M.A. 2nd Semester
Sociology (New Syllabus)

Course Code: SOC-O-204

Social Demography

(Unit- 1-20)

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Course Name: Social Demography **Time**: 3hours

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Block-I Social Demography

Meaning, Nature, Scope and Importance; Demography and Other Social Sciences; Basic Concepts of Demographic Analysis; Sources of Demographic Data: Census, Civil Registration, Population Registers, Sample Survey and National Family and Health Survey (NFHS); Errors in Demographic Data and Methods of Adjustment of Data.

Block- IITheories of Population

Biological and Natural Theories; Malthusian and Neo-Malthusian Theory; Optimum Theory of Population; Demographic Transition Theory; Marxian Theory.

Block- III Population Structure and Dynamics

Population Structure- Age and Sex Composition; Fertility- Concept, Methods of Measurement, Determinants, Differentials and Consequences; MortalityConcept, Methods of Measurement, Determinants, Differentials, Consequences, and Construction of Life Table; Migration-Concept, Methods of Measurement, Determinants, Differentials and Consequences

Block- IV Population Growth in India

Nature and Trends of Population Growth in India; National Population Policy; Family Planning and Family Welfare Programmes in IndiaEvaluation and Critique; Population Explosion and its Consequences

Suggested Readings

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BLOCK-I

UNIT-1

Meaning and Development of Demography

Structure

1.1 Introduction

1.2 LearningObjectives

1.3 Meaning of Demography

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Self- Check Exercise-1

1.5 Important concepts in Demography

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1.12 Terminal Questions

1.1 Introduction

Demography is the scientific study of human populations. The term originates from Greek, combining the words "demos" (people) and "grapho" (to describe), which together mean the description of people. This field examines various aspects related

to population dynamics, such as shifts in population size, birth and death rates, migration patterns, and the demographic structure, including the distribution of gender and age groups. Demography can be divided into different branches, including formal demography, which focuses primarily on quantitative data, and social demography, which explores the social, economic, and political dimensions of populations. Demographic research typically involves data collection methods like censuses or surveys, which gather detailed information about individuals within a defined geographical area.

Demography holds a vital place in sociology and was integral to its emergence as an academic discipline. In the late 18th century, two major developments occurred in Europe: the rise of nation-states as the primary political entities and the establishment of modern statistical science. As the modern state expanded its functions and responsibilities, it began to take on a more proactive role in managing public health, law enforcement, economic policies related to agriculture and industry, taxation, and urban governance.

This broadening of state functions required the systematic and regular collection of social statistics—quantitative data about various aspects of the population and economy. Although the state's collection of such data can be traced to earlier periods, it took on a more structured form at the end of the 18th century. The U.S. census of 1790 is considered the first modern census, and the practice quickly spread across Europe in the early 1800s. In India, the British colonial government began conducting censuses between 1867 and 1872, and regular decennial censuses have been held since 1881. After independence, India continued this practice, conducting seven decennial censuses, with the latest one in 2011. The Indian census is the largest in the world, as China, despite its larger population, does not conduct regular censuses.

Demographic data plays an essential role in shaping and implementing state policies, particularly those focused on economic growth and public welfare. However, the emergence of social statistics also laid the groundwork for the development of sociology as a distinct discipline. Aggregate statistics, which capture numerical characteristics of large populations, offer persuasive evidence for the

existence of social phenomena. For example, statistics like the death rate (the number of deaths per 1,000 people) are calculated by adding individual deaths, but the death rate itself is a social phenomenon that must be interpreted in a broader social context. A key example is Émile Durkheim's famous study on suicide rates, where he showed that differences in suicide rates across countries could be linked to social factors, even though individual suicides were influenced by personal circumstances.

A distinction is often made between formal demography and the broader field of population studies. Formal demography mainly focuses on the measurement and analysis of the factors that drive population change. It is centered around quantitative methods and advanced mathematical techniques to project population growth and demographic shifts. In contrast, population studies, or social demography, examines the social causes and effects of changes in population structures. Social demographers emphasize that social processes and structures play a significant role in shaping demographic trends. Similar to sociologists, they seek to identify the social factors that influence population changes.

1.2 Objectives

In this lesson, we will explore the concept, nature, and evolution of demography, as well as highlight key concepts within the field. By the end of this unit, you should be able to:

- Define the concept of demography
- Explain the nature of demography
- Describe the development of demography

1.3 Meaning of Demography

Demography has its origins in the early formation of civilized societies. Over time, every society and nation recognized the importance of maintaining accurate records of the population to ensure effective administration and address various social and

economic issues linked to population growth. Different countries began recording vital events at various times, each for unique reasons. As a result, the importance of demography has grown considerably in modern times. Recognizing its significance, churches in some regions began documenting baptisms, marriages, and deaths from the early 15th century.

The real credit for initiating modern demographic studies goes to John Graunt (1620-74), who laid the foundations for the field. His influential work, *Natural and Political Observations upon the Bills of Mortality* (1662), analyzed death rates, the causes of death in specific areas, and other related topics such as births, migration, and family growth. Graunt studied the population that could serve in the military and suggested that population studies should be categorized by sex, religion, age, occupation, status, and state. He also believed that fertility, mortality, and migration were interlinked processes, each based on certain principles. For instance, he noted that male birth rates were generally higher than those for females, assuming the overall sex ratio was equal. Additionally, he observed that mortality rates were higher in urban areas compared to rural ones and that early mortality was greater than later-stage mortality. Graunt's work is also credited with introducing life tables and the use of sample surveys to collect data where official records were unavailable. According to Peter R. Cox, Graunt’s contributions were so significant that they essentially gave birth to the field of demography, with subsequent developments being refinements.

The term 'demography' originates from the Greek words "demos" (meaning population) and "graphy" (meaning to describe or draw). While the term had been used informally before, it was first applied scientifically in 1855 by Guillard and has gained widespread recognition since then. Various scholars, including economists, geographers, and social scientists, have defined demography in different ways based on their respective disciplines. Frank Lorimer (1959) defined demography broadly as encompassing both demographic analysis and population studies, focusing on both qualitative and quantitative aspects of population. Stenford (quoted in Hansraj, 1986) describes demography as a technical, highly mathematical study of vital statistics, including birth, death, and migration rates, and the structure of the population. Irene Tanker further emphasized that with improved data and techniques, demography has transformed into a science rather than a literary field.

Demography is the systematic study of populations, examining trends and processes related to changes in population size, birth rates, death rates, migration, and the composition of populations, including gender and age distribution. Demographic data plays a vital role in shaping state policies, particularly in economic development and public welfare.

Social Demography or Population Studies delves into the broader causes and effects of population structures and changes. Social demographers believe that social processes and structures regulate demographic patterns and, like sociologists, they aim to identify the social causes of population trends. Social demography explores how cultural and social factors influence demographic characteristics, such as marriage patterns, childbearing, age structure, and life expectancy. It also examines the social consequences of demographic changes. While demography itself focuses on measuring and determining population characteristics, social demographers seek to understand and explain these patterns, integrating insights from both sociology and demography.

Social demographers investigate three primary variables that drive population change: fertility, mortality, and migration. These variables are influenced by factors like age at marriage, contraceptive use, rural-urban migration, and more. Social demographers study these processes in relation to standard social factors such as income distribution, education levels, gender roles, religion, and economic development. To analyze these relationships, they often use social surveys and correlational techniques. However, theorization in this field remains underdeveloped, with limited attention to cultural influences or ethnographic methods. This narrow focus means that social demography, like demography itself, is somewhat disconnected from the broader field of sociology.

There are two types of demography -

1. Formal Demography:

Statistical analysis of population i.e., total population, number of males, number of females, number of youth, working population, rural urban (quantitative data

2. Social Demography:

Birth rate, death rate and migration that happens in a particular society.Consists of four processes-

(i)DemographicStructure:number of people in an area,
(ii) Demographic Processes: birth rate, death rate, migration,
(iii) Social structure: composition of an area,
(iv) Social processes: Processes by which individuals learn to live together in peace and harmony in society e.g. Cooperation, accommodation, mediation etc.

- Formal demography is to do with statistics, numbers, aggregates. The memorial quantification of data
- Social demography is concurred with changes or the consequences of the population of a society and how it affects us.

1. 4 Definitions of Demography

The term "demography" has been defined in both narrow and broad terms. In its more specific sense, the **Oxford Dictionary of Economics** defines demography as "The study of the characteristics of human populations." Similarly, the **UN Multilingual Demographic Dictionary** defines it as "The scientific study of human populations, primarily with respect to their size, structure, and development."

Barckley provides a simplified definition, stating that "The numerical portrayal of human population is known as demography." Likewise, **Thomson and Lewis** explain that "The population student is interested in a population's size, composition, and distribution, and in changes in these aspects over time and the causes of these changes." These definitions focus mainly on the quantitative aspects of demography, offering a narrower perspective of the field.

Other scholars have taken a more expansive approach by incorporating both quantitative and qualitative aspects of population studies. In this broader sense, **Hauser and Duncan** define demography as "The study of size, territorial distribution, and composition of populations, changes within these, and the components of such changes, which include natality, mortality, migration, and social

mobility." **Cox, P.R.** extends this by stating that "Demography is the study of statistical methods of human populations, primarily concerned with measuring the size, growth, and reduction in numbers of people, the proportions of births or deaths within a specific area, and the related functions of fertility, mortality, and marriage."

According to **Frank Lorimer**, "In a broad sense, demography includes both demographic analysis and population studies. A comprehensive study of demography includes both qualitative and quantitative aspects of population." **Donald J. Bougue** offers a thorough definition, explaining that "Demography is a statistical and mathematical study of the size, composition, and spatial distribution of human populations, and the changes in these over time through the processes of fertility, mortality, marriage, migration, and social mobility. While it involves continuous descriptive and comparative analysis of trends in each of these processes and their net results, its ultimate goal is to develop a theory to explain the events it tracks and compares."

These broader definitions not only emphasize the size, composition, and distribution of populations, as well as the changes occurring over time, but also consider human migration and shifts in social status, influenced by factors such as education, employment, and social mobility.

Self-Check Exercise-1

Q.1 Social Demography was known as before 1960…….
Q.2 ……was the first to use the term of Social Demography.
Q.3 …….two words the word demography has come to being.

1.5 1.5 Important Concepts in Demography

- **Crude Birth Rate**: The annual number of live births per 1,000 people.
- **General Fertility Rate**: The annual number of live births per 1,000 women of childbearing age (typically 15 to 49 years, though sometimes 15 to 44 years).

- **Age-Specific Fertility Rates**: The annual number of live births per 1,000 women in specific age groups (e.g., 15-19, 20-24, etc.).
- **Crude Death Rate**: The annual number of deaths per 1,000 people.
- **Infant Mortality Rate**: The annual number of deaths of children under 1 year of age per 1,000 live births.
- **Life Expectancy**: The average number of years an individual of a certain age can expect to live, based on current mortality rates.
- **Total Fertility Rate**: The total number of live births a woman would have if her childbearing patterns were the same as the current age-specific fertility rates.
- **Gross Reproduction Rate**: The number of daughters born to a woman over her lifetime, assuming current age-specific fertility rates.
- **Net Reproduction Rate**: The number of daughters a woman is expected to have, considering both fertility and mortality rates.

Self-Check Exercise-2

- Q1: Crude birth rate is related to _____.
- Q2: The annual number of deaths per 1,000 people is known as _____.
- Q3: The annual number of deaths of children under 1 year old per 1,000 live births is known as _____.

1.6 Nature of Demography

The definitions of demography illustrate the varying views on its scope. Some perspectives see it as a broad field, while others limit its scope. Below are the different views on the nature of demography:

i) Broader View:

This view considers the scope of demography to be expansive, studying the causes behind slow or rapid changes in birth rates, death rates, population growth, sex ratios, and health conditions. Advocates of this view believe that demographic studies can address a variety of economic problems, such as employment, income conditions, labor conditions, and the relationship between population growth, economic development, and the overall quality of life. Demographic studies are typically categorized into four areas:

- **Descriptive Demography**: Examines census and registration data.
- **Analytical Demography**: Analyzes collected data, including population change rates and ratios.
- **Comparative Demography**: Studies population aspects at different times and locations.
- **Historical Demography**: Investigates historical trends using time series and rates.

Hans Raj (1986) argued that demography helps study social issues such as marital status, family composition, trends in caste and religion, education, urbanization, and migration. Demography is thus seen as an interdisciplinary study of human life, encompassing physical, social, and vital facts, as well as health and disease relationships. The United Nations emphasized that demography involves studying the determinants and consequences of population changes. It also connects deeply with population data, which becomes useful when interpreted by demographers, marking the intersection of demography and population studies.

ii) Narrower View:

This perspective, held by thinkers like Phillip and Otis (1959), argues that demography's scope should be more focused. While demography includes several subjects, it doesn’t cover every aspect. For instance, urbanization, though a demographic topic, involves numerous areas such as transportation, communication, and entertainment, which should not be part of demography.

Demographers argue that widening the scope unnecessarily makes the study unmanageable and dilutes its focus, suggesting that demography should be confined to a specific discipline.

iii) Balanced View:

A more balanced view, represented by thinkers like Warren, S. and Thompson (1953), supports studying death, birth, population growth rates, the status of women, education, and socioeconomic conditions. While demography is about human society as a whole, it uses figures and arithmetic to analyze population trends, focusing on collective phenomena rather than individual issues.

Self-Check Exercise-3

- Q1: _____ deals with the analysis of data, rates, and ratios of population change.
- Q2: Census and registration statistics are related to _____ Demography.

1.7 Development of Demography

Demographic thought dates back to ancient civilizations such as Ancient Greece, Rome, China, and India. The term "demography" itself comes from the Greek words "demos" (population) and "graphy" (study or description).

In Ancient Greece, key thinkers like Herodotus, Thucydides, Hippocrates, and Plato contributed to early demographic ideas. Similarly, Roman philosophers such as Cicero and Seneca also shared thoughts on the population. During the Middle Ages, Christian scholars and Muslim sociologists like Ibn Khaldun challenged classical demographic ideas.

One of the earliest modern demographic studies was **John Graunt's "Natural and Political Observations Made Upon the Bills of Mortality" (1662)**, which laid the foundation for the modern life table. Mathematicians like Edmond Halley further

developed life tables, which became fundamental for life insurance calculations. **Benjamin Franklin** contributed to demographic thought with his essay "Observations Concerning the Increase of Mankind" (1755), which projected population growth in British colonies. **Thomas Malthus** later expanded on this idea, arguing that unchecked population growth would outstrip food production, leading to famine and poverty.

In 1855, **Achille Guillard** defined demography as the study of population history, changes, and conditions. Between 1860-1910, demography evolved from being part of statistics to a distinct field of study. Key figures like **Adolphe Quételet**, **William Farr**, **Louis-Adolphe Bertillon**, and **Emile Durkheim** contributed significantly to demographic methods and analysis.

Self-Check Exercise-4

- Q1: "Natural and Political Observations Made Upon the Bills of Mortality" was written by _____.
- Q2: Plato mentioned a population of _____ for an ideal state.

1.8 Summary

In this lesson, we thoroughly discussed the concept of demography, including its definitions, nature, and development. We examined the importance of demographic studies and how they relate to population data. Understanding these fundamental concepts is essential to grasping the broader scope and applications of demography in analyzing human societies.

1.9 Glossary

- **Fertility**: Refers to the ability to produce offspring or the number of children born within a population.

- **Mortality**: The frequency of death within a population. It often varies by gender and age.
- **Migration**: The movement of people from one location to another, often for economic, social, or environmental reasons. It is one of the key components of population change.

1.10 Answers to Self-Check Exercises

- **Self-Check Exercise-1**:
  - Q1: Population Study
  - Q2: Kingsley Davis
  - Q3: Demo and Graphy
- **Self-Check Exercise-2**:
  - Q1: Fertility
  - Q2: Mortality
  - Q3: Infant Mortality Rate
- **Self-Check Exercise-3**:
  - Q1: Analytical Demography
  - Q2: Descriptive
- **Self-Check Exercise-4**:
  - Q1: John Graunt
  - Q2: 5040

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1.12 Terminal Questions

1. What is demography?
2. Define demography as discussed by various thinkers.
3. Discuss the nature of demography.
4. Explain the development of demography.

Unit-2

Scope & Importance of Demography

Structure

2.1 Introduction

2.2Learning Objectives

2.3 Scope of Demography

Self-Check Ecercise-1

2.4 Relationship of Demography with other Disciplines

Self-Check Ecercise-2

2.5Importance of Demography

Self-Check Ecercise-3

2.6 Summary

2.7 Glossary

2.8Answers-to Self-Check Exercise

2.9Reference Suggested Readings

2.10Terminal Questions

2.1 Introduction

In the previous lesson, we examined the concept of demography. The study of demography has become increasingly important worldwide due to the rapid growth of populations, particularly in developing and underdeveloped countries. This growth puts significant strain on various social, economic, and political systems. These pressures are not only felt within individual nations but also extend across borders, as population changes have a global impact on international relations.

Demography involves the statistical analysis of human populations, examining factors such as size, density, distribution, and vital statistics like birth rates, marriage

rates, and death rates. Key issues in modern demography include the so-called "population explosion," the relationship between population growth and economic development, the effects of birth control, and challenges such as overcrowding in urban areas, illegal immigration, and workforce trends.

Demographic studies can be applied to entire societies or specific groups based on criteria such as education, nationality, religion, or ethnicity. While demographic studies are often considered a part of sociology in academic institutions, there are specialized departments dedicated solely to demography. Formal demography tends to focus on quantifying population processes, whereas social demography (or population studies) examines how economic, social, cultural, and biological factors interact to influence population trends.

In this lesson, we will focus on the scope of demography. We will explore its relationship with other disciplines, as well as the connection between demography and population studies. We will also emphasize the significance and importance of demography. By the end of this lesson, you should be able to:

- Understand the scope of demography.
- Comprehend the relationship between demography and other academic disciplines.
- Grasp the connection between demography and population studies.
- Recognize the importance of demography in various contexts.

2.3 Scope of Demography

The scope of demography is quite broad and encompasses various topics. Key questions about the scope of demography involve whether it is a micro or macro study and whether it is considered a science or an art. These questions often elicit different perspectives among scholars. Below, we outline various aspects of demography:

Size and Shape of Population

The population size refers to the total number of people residing in a specific area at a given point in time. The size and shape of a population can change over time. Factors like customs, social conditions, cultural values, economic conditions, and access to family planning services and healthcare affect these changes. Studying these factors in different regions helps us understand their impact on population trends.

Aspects Related to Birth Rate and Death Rate

Birth rate and death rate are critical factors influencing the size and composition of a population. Other factors that play a role include marriage rates, social customs around marriage, the age at which people marry, and practices such as early marriage, which can affect the health of both mothers and children. In addition, factors like child mortality, maternal deaths, access to medical services, availability of nutritious food, and people's purchasing power also impact birth and death rates.

Composition and Density of Population

Demographic studies also focus on the composition and density of populations. Key factors include sex ratio, racial and age-group distribution, rural vs. urban populations, and the distribution of people based on religion, language, and occupation. Analyzing population density, such as how many people live per square kilometer, can help us understand the socio-economic challenges and opportunities of an area, particularly in relation to urbanization.

Socio-Economic Problems

High population density, especially in urban areas affected by industrialization, leads to significant socio-economic challenges. Issues such as slums, pollution, crime, substance abuse, juvenile delinquency, and prostitution are central to demographic studies, as they impact the quality of life and economic stability of societies.

Quantitative and Qualitative Aspects

Demography involves both quantitative and qualitative aspects. While the numbers related to population growth are important, demographic studies also consider other aspects such as the availability of healthcare professionals, the number of hospitals and hospital beds, life expectancy at birth, caloric intake, and public attitudes toward family planning. These qualitative aspects can shape population trends and public health outcomes.

Distribution of Population

Population studies explore how populations are distributed across continents, countries, and regions, both developed and developing. Important questions include how population numbers and proportions change over time, and what social, political, and economic factors influence these changes. In-country studies also look at the distribution of populations in rural vs. urban areas, as well as within different economic and social communities.

Migration plays a significant role in how populations are distributed, both internally (within countries) and externally (between countries). Demography examines migration's causes and effects, including the impact of urbanization, which is another important factor influencing population distribution. Urbanization-related challenges and solutions are key topics in demography, as are theories related to migration and urban growth.

Theoretical Models

Population studies are guided by various theoretical models. These models include those proposed by sociologists, biologists, demographers, and economists. Theories of migration and urbanization also fall under this category.

Practical Aspects

Practical aspects of population studies involve methods used to measure changes in populations, such as census data, age pyramids, and population projections. These methods help researchers track and forecast demographic changes over time.

Population Policy

Population policy is a crucial area of demography, especially for developing countries. It includes strategies for population control, family planning, reproductive health, maternal nutrition, child health, and human development across different social groups. Understanding the effects of such policies on national populations is vital.

Micro vs. Macro Study

A central debate in demography is whether the study should be considered a micro or macro-level analysis.

- **Micro Demography**
  Micro demography focuses on smaller units, such as individuals, families, or communities. It studies population factors like fertility, mortality, migration, and distribution within a specific local area or community. Scholars like Hauser and Duncan emphasize the importance of understanding these elements at a micro level. Bogue defines micro demography as "the study of the growth, distribution, and redistribution of populations within communities, states, or economic areas."
- **Macro Demography**
  In contrast, macro demography takes a broader, more general approach to population studies, incorporating qualitative aspects and examining the interrelationships between population dynamics and social, economic, and cultural conditions. It looks at the long-term changes in population size, distribution, and composition, as well as factors like migration, urbanization, and their societal impacts. Macro demography also addresses issues such as

unemployment, poverty, and policies related to family welfare, population control, and economic development.

According to Bogue, macro demography is "the mathematical and statistical study of the size, composition, and spatial distribution of human populations and the changes over time in these aspects through fertility, mortality, marriage, migration, and social mobility."

Balanced View

Scholars such as Bogue, Lorimer, and others advocate for a balanced approach to population studies, rejecting the idea of strictly dividing demography into micro and macro categories. As Lorimer noted, “A demographer limited to the mere formal treatment of changes in fertility, mortality, and mobility would be in a position similar to that of a chemist observing the compression of mercury without knowing about the associated changes in temperature or the composition of the liquid.”
This implies that the study of demography should encompass both micro and macro dimensions. Thompson and Lewis assert that demographic studies should address fertility, mortality, female population characteristics, health, marital status, and occupational classification. Furthermore, it should involve the collection and analysis of social and economic data, as well as the study of population migration.

Demography as a Science

To understand whether demography qualifies as a science, it is necessary to define what constitutes a science and assess whether the characteristics of a science apply to demography.
A science is typically defined as a body of organized knowledge derived from observation and experimentation. It involves general principles, theories, or laws that establish causal relationships between phenomena.
For any field to be considered a science, it must meet the following criteria:

1. It must be a systematized body of knowledge.
2. It must have its own established theories or laws.
3. The theories must be testable through observation and experimentation.
4. It must be capable of making predictions.
5. It must be self-correcting, adapting based on new findings.
6. It must have universal applicability.

Demography meets all these characteristics:

1. **Systematized Knowledge**: Demography systematically studies and analyzes population data, ensuring an organized body of knowledge.
2. **Theories**: Demographic theories, such as the Malthusian Theory and the Theory of Demographic Transition, provide frameworks for understanding population trends.
3. **Testable**: These theories have been tested and validated through empirical observation.
4. **Predictive**: Demography can make informed predictions about future population changes based on causal relationships.
5. **Self-Corrective**: Demographic studies continuously refine their conclusions based on new data and observations.
6. **Universal Validity**: The principles of demography are applicable worldwide, as they hold true under similar conditions across different countries.

Given these points, demography qualifies as a science. It is not merely a descriptive science of “what is” but also a normative science of “what ought to be.” It not only examines the causes and effects of population issues but also proposes policies to address these challenges.
As Irene Taeuber states, “With improved data, new techniques, and precise measurement of the demographic transition that is occurring, demography has evolved into a science. In fact, it has become an applied science and applied technology.”

Self-Cheak Ecercise-1

Q.1 What is the size of population?

Q.2 What is micro demography?

2.4 Relationship of Demography with Other Disciplines

To gain a deeper understanding of demography, it is essential to examine its interconnections with various other disciplines. Demography primarily addresses the composition, organization, and distribution of populations within human societies. It covers a wide array of aspects of human life, including biological, geographical, social, economic, and cultural factors. While each of these fields focuses on specific aspects of human life, they have gradually expanded their scope, often overlapping with one another. Below, we explore how demography relates to several other disciplines:

i) Sociology and Demography

Demography focuses on the collection of data regarding biological, economic, and social challenges, while sociology views humans as inherently social beings. Demography acknowledges that individuals are part of a larger societal group, which influences their birth, life, and death. The two fields are interconnected, as many population-related issues are also social problems. For example, demography's study of birth rates is closely linked to marriage, which is a central focus for sociologists as they examine social structures such as marriage institutions.

ii) Demography and Anthropology

While demography looks at population statistics on a global scale, anthropology is concerned with studying specific groups within societies, often focusing on the development and growth of particular tribes or social sections. Anthropologists focus on a narrower scope than demographers, examining the growth of particular subgroups, rather than the overall population trends that demographers track across the globe.

iii) Demography and Human Ecology

Human ecology is concerned with the relationship between human populations and their environment, including how populations interact with and impact their surroundings. Demography examines factors such as birth rates, while human ecology explores the relationship between human populations and the environments in which they live. Human ecology recognizes that populations affect and are affected by their environments. Ecologically, populations can be studied based on how they exploit and develop natural resources, with human ecology emphasizing how population dynamics influence, and are influenced by, environmental factors.

iv) Demography and Geography

Human geography has become more prominent than physical geography in recent times, with geographers increasingly focusing on population growth and related issues. According to Ackerman (as quoted in Hans Raj, 1986, p.24), modern geographers analyze cultural and spatial features of the earth and their interactions with both physical and biological environments. These geographical features are closely linked to demographic patterns, particularly in understanding regional imbalances and disparities. Geographers, like demographers, study population distribution, urbanization, and migration rates. Moreover, geographers have delved into ethnic distribution, racial divisions, and the impact of urbanization, much like demographers examining migration and urbanization trends.

v) Demography and Economics

The connection between demography and economics has strengthened over the 20th century. Today, demography is sometimes viewed as a branch of economics. A growing population leads to an increase in economic activities. Population-related issues—such as education, employment, transportation, industrialization, and per capita income—are all closely tied to economic development. Demography influences economics in various ways. For instance, changes in the population can directly affect the labor force and production sources. Economists analyze these shifts to determine the optimal labor-intensive or capital-intensive techniques suited

for the nation's economy. Demographers thus provide essential data for economists to assess the available productive labor force.

vi) Demography and Statistics

Statistics plays a crucial role in all social science disciplines, and demography is particularly reliant on statistical data. The primary objective of statistics is to collect data, which can then be interpreted by social scientists. This also applies to demography, where the goal is to gather population data that can be analyzed to understand population dynamics. Statisticians and demographers work closely, as accurate population data is essential for demographic studies and making informed conclusions about societal trends.

vii) Relationship between Demography and Population Studies

Although the terms "demography" and "population studies" are often used interchangeably, some scholars make distinctions between them. According to Philip and Otis (1959, p.2), "demographic analysis" refers specifically to studying the components of population variation and change, while "population studies" encompasses not only these variations but also the relationships between population changes and other variables, such as social, economic, political, biological, genetic, and geographical factors. Demography, in its narrower sense, can be synonymous with "demographic analysis" or "formal demography," which mainly focuses on quantitative relationships between demographic phenomena, independent of their connections to other phenomena. However, demography can also be viewed more broadly, including both quantitative population studies and the exploration of how demographic changes interact with socioeconomic and cultural factors.

Some scholars, like Frank Lorimer (quoted in Asha and Tara, 2006, p.24), argue against creating an artificial distinction between demography and population studies. Lorimer suggests that "pure demography" is an oversimplification, akin to a chemist analyzing a process without understanding the underlying context. Meaningful

population studies require interdisciplinary approaches that connect various aspects of human life, including social, cultural, and economic variables.

The increasing focus on development planning post-independence, particularly in countries like India, has led to a broader use of terms such as “economic planning,” “development planning,” and “five-year plans.” These frameworks now integrate demographic concepts into their broader development strategies. This shift has expanded the field of population studies to encompass demography and related disciplines, forming a more comprehensive understanding of population issues.

Sefl- Check Exercise-2

Q.1 Meaning of demography?

Q.2 Demography and Human Ecology.

2.5 Importance of Demography

Demography plays a critical role in understanding the growth, distribution, and challenges faced by populations, not only in developing countries but also in developed ones. The significance of demography is evident through the various areas it impacts:

1. Health Planning

High fertility rates often lead to health complications for both mothers and children. In many developing countries, malnutrition contributes to pregnancy-related issues, and infant mortality rates remain high. Demography's focus on fertility and mortality allows for the development of effective health policies and solutions. Social demography addresses these concerns by collecting data on birth and death rates to guide health planning and find solutions to related health issues.

2. Food Supply Planning

Adequate food supply is essential for population well-being, and insufficient food can lead to poor health, stunted growth, and higher mortality rates. As populations grow, food supply must increase accordingly. In many developing countries, the inability to meet food demands leads to dependence on international aid. By analyzing population trends, demography helps ensure food supply strategies are in place to support growing populations, particularly in underdeveloped countries.

3. Housing Planning

As population size increases, the demand for housing grows. Demographers collect data on fertility, mortality, migration, urbanization, and family formation to inform housing policies. By studying population growth patterns, demographers assist in planning for housing needs, helping governments and organizations address the challenges of providing adequate housing for growing populations.

4. Employment Planning

Unemployment is a pressing issue worldwide, affecting both developed and developing countries. In many less developed nations, a high dependency ratio exacerbates the employment challenge. For instance, in Pakistan, many individuals depend on the income of a single person, which leads to a high level of unemployment. Demography plays an important role in understanding these issues, with population studies offering insights into the workforce's size and structure, enabling better employment planning.

5. Educational Planning

With a rising number of children, educational systems face increasing pressure to provide adequate schooling. Demographers analyze population growth to predict the future number of children and help plan for educational infrastructure. By examining trends in population growth, demography ensures that appropriate educational facilities are available, improving access to education for children across the country.

6. Migration Planning

Migration, particularly to developed countries, has significant implications for both sending and receiving nations. Social demography examines migration trends, including immigration and emigration, and the potential effects on populations and economies. For example, large-scale emigration may lead to a loss of skilled workers, while immigration can place pressure on the receiving country's resources. Demography helps to make informed decisions on migration policies and create plans to address its challenges.

7. Impact on the Economy

Population studies are essential for economic analysis. When the population grows faster than the economy, the pace of development slows, leading to lower standards of living, environmental degradation, and economic challenges. Demography helps track population growth and its effect on the economy, allowing governments to adjust policies to manage population growth and enhance economic development.

8. Impact on Society

Rapid population growth brings numerous societal challenges, including shortages in essential services like water, electricity, transport, education, and public health. These issues can lead to social unrest, urbanization pressures, and migration. By studying population dynamics, demography helps governments and organizations address these problems, ensuring adequate services and infrastructure to meet societal needs.

9. Economic Planning

Data on population trends is crucial for economic planning. It helps in setting targets for agricultural and industrial outputs, social services, and infrastructure development. By using demographic data, planners can project future population trends, estimate labor force changes, and plan for necessary employment opportunities. This ensures that economic growth aligns with population changes, making development strategies more effective.

10. For Administrators

In underdeveloped countries, many social and economic issues stem from population growth. Administrators use population data to tackle problems related to urbanization, migration, and the resulting pressure on infrastructure like housing, transport, and public health services. Demography assists in formulating policies for addressing these challenges, such as improving environmental sanitation, housing, healthcare, and education systems.

11. For Political Systems

In a democratic political system, demographic data is vital for electoral processes. Census data helps in the demarcation of constituencies and understanding voter demographics, including age, gender, education, and income levels. Political parties use this information to shape their policies and election manifestos, while the election commission uses it to set up polling stations and manage electoral processes. Knowledge of demographic trends allows for better governance and representation.

Conclusion

As seen in the above discussion, demography provides critical insights into all aspects of population dynamics, influencing a wide range of fields from health and education to economics and governance. Its importance cannot be overstated, as it plays a pivotal role in shaping policies and strategies that address the challenges posed by growing populations, both in developed and developing nations.

Self- Check Exercise-3

Q.1 Meaning of migration.

Q.2 What is housing?

2.5 Summary

In this lesson, we covered several key aspects of demography. First, we discussed the **scope of demography** in detail, examining the various dimensions of population studies. Second, we explored the **relationship of demography with other disciplines**, highlighting how demography intersects with fields such as sociology, anthropology, geography, economics, and more. Third, we examined the **relationship between demography and population studies**, clarifying how these two terms are often used interchangeably, yet have distinct nuances. Lastly, we emphasized the **importance of demography**, exploring its significance in various sectors like health planning, education, migration, employment, and economic development. This lesson has provided a comprehensive understanding of the concept of demography and its relevance in modern society.

2.6 Glossary

- **Population Explosion**: A sudden, large increase in the size of a population.
- **Anthropology**: The study of human beings, especially of their origin, development, customs, and beliefs.
- **Urbanization**: The process by which large numbers of people become permanently concentrated in relatively small areas, forming cities.
- **Immigration**: The movement of people from their native regions to another country to live. People who immigrate are called immigrants, while they are referred to as emigrants when leaving their home country.

2.7 Answers to Self-Check Exercise

Self-Check Exercise-1

- **Q1**: The size of the population means the total number of persons usually residing in a definite area at a definite time.

- **Q2**: Micro demography is the narrow view of population studies.

Self-Check Exercise-2

- **Q1**: Demography deals with the composition, organization, and distribution of the population in human society.
- **Q2**: Population is an outcome of births, and the birth of human beings and their living is the main concern of human ecology.

Self-Check Exercise-3

- **Q1**: The movement of persons or people from one country, locality, or place of residence to another is called migration.
- **Q2**: Housing refers to the usage or possible construction of shelter as living spaces, either individually or collectively.

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2.9 Terminal Questions

1. What is scope of demography? Explain.
2. Highlight the relationship between demography and population studies.
3. Describe briefly the relationship between demography with other disciplines.
4. Through light on the importance of demography.

Unit-3

Source of Demographic data

3.1 Introduction

3.2 Learning objectives

3.3 Sources of Demographic Data

3.3.1 Census Data

3.3.2 Characteristics of Census

Self-Check Exercise-1

3.4 Registration System

3.4.1 Contents of Civil Registration System

3.4.2 Applications of Civil Registration System

Self-Check Exercise-2

3.5 Survey

3.5.1 National Sample Survey Organisation

3.5.2 Nation Family Health Survey

Self-Check Exercise-3

3.6 Summary

3.7 Glossary

3.8 Answer to Self-Check Exercise

3.9 Reference/Suggested Readings

3.10 Terminal Questions

3.1 INTRODUCTION

According to the International Union for the Scientific Study of Population, *demography* is the scientific field focused on understanding the changes in population size and structure, examining a variety of demographic factors. Demographic data is essential for analyzing the trends, determinants, and consequences of changes within a population.

Data sources can be classified into two categories: Primary Data and Secondary Data. Primary data is directly collected by the researcher or their team using methods such as observations, surveys, group discussions, and interviews. Examples of primary data include doctoral thesis work, post-graduate dissertations, and projects undertaken by faculty and researchers. On the other hand, Secondary Data is obtained from previously collected data, often for different purposes. This can include both published and unpublished data, official or personal sources. Common secondary data sources include census data and reports from the National Sample Survey Organization (NSSO).

The collection of primary data requires significant preparation, including research proposals, obtaining funding, ensuring ethical clearance, and careful planning and execution. The researcher is responsible for maintaining the quality of the data, and this process can be costly. Secondary data, in contrast, is readily accessible, requiring little to no expenditure or responsibility for the data's quality. These data are available through online platforms and published collections, offering ease of use without the need for direct data collection.

3.2 Learning Objectives

- Understand the types of data used in demographic studies and their advantages and disadvantages.
- Recognize the various secondary sources of demographic data, their characteristics, and their applications.
- Explore both online and offline resources for demographic data.

3.3 SOURCES OF DEMOGRAPHIC DATA

Demographic data can be sourced from the following channels:

- Census data
- Civil Registration System
- Surveys (e.g., National Sample Surveys, National Family Health Surveys, Annual Health Surveys, District Level Household Surveys focused on Reproductive & Child Health)
- Online and offline sources

3.3.1 Census Data

The census serves as the fundamental source of demographic data, providing detailed insights into the population and socio-economic status of residents in a country. The practice of conducting censuses dates back to ancient civilizations such as those in Egypt, India, Babylonia, Palestine, and Rome. In these times, censuses were often conducted for purposes like taxation or military conscription.

One of the earliest documented references to population data collection comes from the ancient Indian text, *Arthashastra* by Kautilya, who mentioned the use of population data for taxation. In the 16th century, the *Ain-i-Akbari*, a report on the administration of Emperor Akbar, detailed data regarding population, wealth, and industries. Throughout history, various regions like Greece and England also conducted censuses during specific periods of need, such as times of food shortages or for administrative purposes.

In the modern era, the first comprehensive national census in India was initiated in 1881, though earlier attempts were made between 1867 and 1872. Regular censuses in India have been conducted every ten years, typically at the close of a year ending in zero. In contrast, some countries, such as the United Kingdom and Japan, conduct censuses every five years.

The methods used to conduct a census vary depending on the technological resources, experience, and cultural practices of each country. According to the UN Handbook on Population Census Methods, countries can be categorized into three types based on their census structures:

1. Countries without a permanent census office, where temporary organizations are set up to handle the task and dissolved after completion.
2. Countries with permanent census offices, but without regional offices, relying instead on national or provincial services and field organizations.
3. Countries with both a permanent office and regional or subsidiary offices.

Census of India and Civil Registration System

Census of India

The *Census of India Act*, enacted in 1948, grants the Indian Central Government the authority to conduct the census across the country or its parts. This law compels citizens to respond to census questions while ensuring the confidentiality of personal data. The responsibility for organizing the census lies with the Ministry of Home Affairs at the Central Government level, and permanent offices are set up both at the Central and State levels. At the Central level, an Indian Administrative Service (IAS) officer is appointed as the Census Commissioner, while each State or Union Territory has a Director of Census Operations.

Enumerators, such as primary school teachers, village-level officers, and other local staff, are appointed to collect data from households. Typically, each enumerator is responsible for gathering data from 600-750 people and is compensated with an honorarium. Supervisors are assigned to oversee five enumerators and ensure the quality of data collection. Enumerators undergo practical training before the census starts. Initially, census data was analyzed manually, but starting with the 1971 census, computers were introduced to streamline the data analysis process.

Characteristics of the Census

- Individual Enumeration: Every individual is counted only once, and specific details about their age, sex, education, marital status, and occupation are recorded.
- Universality: The census is designed to cover the entire population, accounting for all residents within a defined territory. If certain regions are missed due to extenuating circumstances (such as war or lack of cooperation), this is documented. Data collection methods include:
    - De Jure (counting individuals according to their permanent residence).
    - De Facto (counting individuals based on their current residence at the time of the census).
- Simultaneity: The census is conducted on a specific date, often at the close of a year ending in zero, ensuring consistency across regions. Some data, such as residence (over the previous five years) and income (from the previous year), are recorded based on retrospective information.
- Periodicity: The census is conducted at fixed, regular intervals. In India, this is done every 10 years.

Civil Registration System (CRS)

Under British rule in India, vital statistics such as deaths were initially recorded to track diseases like cholera, smallpox, and plague. By 1886, the registration of births was introduced in some provinces, starting with Berar. Following this, several provinces, including the United Provinces and Punjab, implemented similar systems. The *Births, Deaths, and Marriage Registration Act* came into force in 1886, mandating the registration of births, deaths, and marriages.

The system improved over time, with the Royal Commissions on Agriculture and Labor in the early 20th century pushing for better data quality. By 1946, the Bhore Committee recommended enhancing the collection of vital statistics, and by 1960,

the responsibility for this data shifted from the Director General of Health Services to the Registrar General and Census Commissioner.

The *Registration of Births and Deaths Act* passed in 1969 made it mandatory for citizens to report births and deaths in their families to local municipal or Panchayat offices. Failure to report these events is punishable under the law.

Data related to vital statistics is collected through observations and retrospective surveys. Local teachers often serve as enumerators, and independent supervisors conduct periodic surveys to verify data accuracy. The rural and urban areas have different sampling units, with rural units being villages and urban units being census blocks.

Contents of the Civil Registration System

1. Births:
    - Date of registration and birth
    - Place of birth
    - Sex of the child
    - Type of delivery care received
    - Order of birth (first, second, etc.)
    - Parents' details, such as nationality, age, religion, occupation, and education
2. Deaths:
    - Date and place of death
    - Cause of death
    - Type of medical care received
    - Deceased's details: nationality, religion, age, sex, marital status, and occupation

Applications of the Civil Registration System

1. Legal Documents: Birth and death certificates are essential for processes like school admissions, pension disbursements, and property inheritance.
2. Fertility Data: The data on births helps track fertility rates and patterns, such as birth order and type of attention received during delivery.
3. Sex Ratio and Gender-Based Analysis: Sex-wise data is used to calculate the sex ratio and allocate resources for female child health, education, and welfare. It also helps in identifying social and cultural preferences for certain genders and combating female foeticide.
4. Public Health and Family Planning: Data on birth location and health care facilities helps evaluate the quality of medical care, fertility levels, and the reach of family planning programs.
5. Mortality and Health Trends: Death registration data is used to track mortality rates, determine causes of death, and assess public health initiatives.

Self-Check Exercise-1

1. Q1: Census is the basic data of _____.
2. Q2: The *Census of India Act* came into force in _____.

3.4 Surveys

Surveys are conducted in various forms, including the National Sample Surveys (NSS), National Family Health Surveys (NFHS), Annual Health Surveys, and District Level Household Surveys (specifically focusing on Reproductive & Child Health).

3.4.1 National Sample Surveys (NSS)

The National Sample Survey Organization (NSSO), established in 1950, is responsible for conducting the National Sample Surveys in India. The primary goal of NSSO is to gather information related to the socio-economic status of the Indian population. In 1970, the organization came under the governance of a council. The

governing body consists of an honorary chairperson, a Director General who also serves as the Chief Executive Officer, and members from various fields such as academia, government officials from both central and state governments, and the Ministry of Statistics and Programme Implementation.

The NSSO conducts regular surveys on a wide range of subjects, including enterprise activities, village infrastructure, household conditions, land and livestock holdings, and many others. These surveys are designed to cover a variety of topics such as social consumption, health, education, urban development, and more. Additionally, special surveys and unorganized sector surveys are conducted, alongside periodic surveys on consumer expenditure and employment/unemployment. As of now, the NSSO has completed its 76th round of surveys, resulting in the release of 586 reports on various subjects (source: NSSO Website).

The NSSO has implemented computer-assisted personal interviewing systems, allowing data to be collected directly through tablets, thereby reducing paper usage. Some sectors, such as government-owned entities like oil storage units, defense factories, and others like technical training institutes and transportation workshops, are excluded from NSSO surveys.

3.4.2 National Family Health Surveys (NFHS)

The National Family Health Surveys (NFHS) were launched by the Ministry of Health and Family Welfare, Government of India, with the objective of strengthening the research capabilities of population research centers. These surveys are coordinated by the International Institute for Population Sciences (IIPS) in Mumbai, which also provides technical support.

The first round of the NFHS was conducted between April 1992 and September 1993, and the most recent round (the fifth) was conducted from 2018 to 2019, with results expected soon.

Applications of National Family Health Surveys (NFHS)

1. The NFHS provides valuable data on various health indicators and family welfare programs.
2. The data collected through NFHS can be used to assess the progress of the health sector and to evaluate the effectiveness of current health programs.

Self-Check Exercise-3

1. Q1: In which year was the National Sample Survey Organization (NSSO) established?
2. Q2: The first NFHS was conducted between _____.

3.5 Summary

Demographic data refers to general statistics that describe the population and its various groups and subgroups. This data can pertain to an entire country, a specific region, a city, or individuals targeted by a product or service. Key demographic information about individuals typically includes age, gender, ethnicity, employment type, education, marital status, and more. This data plays a crucial role in understanding population trends, helping businesses, governments, and organizations make informed decisions.

3.6 Glossary

- Census: A population census is the complete process of collecting, compiling, evaluating, analyzing, and distributing demographic, economic, and social data about all individuals within a country or a specific region at a defined point in time.
- Civil Registration System (CRS): The Civil Registration System, also known as the birth and death registration system, involves the official recording of

vital events such as births, deaths, and stillbirths. This system operates under legal provisions to ensure continuous and permanent data collection.

- National Sample Survey Organisation (NSSO): The National Sample Survey Organisation has been conducting nationwide sample surveys on various socio-economic aspects of the population since 1950. It gathers data on topics such as household consumption, employment, and health to support policy-making and development initiatives.

3.8 Answer to Self-Check Exercise

Self-Check Exercise-1

Q1. Population

Q2. 1948

Self-Check Exercise-2

Q1.1886

Q2.Maharashtra

Self-Check Exercise-3

Q1.1950.

Q2. April, 1992 to September, 1993

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3.10 Terminal Questions

Q1. Discuss the various method of demographic data.

Q2. Discuss the census in detail.

Q.3 Explain the various survey method of demographic data

BLOCK- II

UNIT- 4

Malthus Theory of Population

Structure

4.1 Introduction

4.2Learning Objectives

4.3 Background of Thomas Malthus

Self-Check Exercise-1

4.**4**. Malthus Theory of Population

4.4.1 Major Elements of the Malthus Theory

4.4.2 Criticism of Malthusian Theory of Population

4.4.3 Karl Mark's Response to Malthus Thesis.

Self-Check Exercise-2

4.5 Importance of Malthusian Theory of Population

4.5.1 Things to remember based on Malthusian theory of Population

4.5.2 Is Malthusian Theory Valid Today?

Self-Check Exercise-3

4.6 Summary

4.7Glossary

4.8 Answers toSelf-Check Exercise

4.9Reference/Suggested Readings

4.10 Terminal Questions

4.1 Introduction

Thomas Robert Malthus, an influential British economist and philosopher from the 18th century, is most famous for his theories on population growth, as outlined in his seminal work *"An Essay on the Principle of Population"* published in 1798. In this work, Malthus proposed that populations would continue to grow exponentially until they are checked by factors such as disease, famine, war, or other catastrophes. His theories provided a foundation for discussions on population growth and resource limitations.

Key Highlights:

- **Malthusian Growth Model:** Malthus developed an exponential formula to predict population growth. This model emphasizes that human populations grow at a geometric rate, while food and resources grow at an arithmetic rate, eventually leading to shortages and crises.
- **Theory of Population Growth:** Malthus believed that unchecked population growth would lead to dire consequences, including widespread disease, famine, and war, as populations would exceed the capacity of the earth's resources to support them.
- **Political Economy and Statistical Contributions:** Malthus was a strong proponent of political economy and contributed to the formation of the *Statistical Society of London* in 1834, enhancing the use of statistical methods to understand and manage societal issues, particularly related to population and economics.

4.2 Learning Objectives

After reading this lesson, you should be able to:

1. **Understand Malthus' Theory of Population**: Gain an understanding of Malthus' theories regarding population dynamics.
2. **Comprehend the Background and Significance of Malthusian Population Theory**: Learn about the historical context and key concepts of Malthus' theory and its importance.

3. **Critique the Malthusian Population Theory**: Discuss the criticisms that have been levied against Malthus' views and model.
4. **Analyze Karl Marx's Response**: Understand Karl Marx's critiques of Malthusian theory.
5. **Evaluate the Relevance of Malthusian Theory Today**: Explore whether the Malthusian theory still holds validity in contemporary population studies and global challenges.

4.3 Background of Thomas Malthus

Early Life and Education:
Thomas Malthus was born on February 13, 1766, near Guildford, Surrey, in England, into a prominent family. He was primarily home-schooled before attending Cambridge University in 1784, where he studied at Jesus College. He earned his master's degree in 1791, and two years later, he became a fellow at the college.

Academic Career:
In 1805, Malthus began his career as a professor of history and political economy at the East India Company's college in Haileybury, where he taught until 1834. His academic pursuits were deeply influenced by his interests in economics, population dynamics, and political philosophy.

Recognition and Honors:
Malthus' contributions to economics and political economy were widely recognized. In 1819, he was elected as a fellow of the Royal Society. Two years later, he became a member of the Political Economy Club, alongside notable economists like David Ricardo and philosopher James Mill. In 1824, he was honored by being elected as a royal associate of the Royal Society of Literature. He was also elected to prestigious international academic societies, including the Académie des Sciences Morales et Politiques in France and the Royal Academy in Berlin.

Later Life and Legacy:
In 1834, Malthus co-founded the Statistical Society of London to promote statistical

studies related to social and economic issues. He passed away in 1834, leaving behind a legacy that would continue to influence discussions on population, economics, and sustainability.

Self-Check Exercise-1

Q.1 ……year Thomas Malthus was born.

Q.2 Malthus become a fellow of the Royal Society in ……

4.4 Malthus Theory of Population

The Malthusian Theory of Population, proposed by Thomas Robert Malthus, focuses on the imbalance between exponential population growth and arithmetic food supply growth. Malthus believed that population growth could only be kept in check by "preventive" and "positive" measures, which would help balance the two factors.

Thomas Robert Malthus (1766–1834) was a key figure in the study of population dynamics. His work on population was groundbreaking and contributed significantly to the field of demographic studies. He examined how population factors interact with social changes and proposed a theory based on these interactions.

In his seminal work *An Essay on the Principle of Population* (1798), Malthus argued that the population would increase rapidly due to the strong natural urge between the sexes. He believed that the population could double every 25 years if left unchecked, and eventually, it would surpass the capacity of food production.

Malthus famously wrote, "Population, when unchecked, increases in a geometrical ratio, while subsistence increases only in an arithmetical ratio." This means that while population grows exponentially (e.g., 1, 2, 4, 8, 16, etc.), food production grows in a linear fashion (e.g., 1, 2, 3, 4, 5, etc.). As a result, the growing population would outstrip the available food supply, leading to shortages.

Malthus argued that even though food production might increase, it would never be enough to meet the needs of a growing population. In his view, nature’s way of controlling this imbalance would be through disasters like famine, disease, and wars, which would increase the death rate and help bring the population back in line with the available resources.

Malthus summarized his theory in several key propositions:

1. **Food is essential for human survival**, and thus it limits population growth. In other words, population size is constrained by the availability of food resources.
2. **Population grows faster than food supply**. While population increases exponentially, food production increases at a much slower, arithmetic rate.
3. **Population will grow** whenever the means of subsistence increase, unless it is held back by significant external factors.
4. **There are two types of checks** that regulate population: preventive checks, which limit birth rates, and positive checks, which increase the death rate, thus bringing the population in line with available resources.

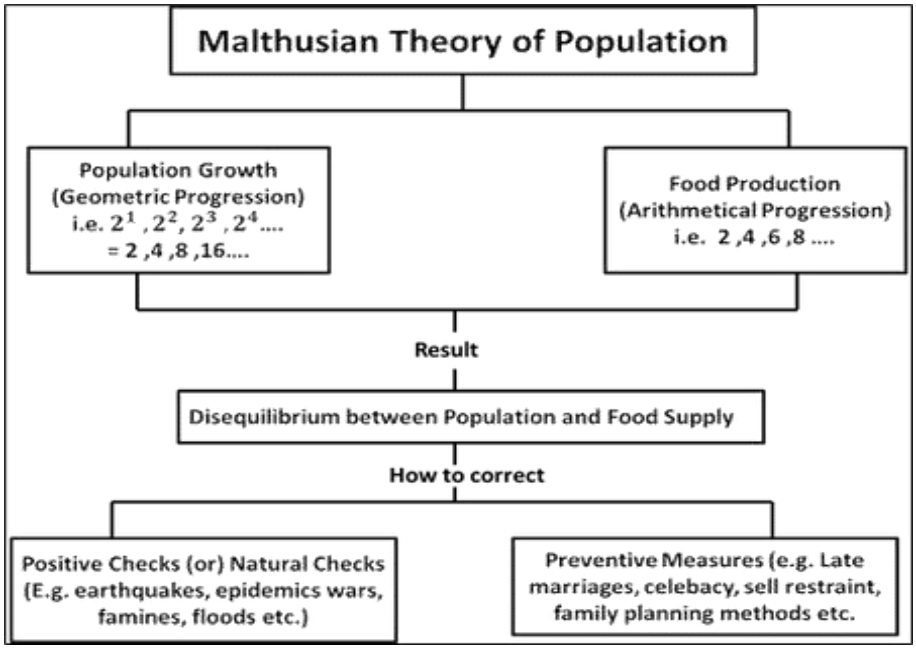
This theory has been influential in the study of demographics and social change, but it has also faced criticism due to its assumptions about food production and population growth. Nonetheless, Malthus's ideas continue to inform discussions about population control and resource management.

4.4.1 Major Elements of the Malthusian Theory

1. Population and Food Supply

According to the Malthusian theory, population increases exponentially, meaning it doubles every 25 years if left unchecked. On the other hand, food supply grows at a much slower, arithmetic rate. This means that while the population grows rapidly, the availability of food increases at a much more gradual pace. As a result, the food supply will eventually become insufficient to support the expanding population. This

imbalance between population growth and food production signals the impending shortage of food resources as the population continues to rise



1. Checks on Population

When the growth rate of the population exceeds the rate at which food supply can increase, a state of imbalance or disequilibrium arises. As a result, the demand for food will surpass its availability, leading to insufficient resources for survival. This scarcity can cause widespread death due to malnutrition and lack of food. To restore balance, nature imposes *positive checks*, such as epidemics, wars, famines, and other natural disasters, which increase mortality rates. On the other hand, *preventive checks* are human-made measures aimed at limiting population growth before such crises occur.

2. Positive Checks

Positive checks are natural phenomena that occur when population growth exceeds the available food supply. These include disasters such as famines, earthquakes,

floods, epidemics, and wars. These events reduce the population by increasing death rates, bringing the population back into balance with the available resources. According to Malthus, these checks are nature's way of controlling overpopulation when growth gets out of control.

3. Preventive Checks

Preventive checks, in contrast to positive checks, are measures that individuals or society take to control population growth before it becomes a problem. These include practices such as late marriage, self-control, and simple living. By adopting these measures, society can limit birth rates and prevent the need for the more catastrophic effects of positive checks. In this way, preventive checks help maintain a balance between population growth and food supply without relying on natural disasters or other crises

4.4.2 Criticism of Malthusian Theory of Population

The Malthusian theory, introduced by Thomas Robert Malthus, argued that population growth would inevitably surpass the growth of food production, leading to widespread famine and societal collapse. This theory has faced considerable criticism over time for several reasons:

1. Technological Advances in Agriculture:

- In many parts of the world, particularly in Western Europe, food production has grown alongside or even faster than population growth, largely due to advancements in agricultural technology. For instance, the U.S. has a minimal percentage of its population (around 2%) working in agriculture, yet the country's GDP exceeds $14 trillion.

2. Food Production Outpaces Population Growth:

- Contrary to Malthus's predictions, there have been times when food production has increased at a rate greater than population growth.

Technological developments, the expansion of agricultural techniques, and global trade have all contributed to surplus food production, disproving the idea that food supply cannot keep up with population growth.

3. Globalization and Food Supply:

- Malthus believed that limited land was a major constraint on food production. However, globalization has enabled countries to import food from other regions, ensuring food security even in nations where domestic food production cannot meet demand.

4. Geometric vs. Arithmetic Growth:

- Malthus suggested that population grows geometrically, while food production grows arithmetically. However, empirical evidence shows that food production often outpaces population growth, and population growth does not strictly follow the geometric pattern that Malthus predicted.

Key Criticisms of the Malthusian Theory:

1. Faulty Mathematical Basis:

- Malthus's assertion that food supply increases arithmetically and population increases geometrically has not been supported by real-world data. In fact, food production has often grown more rapidly than Malthus's formula would predict, and population growth has not consistently followed a geometric progression.

2. Failure to Predict New Agricultural Areas:

- Malthus failed to foresee the opening up of vast new areas for agriculture in regions like Australia, the U.S., and Argentina, which significantly boosted food production. Furthermore, advancements in transportation and trade made it possible for countries to import food, ensuring a stable supply despite population growth.

3. Static Economic Principles:

- Malthus applied static economic laws, such as the law of diminishing returns, to his theory. He could not anticipate the dramatic impact of technological advancements in agriculture, which have allowed food production to exceed the expected limits set by the law of diminishing returns.

4. Ignoring the Positive Impact of Population Growth:

- Malthus focused on the negative consequences of population growth without recognizing the potential benefits. Population growth can lead to an increase in the workforce, which may help boost productivity in agriculture and industry. This view contrasts with Malthus's negative stance, which saw population growth as purely detrimental.

5. Population and Wealth, Not Just Food:

- Malthus's theory wrongly assumed that food supply is the primary constraint on population growth. In reality, the relationship between population and a country's overall wealth is more significant. Wealthier nations can import food and other resources to support growing populations, as seen in the case of Great Britain, which imports most of its food but focuses on industrial production.

6. Decline in Death Rates, Not Just Rising Birth Rates:

- Malthus attributed population growth solely to rising birth rates. However, much of the population growth globally has been the result of declining death rates due to medical advancements and better healthcare, something Malthus could not have predicted.

7. Evidence Refutes Malthus's Predictions:

- Demographic studies show that as per capita income increases, fertility rates tend to decline, leading to slower population growth. In countries with higher standards of living, such as Japan and France, the population growth rate has decreased as people choose to have fewer children.

8. Moral Restraint is Not the Only Solution:

- Malthus proposed moral restraint, such as celibacy and delayed marriage, as a way to limit population growth. However, he could not have foreseen the development of modern birth control methods, which have proven to be far more effective in controlling population growth than the moral measures Malthus suggested.

9. Positive Checks Not Caused by Overpopulation:

- Malthus argued that overpopulation would lead to suffering through events like famines, disease, and wars. However, these events can occur in societies with both high and low populations, as evidenced by natural disasters affecting countries with stable or declining populations.

10. Malthus as a Misguided Prophet:

- Malthus's predictions about the catastrophic effects of overpopulation have largely been disproven, especially in Western Europe, where technological advancements and lower birth rates have negated the need for the grim outcomes Malthus predicted. His pessimistic view has largely been shown to be wrong.

Relevance of Malthusian Theory Today:

Despite its flaws, the Malthusian theory still holds relevance in some developing countries where high birth rates and limited resources contribute to poverty and food scarcity. While it may not apply to industrialized nations, Malthus's warnings about unchecked population growth have had a lasting influence on population control policies, particularly in developing regions.

In many parts of the world, the principles of Malthus's theory have shaped family planning policies and have been key in raising awareness about the need for balancing population growth with available resources. Although technological

advancements and economic changes have mitigated many of Malthus's predictions, his theory continues to inform debates on sustainability, resource management, and poverty alleviation.

Karl Marx's Critique of Malthus's Theory

Karl Marx, unlike Malthus, argued that poverty and famine were not the result of overpopulation but stemmed from the capitalist system's inherent inequality. Marx believed that the capitalist system created disparities in wealth and resources, which led to poverty and hunger. In contrast to Malthus, who viewed population growth as problematic in itself, Marx saw it as the distribution of wealth and resources, not population size, that was to blame for social problems.

Marx also disagreed with Malthus's assertion that food production couldn't keep up with population growth. He argued that advancements in agricultural technology could address any food shortages, and that technological innovation could be driven by population growth itself. This view was echoed by French sociologist E. Dupreel, who believed that population growth could spur innovation and technological advancements.

While Malthus's theory was influential, its predictions have not held true in many parts of the world, especially in advanced economies. His warnings about unchecked population growth have, however, contributed to the development of family planning and population control policies globally. While critics like Marx offered alternative explanations for poverty and resource scarcity, Malthus's theory remains a cornerstone in the study of population and economics. His emphasis on the need for balancing population growth with available resources continues to shape modern discussions about sustainable development and resource management.

Self -Check Exercise-2

Q.1Essay on the Principle of Population book written by…….

Q.2 ……years does population doubles.

Q.3……. progression does foodgrain production increase according to Malthus.

4.5 Importance of Malthusian Theory of Population

The Malthusian theory of population has continued to shape discussions on population growth, resources, and sustainability. Here are some important aspects to consider regarding the relevance of Malthus's theory:

- **Human Reproductive Urge:** Malthus recognized the powerful human urge to reproduce. This drive ensures the survival of family lines and cultural histories. Without measures such as birth control, the population would naturally continue to grow at a rapid pace, potentially outstripping resources.
- **Positive Checks and Historical Evidence:** Malthus's idea of positive checks, where natural calamities and disasters act as a counterbalance to overpopulation, is supported by historical examples. Natural disasters, such as famines and epidemics, often lead to significant population declines, reinforcing Malthus's point that unchecked population growth can lead to devastating consequences.
- **Partial Truth:** While his theory has been challenged, there is truth in Malthus's observations about the potential for population growth to outpace food production. Many economists and scholars acknowledge that Malthus pointed to an important reality about the limits of resources when faced with exponential population growth.

4.5.1 Key Takeaways from the Malthusian Theory of Population

- **Neo-Malthusianism:** Neo-Malthusians, building on Malthus's ideas, argue that controlling the human population is essential to preserving the environment and resources for both present and future generations. This movement stresses the need for population control to avoid resource depletion and environmental degradation.

- **Contraception and Family Planning:** The term "Malthusian" in modern contexts often refers to advocating for contraception and birth control. Groups such as the Malthusian League in the UK promoted family planning as a means of stabilizing population growth and preventing overpopulation.
- **Focus on Environmental Issues:** Unlike Malthus, who was primarily concerned with poverty, modern neo-Malthusians emphasize the risks of catastrophic famine and environmental decline resulting from unchecked population growth. Their focus is on the broader implications of overpopulation, such as ecosystem destruction and resource scarcity.
- **Population Growth vs. Resource Availability:** One of the core tenets of Malthus's theory is that population growth often outpaces the growth of essential resources like food, clothing, and other agricultural products. This imbalance can lead to widespread poverty and inequality.
- **Importance of Population Control:** Malthus highlighted the critical need for controlling population growth to ensure that resources remain sufficient to meet the needs of the population. Without such controls, societies may face dire consequences such as famine and environmental collapse.
- **Role of Positive Checks:** Positive checks, including famines, disease, and war, serve as natural mechanisms to bring population levels back in line with the available food supply. These checks, while tragic, are part of the natural process of balancing population and resources.

4.5.2 Is Malthusian Theory Valid Today?

While Malthus’s predictions about catastrophic consequences from unchecked population growth have not entirely materialized, the core principles of his theory still hold relevance in certain contexts. Several factors that Malthus could not foresee, such as advancements in technology, globalization, and improved agricultural practices, have alleviated some of his concerns. However, the fundamental issues he raised about the imbalance between population growth and resources are still present in some regions, particularly in developing countries.

Malthus’s assertion that without preventive checks, positive checks would inevitably occur is still evident today in certain parts of the world. In countries like India, where both birth rates and death rates remain high, the pressures of population growth continue to contribute to severe poverty, frequent epidemics, food shortages, and social unrest. These challenges mirror the concerns Malthus had about societies facing an unsustainable population without adequate resources.

The situation in countries like India, Pakistan, and China aligns with Malthus's theory to some extent. In these nations, the rapid population growth, combined with limited access to resources and a low standard of living, reflects many of the issues Malthus warned about. The increasing reliance on family planning initiatives and efforts to manage population growth are clear indications of the ongoing relevance of Malthusian ideas in contemporary settings.

Self-Check Exercise-3

Q.1 The …… are more concerned with catastrophic starvation & environmental deterioration than with poverty.

Q.2Controlling population increase is critical for…….

4.6 Summary

In this lesson, we explored the Malthusian Theory of Population, examining its core principles, background, and the key elements that form the foundation of the theory. We discussed both the criticisms and the significance of Malthus's ideas, which continue to offer valuable insights into population dynamics and resource management. By covering these aspects, this lesson provided a comprehensive understanding of Malthus's work and its relevance in both historical and contemporary contexts.

4.7 Glossary

- **Subsistence**: Refers to the basic necessities required for survival, such as food, clothing, and shelter. It is the means of support or livelihood, often

limited to the minimum needed for sustaining life. In farming, subsistence means growing enough food to feed oneself.

- **Gross Domestic Product (GDP)**: The total market value of all finished goods and services produced within a country's borders during a specific time period. It serves as a broad measure of a nation's overall economic activity.
- **Equilibrium**: A state of balance, especially when forces or influences are working in opposite directions but are equal in magnitude. In the context of population and resources, it refers to a balance between population growth and available resources.
- **Sustainability**: The capacity to endure or continue over the long term without depleting natural resources or harming the environment. In environmental science, it refers to practices that support ecological balance and minimize harm to the planet, ensuring resources are available for future generations.

4.8Answerto Self-Check Exercise

Self-Check Exercise-1

Q.1 766

Q.2 1819

Self -Check Exercise-2

Q.1 Malthus

Q.2 25

Q.3 Arithmetic

Self-Check Exercise-3

Q.1 Modern neo-Malthusians

Q.2 Population sustainability.

4.9 References / Suggested Readings

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10. Thompson, Warren S. (1953). *Population Problems*. New York: McGraw Hill.

4.10 Terminal Questions

1) Explain the major elements of the Malthusian theory of population.
2) Discuss the criticism of the Malthusian theory of population.
3) Write a note on Malthusian theory of population.
4) Discuss in detail Malthusian theory of population with examples

Unit-5

Optimum Theory of Population

Structure

5.1 Introduction

5.2Learning Objectives

5.3 History of Optimum Population Theory

Self-Check Exercise-1

5.4 Optimum Theory of Population

5.4.1 Definitions of Optimum Theory of Population

4.4.2 Statement of the Theory

5.4.3 Explanation to the Optimum Theory of Population

Self-Check Exercise-2

5.5 Merits/Benefits of the Optimum Population Theory

5.5.1 Superiority of Optimum Theory of Population over the Malthusian Theory

5.5.2 Demerits or Criticism of the Optimum Population Theory

Self-Check Exercise-3

5.6Summary

5.7Glossary

5.8 Answer-to Self-Check Exercise

5.9Reference/Suggested Readings

5.10 Terminal Questions

5.1 Introduction

Humans have a tendency to increase the population at a rate that often outpaces their ability to manage resources, such as income and the means to care for children. Therefore, there is a need for population control at certain points to maintain a balance. While some social scientists and economists may not fully agree with the Malthusian perspective on population control, they do acknowledge that humans possess the knowledge and capability to reach an optimum population level through thoughtful planning. This understanding has led to the development of the Optimum Theory of Population.

5.2 Learning Objectives

After completing this lesson, you should be able to:

- Familiarize yourself with the Optimum Theory of Population.
- Understand the history, definitions, and explanations of the Optimum Population Theory.
- Identify the merits and demerits of the Optimum Theory of Population.
- Understand how the Optimum Theory of Population is considered superior to the Malthusian Theory.

5.3 History of Optimum Population Theory

The Optimum Theory of Population was first introduced by Edwin Cannan in his book *Wealth* in 1924. It was further popularized by economists such as Robbins, Dalton, and Carr-Saunders. Unlike the Malthusian Theory, which connects population growth to food supply, the Optimum Theory focuses on the relationship between population size and the production of wealth. The Malthusian theory, being more generalized, analyzes population problems in the context of economic conditions, while the Optimum Theory is more concerned with determining the ideal population size for maximizing wealth and overall societal well-being.

The Optimum Theory of Population is regarded as a more realistic and modern approach when compared to the Malthusian Theory. Over time, economists such as Prof. Robbins, Dalton, and Carr-Saunders have refined and enhanced the theory, making it more applicable to contemporary population issues. This refinement of the

Optimum Theory of Population makes it a more practical and relevant framework for understanding the balance between population size and economic prosperity.

Self-Check Exercise-1

Q.1 Wealth book written by…….

Q.2 ……..also called modern theory of population.

5.4 Optimum Theory of Population

The **Optimum Theory of Population** was introduced by **Edwin Cannan** in his book *Wealth* published in 1924 and later popularized by economists like Robbins, Dalton, and Carr-Saunders from the London School of Economics. In contrast to the Malthusian theory, the Optimum Theory does not focus on the relationship between population growth and food supply. Instead, it examines the relationship between the size of the population and the production of wealth. While the Malthusian theory addresses population problems based on the economic conditions of a country, the Optimum Theory is more concerned with determining the ideal population size for maximizing wealth.

According to the Optimum Theory, the **optimum population** is the ideal number of people that, when combined with available resources and means of production, will generate the maximum income per person. This means that there is an optimal population size that will result in the highest per capita income, considering the stock of natural resources, production techniques, and capital available. Any population size that deviates from this optimal level—whether above or below—will lead to a decrease in per capita income.

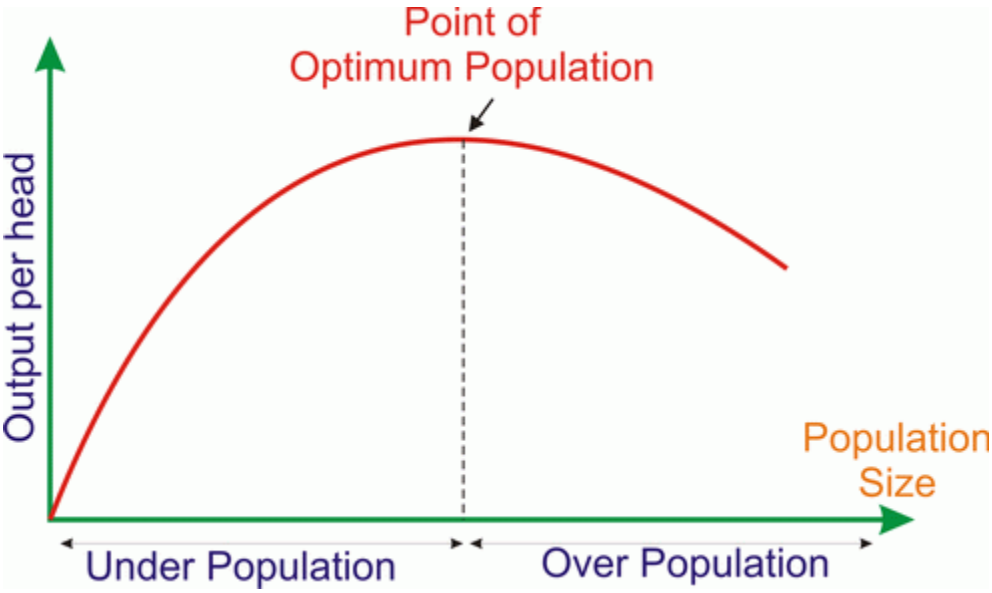
If a country's per capita income is low, it suggests the country is under-populated, and it can afford to increase its population until it reaches the optimum level. Conversely, if the per capita income is high and the country exceeds the optimum population size, the economy will suffer as a result of diminishing returns, reducing income per head.

The concept of the optimum population is not a new one. It can be traced back to **Confucius**, who in 551–479 BCE remarked:
"Excessive growth may reduce output per worker, repress levels of living for the masses, and engender strife."

In the 19th century, the concept of optimum population was further developed by **Karl Winkelblech** (1810–1865), a German professor. He categorized nations into three groups based on the size of their populations:

1. **Under-populated nations**
2. **Over-populated nations**
3. **Nations with normal populations**—meaning those with a population size that is most conducive to the greatest productivity and economic output.

Thus, the Optimum Theory of Population offers a more balanced and practical perspective on population dynamics by focusing on achieving the ideal population size that supports economic prosperity and a high standard of living for all citizens.



Optimum Population Theory: Key Postulations and Main Points

Postulations of the Optimum Population Theory:

1. **Natural Resources**: The natural resources of a country are fixed at any given time, though they may change over time due to various factors such as innovation or depletion.
2. **Production Techniques**: There is no change in the techniques of production within the scope of this theory. The technology used remains constant.
3. **Capital Stock**: The stock of capital in the economy remains constant during the analysis.
4. **People's Habits and Tastes**: The theory assumes that the habits, preferences, and tastes of the people do not change over time.
5. **Working Population Ratio**: The proportion of working individuals to the total population remains unchanged, even with population growth.
6. **Working Hours**: The number of working hours per laborer does not change.
7. **Business Organization**: The modes of business organization and structure remain constant.

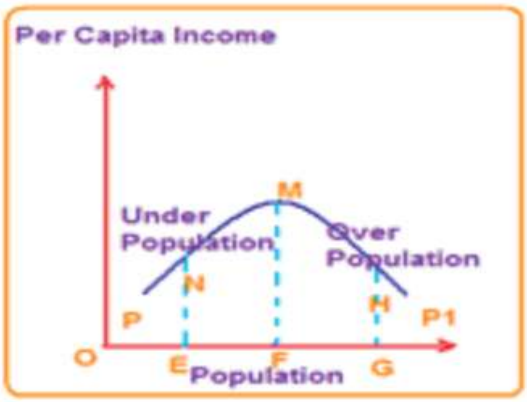
Short Main Points of the Optimum Population Theory

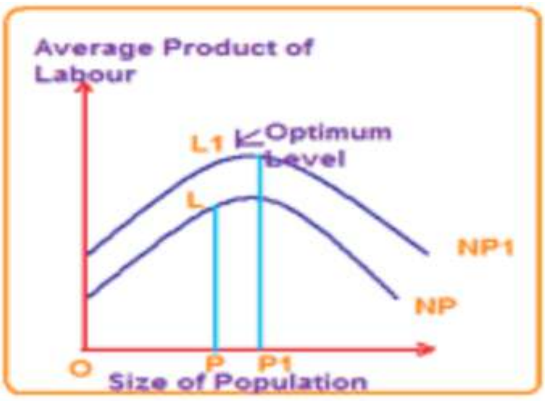
- **Optimum Population Size**: The optimum population is the ideal population size that maximizes income per person. It is the population level that, when combined with other available resources, will generate the highest income per head.
- **Impact of Population Growth**: If the population grows beyond or falls below the optimum level, per capita income will decrease. This signifies that any increase or reduction in population beyond the optimum size will result in a lower standard of living or economic productivity.
- **Relationship Between Population and Income**: Given a constant stock of natural resources, capital, and production techniques, there exists a specific population size corresponding to the highest per capita income. A deviation from this optimum population size—whether an increase or decrease—will result in a reduction of per capita income.
- **Under-population**: If an increase in population is followed by an increase in per capita income, the country is considered under-populated. It means the

country has the capacity to support more people, and population growth can continue until the optimum population level is reached.

- **Over-population**: On the other hand, if population growth leads to a decrease in per capita income, the country is over-populated. In such cases, population size needs to be reduced to maximize per capita income.
- **Income at the Optimum Point**: Per capita income is the highest at the optimum point. Beyond this point, the average product of labor begins to fall, indicating diminishing returns on labor as the population increases.
- **Dynamic Nature of Optimum Population**: The optimum population is not a fixed number; it changes based on several factors such as improvements in production techniques, changes in available resources, and shifts in capital. As any of these factors change, the optimum population level will also shift.
- **Effect of Technological Advancements**: If production methods and techniques improve, the output per person will rise, and the optimum population point will shift upward, allowing for a larger population without diminishing returns.
- **Effect of Natural Resource Increase**: If the stock of natural resources increases, the optimum population of the country can also increase. More resources allow for a larger population while still maintaining or increasing per capita income.

The Optimum Population Theory provides a balanced approach to understanding population dynamics, emphasizing the relationship between population size and economic productivity. It suggests that for maximum economic welfare, a country must maintain an ideal population size that ensures the highest per capita income while accounting for its resources, capital, and technological capabilities.





5.4.1 Definitions of the Optimum Theory of Population

The **optimum population** refers to the ideal number of people that a country can support to achieve the highest possible economic welfare and living standard. Different economists have defined this concept in various ways:

- **Robbins' Definition**: Robbins defines optimum population as “the population which maximizes returns is the optimum population.” This suggests that the optimum population is one that generates the greatest economic output possible.
- **Carr-Saunders' Definition**: Carr-Saunders defines it as “the population that produces the greatest economic welfare.” This definition highlights the importance of overall well-being and societal prosperity in determining the optimum population.
- **Dalton's Definition**: Dalton’s definition states that "optimum population is one that results in the highest income per individual." This emphasizes maximizing individual income as the key measure of an ideal population size.

5.4.2 Statement of the Theory

The **Optimum Theory of Population** posits that there is a specific population size that leads to the highest per capita income, given the available natural resources, capital, and technological knowledge in a country.

The theory can be summarized as:

“Given the natural resources, capital stock, and level of technical knowledge, there is a particular population size that results in the highest per capita income. This population size is referred to as the optimum population.”

- **Optimum Population**: Economists such as Carr-Saunders describe optimum population as the size that maximizes economic welfare. In contrast, **Prof. Cannan** viewed the optimum population in terms of "return to labor," suggesting that the most productive population is one in which any increase or decrease in labor would result in a drop in returns.
- **Bounding's Observation**: Bounding observed that optimum population is the size at which the standard of living is maximized.

Underpopulation:

When a country’s population is below the optimum level, it is considered under-populated. In such cases, there are insufficient people to fully utilize all available resources, leading to lower per capita income. The country could support more people without reducing individual standards of living until the optimum level is reached.

Overpopulation:

If the population exceeds the optimum level, the country becomes overpopulated. With too many people, the resources become spread too thin, resulting in reduced efficiency in production and lower per capita income. The country must reduce its population to optimize living standards.

5.4.3 Explanation of the Optimum Theory of Population

According to the **optimum population** theory, there is an ideal population size that maximizes per capita income, given the country's resources, capital, and technological advancements. If the population is either too large or too small, per capita income will be reduced.

Underpopulation:

- A country is considered under-populated if its population is smaller than the optimum level. This leads to underutilization of resources, resulting in lower economic output and per capita income. As the population increases towards the optimum size, per capita income increases.

Overpopulation:

- If a country's population exceeds the optimum size, it becomes overpopulated. In this scenario, resources become stretched, and the efficiency of production declines, reducing per capita income and the overall standard of living.This is illustrated in Fig.1

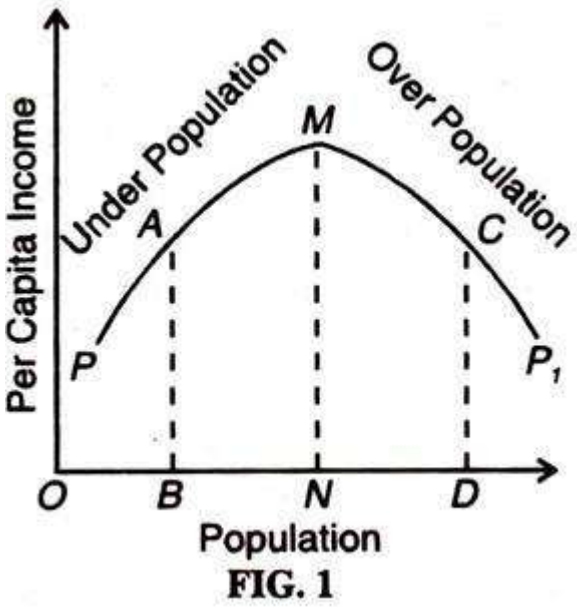


FIG. 1

In the figure, population is plotted along the horizontal axis and per capita income on the vertical axis. Initially, the population is below the optimum level, and per capita income increases as the population grows. At a population level of OB, the per capita income is BA, which is still below the maximum possible income, represented by NM. The optimum population size, ON, corresponds to the point where per capita income reaches its maximum value, NM.

If population continues to grow beyond ON, from ON to OD, the principle of diminishing returns begins to apply. This results in a decrease in per capita income,

which falls from BA to DC. As the population continues to increase beyond the optimum, per capita income continues to decline. The region from ON to ND represents over-population, where the per capita income has diminished due to the excessive population.

However, the optimum population level is not static. It can change when any of the factors assumed to be constant change. For example, improvements in production techniques or methods will increase output per head, shifting the optimum population point upwards. Similarly, if natural resources increase, the optimum population size will also increase. Therefore, the optimum population is not fixed; it is a movable point that adjusts with changes in production methods and resources.

This dynamic nature of optimum population is explained by Cannan's theory. According to Cannan, "At any given time, an increase in labor up to a certain point results in increasing proportionate returns, but beyond that point, further increases in labor result in diminishing proportionate returns." The highest per capita income is achieved at the point where the average product of labor begins to fall. This point, where the return starts diminishing, represents the optimum population size.This is illustrated in Figure 2.

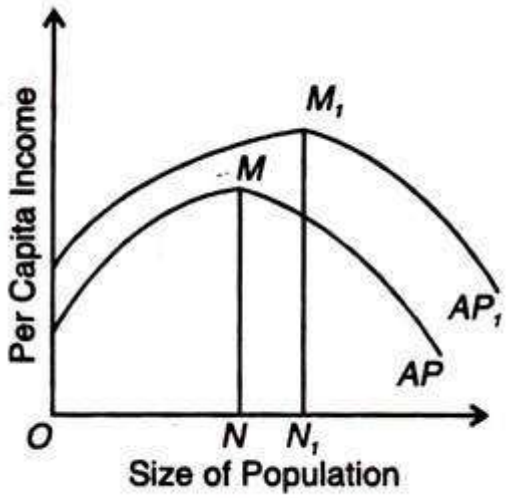


FIG. 2

In this model, the population size is plotted on the horizontal axis, while the vertical axis represents the average product of labor or income per head. The curve labeled

AP illustrates the relationship between the average product of labor and population size.

Initially, as the population grows from point O to ON, the average product of labor and per capita income increase. At the point **ON**, the per capita income reaches its maximum, represented by **M**, indicating the optimum population level.

When the population exceeds **ON**, the average product of labor and per capita income begin to decline. This situation reflects **over-population**, where further increases in population reduce income per head. Conversely, if the population is smaller than **ON**, the country is considered **under-populated**, meaning it has not yet reached the optimal level where resources are fully utilized for maximum per capita income.

However, it's important to note that **ON** is not a fixed point. If technological advancements or improvements in production techniques occur, the average product of labor could rise. This would lead to an increase in per capita income, and consequently, the optimum population level would shift upward. In the diagram, **AP1** represents the new average product of labor after improvements, and **M1** is the new point where the maximum per capita income occurs at the updated optimum population level **ON1**.

This dynamic nature of the optimum population reflects the influence of changes in technology and production techniques, which can push the optimal population level higher, allowing for more efficient use of resources and an increase in per capita income.

- Self-Check Exercise-2

Q.1 The optimum theory of population was propounded by……..

Q2.According to …..“Optimum population is that which gives the maximum income per head.”

Q.3 Dalton’s Formula:……..

5.5 Merits/Benefits of the Optimum Population Theory

1. **Comprehensive Approach**:
   The Optimum Population Theory provides a holistic understanding of population issues, focusing on how population size influences production and economic efficiency. It carefully analyzes the relationship between the number of people and the country's overall productivity.
2. **Qualitative Nature of the Theory**:
   As Prof. Bye stated, "Optimum population is difficult to find because the size of population must lead to the fullest development of social and economic life." This emphasizes the theory's focus on not just the quantity but also the quality of life and how population size can foster the social and economic growth of a nation.
3. **Pragmatic Approach**:
   The theory is rooted in practical, real-world outcomes. It does not just consider theoretical aspects of population size but also addresses the practical implications for managing population growth and its economic impact, offering actionable insights.
4. **More Detailed Analysis**:
   The Optimum Population Theory explores both the consequences of **over-population** and **under-population**, providing a nuanced understanding of these extremes and explaining the negative effects of both on economic development.

5.5.1 Superiority of the Optimum Theory of Population over the Malthusian Theory

The Optimum Population Theory is superior to the Malthusian Theory for the following reasons:

1. **Context-Specific Analysis**:
   The Malthusian theory applies universally, regardless of a country's economic situation. In contrast, the Optimum Population Theory accounts for a country's unique economic conditions, offering a more tailored analysis suited to specific contexts.
2. **Broader Vision**:
   Malthus's focus was limited to the relationship between population growth and food supply. The Optimum Population Theory, developed by Cannan, considers a wider scope, linking population growth to both industrial and agricultural production, and recognizing the importance of overall economic productivity.
3. **Dynamic vs. Static**:
   While the Malthusian theory is static and focuses on a fixed period of time, the Optimum Population Theory is dynamic. It recognizes that over time, the optimum population level can rise as production techniques, technology, and capital improve, leading to a higher per capita income. This adaptability makes the Optimum Population Theory more aligned with real-world changes.
4. **Practical vs. Theoretical**:
   Malthus's theory is often criticized for being overly theoretical, predicting that population growth inevitably leads to suffering and scarcity. On the other hand, the Optimum Population Theory offers a practical approach, recognizing that population growth, if managed well, is essential for utilizing a country's resources to their fullest potential.
5. **Realistic View on Resources**:
   Malthus assumed natural resources were inherently limited, focusing on diminishing returns in agriculture. The Optimum Population Theory, however, recognizes that the law of diminishing returns does not apply immediately. Before reaching the optimum population level, the law of increasing returns applies, making the approach more realistic in the context of long-term economic growth.
6. **Population Growth as a Positive Force**:
   While Malthus feared over-population, the Optimum Population Theory stresses that population growth can contribute positively to economic development. An increasing population brings more labor, helping to expand

resources and improve production. As long as the population is below the optimum level, growth is beneficial.

7. **Optimistic Outlook**:
   Malthus's theory is often criticized for its pessimistic view of the future, assuming widespread misery due to population pressure. The Optimum Population Theory, in contrast, takes an optimistic view, suggesting that population growth, when managed correctly, can be a source of wealth creation and social progress.

The **Optimum Population Theory** is a more **dynamic**, **context-sensitive**, and **optimistic** framework for understanding population growth and its impact on economic development. It takes a **practical**, **realistic**, and **flexible** approach compared to the **Malthusian Theory**, which is more rigid and pessimistic in its assumptions about population dynamics. The Optimum Population Theory provides a balanced and adaptable approach, recognizing that population growth, when managed in relation to a country's resources and economic conditions, can contribute positively to national prosperity.

5.5.2 Demerits or Criticism of the Optimum Population Theory

While the **Optimum Population Theory** has its merits, it is also subject to various criticisms. Some of the key demerits are as follows:

1. **Difficult to Determine Optimum Population**:
   It is extremely challenging to determine the exact optimum population for a country at any given time. Multiple factors like technical knowledge, capital stock, per capita income, natural resources, and technological advancements must be considered. These factors are difficult to quantify and can vary over time, making the calculation of an ideal population size highly uncertain.
2. **A Static Theory**:
   The Optimum Population Theory is often criticized for being **static**. It primarily focuses on the short-term period and does not account for the long-term changes in natural and human resources that can affect per capita income. Moreover, the theory does not adequately address the determinants of population growth, such as birth rates, death rates, and migration patterns.

3. **Neglects Biological and Sociological Factors**:
   Critics argue that the theory overlooks the biological and sociological factors that influence population size and growth. These include reproductive behaviors, family planning, health, and social factors that shape population dynamics. As a result, the theory fails to consider the full complexity of population growth and development.
4. **Not a Realistic Theory**:
   The assumptions on which the Optimum Population Theory is based are often criticized as unrealistic. Natural resources, technical knowledge, and production methods are constantly evolving, and these variables can change over time, making the theory less applicable in the real world. It assumes a level of stability and predictability that is rarely found in actual economies.
5. **Only Economic Factors Considered**:
   One of the primary criticisms of the theory is that it only considers **economic factors**, such as income per capita, when determining the optimum population. The theory fails to incorporate **social**, **political**, and **cultural** factors, all of which play a significant role in shaping a country's population policies and overall development.
6. **Not Practicable**:
   The Optimum Population Theory is often seen as **impractical**. Since it is based on constantly changing variables, it is not a stable framework for forming policy. Prof. Robbins even referred to the theory as the "most sterile idea of economics." This critique highlights the difficulty of applying such a theory to real-world policy-making, as it lacks clear, actionable guidance.
7. **Distributional Aspect Neglected**:
   The theory overlooks the **distributional aspect** of population and income. Even if population growth leads to an increase in national income, this increase can be meaningless if the wealth is not equitably distributed. The theory ignores income inequality and the fact that uneven distribution can hinder economic development. A more comprehensive theory would need to account for how wealth and resources are shared across different segments of society.
8. **No Evidence of Optimum Level**:
   One significant flaw is that there is no concrete evidence or example of an

optimum population level in any country. The theory remains largely hypothetical, and there is no empirical data to show what the "optimum" population looks like in practice.

9. **Optimum Level is Vague**:
   The concept of "optimum population" is vague and difficult to define. It includes both **quantitative** and **qualitative** aspects, such as the ideal age composition, physical health, knowledge, and intelligence of the population. These variables are subject to change and depend on external factors like environment and social conditions, making the optimum level unclear and imprecise.
10. **Correct Measurement of Per Capita Income is Not Possible**:
    Accurately measuring **per capita income** is challenging. National income data is often inaccurate or unreliable, which makes the concept of optimum population difficult to validate. Without accurate income data, it becomes hard to establish what the "optimum" level is or how to measure deviations from it.
11. **No Place in State Policies**:
    The concept of optimum population does not feature prominently in **modern state policies**. While fiscal policies focus on increasing employment, output, and income, the optimum population theory is not directly referenced. Governments do not typically make population size a central part of their economic or social strategies, rendering the theory somewhat irrelevant in policymaking.
12. **Does Not Explain Determinants of Population Growth**:
    The theory fails to explain the **determinants of population growth**, such as the factors influencing birth and death rates. It also neglects the influence of urbanization, migration, and other social changes that can alter population dynamics. As a result, it does not provide a comprehensive understanding of why populations grow or shrink, limiting its practical applicability.

The **Optimum Population Theory** is an important concept in the study of population economics, but it faces significant limitations. It is difficult to measure and lacks practical applicability due to its assumptions and static nature. Additionally, the

theory overlooks critical sociological, political, and biological factors, and its focus on economic factors alone makes it overly simplistic. Moreover, the absence of a clear and measurable "optimum" population level weakens the theory's utility in guiding real-world policies. Therefore, while the theory offers valuable insights, it must be understood in the context of its criticisms and limitations.

Critical Analysis of the Optimum Population Theory

While the **Optimum Population Theory** offers a significant improvement over the Malthusian theory, it is not without its **serious weaknesses**. Below is a critical analysis of these weaknesses:

1. **No Evidence of Optimum Level in Any Country**: The concept of an **"optimum population"** remains largely **theoretical**. Despite the theory's logical framework, there is no empirical evidence to support the existence of an "optimum" population level in any real-world country. The absence of such evidence makes it difficult to validate the theory and apply it effectively to actual population management.
2. **Difficult to Measure Optimum Level**: Even though the **optimum population** theory suggests an ideal population size that maximizes per capita income and overall welfare, determining this ideal number is **extremely difficult**. The factors influencing population size are numerous and complex, including economic variables, technological progress, and changes in social conditions. Since no universal formula or precise measurement method exists, finding the exact optimum level for a country remains elusive.
3. **Correct Measurement of Per Capita Income is Not Possible**: One of the core components of the theory is the measurement of **per capita income** to assess whether a country's population is at an optimum level. However, accurately measuring per capita income is challenging. Data on national income can be **inaccurate, inconsistent, or unreliable**, making it difficult to establish a valid basis for comparing the actual population size against the supposed optimum level. The constant fluctuation of economic factors further complicates this measurement.
4. **Neglects the Distribution Aspects of Per Capita Income**: The theory focuses on **average per capita income** as a benchmark for optimum

population size but **neglects the distribution** of income across different sectors of society. Even if a country's per capita income is rising, it does not necessarily mean that all segments of society are benefiting equally. The **distribution of wealth** can significantly impact the quality of life, and the theory fails to account for this crucial aspect. Without equitable distribution, an increase in national income does not necessarily translate into improved living conditions for all citizens.

5. **Optimum Level Not Fixed but Changes with Time**: Another major limitation is that the **optimum population level is not fixed**. The theory assumes that the optimum population size can be calculated at a specific point in time, but this level **varies** as economic, technological, and social conditions evolve. What may be considered an optimal population for a country at one point in time may not hold in the future due to advancements in technology, shifts in economic policy, or changes in natural resources. This makes the theory more of a **dynamic guideline** rather than a fixed principle.
6. **Neglects Social and Institutional Conditions**: The theory primarily focuses on **economic factors**, such as income per capita and production efficiency, without considering the **social and institutional** conditions that play a crucial role in determining population dynamics. Factors like **education, healthcare, political stability, and governance** are significant in influencing the overall wellbeing of a population. The theory's neglect of these conditions limits its applicability, as a nation's optimal population cannot be determined by economic variables alone.
7. **No Place in State Policies**: The **Optimum Population Theory** does not provide clear guidelines for **state policies** regarding population control or growth. While it suggests an ideal population size based on economic factors, it does not offer actionable recommendations for how governments can manage population growth or regulate birth rates. Most modern state policies, such as fiscal, social, and development policies, do not consider the optimum population level as a key element. Therefore, the theory remains more of an academic concept rather than a practical tool for government action.
8. **Does Not Explain the Determinants of Population Growth**: One of the **most significant weaknesses** of the Optimum Population Theory is that it fails to address the **determinants of population growth**. It does not explain

why birth rates rise or fall, how migration affects population size, or how factors like urbanization, healthcare, and technological advancements contribute to changes in population. Without understanding these drivers, it is difficult to devise effective strategies to influence population growth in line with optimal economic outcomes.

While the **Optimum Population Theory** offers a more nuanced and optimistic perspective compared to the Malthusian theory, its **limitations** cannot be overlooked. The theory's theoretical nature, difficulty in measuring the optimum population, and focus on only economic factors make it impractical for real-world applications. Additionally, its neglect of social, political, and institutional factors further weakens its validity as a guiding principle for population management. Despite these drawbacks, the theory remains an important framework for understanding the potential relationships between population size, economic growth, and resource utilization, albeit with significant caution about its real-world applicability.

Self-Check Exersice-3

Q.1 Two demerits of the Optimum Population Theory.

Q.2 Why Optimum Population Theory is not a Realistic Theory?

5.6 Summary

Modern economists have largely **rejected the Malthusian theory** of population, which argues that once a population exceeds a certain size, it leads to inevitable misery. Instead, they have adopted the concept of the **optimum population**, which focuses on balancing population size with the best possible standards of living for all people.

While the **Optimum Population Theory** has faced criticism, it marks a **significant improvement** over the Malthusian perspective. It provides a way to assess the

progress of a country in terms of **per capita income** and resource utilization, offering a more **optimistic view of population growth**. This theory is valuable for **demographic science**, as it helps counter the pessimism of the Malthusian model and offers a more flexible understanding of the relationship between population and economic prosperity.

However, the Optimum Population Theory has limitations, particularly its **static nature**. This makes it less useful in **real-world policy-making** or for **dynamic social life**. To be more effective, the theory needs to be revised to accommodate **changing economic and social conditions**. Therefore, while it provides a valuable framework for understanding population dynamics, its practical application remains limited unless adapted to a **dynamic context**.

5.7 Glossary

- **Optimum Population**: The concept where the population size of a country or region is balanced to ensure the best possible standards of living for all people. This population size maximizes **per capita income** and ensures efficient utilization of natural and economic resources.
- **Production**: The process of **manufacturing or growing** goods and services in large quantities to meet demand, contributing to economic output.
- **Per Capita Income**: A measure of the **average income** earned by each person in a specific area, such as a country or region. It is used to evaluate the standard of living and the economic well-being of the population. It is calculated by dividing the **total income** of a region by its population.

5.8 Answers to Self-Check Excises

Self-Check Exercise-1

Q.1 Edwin Cannan

Q.2 Optimum population Theory

Self-Check Exercise-2

Q.1 Edwin Cannan

Q2. Dalton,

Q.3 M = $\frac{A - O}{o}$

Self-Check Exersice-3

Q.1 i)Difficult to Determine Optimum Population. ii)A Static Theory

Q.2 It is pointed out that two assumptions, on which the theory has been based, are not realistic. So, the practical value of this theory is reduced. In fact, natural resources, technical knowledge and production methods are generally changeable.

5.9 References/Suggested Readings

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5.10 Terminal Questions

1) Explain the major points of the Optimum theory of population.
2) Discuss the criticism of the Optimum theory of population.
3) Write a note on Dalton's formula.
4) Discuss in detail optimum theory of population with examples.
5) Describe how superiority of optimum theory of population over the Malthusian theory.

Unit-6

Demographic Transition Theory of Population

Structure

6.1 Introduction

6.2Learning Objectives

6.3 History of Demographic Transition

Self-Check Exercise-1

6.4 Demographic Transition in India

Self-Check Exercise-2

6.5 Theory of Demographic Transition of Population.

6.5.1 Key Points of Demographic Transition Theory

6.5.2 Criticism of Demographic Transition theory

Self-Check Exercise

6.6 Summary

6.7 Glossary

6.8Answers to Self-Check Exercise

6.9Reference/Suggested Readings

6.10 Terminal Questions

6.1 Introduction

Demographic transition refers to the historical shift in population dynamics that occurs when a society moves from a phase of high birth rates and high death rates, often found in societies with minimal technological advancement, low levels of education (especially for women), and limited economic development, to a phase of low birth rates and low death rates in more technologically advanced, educated, and

economically developed societies. This shift is accompanied by changes in society's structure, such as improvements in healthcare, education, and industrialization.

While this transition has been observed in many industrialized countries, applying this theory to individual countries can be imprecise. Social, political, and economic factors significantly influence demographic trends, which may differ from one nation to another. However, a broad acceptance exists within the social sciences of the correlation between declining fertility rates and socioeconomic development. Scholars continue to debate whether it is industrialization and higher income that lead to lower population growth, or whether a reduction in population precedes industrialization and economic growth. The role of various interrelated factors—such as higher per capita income, lower mortality rates, the rise of demand for skilled labor, and increased old-age security—is also an ongoing subject of academic inquiry.

6.2 Learning Objectives

By the end of this lesson, you should be able to:

- Understand the demographic transition theory and its implications on population dynamics.
- Analyze the demographic transition process in the context of India.
- Gain insight into various population theories and their impact on demographic studies.

6.3 History of Demographic Transition

The concept of demographic transition originated from an interpretation of demographic history, which was initially proposed by American demographer Warren Thompson in 1929. Around the same time, French scholar Adolphe Landry made similar observations regarding demographic patterns and the potential for population growth. However, it was in the 1940s and 1950s that Frank W. Notestein formalized the theory of demographic transition.

Over time, the idea of demographic transition gained wide acceptance, particularly due to the negative correlation observed between fertility rates and industrial

development. By 2009, this correlation had become one of the most well-established findings in the social sciences, providing a framework for understanding how shifts in population growth relate to industrialization and societal development.

Self-Check Exercise-1

Q.1 In the 1940s and 1950s …… developed a more formal theory of demographic transition.

Q.2 Interpretation of demographic history Theory developed by……..

6.4 Demographic Transition in India

India has experienced distinct stages in its demographic transition, marked by changes in birth rates and death rates. These stages reflect the country's socioeconomic progress and healthcare improvements. Below are the four key stages of demographic transition in India:

First Stage

The first stage of demographic transition in India lasted until the 1920s. During this period, both birth and death rates were extremely high. The country faced numerous challenges, such as frequent famines, epidemics, and limited access to healthcare, which kept mortality rates high. While birth rates were high due to traditional societal norms and limited family planning options, the lack of medical advancements kept death rates high as well.

Second Stage

The second stage of demographic transition spanned from the early 1920s to the early 1970s. This period witnessed a notable decline in death rates. The major causes of mortality, such as famines and epidemics, were gradually brought under control due to improvements in healthcare, sanitation, and public health policies. However, despite the decline in death rates, birth rates remained relatively high, which led to an increase in population growth, especially between 1921 and 1951.

Third Stage

India entered the third stage of demographic transition around 1971. During the 1970s, there was a decline in both birth and death rates, with the decline in death rates being nearly equivalent to the decline in birth rates. This resulted in a plateau in population growth during the 1960s and 1970s. In the 1980s and 1990s, birth rates began to fall faster than death rates, which continues to the present day. This decline in birth rates can be attributed to various factors such as improved access to family planning, better education, particularly for women, and improved living standards.

Fourth Stage

According to predictions from the Office of the Registrar General of India, India is expected to enter the fourth stage of demographic transition around 2026. The fourth stage is characterized by both low birth and death rates, leading to stable or even slowly declining population growth. Some Indian states, such as Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, and West Bengal, have already achieved the Total Fertility Rate (TFR) of 2.1, which is considered the replacement level fertility rate. However, states like Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh, and Uttarakhand are expected to reach this level of fertility only around 2030.

Self-Check Exercise-2

Q.1 In India, the first stage of demographic transition was witnessed till ……..

Q.2 Second stage of demographic transition in India was…….

6.5 Theory of Demographic Transition

The theory of demographic transition, first introduced by Warren S. Thompson in 1929 and later expanded by Frank W. Notestein in 1945, explains the changes in

birth rates, death rates, and population growth observed in societies as they industrialize and modernize. It provides a historical account of the transition from high birth and death rates to low birth and death rates, typically observed in industrialized societies. This process, which began in the later 18th century, is characterized by a shift in population dynamics due to advances in technology, education, and economic development.

However, demographic transition should not be viewed as a "law of population growth" but rather as a general framework or model that describes the evolutionary process of population change. It attempts to explain how human populations change in size and structure during industrialization. While it is widely used to analyze the demographic history of countries, the theory is not a one-size-fits-all model and may not be applicable to every country due to differences in social, political, and economic contexts.

Stages of Demographic Transition

The demographic transition theory generally divides the process into three stages, although some scholars (such as Haggett in 1975) have proposed four or five stages. The stages are as follows:

- **Pre-transition Stage**: Characterized by high birth and death rates with little population growth.
- **Stage I**: High birth rates and declining death rates, leading to rapid population growth.
- **Stage II**: Low birth and death rates, resulting in slow population growth.
- **Stage III**: A situation where both birth and death rates decline substantially, leading to zero population growth.

The theory suggests that socio-economic transformations accompany demographic changes as societies shift from rural agrarian and illiterate systems to urban, industrial, literate, and modern economies.

Breakdown of Demographic Transition Stages

First Stage: High Birth Rate and High Death Rate

In the first stage, a country is at a low level of economic development, with agriculture as the primary occupation. The population experiences high birth and death rates, which balance each other, resulting in a stable population. The high death rate is due to factors such as poor medical facilities, frequent epidemics, and famines. The high birth rate is driven by social and economic factors, including limited access to birth control and the need for large families to contribute to agricultural labor.

Key Features:

- **Population Pyramid**: Expanding at the base, indicating a young population.
- **Life Expectancy**: Low, with high infant mortality rates.
- **Fertility Rate**: High (around 8+ children per woman).
- **Economy**: Stagnant, with no surplus resources for development.
- **Examples**: Sierra Leone, Somalia.

In this stage, population growth is slow, as high mortality rates limit the overall increase in population. The majority of people are involved in primary economic activities like agriculture, where large families are seen as assets. In pre-industrial societies, death rates and birth rates were high and fluctuated in response to factors like food supply, disease, and natural disasters.

Second Stage: High Birth Rate and Low Death Rate (Population Explosion)

The second stage of demographic transition sees a significant decline in the death rate while the birth rate remains high. This stage marks rapid population growth, as advances in healthcare, sanitation, and nutrition reduce mortality rates. However, social norms and limited access to contraception lead to continued high fertility rates.

Key Features:

- **Population Pyramid**: Rapidly expanding, indicating a young population.
- **Population Growth**: Rapid increase (population explosion).
- **Fertility Rate**: High, although beginning to decline.

- **Death Rate**: Rapidly declining due to improvements in health and sanitation.
- **Infant Mortality**: Declining significantly.
- **Examples**: Countries in Sub-Saharan Africa and parts of Asia.

During this stage, the gap between birth and death rates widens, resulting in high population growth. Economic development begins to occur, and public health improvements contribute to a decrease in mortality. However, the birth rate does not immediately fall, leading to a population boom.

Third Stage: Declining Birth Rate and Low Death Rate

In the third stage, both birth and death rates begin to decline. The country experiences a slowdown in population growth, and the economy undergoes significant structural changes. Urbanization increases, and people begin to view large families as liabilities rather than assets. Family planning, improved living standards, and increased access to education, particularly for women, contribute to the decline in birth rates.

Key Features:

- **Population Pyramid**: Stationary, indicating a more balanced age distribution.
- **Population Growth**: Slowing down.
- **Fertility Rate**: Declining rapidly.
- **Death Rate**: Continuing to be low.
- **Life Expectancy**: Increasing.
- **Older Population**: An increasing number of elderly people.
- **Examples**: India, Brazil.

The third stage is marked by a significant shift in societal attitudes toward family size, with many countries in this stage experiencing lower birth rates due to socioeconomic changes, urbanization, and greater access to family planning methods. The decline in fertility is accompanied by a reduction in infant mortality and greater life expectancy.

This model helps in understanding the demographic changes occurring in a country, especially in terms of population dynamics, birth and death rates, and socio-economic development. However, it should be understood that the theory of demographic transition may not be universally applicable and should be interpreted with regard to local historical, cultural, and economic contexts.

Stage Three: Declining Birth Rate and Low Death Rate

In **Stage Three** of the Demographic Transition Model (DTM), both birth and death rates are low, leading to slower population growth. This stage generally emerges as a result of improvements in economic conditions, women's status, education, and access to contraception. The decline in the birth rate is gradual and varies from country to country, influenced by a variety of social, cultural, and economic factors. This transition marks a shift towards population stability. Several factors contribute to this decline in fertility, many of which are commonly associated with sub-replacement fertility rates:

1. **Decline in Childhood Mortality**:
    - As childhood death rates decrease, parents start to realize that they no longer need to have as many children to ensure support in old age. This change occurs when income levels rise, allowing families to be confident that fewer children can provide adequate care in their later years and contribute to family business or welfare.
2. **Urbanization**:
    - Urbanization plays a key role in reducing fertility rates. As people move from rural areas to cities, traditional values surrounding large families change. The cost of raising children increases in urban areas, making larger families less economically viable. Additionally, urbanization can disrupt traditional mating patterns, and some studies, like the 2008 Iceland study, suggest that urban living can lead to a reduction in fertility due to genetic incompatibilities resulting from more distant outbreeding.
3. **Cost of Children and Education**:
    - As societies become more developed, the economic contribution of children to a household declines. In many countries, education

becomes compulsory, which raises the cost of raising children. Children are no longer expected to contribute to household labor as they did in agrarian societies. Even in rural and equatorial areas, the cost of raising children increases due to the need for education, clothes, school uniforms, and basic necessities. Parents, particularly in urban areas, reassess their need for large families, especially as family planning becomes more accessible.

4. **Changing Roles of Women**:
    - The increasing literacy and employment of women also contribute to the decline in birth rates. As women enter the workforce, they have less time and inclination to bear and raise children. In societies where traditional gender roles limit men's involvement in child-rearing, such as in Southern Europe or Japan, women may choose to have fewer children. Moreover, as women gain access to education and employment opportunities, their status within society rises, and childbearing is no longer the sole or primary measure of their worth.
5. **Improved Contraceptive Access**:
    - The availability of contraceptive methods plays a significant role in reducing fertility rates. Access to family planning and knowledge about contraception empowers individuals and couples to control family size. This decline in fertility is not solely due to contraceptives but also to the changing values surrounding gender roles, childbearing, and the desire for smaller families.

Changes in Population Structure

As a result of these demographic transitions, there is a shift in the age structure of the population. The **youth dependency ratio** declines, and eventually, **population aging** begins to take place. This demographic shift results in a less triangular population pyramid, which becomes more like an elongated balloon. The decline in the youth dependency ratio, coupled with a rise in the elderly population, creates what is known as a **demographic window of opportunity**. This is a period when there is a higher ratio of working-age individuals to dependent individuals, which can lead to economic growth—the **demographic dividend**.

However, if the factors that contribute to declining birth rates are not allowed to take effect, a society may find itself stuck in a **demographic trap**. In such cases, birth rates may not decrease as expected, preventing the society from advancing to Stage Three and hindering economic and social development.

Stage Four: Low Birth Rate and Low Death Rate

In **Stage Four** of the Demographic Transition, both birth rates and death rates remain low, leading to population stabilization. This stage is characterized by rapid economic development, which significantly improves the standard of living. People's quality of life becomes more important than the size of their families, and there is a deliberate effort to control family size.

Key Features of Stage Four:

- **Population Pyramid**: Contracting, reflecting a more balanced age distribution with a higher proportion of older individuals.
- **Population Growth**: Stable or slow population increase, as both birth and death rates are low.
- **Low Birth and Death Rates**: The birth rate is approximately equal to the death rate, resulting in minimal or stable population growth.
- **High Life Expectancy**: As healthcare and living standards improve, people live longer lives.
- **Increased Older Population**: A growing number of elderly individuals, contributing to a higher dependency ratio in the later stages.

In this stage, society has transitioned to an urbanized, literate, and technologically advanced state, with individuals exercising control over family planning. Societies in Stage Four typically have high levels of technical know-how, and fertility is consciously managed. The pace of population growth has slowed, and the focus shifts toward ensuring quality of life rather than increasing population size.

The transition through these stages illustrates the complex interplay of economic, social, and technological factors that drive demographic changes. As societies move

from high fertility and mortality rates to low fertility and mortality, they experience significant shifts in economic conditions, family structures, and the status of women. Stage Four represents a stable population, where economic growth and development have been achieved, and individuals actively control their fertility. However, different countries progress through these stages at different rates, influenced by their unique cultural, social, and economic conditions.

6.5.1 Key Points of Demographic Transition Theory

- **Predictable Five-Stage Model**: The demographic transition theory posits that populations evolve in a predictable pattern over time, generally following a five-stage process, though some scholars identify only four stages.
- **Stage 1 - Pre-industrial Society**: In this stage, both birth rates and death rates are high and relatively balanced, leading to very slow population growth. Population growth is constrained by factors like food availability, disease, and lack of medical care. Life expectancy is low due to the high mortality rate.
- **Stage 2 - Developing Country**: During this stage, death rates fall sharply due to improvements in food production, sanitation, and public health. These advancements reduce mortality rates and increase life expectancy, leading to rapid population growth as birth rates remain high. Countries in this stage often experience population explosions.
- **Stage 3 - Developing into Developed**: In stage 3, birth rates begin to decline due to a variety of factors, including greater access to contraception, improvements in living standards, urbanization, and significant increases in women's status, education, and employment. These changes lead to a slower growth rate as the population levels off.
- **Stage 4 - Low Birth and Death Rates**: Both birth and death rates are low in this stage, resulting in a stable or slow-growing population. The large cohort born during stage 2 begins to age, creating an economic burden on the smaller, shrinking workforce. Quality of life becomes a priority over family size, and the population stabilizes.
- **Stage 5 - Declining Birth Rates** (acknowledged by some theorists): In this stage, fertility rates fall to below replacement level (i.e., fewer children are born than are needed to replace the current generation). In some cases, birth

rates can even exceed death rates, leading to population decline. While not universally agreed upon, some theories suggest this stage occurs as developed societies experience significant shifts in family structure and economic priorities.

Each stage of the demographic transition is driven by improvements in healthcare, economic conditions, education, and social changes, which together influence both birth and death rates over time.

6.5.2 Criticism of Demographic Transition Theory

Despite its widespread acceptance, the **Demographic Transition Theory** has faced significant criticism on several fronts. Critics argue that the theory is overly simplistic and not universally applicable. Below are the main points of criticism:

1. **Eurocentric Foundation**: The theory is primarily based on the experiences of Europe, America, and Australia, where demographic transitions were observed during industrialization. Critics argue that applying this model to other regions, especially developing countries, may not be valid due to different historical, social, and economic contexts.
2. **Lack of Predictive Power**: The theory is not predictive, meaning it cannot accurately forecast the pace or trajectory of demographic change for a given country. Additionally, the stages of the demographic transition are not always segmental or inevitable. Not all societies follow the same pattern or experience the same stages in the same order.
3. **Underestimation of Technological Innovations**: The theory downplays the importance of technological innovations, particularly in medicine. Advances in healthcare, disease control, and sanitation can significantly alter mortality rates, preventing societies from following the "natural" progression the theory predicts.
4. **Inadequate Explanation of Fertility Decline**: The theory does not provide a comprehensive explanation for the decline in fertility. It also fails to identify the

key variables that influence fertility rates, such as access to contraception, cultural shifts, or changes in family structure.

5. **No Time Frame for Transition**: The theory does not offer a clear timeline for how long it takes for a country to progress from one stage to the next. This lack of temporal guidance makes it difficult to apply the model effectively in real-world scenarios.
6. **Inapplicability to Developing Countries**: The demographic transition model does not fully account for the population dynamics in developing countries. Many of these countries have experienced rapid population growth due to drastic reductions in mortality rates, even though their fertility rates remain high. This challenges the validity of the model for these nations, as they may not follow the same patterns as the industrialized countries where the theory was first observed.

While the Demographic Transition Theory provides a useful framework for understanding demographic changes in industrialized nations, it is not universally applicable and has been criticized for being too rigid, Eurocentric, and lacking in depth in explaining the complexities of fertility and mortality transitions in different contexts.

Self- Check Exercise-3

Q.1Demographic transition is a term, first used by……

Q.2 ……in first stage of demography Transition.

Q.3 Under developed countries are in…….stage of demographic transition.

6.6 Summary

Despite the criticisms and limitations of the Demographic Transition Theory, it still offers an effective way to understand demographic changes at a broad, macro level. The theory, developed through empirical observations of demographic trends in Western countries, provides a general framework for understanding how a society's

population evolves. Although it may not apply universally, especially in the case of developing countries, it remains a useful tool for understanding the transition process in many contexts.

6.7 Glossary

- **Demographic Transition**: A long-term shift from high birth and death rates to low birth and death rates, leading to significant changes in a population's age distribution.
- **Birth Rate**: The number of live births in a specific population during a particular time period, typically expressed as births per 1,000 people annually.
- **Death Rate**: The ratio of the number of deaths to the total population in a given area, typically calculated as the number of deaths per 1,000 people per year.
- **Population Pyramid**: A graphical representation of the age and sex distribution of a population. The pyramid typically shows the youngest population at the bottom and the oldest at the top, with a division between male and female members of the population.

6.8Answers to Self-Check Exercise

Self-Check Exercise-1

Q.1 Frank W. Notestein

Q.2 Warren Thompson

Self-Check Exercise-2

Q.1 1920

Q.2 1920 to1970

Self- Check Exercise-3

Q.1 Warren S. Thompson

Q.2 High birth and death rate

Q.3 First

6.9 Reference / Suggested Readings

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6.10 Terminal Questions

1) Explain the major points of the demographic transition theory of population.

2) Discuss the criticism of the demographic transition theory of population.
3) Write a note on demographic transition in India.
4) Critically examine the demographic transition theory of population with examples.
5) Describe how different the demographic transition theory of population over the Malthusian theory.
6) Describe the various theories of population.
7) Critically examine the theories of population.

Block-III

Unit-7

Age and sex composition

Structure

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7.3 Concept of Population Structure
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7.4 Age Group Population Structure
Self-Check Exercise-2
7.5 Sex Composition in Population Structure
Self-Check Exercise-3
7.6 Summary
7.7 Glossary
7.8 Answers to Self-Check Exercise
7.9 Reference/Suggested Readings
7.10 Terminal Questions

7.1 Introduction

Population structure refers to the demographic characteristics of a population, including the distribution of individuals by age and sex. It plays a crucial role in understanding the dynamics of a population, as these factors impact economic, social, and policy-related decisions. Age and sex composition are essential elements of population structure, which help determine the active labor force, fertility rates, dependency ratios, and various other important demographic indicators. The age-sex pyramid, also known as the population pyramid, is a key tool used to visualize

the population structure and its implications. This structure can further be broken down into other aspects such as social, religious, and spatial compositions, giving a detailed picture of the demographic makeup of a region.

7.2 Learning Objectives

Upon completing this section, you should be able to:

1. Explain the concept and importance of the age structure of a population and its impact on the individual.
2. Discuss the significance and interpretation of the age-sex pyramid in a nation's demographic structure.
3. Describe the concept of demographic dividend and the labor force.
4. Differentiate between the working-age population and dependent population.

7.3 Concept of Population Structure

Population structure is primarily determined by two critical demographic components: age and sex. These two components are essential for understanding the fertility and mortality dynamics of a population. The structure of a population gives an insight into the distribution of various age groups, which in turn helps with planning for human resources, educational needs, health care services, and social security provisions.

- **Age Structure**: Age is a defining characteristic of any population. The age structure of a population at any given point in time reflects the relative proportions of people in different age groups. This structure is primarily influenced by fertility and mortality rates.
- **Sex Structure**: The sex ratio (number of males per 1,000 females) in a population is another critical demographic indicator. It can offer insights into gender-specific health, migration patterns, mortality rates, and the societal roles assigned to different genders.

In practice, the age-sex pyramid is a visual representation of the population structure. It uses bar charts with the population by age group on the vertical axis and the proportion of males and females on the horizontal axis. Male populations are typically plotted on the left, while female populations are plotted on the right. The

shape of the pyramid can indicate the fertility and mortality levels, as well as the stage of demographic transition in a country.

Significance of Population Structure

Population structure has profound significance in various aspects:

1. **Economic Planning**: Understanding the age structure helps in planning for the workforce, education, and healthcare facilities. For instance, a country with a young population will need more resources for education and child health care, while a country with an aging population will need to invest in elderly care and retirement benefits.
2. **Policy Formulation**: Population structure helps in shaping policies related to health, employment, welfare, and social services. For instance, if the working-age population is large, policies could focus on employment and economic growth. If the population is aging, policies may shift towards providing healthcare for the elderly.
3. **Understanding Dependency Ratios**: The population structure reveals the dependent and working-age population, which helps calculate dependency ratios—important for understanding the financial burden of supporting non-working populations.
4. **Demographic Dividend**: A favorable age structure, with a large working-age population, offers a demographic dividend, where the productive workforce outnumbers dependents, leading to potential economic growth.
5. **Sex Composition and Gender Roles**: The sex ratio, which is the number of females per 1,000 males, plays a significant role in understanding gender dynamics in society. It can offer insights into societal issues such as gender imbalance, sex-based migration, and healthcare needs for each gender group. It is also essential to account for gender and sex beyond binary categories, such as LGBTQ groups, which require specialized health and social policies.
6. **Health and Welfare Policies**: Population structure also affects health policies. For example, a country with a larger proportion of elderly people needs more geriatric healthcare facilities and elderly care services. Similarly,

a younger population requires policies for maternal and child health, reproductive health, and educational infrastructure.

In conclusion, analyzing population structure through age and sex composition is crucial for understanding the present and future demographic trends, guiding economic and social policies, and addressing the needs of various population groups based on their age and gender distribution.

Self-Check Exercise-1

Q1. According to……., age of individual and age of population are different items in population structure.

Q2. What is sex ratio?

7.4 Age Group Population Structure

The age structure of a population is typically presented in five-year age groups, which allows for a better understanding of the distribution of the population across various age ranges. The primary age groups often analyzed are:

1. **Child Population Aged 0-14 Years**
2. **Child Population Aged 0-6 Years**
3. **Working Age Population (15-59 years or 15-64 years)**
4. **Elderly and Dependent Population**

Understanding the age structure of the population is crucial for policy formulation, especially in areas like education, healthcare, and labor force participation. Let’s look at each of these age groups more closely:

1) Child Population Aged 0-14 Years

This group represents the youngest segment of the population. In India, as per 2011 data, about 30.76% of the population, or approximately 37 crore people, were below the age of 15 years. This group is critical because they are not yet part of the workforce, and their needs are more focused on education, healthcare, and welfare services.

- **Gender Breakdown**: The male population under 15 years is approximately 19 crore, while the female population is about 18 crore. Even though child labor is illegal, India still has a significant number of children working. Around **43 lakh children** between the ages of 5-14 were involved in main work in 2011. Interestingly, there were nearly 10 lakh more male child workers than female child workers during the same period.

2) Child Population Aged 0-6 Years

This group is especially important for understanding early childhood development and access to healthcare, early education, and maternal services. Over the past few decades, there has been a perceptible decline in the proportion of children in the 0-6 year age group. This decline is primarily due to a decrease in birth rates.

- **Regional Variation**: In states like **Haryana, Punjab, Delhi, and Uttarakhand**, the decline in the proportion of girls aged 0-6 years has been notably more significant than that of boys. This may be indicative of a sex imbalance at birth, often influenced by factors like gender preferences, son preference, and possibly sex-selective practices. These patterns highlight the need for more focused efforts on gender equality and improving the female-to-male sex ratio at birth.

7.4.3 Working Age Population

The working-age population refers to individuals who are typically economically active, contributing to the workforce and the economy.

- **Definition of Working Age**: In India, the working age is usually considered to be from **15-59 years**, while internationally it is often set as **15-64 years**.
- **Proportion of Working Age Population in India (2011)**: According to the 2011 census, about **73 crore** individuals, or more than 60% of the total population, fall into the working-age group. Of these, **young adults** (15-24 years) make up approximately **19%** (about 23 crore). These individuals represent the next generation of job seekers and have important implications for education, training, and employment policies.

- **Implications of a Young Working-Age Population**: The size of the working-age population plays a critical role in shaping the economy. A large proportion of young adults implies that there will be an increase in the demand for jobs, educational infrastructure, and skills training. The age structure also indicates that there is still population momentum, where the fertility rate could remain relatively high due to the large number of women in childbearing age, even if overall fertility rates decline.

This demographic structure is a key determinant of the country's economic potential and labor force dynamics. Countries with a high percentage of young, working-age individuals may experience a demographic dividend, which is an economic boost when the working-age population outnumbers the dependent population (both young and elderly).

Key Takeaways:

- **Child Population (0-14 years)**: This group is shrinking in proportion due to declining birth rates, which will have long-term implications for schooling, healthcare, and the potential size of the future workforce.
- **Child Population Aged 0-6 Years**: This subgroup highlights issues around early childhood development, gender imbalances, and regional variations in population dynamics.
- **Working Age Population**: The size and characteristics of the working-age population directly impact the country's labor market, economic policies, and workforce planning. A large working-age group, particularly young adults, presents both opportunities and challenges in terms of employment and economic development.

Table 7.1: Population by grouped age and main worker in India, 2011

Age group years	Population			Main Worker		
	Persons	Males	Females	Persons	Males	Females
0-4	112806778	58632074	54174704	-	-	-
5-9	126928126	66300466	60627660	1108808	630875	477933
10-14	132709212	69418835	63290377	3244439	2033172	1211267
15-19	120526449	63982396	56544053	17703310	12721891	4981419
20-24	111424222	57584693	53839529	38664170	28977411	9686759
25-29	101413965	51344208	50069757	48666298	36901575	11764723
30-34	88594951	44660674	43934277	47152411	35600323	11552088
35-39	85140684	42919381	42221303	47503671	35372529	12131142
40-49	134756439	69683500	65072939	77295643	58397073	18898570
50-59	88215309	45299278	42916031	47440004	36456219	10983785
60-69	64118690	31646075	32472615	23840363	18216604	5623759
70-79	28441345	14142102	14299243	6917739	5560331	1357408
80+	11289005	5283695	6005310	1850952	1463786	387166
Age not stated	*4489802*	*2372881*	*2116921*	*1177763*	*878187*	*299576*
0-14, 5-14	372444116	194351375	178092741	4353247	2664047	1689200
15-59	730072019	375474130	354597889	324425507	244427021	79998486
60+	103849040	51071872	52777168	32609054	25240721	7368333
15-24	231950671	121567089	110383582	56367480	41699302	14668178
Total	1210854977	623270258	587584719	362565571	273209976	89355595

Source: Census of India, 2011

7.4.4 Aging Population

The aging of the population refers to a demographic shift where the proportion of elderly individuals (typically defined as those aged 60 and above) in the population increases, while the proportion of children decreases. This phenomenon is particularly notable as life expectancy rises and healthcare improves, leading to a greater number of senior citizens in the population.

In India, **the senior citizen population (aged 60 years and above)** numbered **10.38 crores** in 2011. This figure has been rising steadily due to increasing life expectancy and better healthcare facilities.

- **Gender Difference in Elderly Population**: In India, the elderly population consists of more **females than males**. This is consistent with global trends where women tend to live longer than men, primarily due to biological factors and better healthcare for women in many parts of the world.
- **Proportions**: While the proportion of senior citizens in India is still relatively small compared to many developed countries, **the absolute size of the elderly population** in India is larger than the total population of most countries in the world. This indicates that while the elderly may represent a smaller share of India's population, their numbers are significant and growing, posing future challenges for healthcare, pensions, and social services.

7.4.5 Elderly and Households

In Indian society, elderly individuals are typically **respected members of the household** and the broader community. However, as the population ages, understanding the living arrangements and the role of the elderly in households becomes increasingly important.

- **Households with Elderly Persons**: According to the data, about **three-tenths** of households in India include at least one elderly person. Within these households, a majority (around **71%**) have **only one elderly person**.

- **Elderly Living Alone**: There are **3.1 million households** in India that consist solely of one elderly person. Interestingly, a higher proportion of these households are headed by **elderly women** compared to elderly men. Of these one-person elderly households:
    - **81%** are in **rural areas**.
    - **19%** are in **urban areas**.

  This suggests that a significant portion of elderly individuals, particularly women, are living alone in rural settings, which may raise concerns about the availability of support systems and social care for these individuals.

- **Gender and Household Headship**: There is also an interesting trend in the gender of elderly-headed households:
    - Around **17.4%** of households in India are **headed by elderly women**. The proportion of female-headed households is somewhat higher in **urban areas**.
    - The proportion of female-headed households increases in the **60-69 year age group**, but significantly **falls** for women aged **80 years and over**.

Regional Differences

- **States with Higher Female-Headed Households**: Certain states like **Himachal Pradesh** and **Uttarakhand** report higher rates of **female-headed elderly households**.
- **Patriarchal Influence**: In contrast, many **northern and central Indian states**, such as **Jammu, Punjab, and Madhya Pradesh**, have **lower rates of female-headed households**. This is largely due to the **patriarchal mindset** in these regions, where women traditionally have less power in household decision-making and family leadership. Specific communities, such as **Muslim** and **Jat** or **Rajput** groups, where women often face lower social status, also contribute to this lower rate of female-headed households.

Key Insights:

- The **aging population** is an ongoing and increasing trend, both in India and globally, driven by improved healthcare and longer life expectancy.
- The **elderly population's gender** imbalance, with more women than men, highlights the need for policies that address the unique challenges of elderly women, especially those living alone.
- **Elderly living arrangements** reveal that many elderly individuals, especially women, live alone in rural areas, which poses challenges related to social isolation and access to care.
- **Regional and social differences** in household structures reflect the cultural and societal norms that affect the roles of elderly women in households, with more patriarchal regions having fewer female-headed households.

This data emphasizes the growing importance of considering the elderly in population policies and social programs, particularly as the number of elderly individuals continues to rise in India and other countries.

Self-Check Exercise-2

Q1. Working age is considered at …… years in India.

Q.2 The senior citizens in India numbered …….crores in 2011.

7.5 Sex Composition in Population Structure

Sex composition is a crucial element of population structure that helps analyze the balance between males and females in a population. The **sex ratio** is the most commonly used measure to understand this composition. The sex ratio indicates the relative number of males and females in a population.

Sex Ratio Overview

- The **sex ratio at birth** is typically about **105 males per 100 females**, meaning that there are generally more male babies born than female babies. This is a natural biological phenomenon and is consistent across most human populations. However, the sex ratio can change over time due to factors like

differential mortality rates between genders and societal biases towards one gender over the other.

Key Concepts in Sex Ratio Analysis

- **Sex ratio at birth (SRB)**: As mentioned, this is around **105 males per 100 females**, which is a natural biological tendency observed at birth. High birth rates tend to lead to a higher sex ratio.
- **Gender-based mortality differences**: There are inherent biological differences in the mortality rates of males and females, with male infants generally having a higher mortality rate than females in many societies. This helps to partially balance the sex ratio in favor of females after birth.
- **Societal impacts**: In certain societies where there is gender discrimination, especially against females, the mortality rate among female infants can be artificially increased, leading to a **female deficit** in the population. This phenomenon is seen in some countries where female babies face higher rates of neglect or poorer healthcare, which skews the sex ratio towards males.

Components of Sex Ratio Analysis in India

In India, the analysis of sex composition is typically broken down into the following four components:

1. **Overall Sex Ratio (OSR)**:
    - This is the ratio of the total number of females to the total number of males in the entire population. It is usually calculated as: OSR=(Total number of femalesTotal number of males)×1000\text{OSR} = \left(\frac{\text{Total number of females}}{\text{Total number of males}} \right) \times 1000OSR=(Total number of malesTotal number of females)×1000
    - This ratio helps assess the overall balance between males and females in a population. In India, the overall sex ratio can be significantly influenced by factors such as gender-based discrimination, migration, and differential mortality rates.

2. **Sex Ratio at Birth (SRB)**:
    - This is the ratio of male births to female births. As noted earlier, this is generally around **105 males for every 100 female births** in the natural state. The sex ratio at birth is typically stable across populations but may be influenced by cultural or societal factors in some countries.
3. **Child Sex Ratio (CSR)**:
    - The child sex ratio refers to the ratio of male children to female children in a population, often focusing on the age group **0-6 years**. This ratio can be particularly important in understanding the gender balance in the youngest population, as it can indicate gender bias in child rearing, access to healthcare, or even selective abortions in some regions.
    - In India, the **child sex ratio** has been a topic of concern, as it has been observed to decline in certain states due to cultural preferences for male children.
4. **Elderly Sex Ratio (ESR)**:
    - The elderly sex ratio refers to the ratio of males to females in the **aged 60 years and above** population. It is usually observed that women outnumber men in this age group, as women have a higher life expectancy than men. The elderly sex ratio helps understand the aging population and highlights the challenges of an aging society.
    - In India, **females generally live longer** than males, which results in a higher **elderly sex ratio**.

Significance of Studying Sex Ratio

- The sex ratio is an important demographic indicator that reflects the balance between male and female populations, which can have significant implications for social, economic, and healthcare policies.
- **Gender-based disparities** in mortality and health, especially in early life and old age, can influence the sex ratio in a population.
- **Policy implications**: Studying the sex ratio, especially in relation to age groups (like children and the elderly), helps policymakers understand the challenges posed by an imbalanced sex ratio. For example, the skewed **child sex ratio** in some regions may indicate issues like **gender preference**,

discrimination against girls, and the need for targeted interventions to ensure better gender equality.

Understanding the sex composition of a population helps shed light on many social, economic, and health issues. By examining different components of the sex ratio—such as the **overall sex ratio**, **sex ratio at birth**, **child sex ratio**, and **elderly sex ratio**—we can better understand the demographics of a population and address disparities in health, gender, and economic opportunities. It also provides valuable insight into gender-based challenges, such as the **preference for male children** in some cultures and the **higher life expectancy of women** in others. These insights are crucial for designing policies that address gender equality, healthcare access, and social welfare.

Table 7.2 Trends in Sex Ratio in India

Year	Overall Sex Ratio	Child Sex Ratio (0-6 years)	Elderly Sex Ratio
1961	941	976	992
1971	930	964	946
1981	934	962	964
1991	926	945	931
2001	933	927	1029
2011	943	918	1033

Source : Computed from Census of India from various years survey

7.5.1 Overall Sex Ratio

The **overall sex ratio** is a critical indicator that helps understand the balance between males and females in a population. In most countries where **son preference** is not prevalent, the sex ratio generally favors females. For instance, globally, the sex ratio is approximately **98 females per 100 males**. However, in several countries in Asia, where son preference is more common, the sex ratio tends to favor males, which skews the global sex ratio in favor of males.

Sex Ratio in India: Historical Perspective

India is a unique case when it comes to the overall sex ratio. Unlike many developed countries where the sex ratio favors females, **India has experienced a female deficit** for more than a century. The **sex ratio in India** has been consistently lower than the global average, and this trend has persisted for much of the country's history.

- **In 1901**, the sex ratio in India was **972 females per 1,000 males**.
- However, over the course of the 20th century, India's overall sex ratio continued to **decline steadily** until **1971**.
- The **lowest sex ratio** recorded in India was **926 females per 1,000 males** in **1991**.
- Since **1991**, there has been a **gradual improvement** in the sex ratio, but it remains much lower than the global standard.

Factors Contributing to the Low Sex Ratio in India

Several factors have contributed to the historically low sex ratio in India:

1. **Son Preference**: Deep-rooted cultural preference for male children, particularly in rural areas, has led to neglect of female infants, higher mortality rates among girls, and selective sex-based abortion practices. This is a significant factor contributing to the imbalance.
2. **Gender-based Discrimination**: In many parts of India, gender discrimination against females persists, particularly in terms of access to healthcare, education, and nutrition. This has a long-term impact on the survival and well-being of girls.

3. **Infant Mortality**: In many regions, the **infant mortality rate** for girls has historically been higher than for boys due to unequal access to resources and healthcare, further skewing the sex ratio.
4. **Migration**: Migration trends, particularly rural-to-urban migration, can also impact the sex ratio in different regions. Migration patterns sometimes lead to a higher number of males in certain urban areas, further influencing the overall sex ratio.

Recent Trends and Improvements

Despite these challenges, **India has seen some improvements in the overall sex ratio** since the 1991 census. The improvement, though gradual, suggests that efforts to improve female healthcare, education, and economic opportunities are beginning to have an impact.

However, to better understand the **gender dynamics** and the reasons behind the overall sex ratio, it's important to break the data down further, particularly by examining:

1. **Child Sex Ratio**: The sex ratio in the 0-6 age group, which reflects the gender bias in child rearing, selective sex abortion, and other factors related to the survival of young children.
2. **Elderly Sex Ratio**: The sex ratio in the elderly population (60+ years), which tends to favor females due to the longer life expectancy of women.

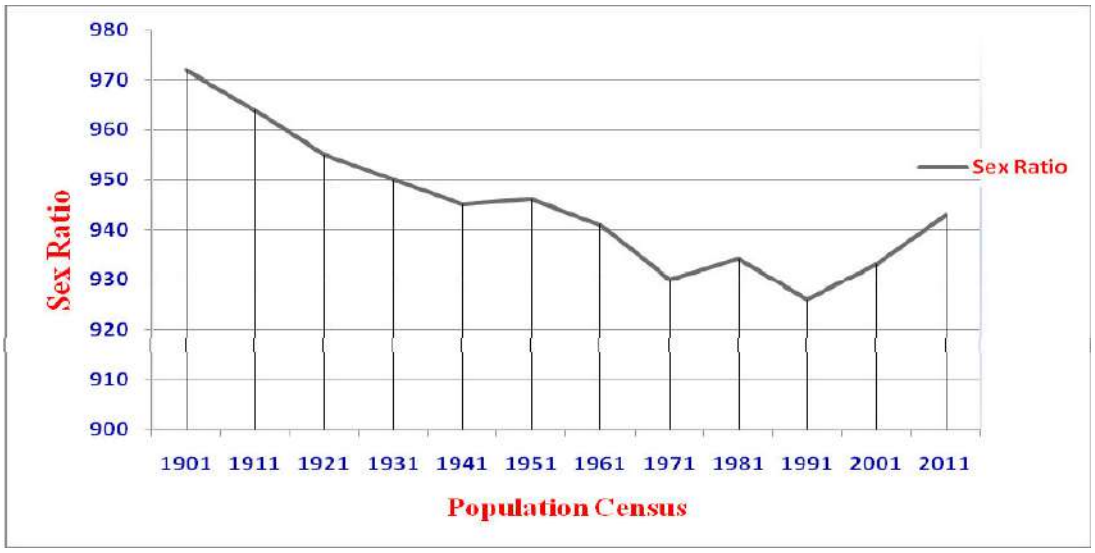
Importance of Analyzing Sex Ratios Separately

By analyzing the **overall sex ratio** alongside the **child sex ratio** and the **elderly sex ratio**, we can better understand the gender dynamics within the population:

- The **child sex ratio** can highlight issues like **gender-based discrimination** in the early years of life.
- The **elderly sex ratio** provides insight into the **longer life expectancy** of women and the challenges faced by **elderly females**, who often live alone in older age, particularly in rural areas.

The **overall sex ratio** of a country is a crucial demographic indicator that reflects the balance between males and females in a population. In India, the historically low sex ratio has been a result of **son preference**, **gender discrimination**, and **infant mortality** among females. Although there has been some improvement in recent years, challenges persist, especially in the areas of **child sex ratio** and **elderly sex ratio**, where imbalances still exist. By analyzing these components separately, we can gain a deeper understanding of the gender dynamics and the vulnerabilities faced by females in different age groups.

Table7.3 Trends in sex ratio, India



7.5.1 Sex Ratio at Birth (SRB)

Sex ratio at birth (SRB) is an important demographic measure that helps assess the balance between male and female births in a population. The **standard ideal** sex ratio at birth is typically **105 males per 100 females**, reflecting the natural biological difference in male and female births. However, this natural ratio can be influenced by various factors, including **infant mortality** rates and **gender-based discrimination**.

Gender-Based Discrimination and SRB in India

In most societies, due to higher infant mortality rates among males, the overall sex ratio tends to favor females. However, in countries like **India**, where **gender-based**

discrimination is prevalent, the pattern is different. The discrimination against females often begins before birth, through **preconception** and **prenatal sex selection**.

One of the most significant contributors to this imbalance is the widespread **use of ultrasound technology** (sonography) for **sex determination**. This practice is a result of **deep-rooted son preference**, where families prefer male children over female children. The availability of ultrasound technology allows families to **select the gender** of their child before birth, leading to the **abortion of female fetuses** in many cases.

This widespread practice of **female feticide** has led to a **skewed sex ratio at birth**, with more male births than female births.

Government Intervention

To curb this issue, the **Government of India** has taken several legal and policy measures to restrict the use of technology for **sex selection**. Key initiatives include:

1. **Ban on Misuse of Prenatal Diagnostic Techniques**: In the past, **misuse of prenatal diagnostic techniques**, such as amniocentesis, was common. To address this, the government banned these practices in **government hospitals** and **government laboratories**.
2. **Maharashtra Regulation of Prenatal Diagnostic Techniques Act (1988)**: In response to advocacy by **health activists** and **women's groups**, the **Maharashtra state government** formulated the **Maharashtra Regulation of Prenatal Diagnostic Techniques Act**, which aimed to regulate the misuse of sex-selective technology.
3. **Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act (PNDT Act, 1994)**: In 1994, **India's Parliament** enacted the **PNDT Act**, which made it illegal to use prenatal diagnostic techniques for sex determination. This was a significant step towards addressing the issue of **gender bias** and **female feticide**.
4. **Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act (1996)**: In 1996, the **PCPNDT Act** was introduced to regulate and prevent sex

selection before conception as well. The rules of this Act were amended in **2003** to ensure more effective implementation and stricter monitoring.

Despite these laws, the issue of **sex selection** persists in some regions, particularly in areas with high fertility rates and low literacy levels, where traditional cultural practices still dominate.

Trends in Sex Ratio at Birth in India

According to data from the **Sample Registration System (SRS)** in India, the **Sex Ratio at Birth (SRB)** has shown **gradual improvement** over the last few years, particularly in urban areas. This trend is encouraging, but the sex ratio at birth is still lower in India compared to the ideal standard of 105 males per 100 females.

Key findings:

- **Urban Areas**: SRB improvement has been more prominent in urban areas than in rural areas. The reasons for this are two-fold:
    1. **Diagnostic Centers**: Urban areas have more readily accessible **diagnostic centers**, where **sex determination** tests are more easily conducted.
    2. **Affordability**: People in urban areas are more likely to afford the cost of diagnostic tests, leading to an increased likelihood of **sex-selective abortion**.
- **Rural Areas**: In contrast, rural areas have **higher SRB** compared to urban areas, primarily due to **higher fertility rates** and **lack of access to diagnostic facilities**. In rural areas, the need for **son preference** may be less pronounced due to the lack of access to sex determination technology, even though cultural preferences still persist.

The** Sex Ratio at Birth (SRB) **in India is heavily influenced by cultural factors, particularly the** son preference **that leads to** prenatal sex selection**. Although legal measures have been put in place to curb this practice, it remains a significant issue, particularly in areas with** high fertility rates **and** limited access to healthcare and education**.

Efforts to improve the **SRB** will need to focus not only on strengthening laws and regulations but also on **changing societal attitudes** towards gender and ensuring **better access to healthcare** for females, especially in rural and economically disadvantaged regions. Monitoring the SRB through data sources like the **SRS** will help track progress and highlight areas that need further intervention.

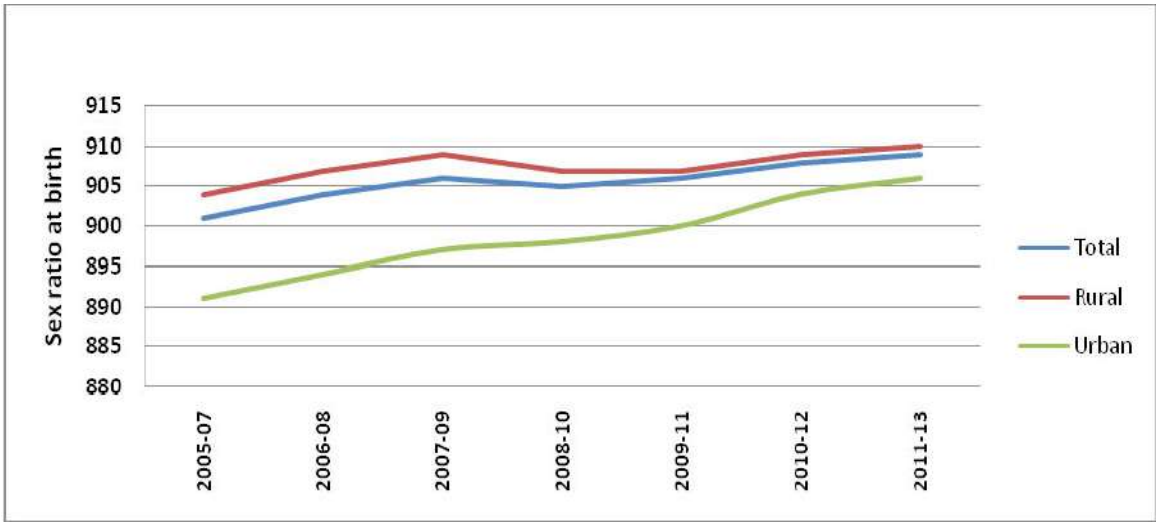


Table 7.4Trends in Sex Ratio Birth, India

Source: Based on SRS Statistical Report 2011, 2012 and 2013

7.5.2 Child Sex Ratio (CSR)

The **Child Sex Ratio (CSR)** is an important indicator of gender-based discrimination that occurs after birth. It provides insights into the **gender imbalance** among children, especially in the age group of **0-6 years**. The CSR reflects the balance

between the number of male and female children, typically calculated as the number of female children per 1000 male children in this age group.

CSR and Gender Discrimination

The **Sex Ratio at Birth (SRB)** reveals gender selection practices before conception and birth, while the **CSR** reflects the discrimination that occurs after birth. A **declining CSR** can indicate that either:

1. **Low SRB** (where the number of female births is inherently low due to sex-selective practices before birth), or
2. **Excess female mortality** (where females in the early years face higher mortality rates compared to males due to neglect, lack of healthcare, or other societal factors).

In India, the **CSR** has been a cause for concern, as it has been on the decline since **1961**, and especially since **1991**, when it first crossed below the critical threshold of **950 females per 1000 males**. This is a significant deviation from the ideal sex ratio at birth, which is **105 males per 100 females**.

Trends in CSR Over Time

- **Before 1991**: The CSR was relatively stable, and it was assumed that it was consistent with the **natural sex ratio at birth** (close to 950 females per 1000 males).
- **Post-1991**: A continuous **decline** in CSR has been observed, highlighting that gender discrimination against females is worsening. This trend points to **excess female mortality** and **poor care for female children**, particularly in rural and economically disadvantaged areas.

This decline is alarming because it indicates the **socioeconomic and cultural preferences** that favor male children over female children. The decline in CSR is a strong signal of **post-birth discrimination**, including factors like poor nutrition, inadequate healthcare, and **gender-based neglect**.

CSR Across States in India

When examining the CSR across various states in India, it becomes evident that some states have performed better than others:

- **Kerala** and **Chhattisgarh** are the only states where both **SRB** (Sex Ratio at Birth) and **CSR** are relatively balanced, with **CSR** values above the critical threshold of **950 females per 1000 males**.
- **Other States**: States like **Haryana**, **Punjab**, and **Uttarakhand** report extremely low **CSR** figures, indicating the **deep-rooted son preference** in these areas.

Despite efforts by the **Indian government** to regulate and curb **sex-selective abortions**, the **CSR** has continued to worsen, reflecting the **cultural and social biases** against female children.

Key Issues Contributing to Low CSR

1. **Sex-Selective Abortions**: The practice of using **ultrasound technology** to determine the sex of the child and opting for **abortion of female fetuses** contributes to the declining **SRB** and, in turn, the **CSR**.
2. **Neglect of Female Children**: Once born, female children often face **discrimination in terms of healthcare**, **nutrition**, and **overall care**, leading to **higher mortality rates** among females.
3. **Cultural Factors**: In many parts of India, the **preference for sons** over daughters is so strong that families may prioritize resources for male children, leading to **neglect** or **insufficient care** for female children.

7.5.3 Elderly Sex Ratio (ESR)

The **Elderly Sex Ratio (ESR)** is another key demographic indicator, which examines the gender balance among individuals aged **60 years and above**. The **ESR** is significant because it reflects the **gendered patterns** of aging and survival, which are influenced by **social, economic, and cultural factors**.

Trends in ESR

In India, the **elderly population** is growing rapidly due to improvements in **life expectancy** and **healthcare**. However, **women** outlive men in most societies, including India, resulting in a **higher number of elderly women** than elderly men.

This trend is particularly noticeable in India, where **longevity among women** has been increasing at a faster rate than for men. This is largely due to **gender-neutral improvements in healthcare** that benefit women as they age.

Why Do Women Live Longer?

Several factors contribute to the higher life expectancy for women:

1. **Health Care**: Women generally benefit more from advances in healthcare, especially in areas related to **maternal health** and **chronic disease management**.
2. **Survival Post-Reproductive Age**: After women pass through their **reproductive years**, their chances of survival improve significantly, as they are no longer exposed to the **risks of maternal death** or complications related to childbirth.
3. **Control Over Resources**: As women age, they often gain more **control over household resources** and **decision-making**, which can improve their quality of life and **reduce gender discrimination**.

Men's Early Mortality

On the other hand, **men tend to die earlier** due to higher rates of **risk-taking behavior**, **cardiovascular diseases**, and **other health-related issues**. The higher mortality rates among men contribute to the **higher ESR** for women, especially in older age groups.

Social Implications of ESR

- The **gendered aging process** means that **elderly women** often face **different challenges** compared to men, such as living alone, economic

dependency, and social isolation. In India, many elderly women, especially in rural areas, may be **without proper support systems** as **sons** often migrate for work, leaving elderly mothers to live alone.

- **Household Dynamics**: As women age, they often gain **more control** over **household resources**, which can reduce gender discrimination within families. However, the **social stigma** and **patriarchal mindset** in certain regions may still restrict women's autonomy, even in older age.

The **Elderly Sex Ratio (ESR)** highlights the demographic reality that women live longer than men, but it also underscores the **gender disparities** that exist at all stages of life. In the context of India, the **ESR** can serve as a reminder that **gender discrimination** diminishes as women grow older, but the process is slow and often marked by **social and economic challenges** faced by elderly women.

In conclusion, the trends in **CSR** and **ESR** emphasize the ongoing gender-based discrimination at different stages of life. While efforts have been made to address these issues, much work remains to be done to ensure **gender equality** in both the early years and later stages of life. Addressing these disparities requires continuous **policy intervention**, **social change**, and **awareness** about the value of **female children** and **elderly women** in society.

Self-Check Exercise-3

Q.1 Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act introduce in……..

Q2. …….. is sex ration of India, census 2011.

7.7 Summary

In this lesson, we have explored the **age and sex composition** of the population structure, a crucial aspect of population studies. The **age-sex pyramid** provides insights into the trends and patterns of population growth, reflecting both the age distribution and the **sex ratio at birth**. The **dependency ratio** is another important

component of the population structure, as it highlights the needs of different population groups—children, the elderly, and working-age individuals—in terms of care, education, and employment. Understanding these aspects is vital for addressing the challenges and opportunities associated with demographic changes.

Glossary

- **Population Structure**: The breakdown of different groups within a population, including age, gender, ethnicity, and density. This structure has a significant impact on the development of a region or country, influencing social services, economic policies, and infrastructure needs.
- **Population Ageing**: A demographic trend where the median age of the population increases due to declining fertility rates and rising life expectancy. This results in a larger proportion of elderly individuals within the population.
- **Sex Ratio**: The ratio between the number of males and females in a population, typically expressed as the number of females per 1000 males. It helps assess gender balance within the population.
- **Sample Registration System (SRS)**: A large-scale demographic survey conducted in selected villages and urban blocks in India. It records births and deaths as they occur, providing reliable estimates of vital rates at the state and national levels. The SRS is essential for monitoring demographic trends and making informed policy decisions.

7.8 Answers to Self-Check Exercise

Self-Check Exercise-1

Q1. Srinivasan (UNFPA, 2011)

Q2. Sex ratio (SR) is a composition of population sex structure which means females (F) per 1000 males(M) in the population composition (SR= F/M*1000).

Self-Check Exercise-2

Q1.15-59

Q.2 10.38

Self-Check Exercise-3

Q.1 1996

Q2. 943

7.9 Reference/Suggested Readings

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7.10 Terminal Questions

Q1. Explain briefly the concept of age and sex composition of papulation.

Q2. Defined working and non working population.

Q3. Define Sex Ratio and describe its importanc

Unit-8

Demographic Process: Fertility

Structure

8.1 Introduction

8. 2 Learning Objectives

8.3 Concept, Meaning and Definition of Fertility

Self-Check Exercise-1

8.4 Measures or Indices of Fertility

Self-Check Exercise-2

8.5 Causes and Factors Influencing Fertility

Self-Check Exercise-3

8.6 Summary

8.7 Glossary

8.8 Answers to Self-Check Exercise

8.9 Reference/Suggested Readings

8.10 Terminal Questions

8.1 Introduction

In this lesson, we will explore key concepts related to population size, distribution, and structure that are central to demographic studies. You will learn about the factors influencing population changes, namely birth rates, death rates, and migration. In demographic terms, the birth rate is referred to as the "fertility rate," and the death rate is called the "mortality rate." These changes in population are primarily driven by births, deaths, and migration, and are collectively known as the determinants of population change. Although factors like natural disasters can occasionally impact population sizes, the focus in this lesson will be on fertility, with an emphasis on types, measurements, indices, and the factors influencing fertility.

8.2 Learning Objectives

After completing this lesson, you should be able to:

- Comprehend the concept of fertility in detail.
- Explain the measures or indices used to assess fertility.
- Understand the causes and factors that influence fertility.

8.3 Concept, Meaning, and Definition of Fertility

In demography, "fertility" refers to the actual birth performance of a group of women or the frequency of births within a population or within a subset of it. The growth of the world's population largely depends on human fertility, as societies reproduce through this process. Fertility acts as a driving force for population growth, counteracting the forces of mortality. If birth rates do not sufficiently replace the number of deaths in a society, that society risks facing decline or even extinction. Conversely, an excessively high fertility rate can lead to significant social, economic, and political challenges.

Fertility is the result of "fecundity," which refers to the biological capacity for reproduction. However, fecundity cannot be precisely measured, but it can be approximated by examining the maximum levels of fertility observed in populations not using contraception. It is crucial to distinguish between fecundity and fertility. While fecundity is the biological ability to reproduce, fertility is the actual reproductive performance of an individual, couple, or group. Fertility can be measured using birth statistics, whereas fecundity cannot be directly measured.

Some key terms related to fertility are:

- **Sterility**: A person or couple who has never had a live birth is considered sterile. While fertility leads to population growth, sterility hinders it and can eventually lead to extinction.
- **Birth Order**: This refers to the sequence of a woman's live births, such as the first, second, or third birth, etc.
- **Parity**: Women can be categorized based on the number of live children they have. For example, women who have one child are considered to be in the

first parity, those who have two children are in the second parity, and so on. Unlike birth order, which focuses on the child, parity refers to the mother.

- **Natural Fertility**: Defined by French demographer Henry (1953), natural fertility refers to the fertility of a population that does not intentionally limit births, and this occurs without the use of contraception or induced abortion. Practices like prolonged breastfeeding or abstinence may lower fertility but are considered natural if not intentionally aimed at controlling birth rates.
- **Contraception**: Contraception includes measures taken to prevent conception during sexual intercourse. While contraception typically refers to methods like birth control pills or devices, the term "birth control" can also include sterilization and complete abstinence.

8.4 Meaning and Definition of Fertility

Fertility refers to the ability to produce offspring after reaching sexual maturity. The fertility rate is the average number of children born to a woman over her lifetime, which is used to quantify fertility in demographic terms. Fertility issues, such as an inability to reproduce naturally, are referred to as infertility. Infertility is common, and specialists are available globally to help individuals or couples facing difficulties in having children. Factors like nutrition, sexual behavior, genetics, culture, economics, lifestyle, and emotions influence human fertility.

Fertility is distinct from fecundity. While fecundity refers to the potential for reproduction (influenced by factors such as gamete production, fertilization, and pregnancy), infertility is a condition in which reproduction is not possible, while sterility refers to a complete lack of fecundity.

Definitions of Fertility:

- **Thompson and Lewis** stated, "The fertility of women has always been a matter of vital concern to all people."
- **Hansraj** defined fertility as "the standard for measuring a woman's capacity to have children."
- **Barclay** explained, "The fundamental concept of fertility is the actual level of reproductive performance in a population, based on the number of births."

- **Barnard Benjamin** described fertility as "the rate at which a population grows through births, usually measured by relating the number of births to the size of a specific group, such as the number of women of childbearing age."

Self-Check Exercise-1

Q.1 ……..type of birth of an infant fertility is related.

Q.2 ……..well said," the fertility of women has always been a matter of vital concern to all the people.

8.4 Measures or Indices of Fertility

Bhaskar D. Misra (1980) outlines various measures of fertility, which range from crude to more precise rates. Below are some of the key fertility indices:

1) Crude Birth Rate (CBR)

The **Crude Birth Rate** (CBR) is one of the most frequently used and simplest measures of fertility. It is straightforward to calculate and understand, requiring only minimal data. The CBR is the ratio of the total number of births in a specific year to the average or mid-year population for that year. It is mathematically represented as:

$$CBR = \frac{\square}{\square} \times \square$$

Where:

- **B** denotes the total number of births occurring in a given year.
- **P** represents the total average or mid-year population in that year.
- **K** is a constant, typically set at 1,000.

The **Crude Birth Rate (CBR)** is influenced by the age and sex distribution of the population. Since not all individuals are involved in reproduction, varying age-sex structures across populations can distort comparisons. This means that the CBR

may not provide an accurate fertility picture when comparing populations with different age and sex distributions. Nevertheless, for short time periods, the Crude Birth Rate can be useful in observing and understanding fertility changes within a specific population.

2) **General Fertility Rate (GFR)** is a more refined measure of fertility compared to the Crude Birth Rate (CBR), as it focuses specifically on the population exposed to the potential for conception. Unlike the CBR, which uses the total population as its denominator, the GFR uses the number of women in the fertile age group (typically ages 15-49 or sometimes 15-44) as the denominator. This makes the GFR a more accurate representation of fertility in a population where only women of reproductive age are considered.

The formula for GFR is:

$$GFR = = \frac{\square}{\square_{15-49}} \times \square$$

Where:

- **B** represents the total number of births in a given time period.
- **W_{15-49}** is the number of women in the reproductive age group (usually 15-49 years).
- **K** is a constant, typically 1,000, to standardize the rate.

General Marital Fertility Rate (GMFR) is a further refinement of the General Fertility Rate (GFR), taking into account the fertility patterns of only currently married women in the reproductive age group. This measure is particularly useful in societies where social customs restrict or influence the reproductive rights of unmarried women, widows, and divorced women. By considering only married women, the GMFR

provides a more accurate picture of fertility patterns within the specific social context of marriage.

The formula for GMFR is:

$$GMFR = \frac{\square}{\square_{15-49}} \times \square$$

Where:

- **B** represents the total number of births during the given period.
- **W_{15-49}^{m}** is the number of married women in the reproductive age group (15-49 years).
- **K** is a constant, typically 1,000.

GMFR offers a more precise measure of fertility, especially in contexts where the role of marriage is central to reproductive behavior. This measure accounts for the fact that married women generally have more opportunities for childbearing, as compared to the broader population, which might include women who are unmarried or unable to conceive due to other social constraints.

3) Age-Specific Fertility Rates (ASFR)

For a more in-depth and insightful analysis of fertility patterns within a population, **Age-Specific Fertility Rates (ASFR)** are used. These rates provide a breakdown of fertility according to different age groups, which can be analyzed either for each specific age or for selected age intervals.

The **ASFR** is calculated using the following formula:

$$ASFR = \frac{\square_{\square}}{\square_{\square}} \times \square$$

Where,

Bx and Wx are the births to women aged 'x' and the average number of women aged 'x' respectively.

The **Age-Specific Marital Fertility Rate (ASMFR)** is an enhanced version of the **Age-Specific Fertility Rate (ASFR)**, focusing specifically on the fertility rates of married women in different age groups. It helps provide a more accurate reflection of fertility patterns among married women, offering better insights compared to the general fertility rate.

The formula for calculating **ASMFR** is:

$$ASMFR_X = \frac{\square_{\square}}{\square_{\square}} \times \square$$

$$= ASFR_x M_x K$$

Where:

- $\square_{\square}$ the average number of married women at age 'x',
- M_x is the reciprocal of proportion of married women at age x.

When TFR per woman is multiplied by the proportion of births that are female out of the total births, we get gross reproduction rate. The proportion of female births in India is around 0.4878, and it varies slightly from country to country.

4) Total Fertility Rate (TFR)

The **Total Fertility Rate (TFR)** aggregates the fertility trends observed in age-specific fertility rates, offering a single, comprehensive measure of overall fertility. It is essentially the sum of **ASFRs** across all age groups, expressed as:

$$TFR = \left(\frac{\sum_{\square=15}^{49}}{} \square\square\square\square_{\square} \right)$$

If the **Age-Specific Fertility Rates (ASFRs)** are provided in five-year age intervals, the sum of these rates should be multiplied by **5** to obtain the **Total Fertility Rate (TFR)**. This adjustment is necessary to account for the fact that the rates are expressed in five-year intervals rather than single years.

The **Total Fertility Rate (TFR)** represents the expected number of children a cohort of 1,000 women would have in their lifetime, assuming that none of them die before

the end of their reproductive years. The TFR provides a summary measure of fertility across different age groups in a population. When the TFR is expressed **per woman** instead of per 1,000 women, it simply reflects the same concept but without the multiplication factor of 1,000.

In essence, the **TFR** can also be thought of as a **standardized rate** because it gives equal weight to all age groups. This makes it **independent of the age composition of the population**, meaning that the TFR does not vary based on the population's age structure. This characteristic makes it a useful tool for comparing fertility patterns across different populations or regions, regardless of their demographic composition.

5) Gross Reproduction Rate (GRR)

The **Gross Reproduction Rate (GRR)** is a demographic indicator that measures the potential for population replacement by tracking the number of daughters born to a cohort of women. It provides an estimate of how many female children a group of women would have throughout their reproductive years, assuming that they adhere to the age-specific fertility rates of the population and all women survive through their childbearing years.

In simpler terms, the GRR represents how many daughters a cohort of women is expected to have if they follow the current fertility rates for each age group and experience no mortality before the end of their reproductive years. It is similar to the **Total Fertility Rate (TFR)** but focuses only on female births, whereas the TFR includes both male and female births.

The GRR is a key measure in understanding how well a population is replenishing itself through female offspring who will eventually contribute to the next generation. This measure is important because, in many cultures, the continued growth and sustainability of a population can be influenced by the birth of female children, who are future mothers themselves.

The formula for calculating

$$GPR = \frac{\sum_{x=15}^{49} \frac{b_x}{p_x}}{} \times \frac{b_{xf}}{b_x}$$

Where:

- b_x/p_x is the age specific fertility rate of age ‘x’ and
- b_{xf}/b_x is the proportion of female births among of total births at age ‘x’ of mothers.

Since the sex ratio at birth does not appreciably change with the age of mother, usual practice is to ignore such variations in the calculation of GRR, which is given by

$$GRR = \left(\frac{\sum_{x=15}^{49}}{} f_x \right) \times \text{proportion of all births that are females}$$

$$= TFR \times \frac{100}{205} \text{ (or 0.4878)}$$

It is assumed that in India for every 100 females 105 males are born. If the data be given in five-year age-groups, GRR is calculated as :

$$GRR = 5x = \left(\frac{\sum_{x=1}^{7}}{} f_x \right) \times \frac{100}{205}$$

The **Gross Reproduction Rate (GRR)** can also be understood as the ratio of the size of birth cohorts in two successive generations, under the assumption of a one-sex population model where no mortality occurs before the end of the childbearing period. In this interpretation, the GRR serves as a generational indicator, reflecting how the size of a female population is sustained over generations, assuming ideal conditions.

Additionally, the GRR can be computed for both **synthetic** and **real cohorts**. When the GRR is calculated using **period fertility rates**, it provides an estimate of the hypothetical reproductive outcomes for a real cohort of women, specifically focusing on female births. This calculation assumes that the cohort follows the current fertility

rates throughout their childbearing years, without experiencing any mortality until they reach the end of their reproductive period.

In essence, the GRR represents the potential for population replacement, based on the assumption that fertility patterns remain constant, and it serves as a measure of how the population of daughters is replenished over generations, reflecting future reproductive capacity.

6) Net Reproduction Rate (NRR)

A key limitation of the **Gross Reproduction Rate (GRR)** is its assumption that there is no mortality before the end of the reproductive period, which may not reflect real-world population dynamics. To address this limitation, the **Net Reproduction Rate (NRR)** is introduced, providing a more accurate measure of population replacement by incorporating mortality rates.

The **Net Reproduction Rate (NRR)** estimates the number of daughters that a cohort of female infants is expected to have as they progress through their life stages, including their reproductive years. Unlike the GRR, the NRR considers both fertility and mortality, offering a more realistic portrayal of how a population is replenished over a generation.

The NRR assumes that women in the cohort will have children according to the current age-specific fertility rates while simultaneously experiencing mortality as outlined by a life table. This adjustment reflects the fact that not all women will survive to their full reproductive age, thus providing a more comprehensive measure of population growth and replacement. In essence, the NRR accounts for both the potential fertility and the survival rates of women, offering a more accurate depiction of population sustainability over time.

In essence, the NRR is a measure of replacement that takes into account both fertility patterns and mortality rates. It is defined mathematically as:

NRR= $\sum_{\square=15}^{49} \frac{\square_\square}{\square_\square}\left(\frac{\square_{\square\square}}{\square_\square}\right)\frac{\square_\square}{\square_\square}$

Where:

- $L_x/l_o$is the life table survival rate
- ($\square_\square/\square_\square$) and ($\square\square_\square/\square_\square$) are the age specific fertility rate at age 'x' and proration of females among the total birth at age 'x' respectively.

Assuming that in Indian for every 100 females, 105 male are born, we have:

NRR = $\frac{100}{205}\sum_{\square=15}^{49}\frac{\square_\square}{\square_\square}\frac{\square_\square}{\square_\square}$

If the data are given in five year age groups, then,

NRR = $\frac{100}{205}\sum_{\square=1}^{7}\frac{\square_\square}{\square_\square}\frac{5\square_\square}{\square_\square}$

he **Net Reproduction Rate (NRR)** is a demographic measure that estimates the average number of daughters a cohort of women will have throughout their life, taking into account both fertility and mortality rates. It provides a more accurate picture of population sustainability by factoring in the probability of women surviving to their childbearing years and their likelihood of having children. This rate reflects how likely a newborn girl is to grow up, give birth to a daughter, and replace herself in the population.

Similar to the **Gross Reproduction Rate (GRR)**, the NRR is used to evaluate population dynamics across generations and can be applied to both real and synthetic cohorts. By looking at fertility and mortality rates across different age groups, the NRR offers an indication of the long-term growth or decline of a population.

Self-Check Exercise-2

Q.1 ……….. population crude birth rate is calculated.

Q.2 …….age-group of female fertility ratio is calculated.

Q.3What is Total Fertility Rate?

8.5 Causes and Factors Influencing Fertility

Fertility rates are influenced by various social, cultural, economic, and environmental factors. In this section, we will examine the factors that have contributed to the shift from high fertility to low fertility, especially in developed countries.

General Factors Affecting Fertility Rates

Several factors play a role in shaping fertility patterns across populations:

- **Social and Religious Norms:** In many societies, particularly in developing countries, cultural and religious practices encourage larger families and higher fertility rates.
- **Duration of Married Life:** In societies where marriage typically occurs at an early age, the longer duration of married life increases the potential for childbearing and tends to result in higher fertility rates.
- **Environmental Conditions:** Certain environmental conditions, such as climate, can influence fertility rates. For example, warmer climates may be associated with higher fertility rates, although this is not always a direct cause.
- **Economic Factors:** Families in lower-income settings may have more children as a strategy for economic security, particularly in environments where children are seen as contributors to family income or provide support in old age.
- **Educational Attainment:** Higher levels of literacy, especially among women, are strongly associated with lower fertility rates. Education leads to a better understanding of family planning methods and increases access to employment opportunities, which may reduce the desire for larger families.
- **Population Age and Gender Structure:** A younger population with a larger proportion of women in their childbearing years tends to have higher fertility rates, as more women are at reproductive ages.

- **Mortality Rates:** In regions with high child mortality rates, higher fertility rates often prevail as families have more children to ensure that some survive into adulthood.

Factors Influencing the Shift to Lower Fertility in Developed Countries

In developed nations, fertility rates have significantly declined due to several interrelated factors:

- **Changes in Attitudes and Motivations:** Over time, attitudes toward family size have shifted. Couples in many developed countries now prioritize smaller families due to changing social norms, greater access to education, and widespread use of contraception. This change in attitude has contributed to the increased adoption of family planning methods and a reduced desire for large families. The Industrial Revolution played a pivotal role in reshaping these attitudes by improving living standards and access to birth control.
- **Economic and Social Influences:**
    1. **Industrialization:** Industrialization boosted per capita productivity and led to higher real incomes, improving working conditions and the quality of life. As economies grew, the need for large families diminished.
    2. **Urbanization:** The shift from rural to urban living diminished the role of children as economic assets. In urban settings, the cost of raising children increased due to higher living expenses and the necessity of education, leading families to have fewer children.
    3. **Decreased Mortality Rates:** Advances in healthcare and sanitation led to significant reductions in mortality rates, especially among infants and children. As a result, parents no longer felt the need to have many children to ensure that some survived to adulthood.
    4. **Social Mobility and Family Structures:** The rise of the nuclear family and an emphasis on upward mobility led many families to limit their size. Larger families were seen as hindrances to achieving a higher standard of living and social mobility.
- **Government Policies:** In many developed nations, government interventions such as old-age security and healthcare programs reduced the reliance on

children for financial support in old age. This further decreased the need for larger families.

- **Women's Education and Employment:** The rise of educational opportunities for women contributed significantly to declining fertility rates. As women entered the workforce and gained financial independence, the opportunity cost of childbearing increased, and many chose to have fewer children. Additionally, women's education fostered a more rational approach to family planning, leading to wider acceptance of contraception.

Scholarly Perspectives on Fertility Transitions

Notestein (1953) emphasized the impact of industrialization and urbanization on family life, noting that these transformations encouraged rational thinking, which eventually led to the acceptance of alternatives to early marriage and childbearing. As society modernized, new methods, such as improved healthcare and family planning, became more accessible.

Asha and Tara (2006) identified several factors contributing to the low fertility levels in developed countries, including:

1. Widespread use of effective contraceptive methods.
2. Liberalized abortion laws, providing easier access to abortion services.
3. A cultural shift away from the desire for large families.
4. The increasing financial burden associated with raising children.
5. A growing trend of women participating in the workforce.
6. Changing views of parenthood, with many perceiving children as a financial and personal burden rather than an asset.

These factors collectively explain the decline in fertility rates in developed countries, highlighting the complex interaction between social, economic, and cultural forces.

Self- Check Exercise-3

Q.1 Two demographic cause of fertility.

Q.2 Two social cause of fertility.

Q.3 Fertility related to…….

8.6 Summary

In this lesson, we explored the concept of fertility in detail. We began by defining fertility, understanding its significance, and distinguishing it from related terms. We then reviewed various measures and indices used to assess fertility rates, such as the Crude Birth Rate (CBR), Total Fertility Rate (TFR), and Gross Reproduction Rate (GRR). Finally, we examined the different factors and causes that influence fertility patterns, including social, cultural, economic, and demographic influences. This lesson provided a comprehensive understanding of fertility, its measurement, and the factors that drive changes in fertility rates across different populations.

8.7 Glossary

- **Fecundity:** Refers to the biological potential of an individual (typically a female) to reproduce, representing the maximum possible reproductive capacity throughout her life. It is distinct from fertility, which refers to actual reproductive performance.
- **Parity:** The number of live births a woman has had up to a specific point in time. Parity values categorize women based on their reproductive history and are useful for studying fertility trends in different populations.
- **Fertility Rate:** The rate at which women of a specific age group give birth to children within a given year. It is calculated by dividing the number of live births to women of a particular age group by the average annual population of women in that same age group.

9.8 Answers to Self-Check Exercise

Self-Check Exercise-1

Q.1: Live
Q.2: Thompson and Lewis

Self-Check Exercise-2

Q.1: 1000

Q.2: 15-49

Q.3: Total fertility rate (TFR) summarizes the patterns of fertility exhibited by the age-specific fertility rates and provides a single index representing overall fertility.

Self-Check Exercise-3

Q.1: i) Sex ratio

ii) Age structure

Q.2: i) Level of education of females

ii) Status of women

Q.3: Actual birth

8.9 References/Suggested Readings

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8.10 Terminal Questions

1. Discuss the meaning and causes of fertility.
2. Write about the various measures of fertility.
3. Define the concept of fertility.
4. Explain the term crude birth rate.
5. Describe the terms total fertility rate and gross reproduction rate.

Unit-9

Demographic Process: Mortality

Structure

9.1 Introduction

9.2LearningObjectives

9.3 Concept of Mortality

Self-Check Exercise-1

9.4 Measures or Indices of Mortality

Self-Check Exercise-2

9.5 Causes of Mortality

9.5.1 Causes of Decline in Mortality Rates in Developed Countries

9.5.2 Causes of Decline in Mortality Rates in Developing Countries

Self-Check Exercise-3

9.6 Summary

9.7 Glossary

9.8Answersto Self-Check Exercise

9.9Reference/Suggested Readings

9.10 Terminal Questions

9.1 Introduction

Mortality is one of the three core factors that drive changes in population, alongside fertility and migration. Historically, mortality has played a significant role in determining the size of populations, with changes in death rates often influencing overall population growth. For example, during the Industrial Revolution in Europe,

population growth was largely driven by a decrease in death rates. Similarly, many developing nations experiencing demographic transitions have initially seen a decline in mortality rates. It is widely acknowledged that rapid population growth in various parts of the world has been primarily due to falling death rates rather than increased fertility.

The study of mortality is crucial for understanding current demographic trends and predicting future population shifts. Mortality statistics are indispensable for public health authorities, who rely on them to design, implement, and assess healthcare policies and programs. Data on deaths, categorized by age, sex, and cause, are valuable tools in shaping these health policies. Mortality data are also used in industries like insurance to assess risks and establish premiums.

Mortality is typically expressed as the frequency of deaths within a population over a specific period. In demography, two key concepts are often used when discussing mortality: lifespan, which is the maximum number of years a human can live, and life expectancy, which refers to the average number of years a person in a population is expected to live. Various factors, such as socioeconomic status, healthcare access, and education, affect mortality rates.

In wealthier countries, both at the individual and societal levels, higher incomes tend to result in lower mortality rates. This is because higher income typically provides better access to health-promoting resources like quality food, healthcare, and education. In the late 19th century, the validation of the germ theory of disease and its integration into public health practices significantly contributed to the decline in death rates in many developed nations. Education, especially among women, also plays a critical role in reducing mortality, as educated women are more likely to seek out modern healthcare services and maintain healthier lifestyles.

The age and gender composition of a population also impacts mortality rates. Countries with a larger proportion of elderly individuals tend to have higher mortality rates, as older people are more vulnerable to death. Additionally, there are often differences in life expectancy between men and women, with women generally living longer than men.

To obtain a more precise picture of mortality, demographers calculate age- and gender-specific mortality rates, which are compiled into life tables. These tables allow researchers to assess trends in mortality and predict future changes. Developed countries generally report lower infant and child mortality rates, along with higher life expectancies, while developing countries often face higher mortality rates and lower life expectancies. The causes of death can also vary significantly between nations, with malnutrition-related mortality being more common in poorer countries, while age-related diseases are more prevalent in wealthier nations.

Sociologists have found that education is a strong predictor of life expectancy. Individuals with higher education levels tend to live longer, as education encourages healthier behaviors such as exercise and smoking cessation, contributing to better health in old age.

9.2 Objectives

Upon completing this lesson, you should be able to:

- Understand the scope and significance of demography.
- Recognize how demography intersects with other academic disciplines.
- Grasp the relationship between demography and population studies.

9.3 Concept of Mortality

Mortality refers to the occurrence of death following birth. According to the United Nations (1953), mortality is defined as: "The permanent cessation of all vital functions after birth, with no possibility of revival." Death can only occur after a live birth, and the duration between birth and death is referred to as the lifespan.

It is essential to differentiate between stillbirth, abortion, and miscarriage:

- **Stillbirth:** The delivery of a fetus that has died naturally before birth.
- **Abortion:** The expulsion of a fetus from the uterus before it is capable of surviving outside the womb. Abortion can be either induced (deliberate termination of pregnancy) or spontaneous (miscarriage).

- **Miscarriage (spontaneous abortion):** The natural expulsion of the fetus, typically due to health complications.

Several mortality indicators are critical for understanding population health, including:

- **Child Mortality Rate (CMR):** The number of deaths among children aged 1-4 years per 1,000 children in this age group at the middle of the year.
- **Infant Mortality Rate (IMR):** The number of deaths of infants under one year per 1,000 live births in a given year.
- **Maternal Mortality Rate (MMR):** The number of deaths among women of reproductive age due to pregnancy-related causes, per 100,000 live births in a given year.

Sources of Data on Mortality in India

Mortality data in India is collected from the following sources:

1. **United Nations Demographic Yearbook:** Provides general statistics on death rates.
2. **Special Editions of the Demographic Yearbook:** Offer detailed mortality data.
3. **Census Surveys of India:** Collect mortality data during the national census process.
4. **National Family Health Surveys (1992-93, 1998-99, 2005-06):** Provide trends and insights into mortality patterns in India and its states.
5. **Research Reports:** Offer additional data and insights into mortality trends and patterns.

Self-Check Exercise-1

Q.1 United Nations (1953), mortality or death is defined as:……..

Q.2 Mortality is related with…… Death

9.4 Measures/Indices of Mortality

There are several ways to measure and analyze mortality, each offering unique insights into population health. Below are the key measures commonly used in mortality analysis:

Crude Death Rate (CDR)

The Crude Death Rate (CDR) is the most straightforward and widely used measure of mortality. It provides a basic indicator of the level of death in a population and is simple to calculate and interpret. The CDR is defined as the ratio of the total number of deaths in a specific year to the total mid-year population, multiplied by 1,000. It is calculated as:

$$\text{CDR} = \frac{\square}{\square} \times \square$$

Where:

- **D** is the total number of deaths registered during a calendar year (from January 1 to December 31),
- **P** is the total population at the middle of the year (usually July 1),
- **K** is a constant (typically 1,000) to express the rate per 1,000 people.

Example:

Let's calculate the CDR for Greater Bombay in 1973, based on the data provided.

- Total number of deaths in 1973 (January 1 to December 31) = 61,931
- Mid-year population (as of July 1, 1973) = 6,551,000

CDR=(61,9316,551,000)

Therefore, crude death rate for Greater Bombay for:

$$1973 = \frac{61,931}{6,551,000} \times 1000 = 9.45$$

This means that, in 1973, there were 9.45 deaths per 1,000 people in Greater Bombay.

Uses of Crude Death Rate:

1. **Rate of Natural Increase**: The CDR is used in conjunction with the Crude Birth Rate (CBR) to compute the rate of natural increase (RNI) of a population, which helps assess population growth or decline.
2. **Indicator of Mortality Level**: It serves as a general indicator of mortality levels in a population, providing a starting point for demographic analysis.
3. **Historical Trends**: By comparing CDR over time, it offers insights into how mortality trends are changing in a specific area. A declining CDR may indicate improvements in healthcare, sanitation, and overall living conditions, whereas an increasing CDR may suggest worsening health conditions or a crisis.

Limitations of the Crude Death Rate:

Despite its utility, the CDR has several limitations that need to be considered:

1. **Lack of Detailed Information**: The CDR does not provide specific information about the age and sex distribution of deaths. It gives a general overview of mortality in a population but ignores vital details that can reveal important patterns (such as higher mortality rates among the elderly or infants).
2. **Inadequate Coverage of Death Statistics**: In some cases, death statistics may not be fully accurate or comprehensive, which can affect the reliability of the CDR. This is particularly true in developing countries where registration systems may not be complete.
3. **Does Not Reflect the Population Structure**: Since the CDR is a crude measure, it doesn't adjust for the population's age and sex distribution. For example, an aging population might naturally have a higher death rate, but this would not necessarily reflect poor health conditions or a crisis in the population.

The Crude Death Rate is an essential and easy-to-calculate metric, it is best used alongside other measures, such as age-specific mortality rates and life expectancy, to gain a more detailed and accurate picture of a population's health dynamics.

Age-Specific Death Rate (ASDR)

The **Age-Specific Death Rate (ASDR)** is a more refined and detailed measure of mortality compared to the Crude Death Rate (CDR). Unlike the CDR, which provides an overall death rate for the entire population, the ASDR breaks down mortality by specific age groups. Since death rates tend to vary significantly across different age groups, the ASDR allows for more precise comparisons and a better understanding of mortality patterns in a population.

$$\text{ASDR} = \frac{\dfrac{\text{□□. □□ □□□□}h\text{□ □□ □□□ '□' □□ □□□ '□'}}{(\text{□□ □□ □□□}h\text{ □□□□□□})}}{\dfrac{\text{□□□ □□□□ □□□□□□□□□□□ □□ □□□□□□ □□□□ □□ □□□ '□' □□□□□□ '□'}}{(\text{□□ □□ □□□}h\text{ □□□□□□})}} \times \text{□}$$

K is usually taken as 1000

- Maternal Mortality Rate

The maternal mortality rate is the number of women who die as a result of I childbearing in a given year per 100,000 births in that year. Maternal deaths are those caused by complications of pregnancy and childbirth.

- Infant Mortality Rate

In demography, **infants** are specifically defined as children who are in their first year of life, i.e., children aged "zero" up to but not including one year. **Infant Mortality Rate (IMR)** is a key indicator of health that measures the number of deaths among infants (children under one year of age) relative to the number of live births in a given year. It is an important measure of the overall health conditions of a population and reflects the effectiveness of healthcare systems, maternal health, and living conditions. $\frac{□_□}{□} \times K$

Where:

- do is the number of deaths below age one, registered during a calendar year.
- B is the number of live births, registered during the same year.
- K is 1,000 constant.

The **Infant Mortality Rate (IMR)** is crucial for a variety of reasons:

1. **Indicator of Healthcare Quality**: IMR is a key measure that reflects the quality and availability of healthcare services for a population. A high IMR often suggests that the healthcare system, especially maternal and child healthcare, is inadequate or lacking in resources.
2. **Focus on Vulnerable Population**: This rate specifically examines mortality in infants, the most vulnerable group in a population. Since infants are particularly at risk for early death, tracking IMR provides insights into the overall health conditions and services available to this group. It also directly influences the **life expectancy at birth**: any reduction in IMR leads to an increase in life expectancy.
3. **Impact on Age Distribution**: A reduction in IMR has significant effects on the age structure of the population. Fewer infant deaths mean a larger number of children surviving past their first year, which impacts the overall demographic composition, resulting in a larger proportion of younger individuals.
4. **Link to Fertility Rates**: Studies have shown that changes in IMR are often associated with fertility rates. In populations with high IMR, families may have more children to compensate for the risk of infant mortality. As IMR decreases, families may reduce the number of children they have, recognizing that more infants are likely to survive, which in turn may lead to a decline in fertility rates.

Infant Mortality Rate is an essential measure that provides critical insights into the health of infants, the effectiveness of public health policies, and the broader demographic shifts in a population. It plays a key role in understanding changes in both healthcare systems and fertility behaviors.

Cause-Specific Death Rate (CSDR)

Cause-specific death rates (CSDRs) are vital metrics for understanding mortality patterns linked to particular causes of death. These rates allow for comparisons of death distributions from various causes across different populations and help track

changes over time within the same population. CSDRs are also instrumental in creating multiple decrement life tables, which assess the impact of mortality changes due to specific causes on life expectancy at various ages.

Cause-Specific Death Ratio (CSDR)

The cause-specific death ratio is a measure that indicates the proportion of deaths attributable to a certain cause. It is calculated by dividing the number of deaths resulting from a particular disease or condition by the total number of deaths during a specified time frame. This ratio provides insight into the relative significance of a particular cause of death within a population.

Cause-Specific Death Rate (CSDR)

The cause-specific death rate provides a more detailed perspective. It is calculated by dividing the number of deaths from a specific cause in a given year by the average population during that year and then multiplying by 1,000 (or another relevant constant depending on the context). This rate offers a clearer picture of how prevalent a specific cause of death is in the population over time.

Formula for Cause-Specific Death Rate:

$$CSDR=\frac{\square_{\square}}{\square} \times K,\ P=\frac{\square}{\sum_{\square=1}^{\square}} \square_{\square}$$

Where:

- Dl represents the deaths due to cause 'i',
- and D is the total number of deaths; value of K is usually 1,000.

Cause-specific death rates can also be calculated for specific age. An age- and cause- specific death rate is given as:

$$\frac{\square_{\square\square}}{\square} \times K$$

Where:

- D_{ai} represents deaths at age 'a' due to cause 'i',
- P is the mid-year population,
- K is a constant, usually 10,000 or 100,000.

Self-Check Exercise-2

Q.1 …….. population crude death rate is calculated.

Q.2 ……age-group of infant mortality rate is calculated.

Q.3 What is Maternal Mortality Rate?

9.5 Causes of Mortality

9.5.1 Factors Behind the Decline in Mortality in Developed Nations:

In regions such as Europe, North America, and Oceania, mortality rates have experienced a steady decline due to continuous economic development, especially following the Agricultural and Industrial Revolutions. This decline in death rates began gradually during the 17th century and accelerated in the 18th and 19th centuries. Key elements that contributed to this decrease in mortality include:

1. **Improved Food Supply:** Enhanced agricultural production helped to ensure a steady and reliable food supply, minimizing the impact of food shortages and famines.
2. **Technological Progress:** Innovations in technology, particularly within industrial sectors and public infrastructure, led to significant improvements in living conditions, which in turn reduced mortality rates.
3. **Medical Advances:** Discoveries in medical science, including vaccines and effective treatments for various diseases, were pivotal in reducing mortality.
4. **Sanitation Improvements:** The implementation of better sanitation systems, including clean water access and waste management, helped reduce the transmission of infectious diseases.

5. **Better Health Services:** The expansion of healthcare infrastructure, such as hospitals and clinics, made healthcare services more accessible to a broader segment of the population.
6. **Social Reforms:** Government initiatives in areas such as public welfare, housing, health insurance, and labor laws contributed to improved quality of life and, consequently, lower mortality rates.

Collectively, these factors have greatly improved public health and significantly lowered mortality in developed countries.

9.5.2 Factors Behind the Decline in Mortality in Developing Countries:

In developing countries, mortality rates have also declined substantially in recent decades, with several key drivers behind this trend:

1. **Access to Life-Saving Medications:** The importation of essential medicines from developed nations has played a critical role in controlling diseases such as malaria, smallpox, pneumonia, and typhoid. The World Health Organization (WHO) has been instrumental in the global effort to eliminate diseases like malaria, polio, and tuberculosis.
2. **Public Health Initiatives:** Many developing nations, with the support of global health organizations like WHO, have introduced public health programs aimed at improving sanitation, reducing pollution, and promoting vaccination. These initiatives have played a key role in reducing the prevalence of diseases linked to poor living conditions.
3. **Growth in Medical Facilities:** There has been an increase in the availability of healthcare professionals and medical facilities in developing countries. The expansion of both public and private healthcare systems, especially in rural areas, has improved access to medical care.
4. **Improvement in Education:** With better access to education, people in developing countries have become more health-conscious. This has led to improved personal hygiene, better nutrition, and a general focus on preventive healthcare, which has contributed to the reduction in mortality.
5. **Enhanced Status of Women:** Women's education and social standing have improved in many developing countries, leading to better healthcare for their

families. As women gain more knowledge, they are better equipped to manage their health and the health of their children, which has led to a decline in maternal and infant mortality rates.

6. **Improved Food Security:** The availability of food has increased due to better agricultural practices and imports from developed countries. This has helped prevent malnutrition and hunger, both of which have historically contributed to high mortality rates.
7. **Rising Life Expectancy:** Economic growth, improved healthcare access, and better living conditions have led to an increase in life expectancy. With greater focus on healthcare and sanitation, mortality rates have decreased, particularly among older populations.

The decline in mortality rates in developing countries can be attributed to a variety of factors, including the spread of medical advancements, public health efforts, education, and social reforms. These changes have led to improvements in health outcomes, extended life expectancies, and significant shifts in the demographic structure of these nations.

Self-Check Exercise-3

Q.1 Two cause of fertility.

Q.2 …….was the first country to start maintaining accounts of mortality.

9.6 Summary

In this lesson, we have explored the concept of mortality, which is a key component in population change. The discussion highlighted various measures and indices used to assess mortality, as well as the factors that influence it. We also examined the causes of mortality from different perspectives and analyzed the reasons behind the decline in mortality rates in both developed and developing countries. By understanding these aspects, we gain a broader perspective on how and why mortality rates change over time, both at the national and international levels.

9.7 Glossary

- **Fecundity:** Fecundity refers to the biological ability of an individual (or couple) to reproduce, or their physiological capacity to produce live offspring. It is distinct from fertility, which refers to the actual number of children born. While fecundity represents the potential to have children, fertility indicates how many children are actually born. While fecundity is not directly measurable, fertility can be analyzed through birth statistics. However, an individual's fertility is influenced by their fecundity, which is their inherent biological capacity for reproduction.
- **Natural Fertility:** Natural fertility, as defined by Henry (1953), is the fertility level in a population where there is no active effort to limit births, such as through contraception or abortion. This includes the fertility levels of groups or individuals who do not deliberately use birth control. Certain cultural practices like extended breastfeeding or postpartum abstinence may also reduce fertility naturally, but when these behaviors are not intended to control reproduction, they are considered part of natural fertility.
- **Contraception:** Contraception refers to methods used to prevent pregnancy during sexual intercourse. This includes a variety of techniques or devices that either prevent conception or make pregnancy less likely. Contraceptive methods are sometimes referred to as birth control methods, but "birth control" can also encompass practices like abortion, sterilization, or abstinence from sexual activity. Contraception includes any measures taken to avoid pregnancy or birth.

9.8 Answers to Self-Check Exercise

Self-Check Exercise-2

Q.1

"Death is the permanent cessation of all evidence of life at any time after birth has taken place, i.e., post-natal cessation of vital functions without capacity for resuscitation."

Q.2

Death

Self-Check Exercise-2

Q.1

1,000

Q.2

0-1

Q.3

The maternal mortality rate (MMR) refers to the number of women who die due to complications related to pregnancy and childbirth per 100,000 live births in a given year. These deaths are directly associated with the process of childbirth.

Self-Check Exercise-3

Q.1

Demographic and Social

Q.2

Sweden

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9.10Terminal Questions

1) Explain the causes of decline in mortality rates both in developing or developed countries.
2) Describe the concept of mortality in detail.
3) Highlight the measures or indices of mortality.
4) Discuss the causes of mortality.
5) Write a note on mortality rates in India.
6) Crude death rate explains with its formula.

Unit-10

Demographic Process: Migration

Structure

10.1 Introduction

10.2Learning Objectives

10.3Meaning and Definition of Migration

10.5 Types of Migration

10.6 Causes of Migration

10. Consequences and Constraints of Migration

10.8 Summary

10.9 Glossary

10.10 Answer to Self-Check Exercise

10.11Reference/ Suggested Readings

10.12 Terminal Questions

10.1 Introduction

10.1 Introduction to Migration

Migration is an essential element in understanding population dynamics, along with fertility and mortality. Unlike fertility and mortality, which are biological processes, migration is a social phenomenon influenced by a variety of social, economic, cultural, and political factors. While migration is typically a voluntary decision, there are instances where people are forced to migrate due to external pressures. Migration responds to a wide range of circumstances, including economic opportunities, social changes, and demographic factors. Alongside fertility and mortality, migration has a significant impact on the size, structure, and growth of a population. Moreover, it affects the geographical distribution of populations and plays

a central role in shaping labor markets. Therefore, migration is an important social indicator that reflects broader social changes in a society.

10.2 Learning Objectives

By the end of this lesson, you will be able to:

- Understand the concept and definition of migration.
- Recognize different types of migration.
- Identify the primary causes behind migration.
- Evaluate the consequences and challenges associated with migration.

10.3 Meaning and Definition of Migration

Migration, unlike fertility and mortality, is a primarily social process influenced by a variety of factors such as economic, social, political, and psychological forces (Misra, 1980). Migration significantly impacts the size and growth of populations, bringing about notable changes in their distribution and structure. As such, the study of migration is essential in population studies. It also attracts the attention of specialists from fields like economics, sociology, geography, political science, and public policy, all of whom seek to understand how migration shapes societies.

Migration is particularly significant for the following reasons:

- **Indicators of Social Change**: Migration often serves as a sign of fundamental social transformations. It can reflect shifts in societal norms, living conditions, and access to opportunities.
- **Economic and Industrial Development**: Migration is closely linked to economic growth. As industries grow, people frequently move from rural areas to urban centers in search of better employment prospects. International migration also occurs as individuals seek work or educational opportunities abroad.

- **Technological Advancements and Urbanization**: As technology progresses, rural-to-urban migration tends to increase. This shift leads to the growth of new cities and towns, further contributing to urbanization.
- **Labor Demand**: Migration is often driven by the demand for labor, whether skilled or unskilled. The expansion of industries, businesses, and markets increases the need for workers, which stimulates both internal and international migration.
- **Challenges of Urbanization**: The increase in rural-to-urban migration brings new challenges, such as overcrowded cities, inadequate housing, and pressure on public services. Understanding migration patterns is essential for addressing these issues effectively.

Definition of Migration

Simply put, migration refers to the movement of people from one location to another. According to the *Demographic Dictionary*, migration is “a type of geographical or spatial mobility between different geographic areas, typically involving a change in residence from the place of origin to the destination.” This type of migration, which involves a permanent change of residence, distinguishes it from other forms of movement that do not entail a permanent shift.

Everett Lee, a prominent demographer, defines migration as “a permanent or semipermanent change of residence,” without any restrictions on the distance traveled or the voluntary or involuntary nature of the move. Eisenstadt describes migration as “the physical movement of an individual or group from one society to another, typically requiring the abandonment of one social setting and the establishment of another.”

Mangalam focuses on the permanence of migration, describing it as the relatively permanent relocation of a group of people from one geographic location to another. This process is preceded by careful decision-making, in which migrants weigh and evaluate different circumstances, leading to changes in their social interactions. Mehta, in his study of Rajasthan, also defines migration as a form of movement or spatial mobility.

Lundquist, Anderton, and Yaukey define migration as “population movements that either increase or decrease the number of members within a given population or society.” This excludes temporary movements, such as vacations, short-term apartment moves, or daily commutes, as these do not alter the overall population of a specific area.

In demographic studies, migration is closely linked to the concept of residence, which involves more than mere physical presence in a place—it includes a social affiliation with a particular population. From the perspective of the area of origin (the sending society), understanding the people who are leaving, and their characteristics, is crucial. Likewise, the receiving society is concerned with how many people, and of what types, it is gaining. For individuals, migration is not just about changing locations; it represents a significant social, psychological, and economic shift as they sever ties with old roots and form new ones.

Unlike terms such as "birth," "death," and "disease," which are widely understood in both scientific and common language, migration-related terms like "emigration," "immigration," "mobility," and "migration" can carry different meanings based on context. To fully grasp the concept of migration, it is important to understand these terms and explore the different types of migration and their implications.

Self-Check Exercise-1

Q.1 Migration is one of the ……of population growth and change. Components

Q2.“As a permanent or semipermanent change of residence”. Definition given by……..Everett Lee

10.4 Types of Migration

The United Nations’ Multilingual Demographic Dictionary (1958) defines migration as “a form of geographical mobility or spatial mobility of people between one geographical unit and another, typically involving a change in residence from the place of origin to the place of destination.” This kind of migration is known as

permanent migration, which should be distinguished from movements that do not result in a lasting change of residence.

In demographic terms, migration refers to the movement of individuals from one geographic area to another (or a move involving a specified minimum distance) over a specific period, resulting in a change of residence. A migrant is an individual who has moved their usual place of residence at least once during a defined migration period.

(i) Categories of Migration

Migration can be classified based on several factors, such as geography, time, causes, and consequences. The main types of migration include:

1. **Spatial Migration**:
   Based on location, migration is classified into:
   - **Internal Migration**: Movement within a country. This can be further divided into:
     - **Intra-local Migration**: Movement within a single local area.
     - **Inter-local Migration**: Movement between different local areas.
     - **Intra-regional Migration**: Movement within a specific region of a country.
     - **Inter-regional Migration**: Movement across regions within a country.
   - **International Migration**: Movement from one country to another, across political borders.
2. **Temporal Migration** (based on time): Temporal migration refers to the duration or timing of the move and can be divided into:
   - **Daily Migration**: Repeated movement, such as commuting for work or school.
   - **Periodic Migration**: Migration occurring at regular intervals, such as seasonal workers.
   - **Seasonal Migration**: Movement tied to specific seasons, like agricultural work.

    - **Long-term Migration**: Extended migration without the intention of returning.
3. **Causal Migration** (based on reason): Migration can be:
    - **Voluntary Migration**: Movement driven by personal choice, such as for better job opportunities or education.
    - **Forced Migration**: Movement due to external pressures like natural disasters, war, or persecution.
4. **Consequential Migration** (based on outcomes): Migration can also be categorized by its effect on individuals or communities:
    - **Innovative Migration**: When migrants move to introduce or embrace new practices, ideas, or technologies.
    - **Conservative Migration**: When people migrate to preserve their own cultural values, traditions, or lifestyle.

Key Terms Related to Migration

To better grasp migration and its types, several key concepts are important:

- **Immigration and Emigration**:
    - **Immigration** refers to the movement of people into a specific area, while **Emigration** refers to movement out of a country or region. These terms are used primarily in international migration. For example, people leaving India to live in the United States are **emigrants** from India and **immigrants** in the United States.
- **In-migration and Out-migration**:
    - **In-migration** refers to people moving into a particular area, while **Out-migration** refers to people leaving an area. These terms are relevant to internal migration. For instance, people moving from Tamil Nadu to Maharashtra are **in-migrants** to Maharashtra and **out-migrants** from Tamil Nadu.
- **Place of Origin and Place of Destination**:
    - The **place of origin** (or departure) refers to the area from which the migrants move, while the **place of destination** (or arrival) is where the migrants settle.
- **Gross Migration and Net Migration**:

    - **Gross Migration** refers to the total number of immigrants and in-migrants arriving in an area, combined with the total number of emigrants and out-migrants leaving.
    - **Net Migration** is the difference between the number of people who arrive (immigrants and in-migrants) and those who leave (emigrants and out-migrants). This is also known as the migration balance.
- **Migration Stream**:
    - A **migration stream** represents the total number of migrations over a specific period from a common origin area to a common destination area. It describes the flow of migrants who share the same source and target location.
- **Migration Interval**:
    - The **migration interval** refers to the specific time frame during which migration is measured. This can be a fixed period, such as one year or five years (definite interval), or a more general lifetime measure (indefinite interval), such as when people are asked about their previous residence during a census.

Understanding these types and key terms helps in comprehending the dynamics of migration and its impact on both the regions of origin and destination.

Self-Check Exercise-2

Q1. What is spatial migration?

Q2. What is causal migration?

10.5 Causes of Migration

Historically, migration was largely driven by men moving for work opportunities (livelihood, employment), while women typically migrated due to marriage (except in matrilineal societies). In contemporary times, people migrate for various reasons, including education, employment, marriage, or in response to natural disasters such as droughts, floods, earthquakes, and famines. Migration patterns have evolved, with individuals moving from rural to rural areas, rural to urban, urban to urban, or even urban to rural areas.

The causes of migration can broadly be classified into two main categories: **Push factors** and **Pull factors** (Lewis, 1982).

i) Push Factors

These factors are associated with the place of origin and create unfavorable conditions that drive individuals to migrate. Push factors include:

- **Decline in local natural resources** or the exhaustion of resources, leading to a loss of livelihoods.
- **Decreased demand for local products or services**.
- **Loss of employment**, often due to economic decline or industry shifts.
- **Political, religious, or ethnic oppression**, where people face discrimination or violence.
- **Alienation from the community** due to social conflicts, or a voluntary decision to leave for better opportunities.
- **Forced displacement** caused by natural disasters such as floods, droughts, earthquakes, or epidemics.

ii) Pull Factors

These factors are linked to the place of destination and attract people to migrate. Pull factors include:

- **Better employment opportunities**, with higher wages or career advancement.
- **Educational opportunities**, such as specialized training or access to better schools.
- **Superior living conditions**, such as better climate, housing, healthcare, or infrastructure.
- **Dependency movements**, such as individuals moving to join family members or spouses (e.g., migration of a bride to her matrimonial home).
- **Attractive social environments**, offering better lifestyles, opportunities for social mobility, or better prospects for future generations.

iii) Socio-Cultural and Political Factors

In addition to push and pull factors, social, cultural, and political influences also play a significant role in migration. For example:

- **Family conflicts** can lead to migration in search of a better life or safety.
- **Improved communication facilities**, such as transportation, radio, television, and cinema, influence migration by changing attitudes, spreading information, and altering perceptions of life in other areas.
- The spread of **urban-oriented education** can shift cultural values, encouraging people to migrate for better educational or career prospects.

iv) Demographic Effects

Migration impacts the population structure and growth in both the areas of origin and destination:

- **Population growth in rural areas** may be slowed as people move to urban centers. As young men leave for work in urban areas, they delay marriage and childbearing, reducing fertility rates in these regions.
- **Urban areas experience population growth**, particularly among young males (often aged 15-24), who migrate without their families. This demographic change tends to result in lower fertility rates in cities, partly due to delayed marriage and the high costs of living in urban environments. Urban settings also offer better access to healthcare, family planning services, and a focus on health and hygiene, which further reduces fertility and mortality rates.

v) Economic Effects

Migration has varying impacts on income and employment in both urban and rural areas, depending on the type of migrants:

- **Unskilled migrants** often find low-paying jobs in the informal sector, such as street vendors, domestic workers, or laborers. While these jobs are typically low-paying, many migrants are still able to send remittances back home, helping support their families.
- **Semi-skilled migrants**, such as those with secondary education, often find work as shop assistants, taxi drivers, or in small-scale enterprises. These

workers earn higher wages compared to unskilled laborers, and their income may be on par with that of the average urban resident.

- A small number of **educated migrants** come to cities for higher education and then secure well-paying jobs in the formal sector, such as in government services, multinational companies, or educational institutions. These migrants often contribute significantly to remittances and help in modernizing rural areas through knowledge transfer.

However, migration to urban areas also brings several challenges:

- **Urban growth leads to the expansion of slums** and informal settlements, where access to essential services such as clean water, sanitation, healthcare, and education is often inadequate.
- **Housing shortages** and **overburdened public transport** systems lead to congestion, environmental pollution, and an increase in crime.
- Despite the intention to improve living conditions, **local governments** struggle to meet the increasing demand for infrastructure and services in cities.
- **Underemployment and unemployment** are significant issues. Many migrants, particularly from rural areas, face difficulties finding formal employment due to a lack of skills or education. As a result, they end up working in the informal sector or engaging in low-paying, unstable jobs.

Migration has a profound impact on both the areas people leave and the areas they move to. While it offers opportunities for economic advancement and personal growth, it also creates challenges, particularly for urban areas, which must contend with rising populations and strained resources.

Self-Check Exercise-3

Q1. According to the……., the evidence suggests that the bulk of employment in the informal sector is economically efficient and profit-making. ILO

Q2. Migration increases the population of the ……class in urban areas.working

10.6 Consequences and Constraints of Migration

Migration is often a voluntary process influenced by societal values and norms, which can significantly impact both the individuals migrating and the communities involved. The effects of migration are widespread and vary across different geographical scales. These consequences affect many aspects of life, including demographic, economic, social, cultural, and political factors, at the individual, community, societal, national, and international levels. However, migration also presents various constraints. In this section, we will explore the consequences of migration as well as the challenges or constraints it can present.

Consequences of Migration

Migration affects several layers of society, including the size and structure of the population, the communities involved (both the origin and destination), and the individuals who migrate. Below, we outline the primary consequences of migration:

(a) Societal Consequences

Migration can act as a catalyst for societal transformation, shifting a society from traditional to more modern practices. It facilitates the spread of advanced skills and human activities, contributing significantly to the modernization process. Migrants often bring with them valuable skills that help drive the economic development of their new regions, especially in sectors such as infrastructure development (e.g., roads, transportation). However, migration can also lead to social and political issues. These include problems like:

- **Unemployment** and an influx of **unskilled labor**.
- **Tensions** between groups, potentially resulting in social unrest.
- **Disruption of agricultural production**, particularly in areas where large numbers of people leave rural settings.
- **Urban challenges** such as slum expansion, rising housing costs, pollution, and increased living expenses.

- **Changes in social values** and family structures, which can lead to societal adjustment difficulties. In dealing with these issues, the pace of economic and social development can slow down or face setbacks.

(b) Community Consequences

The consequences of migration on a community depend on the intensity of migration, the nature of the migration, and the social characteristics of the communities involved. Key impacts include:

- **Increased birth rates** in areas receiving a steady influx of young migrants. Conversely, continuous out-migration of young people can lead to a decrease in birth rates, resulting in natural population decline.
- **Social changes** due to differing socio-economic statuses, education levels, occupations, languages, and ethnic backgrounds among migrants and the local population.
- **Innovative changes** often come from migrants, who may act as leaders or agents of social change within their communities.
- **Urbanization** caused by large-scale migration from rural to urban areas, leading to overcrowding, social segregation, and changes in urban development patterns. This also contributes to rural depopulation, potentially reducing the vitality of rural communities.

(c) Individual Consequences

On an individual level, migration affects the migrant's ability to meet personal needs and aspirations. The degree to which these needs are fulfilled depends on how well the individual adapts to their new environment—socially, economically, politically, and culturally. Successful adaptation requires processes such as:

- **Adjustment** to the new environment and lifestyle.
- **Acculturation** to blend into the new culture while maintaining one’s original identity.
- **Assimilation** into the social, economic, and cultural fabric of the destination community.

Constraints to Migration

While migration offers various opportunities, it is also hindered by several constraints that influence whether individuals or groups can migrate. These constraints are primarily shaped by **market situations** and **public policy**.

i) Market Situation

The availability of resources, as well as the roles played by individuals and institutions in managing these resources (such as housing and employment), often determines the market conditions for migration. Economic factors such as job availability, wages, and housing in the destination area play a significant role. Additionally, high demand for jobs and accommodation in popular migration destinations can restrict migration or lead to overcrowded conditions.

ii) Public Policy

Public policy at national and international levels can act as either a facilitative or restrictive force in migration. Government policies that support the movement of people, such as favorable immigration laws and trade agreements, can encourage migration. However, policies that restrict movement, impose heavy bureaucratic requirements, or are biased in favor of certain groups may act as significant barriers to migration. At the international level, **globalization, urbanization, and liberalization** also affect public policy related to migration. Policies must aim to promote the welfare of the entire population, but when policies are skewed to favor certain groups, they create obstacles for others.

Other Constraints

- **Lack of official information**: Migrants may face difficulties due to the absence of clear and accurate information on the safety and security of destination areas, particularly in the case of international migration.
- **Legal barriers**: Immigration laws that impose strict requirements on work permits, residency, and entry can limit migration opportunities.
- **Social barriers**: Cultural, linguistic, and social differences may also pose challenges for migrants trying to integrate into new communities.

While migration can have significant societal, economic, and individual benefits, it also presents challenges and constraints that need to be carefully addressed by policymakers, communities, and migrants themselves. These constraints include market conditions, legal restrictions, and social barriers, all of which can impact the success and effectiveness of migration processes.

Self-Check Exercise-4

Q1. What is community consequences of migration?

Q2. What is constraints to migration?

10.8 Summary

In this lesson, we focused on migration as a key factor influencing population change. We explored the concept and definition of migration, as well as its causes and various types. Additionally, we examined the consequences of migration on different aspects of society, including economic, social, and demographic changes, and discussed the constraints that may limit or hinder migration. By understanding these components, we have gained a broader perspective on how and why migration occurs at local, national, and international levels, and the extent to which it impacts societies.

10.9 Glossary

- **Seasonal Migration**: Movement of people from one place to another, typically associated with agriculture and tourism. Seasonal agricultural migrants move to different locations according to crop cycles, either to plant or harvest crops.
- **Emigration**: The process of leaving one's country or region to settle permanently in another country or region.
- **Immigration**: The act of entering a country or region to reside there permanently.

10.10 Answers to Self-Check Exercise

Self-Check Exercise-1

Q.1 Components

Q2.Everett Lee

Self-Check Exercise-2

Q1. Spatial migration Based on space it is divided into internal migration (within a country) or international migration (across political borders). The internal migration can again be divided into intra-local and inter-local, and intra-regional and inter-regional

Q2. Causal migration based on the cause, the migration is voluntary or forced.

Self-Check Exercise-3

Q1. ILO

Q2. Working

Self-Check Exercise-4

Q1. The community consequences of migration depend upon intensity of migration, its differential nature and social composition of the communities involved

Q2. The constraints to migrationmainly depend upon the following: i) Market situation, and ii) operation of public policy. Access to resources, roles and functions of individuals and institutions involved in the supply, allocation and utilization of resources such as employment and housing to a large extent influence the market situation.

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10. 12 Terminal Questions

1) Explain the causes of decline in mortality rates both in developing or developed countries.
2) Describe the concept of mortality in detail.
3) Highlight the measures or indices of mortality.
4) Discuss the causes of mortality.
5) Write a note on mortality rates in India.
6) Crude death rates explain with its formula.

Block-IV

Unit 11

Population Growth: Impact on Poverty and Unemployment

Structure

11.1 Introduction

11.2Learning Objectives

11.3 Population Growth

- 11.3.1 Negative Consequences of Population Growth
- 11.3.2 Effects of Population Growth

Self-Check Exercise-1

11.4 Poverty and Population Growth

- 11.4.1 Meaning of Poverty
- 11.4.2 Features/ Characteristics of Poverty
- 11.4.3 Causes/ Reasons of Poverty

Self-Check Exercise-2

11.5 Population Growth and Unemployment

- 11.5.1 Unemployment
- 11.5.2 Types of Unemployment
- 11.5.3Causes of Unemployment
- 11.5.4 Impact/ Consequences of Unemployment

Self-Check Exercise-3

11.6 Summary

11.7 Glossary

11.8 Answers to Self-Check Exercise

11.9 Suggested Readings

11.10 Terminal Questions

11.1 Introduction

11.1 Introduction

We all have our perceptions and experiences concerning the growing population. Often, we analyze or discuss issues such as overcrowding, congestion, and the various consequences that arise from overpopulation. Some major concerns include unemployment, poverty, and a lack of basic amenities like housing and drinking water. It is clear that population growth and development are closely linked. This relationship is reciprocal, with development influencing population dynamics and vice versa (Gould, 2009).

11.2 Learning Objectives

By the end of this lesson, you should be able to:

- Grasp the concept of population growth and its potential negative effects.
- Understand how population growth contributes to poverty.
- Recognize the effects of population growth on unemployment.

11.3 Population Growth

The view that excessive population growth is the root cause of many global problems paints population growth as the world's foremost crisis. This perspective suggests that unrestrained population increase leads to widespread issues such as poverty, low living standards, malnutrition, poor health, environmental degradation, and other social challenges. Terms like the “population bomb” or “population explosion” are often used to describe the situation. Extreme predictions of food shortages and ecological disasters are typically blamed on rising population numbers.

11.3.1 Negative Consequences of Population Growth

Research has shown that population growth can have a detrimental impact on economic development, affecting key sectors like education, health, the environment, food production, and economic growth (Todaro & Smith, 2009). Here are some of the most significant impacts:

1. **Increasing Poverty:** Rapid population growth disproportionately affects the poor. They are often landless and are the first to feel the consequences of cuts in government health and education programs. Moreover, they bear the brunt of environmental damage and are the most affected by job losses due to slower economic growth.
2. **Retarding Economic Growth:** Evidence suggests that rapid population growth negatively impacts per capita income growth, particularly in developing countries with agrarian economies.
3. **Food Scarcity and Security:** As the population grows, meeting food demands becomes increasingly difficult, especially in developing countries. Fertile land has already been cultivated, and food production is nearing its capacity, requiring the development of new technologies to ensure adequate food supply.
4. **Education:** Large families and low incomes often prevent parents from educating all of their children. This issue is particularly pronounced in developing countries, where preference may be given to male children. Moreover, rapid population growth can hinder the quality of education, as governments struggle to meet the demands for education funding, which limits the development of human capital.
5. **Health:** High fertility rates pose health risks for both mothers and children. This can lead to complications during pregnancy, low birth weights, and increased infant mortality rates.
6. **Environmental Degradation:** The planet's resources are stretched thin not only by the growing human population but also by the needs of billions of livestock. This contributes to deforestation, desertification, and soil erosion, as well as air and water pollution, harming ecosystems and biodiversity.

11.3.2 Effects of Population Growth

In this lesson, we will focus specifically on two key effects of population growth: poverty and unemployment. The population explosion has wide-ranging effects on natural resources and various economic sectors:

1. **Poverty:** A large population leads to an increased number of people living below the poverty line. Many of these individuals may lack awareness of the issues caused by overpopulation, and they are often significant contributors to high birth rates.
2. **Unemployment:** As the population grows, the demand for jobs rises as well. However, due to a lack of resources and employment opportunities, many people remain unemployed. The problem of unemployment is continuously growing, and as a result, many individuals are migrating to other countries in search of better job prospects.

Self-Check Exercise-1

Q.1 Two negative consequences of population growth.

Q.2 Two effects of population growth.

11.4 Poverty and Population Growth

Rapid population growth can significantly reduce per capita income growth and well-being, which, in turn, exacerbates poverty. In densely populated poor countries, where land is under pressure, this growth increases landlessness, thus contributing to higher poverty rates. The relationship between poverty and overpopulation is debated, with some economists arguing that the two factors are interrelated, causing a circular impact. This makes it challenging to address the issues of poverty and overpopulation effectively. However, most agree that population growth plays a key role in exacerbating poverty.

In Africa, poverty is often attributed to fast population growth combined with low agricultural productivity. Similarly, in parts of Asia, poverty results from high population growth and density, along with widespread landlessness. It is evident that

rapid population growth is considered a major factor in the persistence of poverty in various regions around the world.

The growing population places increased pressure on land resources. Poverty and high population growth are not confined to rural areas; urban areas also have significant numbers of people living in poverty.

11.4.1 Meaning of Poverty

Poverty can be seen differently depending on the context. For instance, India is poorer compared to the USA, and within India, states like Bihar and Orissa are poorer than Punjab and Haryana. Poverty is often associated with inadequate income, lack of housing, and poor living conditions. However, definitions and methods for measuring poverty vary between countries. Poverty is not merely an economic issue; it also has social, cultural, political, historical, and geographical dimensions. It refers to a lack of livelihood security and access to basic needs such as food, shelter, and healthcare. It is about being unable to afford healthcare, not attending school, living in unsanitary conditions, and lacking job opportunities.

To understand and address poverty, it must be properly defined, measured, and studied. Poverty is a complex and multidimensional issue that encompasses both income and non-income factors, including vulnerability to risks and socio-political access. Attempts to define poverty cannot fully capture its real-world experience. Extreme poverty, especially in developing countries, has profound impacts on the human spirit, forcing families to prioritize survival over dignity and often leading to exclusion from society's benefits.

Poverty is defined by the inability to meet basic life needs and can be seen through various indicators, including income, consumption, education, health, and opportunities. In less developed countries, poverty is often defined as absolute poverty, which is not solely based on income but also on a set of minimum living standards. In India, for example, absolute poverty is defined in terms of calorie intake. A person who consumes fewer calories than the prescribed minimum (2400 calories for rural areas and 2100 calories for urban areas) is classified as living

below the poverty line. This calorie intake is converted into a monetary value to establish a poverty line, which helps in identifying those in need.

11.4.2 Features/Characteristics of Poverty

Poverty has various manifestations, causes, and impacts, encompassing both monetary and non-monetary dimensions. Some of the key features and characteristics of poverty include:

- **Limited assets**: People in poverty often lack land or have very few resources and earn low incomes.
- **Low consumption and high indebtedness**: Poor individuals tend to have little savings and may be in debt.
- **Joblessness and food insecurity**: Many individuals face unemployment or unstable employment, leading to insufficient access to food.
- **Lack of education and training**: Illiteracy and lack of formal education prevent individuals from accessing better opportunities.
- **Poor health and living conditions**: People in poverty often suffer from ill health, inadequate housing, and poor sanitation.
- **Social marginalization**: Poor individuals are often excluded from influential forums or social networks.
- **Competition for resources**: There is intense competition for limited resources, even among the poor.
- **Vulnerability and subordination**: Poverty increases individuals' vulnerability to economic and social subordination.
- **Low self-esteem and social status**: People in poverty often experience low self-worth and resignation to their circumstances.
- **Subsistence living**: People living in poverty often struggle to meet their daily needs and have little to no long-term plans for improving their situation.

11.4.3 Causes of Poverty

Poverty and deprivation in India arise due to several interconnected factors:

i) Colonial Exploitation: The legacy of colonial rule in India is often cited as a primary cause of poverty and underdevelopment. The decline of the Mughal Empire around 1800 marked the beginning of a severe economic transformation under British rule. British colonial policies intentionally de-industrialized India, replacing a more decentralized system with a centralized bureaucratic-military regime. By 1900, India's share of global industrial production had drastically decreased, and British policies led to widespread famines, contributing to the deaths of millions. Additionally, India’s agricultural land was repurposed for the cultivation of crops like cotton, opium, and tea, intended for export, rather than food for local consumption.

ii) Lack of Investment in the Poor: A key issue in India is the insufficient investment in the development of marginalized sections of society. Over the past several decades, India's focus has largely been on creating high-quality educational institutions for the elite, while neglecting basic education for the majority of the population. This lack of attention to literacy—affecting approximately 33% of the Indian population—has hindered their ability to escape poverty. Furthermore, there has been little effort to create sustainable income-generating assets for the poor. This contrasts with countries like China, which reintroduced universal healthcare, allowing its rural population to avoid the healthcare-related debts that India still faces due to its heavy reliance on private healthcare.

iii) Social System: The social structure in India is another major factor contributing to poverty. The caste system, which has deep historical roots, perpetuates inequalities, especially among lower-caste communities like Dalits. These groups face severe discrimination, particularly in rural areas, where land and economic resources are often controlled by higher-caste landowners. This exploitation reinforces the poverty of marginalized groups. While social reforms have improved the position of Dalits to some extent, caste-based discrimination and exclusion persist.

iv) Economic Policies: After gaining independence in 1947, India faced significant economic challenges. The country’s average annual income was low, and compared to nations like South Korea, India's economy stagnated for decades. Known as the "Hindu rate of growth," India's economy grew at an average rate of 3.5% from the 1950s to the 1980s. During this period, the country faced extensive regulation, high

corruption, and bureaucratic inefficiencies under the "License Raj." It wasn't until economic reforms in the 1980s that India's growth began to accelerate, leading to significant poverty reduction, especially in the last decade. However, challenges remain, including inequality and slow growth in certain sectors.

v) Over-reliance on Agriculture: India’s dependence on agriculture, particularly outdated farming methods, contributes to poverty. While the service and industrial sectors have grown significantly, agriculture’s growth rate has dropped drastically, leading to inefficiency in this critical sector. Despite around 60% of the population relying on agriculture, it only contributes around 18% of the GDP. This underperformance in agriculture, combined with a lack of modernization, is a major cause of rural poverty.

vi) Heavy Population Pressures: While high population growth is often seen as a symptom of poverty rather than its cause, many argue that rapid population growth exacerbates the issue. It is often said that larger families are a result of poverty, not its cause. Nonetheless, this continued population growth places significant strain on resources and limits economic development, contributing to persistent poverty, especially in developing countries.

vii) High Illiteracy: India’s literacy rate, which initially saw improvement during British rule, now lags behind other countries like China. While China has a literacy rate of 91%, India’s stands at 66%, with lower rates among disadvantaged groups such as Scheduled Castes (SC), Scheduled Tribes (ST), and females. Illiteracy remains a major barrier to economic mobility, keeping a significant portion of the population trapped in poverty.

viii) High Unemployment: Unemployment is a significant issue in India, with a high degree of underutilization of available resources. The country is experiencing jobless growth, especially in sectors like agriculture, which sees widespread seasonal and disguised unemployment. The IT sector, while growing rapidly, often benefits a small, elite portion of the population and does little to address widespread poverty. Rural areas suffer the most from a lack of stable, well-paying jobs.

ix) Lack of Entrepreneurship: India's industrial sector suffers from a lack of entrepreneurial spirit and capital, resulting in widespread industrial stagnation. While some areas of industry have seen growth, many sectors remain underdeveloped due to insufficient investment, lack of innovation, and capital deficiencies. This limits job creation and economic diversification, contributing to ongoing poverty.

Self-Check Exercise -2

Q1. According to …….., the poverty line is drawn at an intake of 2400 calories in rural areas, and 2100 calories in urban areas.

Q2. In 1947, the average annual income in India was …….

11.5 Population Growth and Unemployment

Rapid population growth significantly contributes to the rise in unemployment. Unemployment, in turn, leads to increased poverty and hampers a country's economic progress. The migration of people from rural areas to urban centers in search of employment exacerbates this issue. With the demand for jobs growing faster than the number of available positions, the gap leads to higher unemployment rates. This lack of employment opportunities is also linked to social issues, particularly among the youth, who may turn to substances like drugs and alcohol or even engage in criminal activities as a way of coping with their situation. Unemployment negatively impacts families, causing financial hardship, strained relationships, poorer health, and even developmental setbacks for children, who may face challenges in their own future employment.

The rapid growth of the population also reduces income, savings, and investment, which limits capital formation and consequently reduces the number of available job opportunities. As the population continues to grow, the unemployment rate climbs steadily, creating a backlog of joblessness that remains unresolved. The rising population is a supply-side factor, while the country's economic conditions serve as demand factors. The imbalance between the supply of labor and its demand leads to unemployment and underemployment.

In general, there is a direct relationship between rapid population growth and rising unemployment. As the population increases, so does the number of unemployed individuals. Rapid population growth hampers development, especially as it intensifies the difficult decision between current consumption and the investments required to achieve higher future consumption. While economic and social improvements can help slow population growth, rapid growth itself continues to hinder overall development.

11.5.1 Unemployment

Unemployment refers to the situation in which individuals actively seeking employment are unable to find work. It is often used as a key indicator of the health of an economy. The most common way to measure unemployment is through the unemployment rate, which is calculated by dividing the number of unemployed people by the total number of people in the labor force.

11.5.2 Types of Unemployment in India

1. **Disguised Unemployment:**
    - This type occurs when more people are employed than are actually needed for the work being done.
    - It is most prominent in sectors such as agriculture and informal industries.
2. **Seasonal Unemployment:**
    - This type of unemployment occurs at certain times of the year, particularly in agricultural work.
    - Agricultural workers often face periods of unemployment during off-seasons.
3. **Structural Unemployment:**
    - Structural unemployment happens when there is a mismatch between the available jobs in the market and the skills of the workforce.

- Many people in India struggle to find jobs due to a lack of necessary skills, compounded by poor education systems that hinder retraining opportunities.

4. **Cyclical Unemployment:**
    - This type of unemployment is linked to the business cycle. It increases during economic downturns and decreases during periods of economic growth.
    - In India, cyclical unemployment is relatively low compared to more developed, capitalist economies.
5. **Technological Unemployment:**
    - Technological unemployment results from the introduction of new technologies that make certain jobs obsolete, leading to job losses.
6. **Frictional Unemployment:**
    - This type, also known as search unemployment, occurs when individuals are between jobs or are seeking better opportunities.
    - It is a normal part of the labor market and is often considered voluntary since it is caused by people leaving their jobs to pursue better prospects.
7. **Vulnerable Employment:**
    - Vulnerable employment refers to individuals working informally, often without contracts or legal protections.
    - These workers are often unrecorded in official employment statistics, even though they are technically employed. This type of employment is prevalent in India and contributes significantly to the unemployment rate.

11.5.3 Causes/Reasons of Unemployment

1. **Large Population:**

   The rapid increase in population puts pressure on available job opportunities, making it difficult for many individuals to find stable employment.

2. **Low Education and Vocational Skills:**
   A significant portion of the working population in India lacks the necessary education and vocational training, which limits their ability to secure skilled employment.
3. **Inadequate State Support:**
   There is insufficient support from the state for small businesses and cottage industries. Legal complexities and lack of infrastructure, financial support, and market linkages further make such enterprises unviable, leading to low employment in these sectors.
4. **Informal Sector Workforce:**
   Many workers in India are part of the informal sector, such as domestic helpers and construction workers, whose employment is not captured in official labor statistics. These workers often lack proper education and skills, further contributing to the unemployment problem.
5. **Mismatch in Education and Industry Requirements:**
   The education system in India often fails to align with the current demands of industries. This mismatch results in **structural unemployment**, where individuals have skills that do not match the available jobs.
6. **Slow Infrastructure Development and Investment in Manufacturing:**
   Insufficient investment in the manufacturing sector and slow infrastructure development limit the growth of employment in the secondary sector, where job opportunities could be created.
7. **Low Agricultural Productivity and Limited Alternatives:**
   In agriculture, low productivity combined with a lack of alternative employment opportunities for agricultural workers makes it difficult for individuals to transition to secondary or tertiary sectors, further contributing to unemployment.
8. **Regressive Social Norms:**
   In some regions, cultural and social norms restrict women from participating in the workforce, reducing the number of potential workers available and exacerbating unemployment.

11.5.4 Impact/Consequences of Unemployment

1. **Increase in Poverty:**
   Unemployment directly contributes to poverty, as individuals without work have little or no income to support their families.
2. **Rise in Crime:**
   Prolonged unemployment, especially among the youth, can lead to frustration, making some individuals resort to illegal activities as a means of earning money. This, in turn, increases crime rates in the country.
3. **Vulnerability to Antisocial Influences:**
   Unemployed individuals are more susceptible to being influenced by antisocial elements, which undermines their belief in democratic values and societal norms.
4. **Substance Abuse and Mental Health Issues:**
   Unemployment can lead to psychological distress, causing individuals to resort to substance abuse, including drugs and alcohol. In extreme cases, it may even lead to suicidal tendencies, further draining human resources.
5. **Economic Impact:**
   The country's economy suffers when a significant portion of the workforce is unemployed. The inability to utilize human resources productively means that the working population must support the unemployed, increasing the economic burden. For instance, a 1% increase in unemployment can reduce the GDP by 2%.

Self-Check Exercise-3

Q1. What is unemployment?

Q2. What is vulnerable employment?

Q3. The problem of unemployment gives rise to the problem of……

11.6 Summary

A rapidly growing population in India puts significant pressure on resources, leading to a reduction in income, savings, and investment. This hampers capital formation

and reduces job opportunities, thus exacerbating unemployment. As the population continues to rise, this backlog of unemployment persists. Additionally, rapid population growth tends to reduce per capita income and well-being, which ultimately increases poverty. In densely populated nations, particularly those facing pressure on land resources, rapid population growth contributes to landlessness, further exacerbating poverty levels.

11.7 Glossary

- **Environmental Degradation**: The process of damaging or ruining the environment, leading to a decline in environmental quality. This can result from pollution, improper land use, and natural disasters, among other factors.
- **Poverty Line**: The minimum income level required to meet basic necessities such as food, clothing, and shelter. Individuals or families whose income falls below this threshold are considered poor. The poverty line represents the dividing line between the rich and the poor.
- **Marginalization**: The act of placing individuals or groups in positions of lesser importance, influence, or power. This often leads to social exclusion, with marginalized groups having limited access to resources, opportunities, or decision-making processes. Marginalization is commonly experienced by individuals based on factors like race, gender, age, or immigration status.
- **Indebtedness**: The condition of owing money or being in debt. This term refers to situations where individuals or groups have borrowed money and must repay it, often with interest.
- **Entrepreneurship**: The process of starting and managing a new business venture, typically by taking financial risks to bring an innovative idea to life. Entrepreneurs create firms that aggregate capital and labor to produce goods or services for profit.

11.8Answers toSelf-Check Exercise

Self-Check Exercise-1

Q.1Problems of Food Scarcity and Security and Increasing Poverty

Q.2 Poverty and Unemployment

Self-Check Exercise-2

Q1. Planning Commission of India

Q2. US$439,

Self-Check Exercise-3

Q1. Unemployment occurs when a person who is actively searching for employment is unable to find work

Q2. People working informally, without proper job contracts and thus sans any legal protection. These persons are deemed ‘unemployed’ since records of their work are never maintained.

Q3. Poverty.

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11.10 Terminal Questions

1) Explain the negative effects of population growth.
2) Discuss the impact of population growth on economic aspect.
3) Describe the ill effect of population growth on poverty and unemployment.

Unit-12

Population Growth: Impact on Housing and Slums

Structure

12.1 Introduction

12.2Learning Objectives

12.3 Global Population Growth

12.**3**.**1** Distribution of World's Population

12.3.2 Population in Asian Countries

Self-check Exercise-1

12.4 Population Growth and Housing

Self-check Exercise-2

12.5 Population Growth and Slums

12.5.1 Who are Slum Dwellers?

12.5.2 Characteristics of Slum

12.5.3Problems Faced by the Slum Dwellers in India

12.5.4 Recommendations for Improving Conditions of Slum Dwellers in India

Self-check Exercise-3

12.6 Summary

12.7 Glossary

12.8Answer to Self-Check Exercise

12.9Reference/Suggested Readings

12.10 Terminal Questions

12.1 Introduction

India has significantly adopted planned development strategies to enhance the social and economic well-being of its people following independence. While progress has been made, challenges such as poverty, illiteracy, unemployment, malnutrition, and other societal issues remain unresolved, continuing to be major concerns for policymakers, planners, leaders, administrators, and development practitioners. The outcomes of development efforts have not lived up to the high expectations set for them. The author highlights that although slum residents represent 27% of the population, they occupy only 5% of urban land. Slums that remain undeveloped often suffer from overcrowding, deteriorating infrastructure, unsanitary conditions, lack of basic amenities, chaotic layouts, and limited accessibility. Many of these areas have existed in such poor conditions for over two decades, progressively becoming more congested and in need of urgent intervention.

In India, urban population growth has been remarkable. By 1988, the country's total urban population had nearly doubled. In 1991, the urban population reached 84.94 million, and by March 2001, it had surged to 285 million. The urban population's decadal growth rate was 31.2%, and the proportion of the urban population to the total population stood at 27.8%. This was an increase from 25.7% in the 1991 census. The 2001 census had projected that the urban population would exceed 100 million, making up 35% of the total population. According to a United Nations report, India's urban population was expected to grow from 33 crores in 2001 to 65.8 crores by 2025, compared to an approximate total national population of 122 crores. India's urban population is unevenly distributed across its states. The 2011 census recorded India's urban population at 286.11 million, or 27.8% of the total population. Cities with populations over one million, or "million-plus cities," accounted for over one-third (37.85%) of the urban population. The number of such cities grew from 23 in 1991 to 35 in 2001, with expectations to rise to 50 by 2011. An additional 78 million people were projected to join the urban population by 2011, with a large portion of that increase concentrated in the million-plus cities. This trend points to significant urban population growth, with India expected to reach 600 million urban residents by 2031. By then, the number of metropolitan cities is expected to rise to 87, and the

population in these cities will grow from 160 million in 2011 to 255 million by 2031. The total urban population is anticipated to increase from 217 million in 2011 to 343 million by 2031. With the number of cities and towns in India growing from 5,161 in 2001 to 7,935 in 2011, this rapid urban expansion is expected to place immense strain on existing infrastructure, particularly in large cities and mega-cities.

The Population Reference Bureau (PRB) released the 2019 World Population Data Sheet, which offers demographic trends for over 200 countries and territories. The report estimates a 28% increase in the global population from 2019 to 2050. In 2019, the global population reached 7.7 billion, and by 2050, India is expected to overtake China as the world's most populous country, with an estimated population of 1.67 billion.

12.2 Learning Objectives

After completing this lesson, you will be able to:

- Discuss global population growth and the distribution of the world’s population.
- Understand the impact of population growth on housing.
- Analyze the effects of population growth on slums.

12.3 Global Population Growth

- In 1830, the world’s population reached 1 billion.
- By 1930, just 100 years later, the population had increased to 2 billion.
- By 1960, the global population reached 3 billion.
- In 1975, it rose to 4 billion, 15 years later.
- By 1987, the population had grown to 5 billion, after another 12 years.
- In 1999, the global population reached 6 billion, 12 years later.
- By 2029, the world’s population is projected to reach 10.4 billion.

12.3.1 Distribution of the World's Population

1. **East Asia**: Approximately one-quarter of the global population resides in East Asia, which includes eastern parts of China, Japan, the Korean Peninsula, and the island of Taiwan. The majority of people in this region—five-sixths—live in China.
2. **South Asia**: This region holds the second-largest concentration of people. It encompasses India, Pakistan, Bangladesh, and Sri Lanka, and is home to over 20% of the global population. India, the second-most populous country in the world, contains more than three-fourths of the population in South Asia.
3. **Southeast Asia**: A third major population cluster in Asia, Southeast Asia consists of a series of islands between the Pacific and Indian Oceans. The largest concentration of people is found on the island of Java (Indonesia), home to more than 100 million people. Indonesia, which consists of over 13,677 islands, is the world's fourth-most populous country. The Philippines is also part of this region.
4. **Europe**: Europe is the world's third-largest population cluster, including about two dozen countries stretching from the United Kingdom to western Russia. Around 15% of the world's population resides in this region.
5. **North America**: The primary population center in North America is in the northeastern United States and southeastern Canada. Approximately 150 million people live in this area, and like Europe, a significant portion of the population is urban, with fewer than 5% engaged in farming.

Sparsely Populated Areas: Certain harsh environments such as deserts, cold tundras, and tropical rainforests are sparsely populated. The world's largest desert region stretches from North Africa through Southwest and Central Asia, encompassing the Sahara, Arabian, Thar, Makan, and Gobi deserts. The largest desert in the Southern Hemisphere is located in Australia.

12.3.2 Population in Asian Countries

China is the most populous country in Asia, followed by India. The other five countries in Asia with populations exceeding 100 million are Indonesia, Pakistan, Bangladesh, Japan, and the Philippines. Together, these top five countries account for a significant 75% of Asia's population. As of 2021, 28 countries in Asia have populations greater than 10 million, with Brunei Darussalam being the least populous. Four countries or dependent territories in Asia have populations below one million.

Five Asian countries are ranked among the top ten most populous nations globally: China, India, Indonesia, Pakistan, and Bangladesh. Twenty countries in Asia are among the top 50 most populous countries worldwide.

Of the 51 countries/territories in Asia, 48 are projected to see population increases in 2021, while three—Japan, Lebanon, and Georgia—are expected to experience population declines. India is projected to be the largest contributor to the overall population growth in Asia, accounting for 34.7% of the region's population increase. India's population is expected to rise by 13.40 million, followed by China (4.9 million) and Pakistan (4.3 million). Seven countries are expected to add at least ten million people in 2021.

By 2027, India will surpass China as the world's most populous country, a status it is expected to maintain until 2100.

Self-check Exercise-1

Q.1World Population Data Sheet was released on……. Year

Q.2 How many Asian countries are in the list of the top ten populous countries?

Q3. ……..is the most populous country in world.

Q4. ……..has the second largest concentration of people.

12.4 Population Growth and Housing

The relationship between population growth and housing is multifaceted. On one side, population changes directly influence housing demand. A growing population, especially an increase in the number of households, leads to a higher demand for housing. Conversely, a decline in population may result in reduced demand for housing, though this typically happens over the long term, once both the population and household numbers decrease. The effects of population decline are often most noticeable in rural areas and places with substandard housing conditions.

Housing is a fundamental human need, along with food and clothing. Without a home, an individual cannot lead a stable life; living without shelter would be akin to a nomadic existence. The demand for housing is directly related to the population size: the greater the population, the greater the need for housing.

In India, the housing crisis is severe. There is a significant shortage of housing, and even the existing homes are often subpar. As the population continues to grow, the housing problem becomes increasingly complex. According to the National Buildings Organization, the housing deficit in India is estimated at 21.3 million units, with 16.5 million units in rural areas and 4.8 million in urban regions.

While some of India's major cities have a high number of quality homes, millions of people either lack permanent shelter or live in poor, unsanitary conditions in slums. During the Sixth Plan period, Rs. 837.37 crores were allocated to social housing schemes, and Rs. 353.50 crores were set aside for the Rural House-sites-cum-Construction Assistance Scheme to support the rural landless. Additionally, the Twenty-Point Programme included provisions for clearing slums and providing homes for those affected. However, these efforts still fall far short of meeting the housing needs of the country.

The increasing population is a key factor that has hindered the resolution of the housing crisis. As population growth fuels demand for housing, the lack of new supply causes both rental and property prices to rise. Furthermore, urban migration and smaller household sizes create a need for even more housing.

Population growth also exacerbates various social issues, such as the migration of people from rural areas to urban centers, which leads to the proliferation of slums.

Overcrowding, traffic congestion, frequent accidents, and pollution in major cities are direct consequences of overpopulation.

India’s housing shortage is particularly acute. The gap between housing demand and supply is responsible for the growth of slums, where millions live in unhealthy and unhygienic conditions. The housing needs in urban areas are reflected in overcrowding, inadequate social amenities, poor environmental conditions, and the absence of open spaces. This urban squalor is often compounded by the overdevelopment of land, leading to overcrowded buildings and poor accessibility.

The rapid urbanization of India is directly linked to economic growth, but this has also intensified the housing crisis and widened inequalities. Currently, the country faces a shortage of approximately 73.6 million homes, with 26.3 million units needed in urban areas alone. This issue has been aggravated by the continuous migration of rural populations to cities, placing an immense strain on urban housing and basic services.

In many developing nations, including India, the rapid growth of population outpaces the development of new housing and infrastructure. This disparity results in overuse and deterioration of existing housing stock. Some consequences of this intensified residential land use include increased room occupancy, physical adjustments in housing space, and the conversion of housing types. These changes have environmental impacts, particularly concerning waste disposal. Given that existing housing makes up the majority of housing stock in any given year, it is vital for housing policies and programs to focus on optimizing the use of available housing space.

Urban areas today face numerous challenges, including population growth, shifting family structures, the expansion of slums and informal settlements, inadequate urban services, climate change, and rising migration. These factors have led to a housing backlog, infrastructure deficits, and the rapid expansion of informal settlements.

Housing plays a crucial role in economic development, with significant forward and backward linkages. Increasing both the supply and quality of housing stimulates

various sectors, including raw materials, construction materials, and services such as architecture, engineering, skilled labor, banking, and finance.

India’s housing issues are largely attributed to its growing population. Urban India is short of 18.8 million homes, and close to 249 million Indians are homeless, which accounts for nearly 20% of the population. The country's rapidly increasing population has placed considerable pressure on housing, as urbanization rates have tripled in the last century.

While the amount of land available for housing is limited, it is not the primary reason for the housing crisis. India’s land area could accommodate a much larger population if existing land were utilized more effectively. In fact, China, despite its large population, does not face the same housing issues as India’s urban centers. Even though housing prices in cities like Shanghai and Shenzhen are rising, China has managed to avoid many of the challenges that Indian cities experience. Moreover, cities in China have seen significant increases in floor space consumption, whereas in India, the issue of underutilized land is more pronounced.

Self-check Exercise-2

Q.1 Sixth Plan period Rs……..crores were allocated for Social Housing.

Q.2 Housing is one of the …….of every human being.

12.5.4 Recommendations for Improving the Conditions of Slum Dwellers in India

To address the challenges faced by slum dwellers in India, several recommendations can help improve their living conditions:

- **Empowering Local Authorities:**
  Developing countries like India need to recognize that slum dwellers should not just be passive recipients of development but active participants. Local authorities should be given both financial and human resources to provide essential services and infrastructure. Cities should create long-term, localized strategies for improving the lives of slum dwellers.

- **Preventing the Formation of New Slums:**
  State governments need to implement proactive strategies to prevent new slums from forming. This includes providing affordable land, reasonably priced construction materials, employment opportunities, and basic infrastructure and social services.
- **Public Investment in Infrastructure:**
  Public investments should prioritize the provision of essential services and infrastructure, such as housing, clean water, sanitation, energy, and waste management. These services must be extended to the poorest communities, especially those living in informal settlements.
- **Transportation Planning:**
  The transportation needs and safety of the poorest residents should be prioritized when planning urban transportation systems. This can help expand their options for where to live and work, improving their access to opportunities.
- **Realistic and Flexible Building Codes:**
  Building regulations should be practical and enforceable, considering the local community's lifestyle and needs. These codes may need to be flexible to accommodate incremental housing development using low-cost materials and small land plots.

How Hindrise is Helping

In a developing society, access to basic amenities is a crucial indicator of socio-economic progress. Improvements in basic services lead to better health outcomes, reduced child mortality, better water quality, and economic growth. Hindrise is committed to improving the living standards of slum dwellers in the Delhi NCR region by providing support in various areas:

A. Improving Housing Conditions

Housing in slums is often inadequate, with issues such as insecure tenure, overcrowding, and a lack of essential services. These conditions create an

environment of poverty, social exclusion, and increased vulnerability to health and safety risks. Hindrise works to address these issues by assisting slum dwellers, particularly rural migrants who often settle in informal and illegal land settlements. The foundation's efforts aim to reduce tenure insecurity and break the cycle of poverty by improving the basic housing conditions for slum residents.

B. Water Supply, Sanitation, and Drainage Facilities

Inadequate water supply and poor sanitation in slums negatively impact the health and living conditions of residents. Due to rapid urban migration, slums often lack safe water and proper sanitation facilities, leading to a host of health problems. Hindrise supports government initiatives to improve sanitation in these areas by constructing public toilets and raising awareness about hygiene and sanitation. The foundation is also focused on the development of drainage systems to improve living conditions and reduce the spread of infectious diseases.

C. Availability of Schools and Health Centers

Access to education and healthcare is limited in many slums. Although over 90% of slums have a primary school within one kilometer, fewer than 50% have access to government hospitals within the same distance. Hindrise has taken the initiative to address this gap by helping establish primary health centers within slums. The foundation's volunteers also conduct campaigns to spread awareness about available health services and encourage the community to utilize these resources.

Self-check Exercise-3

Q.1 Lack of Basic Necessities are the one……of slum.

problem

Q.2 Unhealthy Living Conditions and Hazardous Locations are related to ……..

Slum

12.6 Summary

As a developing country, India has made significant strides in planned development since gaining independence, aiming to enhance the social and economic well-being of its people. Over the course of the Seven Five-Year Plans, some progress has been made in various sectors. However, issues like poverty, illiteracy, unemployment, malnutrition, and other socio-economic challenges continue to persist, highlighting the gap between expectations and achievements. These problems remain central concerns for policymakers, social planners, leaders, administrators, and development practitioners. Achieving the long-term goals outlined in planning frameworks requires consistent, persistent efforts and a more comprehensive understanding of the issues faced by the population.

To address these challenges effectively, a thorough analysis of the problems within the societal context is crucial. There are gaps in our understanding of vital socio-economic aspects, which hinders the creation of realistic, need-based development plans. Urban development planning, in particular, remains incomplete if the issues of slum dwellers are overlooked.

Slum dwellers make up about 27% of India’s urban population, yet they occupy only 5% of the urban land area. These slums are often marked by overcrowding, dilapidated structures, unsanitary conditions, inadequate basic amenities, unplanned layouts, and poor accessibility. Many of these settlements have been in such conditions for decades, becoming progressively overcrowded as time goes on. People are drawn to these areas by both "push" factors (e.g., rural poverty) and "pull" factors (e.g., better job opportunities in cities), seeking improved living conditions.

12.7 Glossary

- **Malnutrition:** A condition caused by an insufficient or imbalanced intake of nutrients, or the inability of the body to properly absorb or utilize them.

- **Sanitation:** Refers to public health practices concerning clean drinking water and the treatment and disposal of sewage and human waste. It may also involve the reuse of resources such as nutrients, water, energy, or organic matter from excreta and wastewater.
- **Social Exclusion:** The concept of social exclusion views poverty not just as a lack of income but as the poor being forced to live in poor conditions, socially isolated from wealthier communities. This phenomenon excludes them from enjoying the same rights and opportunities as others. A typical example is the caste system in India, where certain groups are socially marginalized.

12.8Answer to Self-Check Exercise

Self-check Exercise-1

Q.1 2019

Q.2 five

Q3.China

Q4. South Asia

Self-check Exercise-2

Q.1 837.37

Q.2 basic needs

Self-check Exercise-3

Q.1 problem

Q.2 Slum

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12.10 Terminal Questions

1) Explain the population growth and its impact on slums.
2) Discuss how over population affects housing problems in India.

Unit-13

Population Growth: Impact on Environment

Structure

13.1Introduction

13.2Learning Objectives

13.3 Relationship between Environment and Population Growth

Self-check Exercise-1

13.4 Population Growth and Pollution

Self-check Exercise-2

13.5 Population Growth and Depletion of Natural Resources

Self-check Exercise-3

13.6 Summary

13.7 Glossary

13.8Answer to Self-Check Exercise

13.9Reference/Suggested Readings

13.10 Terminal Questions

13.1 Introduction

The rapid increase in the human population is putting immense pressure on the environment. While developed countries continue to pollute and deplete natural resources, developing countries are under greater pressure to grow economically, which leads to environmental damage as well. The rising demands of this population growth threaten the future sustainability of life on Earth. One of the most significant environmental consequences of population growth is global warming, which some scientists predict will lead to rising sea levels and extreme weather patterns.

In an effort to support a growing population, forests are being destroyed at alarming rates. Additionally, the demand for natural resources is escalating, with non-renewable resources, such as fossil fuels, being depleted due to excessive use. Many parts of the world are also experiencing shortages of food and clean water. The increasing population is intensifying the strain on these already limited resources, further harming the environment. Issues such as resource depletion, loss of biodiversity, waste production, and destruction of habitats are serious challenges that need urgent attention to ensure a sustainable future.

Overpopulation refers to a situation where the number of people exceeds the Earth's capacity to support them. Its causes are varied, ranging from a decrease in the death rate to early marriages. The negative consequences of overpopulation are far-reaching. One of the key impacts is the depletion of natural resources, such as food and water, as the planet can only produce a limited amount. Environmental damage, including deforestation and pollution, is also a direct result of overpopulation. Furthermore, the excessive use of resources like coal, oil, and natural gas contributes to environmental degradation. This leads to a deterioration in air quality and further environmental harm. In developing countries, overpopulation places immense strain on resources, causing conflict, rising disease rates, and other social challenges. It also increases unemployment, which can lead to higher crime rates. Overcrowded and unhygienic living conditions can lead to the spread of infectious diseases. The shortage of water becomes a major issue, and life expectancy in less-developed regions often declines. Additionally, rapid industrialization exacerbates climate change, as industrial emissions continue to rise, increasing global temperatures. If these issues are not addressed, the situation will worsen in the future.

13.2 Reference/Objectives

By the end of this lesson, you should be able to:

- Understand the relationship between population growth and the environment.
- Recognize the environmental impacts of population growth.
- Learn how population growth contributes to pollution.
- Understand how population growth disrupts natural resources.

13.3 Relationship Between Population Growth and the Environment

Humans are an integral part of Earth's ecosystem, and there is a close connection between people and their environment. Since the emergence of life, humans have relied on the environment for food, shelter, and other necessities. There exists an inverse relationship between population growth and environmental well-being, as overpopulation leads to adverse effects on the environment. As the population grows, so does the demand for food and energy sources. Maintaining a balanced population level is crucial to ensuring that natural resources are adequate to support all living beings.

Effects of Population Growth on the Environment

Population growth is influenced by birth rates, death rates, and migration patterns. For instance, while the population in developed countries like Europe and America is growing at a rate of just 0.1% per year, many developing countries experience growth rates exceeding 1.5% annually (Wright and Boorse, 2011; UNDP). In developing nations, where manual labor remains a primary source of income, children often contribute to the family’s labor force, encouraging larger families. Additionally, in regions with weak pension systems, people tend to have more children as a form of support in their old age. In areas where women are more educated and participate in income-generating activities, the birth rate is generally lower. Cultural traditions and customs can also influence higher population growth rates due to less frequent use of contraception.

While it is challenging to precisely determine Earth’s carrying capacity for humans (Cohen, 1995), estimates suggest it is around 7.7 billion people (Van Den Bergh and Rietveld, 2004). With the world population projected to reach 9.1 billion by 2050, concerns are growing about whether the planet can sustain such a large population in the long term. A larger population means greater demand for food, water, and other vital resources, such as fossil fuels. These effects are already visible, particularly in the destruction of tropical forests to create space for agriculture and urbanization. As industrialization and urbanization have increased, pollution in the air, water, and the environment has also grown. Rising populations will exacerbate the depletion of natural resources like water and fossil fuels, as well as contribute to

deforestation, the loss of ecosystems, and the emergence of new diseases. In addition, overpopulation is linked to increasing levels of hunger, poor living conditions, and unsanitary environments, especially in developing countries.

Environmental Degradation and Population Growth

The environment encompasses everything around us, including living organisms (biosphere) and non-living elements such as air (atmosphere), water (hydrosphere), solid earth (lithosphere), and rocks (geosphere). Numerous factors, including human activities like urbanization, industrialization, deforestation, and the overuse of fossil fuels, influence the environment. Natural events such as earthquakes, cyclones, and floods can also contribute to environmental damage.

One of the significant factors contributing to environmental degradation is population growth or density. Population density, in particular, plays a crucial role in shaping socio-economic conditions, and its effects extend to the natural environment. Some major ways in which population growth affects the environment are:

1. **Waste Generation:** Increased human activity results in more waste being produced, which the environment cannot absorb at the same rate. The accumulation of waste leads to air and water pollution, further degrading the environment.
2. **Threats to Biodiversity:** Human activities, such as excessive resource extraction and hunting, have caused a significant loss of biodiversity, leading to ecological imbalance.
3. **Strain on Forests:** The establishment of new settlements, highways, and industrial projects has led to deforestation, disrupting ecosystems and contributing to environmental instability.
4. **Urbanization:** Rapid population growth leads to urbanization, which depletes natural resources in cities at an accelerated rate. While urbanization can reduce pressure on rural environments, it also brings new environmental challenges such as industrial emissions and waste generation.
5. **Industrialization:** Many developing countries are pursuing industrialization, which is contributing to environmental degradation. Industries like chemical

plants, refineries, and steel mills produce significant pollution, including land, air, and water contamination.

6. **Land Degradation:** Intensive farming practices, overuse of fertilizers and pesticides, and the over-exploitation of land and water resources have led to land degradation, including soil erosion, waterlogging, and salinization.
7. **Transport Development:** Transportation growth also contributes to environmental degradation. The expansion of road networks and the increase in vehicle use release pollutants like carbon monoxide and nitrogen oxides into the air. Oil spills from ships harm marine life and coastal ecosystems.
8. **Climate Change:** Human activities are driving climate change by releasing greenhouse gases, contributing to rising global temperatures and erratic weather patterns. This is causing environmental disruptions, such as damage to infrastructure and shifts in agricultural productivity.
9. **Reduced Productivity:** Environmental degradation not only harms human health but also lowers economic productivity. Water pollution, inadequate sanitation, and soil degradation all contribute to diseases, which, in turn, reduce the workforce's productivity.
10. **Technology:** Outdated technology and inefficient industrial processes often lead to higher emissions and pollutants. As industries continue to rely on older methods, the environmental pressure continues to grow.

Self-check Exercise-1

Q.1 The rapid increase of human population is putting an incredible strain on our……..

Q.2 Climatic changes are irregular due to……..

13.4 Population Growth and Pollution

Pollution is closely tied to the issue of overpopulation. As the human population continues to grow, the amount of waste generated increases, and the available space to dispose of it decreases. Landfills are filling up more quickly than ever before, while incinerators are contributing to greater air pollution. With both

population and pollution increasing at similar rates, it is possible that the adverse effects of pollution could become so widespread that they might cause a rapid increase in mortality rates, ultimately leading to a restoration of balance in the environment. It is imperative for society to implement drastic measures to reduce pollution, particularly from the automotive industry, which is a major contributor to air pollution in urban areas. According to the World Health Organization (WHO), 13 out of the 20 most polluted cities in the world are located in India.

Some have even proposed the radical idea of sending garbage into space. While this may seem impractical due to the high costs, some argue that space, being infinite, offers a potential dumping ground for Earth's waste, which could then be burned up by solar energy, leaving Earth cleaner. However, Earth’s orbit is already filled with defunct satellites, spacecraft, and rockets—another form of space debris.

As population density in cities increases, it exacerbates various types of pollution—air, water, and noise pollution—while also leading to a shortage of housing and a loss of green spaces. Industrial development spurred by population pressures often results in higher levels of environmental pollution and increased unemployment.

Air Pollution in India

India ranks second after China in terms of the volume of pollutants released into the atmosphere. The majority of the world's most polluted cities are in India, and WHO has labeled many of them as "death traps." Air pollution is the fifth leading cause of death in the country, according to the Global Burden of Disease report. Vulnerable groups such as the elderly, children, the homeless, and the poor are especially affected. Indoor air pollution, which results from burning wood, coal, and other fuels, produces harmful gases like CO2 and carbon monoxide, as well as hydrocarbons. This leads to respiratory issues, chronic lung diseases, cancer, prenatal deaths, and low birth weights. Industrial emissions from petroleum refineries, chemical plants, paper mills, and dye industries contribute to severe environmental damage and deterioration of human health. Vehicular pollution, especially from congested urban areas, triggers respiratory problems. Traffic speeds in cities like Delhi have decreased to 8–16 km/h, exacerbating the situation. Furthermore, the country uses

high-sulphur diesel in most of its vehicles, contributing to the release of toxic sulfur and nitrogen oxides into the air.

WHO data confirms that India has some of the highest particulate matter (PM) levels in the world. Thirteen of the twenty most polluted cities globally are located in India, with Delhi being among the most polluted. The problem of acid rain, which affected developed countries in the 1950s and 1960s, is expected to reach India soon. Acid rain damages biodiversity and reduces soil fertility. Diesel combustion, which releases sulfur dioxide, is a major contributor to the phenomenon. India supplies low-sulfur diesel only to a few cities, while the rest of the country continues to use higher-sulfur diesel, making the problem worse. However, the tropical climate and high dust levels have slowed the progression of acid rain in India, as the dust particles neutralize the sulfur dioxide in the air.

Land Pollution in India

India is home to about 16% of the world’s population, yet it occupies only 2.5% of the Earth's land area. This imbalance, combined with widespread poverty and overpopulation, places immense pressure on already limited natural resources, leading to land degradation. Overuse of fertilizers and pesticides has significantly reduced soil quality. Additionally, disruptions in monsoon patterns and crop failures have burdened groundwater supplies, causing a dangerous decline in water tables. Safe drinking water remains out of reach for millions in rural India, and poor sanitation continues to cause health problems. Unsafe water and inadequate sanitation are among the leading causes of death in children under five.

Water Pollution in India

Water pollution in India takes three primary forms: marine pollution, freshwater pollution, and groundwater pollution. River water pollution is a particularly significant issue, as industrial effluents and sewage flow into rivers, overwhelming water treatment plants. These facilities are unable to handle the volume of pollutants, and as a result, the untreated waste enters the waterways.

Despite efforts by both national governments and international organizations, access to clean drinking water and proper sanitation remains a challenge. Open defecation is still common in rural areas, with 70% of rural households lacking toilets. Even where toilets are available, many people still choose to defecate in open fields, leading to the spread of waterborne diseases like diarrhea and dysentery. Furthermore, rivers and oceans often become dumping grounds for garbage, contributing to marine pollution. This has disrupted aquatic ecosystems, threatening marine biodiversity and the livelihoods of people dependent on these resources.

Other Types of Pollution

In addition to air, land, and water pollution, emerging forms of pollution, driven by technological advances, urbanization, and industrialization, are having harmful effects on both the environment and human health. Some of these include:

- **Thermal Pollution**: The release of hot water from industrial processes into natural bodies of water, leading to temperature imbalances that affect aquatic life.
- **Noise Pollution**: Increased noise levels in urban areas, often caused by transportation and industrial activities, which can have negative effects on human health, particularly hearing loss and stress.
- **Radiation Pollution**: The release of harmful levels of radiation into the environment, whether from industrial activities or nuclear accidents.
- **Biomedical Pollution**: The improper disposal of medical waste, which can pose significant health risks.
- **Plastic Pollution**: The widespread accumulation of plastic waste, particularly in oceans, which harms wildlife and ecosystems.
- **Visual Pollution**: The degradation of scenic views and landscapes due to overdevelopment and the accumulation of waste.

Each of these pollution types represents a growing environmental concern, further highlighting the need for effective policies and practices to mitigate the impact of overpopulation on the environment.

Self-check Exercise-2

Q.1According to ……..data 13 out of 20 of the most polluted cities are in India.

Q.2. ……of the world population lives in India.

13.5 Population Growth and Depletion of Natural Resources

Depletion of natural resources refers to the overconsumption of resources at a rate faster than they can be replenished. Natural resources are often categorized into two types: non-renewable and renewable. Depletion occurs when either type is consumed beyond its rate of regeneration. This issue is particularly noticeable in areas such as fossil fuel consumption, water use, mining, fishing, and agriculture. The term **defaunation** is used to describe the decline in wildlife populations due to overexploitation and habitat destruction.

Causes of Depletion of Natural Resources:

1. Soil erosion
2. Agricultural practices such as slash-and-burn
3. Pollution and contamination of resources
4. Overpopulation
5. Excessive consumption and waste of resources
6. Large-scale mining for minerals and fossil fuels
7. Deforestation
8. Depletion of aquifers

Depletion of Minerals

Minerals are essential for a variety of human needs, such as housing, clothing, and food. A study conducted by the Geological Survey of the United States revealed a long-term trend from the 19th century, showing that non-renewable resources like

minerals have become increasingly important in the production of materials outside the food and fuel sectors. One example is the rising demand for gravel, sand, and crushed stone in construction.

The large-scale exploitation of minerals began during the Industrial Revolution in England around 1760 and has grown rapidly since then. Advances in technology have allowed humans to access lower-grade ores and dig deeper to extract minerals. Despite these advancements, the production of industrial metals like bauxite, iron, and copper, as well as rare-earth minerals, faces periodic limitations.

Some minerals predicted to face significant production declines in the next 20 years include:

- **Zinc**
- **Copper** (expected by 2024)
- **Gasoline** (expected by 2023)

Certain minerals are expected to decline in production during this century, including:

- **Iron** (around 2068)
- **Coal** (around 2060)
- **Aluminum** (around 2057)

Depletion of Oil

The concept of **peak oil** refers to the point in time when the global rate of petroleum extraction reaches its highest level, after which production will begin to decline. A 2005 report by Hirsch suggested that as oil production decreases and demand increases, the prices of petroleum-based products will rise sharply. The report emphasized that if proper management strategies are not implemented, the world could face unprecedented political, social, and economic challenges due to a shortage of oil. There will be significant price volatility, and the availability of fuel for transportation, especially liquid fuels, will be at risk.

Deforestation

Deforestation is the process of clearing forests, usually through logging or burning trees, which leads to the loss of vital ecosystems. This process has resulted in the destruction of nearly half of the world's original forests. Deforestation occurs for various reasons, often due to the demand for agricultural land as populations in developing regions grow.

A major driver of deforestation is the need for land to grow crops and raise livestock, particularly in areas where forested land is abundant. Many view forests as unimportant simply because the resources within them are not currently being used. For these individuals, the profits from deforesting forests are often seen as more valuable than maintaining them. It is crucial for developing countries to understand the economic value of forests, not only for their resources but also for their role in maintaining ecological balance.

Depletion of Water

Water is essential for life, and its availability has always been a key factor in the success and development of civilizations. Groundwater, a non-renewable resource, represents about 98% of the Earth's fresh water supply. However, it is only replenished at a very slow rate, with only about 6% of groundwater being replenished every 50 years.

Aquifers and wells are crucial sources of groundwater for agricultural, public, and private use. However, excessive extraction of water from these sources has led to a decline in water tables, creating long-term issues for water availability.

Renewable Natural Resources

Renewable natural resources, such as wind and solar energy, provide alternatives to non-renewable resources. Research into alternative forms of energy continues to grow, offering hope for sustainable replacements as we deplete non-renewable

resources. Renewable energy sources are vital for mitigating the environmental impact of fossil fuel consumption and reducing our reliance on finite resources.

The depletion of natural resources is becoming increasingly apparent, and it is essential for us to understand the consequences of overconsumption. We must find a balance between economic development and resource preservation. If we fail to address this issue and exhaust our natural resources, we may face a future where the resources we depend on are no longer available to meet our needs.

Self-check Exercise-3

Q.1 ……is a term that is used to describe the depletion of the populations of wildlife.

Q.2 What is deforestation?

13.6 Summary

Population growth refers to the increase or decrease in the number of individuals in a species, including humans. Human populations experience natural changes due to birth and death rates. Over recent decades, the global human population has surged dramatically (UNFPA, 2011). If immediate measures are not taken to manage population growth, significant challenges such as environmental degradation and the depletion of food resources may arise. Continuous population expansion presents risks, highlighting the importance of finding ways to control growth for the collective benefit of humanity. Historically, humans have devised various methods to ensure food security, including advancements from the Industrial Revolution, modern medicine, and the Green Revolution in agriculture, which have allowed us to be self-sufficient. However, this technological progress cannot continue indefinitely, and without proper population management, there may come a time when all resources are exhausted.

13.7 Glossary

- **Biodiversity** – This term refers to the full range of life forms on Earth, including plants, animals, fungi, and microorganisms, along with the ecosystems they form and the habitats they occupy.
- **Natural Resource** – A natural resource is any material or substance that people use, which comes directly from the environment. Examples include air, water, wood, oil, wind energy, natural gas, coal, and metals like iron.
- **Renewable Resource** – A renewable resource is one that can be used repeatedly without depleting because it is naturally replenished.
- **Non-Renewable Resource** – Non-renewable resources are finite resources that, once used, cannot be replaced. These include rocks, minerals, metals, uranium, and fossil fuels such as coal, natural gas, and petroleum.

13.8Answers to Self-Check Exercise

Self-check Exercise-1

Q.1 Environment

Q.2 Greenhouse gases.

Self-check Exercise-2

Q.1WHO

Q.2. 16%

Self-check Exercise-3

Q.1 Defaunation

Q.2 Deforestation refers to the decrease in forest areas across the world that are lost for uses such as agricultural, croplands, urbanization and mining activities.

13.9 References/Suggested Readings

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13.10 Terminal Questions

1) Explain the impact of population growth on depletion of natural resources
2) Discuss the effect of overpopulation on environment.
3) Describe the impact of population growth on pollution.

Unit-14

Population Policy in India

Structure

14.1 Introduction

14.2Learning Objectives

14.3 Development of Population policies in India

Self-Check Exercise-1

14. 4Population Policies in Post-Independence Period

Self-Check Exercise-2

14.5Five Year Plans of Centre Govt. for Development of the Quality of population

Self-Check Exercise-3

14.6National Population Policies- 1951, 1976/1977 and 2000

Self-Check Exercise-4

14.7 Impact of population Policies in India

Self-Check Exercise-5

14.8 Summary

14.9 Glossary

14.10 Answers to Self-Check Exercise

14.11 Reference/Suggested Readings

14.1 Introduction

Population education has emerged as one of the most crucial global issues. The United Nations has played a pivotal role in shaping population policies for both

developed and developing nations. Following the establishment of the Population Commission in 1946, various organizations have worked to influence population control policies in different countries. In 1974, the United Nations designated the year as the World Population Year (WPY).

In its simplest form, a population policy refers to a welfare strategy aimed at managing population growth. The primary objectives of such policies include reducing fertility and mortality rates and, secondarily, managing the redistribution of population. These policies seek to raise awareness about family planning, improve public attitudes toward population control, and close the knowledge gap. Population policies are designed to address both the quality and quantity of population growth. Their ultimate goal is to reduce both birth and death rates for a more balanced and sustainable population.

Population policies are influenced by the socio-cultural, economic, demographic, and political contexts within a country.

14.2 Learning Objectives

After completing this lesson, you will be able to:

- Understand and explain the population policies in India during both the pre-independence and post-independence periods.
- Identify the policies proposed in India's Five-Year Plans aimed at improving the quality of the population.
- Evaluate the impact of population policies in India.

14.3 Development of Population Policies in India

India's approach to population control has evolved over four distinct phases, each with different strategies to address population challenges. India's population policy primarily aims to:

- Describe the birth rate trends.
- Limit family size.
- Reduce mortality rates.

- Raise awareness about the implications of overpopulation.
- Implement necessary measures for population control.
- Enforce population-related laws and regulations.

Population Policies in the Pre-Independence Period

The issue of overpopulation in India dates back many years. During British rule, there was little to no interest in formulating policies to control the population in India. The concept of family planning was introduced by Dr. R.D. Karve and Mr. P.K. Wattal in 1916. In 1935, the Indian National Congress, led by Jawaharlal Nehru, recognized the rising population of the country. In 1931, Census Commissioner J.H. Hutton expressed concerns about the rapid population growth in India. During World War II, the Indian public became increasingly aware of the issue. Rabindranath Tagore also strongly supported the family planning movement during this period.

Notable milestones in the pre-independence era include:

- **1930**: The Government of Mysore established the world's first government-run birth control clinic.
- **1931**: Madras University began offering courses on birth control methods.
- **1932**: The All India Women's Conference in Lucknow recommended implementing birth control methods at recognized clinics for both men and women.
- **1935**: The Society for the Study and Promotion of Family Hygiene was founded.
- **1940**: P.N. Sapru introduced a resolution in the Council of States advocating for the creation of birth control clinics.
- **1943**: The Famine Enquiry Commission issued an unfavorable report on the practice of birth control clinics.

While these efforts contributed to raising awareness, leaders like Mahatma Gandhi and others did not prioritize population control as a pressing issue for the country during the pre-independence period. Despite their involvement, the population problem was not viewed as an immediate concern during this time.

Self-Check Exercise-1

Q.1 ……opened the first Government Birth Control Clinic in the world.

Q.2 …….year, the Society for the Study and Promotion of family hygiene was founded.

14.4 Population Policies in the Post-Independence Period

After India gained independence, the Health Survey and Development Committee (1946) highlighted that, while the control of diseases and improvements in public health were essential, they would also lead to a significant challenge in terms of population growth. In 1952, India became the first developing nation to adopt a government policy aimed at reducing the number of children per family. Several notable population policies were introduced during this period, as outlined below:

1. Policy on Family Planning (1952)

In 1952, the Government of India launched a national family planning program with the goal of reducing the birth rate. However, this policy did not meet its objectives due to various challenges, including a lack of public awareness and adequate infrastructure.

2. National Population Policy (1976)

The National Population Policy of 1976 focused on reducing birth rates, promoting the raising of the marriage age, and encouraging the adoption of smaller family norms. It used mass media to spread awareness about the benefits of smaller families, emphasized research on population, and introduced population education into school curricula. Additionally, incentives were provided for employees assisting with sterilization efforts.

3. Revised Population Policy (1977)

This policy emphasized family planning but with a focus on voluntary participation, rather than any coercive measures concerning family size. It encouraged the involvement of both private and public organizations in population education programs and placed importance on research related to population issues.

4. National Health Policy (1983)

The National Health Policy of 1983 reinforced the importance of small families, relying on the voluntary efforts of individuals. It aimed to promote the idea of smaller families through education and awareness campaigns.

5. Committee on Population Education (1991)

In 1991, the National Development Council established a committee under the chairmanship of Karunakaran to examine and promote population education. This committee recommended the formulation of a National Policy on Population to address the growing concerns.

6. Draft National Population Policy (1993)

A group of experts led by Dr. M.S. Swaminathan was tasked with drafting a National Population Policy in 1993. While the draft was approved by the Cabinet, it was not officially introduced due to the dissolution of the Lok Sabha.

7. National Population Policy (2000)

In the year 2000, India's population surpassed 1 billion. The objectives of the National Population Policy (2000) were designed to address the unmet need for contraception and improve health infrastructure, with a focus on delivering integrated services for reproductive and child health care. The policy aimed to bring the total fertility rate (TFR) under control by 2010 and achieve a stable population by 2045. The policy set forth 14 National Socio-Demographic Goals, which are as follows:

1. Address unmet needs for basic reproductive and child health services.

2. Ensure free and compulsory school education up to the age of 14 and reduce school dropout rates.
3. Reduce infant mortality rates.
4. Reduce maternal mortality rates.
5. Achieve universal immunization of children against all vaccine-preventable diseases.
6. Promote delayed marriage for girls.
7. Achieve 80% institutional deliveries and ensure that all deliveries are attended by trained professionals.
8. Ensure universal access to information and services for fertility regulation.
9. Contain the spread of HIV/AIDS and integrate management for reproductive tract infections.
10. Control and prevent communicable diseases.
11. Integrate Indian Systems of Medicine into reproductive and child health services.
12. Promote the small family norm to achieve replacement-level fertility.
13. Encourage convergence in the implementation of related social sector programs, making family welfare a people-centered initiative.
14. Achieve 100% registration of births, deaths, marriages, and pregnancies.

These goals aimed to promote sustainable population growth while addressing key social and health issues related to India's growing population.

Self-Check Exercise-2

Q.1 …… year, Government of India adopted a national programme of family planning to reduce the birth rate.

Q.2 National Health Policy was introduce…….year

Q.3 ……was the chairmen of Draft National Population policy.

14.5 Five-Year Plans of the Government of India for Population Quality Development

First Five-Year Plan (1951-1956)

The primary focus of the First Five-Year Plan was economic development, alongside the recognition of the importance of educational development. Three key points were highlighted:

- Acknowledging the need for family planning to ensure healthy living conditions.
- Promoting the reduction of family size by training medical officers in birth control methods.
- Addressing population-related issues resulting from overpopulation.

Second Five-Year Plan (1956-1961)

The Second Five-Year Plan recognized that the rapid population growth was negatively affecting the economic development of the country. As a result, the plan placed emphasis on taking effective measures to control population growth.

Third Five-Year Plan (1961-1966)

The Third Five-Year Plan focused on several important aspects:

1. Birth control and spacing of children.
2. Promoting women's education.
3. Expanding employment opportunities.
4. Raising the legal age of marriage.
5. Educating the population on family life and sexual health.

Fourth Five-Year Plan (1969-1974)

This plan considered the issue of population growth through the lens of social change. Family planning and reducing birth rates were viewed as critical to societal development.

Fifth Five-Year Plan (1974-1979)

The Fifth Plan marked the announcement of the National Population Policy in April 1976, with targets including a birth rate of 25 per thousand and a population growth rate of 1.4%. Family planning programs were expanded to include community health, maternity and child care, and improved nutrition.

Sixth Five-Year Plan (1980-1985)

Key focuses of the Sixth Five-Year Plan included raising the population above the poverty line, promoting economic equality, and expanding employment opportunities.

Seventh Five-Year Plan (1985-1990)

During this period, the National Population Policy was expanded to become more comprehensive. Some of its key objectives were:

- Providing education on family welfare to children, adolescents, and adults.
- Informing couples about conception, pregnancy, childcare, and health.
- Using mass media to raise awareness about population issues.

Eighth Five-Year Plan (1992-1997)

The primary goal of the Eighth Five-Year Plan was to modernize industries. The objectives of this plan also included addressing population growth, poverty, employment opportunities, and human resource development. This plan was significant as it introduced substantial changes to family planning programs. Additionally, the International Conference on Population and Development was held in Cairo in 1994, focusing on reproductive and child health, women's employment, adolescent education, immunization, health, and nutrition.

Ninth Five-Year Plan (1997-2002)

The Ninth Plan aimed to reduce the population growth rate, with a specific focus on improving reproductive and child health (RCH).

Tenth Five-Year Plan (2002-2007)

Population-related objectives of the Tenth Five-Year Plan included:

- Reducing the gender gap.
- Increasing literacy rates.
- Expanding forest and tree cover.
- Addressing unmet contraceptive needs.
  During this period, the government made substantial efforts to improve the quality of India's population.

Eleventh Five-Year Plan (2007-2012)

The main focus of the Eleventh Five-Year Plan was on population education and addressing issues such as:

- Reducing school dropout rates.
- Increasing literacy rates.
- Reducing infant mortality rates.
- Providing clean drinking water.
- Addressing malnutrition among children and anemia among women and girls.
- Ensuring a better environment for children.
  The rapid population growth was identified as a serious challenge for India's development. If left unchecked, it could undermine both the nation's overall development and the quality of life of its people. Therefore, controlling population growth was given high priority to ensure sustainable development.

Self-Check Exercise-3

Q.1 Ninth Five Year Plan focus on the ……

Q.2 First Five Year plan period……..

14.6 National Population Policies - 1951, 1976/1977, and 2000

The formulation of population policies in India dates back to a period before independence. As early as 1938, the National Planning Committee established a sub-committee on population, which laid the groundwork for future population control efforts. The 1940 resolution emphasized the necessity of adopting family planning and welfare policies to achieve a balanced social and economic order, while also stressing the limitation of children. Following independence, the focus on population management continued, especially after the formation of the First Five-Year Plan.

I) National Population Policy – 1951

In April 1951, the First Five-Year Plan formalized a national population policy, recognizing family planning as essential for improving maternal and child health. The goal was to improve the quality of life, provide better opportunities, and integrate family planning into the broader socio-economic development strategy. India was the first country in the world to launch a national family planning program in 1952. The program's objective was to reduce birth rates and stabilize the population in line with the nation's economic needs.

Initially, the program followed a "clinical" approach by establishing clinics and providing direct services. However, by the Third Five-Year Plan (1961-66), a more inclusive approach was adopted. The "community extension" and "cafeteria" methods were introduced, offering a variety of family planning options to motivate people to adopt smaller families. Despite these efforts, the program's emphasis remained on terminal methods of contraception, and it faced challenges in achieving substantial progress.

By 1966, the government established a separate Department of Family Planning within the Ministry of Health to strengthen the program. This department was tasked with reinforcing population control policies and addressing the socio-economic challenges of rapid population growth.

II) National Population Policy – 1976/1977

The National Population Policy of 1976 was further revised in 1977, emphasizing educational reforms, women's empowerment, and voluntary family planning. Key features of this policy included:

- Raising the minimum age of marriage to 18 years for girls and 21 years for boys.
- Freezing population figures at the 1971 census level until 2001 to manage resources and representation in parliament.
- Linking financial assistance to state governments with their performance in family planning.
- Greater emphasis on girls' education and population education.
- Promoting voluntary family planning through awareness programs.
- Offering monetary compensation for sterilization and incentivizing local organizations to participate in the family planning program.
- Greater use of mass media to promote family planning, particularly in rural areas.

This revised policy marked the shift from a clinical to a more educational and voluntary approach. Family planning was redefined as a "family welfare" program, integrating health services, maternal care, child health, and women's education into the broader family planning strategy.

III) National Population Policy – 2000

The National Population Policy (NPP) of 2000 was a significant step toward addressing India's population growth challenges. It focused on the integration of health care infrastructure, reproductive health services, and social development. The policy aimed to reduce the Total Fertility Rate (TFR) to replacement levels by 2010, with a target of 2.1 children per woman.

Key objectives of the NPP 2000 included:

- **Immediate Objective**: Address unmet needs for contraception, healthcare infrastructure, and the provision of services for reproductive and child health.

- **Medium-Term Objective**: Reduce the Total Fertility Rate (TFR) to replacement levels (2.1 children per woman) by 2010.
- **Long-Term Objective**: Achieve a stable population by 2045, supporting sustainable economic growth, social development, and environmental protection.

Key Features of the National Population Policy (2000):

- The policy promotes voluntary and informed choices regarding family planning, empowering citizens to make decisions based on their needs and preferences.
- Making education free and compulsory up to the age of 14, with efforts to reduce dropout rates for both boys and girls.
- Reducing the Infant Mortality Rate (IMR) to under 30 per 1,000 live births and the Maternal Mortality Rate (MMR) to under 100 per 100,000 live births by 2010.
- Achieving universal immunization for children against vaccine-preventable diseases.
- Promoting delayed marriage for girls, ideally after 18 years, and encouraging family planning for all.
- Ensuring 80% of institutional deliveries and 100% deliveries by trained professionals.
- Achieving universal registration of births, deaths, marriages, and pregnancies.
- Providing universal access to information and services for fertility regulation, including a wide range of contraceptive options.
- Controlling the spread of HIV/AIDS, integrating reproductive tract infection (RTI) management with sexually transmitted infections (STI), and strengthening the National AIDS Control Organization (NACO).
- Preventing and controlling communicable diseases and integrating traditional Indian medicine (AYUSH) into reproductive and child health services.
- Promoting the small family norm and focusing on a people-centered approach to family welfare.

The NPP 2000 introduced a paradigm shift by addressing population issues in the context of child survival, maternal health, women’s empowerment, and access to

reproductive healthcare services. This comprehensive approach aimed to balance population control with sustainable development, recognizing the interconnections between health, education, and economic opportunities.

Self-Check Exercise-4

Q.1……. increase in the age of marriage from 15 to 1 8 years for girls and from 18 to 2 1 for boys.

Q.2 Second National Population Policy was launched in the year……..

Q.3 …….amount was remarked for family planning in first five year.

14.7 Impact of Population Policies in India

India became the first country globally to introduce the National Family Planning Program in 1951. The Indian government has continually acknowledged the challenges posed by rapid population growth and has rolled out various population policies to address this concern. Although these policies have evolved over time, their success has often been hampered by poor implementation at the grassroots level. Additional factors such as early and child marriages, illiteracy, child labor, and deep-rooted superstitions significantly contribute to the country's population growth. To tackle these challenges, improving education is crucial.

For population policies to be successful, both central and state governments must work together to address the fundamental causes of rapid population increase. Moreover, government initiatives need to raise awareness and engage the public in population control efforts. Health workers and primary health centers should be actively involved in monitoring and ensuring that population policies are followed in communities.

It is equally important to focus on issues affecting women, such as sexual harassment, reproductive rights, sexual health, and gender equality. Increasing awareness about these matters will significantly contribute to the effectiveness of population control policies. The following actions can be taken to address the unchecked growth of India's population:

1. **Increase the Minimum Age for Marriage**: Both men and women should marry at older ages to ensure better physical and emotional maturity, leading to healthier families and fewer children.
2. **Promote the Two-Child Policy**: Encouraging families to limit their children to two can significantly control the population growth rate and improve economic and social outcomes for the family.
3. **Incorporate Population Education from Age 15**: Population education should be introduced in schools for individuals as young as 15 years old. This would increase awareness about family planning, reproductive health, and responsible parenting at an early age.
4. **Strict Action Against Early Marriages**: Laws prohibiting child marriages should be rigorously enforced, with penalties for those who violate the legal age for marriage, to deter this practice.
5. **Raise Awareness About Family Planning Programs**: The government must ensure family planning initiatives are widely accessible and known to the public. Mass awareness campaigns should be conducted to inform people about the advantages of family planning.
6. **Promote the Use of Birth Control**: Encourage couples to adopt birth control methods to manage family size and maintain healthier lifestyles for both parents and children.
7. **Provide Adult and Non-formal Education**: Expanding adult education, particularly in rural areas, will help raise awareness about population control measures, women's rights, and available family planning options.

By taking these steps, India can effectively manage its population growth, improve the quality of life for its citizens, and ensure a more sustainable future. Successful population control requires a unified effort from the government, social organizations, and the wider community.

Self-Check Exercise-5

Q.1 National Family Planning Programme launched in ……

Q.2 ……..is first country of world to launch family planning. India

14.8 Summary

- **Population policy** refers to strategies designed to manage population growth with a focus on both the **quantitative** and **qualitative** aspects of population dynamics.
- The core objectives of a population policy are to **lower birth rates** and **death rates**, primarily by reducing fertility and mortality rates, and secondarily, to manage the **redistribution** of populations.
- In **1952**, India became the first developing nation to implement a formal government-led initiative aimed at reducing family sizes and controlling population growth.
- Over the years, several **population policies** and **Five-Year Plans** have been introduced in India to address the challenges arising from rapid population growth.
- Issues contributing to high population growth include **early marriages**, **superstitions**, **lack of education**, and **child labor**. Both **Central** and **State Governments** need to work together to address these factors and manage population growth.

14.9 Glossary

- **Family Planning**: The practice of regulating the number of children a family has through the use of contraceptives and other family planning methods. According to the World Health Organization, family planning enables individuals and couples to decide how many children they want and when to have them, achieved through contraception and the management of infertility.
- **Sterilization**: A medical procedure that ensures permanent prevention of pregnancy. In women, this typically involves blocking or sealing the fallopian tubes to prevent eggs from being fertilized. Sterilization also refers to procedures used in medical settings to destroy harmful microorganisms.
- **Superstition**: A belief or practice that arises from ignorance, fear, or misconceptions about the unknown, often involving magic or chance. Superstitions are typically based on unfounded ideas rather than scientific reasoning.

- **AYUSH**: An acronym for the traditional Indian systems of medicine, including **Ayurveda**, **Yoga & Naturopathy**, **Unani**, **Siddha**, and **Homeopathy**. These practices emphasize holistic health and disease prevention, offering alternative approaches to maintaining wellness.

14.10 Answers to Self-Check Exercise

Self-Check Exercise-1

Q.1 ……Government of Mysore

Q.2 1935

Self-Check Exercise-2

Q.1 1952

Q.2 1983

Q.3 Dr.M.S. Swaminathan

Self-Check Exercise-3

Q.1 Reproductive and Child Health

Q.2 1951-1956

Self-Check Exercise-4

Q.1 National Population Policy – 1976

Q.2 2000

Q.365 crore

Self-Check Exercise-5

Q.1 1951

Q.2 India

14.11 References/Suggested Readings

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14.12 Terminal Questions

1) What is population policy of India? Highlight its main points.
2) Discuss the National population policy 2000 and its main features.

Assignment

Q. 1 Define demography. Explain the importance and development of demography.

Q. 2 Discuss meaning and causes of fertility and mortality.

Q. 3 What do you mean migration? Discuss its main types.

Q. 4 Explain the Malthusian theory of population and its criticism.

Q. 5 Describe briefly the theory of demographic transition of population.

Q. 6 Discuss population growth and its impact on environment and resources.

Q. 7 What is population polices in India. Highlights its strength and weakness.