Global Demography Concepts and Population Pyramid

Objectives

- Define the terms; demography and population dynamics
- Apply demographic concepts in health system
- Describe major sources of population data
- Describe features of population pyramid and compare the pyramids of developed and developing countries
- Describe the concept of demographic equation
- Describe and understand the theory of demographic transition
- Describe the effect of population momentum on growth of population
- Explain the phenomenon of migration and its effect on population size
- Define, compute and interpret the rates of population increase and population doubling time

Resources: Slides and Doctor Notes

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Feedback - Editing File

What is demography?

It is the scientific study of human populations

It encompasses three domains:

1. **Change in population size** كم عددهم
2. **Composition of a population** (Age,Gender..)الاجتماعية التركيبة
3. **Distribution of a population in space**

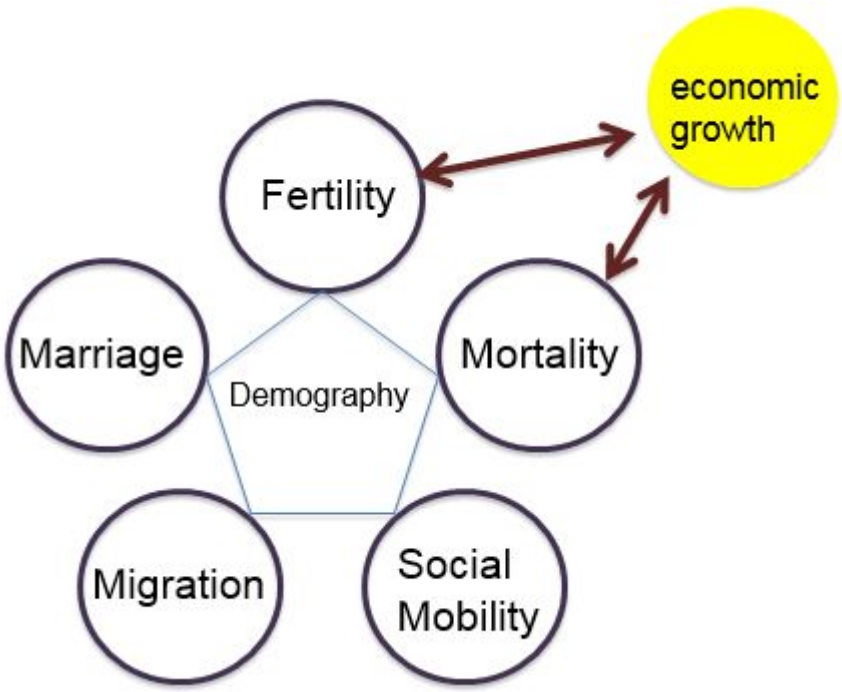
Sources of population data

1. Census data التعداد السكاني
2. Ministry of health
3. World Health Organization statistics Gives the latest estimate
4. United Nations
5. World Bank Statistics

Why is demography important?

The health of people in a community depends on the dynamic interaction between size of the population and the space they occupy Also to divide and spread the health care services..

Population size, distribution and composition are determined by:



1-Fertility

The actual bearing of children, is determined by:

1.Age at marriage (inverse relationship) The younger the women get married the higher fertility rate

2.Duration of married life (most happen in early y) Most of the pregnancies happen in the first five year after married

3.Spacing of children كل ما زاد كل ما قلت الفرتلتي

4.Education (inverse relationship) لأنها تصير مشغولة بالعمل + لها حرية الاختيار في الانجاب من عدهم وليس قسرا عليها

5.Economic status (inverse relationship)

6.Religion

7.Nutrition (Inverse relationship)

8.Family planning

9.Other factor….physiological, biological, cultural, social

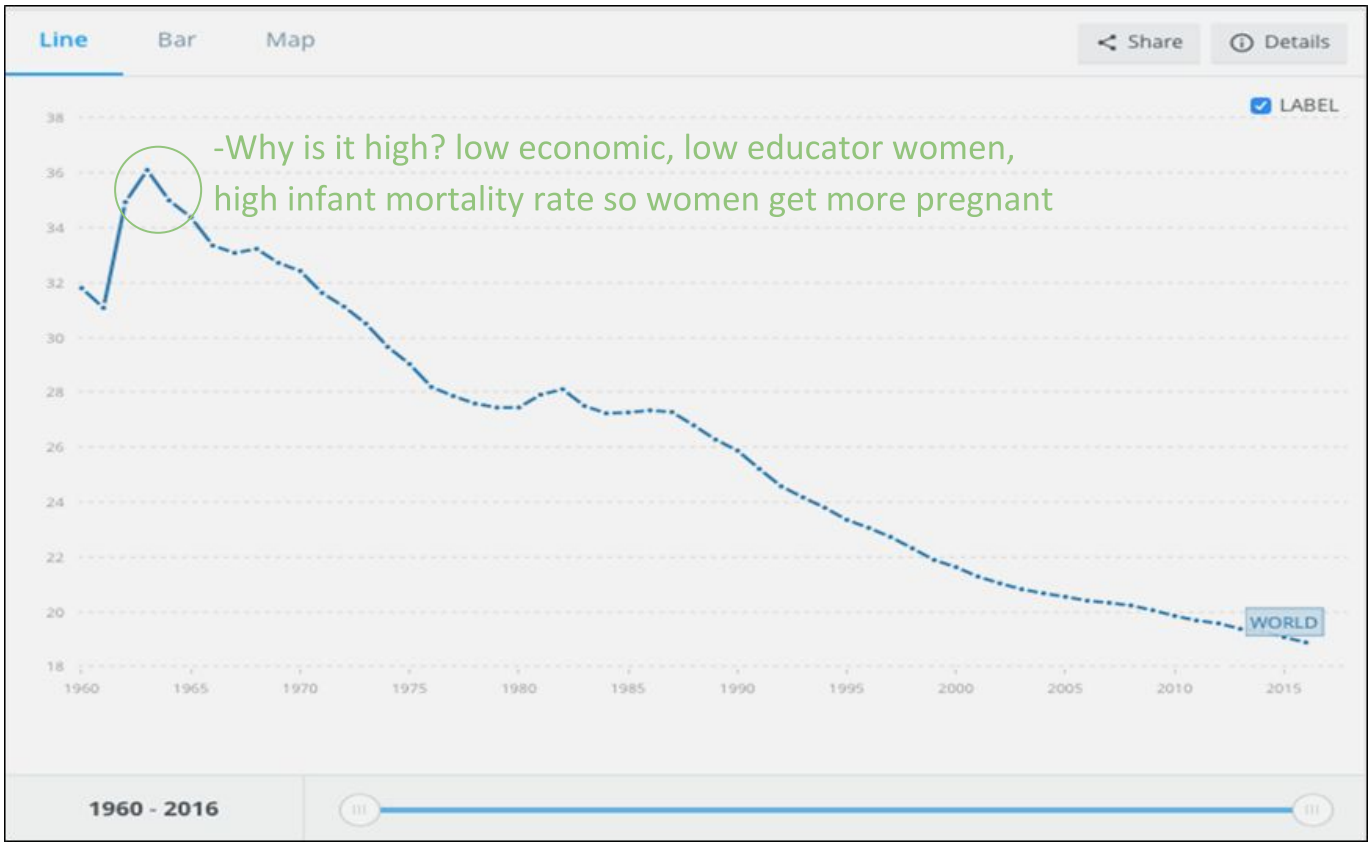
Measures of Fertility

1.**Crude Birth Rate: (Very Important)**

¨Number of live births in a year in a specific locality X 1000

estimated mid-year population size in that same year and locality

"And it's reported as "per 1000 عدد الناس اللي انولدوا على المجتمع كامل سواء نساء أو رجال



Measures of fertility cont.

2.**General Fertility Rate:** number of live births per 1000 women in the reproductive age-group (15-44 or 49 years) in a given year

Number of live births in a year in a specific locality X 1000

Mid-year female population age 15-49 (reproductive age سواء متزوجة أو لا) in that same year and same locality

Problems? – not all women in denominator at risk for childbirth or married

عدد اللي انولدوا على عدد النساء كلهم

3.**General Marital Fertility Rate:** number of live births per 1000 married women in the reproductive age group (15-44 or 49) in a given year X 1000

Number of live births in a year in a specific locality

Mid-year female married population age 15-49

in that same year and same locality

هنا فقط النساء اللي عندهم رسك الحمل (المتزوجات)

4.**Age-specific Fertility Rate:** number of live births in a year to 1000 wome:n in any specified age-group To compare between age groups

Number of live births among a specific age group X 1000

Mid-year female population in that age group

in that same year and same locality

5.**Total Fertility Rate: (rate per woman)** the average number of children a woman would have if she were to pass through her reproductive years bearing children at the same rates as the women now in each age group

Approximates "completed family size"

Sum of age specific fertility rates (rate per woman)

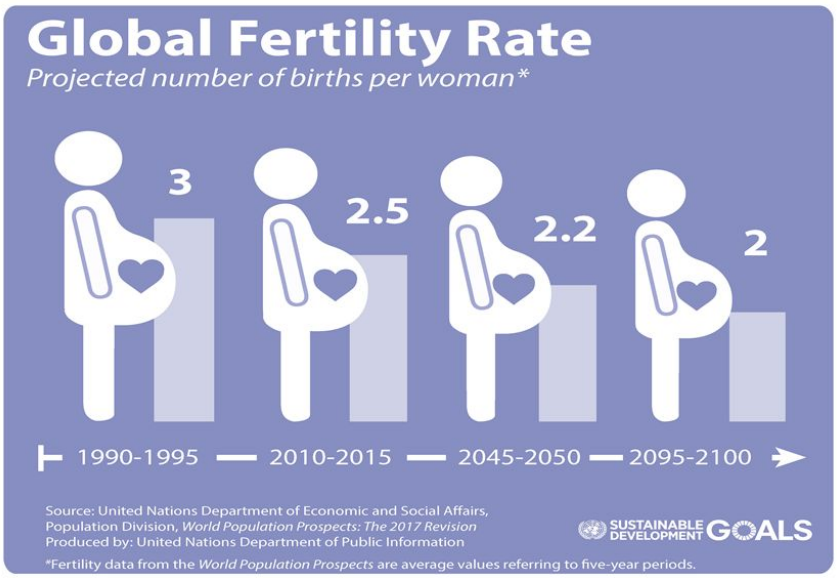
1000

or ***Sum of age specific fertility rate*** (rate per 1000 women)

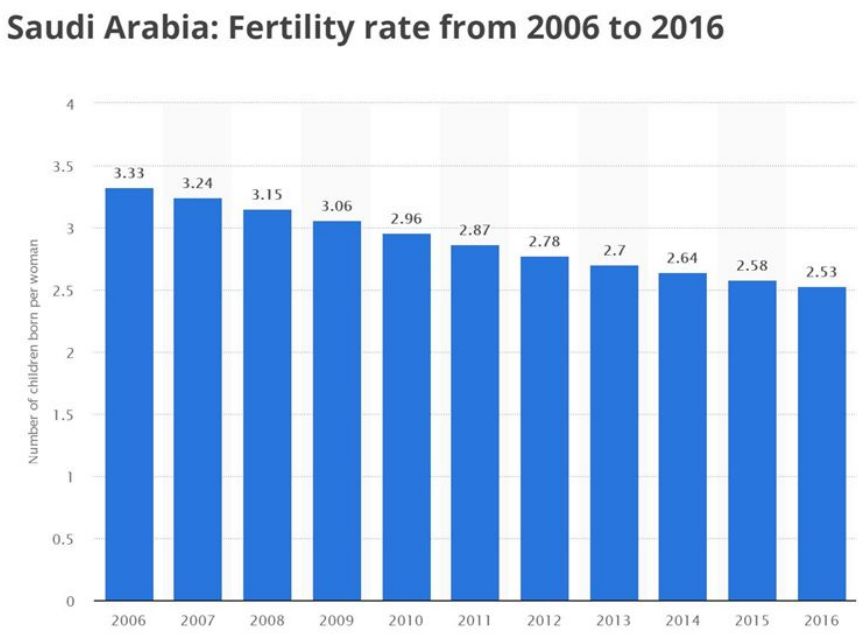
If using a 5-year period, then: Σage specific fertility rate x 5

This measure is more standardised to be used

Global Total Fertility Rate 2017



Saudi Arabia Fertility Rate



Impact of fertility on age distribution in a population

High fertility => High proportion of young people in the population (e.g. developing countries)

Low fertility => Condensed proportion of retired people in a population (e.g. developed countries) يتكدسوا الكبار اللي فوق عمر 60 سنة

2- Migration

- According to UN reports, 258 million people live outside the country where they were born
- Of these, 26 million (10%) are refugees Forced to leave their countries or asylum seekers لجوء سياسي
- Migration is towards high-income countries, except for refugees mostly migrate to low-income countries
- Median age of migrants is 39 years It's a working age group
- Mostly women

Ranking of countries that host migrants:

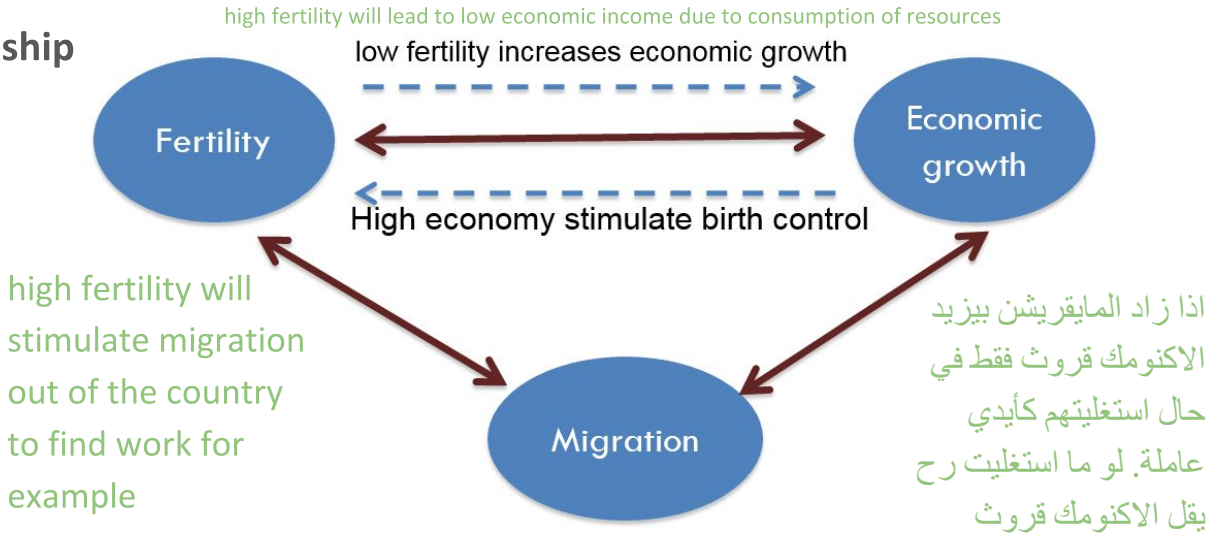
	Country	No. of migrants hosted
1	USA	49.8 million
2	Saudi Arabia	12 million
3	Germany	around 12 million
4	Russia	around 12 million
5	UK	9 million

Saudi Arabia ranks the ***second*** worldwide in hosting migrants

Why is migration important to follow ?

- It helps predict how the population will be shaped
- Migration usually goes from low income to more industrialized countries (more economic opportunity)
- Younger and healthier people migrate to more industrialized areas to work
- Migration affects economic growth and is affected by economic growth

Relationship



3-Mortality

Mortality rate: Number of deaths in a given population in a specific period of time

Expressed as per 100 population or per 1000 population

$$MR = \frac{\text{\# of deaths in a given period of time x 100 (or 1000)}}{\text{Total population in the same given period of time in that same population}}$$

Crude death rate

Crude death rate: Number of deaths in a given population in a specific period of time over the mid-year population of that same time period

$$CDR = \frac{\text{\# of deaths in a given period of time x 1000}}{\text{mid-year population in the same given period of time in that same population}}$$

Crude يعني فيه Mid year في المقام

Other measures of mortality

Age-specific mortality rate

All cause mortality rate

Cause-specific mortality rate

Infant mortality rate

peri-natal mortality rate

neonatal mortality rate

Post-neonatal mortality rate

Maternal mortality rate

Maternal mortality ratio

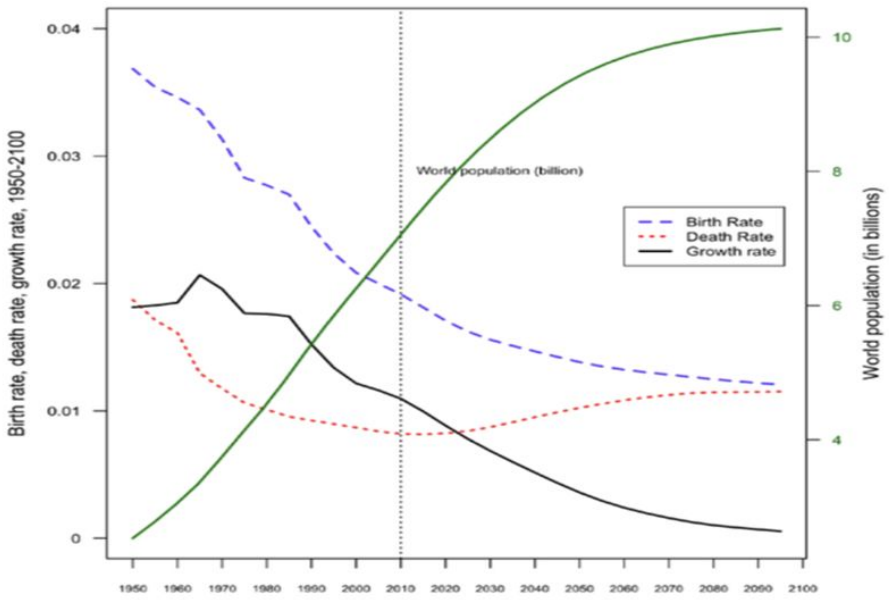
Stages of Demographic Transition

It explains the changes of birth rates and death rates and describes the population growth cycle relation to economic development

5 Stages for Demographic Transition

- **Stage 1: (High Stationary)**
  - High birth rate
  - High death rate Due to several disease as infectious one with no available treatment
- **Stage 2: (Early expanding)** There is a population growth, yet is not that fast
  - Birth rates remain the same
  - Death rates begin to decline
  - e.g. many of the countries in developing world
- **Stage 3: (Late Expanding)**
  - Death rates further decline
  - Birth rates begin to fall
  - Birth rates > death rates => population growth
- **Stage 4: (Low stationary)**
  - Low birth rate
  - Low death rate
  - Population becomes stationary; Zero population growth
  - Many developed countries
- **Stage 5: (Late Expanding)**
  - Birth rates very low
  - Death rates very low
  - Birth rates < death rates
  - Population decline
  - e.g. Germany and Hungary

Expected population growth from 1950-2100



Source: United Nations (2011)

Limitations of Demographic Transition Model

Migration is not considered in the model

How do we measure population growth

Population growth

Annual growth rate =

Crude birth rate – Crude death rate

Annual population growth

TABLE 5
Relation between growth rate and population

Rating	Annual rate of growth %	Number of years required for the population to double in size
Stationary population	No growth	
Slow growth	Less than 0.5	More than 139
Moderate growth	0.5 to 1.0	139–70
Rapid growth	1.0 to 1.5	70–47
Very rapid growth	1.5 to 2.0	47–35
"Explosive" growth	2.0 to 2.5	35–28
——"——	2.5 to 3.0	28–23
——"——	3.0 to 3.5	23–20
——"——	3.5 to 4.0	20–18

Saudi Arabia annual growth rate is 1.7 which considered as Rapid Growth and it will take around 45 years to double the population size

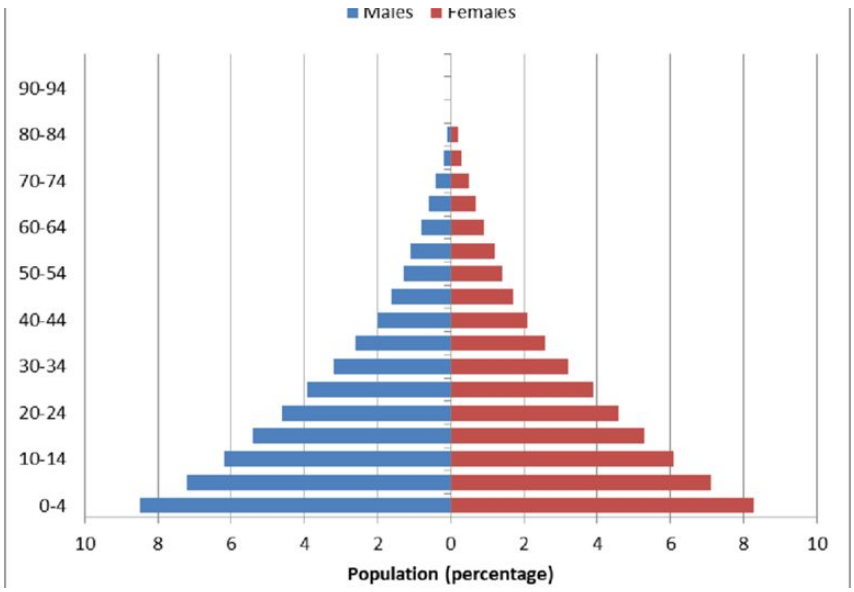
Where does KSA stand?

- unique cultural and religious norms
- death rates have decreased
- with economic development, women education and empowerment, fertility rates have not declined as fast as expected (lag in demographic transition)
- Result?

Population Pyramid

- This shows the age structure in a certain population
- By looking at the shape, you will be able to get an idea about:
  - Proportion age groups in a population
  - Male to female ratio

Example of population pyramid



This pyramid indicate that this population has a high fertility rate since the age groups 0-40 occupied most of it

Components of population pyramids

Base: wide => high birth rate

narrow => low birth rate

Apex: old population (retired population) ….wide? narrow?

Height: life span

Side: change in population size due to death or migration

Important demarcating points

Less than 15 -Size of dependent youth < 15

-Large size in rapidly growing population

-Small size in slowly growing population

60 + years -Represents the size of dependent old ≥ 60

-Large size in population with longer life span

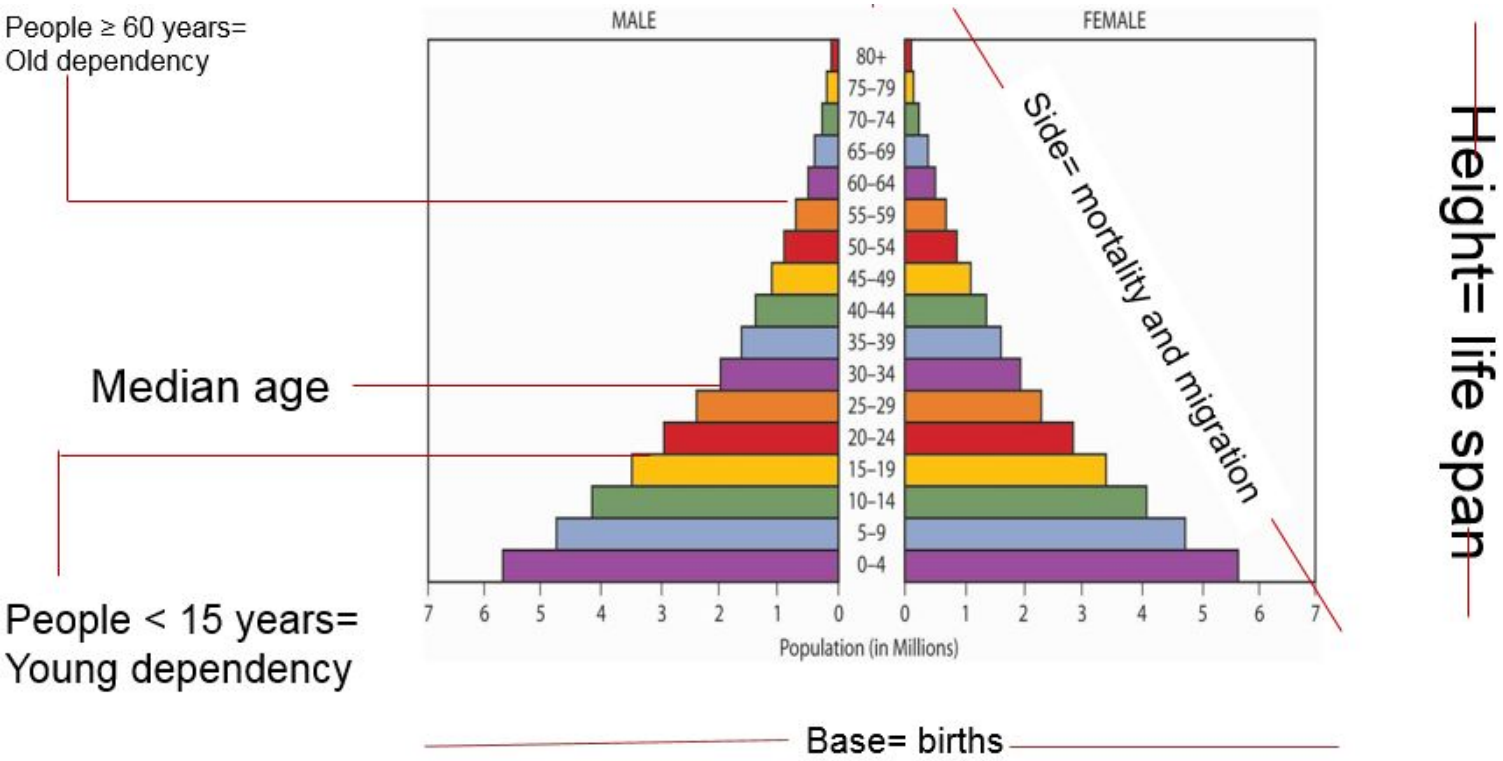
-Small size in population with short life span

Median age -Age that divide the population into two halves

-Small in population with high births

-Large in population with low births

Apex= People living to old age



Types of population pyramids

1.Expansive

2.Stationary

3.Constrictive

1- Expansive population pyramid

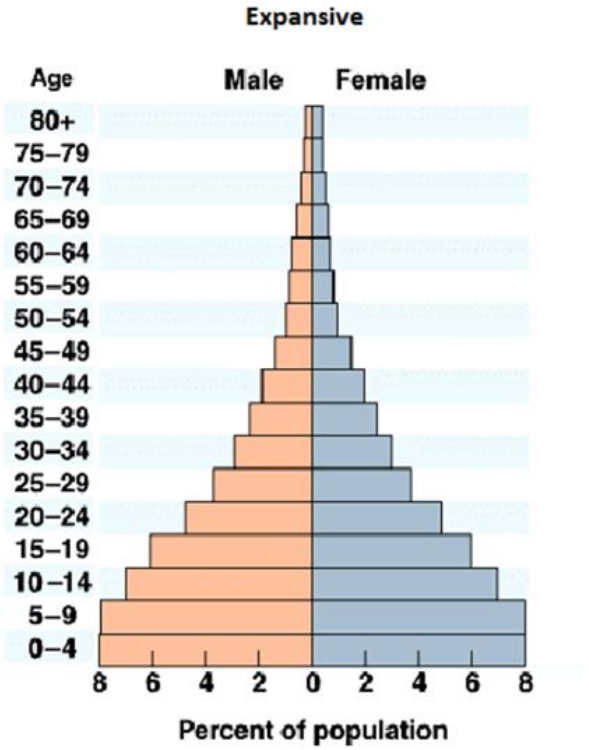
Expansive or expanding pyramid usually presents itself in the form of triangular shape with concaved edges

•High population growth due to:

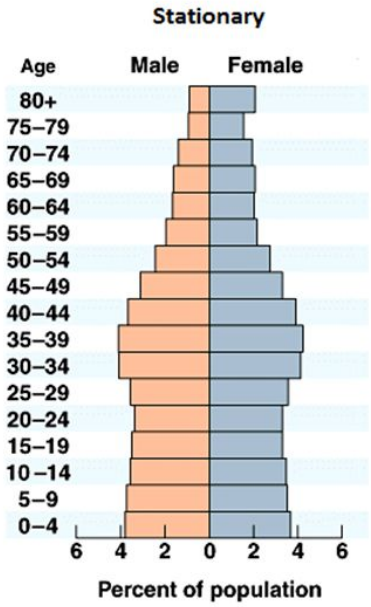
- •High birth rate (wide base)
- •Shorter life expectancy
- •(high death rate)

•Usually associated with lower standard of living

we need in expansive population (youthful)
1-housing (people will have families within 10 years
2-health care (vaccinations for children)
3-education
4-no migration (not enough jobs)
5-Employment



2-Stationary population pyramid



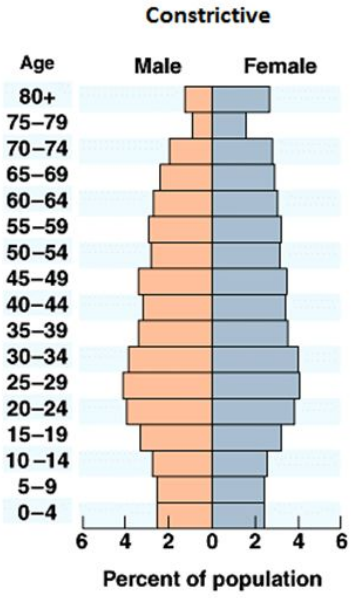
- It is showing unchanging pattern of fertility and mortality
- Age groups almost equal, but it is expected to see smaller figures at the oldest age groups

ما أتوقع يتغير بعد فترة من الزمن لأن البيرث

مب مرة كثير وبنفس الوقت الدِث مب كثير

Fertility rate is not less than death

3-Constrictive population pyramid



- Narrow base
- Apex wider
- It is more common when immigrants are factored out
- Indicated:
    - High level of education
    - Use of birth control (no more cost for birth)
    - Good health care system

narrow base opposite for wide base

Fertility rate is less than death

Population pyramid in Saudi Arabia over the years

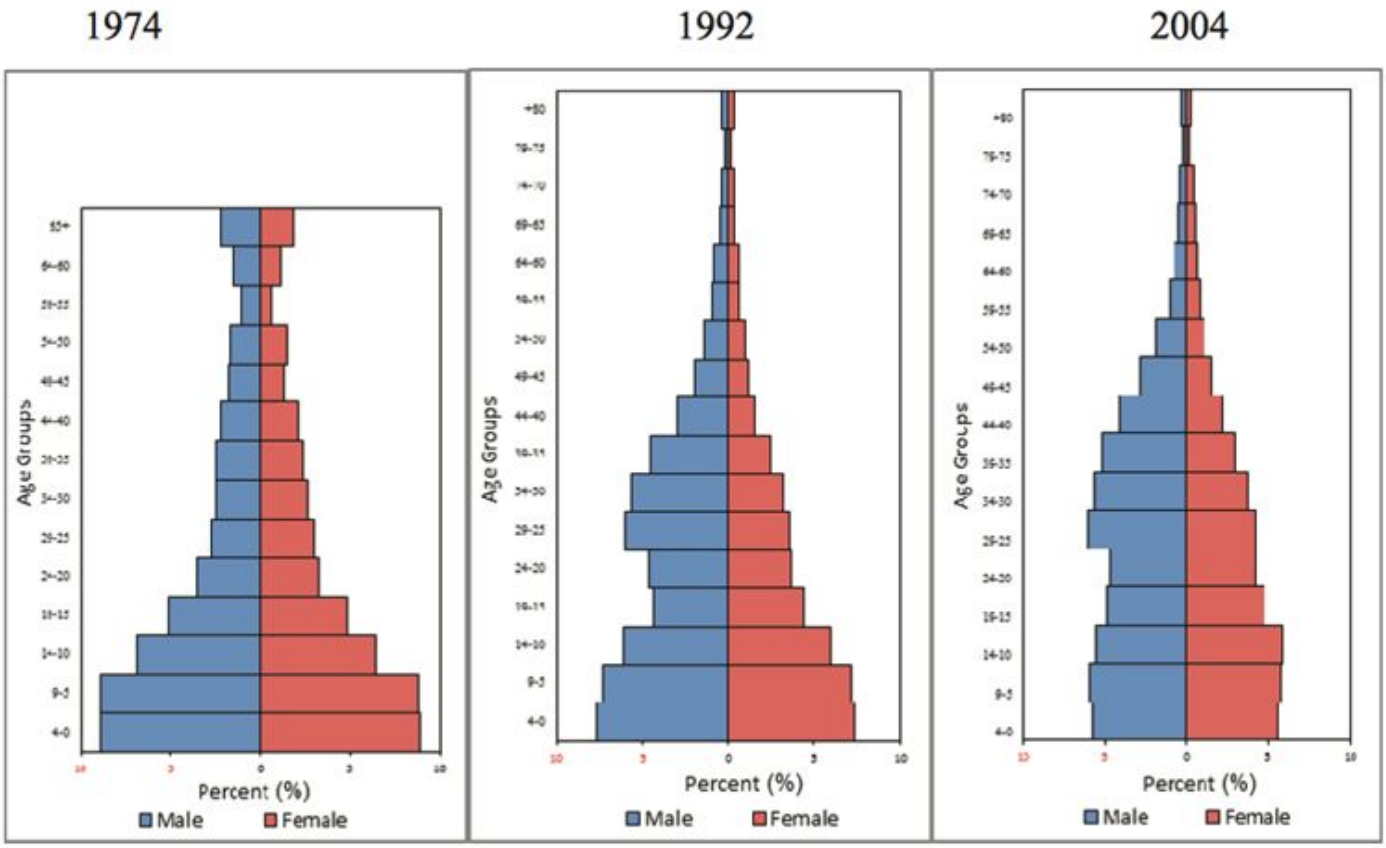


Figure 1. Age pyramid of total population.

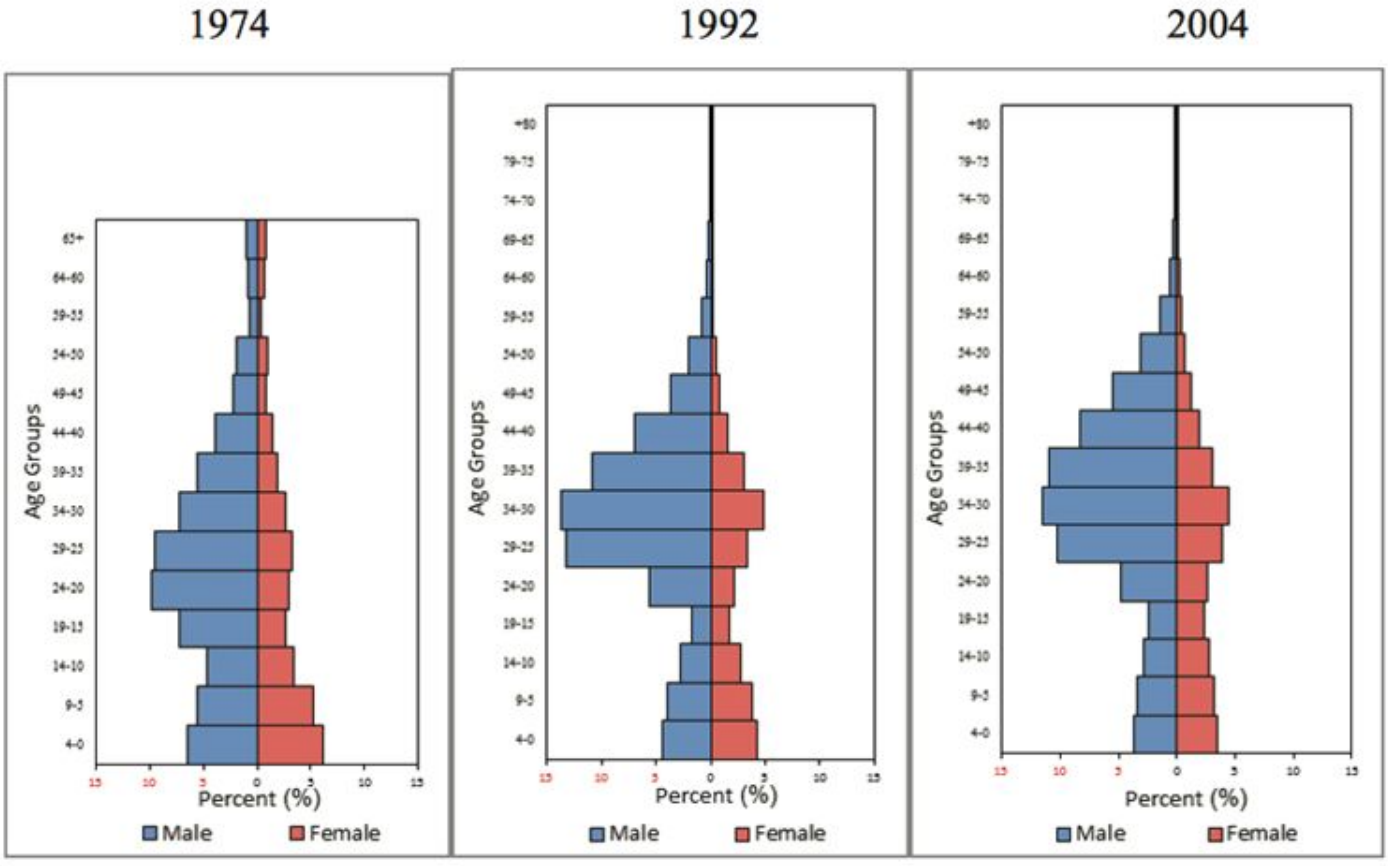
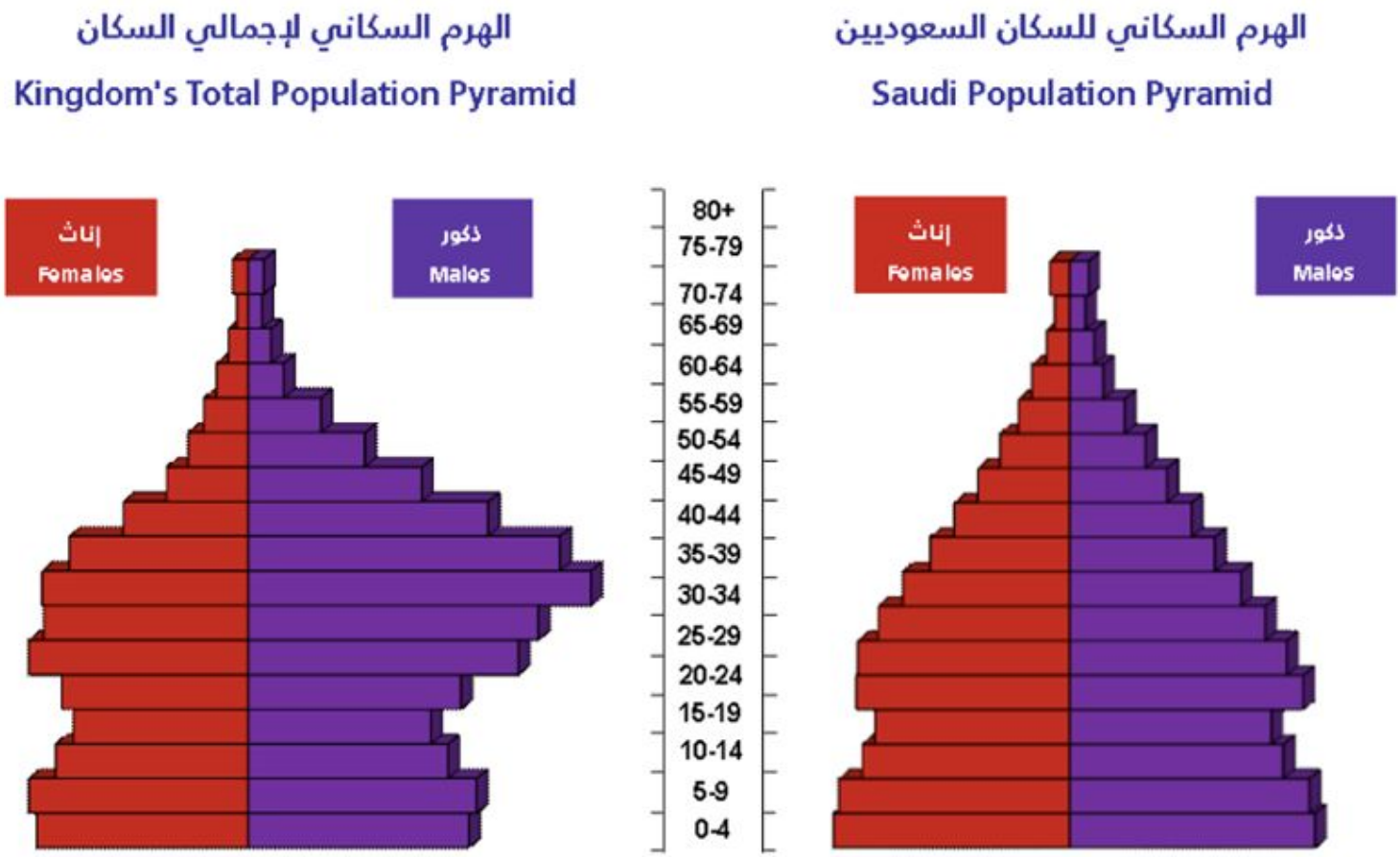


Figure 3. Age pyramid of expatriate population .

Most recent KSA population pyramid (2016)



Other important population distribution measures

Sex Ratio

Other important population distribution measures

Dependency ratio (x 100)

The proportion of persons above 65 years of age and children below 15 years of age are considered to be dependant on the economically productive age group (15-64 years)

Total dependency ratio (x 100)

The ratio of the combined age groups 0-14 years plus 65 years and above to the 15-65 years age group is referred to as the total dependency ratio.

Population density

Total population in a certain region divided by the surface area of that same region

SUMMARY

Demography: The scientific study of human populations.

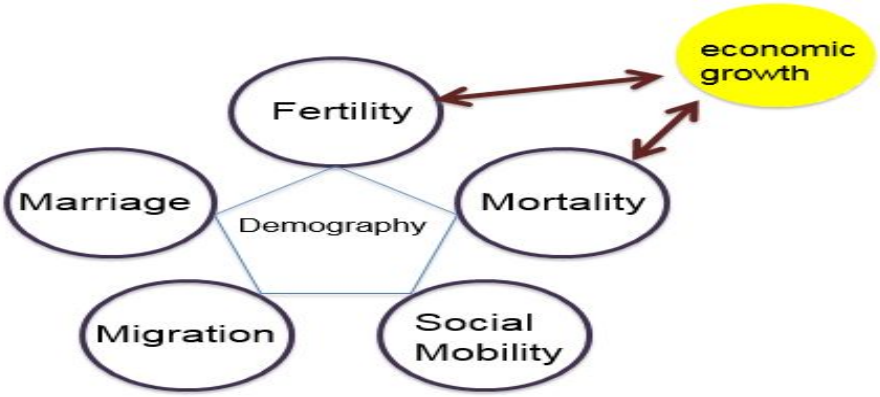
Has three domains:

1.**Change in population size**

2.**Composition of a population**

3.**Distribution of a population in space**

Population size, distribution and composition are determined by:



1-Fertility: The actual bearing of children.

determined by:

1.Age at marriage (inverse relationship)

2.Duration of married life (most happen in early y)

3.Education (inverse relationship)

4.Economic status (inverse relationship)

Measures of Fertility :

1.**Crude Birth Rate** 2.**General Fertility Rate** 3.**General Marital Fertility Rate**

4.**Age-specific Fertility Rate** 5.**Total Fertility Rate**

High fertility => High proportion of young people in the population (e.g. developing countries)

Low fertility =>Condensed proportion of retired people in a population (e.g. developed countries)

2- Migration

Why is migration important to follow ?

- It helps predict how the population will be shaped
- Migration usually goes from low income to more industrialized countries (more economic opportunity)
- Younger and healthier people migrate to more industrialized areas to work
- Migration affects economic growth and is affected by economic growth

SUMMARY

3-Mortality rate: Number of deaths in a given population in a specific period of time Expressed as per 100 population or per 1000 population.

Crude death rate: Number of deaths in a given population in a specific period of time over the mid-year population of that same time period.

Stages of Demographic Transition

It explains the changes of birth rates and death rates and describes the population growth cycle relation to economic development.

Has five stages :

1.**Stage 1:(High Stationary)** 2. **Stage 2: (Early expanding)** 3.**Stage 3: (Late Expanding)**

4.**Stage 4: (Low stationary)** 5.**Stage 5: (Late Expanding)**

Limitations : Migration is not considered in the model.

How do we measure population growth:

Annual growth rate = Crude birth rate – Crude death rate

Population Pyramid

- This shows the age structure in a certain population
- By looking at the shape, you will be able to get an idea about:
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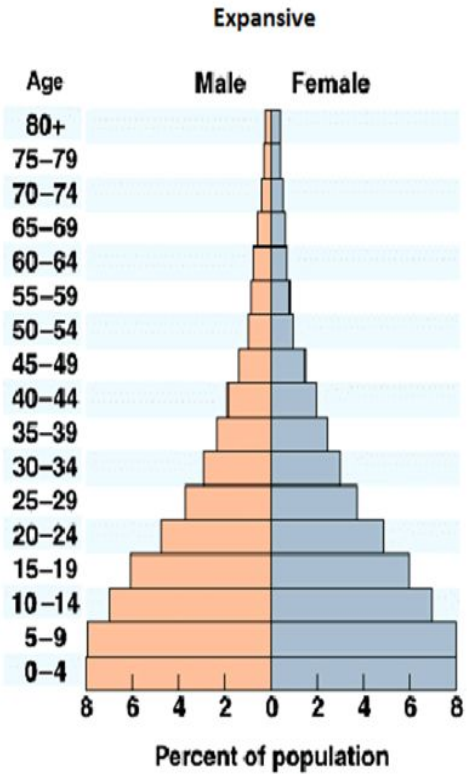
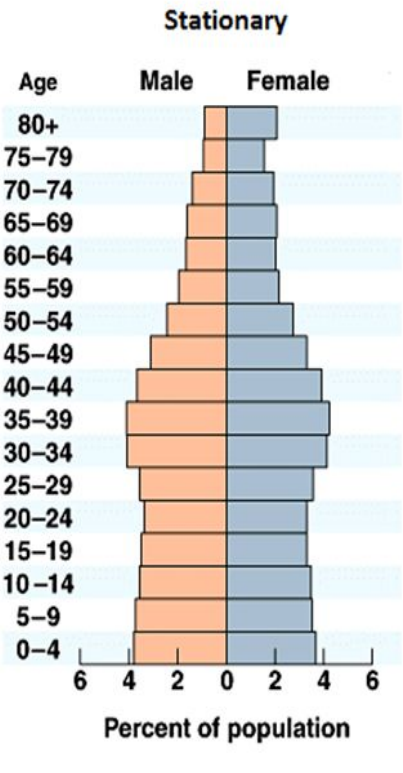
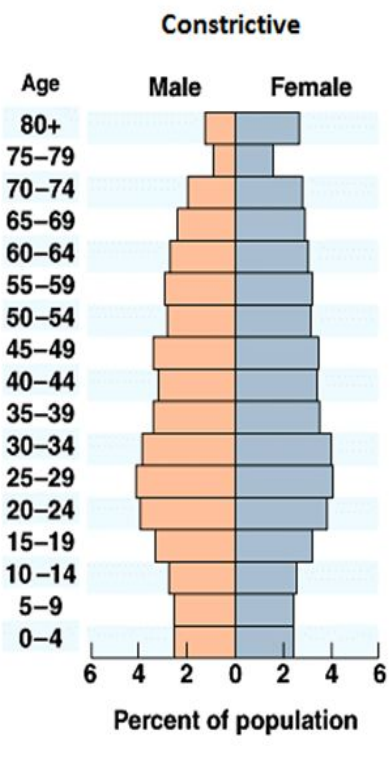
Types of population pyramids :

1.Expansive: 2.Stationary: 3.Constrictive:







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