**MEKDELA UNIVERSITY**

**MEKANESELAM CAMPUS**

**COLLEGE OF SOCIAL SCIENCE AND HUMANITIES**

**DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES**

**Course title:** GEOGRAPHY OF POPULATION AND SETTLEMENT

**Course code:** GeE2062

**Mode of delivery:** Block

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**Course description:** In this course learners are expected to learn basic concepts related to population geography, the disparity between population studies and population geography as well as the scope of population geography and settlement. Thereafter, the course will acquaint students the basic sources of demographic data and the associated problems in each. Subsequently, the course highlights the pattern and trends of world population distribution and the factors behind the uneven distribution of the world population. The course also familiarizes students with the dynamics of population change, theories of population and their application, and the interrelationship between population and development. Finally, the course will permit learners to comprehend the various population policies being implemented by different countries of the world including Ethiopia.

**Course objectives:** At the end of the course students will be able to

* Define the phrase population geography
* Differentiate the term population geography from population studies
* Identify the main sources of demographic data
* Comprehend the pattern of world population distribution
* Recognize the dynamics of population change and their implication on population size
* Understand the various theories of population and their application in the real world
* Understand the population-environment nexus.
* Identify the types of population policies

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Test 1 ----------------------------10%

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UNIT-ONE

**The Concept of Population Geography**

Population geography is a compound term formed by combining two words, **population** and **Geography**.

**Geography** is a scientific discipline concerned with variations in the spatial distribution of features on the surface of the earth. **Population** refers to an aggregate of people or of animals or of plants residing in geographic area. **Population geography** is a branch of [**human geography**](http://geography.about.com/od/culturalgeography/a/humangeography.htm), which studies about the spatial distributions, and density of people. To study these factors, population geographers examine the increase and decrease in population, peoples' movements over time, general settlement patterns and other subjects such as occupation and how people form the geographic character of a place.

Population geography is closely related to demography (the study of population statistics and trends). The main difference is that demography is more concerned with numbers and demographic processes as they occur in political (administrative) units while population geography is more concerned with spatial variations in population and their relations with physical, cultural and economic phenomena. Accordingly, population geography is a branch of geography that studies:

The spatial distribution of people and the various factors that interact to influence that population How population number and population densities vary from place to place

The dynamics of natural population change, particularly the key components of fertility and mortality. The global increase in population Migration or the movement of people across the earth’s surface. The spatial variations in rates of population change. The different dimensions of population structure i.e. age, sex, marital status, family, characteristics, etc.

The well-being of population that is a product of the relationship between population numbers, resources and developments. Generally, Population geography is the study of human population, their number, composition, growth, distribution, and migratory movements in relation to variations in the conditions in the earth’s space. The term “population” has wide range meanings in different fields of study.

**For example**

**To biologist** - the term population refers to organisms (plants and animals of the same species living in the same area at the same time.

**To statistics**- the term population refers the group from which a sample is drawn

**To Sociology**: As sociology focuses on social organization of people into different institutions such as religion, language, ethnicity, etc

**To Anthropology**: is one of the social sciences that specialize in the study of the evolution of human population and its classification into different racial groups.

**To Economics**: The main thrust here is the economic implications of people. Hence, the population resources relationship is a vital issue without considering the space-population relationship as its basis.

**To Political** **Science**: the main thrust of political scientists is the political implication of people. However, unlike population geography, this is done without considering the population-space relationship context.

**To History**: as opposed to population geography history treats human population in temporal perspective, hence it employs chronological approach while geography does it in spatial context.

**To population geography**-, the term population refers to human population.

Hence, Population here refers not to the population of Rabbits or mice or any other animals but to human population.

**1.2 Scope of Population Geography**

By its very nature, population geography attempts to cover almost all aspects of human population. Population geography, in spatial context, threats the biological (natural) properties that are determined by the process of birth, heredity and other physiological behaviors of individuals (population); socio-economically and culturally caused factors of the population; Vital events such as births, deaths and movements of people that make population dynamic; type, form and development of human settlements and their distribution and patterns (spatial difference), and identifying various population centers and assessing their location along with the type of economy.

**Advantage of population Studies**

The following are the advantages of population studies.

It provides information concerning international population trends and their implications

It informs policy makers, educators, political parties, business group, and the media and concerned citizens working in the public interest around the world concerning population issues.

It helps countries or governments increase their awareness and understanding concerning population issues, trends and implications.

It provides foundation knowledge for conducting research in specific areas such as fertility, reproductive health, family planning, crime, immigrations family structure, minority status, effects of nutrition, and environmental education.

It provides comprehensive knowledge about fertility, mortality, migration, population structure and other related processes.

**1.3 Types, Sources and problems of population data**

Population data (also called demographic data) are vital in population geography for analysis of the various aspects of population.

**1.3.1 Types and uses of population data**

Types of population data there are three main aspects population numbers

The state of population at any given time, including its geographic distribution and its structure or composition, and the movement or dynamics of population in time and space (fertility, mortality and migration).

**1.3.2 Sources of population Data**

Basically information pertaining to population is obtained from primary and secondary sources. **Secondary** (documentary) sources are mainly written documents or published materials. These sources include various statistical; and governmental Sources that are collected for several purposes other than demographic. These include the data collected by the ministry of finance, ministry of education, etc.

**Primary** population data are obtained from organization or institution that originally collected the information. There are several sources of demographic data based on primary sources. The major sources include

Population census

Demographic Sample survey

Vital registration system

Continuous registration system or population registers.

I. **Population census**- census has several meanings. Here we shall consider its meaning related to human population. The United Nations gave the modern definition of census as;

The total process of collecting, compiling and publishing of demographic, economic and social data pertaining to a specific time to all persons in a country or delineated defined territory.

**History of Census**: Historical sources suggest that ancient form of census enumeration was common in ancient lands of Egypt, Babylonia, India, China, Palestine, Greece and Rome. Ancient census was made primarily for two reasons: namely, for taxation and military conscription.

Hence, it could be conclusive that ancient census had limited objectives. Such limited scopes of ancient census resulted in incomplete and inaccurate census results. Because instead of covering, the entire population only heads of families, farmers, merchants, landlords and men in the age group suited for military service were counted. Worst of all women and children were seldom counted.

The modern concept of population census took shape only in the 17th and 18 th centuries. It has involved (a) a complete enumerations of the entire population; (b) the collection of information about some important features of each person; (c) the counting of people at regular intervals; and (d) obtaining knowledge about the trends in population growth and its structure and characteristics. Efforts to undertake a complete census at regular intervals were first made in New France (Quebec) and Acadia (New Scotia) in 1665. The Swedish census of 1749 was perhaps the first in Europe.

Following this experience, the USA did its first census in 1790. In 1801 Britain and France held their first censuses. By the middle of the 19 th Century, census operations had come to stay in almost all European countries. After the World War II the UN began to assist several developing countries in various ways in conducting census operations. India became the first developing country to conduct its first census in 1876, in fact with the technical and financial assistance of its colonizer, Great Britain. Ethiopia has done only three censuses since 1984, 1994 and 2007 at an interval of 10 years and now will soon conduct the fourth census in 2019 after 12 years.

**Census in a Modern Sense:** Modern census is attached to scientific and more comprehensive definition. Thus, census is "**the total process of collecting, compiling and publishing demographic, economic and social data pertaining to all persons in a defined territory at a specified time"**.

Census is the major method of demographic data collection in many countries. Most of the time it is conducted decennially or Quiquinally i.e every ten or five years intervals respectively. For example, Japan conducts a census every five years.

**Approaches in conducting Census**

There are two commonly used approaches to conduct a population Census. These are

**(a) De facto:-** In this approach each person is recorded or counted where he or she is found at the time of the census taking. The United Kingdom is one of the leading countries that adopted this approach. Under this system a date is fixed for the whole country. Usually such operation is conducted at night. Nights are preferred to days due to the fact that after daylong work the people will be back to their homes at night. Such night is called **census night.** Such night is selected carefully and it should be moon light night; and an appeal is made to the people that they should stay at home. At such night all those who are found anywhere are counted wherever found. As the census is completed on a particular date, it is also called **date system** or **one night enumeration system**.

**Advantages of the De facto approach**

It is quite simple and clear;

It is easy for international comparisons

Time consumed for the whole operation is very limited; and

The information collected is almost realistic and dependable.

**Disadvantages of De facto approach**

There could be floating and uncounted population-data about such people will be missing.

The system requires a large number of well-qualified and trained field workers (enumerators). Unfortunately such people may not be available everywhere, hence data are collected by incompetent people.

As the time limit is very short, efforts are made to put as few questions as possible. This prohibits the collection of maximum information.

Night time is a time when people want to take rest. They are tired after day work and as such no enumerator is welcomed at this time. This can adversely affect the quality of data collected.

**(b) De jure: -** In this method people are counted in the census according to their normal place of residence. Hence temporary residents are not included. This method was used in Palestine at the time of Christ's birth and today is used in the United States. Under this system a census period is fixed after taking into consideration area covered and people to be dealt with. Usually two to three weeks are allotted to complete census registration.

**Advantages of De jure approach**

The period given to complete the work is quiet sufficient and hence, a chance of data omission and inaccuracy due to shortage of time is minimized.

Similarly, due to sufficient time more data on sex, age, social conditions, etc., can be collected.

As the process is completed with no haste, data collected will be more reliable and can be used for various purposes practically.

**Disadvantages of De jure approach**

As the enumeration period is rather too long, after visiting an area, new births, deaths and migrations were not registered.

It becomes difficult to collect data on those persons who have no permanent residence.

It also becomes equally difficult to have correct data in respect of persons who have more than one residence and people who are homeless.

Yet de facto enumeration tends to inflate the population totals of holiday resorts and places containing sizeable institutions such as universities and colleges, army barracks, hospitals and prisons. It is worth noting that both the de facto and de jure methods have their own merits and demerits. Therefore, there is no single system that is complete and adopted all over the world.

**Essential characteristics/Features/ of Census**

Modern population census has the following important features.

**i) Universality**: it refers to the need to include every individual in a given area. A census thus implies that each individual is separately, but only once enumerated, which may in turn implies that some important characteristics (e.g. sex, age, marital status, religion, etc.) of each person are separately recorded. Universality of census implies also that neglecting and duplication are avoided.

**ii ) Periodicity:** the census is taken at regular interval. A reference period is predetermined for the enumeration and the entire population is counted with reference to that point of time. In several countries including Ethiopia that interval between two successive censuses is ten years (decennial). In some other countries (e.g. UK and Japan) census is conducted every five years interval.

**iii) Government Sponsorship**: - Unlike many other sources, the census is necessarily a government sponsored activity. Governments arrange, finance and implement census plans. They monitor and control also the entire process of census administration.

**Iv) Defined territory: -** Census covers a precisely defined territory such as the entire country or a well-defined part of it called enumeration district or unit. All census data are collected initially based on small areas.

**v) Expensiveness: -** Undertaking of census process is one of the most expensive sources of population data. This has limited the development of census operations scientifically in the less developed countries.

**vi) Wider Range of Data:-** It is the only form of population data source which produces a wider range of large volume of data for all users.

**II. Demographic Sample survey –**It seeks to collect information only from a fraction of a population. Sample survey is similar to census, except it has a limited coverage. In the census information is recorded about every member of a population. But in a sample survey, selected persons or households are considered. As the name implies it covers a portion of the population in question.

In so doing costs can be greatly reduced. Therefore, sample surveys are increasingly used in collecting population data because of their relative ease and cheapness. In Ethiopia before the first census, sample surveys were the major sources of demographic data.

In demographic sample surveys, careful selection of samples (portion or part of a population) is needed to avoid under or over representation.

**III. Vital registration System –**It is a system of recording vital events on continuous basis. This method involves a continuous and complete recording of vital events shortly after they occur and within a specified period of time. Vital events include births, deaths, marriage, and divorces. They also include annulments (cancellation of marriage), adoptions and separations. Most governments require these events to be officially notified.

The continuous population registration system is more reliable in developed countries. It is because of their development method of recording information. In these countries that possess a system of continuous registration, it is possible to maintain a separate cared for each individual from the time of birth (immigration) to his/her death (or emigration) and to continually update the record. Some of the countries that maintain population registers include: Netherlands, Belgium, Finland, Sweden, Norway, Denmark, Iceland, Italy, Belgium, Israel, Japan, Taiwan, Russia, and Bulgaria.

**Definition of Vital Events**

The definitions of vital events are given below:

**(1) Live Birth** is the complete expulsion or extraction from its mothers of a product of conception, irrespective of the duration of pregnancy, which after such separation, breath, shows any other evidence of life, such as beating of the heart, pulsation, etc.

(2)**Death** is the permanent disappearance of all evidence of life at any time after live birth has taken place (post-natal cessation of vital functions without capability of resuscitation). This definition therefore excludes foetal deaths.

(3) **Foetal Death** is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.

(4) **Stillbirth** is defined as synonymous with late foetal death, that is, one of twenty-eight completed weeks of gestation or over.

(5) **Marriage** is the legal union of persons of opposite sex. The legality of the union may be established by civil, religious, or other means as recognized by the laws of each country; and irrespective of the type of marriage, each should be reported for vital statistics purposes.

(6) **Divorce** is a final legal dissolution of a marriage, that is, the separation of husband and wife by a judicial decree which confers on the parties the right to civil and/or religious remarriage, according to the laws of each country.

(7) **Adoption** is the legal and voluntary taking and treating of the child of other parents as one's own, in so far as provided by the laws of each country. ("Affiliation" is considered a type of adoption.)

(8) **Legitimation** is the formal investing of a person with the status and rights of legitimacy, according to the laws of each country.

(9 **Recognition** is the legal acknowledgment, either voluntarily or compulsorily, of the paternity of an illegitimate child.

(10) **Annulment** is the invalidation or voiding of a marriage by a competent authority, according to the laws of each country, which confers on the parties the status of never having been married to each other.

(11) **Legal Separation** is the disunion of married persons, according to the laws of each country, which does not confer on the parties the right to remarry.

**Important principles of a Vital Registration system:**

**Universal coverage**: A vital statistics system should include all vital events occurring in every geographic area and in every population group comprising the national area.

**Continuity**: Continuity is important to insure that short-term fluctuations including seasonal movements, as well as long-term movements will be accounted for.

**Confidentiality:** It is important to safeguard confidentiality of personal information and vital records to insure that use of information and data for specific administrative and statistical purposes is consistent with the intended uses of the records.

**Regular dissemination**: The minimum requirements for using vital statistics should include a) the provision of monthly or quarterly summary, and b) “the production of detailed annual tabulations of each type of vital event across classified by its demographic and socioeconomic characteristics.”

**1.3.3 Problems of Population Data**

The two main data problems are data inaccuracy and data heterogeneity; the former is related to data incorrectness or data erroneousness while the latter refers to the problem of data variability or data dissimilarity.

**Inaccuracy results from:**

Poor and inadequately financed methods of data collection;

Suspicion, resentment and ignorance of censuses;

False statements, especially of age and occupation;

Constant changes in population; and

Omissions of some population groups.

**Heterogeneity results from:**

Diversity in types and comprehensiveness of enumeration,

Lack of synchronization of national censuses,

Frequent changes in boundaries of political, administrative and censes units, and

Wide differences in connotation of terms like language, household, race, nationality, occupation, urban population, still birth, etc.

**UNIT TWO**

**2. Trends in Population Growth and patterns in Distribution**

The spatial distribution of population in the world is **not ubiquitous**. There are wide regional contrasts in the degree of concentration of population giving highly variable densities to different parts of the world. These contrasts in population distribution and density are governed by variety of factors, which can be grouped into three categories: **physical, economical and socio-demographic factors.** These categories are not mutually exclusive, rather, there is a great deal of interaction among the three types of factors, which make it difficult to identify one type of factor as being excessively responsible for a particular pattern of population distribution.

**Pattern and Trends of Population Distribution**

The earth’s surface, which is habitable and can be used for human settlement is very limited; water occupies 71% of the earth's surface while land accounts for the remaining 29%. But it should be born in mind that all land area of the earth is not comfortable for human habitation. Observations showed that (i) about 22% of land area are hot deserts; (ii) humid, hot and wet, tropical rain forests make 20% of the total land area of the earth; (iii) tundra and ice caps account for 14% of the entire land area; (iv) mountains and plateaus that are not cultivable, and hence not habitable, cover about 20% of the total land surface area.

Thus it appears that about 76% of total land area of the earth is not suitable for human settlement. It, then, implies that only about 24% of the earth's land surface area, which in turn accounts for only about 7% of the total earth's surface is suitable for human habitation. Strangely enough, it is the smallest portion of the earth (7%) that supports the growing population of the world. It has been true at the same time that with the development of science and technology people have conquered some parts of the hostile lands. Probably more and more use shall be made of such hostile lands in the future with further advances made in science and technology.

The present distribution of the earth's people is probably only a temporary point in a process of change that has gone on since the beginning of human history. Observations showed that both population size and distribution have been in a state of change and shall continue to change in the future as it has continued to do in the past.

**At present (2019)** there are on the earth about over 7.7 billion, inhabiting more than 148,940,000 Km² (57,510,000 square miles) of land. But historical sources indicate that the world of the past had very small number of inhabitants and the resulting average population density for the world was extremely low. However, with the passage of time as economic and demographic changes continued, there took place a change both in the size and concentration of world population.

**The food-gathering period: -** which coincides with what commonly referred to as primitive communal society, was characterized by the influence of nature over the system of human survival on earth. Hunting and fruit gathering were the basic means of human survival. This implies that economic and technological development stage of the society of that period was one of the lowest in history. Hence problems related to food, housing, diseases and clothing were so critical. Such problems had their own adverse impact on the demography of human society. High birth and deaths of the time were outmaneuvering each other. Thus, population growth was slowed considerably. At this period, the total population of the world was estimated at 3 to 5 million only. The corresponding population density of the world was about 3 to 12 person per 100 square miles.

**During the Period of Agricultural Revolution: -** It was the period when man first began to plant and cultivate and to domesticate animals. As opposed to the food-gathering period, the period of agricultural revolution was marked by a notable technological change; hence, this was followed by a corresponding economic change. Such changes guaranteed food security and this in turn laid the foundation for growing fertility, and brought about harmonious demographic development. Therefore the population of the world started to grow at higher rates than the preceding eras. As a result, size of population increased by many folds and the average density of the world population during this period was estimated at 2700 persons per 100 square miles.

**During the period of 'urbanization':-** This period refers to the time urban centers (settlements) started to emerge and people began to engage in non-agricultural activities. The first true forms of urban areas appeared in the Middle East probably in Mesopotamia. This period was found to be more innovative and productive in nature. Thus, besides urban based economy, the agricultural sector benefited much from the introduction of new farming techniques and tools, better transport services, and the development of trade and the like. As a result, agriculture grew steadily ensuring food supply adequately. The sum total of such profound socio-economic and demographic changes of the urban area had increased not only the size of total population but also population density becomes double. According to some sources population density of this period was about three times larger than the previous period.

**During the mid-17th century**: - This marks the beginning of the early periods of modern era in terms of socio-economic developments, which preceded the **Industrial Revolution**. Most estimates place the earth's number of people at 500 to 550 million by about the middle of the seventeenth century or the beginning of the modern period. The net increase was probably small in the ancient centers and in southern and Western Europe, and more pronounced in the frontier areas of central and Eastern Europe. Asia emerged as the single-biggest continent in the world in population size; surprising enough East Asia and South Asia alone accounted for 50 to 60% of the world's population.

**Contemporary period**:- The most characteristics feature of the present-day distribution of people is its **extreme unevenness**. It was estimated some years ago that one-half of the world's people was contained within about 5% of the earth's land area while, by contrast, about 57% of the land area contained less than 5% of the population. Therefore, population distribution and hence concentration considerably varies among different regions (continents), and between individual countries, more developed countries (MDCs) and less developed countries (LDCs), rim lands and hinter lands, highlands and lowlands, and between the Northern Hemisphere and Southern Hemisphere, etc.

**2.2 Population Distribution**

From the beginning of humanity, people have been **unevenly distributed** over the land. The most crucial fact of population geography is that people are not evenly distributed across the face of the earth. This may be observed at a range of different spatial scales, from global to local. In 1985 there was an estimated 4837 million people occupying the world’s land area of 150 million km2, giving the population density figure of 32 persons per km2. These figures take Antarctica in to account; if it is omitted, then the global density is raised to 36 persons per km2. Sparsely populated places tend to be difficult places to live. These are usually places with hostile environments e.g. Antarctica. Places which are densely populated are habitable environments e.g. Europe.

People are not distributed evenly across the world or within a country. One –third of the world’s population lives in China and India. Yet, each country has large expanses of the land

(Himalayas in India and a vast interior desert in China) where people are absent or sparsely distributed.

**2.3. Factors Affecting Population Distribution**
A variety of factors has been responsible for the uneven distribution of population in the world. These factors can be categorized as physical factors, Socio-cultural factors, and Demographic factors.

**Physical factors**:- the physical factors have always been important in determining the distribution of population and remain so in spite of all developments in technology aiming at freeing human beings from controls of natural environment. The most important physical factors affecting population distribution are **the climate, landforms, soil fertility, energy, and mineral resources and accessibility**.

**Socio-cultural factors**-Although the physical environment determines the habitability of an area in general, the population distribution patterns in many instances are modified by different socio-cultural factors. The chief socio-cultural factors having a bearing on the distribution pattern of population are **the type of economy**, **level of technological development, political decisions, and social organizations.**

**Demographic factors**-Variations in the rate of natural growth bring about changes in the distribution and density of population. Besides natural growth rate, the migration also alters the population distribution pattern. Due to higher growth rate of population in Asian countries, for example, the proportion of the population living in that continent has been rising. It is due to a higher rate of growth of population that Asia has exceeded Europe in density of population. Impact of demographic factors on pattern of population distribution is more clearly visible when population is compared between nations. Since the world is divided in to political units with fixed boundaries and areas and the movements of population across international borders is strictly regulated, much of the increase in population due to natural growth has to be contained within the country.

**2.4. Measures of Population Distribution**

Population distribution over space can be expressed in different ways. These different ways have their own strength and weakness showing population distribution. Population spread over space is something measurable. There are three major methods used to measure population-space relationshipor population distribution. These are: Crude population density, Agricultural density, and Physiological density.

**A. Crude population Density**

Demographers report the **population density** of a country as a measure of total population relative to land size. **Population density** is a measurement of the number of people in an area. It is usually shown as the number of people per square kilometer. The Ethiopians, for example, with a territory of 1,106,000km2 (including the surface of the lakes and ponds) had a population of 73,918,505 in 2007. This yields an average population density for Ethiopia of just over 67 people per square kilometer. This density figure is also known as the country’s **arithmetic population density**.

This crude density suggests that if the population of Ethiopia were evenly distributed throughout the country one-km2 area could have supported 67 people. However, in reality it is know that population is distributed over the surface of the earth unevenly. No country has an even distributed population, and arithmetic population figures do not reflect the emptiness of most of the deserts areas.

The distinction between population distribution and population density must be under stood. Population distribution is simply **where people are located,** whereas population density refers to **man-land ratio**. We can calculate crude population density using the following formula.

Crude population density = Total population of the region

 Total land area of the region

However, crude population density has limited value or has some limitations

It is a rough measurement

It assumes that population is evenly (equally distributed).

It works for countries, which have relative smaller areas size such as Japan, Cuba. However, it could be misleading for larger countries such as Canada, China, and Australia.

**Example-** If the current population of Ethiopia is estimated at about 77 million (2007) and its total area is 1106,000 km2 its crude density will be:

C.D. = = 69.9persons/ km2 =70persons/ km2

This implies there are about 70 people inhabiting every square kilometer of Ethiopia's territory. But this does not hold true because there are sections of Ethiopia, for example, all inland lakes of Ethiopia, forest areas, extremely hot regions such as Dallol Depression, very rocky and rugged areas and very deep and steep river gorges, which are not at all inhabited. Despite its drawback crude density of population is simple to compute and widely used to show population-space association. And yet it cannot be used to evaluate population pressure on resources particularly on comparative basis among different regions of the world at regional scale or larger.

**B. Physiological population Density**

A superior index of population density relates the total population of a country or region to the area of **arable (farmable**) land it contains. This is called physiological population density, defined as the number of people per unit area of agriculturally productive land. Physiological density is a ratio between the total population and total cultivated as well as cultivable areas and expressed in terms , of persons per square kilometer cultivated and cultivable land. As cultivable area only is considered for the whole population it is sometimes referred to as **nutritional density.**

- It excludes uncultivable land

- It is significant for Agrarian countries.

Physiological population density = number of people live in the area

 Total arable land in the area

**Example**- Assuming arable area of Ethiopia is about 66% of the country (1,106,000x 0.66 = 729,960 km2) and the population of 77 million its physiological density will be about:

Physiological population density ==105.5 persons/km2

As this is a more refined measure than CD it can give a better picture of population resource relationship than crude density of population.

**UNIT THREE**

**3. Components of Population Dynamics**

**3.1. Concepts and Determinants of Fertility- as cause of Population Change**

**Population change**-Population changes refers to the growth or decline in population number and changes in structure component and characteristics. Those factors that affect population charge are collectively known as components of population change (dynamics). The important variables, which bring population dynamics, are Fertility, Mortality and Migration.

Population change may be **positive** (growth) or **negative** (decline) has two main components. The population of an area will experience natural increase when the number of births exceeds the number of deaths. Conversely, population will experience natural decrease when deaths outnumber births. This component of population change is known as natural change or reproductive change.

**Population Change**

**Births**

**in-Migration**

**Deaths**

**out-Migrations**

**Natural**

**Change**

**Migration**

**Change**

**Population Gain**

**Population loss**

The other component of population change is migration change. Migration change will lead to population increase when the number of people entering an area (immigrants) exceeds the number leaving (emigrants). On the other hand, where departures exceed arrivals, there will be a net loss of people. Thus the total population of an area, and the trends in total population over time, are the outcome of the interaction of these two components of change. There is always a sort of **dynamic equilibrium** between them. The size of the population at any one time may be associated with the level of water in a tank, which is filled by two pipes (births and inward migration) and emptied by two drains (deaths and outward migration).

Population growth is possible under a circumstance where births exceed deaths, migration change remaining nil, or when rate of inward migration exceeds outward migration, where rate of natural increase remains zero, or where both rate of natural increase and migration change are positive.



The relative importance of natural and migration change varies considerably from place to place and from time to time. In broad terms, the two components can assume two different combinations, producing three different outcomes. They can work together, either increasing or decreasing the population of an area; or they can work against each other. When working against each other the impact of the one is, to varying degrees, cancelled by the impact of the other. The outcome is, therefore, a reduction in the potential scale of population change.

**3.1.1 The concept of Fertility**

**Fertility** is the actual reproductive performance of a women during her child bearing age or it is the actual occurrence of live birth in a given population. Fecundity on the other hand refers to the physiological (Biological) or potential reproductive performance of a women during childbearing age.

**Fertility as a Component of Population Change:** The study of human fertility occupies a central position in the study of population for several reasons. Human fertility is responsible for biological replacement and maintenance of the human race. Therefore, growth of the world population depends largely on human fertility. This is so because any society replenishes itself through the process of human fertility. Thus, in population dynamics, fertility is a force of expansion of population by counter acting the force of attrition caused by mortality.

It is necessary at the outset to define what we mean by fertility and makes a distinction between **fertility, fecundity** and **reproduction**. These are three terms, which commonly used rather loosely, and interchangeably, thereby implying, quite wrongly, that they mean the same thing.

In common usage, **fertility** refers to the ability

of living things to bear offspring and to produce- be it food, ideas or whatever. In population studies, however, whilst fertility broadly indicates the creative element in natural change, as distinct from the destructive element of death, it specifically means the actual occurrence of **live births** in a given population. It is "the actual reproductive performance" whereas **fecundity** differs from fertility because it refers to the potential (capacity) of people to bear children. It is the physiological ability of a person to have offspring. Another difference between fertility and fecundity is related to measuring these concepts. While there are various measures of fertility, there is no direct measurement for fecundity. Fecundity is also called **genetic fertility**.

It should be noted that fertility and fecundity are quite different from **reproduction**. In population studies, the term **reproduction** is the degree of replacement of individuals by others of the same age in the following generation; it is sometimes confounded with the word **natality. Reproduction** refers to the degree to which people, within a given age range, are replaced by people of the same age a generation later.

Terms like **parity, natural** and **controlled fertility**, **sterility** is common in population studies. **Parity** refers to the actual number of children born by a woman during her entire reproductive age (period), which ranges from the age of 15 to 49. In males, this begins at the age of 8 and never stops. Generally women are classified according to the number of children born alive to them. For example, the 1st, 2 nd, 3 rd, etc. parity women are those who have given birth to one child, two children, three children and so on, respectively. While the birth order refers to the child, parity refers to the mother. **Natural fertility** refers to the fertility that exists in the absence of deliberate birth control, while **controlled fertility** is a type of fertility, which involves a deliberate use of birth control. **Sterility** is a situation, which refers to one who has not had a single child. Hence, sterility is the state of being childless or childlessness. It may be used in connection with individuals or groups, consisting of men or women or both. However, in common practice, sterility is associated with women, which is a wrong conception. The causes of sterility could be either **natural** where the resulting type of sterility is referred to as **involuntary sterility** or **artificial**, hence **voluntary sterility**.

***Focus***

Fertility refers to the number of live births women have. It differs from fecundity, which refers to the physiological capability of women to reproduce. A number of factors that, in turn, affected by a great many social, cultural, economic, health, and other environmental factors directly determines fertility.



**3.2 Determinants of fertility**

Why does fertility vary in the two dimensions of time and space? There are spatial variations in global fertility patterns, and although fertility rates are falling in several Asian and many Latin American countries, the rates for Africa are continuing to rise. It is important for population geographer to determine which factors may be responsible for fertility trends. The casual factors are many and diverse, but they may be broadly grouped under the following headings:

**A. Biological factors (proximate determinants)**

**B. Socio-economic factors**

**C. Institutional interventions.**

**A. Proximate determinants (biological factors):** Fertility levels are entirely determined by trends in the proximate determinants of a population. In contrast, socio-economic factors can affect fertility only indirectly, by modifying the proximate determinants. Proximate determinants include: (a) marriage patterns; (b) patterns of sexual activity; (c) duration of breastfeeding; (d) the number of induced abortions; (e) levels of fertility; and (f) the percentage of couples using contraception.

**B. Socio-economic determinants:** Two main socio-economic factors have a significant impact on fertility levels. i) The economic and social values of children, and

ii) The social status of women.

**C. Institutional policies concerning population:** Two major institutions influence the fertility decisions of parents: i) Government policies, and

ii) Religious philosophy.

**Measures of fertility**

Being an important aspect of any population, fertility is measurable for planning and development of the population resource. On the basis of data obtained from vital registration, census and sample surveys different types of measures of fertility may be computed.

The most dominant measures of fertility are the following:

Crude Birth Rate (CBR)

General fertility Rate (GFR)

Age specific fertility rate (ASFR)

Total fertility Rate (TFR)

Child women Ratio (CWR)

Gross reproductive Rate (GRR)

Net reproductive Rate (NRR)

**A. Crude Birth Rate (CBR)** - is the ratio of total live birth to the corresponding mid-year population in a given year. The birth rate (also called the crude birth rate) indicates the number of live births per 1,000 populations in a given year. Remember that 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.

**B. General fertility Rate (GFR)-**This refers to the number of live birth in a given year per 1000 female population in their child bearing (reproductive) years which are from 15-49. The general fertility rate is a somewhat more refined measure than the crude birth rate (CBR) because it relates births to the age-sex group at risk of giving birth (usually defined as women ages 15-49). This refinement helps eliminate 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.

**C. Age specific fertility Rate (ASFR)** –The fertility measure may be further refined by taking in to account the **age factor**. This is achieved by expressing the number of births to mothers of a given age as a percentage of all the women of the same age in that population. This is Called age specific fertility rate (ASFR). This is the number of live birth occurring in a given age i by women of the same age i. Fertility rates can also be calculated for specific age groups to sex differences in fertility behavior at different ages or for comparison over time.

**D. Total fertility Rate (TFR) -** The total fertility rate (TFR) is the average number of children that would be born to a woman by the time she ended childbearing if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year. The TFR sums up, in a single number, the fertility of all women at a given point in time. This is the total number of children a woman would have if the fertility rates for a given year applied to her throughout her reproductive life.

The TFR is a **synthetic** measure; no individual woman is very likely to pass through three decades conforming to the age-specific fertility rates of any single year. In reality, age-specific rates change and fluctuate from year to year, even if only gradually. For example, women who were ages 15-19 in 2003 may delay childbearing longer than women ages 15-19 in, say, 1990. They would lower the TFR a bit in 2003 but then raise it several years later when they begin their childbearing. Thus, year-to-year fluctuations in the TFR may reflect changes in the timing of births rather than changes in the average number of children women bear. The TFR is one of the most useful indicators of fertility because it gives the best picture of how many children women are currently having.

**E. Gross Reproductive Rate (GRR)**

**The Gross Reproduction Rate (GRR)** is the average number of daughters that would be born to a woman (or group of women) during her lifetime if she passed through her childbearing years conforming to the age-specific fertility rates of a given year. This rate is like the TFR except that it counts only daughters and literally measures “reproduction”—a woman reproducing herself by having a daughter.

The GRR indicates how many daughters a woman would have throughout her reproductive life at the age- specific rates prevalent in the specified year of period.

**Focus**

The total fertility rate answers the question “How many children will 1000 women, in a given population, have during their reproductive lifetime?” The Gross reproduction rate answers the question “How many girls will 1000 women in a given population, have during their reproductive lifetimes?” The only difference between the two rates is that the gross reproduction rate is calculated using births of females only.

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**F. The Net Reproduction Rate (NRR)** - is the average number of daughters that would be born to a woman (or group of women) if she passed through her lifetime from birth conforming to the ages specific fertility and mortality rates of a given year. This rate is like the GRR, but it is always lower because it takes into account the fact that some women will die before completing their childbearing years.

The NRR employs the same fertility data as the GRR, but also takes into account the effects of **mortality.** An NRR of 1 indicates that a population's fertility and mortality levels would result in **exact replacement** of mothers by daughters.

**3.2.1. Mortality**

The other half of the natural change component is simply the occurrence of death. The United Nation has defined mortality as the permanent disappearance of all evidence of life at any time after birth. Since death can occur only after birth has taken place, all deaths before birth (still born births) are excluded while calculating mortality.

Mortality, in association with fertility, is the basic determinant of natural growth of population.

**3.2.2. Determinants of Mortality**

There are marked differences in the causes of mortality between the MDCs and LDCs. The MDCs, with an older population structure, reveals a pattern of degenerative diseases.

The LDCs have a more youthful population structure and a mortality pattern that is dominated by child deaths, and hence associated with diseases of youth. The causes of death can be attributed to two major variables,

1. **environmental factors** and
2. **ii) socio-economic factors**, or a combination of both.

**i) Environmental factors:** Environmental factors can have a dramatic and unpredictable effect on mortality levels. Drought and floods have a clear and obvious effect on death rates in the areas experiencing them. Other, less dramatic environmental conditions, such as a hot-humid climate, may have a less obvious impact, but can influence mortality by stimulating conditions favorable to certain diseases and pests. Air pollution for example, has been associated with the incidence of certain cancers and respiratory diseases. Exposure to ultra-violet rays has been shown to have a positive relationship with skin cancer, and higher than average mortality rates are reported during periods of extreme temperatures. Although environmental factors are important in determining death rates they are not easy to quantify, isolate or even identify, as many environmental factors are related to and affected by economic changes.

**ii) Socio-economic factors** that have an impact on mortality levels include housing conditions: mortality rates are higher in damp, over-crowded dwellings. Sanitation and availability of pure water have a direct impact on mortality, as does nutritional status and accessibility of health care facilities. The social class of an individual can also affect life expectancy. A number of studies have shown that life expectancy is higher for professional people than for unskilled workers in both MDCs and LDCs.

**3.2.3. Measures of Mortality**

Mortality can be measured in a number of ways: using crude death rate, age-specific death rate, infant mortality rate and expectation of life at birth.

**Crude Death Rate (CDR) –** The most commonly used and the simplest of the measures of mortality is the **crude death rate (CDR).** Like the crude birth rate, it is expressed as the number of deaths in an area per 1000 of population. The measure is called crude because it provides only an average death rate for a population and does not take into consideration the age composition of the population.

Crude death rates are affected by many population characteristics, particularly 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.

This measure provides a basis for computing the rate of natural increase in a given population. It also helps to make a rough classification of various countries on the basis of their mortality levels. Moreover, it gives a general idea about the trend in mortality in a particular area over a period of time. However, CDR is not a refined measure, this becomes evident from its very name and it suffers from several limitations, which include:

(A) It hides the experience of various population groups whose mortality varies a great deal. CDR does not explain why some Third World countries have a much lower CDR than advanced nations.

(B) CDR of different populations is not strictly comparable. This is caused by the fact that it does not take cognizance of the differences in the age-structures of different populations. This is important that CDR is not uniform for all age groups.

**Age specific Death Rate (ASDR) -** Refers to the numbers of deaths age i in a given year per 100,000 people of the same age i. That is, the age and sex specific mortality rates can be expressed as the number of deaths of persons of a particular age or sex groups. Such measures are called age-specific or sex-specific measures of mortality. The age and sex specific mortality rates can be expressed as the number of deaths of persons of a particular age or sex group in a year per 1000 of population of that age or sex group.

**Infant mortality Rate (IMR) –**An infant is the age group between the births of the baby to its first birth day. Thus, it is expressed as the number of deaths of children below one year per 1000 of live births. The infant mortality rate is considered a good indicator of the health status of a population.

**3.3. MIGRATION**

A Migration is the movement of people from the area of origin to the area of destination because of the push factor from the source and pulls factors from the area destination. It is the geographic movement of people across a specified boundary for establishing **a new permanent or semi-permanent residence**. Along with fertility and mortality, migration is a component of population change. The terms “immigration” and “emigration” are used to refer to moves between countries (international migration). The parallel terms “in-migration” and “out-migration” are used for movement between areas within a country (internal migration).

**Migration and Population Change-**The nature of migration is a factor affecting population size is different from that of mortality and fertility for one thing, migration is **not a biological** variable, while both fertility and mortality operate within the biological framework, though social, cultural, economic and political factors do exercise some influence on them. Migration is therefore a product of the social, cultural, economic, political and/or physical circumstances in which individual societies find themselves. Hence, migration can be taken as a response of human organism to economic, social, and demographic forces in the environment.

**Differences of Migration from other demographic forces of mortality & fertility**

Migration is **not biological** process

Migration **does not** have a uniform process

Migration is not limited to sex.

Migration has no upper and lower limit.

Because migration involves leaving one place and entering another, two things must be considered: the population of the area of origin and the population at the destination. Migration always simultaneously impacts these two areas

**There are two types of migration, namely**

National migration and

International migration

Migrants who cross international boundaries are referred to as emigrants in the country of origin and immigrants in the country of destination. Where the migration takes place within a country, but across administrative boundaries, the equivalent terms are out- migrant and in-migrant. For any area, the difference between the number of arrivals(immigrants and /or in-migrants) and the number of departing people(out-migrants and/or emigrants) is known as either net migration or the net migration balance. If arrivals exceed departures, then the balance is positive; if the reverse situation applies, the balance is negative. A gross migrant is the total volume of movement both into and out of an area (i.e. all immigrants, emigrants, in-migrants and out-migrants).

**Migration Terminologies**

**In-migrants:** are people who have entered a given population during the time period under consideration.

**Out-migrants:** are people who have left a given population during the time period under consideration

**Net-Migrants:** It is the sum of numbers of out-migrants and in-migrants in a given region during a time under consideration.

**Gross Migrants:** It is the sum of number of out-migrant and in-migrants in a given region during a time under consideration.

**Immigrants:** a corresponding term for in-migrants

**Emigrants:** - a corresponding term for out-migrants

Legal Immigrants: are those international immigrants who have governmental permission to live in the place to which they are migrating.

**Illegal (undocumented) migrants:** are those international immigrants who have not governmental permission to live in the place to which they are migration.

**Refugees:** are international immigrants who are outside their country of nationality and is unable or unwilling to return to that country because of persecution or a well-found fear of persecution.

**3.3.2. Causes and Consequences of Migration**

**Factors of migration: why people move?**

A number of factors affect migration. These include **economic, social** and **ecological considerations**, which all in turn affected by **individual perceptions** and **behavior**. Very rarely do these factors operate in isolation, and it is often difficult to distinguish between factors, for example, economic and ecological factors may act together, as economic and social factors. These factors, in whatever combination, act in such a way to **push** and **pull** migrants. Economic factors such as unemployment, for example, may push a migrant to seek employment elsewhere, but the destination that is chosen may be determined by social factors, in other words the migrant may be pulled to a location by its recreational possibilities, such as a golf course, or the nearness of friends and relatives.

Migration patterns are influenced by:

A. **Push** factors that make the current place unsatisfactory

B. **Pull** factors that are the positive lure /attract/of another place

C. The means of migration, including the ability to leave and the resources to migrate

D. People’s knowledge and perception of places

E. Distance, both in terms of cost and emotion

F. Barriers to migration

**+** +

Means to migrate

Pull factors

Push factors

General categories that serve as push and/or pull factors:

A. **Economic** – seeking better economic opportunities and/ or leaving poor economic conditions; this category has been the most important throughout history

B. **Political** – escaping war or persecution

C. **Environmental** – seeking a more pleasant place to live; escaping an area of a natural disaster.

D. **Cultural** – seeking religious freedom or a better education

**Barriers to migration include:**

A. Quality of knowledge about another area and the opportunities available.

B. Economic barriers, such as the cost of travel and establishing a new residence

C. The physical environment (Examples: The tsetse fly area of central Africa deterred migration, especially because of its impact on livestock-raising. The Sahara desert influenced patterns of trade and migration routes.)

D. Political barriers such as immigration policies and laws established by most countries to control migration.

Only at the global scale is population change due to natural increase. At all other scales migration and natural increase influence population growth or decline and thus the distribution of population.

**Population Change = Natural Change (Births - Deaths) + Net Migration**

• Migration may change population numbers by unintended diseases brought into an area by migrants.

• Migration may change population structure, as emigrants are rarely a representative cross-section of the group they leave.(Historically, most emigrants have been young, single males.)

• Migration may bring more people into an area than can be supported with current resources.

• As people migrate into new areas, they bring their ideas of land use and settlement patterns, which alter the physical landscape.

• As people migrate, they may bring flora and fauna from the point of origin to the new area, thus introducing exotic species, which may in turn become a threat to native species.

**The consequences of Migration**

Migration has **Economic consequences** on sending areas. Some of the positive **Economic consequences** of Migration on sending areas include the following:

**Positive consequences:**

The remittance (payments) sent by migrants to their homes help in the growth of economy of the region.

The family for purchasing food, repayment of debts, medical treatment, marriages, children’s education, purchasing agricultural inputs, construction of houses, etc, mainly uses this money.

Many poor people depend on this money for their survival.

Similarly, remittances from the international migrants are among the major sources of foreign exchange earnings.

Some of the negative economic consequences of Migration include

**Negative consequences:-**

Unregulated Migration to the urban areas caused overcrowding.

Development of slums in industrially developed urban areas as a result of unregulated Migration.

The under-development gets even worse due to out Migration of skilled people.

The **Demographic consequences** of Migration of people

**Positive consequences:-**

Migration leads to the redistribution of the population within a country.

It results in balanced distribution of people according to resources.

Rural-urban Migration is one of the important factors contributing to the population growth of cities.

**Negative consequences:-**

It results in imbalances in sex composition due to selective male or female Migration. Large cities have unfavorable sex ratio as compared to rural areas.

Rural areas face shortage of skilled people because most of skilled and semiskilled people migrate to urban areas.

The **Social consequences** of migration of people

**Positive consequences:-**

Migrants act as agents of social change. The new ideas related to new technologies, family planning, girl’s education, etc. get spread from urban to rural areas through them.

Migration also leads to intermixing of people from diverse cultures and results in the evolution of composite culture.

The mind set of people changes. They start thinking broadly and the narrow views changes.

**Negative consequences:-**

It also causes anonymity, which creates social vacuum and sense of dejection among individuals.

Continued feeling of dejection may motivate people to fall in the trap of anti-social activities like crime and drug abuse.

Migration affects the women more. In the rural areas, male selective out Migration leaving their wives behind puts extra physical as well mental pressure on the women which increases their vulnerability.

The **Environmental consequences** of Migration of people

There are **environmental consequences** of Migrations:-

Overcrowding of people due to rural-urban Migration has put pressure on the existing social and physical infrastructure in the urban areas.

This ultimately leads to unplanned growth of urban settlement and formation of slums shanty colonies.

Apart from this, due to over-exploitation of natural resources, cities are facing the acute problem of depletion of ground water, air pollution, and disposal of sewage and management of solid wastes.

**3.3.3. Measures of Migration**

**Immigration Rate (IR)** - The immigration rate is the number of immigrants arriving at a destination per 1000 populations at that destination in a given year.

Immigration Rate= Number of Immigrants arriving at a destination \* 1000

 Total population at that destination in a given year

**The emigration rate(ER)** - is the number of emigrants departing an area of origin per 1,000 populations at that area of origin in a given year.

Emigration Rate= Number of emigrants departing an area of origin \* 1000

 Total population at that area of origin in a given year

**Net migration (NM)**-The net effect of immigration and emigration on an area’s population (increase or decrease) is referred to as net migration.

Net Migration= Immigrants-Emigrants

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

**Net Migration Rate = In migrants - Out migrants OR (I-O)/P**

 **Total population**

**3.3.4. Theories of Migration**

Unfortunately, there is no comprehensive theory of migration, which takes into account all factors discussed above. Most theories of migration stress socio-economic factors or Behavioral inputs and ignore ecological factors. One of the earliest explanations put forward by E.G. Ravenste in in 1885 is called the Laws of Migration.

**I. Ravenstein's Laws of Migration:** Ravenstein formulated broad theories concerning the characteristics of migrants and their origins and destinations in 1885 and 1889. Using data from 1881 British census, Ravenstein formulated a series of laws, which he believed explained contemporary migration in Europe. The main elements of his thesis (explanations) are summarized as follows:-

(i) **Migration and distance**- most migrants move only a short distance, in a step by step

Progression;

(ii) **The direction of migration** is mainly from agricultural to industrial areas; therefore, migrants are more likely to have rural origins than urban origins;

(iii) **Technology and Migration**: The volume of migration increases with the development of industry and commerce. The large industrial and commercial cities receive most long distance migrants.

(iv) **The flow of migrants** decreases with distance.

(v) **Streams and counter streams**: Each migration flow has a counter or returning flow.

(vi)**Migrants are usually adults,** with families rarely migrating outside their country of origin.

(vii) **Preponderance of females:** Females are more migratory than males within their country of origin, but males are more likely to migrate to other countries.

(viii) **Motives behind migration:**  The major causes of migration are economic factors.

It should be noted that the Ravenstein' Laws were developed in and applied at a time of industrialization which was accompanied by massive urban growth in Victorian Britain. Both industrialization and urban growth were fuelled by rural to urban migration. It is perhaps for these reasons that he concludes that major causes of migration were economic, that migration is selective and is related to distance. These observations have become the basis of subsequent work on migration.

**The Lee model**

It was because of Migration elasticity that Lee (1966) revised the simple **push-pull model**. He does not attempt to isolate particular push and pull factors as influencing personal Migrational decisions; rather, he sees the place of origin and the place of destination as possessing a range of attributes. Each individual perceives these attributes differently, depending on personal characteristics like age, sex, marital status, socio-economic class and education.



Lee's laws divide factors causing Migrations **into two groups of factors**: push and pull factors. Push factors are things that are unfavorable about the area that one lives in, and pull factors are things that attract one to another area.

**FACTORS IN THE ACT OF MIGRATION**

The factors which enter into the decision to migrate and the process of Migration may be summarized under **four headings**, as follows:

**Factors associated with the area of origin.**

**Factors associated with the area of destination.**

**Intervening obstacles.**

**Personal factors.**

In every area there are countless factors which act to hold people within the area or attract people to it, and there are others which tend to repel them. Some of these factors affect most people in much the same way, while others affect different people in different ways. Thus a good climate is attractive and a bad climate is repulsive to nearly everyone; but a good school system may be counted as **a + by** a parent with **young children** and **a - by a** house owner with no children because of the high real estate taxes engendered, while an unmarried male without **taxable property** is **indifferent** to the situation.

Lee introduced another refinement to the simple Pull-Push model. This is the concept of **Intervening Obstacles**, both real and perceived, which need to be overcome before Migration takes place. For example, **real obstacles** include international boundaries and the need to obtain a Visa before taking up residence in another country, or the sheer costs of moving (legal costs, estate agents’ fees associated with the selling and buying of houses, the hire of removal van, etc.). **Perceived obstacles** might include **anxiety** about whether the person will settle down well in the new location or whether they know all that new should do about the potential destination. Such Obstacles act as a sort of friction, which reduces the likelihood of Migration.

The **personal factors** include not only perception, but also more basic aspects of the individual (**age, sex, marital status, education**, etc.) which together condition his or her evaluation of area attributes. Lee’s model is appealingly simple. In reality, however, the thought processes involved in the Migration decision are highly complex.

**3.4. Population Change and population Growth rate**

**3.4.1. Population Change**

Population change has three components: births, deaths, and migration. As people are born, die, or move, their total numbers in an area change. During most of history, world population increased very slowly, but during the 20th century, this growth is accelerated.

NI=B-D

Where NI is the natural increase during a period and B is the number of births and D is the number of deaths during that period.

**Rate of Natural Increase (RNI):-** is the difference between the birth rate and death rate. This rate of natural increases is expressed in percent. Natural increase is the surplus (or deficit) of births over deaths in a population in a given time period. The rate of natural increase is the rate at which a population is increasing (or decreasing) in a given year due to a surplus (or deficit) of births over deaths, expressed as a percentage of the base population. This rate does not include the effects of immigration or emigration.

RNI (Rate of Natural Increase); RNI= CBR -CDR

 Or

RNI = Births – Deaths x 100

 Total population

**Example:** the crude birth rate and death rates of country “X” are 50 and 20 respectively expresses per 1000. Thus, the rate of population increase will be 3%

**3.4.2. Population Growth Rate (PGR)**

The growth rate is the rate at which a population is increasing (or decreasing) in a given year due to natural increase and net migration, expressed as a percentage of the base population. The growth rate takes into account all components of population growth: births, deaths, and migration. It should never be confused with the birth rate but it sometimes is. The growth rate can also be calculated from natural increase and net migration rates.

**Example**

If a city of population 20,000 experiences 20 births, 10 deaths, 50 immigrants and 30 emigrants in the course of a year, what is the net annual percentage growth rate?

= 0.15%

Birth rates and population growth characteristically fluctuate. A growth rate that is declining does not necessarily mean that an area’s population is declining. Rather, it may indicate only that the population is growing at a slower rate. A negative growth rate means that an area is losing population. Today, about a dozen countries, all in Europe, are experiencing a decline in total population, but many countries are experiencing a decline in their rates of population growth.

**UNIT-FOUR**

**4. Population Composition**

Population structure implies the composition of any population in terms of mainly **age and sex**. It also refers to the structure and characteristics of population including language, race, nationality, marital status, literacy and education attainment, employment status etc.

Sex and age are the basic characteristic of any population and affect the demographic, social, economic and political condition of any country.

The age and the sex structure of the population are the most important demographic characteristics that are captured by a census of a population. Age and sex are two attributes that largely influence an individual’s role in society.

**Age-sex composition**

**4.1.1 Age composition-** is the classification of a given population in to different age groups. It refers to the composition of a certain population with respect to young (0-14), adult (15-64 years) and old (65 years and above). The proportion of each of the three age groups varies considerably from country to country and from region to region.

Age is one of the basic demographic characteristics of a population. Age data are useful for demographic analysis and for various types of socio-economic development planning. Along with the birth rate, age structure is the demographic “engine” that drives (or retards) population growth. In many developing countries, large proportions of young people virtually guarantee that population will continue to grow during periods of declining fertility and even after fertility drops to “replacement level”. Replacement level of fertility refers to the level of fertility at which a couple has only enough children to replace themselves, or about two children per couple.

The age-sex structure of a population is usually depicted graphically by a population pyramid. It is determined by the effects of past fertility, mortality and migration.

Though age data have many uses, it is usually very difficult to obtain reliable data on age in developing countries. This is mainly due to high illiteracy, which limits individuals’ awareness and capacity to record their children’s and their own age. Moreover, the lack of a complete and sound vital registration system has a negative impact on the quality of age data. As Ethiopia is not an exception, the difficulty of obtaining reliable age information in surveys and censuses is a common challenge.

The age structure/composition of the population can be measured by:-

Dependency Ratio

Age sex pyramid of the population

Percentage

**Dependency Ratio**: - is one of the common measurable items in the demographic data. Dependency ration can be explained in the following three ways. These are

Young Dependency Ratio (0-15)

Old dependency ratio above (65)

Total dependency ratio + above

Note that-

* If the dependency ratio is greater than 100% it means the total number of economical dependent exceeds the total number of economically active or independent population.
* If the total dependency of population is 100%, it implies that the total number of economically dependent population equals the total number of active economically population.
* If the total dependency ratio of the population is less than 100%, it implies that there is less number of dependent populations than economically population.

**4.1.2 Sex Composition/Structure**

Sex is one of the basic characteristics of a population. Sex composition is very important for any analysis, as data on sex provides useful information about reproductive potential, human resources, level of school attendance by each sex, and so on.

Sex structure refers to the male-female composition of a population. It is a measurable concept hence; it uses a numerical measurement called sex ratio. Sex ratio is the numbers of male per 100 females.

If SR>100 it is high sex ratio i.e. female deficient

If SR= 100 it is balanced sex ratio, there are the same number of males and females.

If SR<100, it is low sex ratio. I.e. male deficient, There are more females than males. Sex ratio varies overtime and from place to place.

It is an important aspect of population characteristics that describes the fertility rate and available labor force

It also varies from region to region

**4.1.3 Age –sex pyramid**

 It is also known as the population pyramid. It is a pictorial or graphical representation of the age sex structure of the population. The shape of age sex pyramid is highly determined by the rate of fertility and mortality. Age-sex pyramids (also known as population pyramids) graphically display this information to improve understanding and ease comparison. It displays the percentage or actual amount of a population broken down by gender and age. The five-year age increments on the y-axis allow the pyramid to vividly reflect long term trends in the birth and death rates but also reflect shorter term baby-booms, wars, and epidemics.

The pyramid of developing countries has broad base and steeply sloping sides. This indicates that higher proportion of child and young people and small proportion of old people. On the other hand, the pyramid of developed countries is almost rectangular indicating the percent of lower percentage of children and higher percentage of adults and elderly

Populations of countries can differ markedly as a result of past and current patterns of fertility, mortality, and migration. The shape of a pyramid varies from country to country depending up on the stage of the demographic transition through which the country is passing. As a country moves through each stage in demographic transition model, the shape of the age-sex will change. The shape is also modified by a variety of factors like wars, epidemics, migrations, baby booms, etc. Moreover, from the population pyramid, it can be determined whether the population is growing, stable, stable or likely to decline.

 However, they all tend to fall into three **general profiles of** age-sex composition.

**1. Rapid growth-** which is also called the **progressive pyramid** indicated by a pyramid with a large percentage of people in the younger ages. The pyramid has broad or very wide base showing the predominance of young population and a high fertility rate. Narrow top indicate few size of old age a high mortality as well as short life expectancy. The pyramid has a concave shape.

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Figure 4.2 Population Pyramid of Ethiopia

Source:-Ethiopia’s 2007 Census

As shown in the figure 4.2, the age structure of Ethiopia’s population is characteristic of countries experiencing rapid growth; each cohort is larger than the previous cohort, producing a pyramid shape. This expansive age structure is the result of high birth rates.

That is, the age pyramid shown in figure 4.2 is termed as progressive because it suggests future high population growth. This rapid growth of population is the result of high birth rate and high but declining death rate. These pyramids show the population characteristics of less developed countries. Progressive pyramids indicate a youthful population. i.e the young form a proportionally much important part of the country’s population.

**2. The regressive pyramid-**is the second type of pyramid. It is the characteristics of developed nations, where there are few children and more old people. It indicates ageing population which is caused by decline in mortality. In countries characterized regressive pyramid population is likely to decrease. This is due to low birth rate and death rates. The death rate is greater than the birth rate because of a greater proportion of the elderly population.

The regressive pyramid is cylindrical or beehive in shape. Narrow base indicates low fertility rates, long life expectancy, and relatively low mortality rate.

Figure 4.3 Regressive age-sex pyramid

**3. The stationary pyramid-** is the third type of pyramid which shows a balanced between old and young. It is the intermediate population pyramid. It shows no population growth.



 Figure 4.4 Stationary age-sex pyramid

**. Socio-Economic Composition/Non- biological characteristics of population**

The non-biological factors of population are also called **achieved characteristics**. This is because, unlike the biological factors, natural (biological) processes do not determine them. They are rather open to the individual's choice. In any society, the non-biological characteristics of population are always capable of affecting the processes of both demographic and socio-economic evolutions.

**(a) Marital Status**

This is not a biologically ascribed characteristic; rather it is an acquired characteristic. Studies showed that marital status is useful for several reasons. Marriage involves the first step in the formation of a biological family. The combined effects of various biological factors determine the pattern of marital status distribution of any society, social, economic and religious factors affecting marriage. The marital status of a population refers to the proportions of single, married, widowed and divorced persons.

As noted in the previous section, the age-sex structures directly influence the proportions of marital status. Besides, the influences of economic conditions and social institutions on these proportions are equally important.

**The Single population** may be divided into three groups:

Persons below the legal age of marriage;

Unmarried adults desiring marriage at some time or another;

Celibates vowed to a single life. The numbers in these three groups vary greatly throughout the world, caused by a number of socio-cultural factors.

**(b) Educational Status:-**The level of literacy and educational attainment is one of the most important indicators of social development in any society. Hence, high level of literacy and educational attainment is considered to be an important variable in the process of modernization.

According to UNESCO literacy is defined as the ability of a person to read and write with an understanding of a short simple statement on his /her everyday life. Remember, an important aspect of the definition of literacy is the ability to read and write with understanding. Based on the above definition, a person who can only write his/her name or numbers or who can ritualistically read religious books like the Koran or the Bible or recite passages from such books which are actually memorized, is not considered to be literate. The UNO has recommended that information on literacy should be collected from only those who are either10 years of age or above. This is so because the ability to read and write is not generally achieved until one has some schooling or has had some time to develop these skills.

Literacy is a measurable concept. The simplest measure of it is the Crude Literacy Rate (CLR). It is the measure of average number of literate persons per 100 people.

Crude Literacy Rate = Number of Literate Persons \* 100

 Total Population

Where, CLR is crude literacy rate, L is the number of literates, P is total population and K is the constant 100.

**C) Linguistic Status:** Language is universal to all human races, but it is also one of the most significant differentials. Unfortunately, there exists no standardized basis of classification of languages in the world. This problem in fact impeded the comparison of linguistic data of different countries

**D. Religion:** As for many other aspects of population composition, there have been few systematic studies of the geography of religion. Although it does not match linguistic diversity, the diversity of religions is considerable. The four great religions, Christianity, Islam, Hinduism and Buddhism, certainly incorporate a large proportion of humankind.

**E. Occupational Composition:** The occupation of an individual refers to his/her trade, profession or type of work, and thus an occupation may be followed in different industries. Occupation is often confused with industry, for the distinction is not always clear. At best occupational structure of a given population is a function of a number of interrelated factors. These could be of social, economic, political, institutional and physical in nature.

**UNIT-FIVE**

**5. Population Theories**

**5.1. Population Thought**

A theory of population is an explanation of the phenomenon of population growth. It tries to explain the rise and fall, the increase and decrease of population in different countries. It surveys the trends and analyses the causes of the various stages in the curve of population. Based upon the data in one or more particular countries, a population theory seeks to generalize about the laws of population. It tries to unravel the first principles of demographical process. Though systematic theories of population have evolved very recently, theorizing about population is sufficiently old. In ancient times statesmen and thinkers tried to control population according to the availability of means or to encourage it if required. The criteria to encouraging or discouraging were military, political, social and economic issues. This is true about population theory even now. The problem of population is not worked out in vacuum. It is always considered in the context of economic, social and political issues. Of these, the economic issue is the most important, since the most important problem, concerning population is to meet the needs of growing population. The history of population theories has been classified based on before and after the advent of Malthus, the celebrated demographer. Thus, the periods are classified as pre-Malthusian, Malthusian and post-Malthusian periods. These periods show thinking about population theories. Nevertheless, even before these some early thinking can be discerned about population problems.

**5.2 MALTHUSIAN THEORY OF POPULATION**

 **5.2.1 Historic Review**

**The Beginning of the Malthusian Theory**: - during this period it was more and more realized that population increases more rapidly than food supply.

The most important theory in the history of demography was presented by Thomas Robert Malthus (1766-1834). Among his most important work was his famous Essay on population entitled: An essay of The Principle of population as it affects the Future Improvement of Society.

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**5.3 Boserupian Theories**

Ester Boserup, a Danish Economist, has put forward a view that is diametrically opposed to that of Malthus. The essence of her case, based on observations made of third world countries, is contained in the age-old saying that “Necessity is the mother of invention” and her own quotation that ‘Agricultural developments are caused by population trends, rather than the other way round’. In other words, she argued that population growth in many pre-industrial countries, rather than being restrained by food, has in fact served as a stimulus to the improvement of agricultural production. She pointed out that as population has increased during the 20th century, so there has been a shift towards more intensive forms of cropping in many parts of Africa, Asia, and Latin America. The point is also made that a similar sequence of events was experienced in Europe at a much earlier date.

In many respects, then, this is a much more optimistic view of the relationship between population growth and food supply. Malthus and Boserup put forward different theories about the relationship between population and resources. Malthus was pessimistic. Boserup was optimistic.

**5.6 Theory of Demographic Transition**

Demographic transition means the progress from one demographic condition to a different stage, for example in Western countries it was found that the population moved from a condition of high mortality and high fertility to conditions of low mortality and low fertility. Thus, the stage of high expansion of population itself leads to stationary stage and vice versa several demographers such as Landry in 1909 and Warren Thompson in1929 attempted to construct a typology to describe demographic transition from conditions high mortality and high fertility to the conditions of low mortality and low fertility. None of these demographers, however, made an attempt to explain these changes. In 1974 C.P. Blacker identified five phases of the demographic transition as follows:-

The high stationary stage characterized by high birth rates and high death rates.

The early expanding stage with failing birth rates but rapidly decreasing mortality.

The late expanding stage with failing birth rates but rapidly decreasing mortality. The low stationary stage with low birth rates balanced by equally low mortality. The declining stage with low mortality and deaths exceeding births.

It was Frank W. Notestein who, for the first time presented a theory of demographic transition in 1945 in a mature form with explanations for the changes in fertility. John Caldwell has therefore credited Notestein with expounding the theory of demographic transition.

According to George J. Stolnitz, “All nations in modern era, which have moved from traditional, agrarian-based economic system to a largely industrial, urbanized base, have also moved from a condition of high mortality and fertility to low mortality and fertility.”

The first stage is when birth rates and death rates are high so there is little natural increase and a relatively small population. The second stage features high birth rates and low death rates so there is high growth in the population (this is normally where least developed countries fall). The third stage has a decreasing birth rate and a decreasing death rate, again resulting in slowed population growth. Finally, the fourth stage has low birth and death rates with low natural increase. It has been observed that as countries develop, their birth and death rates change and, as a result, so too does the rate of natural change. These changes underlie a generalization known as the ‘demographic transition model’, The model suggests that countries pass through five different stages:

**Stage 1: High fluctuating** – A period of high birth and death rates, both of which fluctuate. Natural change hovers between increase and decrease.

Reasons for the high birth rate include:

Little or no birth control

High infant mortality rate, which encourages couple to have more children

Children are seen as an asset and status symbol.

Reasons for the high death rate include:

High infant mortality

High incidence of disease

Poor nutrition and famine

Poor housing and hygiene

Little or no healthcare.

**Stage 2: Early expanding** – A period of high birth rates, but falling death rates. The population begins to increase rapidly. Reasons for the falling death rate include:

Lower infant mortality

Improved healthcare and hygiene

Better nutrition

Safer water and better waste disposal.

**Stage 3: Late expanding** – A period of falling birth rates and death rates. The rate of population

Growth slows down as the rate of natural increase lessens. Reasons for the falling birth

Rates include:

Widespread birth control

Preference for smaller families

Expense of bringing up children

Low infant mortality rate

**Stage 4: Low fluctuating** – A period of low birth and death rates. Natural change hovers between increase and decrease. The population as a whole ‘greys’ – it becomes older. Death rate kept low by improving healthcare. Birth rate kept low by:

Effective birth control

More working women delaying the age at which they start having a family.

**Stage 5: Decline** –A period during the death rate slightly exceeds the birth rate. The result is natural decrease and a decline in population.

The population becomes even ‘greyer’. Modern medicine is keeping elderly people alive longer. Fewer people in the reproductive age range (15–50) means a lower birth rate. This stage has only recently been reached – by some European countries. It raises some interesting questions. Do populations continue to decline to the point where they disappear altogether? Or will immigration keep up the numbers?

Finally, a word or two of warning about the demographic transition model:

It is a generalization.

Not all countries will follow the same pathway.

Countries that do appear to follow the transition will do so at different speeds – some much faster than others. The important factor is the speed of development.

**UNIT-SIX**

**6. Population Policy and Resource issues**

**6.1. Population policies**

Man power is an important resource of a country and its proper development (qualitative improvement) can help in raising the levels of economic development in a country. Therefore, population planning is central to national economic planning in various most countries of the world. The population policies of countries, reflective of the problems and developmental needs of the country- differ from each other not only in minor details but also in their basic objectives. For instance, some countries may have a policy aiming at increasing the population (pro-natalist view), While the others emphasis on reducing the growth rate of the population. In Ethiopia, the basic population related problems are (a) large size; (b) the high growth rate of the population. Therefore, a check on the growth rate of the population is the basic objective of our population policy and a number of measures have been adopted at different times to control the growth of population and they form a part of the population policy of the country.

Population policy is explicit or implicit measures instituted by a government to influence population size, growth, distribution or composition. They are government actions (laws, regulations, programs), that try to influence the three agents of population change (births, deaths and migration), as a way to promote social and economic development. The stated intent of these policies often, is to improve the quality of life, consistent with the available resource in a country.

National Population projections are often the stimulus for the introduction of population policies as governments realize the implication of current growth rates for the future size and structure of their population. Population policies are concerned with influencing growth rates, regulating fertility, lowering mortality altering patterns of internal migration and hence population distribution and controlling international migration.

Population problems are integral parts of wider development problems and a variety of polices are formulated to deal with them. Even so, the integration of demographic factors in to policies concerned with wider development planning has been slow. Population polices entered the agenda of many governments of the developing world during the 1970s as the implications of rapid population growth rates became apparent. During the second half of the 20th century a large number of countries developed policies that focus focused on slowing the unprecedented pace of population growth.

**6.2. Emergence and development of population policies and programs**

Rates of births, deaths, and migration and population growth have concerned governments from the earliest times, but the concept of population policies and programs specifically designed to change demographic behavior is of relatively recent origin.

Although such countries as India recognized the needed to adopt comprehensive national family planning policy developmental plans as early as 1951, population policy issues did not reach the forefront of the world attention nearly two decades later.

Over the years, the United Nations has helped a major role in increasing worldwide awareness of population problems and the need for integrating population policy in to general economic and social development policies and programs.

The first world population conference was held in Rome in 1954 under United Nations supports. Although primarily a scientific meeting, a heated debate over the role of population in development took place between the western “capitalist” countries and centrally planned economies, with most third world countries remaining far from convinced that rapid population growth constituted a barrier to development. At the second world population conference, held at Belgrade in 1965, the debate between those groups of countries continued, with most developing countries once again remaining in the background.

In 1974, which was declared by the United Nations to be World population year, the third world population conference was convened at Bucharest. It was the first conference that brought together high-ranking governmental offices and experts. The donor countries initiating the conference, principally the United States of America, planned it to be a staging ground for a United Worldwide effort to endorse family planning programs. There was a heated debate with the heads of the Indian delegation asserting that “Development is the best contraceptive”.

Nevertheless, for the first time, sufficient agreement was reached for the adoption of the world population plan of action. The plan of action was finally adopted in 1974 at Bucharest reflected a developmentalist rather than a narrowly pro-family planning approach.

In 1984 the fourth international population conference was convened at Mexico City. One of the most significant aspects of the conference was the turn-round in the position of the African Delegation. In contrast to their position at Bucharest, where most of those governments had expressed optimism that Africa could easily accommodate more inhabitants because of its vast territory, low density, and abundant and rich resources, many African governments expressed serious reservations about the consequences of continuing rapid population growth.

The fifth International Conference on population and development (ICDP) was held in Cairo in 1994. The main theme of the conference was to link population issues with sustainable development and human welfare. It is through these Conferences and consequences that the present population policies and programs emerged and adopted by many countries of the world in different times with mainly similar major objectives: improving the quality of life of human beings.

**6.3. Types of population policies**

There are two main types of population policies: policies that are ‘Explicit’ and those that are ‘implicit’. In an ‘explicit’ situation, there is a specific statement or document by a national government announcing its intensions, plans, or measures to affect the country’s population growth and dynamics, in order to relate them to the overall socio-economic development process. Explicit statements may also be found in the National Development plans, policy declarations by the ruling political party, policy framework, documents, statements by high-level officials, including national leaders, etc.

The ‘implicit’ policies situation may include laws, regulations, and others directions, which may not necessarily be issued for the purpose of affecting population growth, distribution, composition, but which nevertheless have some direct or indirect effect of doing so. Implicit policies are not easy to discern. Moreover, unlike explicit ones they are not consciously ordinate to achieve a common goal and therefore can go in different and contradictory directions.

Population policies may theoretically operate through any of the three components of population change; fertility (as in the case of pro-natalist and anti-natalist policies), mortality (and its supplementary variable mortality), and migration both internal and international.

Moreover, there are policies which are designed for specific objectives plans like:

Policies relating to rate of natural increase of the population

Policies relating to mortality

Policies relating to fertility

Policies relating to the spatial distribution of the population and internal migration

Policies relating to international migration

Policies relating to Children and women

Policies relating to Vulnerable groups in a society; etc

**Policies relating to Fertility**

**Expansive Policies or Pro-natalist policies**-are designed when governments have a desire to encourage population growth. Such policies are adopted with the intention of achieving various objectives such as military strength, economic production, national pride and replacement of deceased infants. Pro-natalist policies may be enforced by at least two methods. The first is to approve the prevailing values and viewpoints concerning children and remove the economic liability of having children. For the most part,pro-natalist policies try to ease the economic costs of children through the provision of cash, goods, schooling or some other benefits such as regulation of taxes according to the family size, giving free medical services and milk for babies. The second approach that can be used to execute pro-natalist policies is to try to modify the norms and values concerning reproduction. Here we find legal moves including the lowering of the minimum age at first marriage and the possibility of having children outside of wedlock.

**Restrictive or** Anti**-natalist policies-** government policies which are proposed to reduce the birth rate are anti-natalist population policies. Anti-natalist population policies are promoted for several reasons. For example, facilitating the reduction of population growth rates, alleviating certain social problems) like housing and schooling problems), improving the health of mothers and children, alleviating some of the problems of raising of and caring for children, and reducing the adverse effects of widespread illegal abortions on the health of adolescents.

**6.4. Factors affecting implementation of population policies**

 In order to operationalize these policies several problems and constraints are inevitable, especially in poor African countries where the resources are not sufficient and man-made, physical, internal and external resources are at play further negating efforts on several levels and fronts. The situation is worsened by political instability, lack of consensus on the development philosophy and how to solve conflicts, as well as disunity among several interested groups. Hence, like all the efforts in trying to bring meaningful development to countries, the population policies are seriously constrained in terms of man power, financial, institutional and managerial, political and socio-cultural factors. Among many, some of the factors influencing national population policy are briefly discussed below:

**Man power constraints-** in the population policy implementation exercise; a wide array of multi-sectorial/multi-disciplinary personnel is needed to tackle different aspects of the programs. There is a critical shortage of manpower in several African countries. This becomes even more acute where the policy implementation is decentralized.

**Institutional/management and financial /resources Constraints-** This has to do with relations and interacting among organs of government in terms of responsibilities, accountability, and attempts to establish cohesion and coherence in the work of the various actors to achieve the common goals, as enshrined in these policies. It is quite a difficult task with multi-sector ventures, and there is always the need to realign planning and operational structures, build bridges, and also improve the methodologies to enhance these processes. There is also resource/ financial problems to execute the programs or activities of the policy efficiently and in a timely manner.

**Insufficient Data and limited knowledge of the demographic-development interactions-**The implementation of national population policies requires, among other things, a reliable demographic, social and economic data base. Though some progress has been made in several countries through censuses and special surveys, they are still inadequate to fulfill the requirements of policy implementation. The situation is worse no data exist, or where they exist, they are not analyzed in the form needed to determine the parameters of the problems at those levels.

**Socio-Cultural Constraints-** There is also socio-cultural impediments to realization of the objectives of these sensitive population policy issues, some of which touch on the core of the life of individuals. Here we come face to face with the rights of individuals and the responsibilities of a nation or government which has to ensure the collective good and interest of all its citizens.

**Political constraints-** By far the greatest constraint can come from lack of political commitment on the part of national leaders, and also the extent to which national governments consider the policies in this area on their scale of priorities. People’s support and participation at local grassroots levels, where the problems are more acute, is needed. In particular, for a decentralized population planning and policy implementation work ahead meaningfully, it requires a great deal of change in attitude and modes of operation at the centre.

**6.5. Population, Environment and Development**

Discussion of the interrelationships among **population, environment and economic development** long precedes the writings of Thomas Malthus in the late eighteenth century. Since ancient times, statesmen and philosophers have expressed opinions about such issues as the optimum number of people and the disadvantages of excessive population growth. The recurrent theme was the balance between population and natural resources conceptualized as means of subsistence or, more concretely, food and water. Not all theorists saw population growth in a negative light. In particular, mercantilist ideas in Europe during the seventeenth and eighteenth century saw the positive aspects of large and growing populations and favored policies to encourage marriage and large families. Today, members of the Julian Simon School also emphasize the positive aspects of large and growing populations.

Deliberations and actions of the United Nations in the area of population, environment and development began at the founding of the Organization. This topic was the focus of an important debate, at the first meeting of the Population Commission (now the Commission on Population and Development) in 1947, and remained a recurrent topic in the work agenda of the Organization, at both the parliamentary and technical levels. In the early years of the United Nations, when world population was slightly more than a third of its present size, environmental issues in relation to population and development tended to be framed in terms of the natural resources needed to sustain population growth and economic development. In addition, issues of land availability and agricultural production were very prominent. Data on demographic and socio-economic trends in developing countries were exceedingly scanty at the time. The first studies concentrated on the situation of industrialized countries and on the impact of socio-economic development on demographic trends (that is to say, fertility, mortality and migration).

**6.6 Population resource Balance**

Introduction

In analyzing the relationship between population, resources and development, it is simplest if we imagine a sort of balance existing between the first two, precise nature of that balance strongly conditioned by the state of development. The link between people and resources is mainly affected through the medium of food supply, the most basic of all human needs.

In primitive societies, resources exploitation is largely concerned with bare survival and subsistence. In advanced societies, there are many more options. Resource exploitation might be geared to high levels, of food production. Equally, it might involve providing raw materials for manufacturing; in which case sale the sale goods, along with the provision of services will provide the means for purchasing food from elsewhere. Or there might be a mix of these options. In this sense, therefore, development leads to higher levels of resources exploitation, which in turn, raise the carrying capacity and therefore the number of people who can be supported. The rise in population, in its turn, becomes a spur to further development thereby creating a sort of upward spiral. But the spiral does continue indefinitely; eventually some sort of ceiling is reached. All this suggest that there always exists a strict equivalence between the number of people in an area and the amount of food that can be raised by whatever means. In reality, of course, there is frequently a mismatch.

**6.6.1. Under Population versus Resource**

**Under population**: when there are too few people to fully develop the resources available.Under population can occur if the available resources could support a larger population than currently exists. It can also occur if there are too few people to fully develop the economic potential (e.g. too few workers, birth rate too low).

As stated above, this exists where resources and development could support a large population without any lowering of living standards, or where population is too small to develop its resources effectively.

Problems of under population

Uneven distribution or population densities for under populated countries are low. Imbalance between town and country is a major problem of underdeveloped countries.

Underutilization of resources- lack of population makes it difficult for a country to develop its resources to the full.

Slow growth of industries-The growth of industry is often slow in underdeveloped countries because there is a shortage of labor, especially skilled (example south America and African countries).

**6.6.2. Optimum Population versus Resources**

Between the two extremes of overpopulation and under population, there possibly exists a condition which writers refer to as **optimum population.** This might be simply defined as that size of population which, for a given area, allows the maximum utilization of resources and achieves the greatest output per capita and the highest standards of living. It is a critical point on the population growth curve, a narrow divide between under population and over population. Clearly, that point depends on a range factors, such as the size of the area, the resource base, available technology, the state of economic development and social organization.

In another way, optimum population is the size of population enabling the highest standard of living in a given area under given conditions /under given technology/:the size, distribution and structure of the population within a country must be valued in relation to its natural resources and techniques of production used by its people.

A country is said to have an optimum population where the number of people is in balance with the available resources.

Optimum conditions can only be maintained if the exploitation of new resources or the development of other forms of employment keeps pace with increase in population. An optimum population is defined in economic terms as the number of people that, in a given natural, cultural and social environment, produces the maximum economic return. However, it is impossible to define it precisely in a manner that is universally accepted or to suggest a specific number that is the optimum population for a particular area.

GDP per capita Optimum population

 Under population over population

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 Total population

**6.6.3. Over Population**

Over population is said to be occur when and where the number of people exceeds the supporting capacities of current resource use and the prevailing mode of production. This imbalance most often occurs when population growth races ahead of economic development, as persisted in China, Indonesia (notably Java), Puerto Rico and many other parts of the world. It can also be caused by exhaustion of non-renewable resources (as when coalfield becomes worked out), and by abuse of renewable resources (as when bad farming practices lead to soil erosion) as well as by a decline in the demand of labor. The consequences of overpopulation are painful and are largely reflected in lower standards of living; the symptoms of this include malnutrition and starvation, increased disease and poverty. Overpopulation can also often be a powerful force motivating migration and civil unrest. Possibly its worst aspect is that its effects are most keenly felt by the weakest and poorest members of society.

A dense population **does not necessarily** mean that a place will be overpopulated. For example: Hong Kong is very densely populated, but has enough resources, so is not considered overpopulated. Sudan is sparsely populated, but does not have enough resources, so it is considered over populated.

**What is the problem with over population?**

Too many people

Poor pay & too few jobs

Shortage of money

Poor Education and health cares

Too few houses

Homelessness

Low standard of leaving

Poor Health

Less food to go around

In general, one of the duties of government is to monitor what is happening to a country’s population. Is it growing in number or declining? Is it changing?

And, most importantly, is it changing in a way that is likely to lead to problems? The key to answering this last question lies in the balance between the resources of a country and its population. As shown in Figure 8, if population outweighs resources, then all sorts of problems, known collectively as **overpopulation**, are likely to arise. Feeding all the people is an obvious challenge.

Conversely, but much less commonly, the balance may tip in favor of resources. This is known as **under population**. Generally speaking, its problems and challenges are much less demanding than those of overpopulation. Providing services and exploiting resources in under populated areas are two of the challenges. An optimum population exists when resources and population are equally balanced. Achieving this sustainable situation is probably the main aim of most governments.



There are many examples of governments deciding that they need to manage their populations. In the majority of cases, the reason has been the need to control numbers – to stop them passing the **tipping point** that leads to overpopulation. So what does a government do to control population numbers? The target of any action is most often the birth rate. If this is lowered, then in time the whole population will become less. The birth rate is usually lowered by encouraging birth control (Figure 9) and making it expensive to have too many children. However, it is important to understand that there are some religions that are strongly against such policies.

When the aim of government action is to increase population, again the target is likely to be the birth rate. Couples may be offered money or other benefits to have more children. But there is another possible action. That is to encourage migrants to come to the country, particularly young adults, who are likely to want to have children eventually.

**UNIT- SEVEN**

**7. Geography of Settlement**

**7.1. Settlement Origin and Growth**

**What is Settlement?**

Though we use this term very frequently, but when it comes for defining, it is very difficult to give a clear cut definition. In simpler term we can define settlement as any form of human habitation which ranges from a single dowelling to large city.

The word settlement has another connotation as well as this is a process of opening up and settling of a previously uninhabited area by the people. In geography this process is also known **as occupancy.**

The term **settlement**, here used as a noun, refers to the characteristic groupings of population into occupancy units, together with the facilities in the form of houses and streets, which serve the inhabitants. It is any form of human habitation, even a single dwelling, although the term is usually applied to a group of dwellings. Activity wise, it is the act of peopling a formerly uninhabited or under-populated land.

In its complexity, human settlement may refer also to the human community taken as a whole whether it is in the city, town or village with all social, material, organizational, spiritual and cultural elements which are essential for its existence. The occupancy units vary in size and complexity from the simple isolated one-family farmstead (single dwelling) on the one hand to the great urban metropolis such as London, Mexico city, Paris, Cairo, Addis Ababa, etc. on the other. In either case, however, the farmstead or the metropolis, the settlement unit represents an organized colony of human beings together with the buildings in which they live or that they otherwise use and the paths and streets over which they travel.

**Settlement and geography**: settlement provides a focus for interdisciplinary study. The economist, sociologist, historian, psychologist and geographers are all able to examine a settlement from a clearly defined disciplinary base. Geography acts as an integrator, borrowing from the other disciplines but at the same time, making its own distinctive contribution, particularly with respect to spatial organization. Looking for patterning both within and amongst settlements provides some insight into how things are organized spatially.

**Settlement geography** is closely related to population geography, for the ultimate detail of population distribution is revealed in the size, spacing, and arrangement of the settlement units. Moreover, as settlements and their facilities are designed to serve specific purposes, settlements have functional meaning. Their exterior features are consequently a reflection of the numbers and characteristics of population at the time they were constructed- their economy, their architectural fashions, and their culture in general.

Settlements can broadly be divided into two types – rural and urban. The primary bases of this distinction are **dominant economic activity and population density.**

**EARLY URBAN HEARTHS**

As Figure 7.1 illustrates, there is evidence of early city growth in four areas of the Old World and one area of the New World.

**Mesopotamia:-** The ﬁrst cities are thought to have begun around 3500 BC in lower Mesopotamia (Sumer) around the Tigris and Euphrates rivers (Figure 7.1). One of the earliest cities was Ur, which from 2300 BC to 2180 BC was the capital city of the Sumerian Empire, which extended north along the Fertile Crescent, possibly as far as the Mediterranean. In 1885 BC Ur and the other southern cities were conquered by the Babylonians.

**Egypt:-** There is a long-standing debate in archaeology over theories of urban diffusion or independent invention but it is most probable that agricultural and other technologies, possibly including city-building, spread along the Fertile Crescent, then south-west into the Nile valley. By 3500 BC a number of the Neolithic farm hamlets along the lower Nile had risen to ‘overgrown village’ status and were clustered into several politically independent units, each containing large co-operative irrigation projects. The transition from settled agricultural communities to cities occurred around 3300 BC when the lower Nile was uniﬁed under the ﬁrst pharaoh, Menes.

The early Egyptian cities were not as large or as densely settled as those of Mesopotamia because:

The early dynastic practice of changing the site of the capital, normally the largest settlement, with the ascendancy of a new pharaoh limited the growth opportunity of any single city.

The security provided by extensive desert on both sides of the Nile meant that once the valley was united politically, Egyptian cities, unlike those of Mesopotamia, did not require elaborate fornications and garrisoned troops for protection.



 Figure 7.1 Early Urban Hearths

**The Indus valley.** The Harappa civilization appeared around 2500 BC in the Indus valley in what is now Pakistan. It was distinguished by twin capital cities, a northern one of Harappa in the Punjab and Mohenjo-Daro, 350 miles downriver.

**The Yellow River**. The valley of the Huangho (Yellow River) was the birthplace of the Shang civilization that arose around 1800 BC. The most signiﬁcant feature is that individual cities, such as An-Yang, were linked into a network of agricultural villages; a town wall did not separate an urban **subculture** from a rural one. This form of ‘urban region’ is without precedent in the early civilizations of Mesopotamia, the Nile and the Indus.

**Mesoamerica.** The earliest cities in the New World appeared around 200BC – in southern Mexico (Yucatán), Guatemala, Belize and Honduras. Thus Mesoamerican peoples were entering a stage of development equivalent to the Neolithic of the Old World at a time when Mesopotamian cities had been in existence for 2,000 years. Of the several civilizations that evolved in Mesoamerica, the Mayan, which ﬂourished between AD 300 and AD1000, was the most culturally advanced.

**7.2. Spatial Distribution of Settlement**

Although each type of settlement is **unique,** settlements fall into distinct groups. They are identified differently based on the criteria considered, such as form, size, function, etc. Based upon **form and function,** two great subdivisions of settlements may be recognized: (a) the **dispersed** or **isolated,** or **diffused**, type in which the single-family residence unit is the distinctive nucleus peasant **tukls** in many part of rural Ethiopia, particularly in the south, where individual houses were built out in the fields, giving the village a more fragmented appearance

 (b) the **nucleated** (or **grouped** or **compact**) type indicating a grouping around a central nucleus, which there is a collection of several or many family residences, together with other types of buildings.

A. **Dispersed settlements:** The outstanding characteristics of dispersed settlement are the minute size of the settlement unit, viz., the family, and the isolation and privacy in which it exists. Such isolated living tends to separate men psychologically as well as economically. Admittedly there are both advantages and disadvantages to this system of open-country living; the advantages being chiefly economic and the disadvantages social. Economically the isolated farmstead or peasant tukls has the advantage of keeping the farm family at its place of work and near the fields and animals that it cultivates and rears. There is not required the time-consuming movement between home and fields that is necessary when the farmer is a village dweller, with his scattered fields located at some distance from the residence.

 B. **Nucleated or compact settlements:** As noted earlier, houses and streets in various combinations of number and pattern, and the people who occupy and use them, comprise the essential elements of all types of compact or collective settlements, from the rural village to the largest metropolitan center. As soon as houses become grouped the necessity is immediately created for intercommunication between them, so that more or less clearly defined streets become necessary, and the spaces between the buildings become relatively regular.

Settlement is a place where people live and interact through activities such as agriculture, trading and entertainment

Settlement in geography helps us to understand man’s relationship with his environment.

A rural settlement is a community involved predominantly primary activities such as farming, lumbering and mining. Urban settlement engages in predominantly in secondary and tertiary activities such as food processing and banking. There is often correlation between functions, population sizes and population density. A rural settlement tends to have small population and low population density whereas Urban settlement often has a large population size and high population density.

**Site Factors for Settlement**

Physical environment determine the site of a settlement depend on:-

 1. Water supply – water is essential for human survival and agricultural activities.

 2. Relief – the availability of broad flat land such as floodplains promote agricultural activities.

 3. Soils- fertility of soils also another consideration for agricultural activities

 4. Shelter-which are sheltered from natural elements. Windswept highland with harsh cold climate are conducive for settlement.

 5. Defense– Threat from enemies and predatory animals drove people to live together for protection.

**7.3. Residential segregation and Mobility**

The development of cities, and in particular the onset of industrial urbanism, exerted a major inﬂuence on the nature of human association.

**Residential Segregation**- the concentration of ethnic, national origin, or socio economic groups in particular neighborhoods of a city or metropolitan area-is widely perceived as the antithesis of successful immigrant integration. Differences in the residential patterns of ethnic groups are thought to reflect social distance between these groups and therefore poor social cohesion. Geographical isolation is often associated with social exclusion and economic marginalization. The existence of distinctive socio-spatial urban subcultures is the result of the processes of segregation and congregation of groups in the city.

**THE BASES OF RESIDENTIAL SEGREGATION**

The processes underlying neighborhood change lead to a sorting of the urban population into a mosaic of social worlds. The main dimensions of socio-spatial differentiation are based on:

**Socio-economic status.** The effects of social class on residential location, evident in the nineteenth-century industrial city, continue to inﬂuence the socio-spatial structure of the contemporary city. Whereas social constructs, such as the **caste system** in India, can determine social position in traditional societies, in Western society individual socio-economic status is determined largely by their economic power, which, for most people, is reﬂected in the nature of their employment.

**Family status and lifestyle**. The socio-spatial formation of the city is also a function of changing life styles and of different stages in the life cycle. In industrial societies people may choose among several lifestyles, including:

**Familism,** in which child-rearing is the dominant feature. Although closest to the traditional pre-industrial lifestyle, the salience of the extended family relationship is much reduced in industrial society, and couples are more able to determine the size and timing of a family in order to enable them to participate in other lifestyles

 **Careerism**, in which people are mainly oriented towards the goal of vertical social mobility. Many may never marry; those who do, marry at an older age and, if having children, do so later in their married life.

**Consumerism,** in which people opt for pat- terns of consumption dominated by hedonistic self-gratiﬁcation.

**Differences in the choice of lifestyle** are translated into choice of residential environment, with, for example, a traditional family looking for a suburban detached home with a garden, and a yuppie preferring a central-city loft apartment. Individuals are also inﬂuenced by their stage in the life cycle, which is also reﬂected in urban residential structure.

**Geographical mobility and membership of minority group**. The rise of urban industrial society was fuelled by the inﬂux of migrants both from rural areas and from overseas. A large proportion of the residents of the growing nineteenth-century cities of Britain were not born in the city. In some inner quarters of London in 1881 over 60 per cent of the population were migrants, while by 1900 Chicago had more Swedish residents than any other city except Stockholm. The cultural difference of migrants often led to difficulties of communication with existing residents, resulting in varying degrees of residential segregation. Although for many migrant groups this has been reduced over time by processes of assimilation, for others (in particular, the more visible ethnic minorities) socio-spatial segregation remains a feature of urban life.

**SEGREGATION BY SOCIAL STATUS**

Residential differentiation on the grounds of socioeconomic status is a deﬁning characteristic of cities. People of **high social status** have the income to select houses and neighborhoods in accordance with their tastes, whereas the residential location decisions of lower-status households are constrained by their weaker market position. The extreme manifestations of social-class segregation are represented by slums and status areas in the city.

**ETHNIC SEGREGATION**

The basis of ethnic segregation can be racial, religious or national, and its recognition may rest on distinguishing physical characteristics, cultural traits such as language or custom, or on a group identity due to common origin or traditions. The categorization may be employed both by the group itself and by the larger society of which it is a part. Ethnic minority groups in cities are typically segregated, but the extent of segregation depends on two factors. The ﬁrst relates to the migrant status of the group, in particular the recency of migration. The second refers to the social distance that separates the ethnic minority from the charter group, or host society.

**7.4. Morphology and Indices of Settlement Location**

**7.4.1 Meaning and concept of Morphology**

In geography, morphology implies the study of the forms of earth’s surface or some other elements such as settlements and the term “Morphology” can be developed in terms of structure, process and stage according to the concept of Davis. The mode of the arrangement of buildings and streets represents the physical structure of settlement, the social and economic character and the tradition of the community denotes the process which determines the structure of the town or village, and the stage is expressed by its historical or evolutional development. But according to some modern geographers the order of the three expressions should be arranged as process, structure and stage, because in human agglomeration no structure can come in to existence, without any process which may be historical, cultural, social or economic. It is in the process of city building that the city takes its structural form or shape and then comes the stage. Stage itself can be subdivided according to Tailor as sub-infantile, infantile, youth, mature, and senile (old).

**7.4.2 Indices of Settlement Location**

From the planner’s point of view, the background of the term Morphology of a town or a village necessitates the study of the existing lay out of streets, arrangements, and characteristics of buildings, associated patterns of land use and ultimately investigation of historical circumstances influencing their origin and evolution. It will be noted that the morphological studies so far made in India and abroad generally deal with the location, evolution and growth and interaction among the various urban or rural functions. Thus, rural “Morphology” may be regarded as the study of forms of the rural settlements. In general the rural settlements differ in shape, size, nature and the degree of compactness. The entire villages acquire some definite observable forms. Thus, aspects of rural morphology have been termed as “village patterns” by certain geographers.

**Nearest neighbor Analysis**

The Nearest Neighbor Index (NNI) is a complicated tool to measure precisely the spatial distribution of a patter and see if it is regularly dispersed (probably planned), randomly dispersed, or clustered. It is used for spatial geography (study of landscapes, human settlements, CBDs, etc).

It can be used to identify a tendency towards nucleation (clustering) of or dispersion for settlements, shops, industry, etc. as well as plants. Nearest neighbor analysis gives a precision which enables one region to be compared with another and changes in distribution to be compared over a period of time, but it is only a technique and it does not offer any explanation of patterns.



The formula used in nearest neighbor analysis procedures a figure (expressed as Rn) which measures the extent to which a particular pattern is clustered (nucleated), random, or regular (uniform).

The NNI measures the spatial distribution from 0 (clustered pattern) to 1 (randomly dispersed pattern) to 2.15 (regularly dispersed /uniform pattern. The nearest neighbor index measures the degree of spatial dispersion of features over distance. Its value ranges between 0 to 2.15 and it shows if a settlement is clustered, random or regular.

**Clustered Settlement:**

A clustered settlement is formed when all points are close together in the same point. In a nearest neighbor analysis, the value of (Rn) for clustered settlement is zero.



Neighbor analysis can be used to describe both human and physical features to know the proximity of points. For example settlement and vegetation. The nearest neighbor index measures the degree of spatial dispersion of features over distance. Its value ranges between 0 to 2.15 and it shows if a settlement is **clustered, random or regular**.

**Random Settlement:**

 Settlements are random when they are not evenly or uniformly distributed. That is the settlement has no definite direction. There is no pattern at all. In the nearest neighbor value, random settlement is represented at1.0

**Regular Settlement:**

 Settlements are regular when it is at the value of 2.15. Regular settlement occurs when all dots describing settlement points during the nearest neighbor search are uniformly distributed having direction and pattern. That is, this would mean that each dot was equidistant from all of its neighbors.

**The formula for nearest neighbor is expressed as**

**Rn =** $\frac{D(obs)}{D(ran)}$

Where: **Rn** is the nearest neighbor value.

**D (obs)** is the mean distance of nearest neighbor in kilometers.

**D (ran)** is the assumed mean distance between settlements and is calculated as:

 **D (ran) is calculated as:** $\sqrt[        0.5]{\frac{a}{n}}$

Where,

**n** is the total number of features (points, settlements…) to be studied.

**a** is the area of study in kilometer square.

Rank Size Rules

If all cities in a country are placed in order from the largest to the smallest, each one will have a population half the size of the preceding city.

In 1949, George Zipf devised his theory of rank-size rule to explain the size cities in a country. He explained that **the second and subsequently smaller cities should represent a proportion of the largest city. For example, if the largest city in a country contained one million citizens, Zipf stated that the second city would contain one-half as many as the first, or 500,000. The third would contain one-third or 333,333; the fourth would be home to one-quarter or 250,000, and so on, with the rank of the city representin**g the denominator in the fraction.

Rank-Size Rule

 Cities in a country are ranked according to their size in relation to the country’s largest city

– Rank 1 – Largest City

– Rank 2 – ½ the number of people as Rank 1 city

 – Rank 3 – 1/3 the number of people as Rank 1 city

– Rank 4 – ¼ the number of people as Rank 1 city

– Rank 5 – 1/5 the number of people as Rank 1 city



**The proportion of small towns to large cities is called the rank size rule, and it applies both to regions and to the world as a whole. The rank size rule states that there is a specific relationship between relative abundance of settlements of different sizes, and that the smallest settlements should always be the most abundant. More specifically the rank size rule states that population of any given town should be inversely proportional to its rank in the country’s or world’s hierarchy of cities. Thus the second largest city should be half the population of the largest city within a certain country. Many countries, especially in the developed world, display this kind of pattern in terms of their cities populations. The rank size rule has a real impact on the quality of life and the standard of living for a country’s inhabitants. A regular hierarchy indicates that the society in sufficiently wealthy and may even be participating in the global market as a means to gain fame as a world power MDC. The rank size rule also justify that the society is sufficiently wealthy to justify the provisions of goods and services to consumers throughout the country which in turn may mean an industrializing MDC service sector economy in present within the country. However, in LDC’s, the rank size rule tends to fail at other levels of hierarchy and development as well. The absence of the rank size distribution in a LDC shows that there is not wealth in the society to pay for a full variety of services, possibly due to uneven development.**

**Primate City**

**A primate city is the leading city in its country or region, disproportionately larger than any others in the urban hierarchy.** A 'primate city distribution' has one very large city with many much smaller cities and towns, and no intermediate-sized urban centers, in contrast to the linear 'rank-size distribution'. The 'law of the primate city' was first proposed by the geographer Mark Jefferson in 1939. He defines **a primate city as being "at least twice as large as the next largest city and more than twice as significant." Basically it should be more than twice as large than the next city. The size and dominance of a primate city acts as a pull factor** and ensures its continuing dominance. A primate city is a city that dominates the entire urban system of a nation. **The population of a primate city is usually at least three times the size of the second largest city, yet in the case of the Philippines and numerous other nations, the gap is much larger.**A primate city is not only large but also economically dominant and the cultural center for national identity. It controls media, creates jobs, circulates currency and sets trends. The influence of a primate city reverberates throughout the entire country. **Primate cities in the developing world are largely a relic of their colonial history when European colonizers concentrated all economic, transportation, and trade actively in one place, leaving the infrastructure in place after decolonization. Many LDC’s tend to follow the primate city rule which though for the economy of one part of the city may be good but the economy of the other part of the city may be bad as a result of , uneven development**due to the primate city rule (in some cases). Not all countries have primate cities, but in those that do, the rest of the country depends on it for cultural, economic, political, and major transportation needs. On the other hand the primate city depends on the rest of the country as paying consumers of the cultural, economic, political and other services produced in the city. The presence of a primate city in a country may indicate an imbalance in development — usually a progressive core, and a lagging periphery, on which the city depends for labor and other resources. However, the urban structure is not directly dependent on a country's level of economic development. Similarly, the United Kingdom has London as its primate city (7 million) while the second largest city, Birmingham, is home to a mere one million people.

**Gravity Model**

The gravity model is one of the most important spatial interaction methods. It is named as such because it uses a similar formulation to Newton’s gravitation model. Accordingly, the attraction between two objects is proportional to their mass and inversely proportional to their respective distance. Consequently, the general formulation of spatial interactions can be adapted to reﬂect this basic assumption to form the elementary formulation of the gravity model:

Pi and Pj = the importance of the location of origin i and the location of destination j.

dij = the distance, or any measure related to the friction of space, between the location of origin and the location of destination.

k = a proportionality constant related to the temporal rate of the event being measured.

For instance, if the same system of spatial interactions is considered, the value of k will be higher if interactions are considered for a year instead of a week.

Thus, spatial interactions between locations i and j are proportional to their respective importance divided by their distance.

**UNIT-EIGHT**

**8. Population and Development in Ethiopia**

**Population growth (past, present and future trends)**

The total population in 1900 was estimated at 11.8 million. It took only 28 years for the population in 1960 to double to 47.3 million in 1988. A recent UN report stated that the population increased fourfold between 1900 and 1988.The population growth rate was estimated at 0.3% per year at the beginning of this century. The rate of natural increase, which, was estimated at 0.3% for the early part of the 20th century – only a tenth of the 2.9% annual growth suggested by the 1984 census. It grew at an average annual rate of 2.5% between 1965 and 1980, at 2.9% between 1980 and 1989, and up to 3.2% during the 1990’s.

Ethiopia conducted its first ever population census in 1984. The census covered 81 percent of the population. The rest had to be estimated due, mainly, to security concerns spawned by the secessionist wars in the north. It gave a total count of 42 million and a growth rate of 3.1 percent.

The figure below is based on (a) estimates for all the years prior to the 1984 census, (b) estimates for the inter-censual years, and (c) projections to the year 2010. The fact that we are using the words “estimates” and “projections” suggest that we should not place full trust in the numbers for the decades shown, or in future numbers suggested by the trend line.



The second census was conducted 10 years later in 1994 and, unlike the first, it covered the entire country. The second census gave a population total of 53.5 million. The growth rate at this time had declined somewhat to 2.9 percent.

Much of the estimate for the pre-1984 period came from sample surveys – the first National Demographic Survey held on 1964-67, the second National Demographic Survey in 1968-69, and the third National Demographic survey held on 1981. Subsequently, better organized surveys analyses have been conducted including the 1990 National Family and Fertility Survey (NFS), the 1995 Fertility Survey of Urban Addis Ababa, and the 2000, 2005, 2011 Ethiopia Demographic and Health Surveys (EDHS).

**8.2 Population policy and environmental policy of Ethiopia**

**Introduction**

**8.2.1 Population policies in Developed and developing countries**

Population policies in the developed countries are remarkably different from those of the developing countries. In the developed countries, in general, population policies are directed to issues such as assisting couples in fulfilling their family plans, giving special attention to the health of ageing population, raising the number of births to replacement levels, especially in countries which have below replacement level of fertility, for their shortage of labour force in the economy, immigration matters and the like. Hey had already been successful in their fertility and mortality goals.

In the developing nations, the issues of their population policies are mainly to decrease the fertility and mortality rates and thereby decrease the rate of population growth to change the situation of emigration of their educated people to the developed nations (the so called “brain drain”) and the effects and consequences of these demographic dynamics on their development.

**8.2.2 Population policy and programs in Ethiopia**

Ethiopia formulated a National population Policy in 1993 and has also adopted other policies and programs which are directly and indirectly related to population issues. Among many types of policies and programs designed and implemented, the population policy of the country is the leading policy which is expected to bring about significant changes in the population and development situation of the country. There are also some important policies and programmes like the national policy on Ethiopian women, the economic policy, the agricultural policy, the health policy and the program of decentralization and regionalization which have much contribution towards achieving the objectives of the population policy.

**Rational for the National Population Policy**

In Ethiopia demographic factors such as rapid population growth, young age structure and the uneven spatial distribution of the population aggravated by a continuing high fertility manifest the severe state of underdevelopment that characteristics the present Ethiopian society.

Underdevelopment manifests itself, among others, in the following ways.

1. Low productivity in almost all sectors of the economy resulting in high rates of unemployment and underemployment.

2. Low accessibility to education, health services and housing.

3. The perennial problem of food insecurity.

4. High prevalence of maternal, infant and child morbidity and mortality.

5. Low life expectancy.

**Objectives of the National Population Policy**

The National Population Policy of Ethiopia has for its major goal the harmonization of the rate of population growth and the capacity of the country for the development and rational utilization of natural resources, thereby creating conditions conductive to the improvement of the level of welfare of the population.

The task of harmonizing the rate of population growth with the rate of economic and social development requires the involvement and collaboration of a number of governmental and non- governmental agencies. The general objectives specified in the policy cannot be handled without reference to the need for a well-defined division of labor among these agencies.

**General Objectives**

The paths to the attainment of the goal of harmonizing the interrelationship between population dynamics and other factors affecting the probability of development are many Given the assumption that there is a two way interaction between demographic factors of the one hand and other development indicators on the other, sound fertility reduction policy requires that action be taken in carefully selected areas in both spheres. Thus population policy aims at pursuing the following general objectives:

Closing the gap between high population growth and low economic productivity through planned reduction of population growth and increasing economic returns;

Expediting economic and social development processes through holistic integrated development programs designed to expedite the structural differentiation of the economy and employment;

 Reducing the rate to urban migration;

Maintaining/improving the carrying capacity of the environment by taking appropriate environmental protection/conservation measures;

Raising the economic and social status of women by freeing them from the restrictions and drudgeries of traditional life and making it possible for them to participate productively in the larger community;

Significantly improving the social and economic status of vulnerable groups (women, youth, children and the elderly).

**SPECIFIC OBJECTIVES**

Reducing the current total fertility rate of 7.7 children per woman to approximately 4.0 by the year 2015;

 Reducing maternal, infant child morbidity and mortality rates as well as promoting the level of general welfare of the population;

Significantly increasing female participation at all levels of the educational system;

 Removing all legal customary practices militating against the full enjoyment of economic and social rights by women including the full enjoyment of property rights and access to gainful employment;

 Ensuring spatially balanced population distribution patterns with a view to maintaining environmental security and extending the scope of development activities;

Improving productivity in agriculture and introducing off-farm non agricultural activities for the purpose of employment diversification;

Mounting an effective country wide population information and education programme addressing issues pertaining to small family size and its relationship with human welfare and environmental security.

**STRATEGIES**

Expanding clinical and community based contraceptive distribution services by mobilizing public and private resources;

 Promoting breast feeding as a means of dealing with the problem of childhood malnutrition and increasing the time span between earlier and subsequent pregnancies through IEC;

 Raising the minimum age at marriage for girls from the current lower age limit of 15 to, at least, 18 years;

Planning and implementing counseling services in the educational system with the view to reducing the current high attribution rate of females;

Providing career counseling services in second and third level institutions to enable students especially girls to make appropriate career choices;

Designing and implementing a coherent long term policy that is likely to create conditions facilitating an increased integration of women in the modern sector of the economy;

Undertaking feasibility and experiments in respect to micro enterprises, and creating a system for providing technical and credit support to men and women who have the aptitude for engaging in small to medium sized private enterprises;

Making population and family life related education and information widely available via formal and informal media;

Establishing a system for the production and effective distribution of low cost radio receivers and information materials such as posters, flyer and all kings of promotional materials;

Amending all laws, impeding, in any way, the access of women to all social, economic and cultural resources and their control over them including the ownership of property and businesses;

Amending relevant articles and sections of the civil code in order to remove unnecessary restrictions pertaining to the advertisement, propagation and popularization of diverse conception control methods;

Ensuring and encouraging governmental and non-governmental agencies involved in social and economic development programs that they incorporate gender and population content in their activities by establishing within their organizations, appropriate units to deal with these issues;

Establishing teen-age and youth counseling centers in reproductive health;

Facilitating research program development in reproductive health;

 Developing IEC programs specially designed to promote male involvement in family planning;

Diversifying methods of contraception with particular attention to increasing the availability of male oriented methods;

**8.2.3 Environmental Policy of Ethiopia**

**The Natural Resource Base and the Rural Environment**

Natural resources are the foundation of the economy. Smallholder peasant agriculture, in some areas including forestry, is the dominant sector accounting for about 45 per cent of the GDP, 85 per cent of exports and 80 per cent of total employment. Agriculture has also been the main source of the stagnation and variability in GDP growth caused in the main by policy failures and exacerbated by recurrent drought, civil war, natural resource degradation, and poor infrastructure.

Renewable natural resources, i.e. land, water, forests and trees as well as other forms of Biodiversity, which meet the basic needs for food, water, clothing and shelter have now deteriorated to a low level of productivity. In many areas of highland Ethiopia, the present consumption of wood is in excess of unaided natural sustainable production. Estimates of deforestation, which is mainly for expansion of rain fed agriculture, vary from 80,000 to 200,000 hectares per annum.

The burning of dung as fuel instead of using it as a soil conditioner is considered to cause a reduction in grain production by some 550,000 tons annually. In 1990, accelerated soil erosion caused a progressive annual loss in grain production estimated at about 40,000 tons, which unless arrested, will reach about 170,000 tons by 2010. Livestock play a number of vital roles in the rural and national economy but according to one estimate some 2 million hectares of pasture land will have been destroyed by soil erosion between 1985 and 1995. Land degradation is estimated to have resulted in a loss of livestock production in 1990 equivalent to 1.1 million tropical livestock units (TLUs), and, unless arrested, will rise to 2.0 million TLUs or to 10 per cent of the current national cattle herd by 2010.

In economic terms, soil erosion in 1990 was estimated to have cost (in 1985 prices) nearly Birr 40 million in lost agricultural production (i.e. crop and livestock) while the cost of burning dung and crop residues as fuel was nearly Birr 650 million. Thus in 1990 approximately 17 per cent of the potential agricultural GDP was lost because of physical and biological soil degradation.

The permanent loss in value of the country's soil resources caused by soil erosion in 1990 was estimated to be Birr 59 million. This is the amount by which the country's soil "capital" should be depreciated in the National Accounts or which should be deducted (as capital depreciation) from the country's Net National Income (NNI).

The Ethiopian Forestry Action Program (EFAP) estimated the full value of forest depletion in 1990 to have been about Birr 138 million or some 25 per cent of the potential forestry GDP of Birr 544 million.

Despite the presence of mineral resources in quantities and qualities suitable for exploitation, they currently contribute only about 2 per cent of the GDP. Only 1 per cent of the potential of Ethiopia's vast water resources for irrigated agriculture and hydropower generation have been developed. The energy sector is one of the least developed in the world with 90 per cent of needs being met from biomass fuels, particularly wood, charcoal and animal dung. The genetic diversity of Ethiopia's domesticated plants and its unique flora and fauna is increasingly being eroded because the long history of disruptive interventions by the state and the weakening of local management in the face of an expanding population and the increasing needs of agriculture.

**The Need for a Policy on Natural Resource and the Environment**

The Government of the Federal Democratic Republic of Ethiopia (FDRE) has established a macroeconomic policy and strategy framework. Sectoral development policies and strategies have been, or are currently being, formulated. Environmental sustainability is recognized in the constitution and in the national economic policy and strategy as a key prerequisite for lasting success. However, there is as yet no overall comprehensive formulation of cross-sectoral and sectoral issues into a policy framework on natural resources and the environment to harmonize these broad directions and guide the sustainable development, use and management of the natural resources and the environment. Therefore, given the current stage of the country's political and policy development, the time is opportune for developing a comprehensive environmental policy on natural resources and the environment.

**THE POLICY GOAL and OBJECTIVES**

 **The Overall Policy Goal**

The overall policy goal is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

 **Specific Policy Objectives**

**The Policy seeks to:**

Ensure that essential ecological processes and life support systems are sustained, biological diversity is preserved and renewable natural resources are used in such a way that their regenerative and productive capabilities are maintained and where possible enhanced so that the satisfaction of the needs of future generations is not compromised; where this capability is already impaired to seek through appropriate interventions a restoration of that capability;

 Ensure that the benefits from the exploitation of non-renewable resources are extended as far into the future as can be managed, and minimize the negative impacts of their exploitation on the use and management of other natural resources and the environment;

 Identify and develop natural resources that are currently underutilized by finding new technologies, and/or intensifying existing uses which are not widely applied;

Incorporate the full economic, social and environmental costs and benefits of natural resource development into the planning, implementation and accounting processes by a comprehensive valuation of the environment and the services it provides, and by considering the social and environmental costs and benefits which cannot currently be measured in monetary terms;

 Improve the environment of human settlements to satisfy the physical, social, economic, cultural and other needs of their inhabitants on a sustainable basis;

Prevent the pollution of land, air and water in the most cost-effective way so that the cost of effective preventive intervention would not exceed the benefits; Conserve, develop, sustainably manage and support Ethiopia's rich and diverse cultural heritage;

Ensure the empowerment and participation of the people and their organizations at all levels in environmental management activities.