

Human Population

Population

A population is defined as a group of individuals belonging to the same species which live in a given area at a given time.

The study of population change is known as "Population Dynamics".

Population Density

It is expressed as the number of individuals of the population per unit area or per unit volume. This varies in response to changes in the environment and introduction with other living organisms.

Parameters affecting population size Changes in population size are governed by four main parameters. They are

- i) **Birth rate or Natality** It is the number of live births per 1000 people in a population in a given year.
- ii) **Death rate or Mortality** It is the number of deaths per 1000 people in a population in a given year.
- iii) **Immigration** It denotes the arrival of individuals from neighbouring populations.
- iv) **Emigration** It denotes the dispersal of individuals from the original population to new areas.

POPULATION GROWTH

The rapid growth of the global population for the past 100 years results from the difference between the rate of birth and death. The general trend in the population growth is explained as shown in the following graph.

Characteristics of Population Growth

- i) **Exponential Growth** Now population growth occurs exponentially like 10, 10², 10³, 10⁴ etc., shows the dramatic increase in global population in the past 160 years.
- ii) **Doubling time** It is the time required for a population to double its size at a constant annual rate. It is calculated as follows

$$T_d = \text{Doubling time} = 70/r$$

where, r = annual growth rate if a nation has 2% annual growth, its population will double in next 35 years.

- ii) **Infant mortality rate** It is the percentage of infants, died out of those born in one year. Even though this rate has decreased in the last 50 years the pattern differs widely in developing and developed countries.

- iv) **Total fertility rates (TFR)** It is the average number of children delivered by women in her life time. The TFR values vary from 2 in developed countries to 47 in developing countries.

- v) **Replacement level** Two parents bearing two children will be replaced by their offspring. Due to infant mortality this replacement level is changed. But, due to high infant mortality the replacement level is generally high in developing countries.

vi) Male - Female ratio The ratio of girls and boys should be fairly balanced in a society to flourish. But the ratio has been upset in many countries including China and India. In China, the ratio of girls and boys are 100: 140.

vii) Demographic transition Population growth is generally related to economic development. The death rates and birth rates fall due to improved living conditions. This results in low population growth. This phenomenon is referred to as demographic transition.

Variation of population among nations

Different regions of the world find themselves at different stages of demographic transition from high to low mortality and fertility. Their growth path also differ considerably, resulting in significant shifts in the geographical distribution of the world's population.

At present the world's population has crossed 6 billions. This existing population is also not evenly distributed; less developed countries have 80% population while the developed countries have only 20%.

Less developed countries (Africa, Asia, South America) have 80% of total world population and occupy less than 20% of the total land area.

In the most developed countries like USA, Canada, Australia, the population increases at the rate of less than 1% per year. But in less developed countries like south America, Africa and Asia, the population increases at the rate greater than 1% per year.

Kenya is the fastest population growing country in the world, where 20 million people are residing. If the current rate of increase continues, the population would triple by 2010.

China and India's population was above 1000 million in 2000 year. Its share is about one third of the world's population.

Europe and North America accounts for 14% of the world's population

Variation of population based on age structure

Age Structure of population can be classified into three classes.

- i) Pre-productive population (0-14 years)
- ii) Re-Productive population (15-44 years)
- iii) Post re-productive population (above 45 years)

Variation of population is now explained based on the above three classes.

a) Pyramid shaped variation of population (increase)

Ex: India, Bangladesh, Ethiopia - Nigeria etc.

The pre-productive age group population (0 - 14 years) is more, indicated at the base of pyramid and post reproductive age group population (above 45 yrs) is less, indicated at the top of the pyramid. The large number of young age people will soon enter into reproductive age group population (15-44 years), which increases the population growth. But the less number of old age people indicates less loss of population due to death.

b) Bell shaped variation of population (Stable)

Ex : France, USA, UK, Canada etc.

The pre-productive age group population (0-14 years) and reproductive age group population (15-44 years) are more or less equal. So the people entering into reproductive age group will not change the population and thus the population growth is stable.

c) Urn shaped variation of population (decrease)

Ex : Germany, Italy, Sweden, Japan etc.

The pre-productive age group population (0-14 years) is smaller than the reproductive age group population (15-44 years). In the next 10 years, the number of people in the reproductive age group is less than the before, resulting in a decrease of population growth.

POPULATION EXPLOSION

Definition

The enormous increase in population, due to low death rate (Mortality) and high birth rate (Natality) is termed as population explosion.

The human population is not increasing at a uniform rate in all parts of the world. Populations of countries in different years and in the near future are given below:

Country	Population in crores		
	1950	1992	2025
China	55.5	116.6	159.1
India	35.8	88.3	138.3
USA	15.2	25.6	29.6
Indonesia	8.0	18.5	28.6
Pakistan	4.0	12.2	28.2
Brazil	5.3	15.1	23.7
Nigeria	3.3	9.0	21.6
Bangladesh	4.2	11.5	21.2
Iran	1.7	6.0	16.0

Among the above countries, the most developed country like USA has a slow growth rate, whereas the other developing countries have exorbitant growth rates.

Birth rate of developing country = 45 per 1000 population

Birth rate of developed country = 12.7 per 1000 population

If we analyze the “quality of life” factors such as GNP, life expectancy, infant mortality etc. with the birth rate, low birth rates produces the higher “quality of life”

S.No.	Quality of life factors	Developing Countries	Developed countries
1.	GNP per capita	176\$	22,634\$
2.	Life expectancy	49	77
3.	Infant mortality (Per 1000)	122	6.4
4.	Child death (per 1000)	208	7.9
5.	Safe Drinking water	36%	100%
6.	Calories for health life	95	130
7.	Female literacy	20%	99%
8.	Birth rate (per 1000)	45	12.7

Doubling time

Population explosion can be better understood by considering the doubling time.

Doubling time can be defined as “number of years needed for a population to double in size”.

The table below shows the doubling times of population growth.

Developing countries		Developed country	
Country	Doubling time	Country	Doubling time
India	28 yrs	United State	87 yrs
Turkey	28 yrs	U.K	231 yrs
Nigeria	27 yrs	Italy	99 yrs
Saudi Arabia	25 yrs	France	117 yrs
Pakistan	21 yrs	Japan	58 yrs

Then human population is not increasing at uniform rate in all parts of the world. In many non-industrialized, poor developed countries like Asia, Africa and South America shows higher growth rate. In contrast the population of industrialized, developed countries like USA, UK, France and Italy shows lower growth rate.

Causes (or) Reasons for population explosion

- o Reduced death rate and increased birth rate by the invention of modern medical facility, which leads to population explosion.
- o Increase of life expectancy
- o Ex.: In 1950, the average life expectancy of human being was 50 years but now it is 61 years.
- o Illiteracy.

Effect of population explosion

- o Infant mortality is one of the most tragic indicators of poverty. There are still 34 developing countries, where more than 10 children die before he or she reaches the age of five.
- o Population explosion leads to environmental degradation.
- o Many of the natural and renewable resources like forest, grassland are also under threat.
- o Increase in population will increase disease, economic inequity and communal war.

Family welfare programme

The natural family welfare programme started in India in the year 1951 with the objective of “Reducing the birth rate to the extent necessary to stabilize the population at a level consistent with the requirement of the National economy”.

The family welfare programme is considered as a priority area and a fully sponsored programme.

1. **The first and second five year plans** gave emphasis mainly to the clinical aspects of family planning.

2. **In the third five year plan**, the clinical approach have been supplemented with “Extension of Education Approach”, which is mainly spreading of message regarding family planning.

3. **From the fourth five year plan** onwards high priority was given for family planning activities and it was proposed to reduce the birth rate from 35 per thousand to 32 per thousand by the end of plan.

4. **The main objective of fifth five year plan (1975-1980)** was to bring down the birth rate to 30 per thousand. The family planning services were integrated with Maternal and child Health (MCH) and nutrition programme, so that it will be an attractive one as well as acceptable one.

5. **The sixth five year plan (1980-1985)** mainly aims at the following achievement by the year 2000.

- i) Reduction of family size from 4.4 children in 1975 to 2.3 in 2000.
- ii) Reduction of crude birth rate to 21 from the level of 33 in 1975 per 1000.
- iii) Reduction of death rate due to infanticide from 14 to 9 per 1000.
- iv) Reduction in the infant mortality rate from 127 to below 60 per 1000.

6. **The seventh five year plan (1985-1990)** with family planning programmes are carried out on giving emphasis on educating the mass regarding the programme.

7. **The eighth five year plan** involving family planning were area projects assisted by World Bank, which developed trained man power. One of the project is the India Population Project (IPP), which aims at improving health and family welfare services in the urban slums in the cities of Delhi, Calcutta Hyderabad and Bangalore.

8. The following are the main strategies of **the ninth five year plan** regarding family planning.

- i) To assess the needs for reproductive and child health at Public Health Clinic (PHC) level and under take area-specific micro planning.

ii) To provide need-based, demand-driven, high quality integrated reproductive and child care.

Family Planning Programme

Family planning provided educational and clinical services to the people by giving information on birth spacing, birth control and health care for pregnant women and infants. It also reduces the number of legal and illegal abortions per year and decreased the risk of death from pregnancy.

Objectives of family planning programmes

- o Reduce infant mortality rate to below 30 per 1000 infants.
- o Achieve 100% registration of births, deaths, marriage and pregnancy.
- o Encourage late marriage and later child - bearing.
- o Encourage mother feeding.
- o Enables to improve women's health, education and employment.
- o Prevent and control of communicable diseases.
- o Making school education upto age 14 free and compulsory.

Fertility Control Methods

i) Traditional method

It includes some traditions like taboos and folk medicine.

ii) Modern methods

It includes some important birth control techniques like mechanical barriers, surgical methods, chemical pills, and physical barriers to implantation. More than 100 contraceptive methods are on trial.

Family Planning Programme in India

- o In 1952, India started the family planning programme.
- o In 1970's Indian Government forced family planning campaign all over the country.
- o In 1978, the government legally raised the minimum age of marriage for men from 18 to 21 years and for women 15 to 18 years.
- o In 1981, census report showed that there was no drop in population. Since than finding for family planning programmes have been increased further.
- o

Family planning programmes have greatly contributed to the fertility declines globally. If these programmes continue and fertility declines at the rate as it did during 1980-85, the world population could be 11.3 billion in 2100 instead of 16 billion in the absence of family planning.

If all the unwanted births in developing countries could be prevented, the population of the developing countries would be 7.8 billion and the world population would be 9.1 billion in 2100.

ENVIRONMENT AND HUMAN HEALTH

Environment is closely related to human health. The human health involves both physical and mental health. We can avoid various kinds of diseases caused by the polluted

environments, if we keep our environment clean and neat. Many of the epidemics spreads out through the mediums such as food, water and air. The pathogenic bacteria and viruses contaminate as well as multiply rapidly in unprotected food, water and air.

Types of health hazards

Health Hazards	Examples And Causes
Communicable disease	Malaria, Diarrhoea, respiratory infections
Non communicable disease	Poisoning, pollution, dust
Malnutrition	Micronutrient deficiency, lack of adequate food.
Injury	Traffic disorders, crashes, and collisions, occupational injury
Mental disorder	Abuse, stress

Rural people attracted to urban industrial areas in the hope of jobs are to live with unsafe water, toxic fumes and densely populated conditions. As a result, they are prone to tuberculosis, viral infections and other contagious diseases.

Epidemics

The epidemics can be classified into three categories based on the mode transmittance.

- o Diseases spread from person to person directly are mainly sexually transmitted diseases (STD) such as AIDS, Syphilis, Gonorrhoea etc.,
- o Diseases spread through food, water and air. Diseases such as cholera, Typhoid, Jaundice, Diarrhea, Amoebiasis etc spread through food or water.
- o Diseases such as influenza, whooping cough, Small pox, Chicken pox, Tuberculosis etc spread through air as medium.
- o Diseases can also spread through small animals like rat as well as insects like mosquitoes.
- o The deadly plague disease is spread through rats. Disease like Malaria, Filaria, etc is spread through mosquitoes.

Health effects due to water

The most deadly pollutant of water is untreated human waste which is routinely released into waterway. Each year around 4 million people mostly children die out of diarrhea in developing nations and around 70 million people affected by typhoid. All together an estimated 10 to 25 million people die each year by drinking polluted water. 73 million work days are lost each year due to water related diseases. In adequate water supply leads to poor hygiene and lead to diseases such as trachoma, scabies, conjunctivities, leprosy and ulcers.

Health effects due to air

About 70% of the world's urban population breathes unhealthy air. The use of leaded petrol and traffic congestions in developing nations create health hazard. Even rural residents suffer from indoor pollution causes diseases such as cancer, respiratory, heart and lung diseases, genetic defects and mental retardation.

Case study - Construction of Dams

Sardar Sarovar Dam

It has submerged 1000 hectares of forest affecting about 430 species of plants. The Sardar Sarovar project was a vision of the first deputy Prime Minister of India, Sardar Vallabhai Patel. It was on April 5, 1961, that Pandit Jawaharlal Nehru laid the foundation stone of the project. It was carried out after the study on the usage of the Narmada River that flowed through the states of Madhya Pradesh and Gujarat and into the Arabian Sea. However, the idea of the project led to the first dispute over the means of distributing the Narmada water over three states – Gujarat, Maharashtra and Madhya Pradesh. It was decided to create the Narmada Water Dispute Tribunal (NWDT) in 1969 to determine the fate of the project. There were many large numbers of reports and studies made by the three states before the NWDT gave its verdict in 1979. It was decided that from the 35 billion cubic meters of water available for consumption from the dam, 65 percent would be provided to Madhya Pradesh, 32 percent would be supplied to Gujarat and Maharashtra will be eligible to 3 percent.

Effects of dam on tribal people

- o The greatest social cost of big dam is the widespread displacement of tribal people.
- o Due to the submersion of their lands and displacement, the income of the villagers has been drastically reduced.
- o Many of the displaced people were not recognized and resettled or compensated.
- o The body conditions of the tribal people (lived in forest) will not suit with the new areas and hence they will be affected by many diseases.
- o The displacement will affect the tribal people's culture, dance, songs, festivals, etc., all closely associated with the hills, forests and streams.
- o

Dams and their effects on Forests and Tribal People

- o Dams are the massive artificial structures built across the river to create a reservoir in order to store water for many purposes.
- o Big dams and River valley projects have multi-purpose uses and have been referred to as 'Temples of modern India'
- o However, these dams are also responsible for the destruction of vast areas of forests.

- o India has more than 1600 large dams, the maximum being in the state of Maharashtra (more than 600), Gujarat (more than 250) and Madhya Pradesh (More than 130).
- o Tehri dam is the highest built across the river Bhagirathi in the state of Uttaranchal.
- o The largest dam in terms of capacity is Bhakra dam on river Satluj in Himachal Pradesh.

Effects of dam on forest

Positive effects

- o Water scarcity can be managed.
- o Availability of water can also lead to significant greening of barren lands.
- o Creation of habitats for water birds. Many of the bird sanctuaries are located in and around the water reservoirs.

Negative effects

- o The evidence shows, the creation of reservoirs in more than 1500 major river valley projects have flooded over 5,00,000 hectares of forest land.
- o Hydroelectric projects also have led to widespread loss of forest areas.
- o For building big dams, large scale devastation of forest takes place which breaks the natural ecological balance of the region.
- o Floods, droughts and landslides become more prevalent in such areas.
- o The big river valley projects also cause water logging which leads to salinity and in turn reduces the fertility of the land.

1. Upstream problems

- o Displacement of tribal people.
- o Loss of forests, flora and fauna.
- o Stagnation and water logging near reservoir.
- o Reservoir induced seismicity (RIS) causing earthquakes.
- o Breeding of vectors and spread of vector - borne diseases.

2. Down stream problems

- o Water logging and salinity due to over irrigation.
- o Reduced water flow and silt deposition on river.
- o Salt water intrusion at river mouth.
- o Sometimes, due to structural defects, the dam may collapse suddenly and destroy many living organisms.

BANDIPUR NATIONAL PARK

Bandipur National Park second highest Tiger population in India. Bandipur National Park is located in Gundulpet taluk, Chamarajanagar district. Park is the part of Nilgiri Biosphere Reserve

making it largest protected area in Southern India and largest habitat of Wild Elephants in South Asia.

Bandipur National Park shares its boundary with 3 other National park namely Nagarahole National Park, Wayanad National Park and Mudumalai National park. There is ban of traffic from 9 PM to 6 AM of dusk to dawn to help to drawn down the death rate of wildlife.

Tigers, Indian Elephants, Leopard, Dhole, Sambar, Sloth bear, Chital many more animals and Birds can be spotted in the Bandipur National park.

India is the world's largest home for Royal Bengal Tigers. India hosts more than 70% of total Tigers in the world. It is no surprise then that we are also prime targets for tiger hunters and poachers. To overcome this threat **Project Tiger** was launched in 1973 in India.

Initially, When **Project Tiger was rolled out in 1973**, nine tiger reserves encompassing an area of 9,115 sq km were identified to be brought under special protection. By the late 1980s the number of protected tiger reserves increases from 9 to 15. And a total area of 24,700 sq. km of forested land was reserved for the Tigers.

By 1984, the number of tigers present in Project Tiger reserves reached above 1100. In the next few years, more and more **tiger habitats** were added to the Project Tiger. By the year 1997 there were 23 tiger reserves stretched over an area of 33,000 sq. km were being protected under Project Tiger in India.

However, even as the range of protected areas continued to expand, the number of tigers didn't increase considerably.

Man - Wild Life Conflicts

Man - Wildlife conflict arise, when wildlife starts causing immense damage and danger to the man. Under such condition it is very difficult for the forest department to compromise the affected villagers and to gain the villagers support for wildlife conservation.

a) Examples for Man- Wildlife conflicts

1. In sambalpur, Orissa, 199 humans were killed in the last 5 years by elephants. In retaliation, the villagers have killed 98 elephants and badly injured 30 elephants.
2. In the border of kote chamarajanager, Mysore, several elephants were killed because of the massive damage done by the elephants to the farmer's cotton and sugarcane crops.
3. The agonized villagers sometimes hide explosives in the sugarcane fields, which explode when the elephants enter into their fields.
4. It has been reported that a man - eating tiger killed 16 Nepalese and one 4 year old child in a Zoological park in Kathmandu.

b) Factors influencing Man - Animal conflicts

1. Shrinking of forest cover compels wildlife to move outside the forest and attack the fields and humans.
2. Human encroachment into the forest area induces a conflict between man and the wildlife.
3. Injured animals have a tendency to attack man.
4. Often the villagers put electric wiring around their crop fields. The elephants and wild pig's get injured, suffer in pain and start violence.
5. The farmers who are affected by the wild animals due to the damage caused by the animals will try to kill the wild animals.

c) Measures for Man Wildlife Conflicts

1. Adequate crop and cattle compensation schemes must be started.
2. Solar powered fencing must be provided along with electric current proof trenches to prevent the animals.
3. Cropping pattern should be changed near the forest borders.
4. Adequate food and water should be made available for the wild animals within forest zones.
5. The development and constructional work in and around forest region must be stopped.

Sacred Groves in Western Ghats

The Western Ghats are one of the globally recognized “*hot spots*” of biodiversity in India. In Maharashtra small patches of forest in the Ghats are protected by local people as “sacred groves.” They are called “Devrai” which have been managed by local people and are dedicated to the deity in the grove [Arpita Vipat]³.

These groves act as benchmarks of less disturbed vegetation. The study has been conducted on fifteen groves through detailed expert and semistructured interviews of their priests and locals have been conducted to appreciate their traditional management systems. There is no evidence to show that the groves were intended primarily for biodiversity conservation or as a science based natural resource management strategy. Biodiversity conservation of groves is thus a by-product of a traditional belief of locals in the supernatural power of the forest deity. The concept of ICCAs (Indigenous Community Conserved Areas) and making registries of local knowledge of biodiversity as a tool for developing future conservation initiatives can act as a useful strategy to preserve the groves in the face of regional development pressures and gain government recognition for protecting the groves in the long term.

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