POPULATION DYNAMICS

Population dynamics can be defined as the study of the changing pattern of population size, growth and distribution. It is a field that tracks the factors related to changes in population such as fertility rate and life expectancy. Predicting population changes is important because these demographic\* trends impact economic, social and environmental systems. An increase in human population can impact the quality of natural resources like biodiversity, air, land and water.

WORLD POPULATION

The population in the world has grown tremendously over the past two hundred years. In the beginning of 1900, population was less than one billion but now it stands at over seven billion. The vast majority of this population live in developing countries. The world’s population is spread unevenly across the globe with small concentrations of large number of people living in the same area. The world as a whole has more ‘empty’ areas than ‘crowded’ areas.

This growth of population has now slowed down. But what will actually happen in the future is difficult to predict. Better health care means decline in death rate, which could lead to an increase in population. Break out of new diseases, on the other hand, could mean a decrease in population, e.g., impact of AIDS in Africa. A war may break out which would also mean a decrease in population. So, though the rate of global population is predicted to decrease, we are not sure when zero population growth will be reached. Some have suggested this will occur in the early 2020s but others think the global population will reach about ten billion.

DISTRIBUTION OF POPULATION OF THE WORLD

The distribution of population describes the location and number/size of people living on the Earth’s surface. It can be represented by a population density map that represents the ratio of po0pulation with respect to area. It is represented as the number of people per square kilometre.

The world’s population distribution is uneven. Places which are sparsely populated contain few people. Places which are densely populated contain more people. Sparsely populated places tend to be difficult places to live. These are usually places with hostile environments, e.g., Antarctica, mountains and deserts. Places which are densely populated have favourable environments, e.g., Europe and South-East Asia.

The above map shows patterns of population distribution for the entire world using shades of colours. It shows that the world’s three largest population concentrations all lie on the Eurasian\* landmass-East Asia, South Asia and Europe- each also associated with ancient civilizations. It also reminds us that the overwhelming majority of the world’s population inhabits the Northern Hemisphere.

The area around China, Korea and Japan, holds about one-quarter of the world’s population- nearly 1.3 billion in China alone. The map shows that the population is concentrated in island nations of South-East Asia.

India lies at the centre of the South Asian concentration with extensions to Pakistan, Bangladesh and the island of Sri Lanka. This is one of the greatest concentrations of people on Earth with about 1.5 billion people. This is a region with a rapidly growing population. The capacity of the region to support this population has already been exceeded. Most of the people here are mostly engaged in primary activity.

Europe is the third most populated region with around 700 million people. Unlike the two regions mentioned above, the terrain and environment are not as closely related to population distribution. Another contrast lies in the fact that the majority of the European population live in cities and towns, leaving the rural country-side more open and sparsely populated. These contrasts with the East and South Asian clusters reflect the impact of the Industrial Revolution on Europe over the last 200 plus years.

Based on the above information we can say that the world’s population distribution is divided into three main groups:

1. Areas of low density

* Less than 10 people per square km
* Examples include Sahara Desert and Canada.

1. Areas of medium density

* 10 – 50 people per square km
* Examples include California, south-east Australia and the Nile valley in Egypt

1. Areas of high density

* Above 50 people per square km
* Examples include South and East Asia and Europe

# POPULATION DENSITY

Population density is the average number of people per square kilometre. It is a way of measuring population distribution. It is affected by size or area. The same population size with larger area will change the density of population. Population density is calculated using the following formula:

Population Density = Total population/ Total land area in km2

FACTORS RESPONSIBLE FOR THE POPULATION GROWTH

The growth of population depends on a number of factors. These factors can be broadly grouped into two major categories-

* Physical and economic factors
* Social and cultural factors

# PHYSICAL FACTORS

Physical factors play a vital role in the density and distribution of population. These factors include landform, climate, soil, etc. Thought there is a lot of improvement in technology, the patterns of population distribution all over the world continue to reflect the influence of various physical factors.

**Landforms:**  The altitude and slope of the land are the main attributes that determine population density and distribution. The evidence of the influence of altitude and slope on population density and distribution has been observed between mountains and plains. For example, the Ganga plains are among the most densely populated areas of the world while mountains such as the Andes, Alps and Himalayas are sparsely populated.

**Climate:** People usually avoid extreme climates that are very hot or very cold such as Sahara Desert and the Polar regions.

**Soil:** Fertile soils provide suitable land for agriculture. Fertile plains such as Ganga and Brahmaputra in India, Huang He and Chang Jiang in China, and the Nile in Egypt are densely populated.

**Water:** People prefer to live in areas where fresh water is easily available. The river valleys of the world are densely populated while deserts have sparse population.

# ECONOMIC FACTORS

Like physical factors, economic factors also play an equally important role in density and distribution of population.

**Minerals:** Areas with rich mineral deposits attract mining and industrial activities. Therefore skilled and semi-skilled workers move to these areas for employment and make them densely populated. Katanga Zambia copper belt in Africa is one such good example.

**Urbanization:** People migrate to cities for better employment opportunities, educational and medical facilities, for better means of transport and communication and good civic amenities. Mega cities of the world continue to attract large number of migrants\* every year.

**Industrialization:** Industrial belts provide job opportunities and attract large number of people. These include not just factory workers but also transport operators, shopkeepers, bank employees, doctors, teachers and other service providers. For example, the Kobe-Osaka region of Japan is thickly populated because of the presence of a number of industries.

## SOCIAL AND CULTURAL FACTORS

People tend to move away from places where there is social and political unrest. Refugees from Ethiopia, Sudan, and Syria have moved out from their own countries. Many a times governments also offer incentives to people to live in sparsely populated areas or to move away from overcrowded places.

Religious places attract more people because they have religious or cultural significance. For example, Haridwar in Uttarakhand is densely populated as it is of religious importance since ancient times.

FACTORS AFFECTING POPULATION CHANGE

There are three factors that affect population change in a country:

**Births:** It is usually measured using the birth rate (number of live births per 1,000 of the population per year). Birth is a chief natural factor affecting population change. It causes an increase in the population. The higher the birth rate, the quicker the population growth.

**Deaths:** It is usually measured using the death rate (number of deaths per 1,000 of the population per year). Death is an important natural cause that brings change in population. It decreases the population of a country. Reduction in death rate automatically brings down the birth rate.

**Migration:** As we migrate or move from one place to another, the population of one place decreases while that of the other increases. It is considered as an unnatural element of population change. Emigration is used to describe the movement of people going out of a country. People who left Ireland during the famine\* were referred to as emigrants by the people who were left behind in Ireland. Immigration is the term that describes people that arrive into a country.

## RATE OF CHANGE

Births and deaths are natural causes of population change. The difference between the birth rate and the death rate of a country or place is called natural increase. The natural increase is calculated by subtracting the death rate from the birth rate.

**Natural increase = birth rate – death rate**

The rate of natural increase is given as a percentage, calculated by dividing the natural increase by 10. For example, birth rate is 14 per 1,000 population, and the death rate is 8 per 1,000 population, then the natural increase = 14 – 8 = 6. That is 6/1,000, which is equal to 0.6 per cent.

OVER AND UNDER POPULATION

Both large and small countries can be under populated and over populated. A country can be over populated if its resources cannot sustain the current population. As long as there is over population the quality of life will decline through unemployment, pollution and degradation of the environment. In an under populated country, the population cannot fully utilise the resources available. An increase in population would lead to an increase in the quality of life.

OVER POPULATION

When too many people are living in a country but there aren’t sufficient or enough resources to help them live or feed them then that particular situation is termed as over population. With an increasing population, even the basic amenities are not provided to the people. These basic amenities include food, shelter, clean water, fuel and farmland. Generally higher levels of population growth is happening in developing or poorer countries, and the lower levels of growth, population balance or even decline are happening in developed or richer countries.

## CAUSES OF OVER POPULATION

**Migration:** Migration can raise the population. In developed countries, population increases because people want to explore better opportunities in terms of employment and standard of living. Sometimes they may move to areas that are already under stress due to soil erosion and overgrazing. Rural-urban migration is another important reason as a result. Shanty towns have to be built. Homelessness, congestion and crime are also symptoms of an over populated city region.

**Illiteracy:** Illiteracy is an important cause of over population. People who lack education fail to understand the need to prevent excessive population growth. They are unable to understand the harmful effects that over population may cause. Illiterate people are unaware of the ways they can control population. Lack of family planning leads to over population. Due to ignorance, they do not follow family planning measures and thus contributing to a rise in population. At some points, over population might be referred to as an increase in human resources. This increase in the number of people leads to an increase in the number of people leads to an increase in the number of productive hands and creative minds. On the other hand, greater number of people require a greater number of resources which eventually leads to depletion of natural resources.

**Poverty:** Many poor parents produce children not only because they are ignorant but because they need them. Producing more children by poor people illustrates the paradox of population – poverty interrelationship. Poverty is both the cause and effect of the population growth. Having produced many children to have sons to combat one’s growing needs, the parents are forced to keep them out of school to supplement their household income. Ironically, a huge family size is the poor man’s only way to combat poverty caused by the population boom.