



Ministry of Higher Education and Scientific Research

Abbas Laghrour University - Khenchela

Faculty of Humanities and Social Sciences

Department of Social Sciences



Introduction to Demography

Lectures for First-Year Common Core Social Sciences Students

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Course Specification Sheet

Field	General Sociology
Degree Title	General Sociology
Semester	Second Semester
Unit Title	Fundamental Education Unit
Course Title	Introduction to Demography
Credits	05
Coefficient	02
Sessional Hourly Volume	45 Hours
Weekly Hourly Volume	03 Hours (1 hour 30 min Lecture, 1 hour 30 min Tutorial/Directed Works)
Evaluation Method	60% Examination / 40% Continuous Assessment
Learning Objectives	➤ Gaining proficiency in the study of Demography (Population Science), including its various fields and historical development. ➤ Identifying the most prominent pioneers of this discipline since its inception. ➤ Identifying the primary methods of data collection and key indicators related to demographic phenomena, as well as their calculation methodologies.

Introduction:

The significant increase in population during the early twentieth century garnered the attention of numerous researchers and scholars across various fields focused on human studies. This interest stems from the various challenges posed by population growth, particularly in light of resource scarcity and the inability to meet the basic needs of the entire population. Consequently, this substantial growth in the global population has become a major concern for societies, whether developed or developing.

This has prompted many countries worldwide to seek solutions capable of alleviating the anxieties faced by their peoples, aiming to reach a resolution that balances available resources in a specific region with its population size to ensure a decent standard of living. Although the population issue and its associated problems are not contemporary in their emergence, their roots trace back to the most ancient civilizations, such as the Chinese, Greek, Roman, and Islamic civilizations. All societies have strived to research and delve into this matter due to its profound importance in their historical trajectories.

This pedagogical publication has been prepared for first-year core curriculum students in the Social Sciences to enable them to understand their society and conduct comparisons with other nations. In this publication, we will address the primary themes that constitute Demography, such as its concept, origin, and evolution, as well as the significance of this science in the lives of peoples. Furthermore, we shall link this field to other disciplines by examining the relationship between Demography and other sciences, whether theoretical or technical, and the key milestones through which this science flourished. We will also

highlight the sources upon which researchers rely to obtain demographic information, whether quantitative or qualitative, categorized into static and dynamic sources. Additionally, we will cover the most prominent theories that are considered the foundation or the solid base upon which this science was established.

Finally, we move to the last module of this subject, titled "Demographic Phenomena." This section transitions from the theoretical aspect to the technical dimension, where each phenomenon is studied individually, applying a set of indicators designed to facilitate the understanding of these phenomena.

Module I: The Essence of Demography

- **Lecture 1 & 2:** The Concept of Demography,
Factors of Its Emergence and Development
- **Lecture 3:** Relationship Between Demography
and Other Sciences
- **Lecture 4:** Patterns of Demography

Lectures 1 & 2: The Concept of Demography, Factors of its Emergence and Development

First: The Concept of Demography

Demography, or the science of population, is a term of Greek origin meaning the science of describing populations. The word "Demos" signifies people or population, while "Graphics" refers to description or planning; thus, the term Demography denotes the description or planning of populations.

The Belgian scholar Achille Guillard was the first to use this term in 1855 in his book *Elements of Human Statistics*, where he defined it as: "The natural and social history of the human species, or the mathematical knowledge of populations, their general movements, and their physical, civil, intellectual, and moral conditions." (Al-Bayati, 2009, p. 25).

Definitions of demography have diversified as scholars defined it based on its intersection with their respective disciplines. These concepts evolved to transcend initial perceptions, adding new and varied characteristics that reflect the complexity of the population phenomenon. These characteristics include elements such as size, referring to the quantitative number of individuals within a society; distribution, which illustrates how the population is geographically spread across different regions, ranging from densely populated to sparsely populated areas; and growth, which expresses population changes over time in terms of increase or decrease. Furthermore, definitions incorporated features reflecting cultural and ethnic diversity, economic characteristics

illustrating income and living standards, as well as linguistic aspects reflecting the multilingual and multicultural nature of society. Thus, the study of population has become more comprehensive, integrating various dimensions to understand their movements and impacts on society.

Perhaps one of the most prominent definitions is that of the French economist Levasseur: "Demography is a science that relies on statistics to investigate human life, particularly births, marriages, deaths, and the relations arising from these phenomena, as well as the general population conditions resulting therefrom. It highlights the essential elements of which a population is composed, how human societies stabilize and persist, increase or decrease, how humans cluster or disperse, and the material and moral causes of such changes." (Al-Sayed, 2004, p. 100).

It is also defined as: "A study of a set of population characteristics, particularly quantity, density, distribution, growth, size, and population structure, in addition to certain qualitative characteristics such as development, education, and nutrition... Demography is also concerned with statistics encompassing income, births, deaths, and other factors that help clarify human changes." (Al-Kamila & Miloud, 2017, p. 60).

Meanwhile, the scholar Roland Pressat focused on various demographic phenomena, considering demography as the study of populations in terms of changes in their numbers due to the phenomena of births, deaths, and migration. It can also be said that demography, according to Pressat, is a descriptive study of a society's population with an analytical character regarding the various prevailing variables that affect and are affected by the population. This can be illustrated through population size within a society and its age-sex structure, and how these interact with variables such as marital status and educational level, while also studying other factors that influence the population composition.

Based on the aforementioned definitions, a comprehensive definition of demography can be established as: A branch of sociology and human geography that focuses on the comprehensive quantitative and qualitative study of population characteristics in a specific area. This study includes the analysis of quantitative size, geographical distribution, and population density, in addition to the age-sex structure. Demography is also concerned with calculating various demographic indicators such as crude birth and death rates, migration, and the demographic growth rate. Furthermore, demography does not stop at calculating these indicators but works to link them to various aspects of life, such as the prevailing health, social, and economic conditions, to determine population needs across different sectors. Demography has expanded further to study a wide range of prevailing problems in various societies, such as the demographic explosion, environmental pollution, urban overcrowding, unemployment, poverty, celibacy, fetal mortality, etc.

Operational Definition for First-Year Social Sciences Core Curriculum Students:

It is the science that emerged with the appearance of man and evolved alongside him; it studies populations from birth until death through qualitative and quantitative approaches addressing their movement, distribution, and composition, and is concerned with their future projections.

Second: Factors in the Development of Demography

Demography has witnessed a remarkable development in recent years compared to its early stages, due to a set of factors that made it a subject of interest for philosophers, economists, and sociologists. Social and economic changes, such as demographic transitions resulting from

industrial revolutions and mass migrations, prompted researchers to understand population movement more deeply. Moreover, progress in statistical sciences played a fundamental role in providing more accurate tools for data analysis. On the other hand, challenges related to urban planning, public health, and resource distribution necessitated a focus on understanding population characteristics. All of this has made demography a growing field that combines theoretical and applied studies, becoming a fundamental axis for studying the impact of population changes on society and the economy. The key factors contributing to its development can be highlighted as follows:

1. Demographic Explosion:

Although the demographic explosion is a population problem experienced by all peoples, it is considered one of the most prominent factors that stimulated increased interest in demography. Concerns related to the rapid increase in population relative to available resources sparked widespread debate among scientists and policymakers, leading to an accelerated search for population policies and sustainable solutions to curb this growth, which is viewed as a threat to humanity.

It is worth noting that statistical studies of population numbers indicate that the population has doubled at very high rates throughout history. At the beginning of the seventeenth century, the world population was estimated at about 500 million people. By the eighteenth century, it rose to one billion, meaning the doubling period during this stage was 100 years. It then doubled to reach two billion by 1930 (in less than 100 years). Thus, the doubling period was decreasing, evidenced by the world population reaching 4 billion in 1974—a clear doubling within 44 years. The population continued to rise to approximately 8 billion over the last fifty years.

This significant increase resulted in deterioration across various fields, leading to the development of demographic policies at local and international levels, aiming to achieve a balance between population growth and available resources, with a focus on issues such as food security, climate change, and sustainable development to ensure a better future for humanity.

- Development of Research Methodologies in Demography:

Technological advancement in various aspects of life has had a significant and positive impact on demography, which has witnessed immense development in scientific research. This led to variations in the methodologies used, contributing to the enhancement of the field's status. Demography has become of paramount importance, keeping pace with leading sciences such as economics, mathematics, and statistics.

Through this development, it succeeded in drawing the attention of governments to the importance of population studies. Demography transformed from a purely descriptive science to an analytical one based primarily on mathematical and statistical methods. It is no longer limited to describing population phenomena but has become a scientific tool for future forecasting and formulating effective policies. Modern demography relies on precise mathematical models to analyze population patterns such as growth, birth, death, and migration rates, taking into account complex interactions between them. It provides reliable scientific data that helps decision-makers establish sustainable strategies to face demographic, economic, and social challenges.

- Scientific and Technological Development:

Demography experienced a qualitative leap thanks to scientific and technological progress, especially in the field of information technology

(IT). The field benefited directly from modern technologies in research, analysis, and forecasting processes. Advanced technological tools, such as Geographic Information Systems (GIS), statistical software, and continuous registration of various population phenomena and data analysis, have improved the accuracy of population studies and deepened the understanding of patterns. On the other hand, progress in medical and pharmaceutical sciences played a pivotal role in improving population indicators. The eradication of many infectious and fatal diseases, such as smallpox and polio, contributed to enhancing public health and reducing mortality rates, particularly infant mortality. This health improvement was reflected positively in survival rates, leading to an unprecedented increase in life expectancy—a phenomenon referred to in demography as the health transition or change in societies.

Furthermore, the spread and development of family planning methods and reproductive healthcare provided individuals with wider options in controlling fertility rates, which had direct impacts on population structure and demographic growth, especially within developed societies. Generally, the intersection between science, technology, and medicine constitutes an integrated system that supports demography in understanding population movements and drawing future policies to deal with demographic challenges and achieve sustainable development goals.

- Emergence of Specialized Agencies:

The emergence of international agencies specialized in population matters has led to a qualitative shift in addressing population issues. These include the World Health Organization (WHO), established in 1948 in Geneva; the United Nations Statistics Division (UNSD) in New York, the central body for collecting and disseminating national statistical data; and the United Nations Population Fund (UNFPA), which works toward a

world where every pregnancy is wanted and every childbirth is safe. These institutions contributed to unifying international efforts to face demographic challenges and pushed for the implementation of outcomes from international agreements and conferences, such as the International Conference on Population and Development (ICPD) held in Cairo in 1994.

This cooperation contributed to the development of demography by providing accurate data on global population conditions and supporting research with modern techniques. It led countries to adopt evidence-based policies aimed at balancing growth rates with available resources, while strengthening the links between population and socio-economic development. These agencies also helped raise awareness of the importance of population studies as a tool for understanding demographic changes globally.

Third: The Historical Context of the Emergence and Development of Demography

Population issues have received the attention of philosophers and politicians since the early years of human existence. However, this interest was qualitative rather than quantitative and was unorganized, focusing primarily on general policy issues.

Most early studies tended to be personal in nature, reflecting the thinker's spirit and the prevailing conditions of the era. They were local ideas for improving conditions and developing human knowledge. Eventually, population theories emerged as an extension of these ancient ideas to keep pace with the progress achieved in other sciences.

Population theory is defined as "the set of important factors that determine population growth and explain the dynamics of demographic

growth." (Al-Bayati, 2009, p. 46). Through a careful reading of this concept, it can be said that population theory is a set of issues experienced by a population in a specific society during a certain period, characterized by their interconnectedness. They are based on observation, experimentation, and the interpretation of one or more population phenomena to address them and propose solutions. Consequently, the beginnings of demography were linked to human existence itself and the need to understand the social environment, making this science one of the most important tools for studying population changes and their impacts on societies throughout the ages.

1- Ancient Civilizations:

Population ideas have occupied a significant space for thousands of years. The study of population captured the attention of many thinkers, writers, and philosophers such as Confucius, Plato, Aristotle, and Ibn Khaldun. These thinkers succeeded in developing population thought that effectively contributed to establishing the primary and broad principles of demography—a science whose importance has become increasingly evident in recent years, particularly following the Enlightenment trends in societies, especially Western ones. Below is a brief presentation of the ideas of these thinkers and their views on various population issues.

A- The Chinese (Confucius):

Confucius was the first to address the concept of "Optimum Population Size," highlighting the proportional relationship between land area and population numbers. He emphasized the government's role in achieving demographic balance by relocating individuals from high-density areas to lower-density regions.

He also pointed to multiple factors affecting population processes, such as food shortages that limit a society's ability to support large numbers, the impact of wars in reducing population and destabilizing it, and early marriage as a means to promote population growth. Conversely, he noted that excessive and exaggerated marriage costs act as barriers to family formation. Confucius's ideas resonated widely in ancient China, forming the basis for many population policies aimed at achieving a sustainable balance between resources and population, while considering social and economic dimensions.

In his writings, he noted that to know the new, one must study the old. He defined the government's task and role regarding the population and their lives through three essential matters: (Kradsha, 2009, p. 24)

- That the population has sufficient food.
- That they have sufficient military equipment.
- That there is trust between the population and their rulers.

Confucius's ideas did not stop there; he urged the government to care for the population, achieve self-sufficiency, distribute various riches fairly, and spread education to all based on the principle of equal opportunity, as social inequality and disparities among the population generate the problems that most nations struggle with.

Generally, Confucius's key ideas can be summarized as follows: (Kradsha, 2009, p. 25)

- Emphasis on the government's duty to transfer population from high-density areas to low-density areas to create demographic balance.

- Fate governs people, yet people are distinguished through their upbringing.
- Multiple factors influence population growth (food shortage, wars, early marriage, exaggerated marriage costs).

B- The Greeks:

Greek population thought is manifest in the ideas of both Plato and Aristotle.

- ❖ **Plato:** His fundamental idea was the "Optimum Population Size" (The City-State) or what is known as the "Utopia." He set its size at 5,040 citizens (excluding slaves). Plato's advice to rulers was to practice birth control, regulate marriage, and prevent migration to maintain this specific number.

If the city's population fell below the optimum limit for any reason, the deficit had to be compensated through: encouraging procreation, rewarding families with more offspring, and granting Greek citizenship to foreigners. (Kradsha, 2009, p. 26).

Regarding life within this city, Plato enacted several laws, including:

- Communalism of women and children: All women are wives to all men, as decreed by the ruler (children are raised together; no one knows their father and vice versa). He also advocated for the disposal of deformed children.
- Mandatory exercise for both men and women, and the necessity of noble morals that serve the state's interest.

- Philosophers are the greatest, most intelligent, and wisest people; thus, governance must be given to them. Without philosophers, the state cannot rise, thereby achieving Plato's "Virtuous Republic."
 - If procreation is necessary, intercourse occurs by lottery under the ruler's supervision. The age for procreation was set at 20–22 for women and 30–45 for men. If a young man refused, he paid what Plato called the "Tax of Happiness." Intercourse was subject to conditions: good health, prevention of consanguinity (inbreeding), and favoring procreation by the strong over the weak.
- ❖ **Aristotle:** The second thinker in Athens, who believed in achieving proportionality between population size and resources, especially land area. He opposed the "camp" idea advocated by Plato and mocked the concept of an open society. He approved of abortion to maintain population size.

Aristotle divided society into three basic units:

- Social units: Groups such as the family as the smallest unit, then the village, the city, and finally the state.
- Occupations: Categorized into natural occupations (hunting, agriculture) and unnatural ones (trade and industry).
- Age and Sex: He differentiated between males and females based on physical and mental readiness. He stipulated that citizens of the desired state must be Greeks—reflecting a subjective bias—believing they could combine the vitality of Northern peoples with the intelligence of Eastern peoples. Regarding age, he believed nature set the procreation limit at 70 for men and 50 for women. He advocated for the freedom to choose the appropriate time for marriage, arguing against early marriage as it causes problems for

the offspring. He deemed the ideal age for marriage to be 18 for women and 37 or older for men—a gap of over 19 years—to ensure physical maturity and the fulfillment of marital obligations. (Kradsha, 2009, p. 33).

Despite his opposition to Plato's closed society, he supported the ruler's responsibility to control and maintain population size, meet essential needs, and protect society from poverty and epidemics. Thus, Aristotle held the state responsible for the balance between population and food, forcing it to find solutions, even if it meant disposing of disabled children. (Al – Khashab, 1975, p. 55)

C- The Romans:

The Romans were among the peoples most concerned with population issues, particularly regarding size and age-sex composition. This interest was not because the population was the core concern of their governments, but rather to assess the human potential of the Roman Empire for waging wars, increasing soldiers, and expanding territory.

For instance, they encouraged marriage and rejected celibacy and divorce, issuing legislation to this effect and granting privileges to married individuals while withholding them from the unmarried. They also imposed harsh penalties on those who resorted to abortion. (Ali, 2010, p. 45).

Initially, the Roman people experienced an increasing population curve, which contributed significantly to their ability to fight long wars and achieve expansionist victories. Population growth provided the manpower to support armies and strengthen the empire economically and socially. However, over time, the demographic structure changed significantly; the population began to decline noticeably. This decline was linked to the

luxury and wealth that characterized Roman society during periods of stability. Material wealth and the spread of values of comfort led to lifestyle changes, including declining marriage rates and rising celibacy, especially among the upper classes. These social shifts reduced fertility rates, leading to a gradual population decrease. This demographic trend negatively affected military and economic capabilities, making the empire less able to face internal and external pressures, indirectly contributing to its weakness and disintegration.

D- The Muslims:

Muslims and Arabs are known for high procreation and taking pride in it, following the Prophet's (PBUH) saying: "Marry the loving and fertile, for I will boast of your great numbers before the nations on the Day of Resurrection."

Perhaps the most important Arab scholar to address the population issue was Ibn Khaldun, who gave population studies great attention. He believed that societies generally pass through several evolutionary stages that affect birth and death rates. In the first stage of a society's emergence, it witnesses a high birth rate and a low death rate, positively affecting growth. As the society collapses, the demographic equation reverses: death rates rise while birth rates fall, negatively impacting demographic growth.

In this regard, he states: "High fertility in the first stage is due to the activity and confidence of the population... while in the final stage, death rates increase due to epidemics, revolutions, and disturbances, which reduces population activity and consequently their procreation." (Kradsha, 2009, p. 35).

Ibn Khaldun encourages population increase because he sees in it the creation of social diversity that contributes to a strong economy capable of creating wealth, which in turn causes further population increase. He states: "Know that if labor is lost or decreases due to the decrease in civilization (Umran), God permits the withdrawal of earnings... Do you not see that in cities with few inhabitants, provision and earnings are low or absent? Likewise, in cities with greater civilization, the inhabitants are more prosperous." (Kradsha, 2009, p. 35).

In his famous *Muqaddimah*, Ibn Khaldun views population increase as a vital element in strengthening the military power of nations. A large population reflects the capacity for expansion and growth, providing the human resources necessary for military strength and economic stability. He adds that population growth leads to the expansion of natural resources; as the population increases, there is more pressure on land, stimulating agricultural and industrial production. As standards of living rise, people move toward luxury, further encouraging procreation. However, he warns that this expansion may lead to social problems if the capacity to manage the increase is exceeded.

2- The Enlightenment:

This stage is considered the actual beginning of demography, not just because the term "Demography" appeared for the first time, but as a result of the abundance of studies and wide interest in population during this period. Most previous studies (except for Ibn Khaldun's) did not investigate the causes of growth or decline but rather sought the values and goals desired by the state. As these studies lacked the required data, the need arose for more accurate and scientific studies. By the seventeenth century, scientific population studies flourished; some monarchs began applying administrative scientific methods based on

numbers, such as Louis XIV in France and Peter the Great in Russia. Prominent pioneers of this stage include:

A- John Graunt:

The English scholar John Graunt is considered one of the early pioneers of demography. He conducted a systematic scientific study on the causes of death in London, which is one of the first works to establish this field as an independent science. Graunt relied on advanced statistical tools of his time, collecting population data over seventy years. His study was pioneering because it did not just collect data but sought to explain the relationship between environmental, health, and social factors and mortality rates.

His contributions, published in 1662 as *Natural and Political Observations Made upon the Bills of Mortality*, provided a solid foundation for demography. Some argue his most important contribution was his extreme care in selecting data and interpreting statistical calculations. (Al-Sayed, 2004, p. 100). Graunt noted that: (Al-Sayed, 2004, p. 103)

- There is significant migration from rural areas to cities.
- This migration selects those of reproductive age.
- Natural increase in rural areas is higher than in cities.
- Birth rates in rural areas are higher than in urban areas.
- Mortality rates in urban areas are higher than in rural areas.

Graunt is considered the "spiritual father" of demography due to his application of scientific and statistical methods to study population distribution, movement, and composition.

B- William Petty (1623–1687):

Alongside Graunt, William Petty was among the first to apply statistics to the study of population and its impact on social development. He believed statistics was a primary tool for solving population issues and formulating government policies. Petty focused particularly on "Population Forecasting" and the impact of urbanization on growth. He also addressed population economics, such as the labor force and unemployment, linking them directly to demographic changes. Although he was not as skilled as Graunt in data collection, he estimated the population of Ireland using housing tax records in the mid-seventeenth century—though his estimates were low because he only counted registered houses. (Al-Sayed, 2004, p. 103).

C- Achille Guillard:

The Belgian Achille Guillard, a mathematician, statistician, and astronomer, is considered the actual founder of demography. In 1855, he published his famous book *Elements of Human Statistics*, where he coined the term "Demography" (the science of population description). He provided a comprehensive framework for studying births, deaths, and migration, applying statistical methods to population data. Guillard attempted to organize data from different regions and times, laying the practical foundations that demography still relies on today. He was influenced by the Malthusian debates of his time and sought to create an objective science based on the investigation of people's conditions and movements. (Amira, 2014, p. 15).

His key contributions include:

- Introducing the quantitative method to population study.
- Establishing the idea that social phenomena are measurable.

D- Johann Süssmilch (1707–1767):

The German Johann Süssmilch is considered the "second founder" and one of the most prominent demographers of this period. He focused on the sex ratio of the population, birth and death rates, and marriage factors. He was one of the first to identify the relationship between demographic development and economic growth, emphasizing social factors like cultural and religious customs. (Amira, 2014, p. 80) concluded:

- The more statistics increase, the lower the error rate.
- The number of males at birth is higher than females (attributed to Divine Providence to balance the sexes later, as male mortality is higher).
- Mortality rates vary by age and sex.
- There is a correlation between socio-economic factors and marriage, divorce, births, deaths, and life expectancy.
- Excessive taxes on the French rural population led to poverty and migration to large cities.

E- Adolphe Quetelet (1796–1874):

The Belgian Quetelet studied statistically observable social phenomena—both normal (births, deaths, marriage, migration) and deviant (crime, suicide)—across various peoples. He is prominent for his focus on the negative aspects of society, being a pioneer in the "Geography of Crime," focusing on the relationship between the locations of crimes and their social causes. He realized that crime distribution is influenced by population density, socio-economic distribution, and educational levels. His contributions form the cornerstone for understanding social deviance as a phenomenon affected by the spatial and social structure.

3- The Turn of the Twentieth Century:

This period marked the actual beginning of modern demographic studies. Due to the demographic explosion, it became necessary to research the causes of population increase—either to curb it or identify its drivers—to align growth with available resources. Key contributions came from the English scholar Thomas Robert Malthus and other theorists from England, France, and Germany. (These will be discussed in detail in the "Population Theories" lecture).

4- Importance of Demography:

Demography provides an extensive informational reference on population status globally, which states use to build developmental and economic policies. It helps:

- Identify labor force potential and available human resources.
- Understand "push and pull" factors in population distribution, helping the state determine needs for schools, hospitals, and job creation.
- Identify population growth trends (increase or decrease) and forecast future growth to plan the infrastructure and services required for the future population.

Lecture 3: The Relationship of Demography with Other Sciences

Introduction:

It is widely recognized and agreed upon that demography was formed as a result of the interaction between various cognitive sciences, particularly economics, statistics, and mathematics. However, this has not made it a prisoner to these fields. Rather, it has transcended the numerical description of people to treat man as a speaking, eating, and drinking living being who possesses customs and traditions and interacts with his environment—affecting it and being affected by it. Like other sciences, demography needs to establish relationships with various disciplines, whether for the periodic flow of data, reliance on different methodologies and scientific analyses, or to serve as an information source for other sciences. Consequently, what are the most important sciences that form a tributary to demography? And which sciences benefit from it?

First: The Relationship between Demography and Sociology

The relationship here is of a special nature. Although population studies are much older than sociology, demography has become more closely linked to sociology than to any other science in modern times. This is because researching social phenomena requires the use of certain demographic variables and vice versa. There are several considerations that make population studies a vital field for sociological research: (Al-Jawad, 2009, p. 08)

- The subject of sociology is society in terms of structure and change, and the basis of society is the population; thus, they fall directly within the focus of sociology.
- Sociologists rely on demographic variables in their analysis of social phenomena, utilizing them to highlight differences

particularly in gender, age, family, minorities, and social classes—topics that lie at the core of sociology.

- Demography benefits from sociological methodologies and research tools in analyzing demographic phenomena and investigating population variables. The intersection of these two sciences in studying societal phenomena provides an abstract quality that helps reach a high degree of generalization.

Second: The Relationship between Demography and History and

Geography History is one of the essential sciences in human life. To study the present of any people, one must understand their past and history in terms of formation and evolution. There is a profound relationship between history and demography; the former investigates the conditions of peoples during specific periods and their development over time, requiring knowledge of population characteristics, composition, size, and distribution—data that only a demographer can provide. Thus, history is a science that studies humans across time through social, economic, political, and cultural lenses, informing us of population development stages and power struggles within human groups. (Al-Kubaisi, 2011, p. 44). For example, studying the compositional structure of the population during the French colonial period from 1954 to 1962.

Regarding Geography, this term was previously associated mainly with terrain, mountains, and valleys. However, it has evolved to become more comprehensive, covering population distribution and the reasons for "push and pull" factors. This is known as "Human Geography," which studies how humans deal with their environment regarding residence choice or spatial distribution. This has yielded important results concerning the design and collection of population data and the analysis

of spatial differences, settlement patterns, and colonization, tracking the developments in distribution. (Al-Bayati, 2009, pp. 29-30).

Third: The Relationship between Demography, Economics, and Political Science

It is impossible to separate demography from economics due to the mutual requirements of their studies. An economist must understand the population structure and composition to provide the requirements for living; for example, producing a certain commodity requires identifying the consumer first. Population size can significantly affect the economy by increasing production, formulating economic policies, and enhancing economic development.

Furthermore, economics studies human and material resources and human needs. Measuring the standard of economic welfare requires assessing per capita income, which depends on the gross national product measured by the average productivity of the working population. Economic planning relies fundamentally on demographic studies and facts provided by demography within the framework of socio-economic transitions. (Amira, 2014, p. 22).

Politically, demography plays a vital role in formulating government policies. A politician must know the population structure and size to understand requirements and the potential available for development plans. The state always strives to control its population size according to its capabilities; for instance, many developing countries suffer from a population explosion and seek to control births, while industrialized nations may suffer from "human poverty" due to birth shortages and increased life expectancy.

Fourth: The Relationship between Demography and Statistics

Statistics is a major tributary to demography as it feeds it with data. Its primary task is to transform raw data into prepared information for use, a process known as "Demographic Analysis." These two sciences are so closely linked that a demographer cannot deal with population data in its raw state; therefore, the role of statistics is certain and essential. Moreover, demography relies on expectations and probabilities, particularly regarding future forecasting of size and composition and population projections to determine growth. Thus, statistics is the reason demography transformed from a qualitative/descriptive science into a quantitative science.

Fifth: The Relationship between Demography and Medicine

The relationship between demography and medicine is fundamental in improving the understanding of population phenomena. Medicine is one of the most important factors for demographers, as it studies disease and mortality rates resulting from specific ailments and their impact on the general population structure. Analyzing disease prevalence rates helps in formulating effective health policies.

Conversely, medicine focuses directly on the population, as humans are the center of medical sciences. Medicine concentrates on community health by providing therapeutic and preventive solutions to diseases that threaten public health, such as epidemics. This interaction has enhanced mutual understanding; medical progress contributes to improving life expectancy and increasing birth rates, which leads to noticeable impacts on population growth. Advances in medicine—including healthcare improvement and the development of technologies for chronic and infectious diseases—lower mortality rates and increase quality of life, a factor known as the "health transition" in societies.

Relationship between Demography and Biology:

Demography and biology are closely linked as both study humans in terms of growth, reproduction, death, and survival. Biology explains biological aspects associated with reproduction, such as puberty and fertility, while demography studies fertility rates and reproductive patterns within society. While biology studies the causes of death, genetics, and aging, demography analyzes mortality rates, life expectancy, and their distribution across population groups. Genetics and the environment also explain the spread of certain diseases or human adaptation to the surroundings, reflecting on population growth or decline. Biology provides the natural basis for population phenomena, while demography analyzes these phenomena at the societal level quantitatively.

Relationship between Demography and Nutrition:

The relationship here is also profound because the nutritional status of the population directly affects fertility, mortality, and population growth. Good nutrition improves general health, raises life expectancy, and reduces child and maternal mortality rates. Malnutrition leads to increased disease, weakened immunity, and high mortality rates, especially among vulnerable groups like children and the elderly. Nutrition also affects reproductive capacity, as nutrient deficiencies can delay growth or cause pregnancy complications. Conversely, demography studies population distribution and size to help estimate nutritional needs and plan for food security. Thus, the relationship is complementary: nutrition affects population indicators, and demography provides the data necessary for effective food and health policies.

Lecture 4: Patterns of Demography

Introduction:

Demography is considered an expansive science, yet its core focus remains the most essential element: the population. Humans are the axis of existence, and all social phenomena are inherently linked to them. For instance, when studying the phenomenon of unemployment, it is impossible to separate it from the population; likewise, studying the spread of an epidemic must be linked to the population. Consequently, this science has been divided into several branches, each focusing on a specific field, while all contribute to the same foundational objective.

Type I: Social Demography:

This type of study focuses on understanding the complex relationship between social factors, population growth, and population composition. Poverty, educational level, and marital status are considered fundamental factors that significantly influence demographic dynamics. These social factors are among the primary drivers that shape the population structure and determine patterns of growth, in addition to their direct impact on the demographic decisions made by individuals within a society.

Poverty is one of the most prominent social factors affecting fertility rates; studies indicate that individuals in low-income areas tend to have more children compared to those in high-income areas. This is due to a set of factors, such as:

Lack of access to healthcare, education, and family planning. Additionally, poverty may lead to increased mortality rates due to the lack of medical care and weak health services.

As for the educational level, it is an important factor in shaping demographic trends. High education, especially among women, is strongly associated with declining fertility rates and increased life expectancy. Educated women often have better options regarding family planning and focus more on employment and personal development, which reduces their drive to have a large number of children. Education also enhances health awareness, contributing to improved survival rates and a reduction in mortality rates.

Marital status also contributes significantly to determining family and population composition. Marriage and the presence of children in the family have a direct impact on population growth, as family relationships can influence reproductive decision-making. Families that rely on economic assistance may be more prone to forming larger families compared to economically independent families.

Other demographic factors such as age and sex also play a pivotal role in shaping population growth. For example, countries with a youthful population structure may witness higher fertility rates due to the increased number of women in reproductive age. Furthermore, gender disparities in some societies may lead to differences in marriage and reproduction rates between males and females, affecting the population structure.

Consequently, this type of study shows the importance of examining the mutual influence between social and demographic factors, as social factors contribute to directing population policies and determining future population trends. By understanding these complex relationships, policies can be designed that suit the social and economic needs of societies, helping to manage population growth in a sustainable and effective manner.

Type II: Geographical Demography:

Or as some call it, Human Geography; it is primarily concerned with the distribution of populations and the extent of their spread across a certain geographical area. It identifies areas of population attraction as well as areas of repulsion, in light of certain social and economic requirements. Every region has incentives through which population is attracted toward it, which are fundamentally centered on job opportunities, climate, and the provision of life necessities such as schools, hospitals, administrations, and public facilities, etc.

Type III: Medical Demography:

This branch is considered one of the most important specializations in the science of population, as it focuses on studying the relationship between the health status of individuals and a number of demographic variables such as age, sex, educational level, living standard, and economic conditions. It aims to analyze health differences between various social groups, focusing on the impact of diseases and their variables on these groups. The primary topics of this field include the study of life expectancy, the prevalence of chronic diseases such as diabetes and hypertension, in addition to evaluating the impact of health conditions on population growth and quality of life. This branch contributes to providing accurate data to support health policies and promote sustainable development.

Type IV: Economic Demography:

Economic demography is one of the most important branches of demography, as it is concerned with studying the relationship between the population structure and the existing economic situation of the population. This branch focuses on analyzing the mutual effects between

demographic variables—such as population growth, age, and sex—and economic indicators such as unemployment rates, income, poverty, and patterns of consumption and production. It is also concerned with studying the distribution of the labor force and its impact on economic development, along with analyzing economic disparities between different population groups. This branch contributes to providing deep insights into how to invest human resources to achieve comprehensive development and to formulate appropriate economic policies to improve living standards and enhance social justice.

Type V: Historical Demography:

Historical demography is a branch of demography that focuses on the study of populations during specific historical periods, with the aim of understanding population changes and their relationship to historical events and the economic, social, political, and cultural conditions witnessed during those periods. This science relies on the analysis of old records, such as birth, death, and marriage registers, official documents, and administrative reports, to reconstruct a clear picture of population changes, such as growth rates, migration, population distribution, and changes in age structure. Historical demography also sheds light on the impact of wars, epidemics, famines, and major economic shifts on the population, allowing for a deeper understanding of the interactions between the population and the conditions surrounding them over time.

Type VI: Mathematical Demography:

Mathematical demography is a specialized branch of population science concerned with using mathematical methods and statistical models to analyze population phenomena and predict demographic changes. It aims to develop mathematical equations and formulas to understand population

dynamics, such as rates of growth, fertility, mortality, and migration. These models are used to estimate future changes in population size, age structure, and geographical distribution based on current and historical data.

Mathematical demography relies on tools such as life tables, population growth equations, and simulation models, which help in making strategic decisions in fields such as urban planning, health policies, and economic programs, as it provides a clear vision of population variables and their impacts on societies.

Module II: Sources of Population Data

- **Lecture 5:** Static Data Sources
- **Lecture 6:** Dynamic Data Sources

Module II: Sources of Demographic Data

Introduction:

Demography is a science that requires a periodic flow of data, as its strength and credibility derive from the availability of exclusive data regarding the geographical scope within its jurisdiction. Therefore, it is essential to address the primary sources that provide demography with various types of data.

Some sources provide data that changes daily, or in some cases, over time intervals often measured in seconds and minutes, while other sources are stationary and do not change except after significant and periodic intervals.

These sources are considered complementary to one another. Sample demographic surveys are used to update census data, particularly when censuses are conducted at long intervals (which may exceed 20 years in some countries). Some countries conduct a census every ten years, while others do so every five years. These surveys may also be used as a substitute for census data when conducting a population census is not feasible due to specific national circumstances. Through these surveys, population size can be estimated and key characteristics identified. Occasionally, censuses and surveys are used to fill gaps recorded in vital records. In this lesson, we will discuss these primary sources and their methodologies in detail.

Lecture 05: Sources of Static Data

First: The Population Census

The population census is considered one of the most prominent and extensive sources in the field of population studies, both in terms of the number of countries that rely on it and the comprehensive characteristics it seeks to collect. Population censuses are conducted periodically in most countries worldwide and serve as an essential tool for obtaining accurate and comprehensive information about the population.

The census covers a wide range of characteristics, including demographic data such as size, age structure, and sex composition; economic characteristics such as occupations, income levels, and unemployment rates; social characteristics such as educational attainment, marital status, and religion; as well as cultural characteristics such as languages spoken and others. The census is used to provide an integrated database that contributes to developmental planning, public policy formulation, and the more efficient allocation of resources to achieve sustainable development.

1. Concept:

It can be defined as the total process of collecting, compiling, and publishing demographic, economic, and social data pertaining, at a specified time, to all persons in a particular territory. (Ali, 2010, p. 77)

The census can also be defined as "the total process of collecting, preparing, and publishing demographic information concerning all persons in a country or a specific area at a particular time." (Al-Bayati, 2009, p. 37)

Furthermore, a population census can be defined as a set of comprehensive statistical operations aimed at enumerating and counting all individuals residing in a specific geographical area during a specific period. These operations are a fundamental tool for gathering accurate population data, ensuring inclusivity by including all individuals without exception.

The census aims to provide detailed information on demographic characteristics such as size, age, and sex, in addition to economic aspects like income and occupation, and social factors such as educational level and family status. In other words, the census focuses on collecting all data related to population conditions to help understand demographic dynamics and utilize them in planning and decision-making related to social and economic development.

From the previous definitions, we can conclude that a census must meet several conditions to ensure its credibility, most importantly:

- **Official Status:** This means the census process must be under the auspices of the government (the state), as it is the entity authorized to carry out this operation. No individual can conduct it, given its high cost and the confidentiality of the data.
- **Universality (Inclusivity):** The process must include all citizens regardless of their religion, ethnicity, or nationality, and cover the entire geographical area under study, such as the state's borders. If it lacks universality, it is not considered a census but rather a demographic survey.
- **Individuality:** This means the census should cover individuals separately, where a specific information form is allocated to each person, whether old or young, as every individual has their own data.

- **Periodicity and Regularity:** Temporal succession is a fundamental condition for conducting a population census. The time interval must be fixed between one census and the next, especially since censuses are required to be conducted periodically. This succession helps countries conduct comparisons and track population developments in terms of structure, composition, and size. Time intervals range from 20 years to 10 years, or 5 years in some countries. Algeria, for example, adopts a census every 10 years. The first census in independent Algeria took place in 1967, followed by 1977, 1987, and then 1998 (the latter was delayed by one year due to internal conditions in the Algerian state), then 2008, and finally the 2022 census, which is the most recent. It is worth noting that this census was delayed by four years due to the COVID-19 pandemic that affected the world.
- **Simultaneity:** This refers to the specific time frame set for the census process. It is preferred to conduct it during holidays when population movement decreases. The duration of the enumeration should ideally be short, such as a single day across the entire national territory, preceded by a day to issue the order of passage. The credibility of the census depends on the brevity of the implementation period; the longer the duration, the more population movement increases and their composition changes, especially in *de facto* censuses.

2. Types of Census:

There are two types of censuses, and each country chooses a specific type. However, some countries resort to population enumeration by combining the two types, which we will explain in detail:

- **The *De Facto* Census:** In this type, agents count individuals where they are actually present at the moment of the census, without considering their original place of residence or the principle of permanent or

temporary residence. In this case, the individual is counted based on their location at the time of the census, whether they are a resident or a foreigner. This type is used in developed countries, and synchronization is preferred.

- **The *De Jure* (Theoretical) Census:** This type relies on the actual place of residence regardless of where the individual is present at the moment of the census. For example, a person residing in the province of Batna but working in the province of Khenchela is counted among the population of Batna. In this case, the assigned agent records individuals based on data declared by a family member and based on the family record book. This is the type adopted by Algeria in its population census process.

3. Steps for Conducting a Population Census:

To conduct a population census, a series of practical steps must be followed. The credibility and success of the census depend on the extent to which these steps are implemented:

1. **Who conducts the census:** In every country, there is a body authorized by the government to be responsible for conducting the census. In Algeria, for instance, the responsibility is given to the National Office of Statistics (ONS).
2. **Technical and Human Preparation:** In this stage, preparation for the census occurs at both national and local levels. A specific date is set and announced, focusing on community awareness regarding its importance and objectives. Awareness campaigns emphasize that data collected during the census is used exclusively for statistical purposes, especially when the census is conducted for the first time, to avoid any misunderstanding that might cause public concern. Additionally, a precise timeline for implementation is prepared, with personnel carefully selected

and provided with comprehensive training to ensure accurate and efficient data collection.

3. **Preparation of Questionnaires:** Census forms are designed based on questions used in previous censuses to facilitate comparisons of demographic data over time. However, adjustments and updates are made to the content in response to changing needs and social and economic developments. These modifications are usually made in consultation with various government bodies and agencies to ensure the forms cover all aspects of national importance and meet the needs of decision-makers.

Disadvantages of the Census:

- Some forms may contain inaccurate, incomplete, or contradictory information, leading to their exclusion and cancellation.
- Difficulties are faced in enumerating certain groups, such as nomads and Bedouins, whose counting and registration require a long period that may exceed three months.
- The census is characterized by high costs and delays in publishing results, meaning the data it provides may become inaccurate by the time it is released. For this reason, some countries have adopted alternative means to collect population data more efficiently and in a more updated manner.

Second: Sample Surveys

This is one of the most important methods for collecting demographic data. Through this method, we rely on downsizing the studied population using random sampling to allow for the subsequent generalization of results. A sample survey is defined as "a statistical inference based on generalizing from the part to the whole. Through it, demographic data can be obtained quickly and at a low cost without a significant loss in accuracy. These surveys are conducted either for the entire population or

a specific segment thereof." (Al-Saidi, 2014, p. 43). There are many types of samples, such as simple random, systematic random, stratified, and cluster sampling. Each type has a method for selecting subjects that primarily depends on the nature of the studied population and the objective of the study.

This method is used when it is assumed that the studied portion can achieve the desired objectives without the need to study the entire population. This method is characterized by several features that distinguish it from other methods, including:

- **Ease:** If the sample is selected correctly and appropriately, the process of obtaining, analyzing, and extracting results can be organized and managed with total ease.
- **Flexibility:** This means that obtaining data can occur at any time and place; it is not restricted to a specific period or a particular group.
- **Low Cost:** Reducing the number of study subjects allows for significant savings in expenses, especially those related to printing and distributing questionnaires, as well as traveling to multiple and diverse locations to conduct the study.
- **Immediacy in Obtaining Results:** By relying on sample surveys, a lot of time can be saved. Reducing the studied population allows the study to be conducted in a short period compared to a comprehensive study like a census.

Lecture 06: Sources of Dynamic Data

As previously indicated, the data from these sources are considered non-static due to the continuous nature of population change. For instance, a new birth may occur every hour or less, and similarly, deaths occur frequently, rendering the population size in a state of permanent flux.

Among the most prominent sources dedicated to providing continuous and accurate population data are Vital Records—also known as Civil Registration records—which document events such as births, deaths, marriages, and divorces. Additionally, Population Registers focus on collecting information about individuals, such as places of residence, family status, and other demographic characteristics, contributing to a comprehensive and updated picture of population dynamics.

First: Vital Records

These are records in which various vital events are registered, such as births, deaths, marriages, and divorces, as well as adoptions. Registration is mandatory for every citizen as stipulated by the United Nations General Assembly. The registration of these phenomena has been organized in most countries worldwide according to the civil law existing in each state. When an individual is born, they are registered immediately, and all demographic changes occurring throughout their life continue to be recorded until their death is registered. Therefore, vital registration for individuals can be considered a means of protecting their rights on one hand, and a method for documenting and preserving personal facts on the other.

1. Origins:

The early beginnings of this type of registration date back to the 16th century in Europe, where the church collected vital statistics on population strata. In the second half of the 18th century, some European countries pioneered these registrations, led by Finland, Denmark, Norway, and Sweden, by establishing a civil administration to replace the church in recording these statistics in an organized manner. Subsequently, this practice spread to many countries worldwide, particularly in North America and Europe.

In the contemporary era, vital registration has become a global system to which all countries are committed, although only a few have actually succeeded in establishing a complete registration system. The process is still progressing at a very slow pace in many regions of the world.

2. Characteristics of Vital Registration:

This source of data collection is characterized by a set of features that distinguish it from other sources, mainly:

- **Universality:** This means the process includes all individuals residing within the geographical area of the registration district (municipality, province, etc.).
- **Compulsion (Mandatory Nature):** Vital registration is a mandatory process, whether it concerns registering a newborn, declaring marriage or divorce, or recording deaths when they occur.
- **Continuity:** The vital registration process is endless, as it is inextricably linked to human existence; thus, it continues as long as humans exist.
- **Immediacy of Registration:** Immediacy here refers to the instantaneous recording of events coinciding with their occurrence. For example, a birth

is registered immediately after the child is born, and the same applies to deaths, marriages, etc.

- **Low Cost:** Compared to other sources, vital registration is the least expensive, as it only requires reporting and recording rather than drafting plans and allocating specific budgets for its implementation.

3. Obstacles Limiting Effectiveness:

Despite many countries possessing accurate vital statistics, others lack even primary data. For example, death statistics are available for only a quarter of Africa's population and half of the populations in Asia and South America; birth statistics are in no better state. Consequently, several obstacles limit the process of registering deaths, births, and other vital events, which can be summarized as follows:

- Failure to register births, as is the case in remote areas.
- Omission of registering female births due to customs and traditions in many countries, where many aspire to have a male child first. In the case of a firstborn female, her registration might be delayed until a male is born; he is registered first, and then the girl is registered.
- Registering deaths, particularly for infants, without specifying sex, age, or even the causes leading to death.
- Confusion between formal and informal marriage, especially in European countries, where separation does not necessarily result in a legal record. Consequently, it does not enter vital registrations, which ultimately necessitates handling this type of population data with constant caution to avoid estimation errors.

Second: Population Registers

This is considered one of the most modern and accurate methods of population counting, emerging in response to significant technological advancements and the increasing need for accurate and continuously updated data. Several countries, especially Scandinavian ones, adopt this method due to its advantages in managing population data.

The mechanism begins at the moment of an individual's birth, where a personal record is opened containing all their basic data. This record is not limited to birth registration but is continuously updated to include any substantial changes in the individual's life, such as changes in residence, social status (marriage or divorce), educational level, and even family-related events like a new birth or the death of a family member.

The population register is distinguished as an accurate and comprehensive tool, as this data accompanies the individual wherever they move or settle, ensuring precise and permanent monitoring of population movement. Updating is performed regularly by linking the population register with other data sources, such as health, educational, and administrative institutions.

Module III: Population Theories

- **Lecture 7:** The Concept of Theory / Malthusian Theory
- **Lecture 8:** Naturalistic Theories
- **Lecture 9:** Sociological Theories
- **Lecture 10:** Economic Theories

Lecture 07: The Concept of Theory and Malthusian Theory

Introduction:

After providing a conceptual overview of the basic terms that contribute to the formation of an introduction to Demography, it is essential to present an independent theoretical exposition. This involves delving into the various theories that have shaped the field, attempting to understand it through scientific and methodological lenses. We observe that many students and laypeople alike experience confusion when first encountering the term "theory," perceiving it as an abstract, vague, or ambiguous construct that is unmeasurable in reality. However, the truth contradicts this belief; theory is the foundation of our daily lives, influencing our behaviors, reactions, and problems. To explore this further, this lecture aims to define "theory" and examine the Malthusian Theory in detail.

First: The Concept of Theory

Population theory can be defined as a set of propositions based on observation and experimentation that provide an explanation for population phenomena from a purely social perspective or through relationships with a demographic outlook, which can be observed and verified. Numerous and diverse theories have emerged, addressing the population issue from various angles (Kradsha, 2009, p. 54). From this definition, it can be argued that a "good theory" is one capable of touching upon reality, especially since some theories express simple, easy-to-understand ideas, while others possess a high degree of complexity and ambiguity.

If theory is defined as "a set of interrelated concepts, definitions, and assumptions that present a systematic view of phenomena; specifying variables that influence each other and the relationships between them with the aim of describing, explaining, and predicting these phenomena" (Al-Kubaisi, 2015, p. 136), then this general concept drives us to research population theories deeply, starting with Thomas Robert Malthus.

Second: Malthusian Theory

Thomas Robert Malthus is one of the most prominent and famous thinkers whose name has been permanently linked to Demography. Born in England in 1766, he was a distinguished scholar at Cambridge University, ordained as a clergyman in 1797, and served as a professor of history and political economy. The era in which he lived was characterized by significant social and economic reorganization. Malthus is considered by many demographers as the true founder of this field of study, due to his use of scientific and statistical methods to support his ideas.

Content of Malthusian Theory:

Malthus presented his initial ideas on the population issue in his 1798 book titled *An Essay on the Principle of Population*, in which he compared population growth to means of subsistence. His ideas were based on data available in England, the United States, and some European countries in the 18th century regarding population size and land productivity. He derived several key conclusions, notably: (Al-Bayati, 2009, p. 55)

- There is a direct correlation between population size and subsistence resources; an increase in population must be accompanied by an increase in resources.

- The cause of poverty in societies is that the population exceeds the resources sufficient to satisfy their needs.
- The human capacity for reproduction is faster than the earth's capacity to produce what is required for human survival.
- Population doubles every 25 years, unless obstructed by obstacles, increasing in a **geometric progression** (2, 4, 8, 16...), whereas resources double in the same period in an **arithmetic progression** (2, 4, 6, 8...). Consequently, the world's population will inevitably face food shortages because subsistence resources and cultivated land often remain stagnant.

There is an inverse relationship between population increase and the production rate of consumer goods. The level of population growth is maintained in proportion to the means of survival through **positive checks** (unhealthy industries, epidemics, wars). When an imbalance occurs between population size and the means of subsistence, the death rate rises systematically until the population size decreases to a level proportionate to available resources. Conversely, a temporary increase in the means of survival leads to lower death rates until the population reaches a point of equilibrium with resources—this is known as the **Malthusian Dilemma**.

Malthus's Ideas for Limiting Population Growth:

Malthus emphasized the necessity of controlling population growth to match available resources. He famously rejected increasing workers' wages, justifying this by claiming that higher wages would encourage early marriage and procreation, leading to growth rates that exceed the carrying capacity of natural resources. He also criticized the marriage and reproduction of the poor, viewing it as a burden on resources, and argued they had no right to assistance from charities or a share of nature's resources, and must bear the responsibility for choices that violate the

laws of nature. Furthermore, he proposed "moral restraint"—imposing obstacles to early marriage—as an effective means to lower birth rates.

Advantages of Malthusian Theory:

Malthusian theory was a significant starting point for conducting periodic and comprehensive censuses in countries like England and Scotland, contributing to the collection of vital demographic data. Through his hypotheses on growth and equilibrium, he laid the foundations upon which subsequent theories regarding the eternal relationship between population and development were built. Despite criticisms, it remains a fundamental reference for understanding the relationship between demographic growth and economic resources, serving as the cornerstone for the quantitative study of population.

Evaluation of Malthusian Theory:

For years, Malthus sought to develop his theory to align with reality, especially given the widespread criticism that earned him the label of a "pessimist." His theory was criticized for unrealistic assumptions, most notably the "law of geometric progression." Reality has shown that population growth is far more complex. Critics also contested his arithmetic progression for food production for the following reasons:

1. **Assumption of Static Production Methods:** Malthus assumed production would not evolve fast enough; however, agricultural technology and modern techniques have allowed food production to increase substantially.
2. **Agriculture as the Sole Source:** He ignored other diverse food sources, such as the food industry and technological innovations.
3. **Marginalizing the Human Role:** Malthus viewed humans solely as **consumers** of resources, neglecting their proactive role as **producers**

and innovators who drive progress and improve economic and technological output.

These criticisms highlighted that Malthus's theory was limited in its explanation of the factors influencing population growth and development, rendering some of his concepts far removed from reality.

Lecture 08: Natural (Biological) Theories

Introduction:

Malthusian ideas formed the primary reference for natural or biological approaches to population. His perspective—that population tends to increase at a rate exceeding the growth of food resources required for human existence—dominated demographic thought. Eventually, thinkers emerged who subjected these ideas to debate, with some offering critiques and others support. This lecture explores the works of thinkers who engaged with Malthusian concepts.

1. Sadler's Theory (1780–1835):

Michael Thomas Sadler was an English economist and social reformer who believed that natural law governs population increase, a view fundamentally opposed to that of Robert Malthus. Sadler argued that the human tendency to increase would inevitably and naturally cease. In his 1830 book, *The Law of Population*, he posited that variations in fecundity are influenced by wealth and happiness rather than misery and poverty.

According to Sadler, the deprivation of luxury encourages procreation by stimulating the physical capacity for reproduction. This applies to small-scale societies in transitional phases (from hunting to pastoralism, then to agriculture and finally industry). As humanity ascends the ladder of civilization, reaching higher levels characterized by intense division of labor and specialization, the physical burden of labor diminishes. Gradually, man's relationship with production becomes indirect as machines take his place. This process liberates people from manual labor, shifting work toward mental and intellectual domains. At this stage, comfort and luxury prevail, and the population begins to decrease

gradually until it stabilizes at a specific point where humanity reaches maximum happiness (Kradsha, 2009, pp. 43–44).

2. Thomas Doubleday's Theory (1790–1870):

Thomas Doubleday was an English economist and social philosopher known for his contributions to sociology and economics. He criticized the Malthusian theory of growth, believing that population increase should not be viewed as a permanent threat if managed correctly. He argued that resources are not as strictly limited as Malthus claimed and was among the first to suggest that social and technological development enhances the capacity to adapt to population growth.

Doubleday divided society into three categories (Al-Sayed, 2004, p. 147):

- **The First Category:** The extremely poor, who increase rapidly in number.
- **The Second Category:** The wealthy, who enjoy abundant food and luxury; this group is in constant decline as they do not encourage procreation.
- **The Third Category:** The middle class, who have sufficient food, do not suffer from exhaustion, and are not idle. Their birth rate remains stable.

Based on this classification, Doubleday formulated the "**Great Law of Population**," stating that the interaction between wealth and poverty directly affects population size:

- **In Wealthy Societies:** Abundance naturally leads to population decline as improved living standards reduce the necessity or drive for large families.

- **In Poor Societies:** Conversely, societies suffering from poverty and malnutrition witness population increases proportional to their level of deprivation.
- **In Equilibrium:** If a balance between wealth and poverty is achieved—providing sufficient welfare while maintaining socio-economic stability—the population remains constant.

3. Herbert Spencer's Theory (1820–1903):

An English philosopher whose thought was rooted in biological interpretation, Spencer articulated his views in *The Principles of Biology* (1901). He believed that:

- While food increases the capacity for procreation, nature—not individual will—ultimately controls population growth.
- Nature diminishes the individual's interest in procreation as effort is redirected toward personal, professional, and economic development (**individuation**).
- Spencer supported his theory with the observation that women in intellectual professions often exhibit lower fertility. Despite belonging to upper classes with access to healthy food, their intense mental effort renders them less capable of child-rearing. He concluded there is an inverse relationship between the effort an individual exerts for self-assertion and the effort directed toward procreation. He predicted a demographic slowdown as humanity seeks higher civilization (Al-Bayati, 2009, p. 61).

Spencer's views reflect an optimistic outlook where population growth stimulates the effective use of resources, leading to societal evolution. However, Spencer also attacked Doubleday's "Great Law," arguing his data was flawed and that better nutrition actually increases fecundity

rather than decreasing it, noting that prosperity generally leads to population growth.

4. Corrado Gini's Theory:

An Italian sociologist who studied population changes as indicators of evolution, Gini presented his views in *The Contribution of Demography to the Evolution of Societies* (1912). He analyzed the relationship between population and changes in social structure across biological, morphological, economic, and cultural dimensions (Kradsha, 2009, p. 44).

Gini compared population growth to the human life cycle: birth, childhood, youth, maturity, old age, and death. He argued that societies pass through three evolutionary stages (Kradsha, 2009, p. 46):

- **Stage One: Emergence and Formation:** Characterized by high fertility, rapid growth, and a lack of class distinctions (similar to ancient Athens or modern migrant societies like the early USA or Australia).
- **Stage Two: Progress and Prosperity:** Society stabilizes and shifts toward agriculture. Fertility rates decline as the population ages. Gini attributed this decline to "social capillarity" (social climbing); newer generations are more focused on self-realization and social mobility. Rising classes limit procreation to improve their socio-economic status. This stage often sees population loss due to expansionist wars but results in economic revival, luxury, urbanization, and the flourishing of arts and democracy.
- **Stage Three: Senescence and Dissolution:** This is the stage of state collapse. It is characterized by the neglect of agricultural land due to labor shortages, leading to rural decline. In cities, industrial demand falls while consumption remains high, triggering economic crises. Class

conflict intensifies, and state intervention (via taxes and economic control) fails to stabilize the society, eventually leading to its disappearance.

It is worth noting that Gini's theory did not achieve significant global resonance, as many critics argued his ideas lacked a strong connection to empirical reality and had not been documented in actual global demographic trends.

Lecture 09: Social Theories

Introduction:

The late 19th and early 20th centuries witnessed the emergence of several social theories to explain population issues, particularly growth and density and their relationship to the evolution of human societies. These theories posit that through numerical increase and density of distribution, populations achieve significant progress, especially under conditions of diversity and variation, where the division of labor stands as a primary catalyst.

Among the most prominent theories that gained widespread acclaim during this period were those proposed by the French scholar Émile Durkheim and the American sociologist Kingsley Davis, in addition to the Demographic Transition Theory, which resonated globally.

Émile Durkheim's Theory:

As a French sociologist and philosopher, Durkheim made extensive contributions to social structure and population, particularly regarding social solidarity and the division of labor. Durkheim's contribution to demography lies in his creative vision of the relationship between population growth and the division of labor. He noted that population

increase—especially in high-density societies—may lead to intense conflict and competition over resources and economic opportunities.

In certain cases, when individuals compete for the same roles or activities (such as vending or carpentry), social and economic life becomes complex, leading to tension. Durkheim offered a solution through the "division of labor," advocating for the diversification and organized distribution of occupations among individuals to mitigate competition and enhance social cohesion. This distribution relies on creating differentiation in roles, leading to two types of social solidarity: **Mechanical Solidarity** in traditional societies, where cohesion results from similarity in tasks, and **Organic Solidarity** in modern societies, where specialized roles build a network of mutual interdependence.

Durkheim's ideas emphasize that increased population density can be an opportunity for societal development, provided labor is distributed in a way that achieves balance and social stability. Thus, his core argument links population increase to the diversification of skills and professions, driving societal evolution—a phenomenon absent in small populations.

In this context, his disciple Marcel Mauss conducted a study on Eskimo tribes, demonstrating how living patterns change with demographic shifts. In winter, people gather in large rectangular houses (multiple families in one dwelling), whereas in summer, they disperse into individual family units. Thus, population density is high in winter and low in summer, a variation followed by shifts in their entire social life, including family systems, wealth, and religious practices (Amira, 2014, p. 118).

Kingsley Davis's Theory:

An American sociologist who addressed various population-related topics, Davis differed from previous theories by rejecting single-factor

explanations (economic, cultural, or biological) for social and demographic change. Davis views society as tending toward **social equilibrium**—not a balance between population and resources as Malthus claimed, but an equilibrium between population size and the **requirements of the social structure**. These requirements include resources necessary to achieve the religious, educational, artistic, recreational, and political goals pursued by society (Al-Jawad, 2009, p. 18).

If social equilibrium is disrupted—whether by population increase or a deficiency in social structure requirements—the population tends to adapt through various responses such as delaying marriage, abortion, or family planning. In this regard, he aligns with Carr-Saunders in believing in the individual's will to control population size.

His theory can be summarized as follows (Kradsha, 2009, p. 38):

- **Rejection of Monocausal Theories:** He completely rejected theories explaining social change based on a single variable.
- **Opposition to Purely Economic/Cultural Factors:** He opposed ideas that subjected fertility control solely to economic factors (resource scarcity) or cultural factors alone.
- **Complexity of Explanation:** He viewed single-factor explanations as an evasion of complex analysis. To understand demographic changes, one must view society as a system seeking social equilibrium, influenced by internal and external forces that threaten balance, met by social forces working to restore it.
- **Adaptation Mechanisms:** When equilibrium is lost, populations adapt through responses like delaying marriage or abortion.
- **Application to Developed Nations:** Applying his theory to developed countries, Davis argued that the real reason for declining birth rates is the

material capacity of individuals to benefit from increasing welfare and new life opportunities. This led to higher costs for socialization (such as education) and a shift in focus toward **quality over quantity** in child-rearing.

Lecture 10: Economic Theories of Population

Introduction:

Many economists have approached demographic issues not from a purely social, biological, or health-related perspective, but rather as a means to address economic problems by establishing laws and rules that govern them, considering the human element as the most vital component. Consequently, no economic problem can be analyzed in isolation from the population. The following is a presentation of the most prominent economic theorists who linked economic issues to the human element.

1. Karl Marx's Theory (1818–1883)

A German philosopher and economist famous for his socialist ideas and rejection of capitalist systems. Although more than a century has passed since his death, his ideas continue to provoke debate and find acceptance among those interested in sociological, philosophical, and even political studies.

When Robert Malthus died, Karl Marx was still a young boy, and Malthusianism dominated European demographic thought. Marx did not accept the idea of a single universal law governing population for all places and times, regardless of the nature of social organization. While Marx did not author a specific book solely on population, his ideas stemmed from his general theory, which viewed the socialist system as the only remedy for the economic and social problems individuals face.

Marx focused on analyzing the relationship between the material conditions of life and patterns of thought—a relationship based on a principle that evolves and changes as society develops through history (Abdel-Jawad, 2008, p. 14). His most important ideas regarding

population were included in his seminal work, *Das Kapital* (Capital), published in 1867, and can be summarized as follows (Kradsha, 2012, p. 30):

- ✓ **Production and System:** He believed that society passes through distinct stages of change based on economic shifts.
- ✓ **Employment Rates:** He hypothesized that population growth is linked to the employment rate within the prevailing economic system.
- ✓ **The Capitalist Critique:** Based on his study of capitalism, Marx observed a "surplus population" resulting from decreasing employment rates, cost-cutting measures, and capital accumulation.
- ✓ **The Socialist Vision:** He predicted the absence of a surplus population in a socialist system due to full employment and the balance between capital and labor.
- ✓ **Rejection of Universal Laws:** He concluded that there is no fixed natural law governing human population; rather, each historical stage of development has its own specific law. A "natural law" of population, he argued, only applies to plants and animals where human intervention in reproduction is absent.
- ✓ **Elimination of Poverty:** He denied that poverty and misery are products of biological factors; instead, they are the results of a failed economic system (Capitalism) that fails to achieve full employment for all members of society.

2. Adam Smith's Theory

One of the most famous Scottish economists of the 18th century, Smith linked the issue of supply and demand to population in his economic frameworks. He aimed to create balance in productive societies, concluding that population size and individual income are directly related to marriage rates.

According to Adam Smith, if the population decreases, wages will rise, which inevitably encourages marriage and leads to increased childbirth, thereby restoring demographic balance. Conversely, in cases of economic collapse and receding job opportunities, marriage and birth rates decline until conditions allow for a return to social equilibrium. He argued that improved economic conditions lead to a labor supply that exceeds demand, resulting in higher wages and improved living standards (Amira, 2013, p. 122).

However, these ideas were not entirely embraced by later European scholars, as they failed to align with reality in subsequent periods. Despite a significant decline in birth rates in European societies, the economy continued to advance remarkably, contradicting Smith's premise.

3. Carr-Saunders' Theory

The name of this English scholar is associated with the "**Optimum Population Theory**." Unlike Malthus, Carr-Saunders believed that populations increase at rates proportional to their available resources. His ideas centered on the "Optimum Size," a threshold that humans constantly strive to reach. From his perspective, population growth is under human control based on the ability to satisfy desires for a decent and dignified life.

Carr-Saunders posited an organic relationship between the natural resources available and population size, focusing on the optimal utilization of these resources for production. This link between the most suitable size and resource optimization aims to raise individual living standards (Amira, 2013, p. 113). He used **average per capita income** as a measure: if per capita income is increasing, it indicates a population

under-size; if it is declining, the population has exceeded the optimum level (Abdel-Jawad, 2008, p. 17).

Despite his contributions, he faced criticism for focusing on a static model and neglecting how technological development dynamically changes resource availability over time. His theory is often described as "monocausal" because it relies solely on wealth and resources, ignoring social and natural factors.

4. Cost Theory (Leibenstein)

Proposed by the demographer Harvey Leibenstein, this theory suggests that individuals act rationally and wisely regarding their reproductive behavior. People perform "preliminary calculations" to determine the desired number of children, aimed at achieving satisfaction and utility from an additional child while weighing the resulting costs.

Leibenstein identified three types of **utility (benefits)** derived from an additional child (Kradsha, 2012, p. 35):

- **Psychological Utility:** The child as a source of joy for the parents.
- **Economic Utility:** Children as factors of production and sources of new income; each child represents a new pair of hands added to the family labor force.
- **Prospective Utility:** Children as "old-age security," providing care for parents during illness or senescence.
- Conversely, he identified two types of **costs** for an additional child:
- **Direct Cost:** Calculated through the continuous financial expenditures required to support children until they reach self-sufficiency.
- **Indirect Cost (Opportunity Cost):** Calculated through the loss of employment opportunities for the mother. Childbearing places the

woman before two choices: remaining in the labor market (thereby reducing the number of children) or leaving work to raise the desired number of children.

Lecture 11: Demographic Phenomena: Fertility and Mortality

I. Concept of Demographic Phenomena

A demographic phenomenon refers to the set of characteristics and traits that distinguish a population in a specific region or society during a defined period. It is the focal point of Demography and encompasses all aspects related to population, such as size, geographic distribution, density, and age-sex structure, as well as dynamics associated with population growth, namely births, deaths, and migration.

II. Fertility

1. Concept:

Fertility is defined as the actual reproductive performance or the biological capacity to bear children. Any woman within the reproductive age span (15–49 years) is considered fertile. Atif Ghaith defines it as "the actual rate of births, referring to the capacity for procreation within the period between fifteen and forty-nine years" (Ghaith, 1999, p. 189). There are several types of fertility:

- **Actual Fertility:** Measured by the number of live-born children.
- **Natural (Physiological) Fertility:** The physiological capacity to conceive and bear children.
- **Preferential Fertility:** The number of children a couple desires to have.

2. Factors Controlling Fertility:

- **Age:** Fertility peaks for women in their 20s and early 30s. After age 35, it declines significantly until menopause. For men, fertility

remains robust longer, though sperm quality may decline after age 40.

- **Female Labor Force Participation:** Employment can delay the age of marriage and first birth as women seek economic stability. However, high-stress jobs may negatively impact reproductive hormones.
- **Socio-Cultural Level:** Higher educational attainment often leads to lower fertility as women prioritize professional goals. Conversely, in societies with lower educational levels, a lack of family planning awareness often results in higher fertility rates.

III. Mortality

1. Concept:

Mortality refers to the cessation of life and the failure of bodily systems. Its primary causes include:

- **Diseases:** Including chronic biological diseases (heart disease, cancer), infectious diseases (Malaria, COVID-19), and "social diseases" linked to poverty (Tuberculosis, anemia).
- **Poverty:** A direct correlation exists between high mortality and low income, affecting life expectancy.
- **Wars and Natural Disasters:** Factors causing immediate and large-scale population loss, such as the recent earthquakes in Syria and Turkey.
- **Traffic Accidents:** One of the leading modern causes of rising mortality rates.

Lecture 12: Marriage and Divorce

I. Marriage

1. Concept:

Marriage is a contract between a man and a woman (or their representatives) that legalizes their relationship according to legitimate social and religious norms. It entails mutual rights, duties, and responsibilities regarding offspring and kinship (Shaban, 1964, p. 9).

2. Conditions:

- **Legitimacy:** The contract must comply with legal and religious frameworks.
- **Continuity:** The intention must be for a lifelong union without a pre-defined expiration.

3. Types of Marriage:

- **Halal (Legitimate) Marriage:** Meets all legal/religious pillars (consent, guardian, witnesses, and dower).
- **Nikah al-Mut'ah:** A marriage where the husband has a hidden intention to divorce after a certain period (specific to certain contexts).
- **Urfi (Customary) Marriage:** A contract with witnesses but without official registration in state courts.
- **Misyar Marriage:** The husband visits the wife but she remains in her own home and may waive certain financial rights.
- **Shighar Marriage:** An exchange marriage between families without dowries (prohibited in many jurisdictions).

II. Divorce

1. Concept:

The legal termination of a marital relationship, occurring at the request of one or both parties, often involving procedures for child custody and asset division.

2. Types of Divorce:

- **Sunni Divorce:** Occurs in accordance with religious teachings (a single revocable pronouncement during a period of purity).
- **Bid'i (Innovative) Divorce:** Occurs in contradiction to religious guidance (e.g., during menstruation).
- **Revocable Divorce :** The husband can take the wife back during the waiting period without a new contract.
- **Irrevocable Divorce :**
- **Minor Irrevocability:** Requires a new contract and dower to reunite after the *Iddah*.
- **Major Irrevocability:** Occurs after the third pronouncement; they cannot reunite unless she marries and is divorced by another man.

Lecture 13: Migration

1. Concept

Migration is the process of changing one's place of residence, whether permanently or temporarily, voluntarily or forced. It is classified as **Internal** (within a country) or **International** (between countries).

2. Types of Migration

❖ Geographic:

- **Internal:** e.g., rural-to-urban migration.
- **External:** Crossing international borders for work or study.

❖ Legal Status:

- **Regular (Legal):** Conducted with valid visas and through official ports.
- **Irregular (Illegal):** Crossing borders without official documentation.

❖ Volition:

- **Voluntary:** By choice, for better opportunities.
- **Forced (Involuntary):** Due to wars, persecution (refugees), or natural disasters.

Lectures 14 & 15: Demographic Growth and Measures

Demographic growth refers to the net change in a population size (increase or decrease) annually. This growth is governed by three primary components: **births**, **deaths**, and **migration**.

Demographic Measures and Calculation Methods

There are numerous measures used in demography. We will focus on the most significant ones, using empirical data from the local community (**Bechar Province**, prior to the administrative split) for the year 2020 as illustrative examples.

1. Reproductive Measures (Fertility and Birth Measures)

These measures focus solely on population increase through births.

I. Crude Birth Rate (CBR)

It is defined as the number of live births during a specific year divided by the total mid-year population, with the result multiplied by 1,000.

$$CBR = \left(\frac{\text{Number of Live Births}}{\text{Mid-year Population}} \right) \times 1000$$

Note: The mid-year population refers to the population count as of June 30th of the same year, calculated as follows:

$$\text{Mid-year Population} = \frac{\text{Population on Jan 1st} + \text{Population on Dec 31st}}{2}$$

Example (Bechar Province, 2021):

- Population on Dec 31, 2020: **361,496**
- Population on Jan 1, 2020: **353,591**

- Registered Live Births: **8,870**

Calculation:

$$\frac{353,591 + 361,496}{2} = 357,543$$

2. Calculate the CBR:

$$CBR = \left(\frac{8,870}{357,543} \right) \times 1000 \approx 24.81 \text{ per 1,000}$$

II. Real Birth Rate

Unlike the Crude Birth Rate, which includes the entire population, the Real Birth Rate focuses specifically on the segment capable of reproduction—married women of childbearing age—excluding males, children, and the elderly.

$$\text{Real Birth Rate} = \left(\frac{\text{Number of Live Births}}{\text{Number of Married Women (15–49)}} \right) \times 1000$$

Illustrative Example:

If the number of married women of childbearing age in 2020 was **58,712**:

$$\text{Real Birth Rate} = \left(\frac{8,870}{58,712} \right) \times 1000 \approx 151.07 \text{ per 1,000}$$

III. General Fertility Rate (GFR)

This is more precise than the Crude Birth Rate as it restricts the denominator to all women in the reproductive age group (15–49), regardless of marital status.

$$GFR = \left(\frac{\text{Number of Live Births}}{\text{Total Women of Childbearing Age (15–49)}} \right) \times 1000$$

Application: Using the same birth data, with the number of women aged 15–49 reaching 104,235:

$$GFR = \left(\frac{8,870}{104,235} \right) \times 1000 \approx 85.10 \text{ per 1,000}$$

IV. Age-Specific Fertility Rate (ASFR)

This measure focuses on fertility within a specific age cohort (e.g., females aged 20–24) rather than the entire reproductive span.

$$ASFR_{(\text{specific age})} = \left(\frac{\text{Live Births to Women in Age Group}}{\text{Number of Women in the Same Age Group}} \right) \times 1000$$

Example: If there are 40,214 women aged 20–25:

$$ASFR_{(20-25)} = \left(\frac{8,870}{40,214} \right) \times 1000 \approx 220.57 \text{ per 1,000}$$

2. Mortality Measures

These encompass all statistical measures related to deaths within a population.

I. Crude Death Rate (CDR)

It is defined as the total number of deaths in a given year divided by the mid-year population, multiplied by 1,000.

$$CDR = \left(\frac{\text{Total Deaths}}{\text{Mid-year Population}} \right) \times 1000$$

Example: Using the mid-year population of **357,543** and **1,826** registered deaths:

$$CDR = \left(\frac{1,826}{357,543} \right) \times 1000 \approx 5.11 \text{ per 1,000}$$

II. Age-Specific Death Rate (ASDR)

This represents the actual number of deaths in a specific age group relative to the population of that same group.

$$ASDR = \left(\frac{\text{Deaths in Age Group}}{\text{Population of Age Group}} \right) \times 1000$$

Example: In Bechar (2020), deaths in the **80–84** age group reached **80**, with a cohort population of **1,735**:

$$ASDR_{(80-84)} = \left(\frac{80}{1,735} \right) \times 1000 \approx 46.11 \text{ per 1,000}$$

III. Sex-Specific Death Rate

This measures mortality for a specific gender, allowing for comparisons between male and female mortality levels. This is particularly useful in addressing the demographic debate regarding higher male mortality rates.

$$\text{Sex – Specific Death Rate} = \left(\frac{\text{Deaths of Specific Sex}}{\text{Population of Same Sex}} \right) \times 1000$$

Example (Bechar, 2020):

- Female Deaths: **785** | Female Population: **180,206**
- Male Deaths: **1,041** | Male Population: **181,290**

Calculations:

- **Male Death Rate:** $IMR = \left(\frac{1,041}{181,290} \right) \times 1000 \approx 5.74 \text{ per } 1,000$
- **Female Death Rate:**
 $IMR = \left(\frac{785}{180,206} \right) \times 1000 \approx 4.36 \text{ per } 1,000$

IV. Infant Mortality Rate (IMR)

This is defined as the number of deaths of children under one year of age divided by the total number of live births (though some definitions use mid-year population, the standard demographic practice typically uses live births for greater accuracy)

Example: Using the mid-year population of **357,543** and **180** infant deaths:

$$IMR = \left(\frac{185}{357,543} \right) \times 1000 \approx 0.50 \text{ per } 1,000$$

Fifth: Cause-Specific Mortality Rate

We resort to calculating this rate in certain cases, such as diseases and fatal epidemics, in order to determine the rate **related** to this specific cause alone, excluding other cases.

It can be defined as: the total number of deaths due to this cause (disease, epidemic, natural disasters, traffic accidents, etc.), divided by the mid-year population of that year, multiplied by one thousand.

Cause – Specific Mortality Rate

$$= \frac{\text{Number of deaths due to this cause}}{\text{Mid – year population}} \times 1000$$

Example: Suppose that the COVID-19 epidemic claimed the lives of 185 people in the year 2020. What is the mortality rate due to the COVID-19 epidemic?

$$\text{Mortality rate due to COVID} - 19 = \frac{185}{357,543} \times 1000$$

Marriage and Divorce Measures

First: Marriage Rate

It is the number of marriage cases registered during a year in a specific area divided by the population of that area, with the result multiplied by one hundred. That is:

$$\text{Marriage Rate} = \frac{\text{Number of marriage cases}}{\text{Mid-year population}} \times 100$$

Illustrative Example for Bechar Province for the year 2020:

Where we registered 2,737 marriage contracts.

Accordingly:

$$\text{Marriage Rate} = \frac{2,737}{357,543} \times 100$$

4. Migration Measures

These measures concern the total number of out-migrants and in-migrants from or to the area or country intended for study.

First: Out-Migration Rate

$$\text{Out-Migration Rate} = \frac{\text{Number of out-migrants}}{\text{Mid-year population}} \times 1000$$

Illustrative Example:

If we have 1,423 in-migrants to the province and approximately 845 individuals left it, calculate the in-migration rate and the out-migration rate?

$$\text{Out-Migration Rate} = \frac{845}{357,543} \times 1000$$

Second: In-Migration Rate:

$$\text{In-Migration Rate} = \frac{\text{Number of in-migrants}}{\text{Mid-year population}} \times 1000$$

In figures:

$$\text{In-Migration Rate} = \frac{1,423}{357,543} \times 1000$$

Third: Net Migration:

Net migration is defined as the difference between the number of in-migrants to the country or area intended for study and the number of out-migrants from it.

That is: Net Migration = Number of in-migrants - Number of out-migrants

Illustrative Example:

Since we cannot determine migration numerically, let us assume that approximately 1,423 people immigrated to Bechar Province, and 845 people were registered as out-migrants from it. (The assumed number does not actually pertain to Bechar Province).

Required: Determine the Net Migration.

$$\text{Net Migration} = 1,423 - 845 = 578 \text{ persons}$$

Fourth: Net Migration Rate:

$$\text{Net Migration Rate} = \frac{\text{Net Migration}}{\text{Mid-year population}} \times 1000$$

Example: Using the same previous data:

$$\text{Net Migration Rate} = \frac{578}{357,543} \times 1000$$

5. Growth Measures

First: Natural Increase

It is the increase that does not take migration into account; i.e., it is related to births and deaths only. It is calculated by the following relationship:

Natural Increase = Number of births in a specific year- Number of deaths in the same year

Example: In the same context regarding the population of Bechar Province, where births were estimated at 8,870 persons, while deaths reached 1,826 cases.

Required: Determine the Natural Increase.

$$\text{Natural Increase} = 8,870 - 1,826 = 7,044 \text{ persons}$$

Second: Rate of Natural Increase

It is the natural increase of a specific year divided by the mid-year population of the same year, the total multiplied by one thousand. As follows:

$$\text{Rate of Natural Increase} = \frac{\text{Natural Increase}}{\text{Mid-year population}} \times 1000$$

Illustrative Example: Based on the previous data:

$$\text{Rate of Natural Increase} = \frac{7,044}{357,543} \times 1000$$

Third: General Increase

It is the increase that takes migration into account as a third factor affecting population growth, in addition to the two factors of natural increase (births and deaths).

$$\text{General Increase} = \text{Natural Increase} + \text{Net Migration}$$

Example: Based on the previous data, the general increase can be concluded as follows:

$$\text{General Increase} = 7,044 + 578 = 7,622 \text{ persons}$$

Fourth: General Increase Rate

$$\text{General Increase Rate} = \frac{\text{General Increase}}{\text{mid year population}} \times 100 \quad \text{Accordingly:}$$

$$\text{General Increase Rate} = \frac{7,622}{357,543} \times 100$$

Fifth: Population Growth Rate

Population growth is defined as the amount by which a population increases or decreases annually, which can be determined through the

general increase. If the general increase rate is positive, it can be said that the society is experiencing population growth, and conversely if this rate is negative.

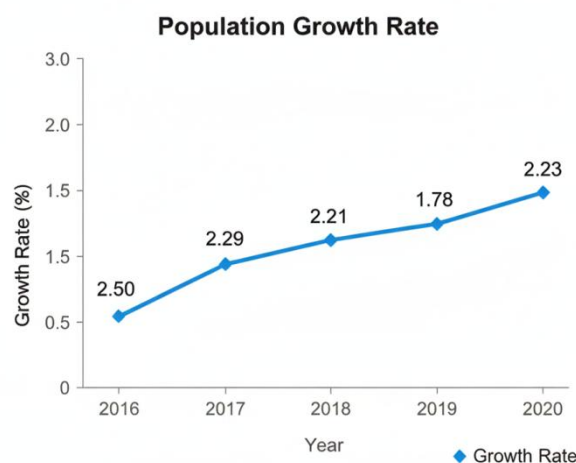
The population growth rate is essentially the same as the general increase rate. Alternatively, it is the population count for a given year minus the population count of the preceding year, with the result divided by the latter population count.

The following example further clarifies this:

Year	Population	Growth Rate
2015	324,104	/
2016	332,213	2.50%
2017	339,841	2.29%
2018	347,385	2.21%
2019	353,591	1.78%
2020	361,496	2.23%

From the table above, we observe that the population of Bechar Province is in a somewhat steady growth, as the growth rate for the last five years is very close. However, it experienced a slight decrease in 2019.

The following figure illustrates the steady growth of the population during r



6. Other Measures

First: Population Density

It is defined as the proportionality between land area and the number of inhabitants; i.e., the amount of area allocated equally to all residents. It is calculated by the following relationship:

$$\text{Population Density} = \frac{\text{Number of Inhabitants}}{\text{Area}}$$

Example:

If we take the population of Bechar Province in 2020, totaling approximately 361,496 inhabitants, and the land area estimated at 161,400 km²

The population density for Bechar Province is:

$$\text{Population Density} = \frac{361,496}{161,400}$$

Second: Crowding Degree

While population density is calculated for the geographical area as a whole, the crowding degree is the population density within homes, calculated by the following relationship:

$$\text{Crowding Degree} = \frac{\text{Number of Household Members}}{\text{Number of Rooms}}$$

Example: If we have a house consisting of 3 rooms inhabited by 8 individuals, what is the crowding degree in it?

$$\text{Crowding Degree} = \frac{8}{3}$$

We can also calculate the crowding degree for a city, province, or country as a whole by knowing the total number of rooms in that city or country and comparing it to its population.

Example: Suppose the number of rooms in Bechar Province for the year 2020 reached 164,598 rooms.

Accordingly:

$$\text{Crowding Degree} = \frac{361,496}{164,598}$$

Third: Sex Ratio

It is the ratio of males to females, calculated by the following relationship:

$$\text{Sex Ratio} = \frac{\text{Number of Males}}{\text{Number of Females}}$$

Illustrative Example: Taking data for Bechar Province, where the number of males for the year 2020 reached approximately 181,290 inhabitants, while 180,206 females were recorded.

Accordingly:

$$\text{Sex Ratio} = \frac{181,290}{180,206}$$

Fourth: Percentage of Males

In contrast to the sex ratio, the percentage of males is calculated based on the total population, using the following relationship:

$$\text{Percentage of Males} = \frac{\text{Number of Males}}{\text{Total Population}} \times 100$$

Example: Based on the same previous data for the population of Bechar Province:

$$\text{Percentage of Males} = \frac{181,290}{361,496} \times 100$$

Fifth: Percentage of Females

The percentage of females follows the same logic as the percentage of males, simply replacing the number of males with the number of females. That is:

$$\text{Percentage of Females} = \frac{\text{Number of Females}}{\text{Total Population}} \times 100$$

Example: Based on the same previous data for the population of Bechar Province:

$$\text{Percentage of Females} = \frac{180,206}{361,496} \times 100$$

Conclusion

In conclusion, we hope we have succeeded in presenting the content of this module, which in turn will advance to become an independent specialization in the coming year. It should be noted that the information and knowledge provided through this publication are considered an introductory gateway through which the student learns the basics of this science and its most distinguishing features.

Our primary goal remains the extent of the student's familiarity with the module to facilitate the process of choosing the specialization that suits their aspirations and capabilities in the coming years. The need for this science remains one of the necessities of the modern era because populations and their problems are linked to many other issues—whether social, economic, or health-related. Increasing population growth without prior planning may create a gap between size and available resources, which in turn leads to the creation of more problems on all levels.

References

- Al-Bayati, F. (2009). *Population morphology: Topics in demography* (1st ed.). Arab Diffusion House.
- Al-Khabash, M. (1975). *Sociology and its schools: Book one – Social thought and its development*. Arab (Al-Bayan) Press.
- Al-Kubaisi, A. M. H. (2015). *Population education: Concepts, goals, systems approach, methodology, and evaluation*. Dar Al-Issar for Publishing and Distribution.
- Ali, Y. H. (2010). *Principles of sociology*. Dar Wael for Publishing.
- Amira, J. (2014). *Theoretical trends in demography*. Dar Farha for Publishing and Distribution.
- Gawad, M. K. A. (2009). *Population sociology*. Dar Al-Maisara.
- Karadsheh, M. A. (2009). *Demography: Social demography* (1st ed.). Alam Al-Kutub.
- Sayed, S. A. A. (2004). *Population sociology*. Dar Al-Ma'rifah Al-Jami'iyah.