

PABLO

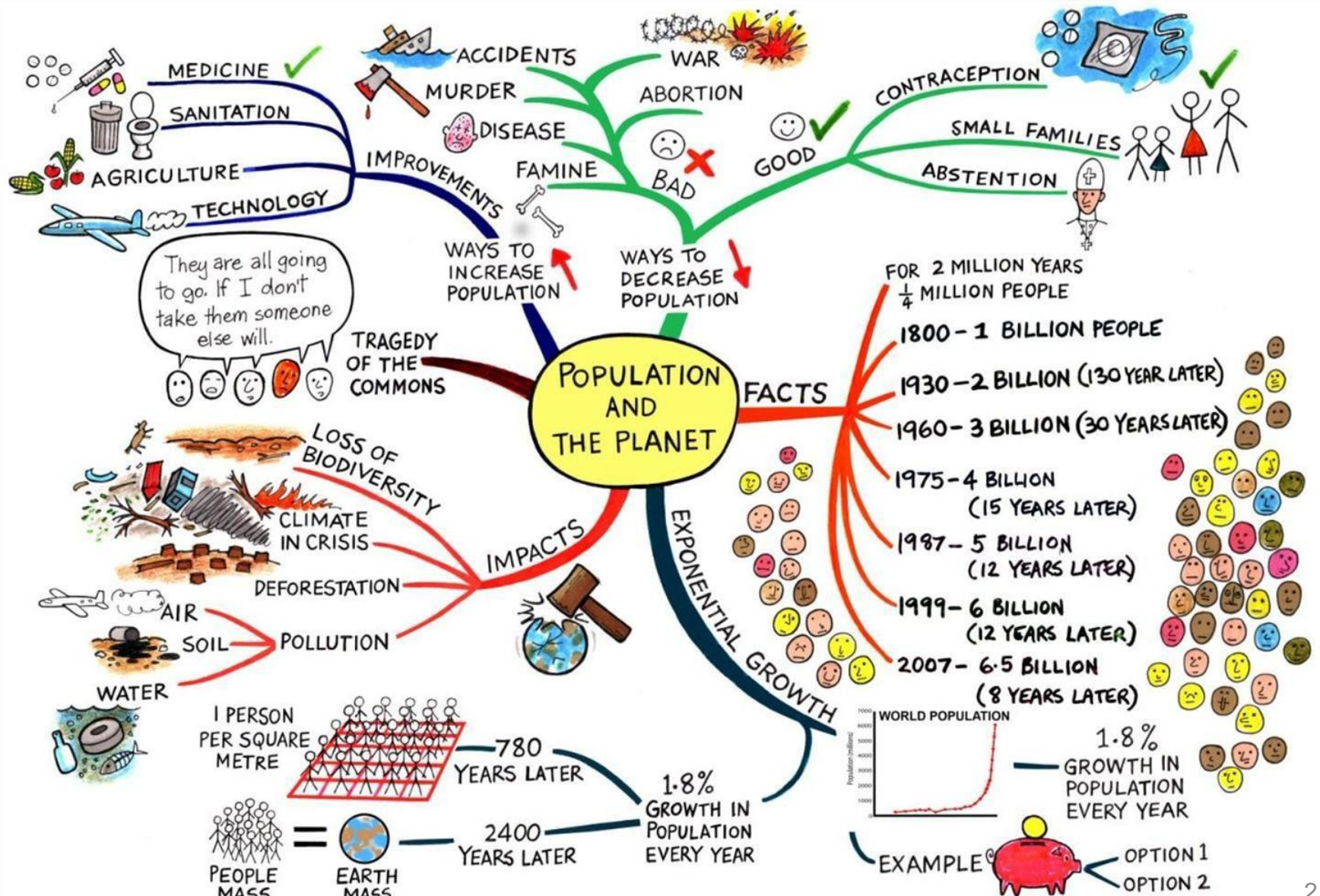
INTRODUCTION TO ENVIRONMENTAL SCIENCE

HUMAN POPULATION

DR. EMMANUEL AMANKWAH

Population and Environment





Introduction

Population is a group of individuals of a particular species, sharing the common genepool and occupying a particular area at a specific time.

Population density: it is the number of people per unit area. When the density is great, individuals compete for the scarce resources that affect one another.

Population density will be influenced

1. Dispersal
2. Emigration
3. Immigration

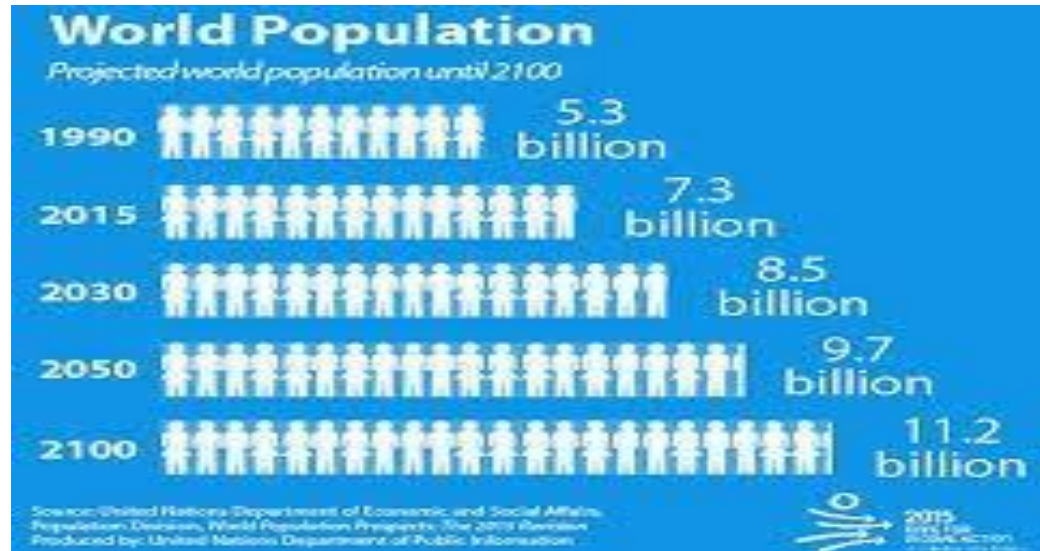
3

Current Population Trends

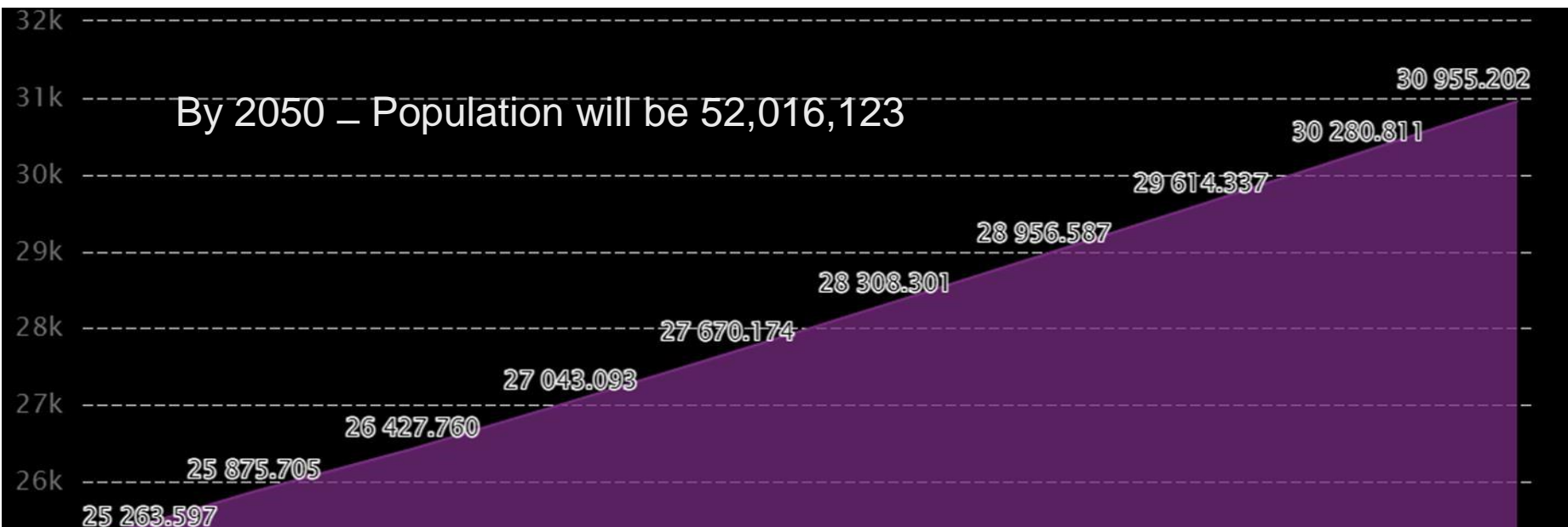
- World population is about 7.7 billion with an increasing rate of 100 million every 14 months
 - Doubled since 1963 = 3.2 billion
-

-
- In 2050 could be 9.7 billion with the greatest growth in Africa.
 - Amplifies all environmental problems
 - Largest increase expected in developing countries (approximately 97%)
 - Decreasing in some developed countries
-

Projected Population



By 2050 – Population will be 52,016,123



Characteristic of population

- Size and density
 - Natality (birth rate)
 - Mortality (death rate)
 - Age distribution
 - Growth rates
 - Spatial distribution (dispersion)
-

➤ Sex ratio

6

Population density: it is the number of people per unit area. When the density is great, individuals compete for the scarce resources thus affect one another and vice versa.

Population density will influence

1. Dispersal
 2. Emigration
 3. Immigration
-

Natality: it is the number of individuals added to the population at a particular time period. The number of people born per 1000 individuals per year.

Mortality: the number of people who die per 1000 individual per year.

Age distribution: Number of individuals of each age in a population. When large number of the population are

prereproductive and reproductive age, population is likely to increase and vice versa

Age distribution it influences both natality and mortality
The ratio of different age groups in a population determines the current reproductive status of the population.

1. **Pre-reproductive age**
 2. **Reproductive age**
 3. **Post-reproductive age**
-

The proportion of different age groups in any population is usually expressed geometrically as pyramids shown below
Population growth rate = Birth rate - Death rate
expressed in % of the total population.

Example: 25 births/1000/yr and 12 death/1000/yr.

The difference is $13/1000/\text{yr} = 13/1000 \times 100 = 1.3\%$

Sex ratio: Relative number of males and females in a population.

The number of females determine the population growth than males as one male can have more females.

Perspectives of population growth

Antinatalist is a perspective which opposes childbearing through the support of contraceptive, abortions, and sterilization along with the education of women.

The antinatalists blame too many babies and people, too much destruction of the natural environment, the existence of the traditional family, and capitalistic profit-seeking at the cost of global well-being

Pronatalist is a perspective which promotes birth and increased population through the support birth, large families, extended families, and the governmental support for childbearing.

The pronatalists argued that there is plenty of food in the world and always has been. They blame political and social mismanagement for the social ills, not the high birth

Migration

Migration is influenced by push or pull factors.

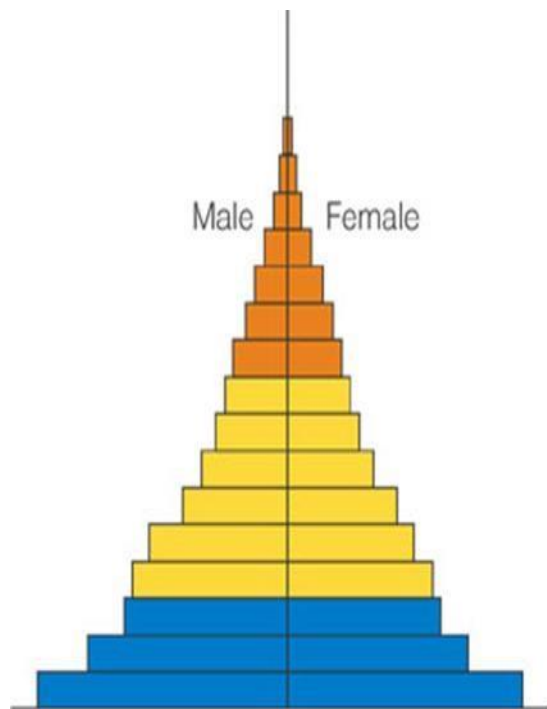
Push factors are negatives aspects of where you live which make you consider leaving.

Push factors include wars, famines, political hostility, natural disasters, and other harsh circumstances that create an environment conducive to looking for another place to live.

Pull factors are positive aspects of another place which draw you to migrate to it.

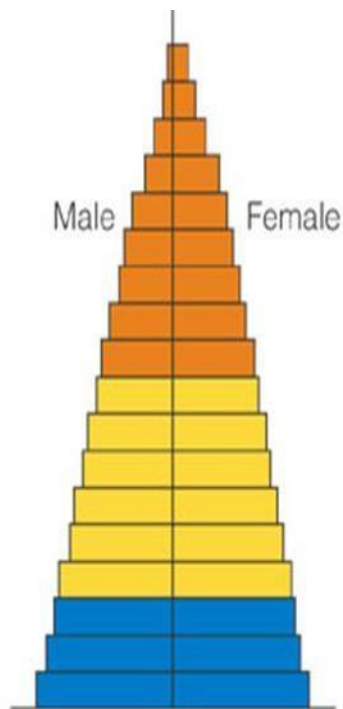
Pull factors include economic prosperity, jobs, food, safety, asylum, and the hope of survival that draws people to move to the desired location.

Population Age Structure



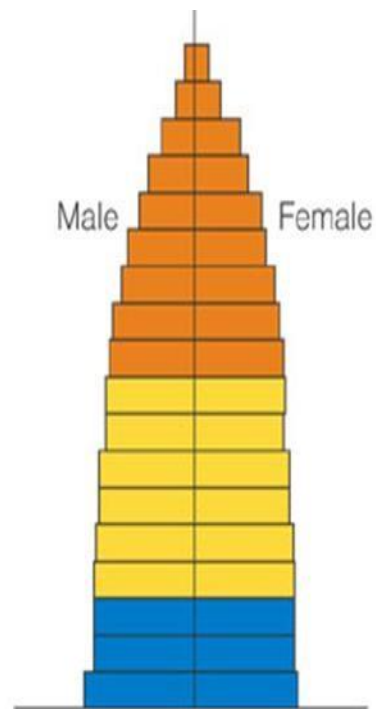
Rapid Growth

Guatemala
Nigeria
Saudi Arabia



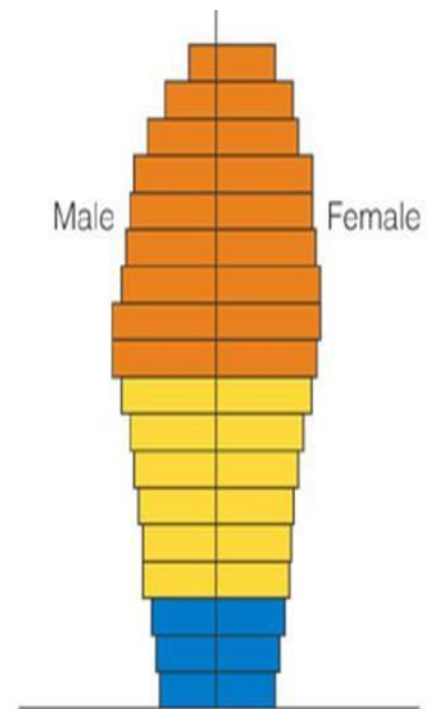
Slow Growth

United States
Australia
Canada



Zero Growth

Spain
Austria
Greece

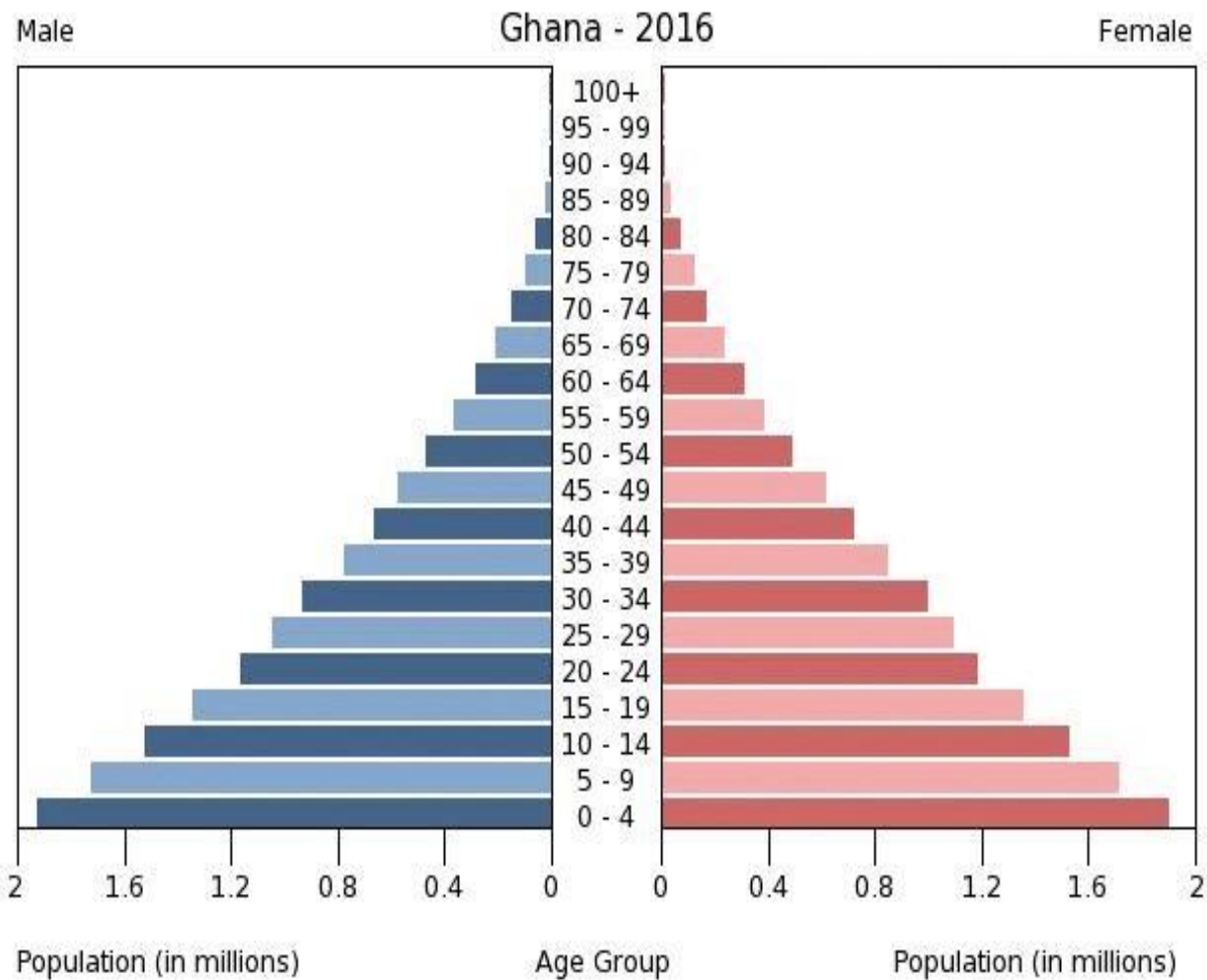


Negative Growth

Germany
Bulgaria
Sweden

■ Ages 0–14
 ■ Ages 15–44
 ■ Ages 45–85+

Population Pyramid of Ghana



It illustrates the age and sex structure of a country's population. May provide insights about political and social stability, as well as economic development.

Age structure

0-14 years: 38.01% (male 5,253,430/female 5,198,892)

15-24 years: 18.63% (male 2,548,661/female 2,575,160)

25-54 years: 34.14% (male 4,554,972/female 4,834,765)

55-64 years: 4.97% (male 664,866/female 701,277)

65 years and over: 4.25% (male 538,790/female 629,111)

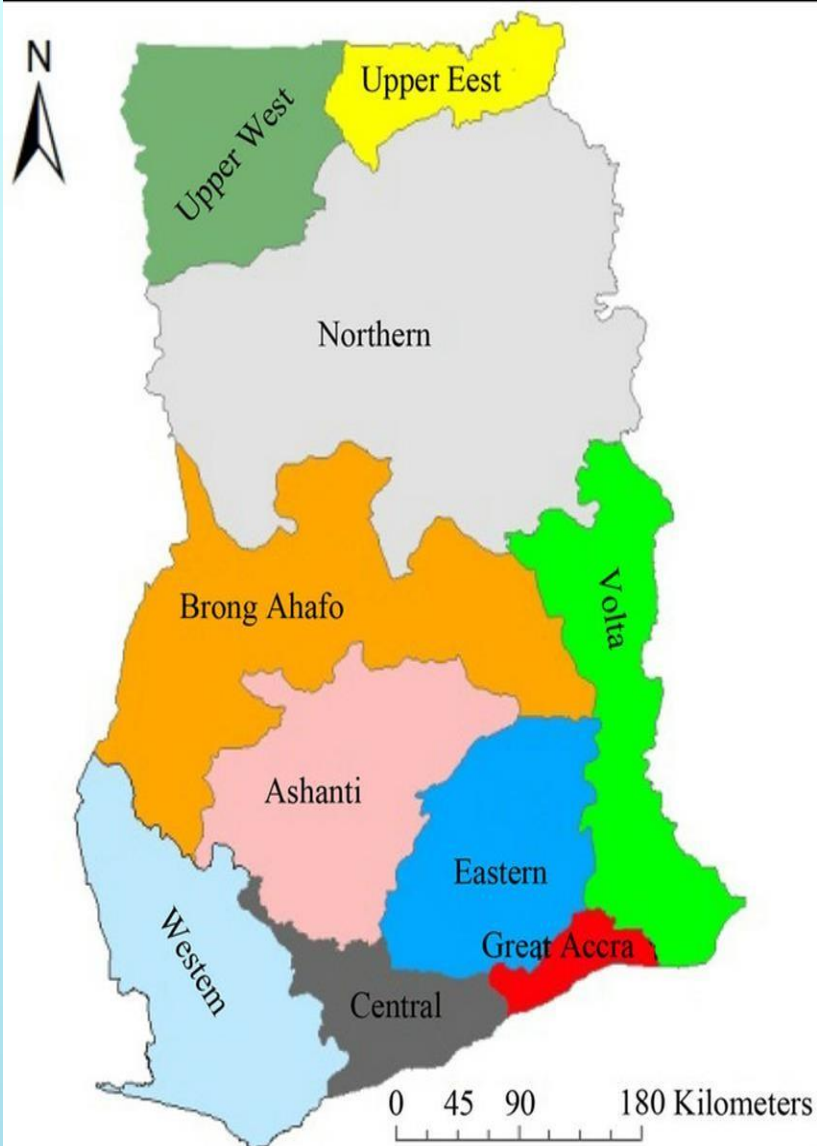
(2017 est.)

Countries with young populations (high percentage under age 15) need to invest more in schools, while countries with older populations (high percentage ages 65 and over) need to invest more in the health sector.



Table 2: 2010 and 2000 Population Compared

Region	2010	2000	% increase
Western	2,325,597	1,924,577	20.8
Central	2,107,209	1,593,823	32.2
Greater Accra	3,909,764	2,905,726	34.6
Volta	2,099,876	1,635,421	28.4
Eastern	2,596,013	2,106,696	23.2
Ashanti	4,725,046	3,612,950	30.8
Brong Ahafo	2,282,128	1,815,408	25.7
Northern	2,468,557	1,820,806	35.6
Upper East	1,031,478	920,089	12.1
Upper West	677,763	576,583	17.5
Ghana	24,222,431	18,012,070	34.5



Population Trend Comparisons

<u>Developed Countries</u>	<u>Developing Countries</u>
Low infant mortality rate	High infant mortality rate
Life expectancy 77 years	Life expectancy 52 years
Total fertility rate = 2.0	Total fertility rate = 5.7
21% population < 15	44% population < 15

12% population > 65	3% population > 65
Per capita GDP = \$36,110	Per capita GDP = \$800

Factors Affecting Human Population Size

Population change equation

$$\text{Population change} = (\text{Births} + \text{Immigration}) - (\text{Deaths} + \text{Emigration})$$

Crude birth rate = births per 1000 people in population per year

Crude death rate = deaths per 1000 people in population per year

Population growth rate is the net result of births, deaths and dispersals.

Doubling Time

Doubling Time is the time required for a population to double if the current growth rate continues.

Doubling time = 70 divided by the current growth rate

Example: if Ghana has a growth rate of 2.4/yr Then

$DT = 70/2.4 = 29.2$ years to double.

Zero Population Growth occurs when a population neither shrinks nor expands from year to year.

Human Population Issue

- Factors that determine the impact of a society on natural resources.
 1. Population size
 2. Population density
 3. Degree of technological development
-

Demography - Study of populations and their characteristics.

Factors such as financial, educational, spiritual, cultural, emotional and social forces shape and form the demographic trends within a society.

Factors that affect population growth

- Children in Labor Force
 - Cost of raising and educating children
 - Availability of pension systems
 - Urbanization
 - Education and employment for women
 - Infant mortality rate
 - Average marrying age
-

-
- Abortion
 - Availability of birth control

Factors that limit population size

Factors that prevent unlimited population growth is called limiting factors and a collection of limiting factors is called environmental resistance.

- Availability of raw materials
-

-
- Availability of energy
 - Accumulation of waste products
 - Interaction among organisms

Exponential or Geometric growth

The population density keeps on increasing exponentially or geometrically until some resources run out or encounters some other limitation. Population growth has upper limit.

Increase in density reduces the rate of growth

Carrying capacity

In any natural ecosystem, biota and various abiotic factors work in such a way that a population should have an upper size limit that cannot be exceeded.

Such a limit is called carrying capacity of the environment on that population.

It can be determined by the availability of resources (food and space)

Controlling Global Population Growth

- Family planning
 - Improve health care
 - Elevate the status of women
 - Increase education
 - Involve men in parenting
 - Reduce poverty
-

- Sustainability

Population and Environment

