Population:
It is defined as a group of individuals of the same species

Or Individuals that can exchange genetic information among themselves and occupy a specific place in a certain period.

A population has different characteristics that can be expressed statistically and these characteristics are the characteristics of the population and not of individuals such as , population density, birth rate, mortality rate ... etc. The word population was used first to mean the human population and then included all other organisms.

A population is formed in several ways:

1- Reproduction

2- Transportation by wind, water, etc.

3- Movement of the organisms (migration).

Population properties: -

1- Population density:
It is the size of the population per unit area or volume, and it is usually expressed as the number of individuals **or** the biomass of the population per unit area or volume, for example 200 trees / 1000 km^2 or 5 million algae / m^3 water or 10 beetles / g flour or 500 kg fish / 100 m^3 water .

The rate of change in population can be calculated through the following equation:

$$d\,P = d\,N\,/\,d\,t$$

Where N = population size, t = the time

There are several methods for measuring population density, the most important of which are the following: -

1- The method of total count (طريقة التعداد الكلي) : - Photographs and television cameras are used to count wild animals or sea birds, and the researcher may use this method to know that area (X) has more or fewer numbers from area (Y).

2- The Quadrate method (طريقة المربعات) : This method includes calculating the numbers or   weights of living organisms in a certain area of the earth.

3- Hunting - Marking - Release- and Rehanting method (طريقة الصيد – التعليم – الاطلاق – إعادة الصيد)

This method is used to measure the density of moving animals. In this method, a number of animals are hunted and marked and released again, then after a period a number of animals are hunted randomly, and these animals necessarily contain individuals marked and others are not marked .

The following law can be used : -

$$P = a\, n\, /\, r$$

Where P = Total population size

a = individuals marked in the first case

n = individuals hunted in the second case

r = individuals marked in the second case

Example / Suppose that 100 individuals were hunted and marked, then released to the area of the population, and then a second sample of 80 individuals was hunted, among which 10 of the marked individuals were found. What is the approximate population of animals in this case?

P = a n / r

P= 100 * 80 / 10

P = 800

2- Natality: It is the production of new individuals for an organism in any way . There are two types of Natality : -

a- Maximum natality (ولادة عظمى) Or Potential natality (ولادة وسعية)

It is the theoretical upper limit of production from new individuals under optimum conditions, so it is stable for the population . It is difficult to occur in a normal population . Some types of population may approach this upper limit for certain times when conditions are relatively optimal, as occurs in population explosions in some types of insects and rodents.

b- Ecological natality (ولادة بيئية) Or realized natality (ولادة متحققة) .

It is the reproduction that actually occurs in a population under a real environmental condition, so it is not stable, and it is according to the environmental conditions .

3-Mortality: It refers to the death of individuals in the population. There are two types of mortality : -

a - Minimum mortality (هلاك ادنى) . It is the deficiency that occurs under optimal conditions and is stable for any population .

b- Ecological mortality (هلاك بيئي) . Or realized mortality (هلاك متحقق)

It is the death of individuals under certain environmental condition, so it is not stable, and it is according to the environmental conditions .

4- Population dispersal (انتشار السكان) : It includes the movement of individuals, seeds, larvae and others. There are three forms :

a- Emigration هجرة خارجية

b- Immigration. هجرة داخلية

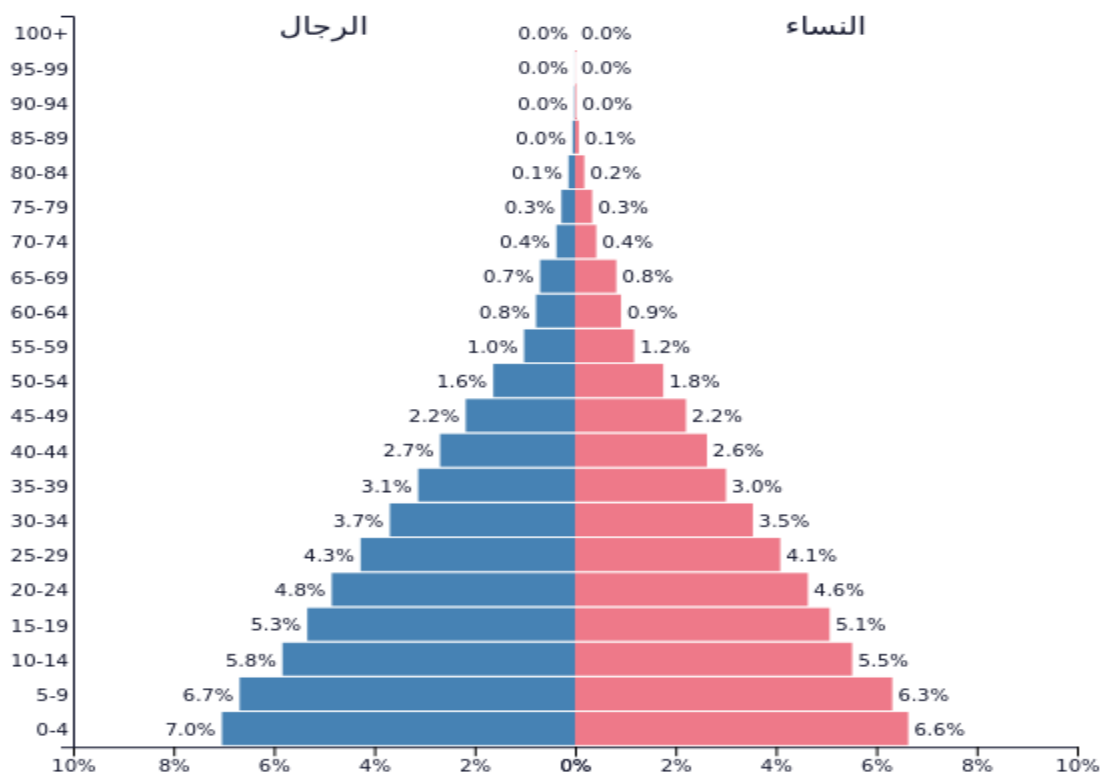c- Migration هجرة عامة : leaving a region and returning to it

Not: Population dispersal is very important for the exchange of genes between members of a population and the emergence of new species .

5- The age structure of the population: is defined as the ratio of different age groups within the population .There are three forms :

a- younger population :   Younger individuals > Older individuals

b- stable population :   Younger individuals ~ Older individuals
patterns of birth and death are unchanging over time .

c- Elderly population   :   Older individuals > Younger individuals

	الرجال		0.0% 0.0%	النساء	
100+			0.0% 0.0%		
95-99			0.0% 0.0%		
90-94			0.0% 0.0%		
85-89			0.0% 0.1%		
80-84		0.1%	0.2%		
75-79		0.3%	0.3%		
70-74		0.4%	0.4%		
65-69		0.7%	0.8%		
60-64		0.8%	0.9%		
55-59		1.0%	1.2%		
50-54		1.6%	1.8%		
45-49		2.2%	2.2%		
40-44		2.7%	2.6%		
35-39		3.1%	3.0%		
30-34		3.7%	3.5%		
25-29		4.3%	4.1%		
20-24		4.8%	4.6%		
15-19		5.3%	5.1%		
10-14		5.8%	5.5%		
5-9		6.7%	6.3%		
0-4		7.0%	6.6%		

10%   8%   6%   4%   2%   0%   2%   4%   6%   8%   10%

PopulationPyramid.net

العراق - 2019
التعداد السكاني: 39,309,789

Ecology   Lect. 7   Prof. Dr. Munther H. Rathi

Population of the United Kingdom (2017)

Male

Female

Age
100+
95-99
90-94
85-89
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4

Population (in millions)

Male   Italy - 2018   Female

Population (in millions)   Age Group   Population (in millions)

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