DEMOGRAPHY

Scientific study of human population is called demography.

Population is defined as the total number of individual of a species present in a particular area at a given time.

The population have specific character different from the character of individual.

Character of population :

1. **Population density (Population size) :**

It is measured as total number of individual present in unit area or unit volume.

The size of a population for any species is not a static parameter. It keeps changing in time depending on various factor including food availability predation pressure and reduced weather.

For human population density is officially counted in first four month of 1st year of each decade is called census.

(i) For human population density is calculated as number of person living in. per square km area.

(ii) The tiger census in our national park and tiger reserves is often based on pug marks and fecal pellets.

2. **Birth rate / Biotic potential / Fertility / Natality :**

Birth rate is defined as total number of birth in a population with respect to total number of individual of the population in a year.

Birth rate is represented as per capita birth rate

Per capita birth rate (b) = $\dfrac{\text{Total number of birth}}{\text{Initial population}}$

Eg. If in a pond there are 20 lotus plant year and through reproduction 8 new plant are added, then the birth rate during the year is calculated as:

Solution: b = $\dfrac{\text{Total birth}}{\text{Initial population}} = \dfrac{8}{20}$

b = 0.4 offspring per lotus per year.

- Birth rate varies from region to region
- Developed country have lower birth rate.
- Developing or poor country have higher birth rate than developed country
- Higher fertility in developing world is partially explained by large number of hand needed to perform work.
- Population evolve different strategy to maximise their reproductive fitness. Some organism breed only once in their life time like **Pacific salmon fish, Bamboo** etc. and some produces small sized offspring like **Oyester, Pelagic fishes** etc. maximise their fitness by producing large number of offspring. Some organism breed many time in their life and produces a small number of large sized offspring **(Birds, Mammals)**.

3. **Death rate I Mortality :**

- Death rate is definedas total number of death in a population with respect to total number of individual of the population in a year.
- Death rate is represented' as per capita death rate

$$d = \frac{\text{Total number of death}}{\text{Initial population}}$$

Eg.: If 4 individuals in a laboratory population of 40 fruit fly died during week. The death rate is calculated as:

Sol. $d = \dfrac{\text{Total number of death}}{\text{Initial population}} = \dfrac{4}{40}$

$d = 0.1$ individual per fruitfly per week

4. Growth rate:

Intrinsic growth rate $(r) = b - d$

Growth rate $= \dfrac{\Delta N}{\Delta t}$

Percent growth rate $= \dfrac{\left(\dfrac{\Delta N}{\Delta t}\right)}{N_0} \times 100$

Note : Natality, Mortality, Immigration and emigration are the basic process responsible for fluctuation in population size under normal conditions, Natality and Mortality are the most important factors influencing population size than other two factor i.e., Immigration and Emigration.

$N_{t+1} = N_t + [(B + I) - (D + E)]$
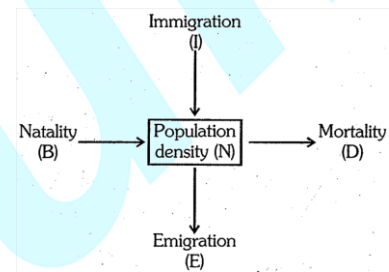
5. Age and Sex Structures:

The age structure of a given population refers to the proportion of individuals of different age. This is important aspect because **many functional aspect of individuals are related to age.** (Like Reproduction) Age structure of a population can be depicted in the form of a pyramid diagram.

Diagram is particularly important in understanding future growth.

Population has 3 age groups.

(i) Pre-Reproductive individuals   -   < 15 yr

(ii) Reproductive individuals   -   15 – 44 yr

(iii) Post-Reproductive individuals   -   > 45 yr
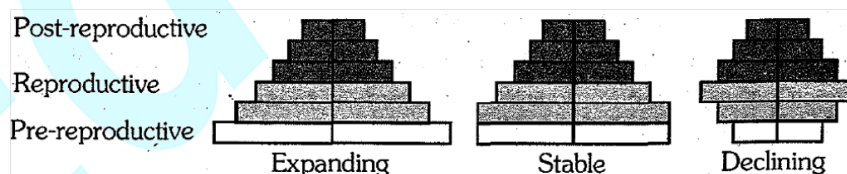
Representation of age pyramids for human population

♦ A **higher number of pre-reproductive** individuals, moderate number of reproductive individuals and fewer post reproductive individuals will form young population it shows **rapid growth.**

♦ **Fewer number of pre reproductive** individuals as compared to reproductive ones will make population aged. It shows negative growth.

♦ An **equal number** of pre reproductive and reproductive individuals will constitute a mature population or **stable population.**

♦ Developed countries have a steeper pyramid which represent nearly a stable population.