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The Nature and Scope of Population Geography

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Introduction

As a branch of human geography and a subset of population studies, population geography studies the ways in which spatial variations in the distribution, composition, characteristics and growth of populations are related to the nature of places (Ajaero, 2015; Ajaero and Madu, 2016). Population geography as a scientific field, engages in spatial and temporal discourses of the patterns and processes of variations in population distribution in any defined territory. As a result, the population geographer is concerned with several questions such as; what is the pattern of population of any area? What are the processes that lead to the observed pattern of population distribution? What are the relationships/linkages between the population of any place and the environmental conditions of the area? Subsequently, common concepts studied in population geography are population size, growth, density, distribution and composition. Others include migration, fertility, mortality, ethnicity, aging etc

Basic tools in population geography

In population geography, several tools are used to explain the spatial variations in the nature of population of any given area. The most commonly used tools for geographical explanation of population phenomena are (i) count (ii) rate (iii) ratio (iv) proportion, and (v) proportion (vi) Cohort measure (vii) Period measure (PRB, 2016).

Count: This is the absolute number of a population or any demographic event occurring at a defined area in a specific time. E.g. the total population of the world in 2016 was 7.4 billion persons.

Rate: This refers to the frequency of occurrence of any demographic event in a population within a specific period of time (usually a year), divided by the population at risk of the event within the same time. It denotes how common or rare a demographic event occurs. E.g. the world global fertility rate (number of births per 100 persons in the world) in 2016 was 2.5%.

Ratio: This is the relationship between one population sub group and the total population or another sub group. E.g. in 2016, the world population sex ratio is 101 males per 100 females, world birth ratio is 20 births per 1000 population.

Proportion: This denotes the relationship of a population Sub-group to the total population. This can be derived by dividing a population subgroup by the entire population. E.g in 2016, 54% of the world population lived in urban areas,

Cohort measure: This is a statistics that measures demographic events occurring to a cohort (that's a group of people with common demographic experience which have been observed over time). E.g; birth cohort which refers to a statistical record of persons born in a particular year). Others include marriage cohort and graduation cohort

Period measure: This tool measures events occurring to all or a sub group of a population during one period of time. In other words, this measure "takes a snapshot" of a population or the sub group of any population at any given time. E.g. the mortality rate of the world population in 2016 was 36 per 1,000 births

The nature and sources of data used in population geography

The need for population data cannot be over emphasised in an economy because these human populations generate, sustain and enjoy the socio economic development in a region. In population geography, data comes in various forms such as (i) quantitative data (They are data expressed as numbers examples: weight, height, total population etc), and (ii) qualitative data which refers to categorised /non-numeric data such as sex (male or female), social status (rich or poor)etc. These data can be got from different sources which include:

Population census:

The United Nations defines census as total process of collecting, compiling, evaluating, analysing and publishing or otherwise disseminating demographic, economic and social data pertaining, at a specified time, to all persons in a country or in a well delimited part of a country (United Nations, 1998). This is done usually within the interval of 10 years. Some information obtained from census records include; age, sex, marital status, size of the population, religion, education, place of birth, etc. There are two approaches to carrying out a population census

- *De jure approach:* This is done by counting and obtaining information from individuals at their places of residence during census.
- *De facto approach:* Here wherever the individual happens to be at the census period, is where he will be counted and information obtained regardless of his place of residence or abode.

The registration system:

This is the continuous universal recording of the information about a population in a particular area into designated registers. These registers help in analysing changes in population, denoting the change direction and the amount of change that transpired. Examples of such registers are;

- Vita registers
- Migration records
- Population registers

Vital registration contains the vital demographic events happening in the life of individuals throughout their life span. Some of the vital demographic events includes birth, marriage, death, dissolution of marriage, etc

Migration records: Travelling points like sea ports, airports, border post, serves as a collection site for information regarding movements of individuals in or out of a country.

Population registers is kept by the population commission as they make entries of individuals bio-data, starting from their birth throughout his life span to his death. These registers contain social, demographic and economic data about the individual.

Sample Survey:

The delay in publishing of census results may spring up an urgent need for current information about a particular population in a specific territory. Subsequently, sample survey is designated to meet these immediate population information needs. Sample survey is therefore a systematic way of eliciting information from a sub group of an entire population. The results of sample surveys give a degree of accuracy in generalization of the entire population. Sample surveys are also more convenient in deriving social, cultural, economic

and demographic situation of any population on the spot at a relatively low cost. Consequently, individual researchers, research institutes, and multinational companies etc mostly makes use of these surveys.

Non- Conventional Sources

When all the above methods are unavailable or inconvenient to be used at any moment, some non-conventional means could be applied to generate population data. These non-conventional sources of population data include administrative records of various organisations, records and registers from religious centres like mosques and churches, schools, hospital, and town unions. In as much as these records could be very accurate, some of them maybe obsolete as little or no concerted efforts are employed to update them. The subsequent sections of this chapter will highlight the two major aspects of population geography namely; population characteristics and population dynamics.

(A) Population characteristics

Population characteristics refers to the attributes that individuals in the population possess biological or sociologically. Some of the biological characteristics include; age, sex, race etc. these attributes are not changeable. Sociologically assigned attributes are: changeable and includes: occupation, marital status, education, income etc. For instance, it is estimated that 54% of the world population size since 2000 years live in urban areas. Some of the population indicators are shown in table 1 below

Table 1: 2016 World population indicators

World population mid 2016	7,418,151,841
Number of births	20 births per 1000 persons
Number of deaths	8 deaths per 1000 persons
Infant Mortality rate	36%
Total fertility rate	2.5%
Proportion of Urban population	54%
Life Expectancy at birth (years) males	70 years
Life Expectancy at birth (years) Females	74 years
Maternal deaths	216 deaths per 100,000 births

(Source: 2016 World population sheet)

In addition, Table 2 shows the population characteristics of different regions of the world. It can be seen from the table that Asia alone constitutes more than half of the entire world population while Africa has the highest net fertility of 4.71

Table 2: Population characteristics of different regions of the world

S/ N	Regions	Population (2017)	Yearly changes	Density (pop/sq km)	Land area(Km²)	Net Migration	Net Fertility	Median Age	Urban pop (%)	World share (%)
1	Asia	4,478,315,164	0.95%	144	31,034,755	-1,256,133	2.2	30	49.3%	59.6%
2	Africa	1,246,504,865	2.5	42	29,678,687	-579,959	4.71	19	40.5%	16.6%
3	Europe Latin	739,207,742	0.05%	33	22,131,968	824,644	1.6	42	74.5%	9.8
4	Americas and the Caribbean	647,565,336	1.02%	32	20,110,725	-414,767	2.15	29	79.7%	8.6
5	Northern America	363,224,006	0.75%	20	18,626,872	1,235,878	1.86	38	82.8%	4.8%
6	Oceania	40,467,040	1.42%	5	8,430,6337	190,337	2.42	33	70.8%	0.5%

(Source: Worldometer, 2015), (www.Worldometers.info)

Sex Ratio:

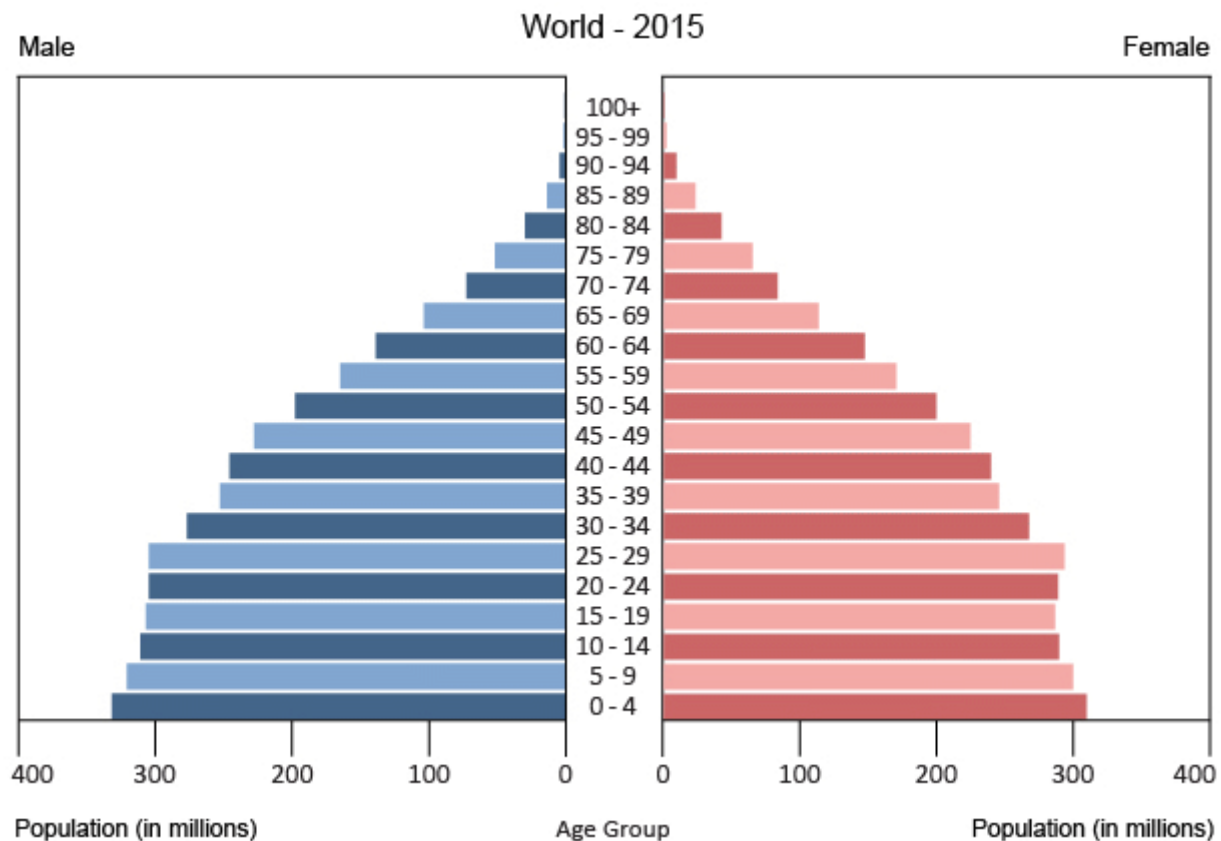
This is the relation of males to females in a known population usually expressed as the number of males for every 100 females. Factors like mortality, migration pattern and fertility brings about variations in sex ratio. Sex ratio can be calculated as follows;

Age structure:

The age structure of a population affects a nation's key socioeconomic issues. 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. The age structure can also be used to help predict potential political issues. For example, the rapid growth of a young adult population unable to find employment can lead to unrest.

Age-sex composition

This is also known as population pyramid and it refers to the number of males compared to the number of females of different age groups in a given population. The human population of an area is either male or female (sex composition) and they belong to different age groups too. The knowledge of the age-sex composition of any population goes a long way in the formation of social welfare policies, as it affects the social, political and economic development of a region. The global age-sex composition is shown below in figure.



Source: CIA World Factbook, 2016

Population distribution/density

There is an uneven distribution of human population globally. It is estimated that 7.4 billion persons live on a land of 510million square kilometres and their concentration differs from one place to another. Population distribution is the arrangement or spread of people living in a given area and this also includes their arrangement according to sex-races, urbanization, age etc. According to Umoh (2001) population density is the most common measures of population pressures on the land surface. It depicts the number of people in a unit area. Population density can be calculated by dividing the total number of the population in a region by the total land area of the region. The global population density is shown in the map below.

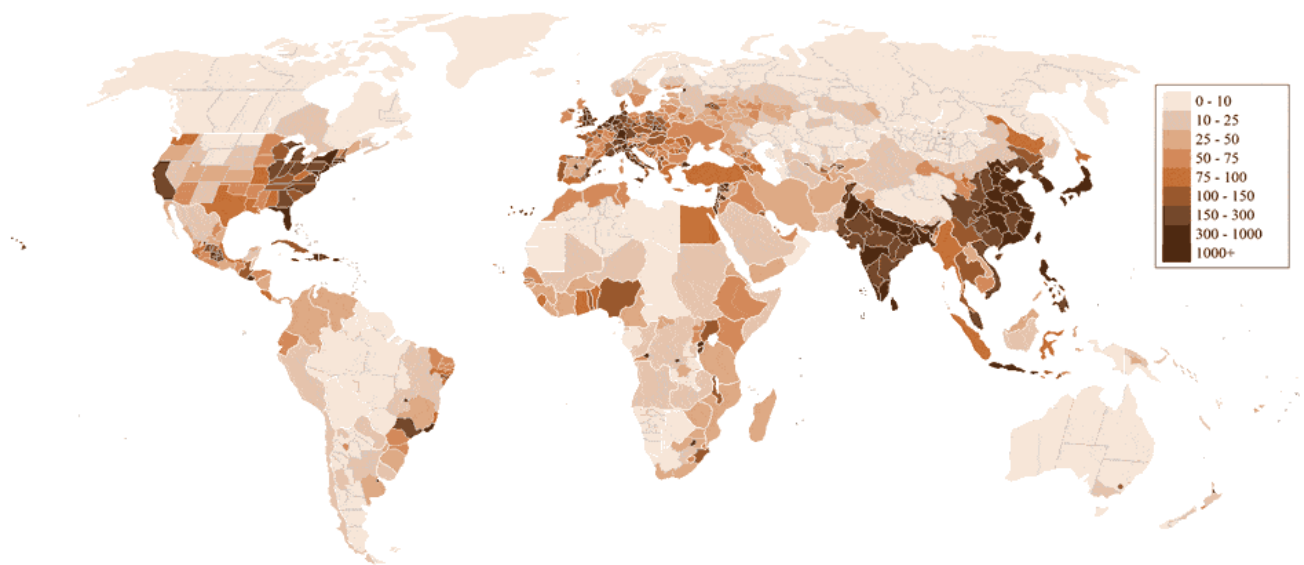


Figure 2: World Population Density (people/km²)

(Source: The World Population Density 2016, World Bank Group)

The figures above depict the distribution of the human population by regions globally. While some areas are sparsely populated while others are densely populated. The global population is 7.4 billion while 59.81% of the population is located in Asia, 16.2% in Africa, Europe 9.98%. Some certain factors are responsible for the global uneven distribution in human population. These factors are physical factors, biological factors, social factors, economic factors, etc. these factors can either be repulsive or attractive to man influencing the number of persons inhabiting a place.

Population growth

At the dawn of agriculture, about 8000 B.C., the population of the world was approximately 5 million. Over the 8,000-year period up to 1 A.D. it grew to 200 million (some estimate 300 million or even 600, suggesting how imprecise population estimates of early historical periods can be), with a growth rate of under 0.05% per year (Woldometer, 2016)

A tremendous change occurred with the industrial revolution .Whereas it had taken all of human history until around 1800 for world population to reach one billion, the second billion was achieved in only 130 years (1930), the third billion in less than 30 years (1959), the

fourth billion in 15 years (1974), and the fifth billion in only 13 years (1987). The trend in world population growth from 1965 to 2017 is shown in Table 3

- During the 20th century alone, the population in the world has grown from 1.65 billion to 6 billion.
- In 1970, there were roughly half as many people in the world as there are now.

Table 3 : Trend in world population characteristics (1965-2017)

Year	Total population	Yearly population change	Median age	Fertility rate	Density (p/km ²)	Urban pop(%)
2017	7,515,284,153	1.11%	29.9	2.5	58	54.7%
2016	7,432,663,275	1.13%	29.9	2.5	57	54.3%
2015	7,349,472,099	1.18%	30	2.51	57	53.8%
2010	6,929,725,043	1.23%	29	2.62	53	49.1%
2005	6,519,635,850	1.25%	27	2.62%	50	46.6%
2000	6,126,622,121	1.33%	26	2.74	47	46.6%
1995	5,735,123,084	1.55%	25	3.04	44	44.8%
1990	5,309,667,699	1.82%	24	3.45	41	43%
1985	4,852,540,569	1.79%	23	3.59	37	41.3%
1980	4,439,632,465	1.8%	23	3.87	34	39.4%
1975	4,061,399,228	1.98%	22	4.48	31	37.8%
1970	3,682,487,691	2.08%	22	4.92	28	36.7%
1965	3,322,495,212	1.94%	23	4.96	21	---

(Source: Worldometer,2015), (www.Worldometers.info)

The population growth rate exposes one to the changes in population over time. Before 1800, world population growth rate has been 1%, during the first fifty years that followed, an annular growth of 2.1% was observed. The peak was in 1962 and 1963 which had 2.2 as its growth rate. Ever since, population growth rate has been observed to be on a decline with an estimate projection of 0.1% in 2100.

Also, the global pattern of population growth depicts heterogeneity across countries because growth rates increase or decrease in different countries at different points in time. Example Nigeria and India both had similar growth rates in 1960 (1.7%) but have followed different paths in subsequent years with a growth rate of 2.6% and 1.2% respectively.

(B) Population Dynamics

The components of population dynamics can be classified into fertility, mortality and migration (Haupt et al, 2011). However, each brings about the population change

1. Fertility

Fertility refers to the number of live births women have. It differs from fecundity, which refers to the physiological capability of women to reproduce. Fertility is directly determined by a number of factors which, in turn, are affected by a great many factors which can be social, cultural, environmental, health and economic in nature. These social, cultural etc factors operate through four major variables which are:

- Proportion of women in sexual unions.
- Percentage of women using contraception.
- Proportion of women who are not currently fecund (primarily because of breastfeeding).
- Level of induced abortion.

Knowledge of these four variables provides clues to potential changes in fertility and aids our understanding of past change. (Stein, 2011). For instance, the proportion of women who are in union is affected by other demographic factors including the age at first marriage or union; the pervasiveness of marriage and other unions; rates of divorce, separation, and remarriage; and male mortality levels. In addition, the percentage of women in married or in union and the percentage of women in sexual unions are sometimes approximated by the percentage of women of reproductive age who are legally married. Some measures of fertility include crude birth rate, total fertility rate, and general fertility rate

Birth Rate

The birth rate (also called the crude birth rate) indicates the number of live births per 1,000 populations in a given year. Most annual rates, such as the birth rate, relate demographic events to the population at mid-year (July 1), which is considered to be the average population at risk of the event occurring during the year. Births are only one component of population change, and the birth rate should not be confused with the growth rate, which includes all components of change. The formula for crude birth rate (CBR) is as follows;

$$\text{CBR} = \frac{\text{Number of births}}{\text{Total mid-year population}} \times K \dots\dots\dots 1$$

Where K = 1000

For instance there were 22 births per 1,000 population in Israel in 2009. Around the world, birth rates vary widely. Niger's 52 per 1,000 in 2010 is a very high birth rate, while Taiwan's 8 per 1,000 in 2009. In Nigeria there were 37.19 births per 1,000 woman ages 15 to 49 2006 with a natural growth of 2.50 percent.

General Fertility Rate (GFR)

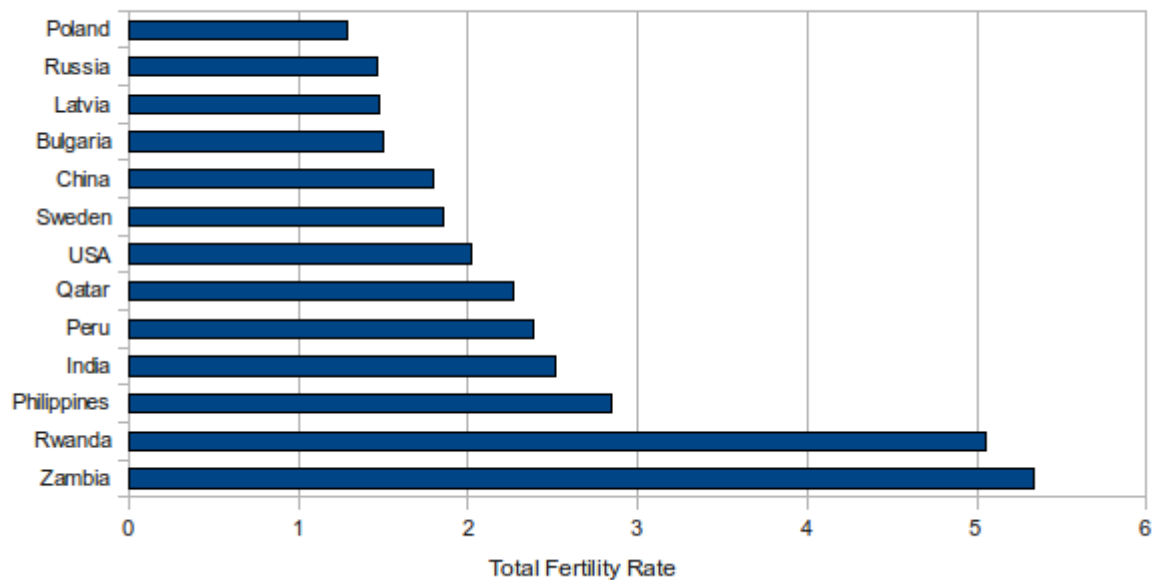
The general fertility rate (also called the fertility rate) is the number of live births per 1,000 women ages 15 to 49 in a given year. The general fertility rate is a somewhat more refined measure than the birth rate because it relates births to the age-sex group at risk of giving birth (usually defined as women ages 15 to 49). This limitation helps eradicate distortions that might arise because of different age and sex distributions among populations. Thus, the general fertility rate is a better basis to compare fertility levels among populations than are changes in the crude birth rate.

Total fertility rate (TFR)

TFR is based on the age-specific fertility rates of women in their "child-bearing years", which in conventional international statistical usage is ages 15–44 or 15–49. The TFR is, therefore, a measure of the fertility of an *imaginary* woman who passes through her reproductive life subject to *all* the age-specific fertility rates for ages 15–49 that were recorded for a given

population in a given year. The TFR represents the average number of children a woman *would* potentially have, were she to fast-forward through all her childbearing years in a single year, under all the age-specific fertility rates for that year. In other words, this rate is the number of children a woman would have if she was subject to prevailing fertility rates at all ages from a single given year, and survives throughout all her childbearing years.

Total Fertility Rates for Select Countries, 2010.



Source: UN World Population Prospects, 2008.

2. Mortality

Mortality refers to cessation of life or death of an individual or groups of individual in any population at any given time. The probability of dying during a given time period is linked to many factors, such as age, sex, race, occupation, and economic status. Also, the incidence of death can reveal much about a population's standard of living and health care.(Cochrane, Leger, and Moore 2011). Some measures of mortality include crude death rate and age specific death rate.

Crude Death Rate (CDR)

The death rate (also called the crude death rate) is the number of deaths per 1,000 population in that population in a given year.(World bank,2011) We calculate the CDR as follows;

$$\bar{CDR} = \frac{\text{Number of deaths}}{\text{Total mid-year population}} \times K \dots\dots\dots 2$$

Where K = 1000

The crude death rate can be particularly affected by age structure. It is therefore prudent, when comparing death rates between countries, to adjust for differences in age composition before making inferences about a country's health, economic, or environmental conditions. For example, In 2006 Nigerians death rate was 12.7 per 1000 and had grown to 12.9 in 2014. Similarly in 2009, Sweden's crude death rate was twice as high as Panama's—10 per 1,000

compared with 5 per 1,000—despite the fact that life expectancy in Sweden was 81 years, compared with 76 for Panama. The higher Swedish rate is attributable to the differences in age composition between the two countries. In “old” Sweden, 18 percent of its population is ages 65 and older, so deaths are more likely to occur, while “young” Panama’s proportion of elderly people is only 6 percent of the total population. Thus, despite Sweden’s better health conditions, it has a higher proportion of deaths in the total population each year than Panama.

Age-Specific Death Rate (ASDR)

This refers to death rates calculated for specific age groups in order to compare mortality at different ages or at the same age over time. Comparisons also can be made between countries or areas. Because mortality varies greatly by sex and race, age-specific death rates are often given separately for males and females and for different racial groups in a population.

Cause-Specific Death Rate (CSDR)

Cause-specific death rates are usually expressed in deaths per 100,000, because for most causes of death, the rates of occurrence are very low. Deaths from heart disease. For instance, in 2008, 203 people per 100,000 died of heart disease, the leading cause of death in the United States for that year.

3. Migration

According to World Bank's *Migration and Remittances Factbook* (2011), migration is the geographic movement of people across an administrative boundary for the purpose of establishing a new permanent or semi-permanent residence. The determinants of migration have been classified into “push” and “pull” factors. While the pull factors drive people away from an area, the push factors attract people to an area (Ajaero and Onokala, 2013). However, what constitutes a push factor from a migrant’s place of origin (where the migrant is moving away from) can also be a pull factor in a migrants’ place of destination (where the migrant is moving into). Together with fertility and mortality, migration remains an important component of population change. The terms “immigration” and “emigration” are used to refer to moves “into” and “out of” countries (international migration). On the other hand, the terms “in-migration” and “out-migration” are used for movement “into” and “out of” areas within a country (internal migration). Some measures of migration include;

Immigration rate: The immigration rate is the number of immigrants arriving at a destination per 1,000 population at that destination in a given period.

Emigration Rate: This is the number of emigrants departing an area of origin per 1,000 population at that area of origin in a given year.

Net Migration Rate: The net migration rate shows the net effect of immigration and emigration on an area’s population, expressed as an increase or decrease per 1,000 population of the area in a given year.

According to The World Bank's *Migration and Remittances Factbook* (2011) the percentage of international migrants worldwide increased by 33% with 59% of migrants targeting developed regions in 2013. Almost half of these migrants are women, which is one of the most significant migrant-pattern changes in the last half century. Women migrate alone or with their family members and community. Even though female migration is largely viewed

as associational rather than independent migration, emerging studies argue complex and manifold reasons for this

Also, in 2010, 16.3 million or 7.6% of migrants qualified as refugees. At the end of 2012, approximately 15.4 million people were refugees and persons in refugee-like situations - 87% of them found asylum in developing countries(UNPF,2013).In Nigeria the net migrants is - 0.22 per 1,000 in 2006. Structurally, there is substantial South-South and North-North migration, i.e., most emigrants from high-income OECD countries migrate to other high-income countries, and a substantial part (estimated at 43%) of emigrants from developing countries migrate to other developing countries(Adepoju, 1990). According to the United Nations Population Fund, while the North has experienced a higher absolute increase in the migrant stock since 2000 (32 million) compared to the South (25 million), the South recorded a higher growth rate between 2000 and 2013 even as the average annual rate of change of the migrant population in the developing regions (2.3%) slightly exceeded that of the developed regions (2.1%).

Globally the top ten immigration countries are: United States, Russian Federation, Germany, Saudi Arabia, Canada, UK, Spain, France, Australia and India While the top ten countries of origin are: Mexico, India, Russian Federation, China, Ukraine, Bangladesh Pakistan, UK Philippines and Turkey (Migration and Remittances Factbook 2011). In addition, the top ten migration corridors worldwide are: Libya–European Union, Mexico–United States; Russia–Ukraine; Ukraine–Russia; Bangladesh–India; Turkey–Germany; Kazakhstan–Russia; Russia–Kazakhstan; China–Hong Kong; China–United States.(GCIM,2005).

In some countries, immigration plays a significant role in population growth. For instance, in Sweden in 2009, 66 percent of all population growth was a result of immigration In 2009, Norway experienced a net increase of 8.0 persons per 1,000 population through migration. Also, in 2010, Australia had a net migration rate of 11.0 per 1,000 population; the United States' rate was 2.8; while Bulgaria had a net migration rate of -2.1 per 1,000 in 2009 (the net result was a loss of 2.1 persons per 1,000 population due to migration).

Conclusion

This chapter has proffered a definition of the concept of population geography. It has also highlighted the tools and the sources of data for population geography studies. In addition, the chapter gave a synopsis of the characteristics and dynamics of population as a field in which the population geographer seeks to find answers to its numerous questions. It is evident from the discourse above that the field of population geography is interwoven and interrelated with other disciplines such as demography, sociology, political science, economics, anthropology, epidemiology etc. However, the difference between population geography and these other disciplines that study population lies in the fact that population geography carries out a scientific inquiry into the spatio-temporal variations, processes, causes, and consequences of population phenomena

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