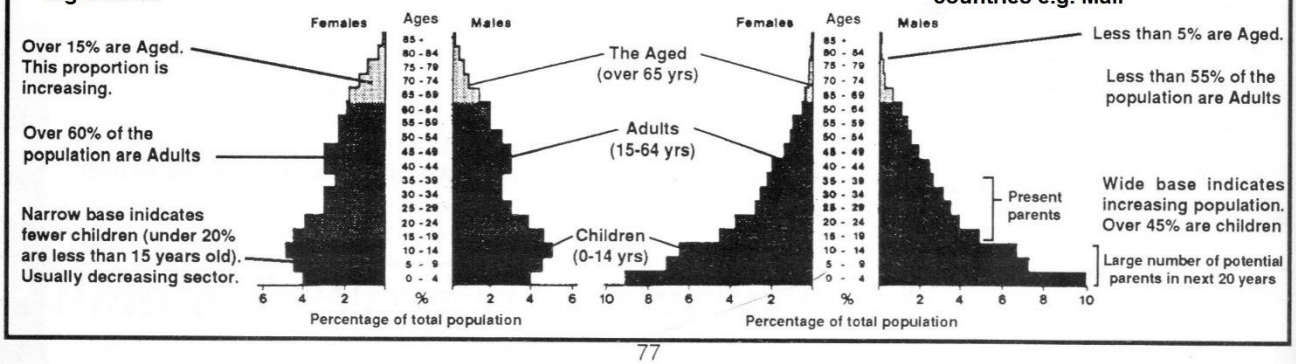
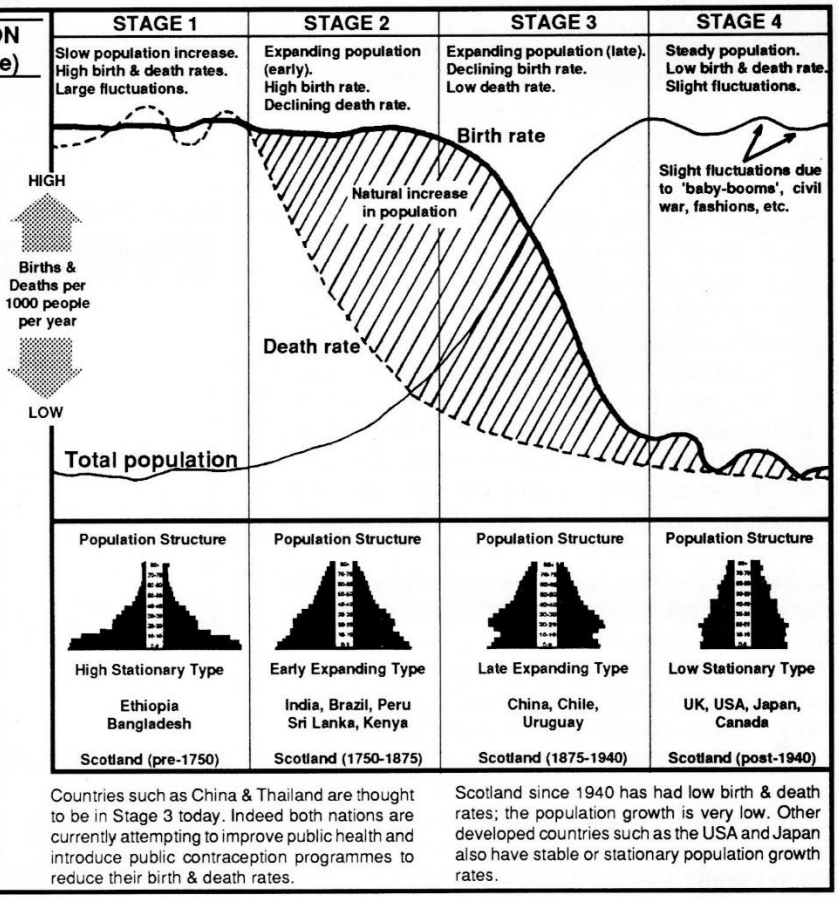


Fig.133 The Demographic Transition

THE DEMOGRAPHIC TRANSITION MODEL (or the Population Cycle)

The graph shown opposite details the **Population Cycle** or a model of **Demographic Transition**.
Demographers believe that all countries pass through the stages of this model over time. However, different countries are at different stages and may take different lengths of time to pass through each stage.

For example, before 1750, both birth and death rates were high in Scotland. The average family had 8 or more children but only half grew to become parents. Medical knowledge was limited and infant mortality was high. Few people lived to their 60's and famines, war and diseases reduced the population regularly. Scotland's population remained stable (**Stage 1**). Today, countries such as Ethiopia remain in Stage 1, for similar reasons.
Scotland's population increased rapidly between 1750 & 1875 (**Stage 2**). Advances in medical science (antiseptics, medicines, etc), improved diets, clean piped water and decent housing combined to reduce the death rate and increased life expectancy, whilst birth rates remained high. A similar, large natural increase is experienced today in countries such as India and Brazil.
Between 1875 & 1940 (**Stage 3**) Scotland's population growth rate decreased. Improvements in public health and better drugs further reduced the death rate and increased life expectancy. A rapid decrease in birth rates, due to greater awareness of and efficiency of methods of contraception and the emancipation of women (greater choice in marriage, the 'vote') combined to reduce the natural rate of population increase.



Countries such as China & Thailand are thought to be in Stage 3 today. Indeed both nations are currently attempting to improve public health and introduce public contraception programmes to reduce their birth & death rates.

Scotland since 1940 has had low birth & death rates; the population growth is very low. Other developed countries such as the USA and Japan also have stable or stationary population growth rates.

The census statistics once collected can be mapped to indicate variations between different areas (and countries) or collated as a **Population Pyramid** - a graph which illustrates the structure or age variations within a given population. Both figures 130 and 132 also illustrate differences between the developed countries (or "**The North**") and developing countries (or "**The South**"). Countries of the South, e.g. Angola and Chad are experiencing population growth rates in excess of 2% whereas countries of the North, e.g. Austria, Denmark and the UK have very low growth rates of about 0.01%. The greatest increase in terms of world population will continue to take place in the least developed countries.
These differences are also illustrated in the structure of both developed and developing countries (Fig.132). Developed countries have population pyramids roughly rectangular in outline. A narrow base (low birth rate) and expanding top (increasing life expectancy rate) indicate a stable population. Population pyramids for developing countries are roughly triangular in outline. The wide base (high birth rate) and tapering top (lower life expectancy) indicate a much less stable population with higher growth. Differing population structures create differing problems for governments.
Demographers also use the census information to chart the progress or cycle of a country's population (Fig.133). The cycle is known as the **Demographic Transition Model** - the rate and change of natural increase in population studied against time. The stages recognised within the demographic transition model are also linked to the level of development of a country, where countries in Stage 2 are considered to be less 'developed' than those in Stage 3, etc. Other changes in population also take place, including **migration** - often classified as either **out-migration** (movement out of an area or country) or **in-migration** (movement into an area or country).

Assignment

1 Describe the growth of the world's population since 1750.

2a Give the meaning of each of the following terms: birth rate, death rate, life expectancy, infant mortality rate, census, natural increase, The South, The North, dependency ratio.
2b Calculate the dependency ratio for both the countries shown in Fig.132.
2c What are the consequences for a country with a high dependency ratio ?

3 What are the main points the cartoonists are attempting to make in Fig.129 ? Do you agree ?

4a Describe the differences between the population pyramids shown in Fig.132.
4b Describe the effects on **population pyramids** of
i. Birth control programmes
ii. War (eg. the Gulf War)
iii. More rapid population growth

5 What problems will the structure of population of the countries in fig.132 cause for their governments ?

6a Describe the changes from Stages **1-4** of the Demographic Transition model in terms of birth, death and growth rates.
6b Compare Scotland's population cycle with that of any current stage 1 country.
6c What is meant by **population change** ?

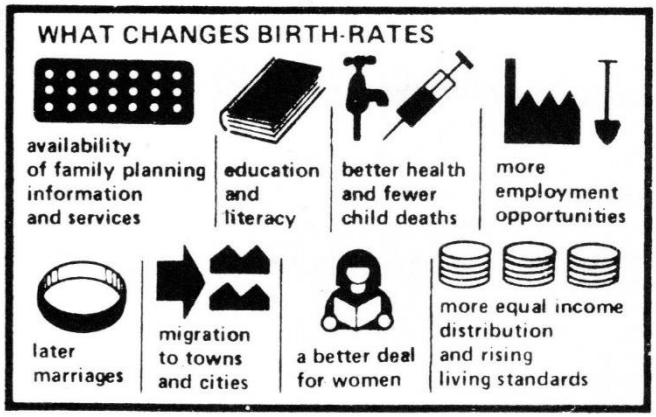
POPULATION GROWTH

A

% of world popn.	1920	2020	Current Growth Rate	Popn. Density
Europe	18%	9.6%	0.06%	34 per km^2
South America	5%	5.3%	0.83%	24 per km^2
Africa	8%	17.2%	2.49%	44 per km^2
Asia	53%	59.5%	0.86%	104 per km^2

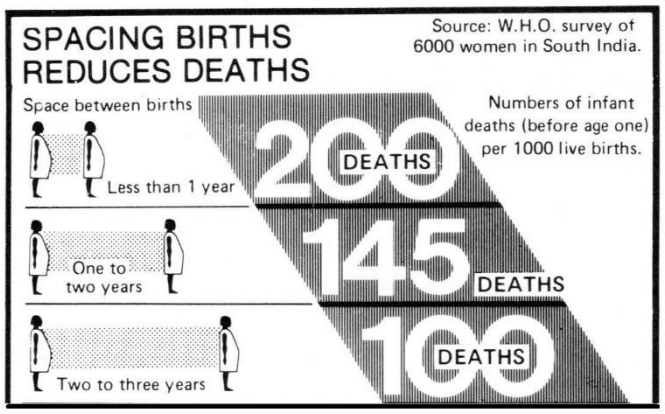
B

UNFPA



C

UNICEF



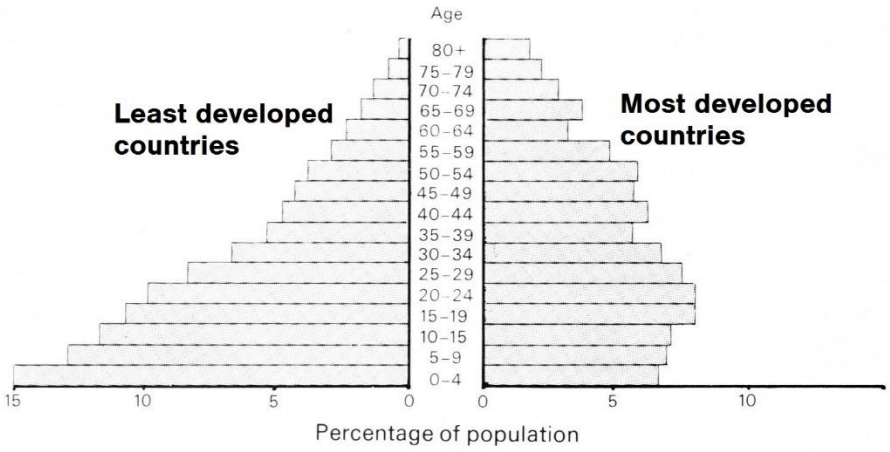
Look carefully at diagrams A, B and C.

1. Describe the **main trends** in the population growth between **1920** and **2020**
2. Define the following terms.
   (a) Birth rate
   (b) Death rate
   (c) Natural increase
3. Which areas of the world will experience
   (a) the fastest population growth?
   (b) the slowest population growth?
4. Explain why there are likely to be different rates of population growth in different parts of the world.
5. For any **two** factors shown in diagram B, describe and explain their effect on the population growth rates of
   (a) a developed country,
   (b) a developing country.
6. Why should 'spacing births' reduce the infant death rate of a developing country? Give reasons for your answer.
7. Quoting specific examples, describe the problems associated with expanding populations and contracting populations.
8. Some countries, such as China, have adopted a **population control policy.** Describe the ways in which such a policy is necessary.

POPULATION STRUCTURE

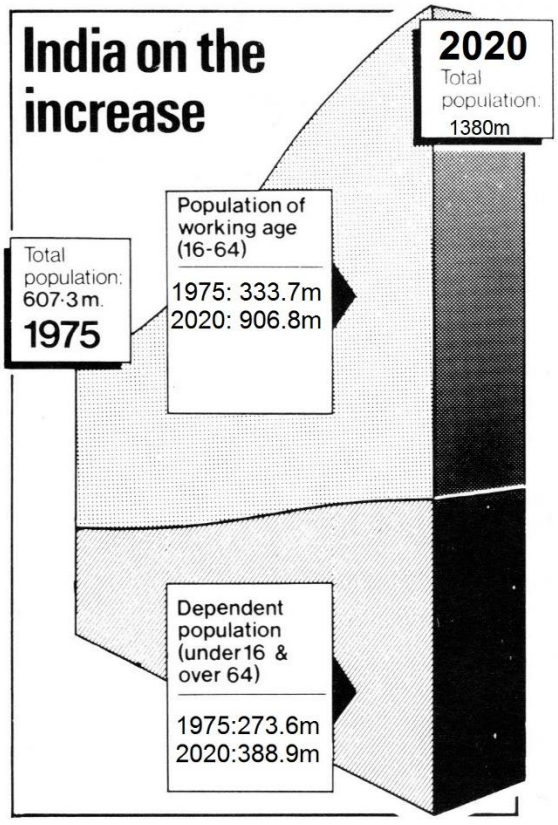
A

Study the information given in population pyramid A.



1. Describe the differences shown in A between the population structure of least developed and most developed countries.
2. In which type of country is there
   (a) a higher birth rate?
   (b) a higher death rate?
   (c) more rapid population growth?
3. Describe the **effects on population pyramids** of each of the following.
   (a) Birth control programmes (b) Famine
   (c) Large-scale in-migration (d) Young-marriage practices.
4. Using information in A, work out for (i) developed and (ii) developing countries
   (a) the total percentage of people under 15 years old;
   (b) the total percentage of people over 60 years old;
   (c) the dependency ratio $= \frac{\text{Percentage of population under 15 + percentage over 60}}{\text{Percentage of population of working age (15–60)}}$

B



   (d) What are the consequences for a country with
   (i) a high dependency ratio
   (ii) a decreasing dependency ratio?
5. Look at diagram B. Describe the main changes in India's population from 1975 to 2020.
6. Describe the effect of these changes on India's
   (a) population pyramid;
   (b) dependency ratio;
   (c) economy and standard of living.
7. What do you think the Indian Government should do to ease the problems of population increase? Justify your answer.

POPULATION: Factors affecting change

It is predicted that the world's population will exceed 9 billion by about **2040**. Much of the growth in population will take place in Africa, Asia and South America with more than half the growth taking place in Africa and SE Asia. Much of the next two decade's population growth will take place in urban areas, particularly in sub-Saharan Africa. According to projection studies of population by region the world population will reach 10 billion by 2050.

In contrast, population growth in developed countries, already low, will slow further as the population of the North ages. Growth is slowing in Asia. World population projections are made by various bodies including the World Bank and the UNO. They recognise current trends and cannot make assumptions about future factors which may change the population growth rate.

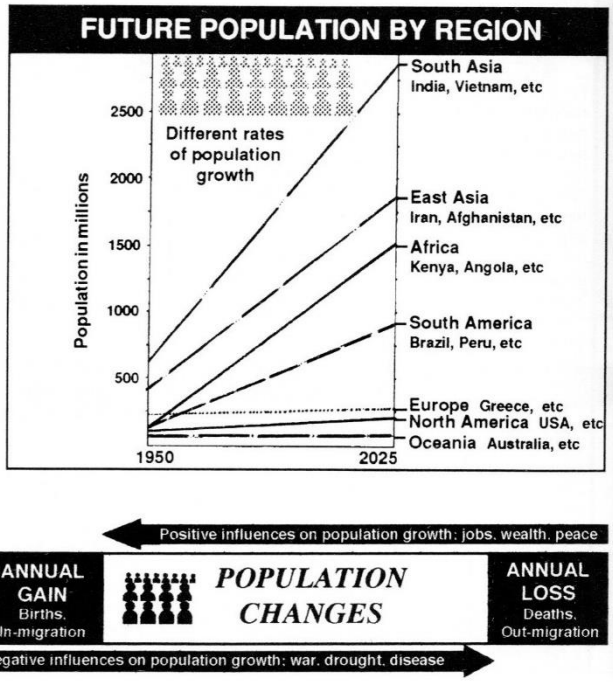
The population of any area depends upon the balance between annual losses and annual gains (Fig.134). Change should not solely be associated with population growth - population change also encompasses population decrease, slowing of the growth rate and migration (in- and out-migration). Population Change is the result of a *combination* of physical-environmental and human-social factors.

Physical-environmental factors which influence change include natural disasters such as earthquakes (eg. Los Angeles 1994), floods, cyclones and severe drought. Environmental factors include the desertification of formerly fertile areas, the deforestation of large areas of rainforest, the spread of new diseases and pollution of water, coast-lines or farmland.

Human-social factors influencing population change are more complex and difficult to isolate. The quality of life within an area is a vital factor. The provision of medical care, education, food, housing and sanitation facilities together with Government policy, distribution of wealth and level of technology are all important influences on population change within any country or area.

It is important to note that change is usually influenced through the interaction of both physical and human factors. For example, the population of China is estimated (at the last census) to exceed 1.2 billion people. The government of

Fig.134 Projections of population for different regions



China recognised a high population growth rate (>2%) would increase crowding in Eastern China, reduce the amount of food per citizen and further threaten soil fertility in various areas. In order to lower the population growth rate and maintain the drive to raise standards of living for all people, the government introduced a "**One-child Policy**' in 1984 (Fig.135). Couples were restricted to having one child by a stringent birth control and public education programme. The environmental and social threat of both a large population and high growth rate forced action, lowering growth rate below 0.4%. Attempts to change the population growth rate are also being made in other countries, with varying degrees of success. For example, a Transmigration policy operated for decades in Indonesia where people were pushed to the outer islands in order

Fig.135 Giant posters in Beijing remind citizens of China's one-child per family policy

to relieve overcrowding and pressure on the land in the main islands of Java, Bali and Madura. Since 1969 over 3 million people have been resettled. In this way, Indonesian government policy has directly influenced population change.

In developing countries, the main population change is that of rapid growth. The main reasons for high growth rates in excess of 3% (e.g. in Rwanda or Uganda) are a combination of physical and social factors. Whilst death rates are falling through government and international aid for medical care, education and food production, birth rates remain high for a variety of reasons. People in many developing countries have large families *not* through ignorance of birth control methods but for positive reasons. Children are not regarded as a financial burden but as a boon. Children help in the fields when young and later may get a job and contribute to the family income. There are few welfare schemes in developing countries. The only real way to safeguard old age is to have children who will provide for their parents. Many religions encourage the birth of children (e.g. Hindu, Muslim) and discourage many methods of birth control. People also have large families for negative reasons. The infant mortality rate remains high. When one child in four dies due to diseases caused by poverty (Fig.136), people have more children to ensure some survive. In many countries men exert power over women who, as a result, often have no control over the use of birth control methods. In some societies there is great social pressure on both men and women to have large families. Many people cannot afford effective methods of birth control (e.g. birth pill, sterilisation, etc) or live in rural areas with no access to health clinics. In many countries migration changes the population growth rate in various ways and for various reasons (Fig.137). Migration creates problems in both North and South. Common problems involve rural depopulation, overcrowding in urban areas, shortages of work, housing and discrimination of all types.

In **developed countries** such as Denmark and Norway, the main population changes involve very low growth rates and ageing. Death rates are low, life expectancy is high (often over 75yrs) and there is increased wealth. Birth rates remain low mainly because infant mortality is low and there is less need to have large families. Children are often viewed as a cost and the desire for a higher living standard with high cost of living tend to restrict family size. Women increasingly follow their own career often combining work with having children, in many cases limiting family size.

Fig.136

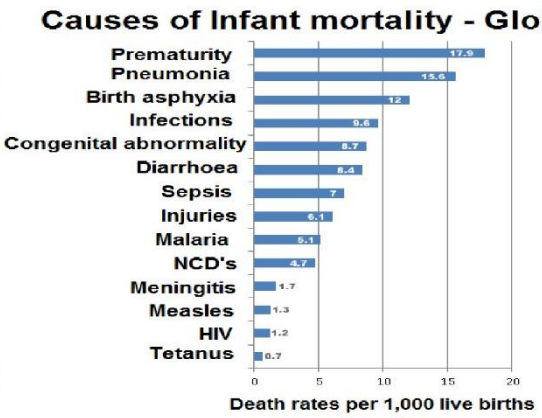
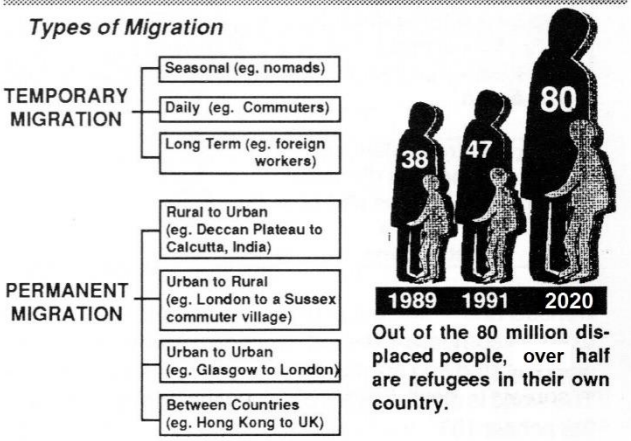


Fig.137 MIGRATION AND ITS CAUSES



Out of the 80 million displaced people, over half are refugees in their own country.

Causes of Migration

Lack of basic amenities, overcrowding, civil war, shortage of labour, poverty, polluted environment, better life with paid work, high infant mortality rate, medical serves provided for all, lack of land, safer environment, radioactivity in environment, markets and food shops, desertification, poor health care, high population growth rate, entertainments, long-term drought, television & media, famine, better housing, earthquakes & floods, noise pollution, schools open to all, vandalism & crime, higher living standards, religious bigotry, ethnic cleansing, deforestation.

Assignment Twenty-nine

1a Describe the differences between the projected population growth for developing and developed regions of the world.

1b What factors influence change in population ?

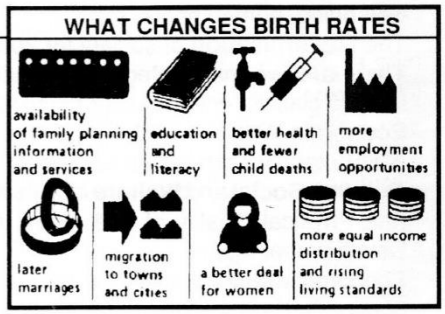
2 Write the meaning of each of the following terms:-
ageing, quality of life, transmigration, refugee, migration

3a Describe the main population changes in
i. Developing countries
ii. Developed countries

3b Explain why there are likely to be different rates of population growth in different parts of the world.

4 The reasons for migration may be a combination of **Push factors** (negative factors which encourage people to move out of an area) and **Pull factors** (positive factors which attract people to new areas).
i. Classify the causes of migration (Fig.137) as Push or Pull factors.
ii. Re-classify the causes of migration as Economic, Political, Natural or Environmental.

Fig.138



5a Why are child deaths (Fig.136) a result of poverty ?

5b For any **three** factors shown in Fig.138, describe and explain their effect on the population growth rates of developed and developing countries.

6 How would a population policy such as that of China (One-child policy) be received in a developed country such as the UK ? Explain your answer.