

Human Population

Introduction

The first clear warning of the dangers of human overpopulation was given by **Thomas Malthus** (1766-1834). Malthus in his article "*Essay on the Principle of Population*" (1798) pointed out that population tends to increase in geometric progression while food supply increase only in arithmetic progression. The human population may outrun food supply according to Malthusian theory. The five billionth baby was born on July 11, 1987; it has been observed as **World Population Day**. A population consists of all the members of a species living at any time in a specified area. The world's problem No. 1 today is the population explosion. Demography is the study of human population growth and prediction of future development.

16.1 Terminology of population

- (1) **Population size** : Population size may change when individuals enter or leave the population.
- (2) **Biotic potential** : It is the measure of maximum rate of reproduction under optimal conditions.
- (3) **Population crash** : It is a sudden die off, particularly after the carrying capacity of the environment.
- (4) **Environmental resistance** : A force which acts against the achievement of the highest possible level of population growth is known as **environmental resistance**.
- (5) **Carrying capacity** : It refers to the size of a population that can be maintained indefinitely.
- (6) **Zero population growth** : If the number of individuals gained from birth and immigration is exactly equal to the number lost due to deaths and emigration, then the population shows **zero population growth**. The proportion of young individuals is highest in an expanding population.
- (7) **Natality (Birth rate)** : Number of offspring produced per unit of population by reproduction.
- (8) **Mortality (Death rate)** : Number of deaths per one thousand individuals per year.
- (9) **Sex ratio** : It is the ratio between males and females in a given population or number of females per 1000 males.
- (10) **Density** : The density of a population can be calculated by $D = \frac{N(\text{Number})}{S(\text{Space})}$.
- (11) **Vital Index** : The percentage ratio of natality over mortality.

16.2 Population growth curves

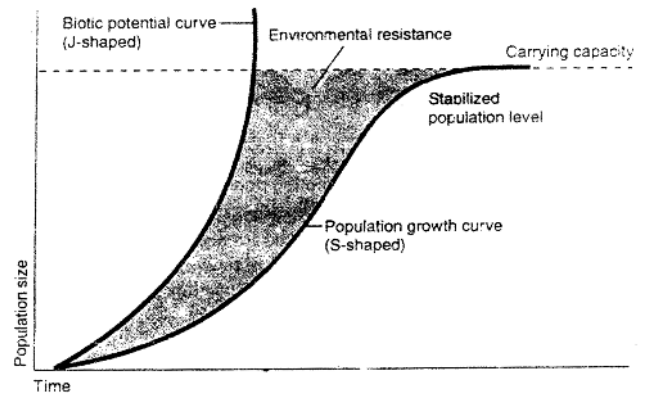
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Population growth curves are of two major types : the *J*-shaped curve and the *S*-shaped curve. The *J*-shaped curve is a biopotential curve when environmental resistance is zero; it is produced because larger population increase more rapidly than smaller ones. The **S-shaped curve** (sigmoid curve) is generated when a population approaches the environment's carrying capacity. The *S*-shaped curve shows three phases :

(i) **Early phase** (Lag phase) : Little or no growth takes place due to small size of population and lack of adaptation.

(ii) **Middle phase** (Log phase or exponential phase) : There is geometrical increase in population size owing to abundance of food and other favourable conditions.

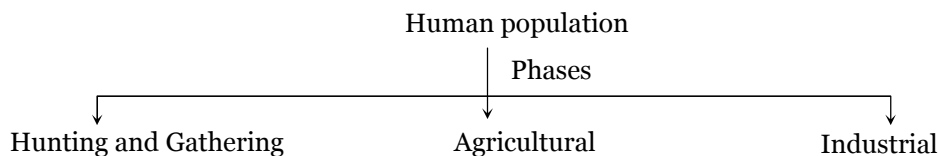
(iii) **Stationary phase** (Zero growth or Plateau rate) : Birth and death rates are equal, the population stabilizes around the carrying capacity of the environment.



The theoretical relationships between biotic potential, environmental resistance and carrying capacity

16.3 Human population and its phases

The impact of human population is directly related to standard of living, food supply, housing health and medical care. One of the important factors controlling human population density is the climate.



(i) **Hunting and Gathering phase** : Agriculture was almost unknown before 8000 B.C., most humans must have lived by hunting and gathering their food.

(ii) **Agricultural phase** : As agricultural techniques spread and improved between about 8000 BC and 1750 A.D., world population increased from 10 million to about 800 million.

(iii) **Industrial phase** : Industrial revolution caused a spurt in human population and a third phase of growth began in the 18th century. In human population, exponential phase started in 1750 and is continuing till date.

The poorer, less industrialized nations are referred to as developing countries, while the more affluent, industrialized countries are called developed countries.

16.4 Census

- (1) The official counting of population is known as **census**.
- (2) In India, census is recorded after every 10 years (decennial census)
- (3) The first census in India was carried out in 1891.
- (4) The year 1921 is called big divide because after this year India's population began to increase rapidly.
- (5) India is the home of 16% of world's population.
- (6) India accounts for 2.4% of total world area (7th place).

(7) In last census, **Nagaland** registered the highest growth rate of 56.86% while **Kerala** the lowest 13.98%.

(8) The most thickly populated state of India is **West Bengal** ($766/km^2$); the most sparsely populated area of the country is **Arunachal Pradesh** ($10/km^2$).

(9) **Uttar Pradesh** is the most populated state (138,760,417) followed by Bihar (86,338,853), Maharashtra (78,706,719), West Bengal (67,982,732) and Andhra Pradesh (66,304,854).

(10) **Kerala** is the only state with a higher number of females than males, 1040 females for 1000 males.

(11) Chandigarh has the lowest number of females per 1000 males with 790.

(12) The literacy rate in India is 52.21% (64.13 for males and 39.29 for females). Now in 2001 it is 65%

(13) In the 1991 census, **Kerala** retained its position by being on the top with an 89.81% literacy rate. Bihar stood at the bottom with a literacy rate of 38.48%, with Rajasthan being close to it having 38.55 literacy percentage.

(14) In the year 2001 census Kerala has gone at 92.98% and Manipur is on 87% while Bihar with 48.42 at bottom.

(15) The first district to become 100% literate is **Ernakulam** in Kerala.

(16) The most populated city in India is **Mumbai**, followed by Calcutta, Delhi, Chennai and Hyderabad.

(17) The present population of the world is about 6 billion. At mid-1996, the world population was about 5.8 billion.

(18) **China** (1234 million) and **India** (1027035243 in 2001 census) are two most populous countries; **USA** (265.8 million) and **Indonesia** (200.6 million) come next.

(19) India's population density is $270/km^2$ whereas China's is only $120/km^2$.

(20) India's population growth rate is about 2% a year and China's 1.4%.

(21) Maximum population growth rate in the world is in **Kenya** (5.5%).

(22) **Austria** and **France** has shown a negative growth rate.

(23) The most thickly populated country of the world is **Bangladesh** (previously Japan).

(24) **Greenland** is the most thinly populated country ($45/km^2$) followed by Australia.

(25) The International Conference of Population and Development (ICPD) was held at **Cairo** in September 1994.

(26) **Mumbai** will become the second largest megapolis in the world by the turn of the century with a population of 18.9 million.

(27) **Tokyo** is the largest city with 26.5 million people.

16.5 Population control methods

Among various methods of birth control available, birth control pills and surgical sterilization are the most effective.

The use of condoms provides the added benefit of protection against sexually transmitted diseases, including AIDS. Abortion or **medical termination of pregnancy** (MTP) has now been legalised in India.

Methods of birth control

S.No.	Method	Action
(1)	Rhythm method	No intercourse during woman's fertile period (day 12-20).
(2)	Withdrawal	Penis is withdrawn before ejaculation.
(3)	Tubectomy Tubal ligation	Woman's fallopian tubes are cut and tied, permanently blocking sperm passes.
(4)	Vasectomy	Man's vasa deferentia are cut and tied permanently blocking sperm release.
(5)	Intrauterine device (IUD)	Small plastic or metal device placed in the uterus, prevents implantation. Some contain copper, others release hormones.
(6)	Oral contraceptive	Synthetic estrogens and progesterones prevent normal menstrual cycle; primarily prevent ovulation.
(7)	Male condom	Thin rubber sheath on erect penis collects ejaculated semen.
(8)	Female condom	Plastic pouch inserted into vagina catches semen.
(9)	Diaphragm	Soft rubber cup covers entrance to uterus, prevents sperm from reaching egg and holds spermicide.
(10)	Cervical cap	Miniature diaphragm covers cervix closely, prevents sperm from reaching egg and holds spermicide.
(11)	Foams, creams, jellies, etc.	Chemical spermicides inserted in vagina before intercourse, prevents sperm from entering uterus.
(12)	Implant (Norplant)	Capsules surgically implanted under skin, slowly release hormone that blocks ovulation.
(13)	Injectable contraceptive (Depo-Provera)	Injection every 3 months of a hormone that is slowly released and prevents ovulation.