VIRTUAL UNIVERSITY OF PAKISTAN

Population Dynamics

SOC605

Course Handouts

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Lesson 01

INTRODUCTION TO THE POPULATION DYNAMICS

Topic 001: Introduction to Population Studies

Population studies is defined as the scientific study of Human Population (Lundquist, Anderton and Yaukey, 2015).

Or

Population studies is the study of the relationship between demographic and non-demographic variable (Lundquist, Anderton and Yaukey, 2015).

Topic 002: Introduction to Population Studies

Population

In terms of defining Population, it is the whole number of inhabitants occupying an area (such as a country or a world) and continually being modify by increases (births and immigrations) and losses (deaths and emigrations).

(Oxford dictionary, 2021)

Population studies is the science of population that examines:

1. The Size and Composition of Population.
2. The Dynamic Life courses of the population.
3. It deals with the relationship between population composition and population change.

1. The size and Composition of Population includes:

- Age
- Ethnicity
- Sex
- Union status (marital or cohabiting)
- Educational attainment
- Spatial Distribution

2. It also deals with the dynamics of Life-course processes that changes the population composition:

- Births
- Deaths
- Unions
- Migration

3. It also deals with the relationships between population composition and change, and the broader social and physical environment in which they exist.

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Top 10 Largest Countries by Population, 2020

Country	Population
China	1,441,472,652
India	1,380,004,385
USA	331,755,305
Indonesia	274,653,007
Pakistan	222,589,309
Brazil	213,146,399
Nigeria	208,177,451
Bangladesh	165,329,483
Russia	145,958,533
Mexico	129,461,649

Population of Countries of South Asia 2020

Country	Population
India	1,380,004,385
Pakistan	222,589,309
Bangladesh	164,689,383
Iran	83,992,949
Afghanistan	38,928,346
Nepal	29,136,808
Sri Lanka	21,413,249
Bhutan	771,608
Maldives	540,544

Topic 003: Significance of Studying Population Studies for Social Sciences Student – I

With the majority of developing countries facing population explosion, the study of population and its problems has become very important in every sphere of an economy.

1. **For Economy**

Population studies helps us to know how far the growth rate of the economy is keeping pace with the growth rate of the population. If the population is increasing at a faster rate, the pace of

development of economy will be slow. Rapid population growth reduces per capita income, lowers the standard of living, plunges the economy into mass unemployment and under employment, brings environmental damage and puts a burden on existing social infrastructure. Population studies highlights these problems of the economy to be solve by the government.

2. **For Society**

Population studies have much more importance for the society. When population is increasing rapidly, the society is face with innumerable problems. Shortages of basic services like water, electricity, transport and communications, public health, education, etc. arise. Along with these, problems of migration and urbanization are associated with the growing population, which further lead to the law-and-order problem. Faced with such problems, which are the concomitant result of population growth, the state and nongovernment social organizations can adopt appropriate measures to solve them.

Topic 004: Significance of Studying Population Studies for Social Sciences Student - II

3. **For Administrators**

Population studies are also useful for administrators who run the government. In underdeveloped countries, almost all social and economic problems are associated with the growth of population. The administrator has to tackle and find solutions to the problems arising from the growth of population. They are migration and urbanization which lead to the coming up of shantytowns, pollution, drainage, water, electricity, transport, etc. in cities. These require improvement of environmental sanitation, removal of stagnant and polluted water, slum clearance; better housing, efficient transport system, clean water supply, better sewerage facilities, control of communicable diseases, provision of medical and health services, especially in maternal and child welfare by opening health centers, opening of schools, etc.

4. **For Political system**

The knowledge of demography is of immense importance for a democratic political system. It is on basis of the census figures pertaining to different areas that, the election commission of a country does the demarcation of constituencies. The addition to the number of voters after each election helps to find out how many have migrated from other places and regions of the country. Political parties are able to find out from the census data the number of male and female voters, their level of education, their age structure, their level of earning, etc. On this basis, political parties can raise issues and promise solutions in their election manifestos at the time of elections. Further, it is on basis of male and female voters in an area that the election commission establishes election booths for voters and appoints the election staff.

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Oxford dictionary, 2021

Lesson 02

OBJECTIVES AND COMPONENTS OF POPULATION

Topic 005: Objectives of Population Studies

The main objective of population studies is to educate the people about the population situation ideal for the family for the community and for the country. Following are some of the objectives of the Population Studies that must be keep in consideration:

1. To achieve knowledge about the size, composition, Organization and Distribution of the Population.
2. To study the trend of population growth, which describes the past evolution, present distribution and future changes in the population of an area.
3. To study the trend of population growth and the population distribution, which describes the trends of population and its relationships with the different aspects of social parameters like education level, extent of urbanization, employment, living standard etc. in an area.
4. To protect the future demographic evaluation and its probable consequences.
5. Population studies motivates the people to have small families it gives the message of a small family and informs the people about prenatal care and child welfare.

Topic 006: Components of Population Change (Components and Definitions)

The components of Population change include:

1. Age
2. Sex
3. Gender
4. Death
5. Mortality
6. Ascribed and Achieved Characteristics
7. Life Expectancy
8. Migration (Internal and International)
9. Fecundity
10. Marriage
11. Natural Balance (Births minus Deaths)

1. Age

Age is defined as a span of years during which some event occurred (Yusuf, Martins and Swanson, 2014).

Or

Age is the number of years something has been alive or in existence.

Age is generally express in terms of time units after birth. The most common measure is the number of years after birth. The last birthday is usually the reference point to count the number of years after birth. Other age-related classifications may refer to stages of the life cycle. An infant is generally considered as a person less than 1 year of age. The infant neonatal period has been defined as the first 28 days after birth. There is more than one definition of the term child. Usually,

children are people less than 15 years of age. However, child mortality usually refers to deaths of children under 5 years of age. On the other end of the age range, old people are habitually defined as those who are 65 years of age and over. The term adult can also have more than one definition. It is often associated with legal responsibility that varies from country to country. It can also be seen, as people who are not classified as children that is those 15 years of age and over. There is a degree of ambiguity involved and the term adolescent is frequently use to describe people in the age range of about 13–19 years of age. The varying perceptions lead to the need to have clear definitions in demographic analysis.

2. Sex

Sex is defined as the biological characteristics between male and female (Yusuf, Martins and Swanson, 2014).
It is an ascribed characteristic. Sometimes, persons' genetically assigned sex not lineup with their gender identity. These individuals might refer to themselves as transgender, nonbinary, or gender non-conforming.

3. Gender

Gender is a psychological and social characteristic arising from belief systems of what male and female behavior is or should be. It is an achieved characteristic (Yusuf, Martins and Swanson, 2014).

4. Death

A death is the complete and permanent disappearance of all evidence of life after a live birth has taken place (Yusuf, Martins and Swanson, 2014).

5. Mortality

It is the number of deaths over a period of time, usually 1 year, and relates it to the reference population (Yusuf, Martins and Swanson, 2014).

Topic 007: Components of Population Change (Components and Definitions)

While discussing population change, it has two components i.e.

6. Ascribed and Achieved Characteristics

Ascribed characteristics *are those characteristics that a person receives at a time of birth or takes on involuntarily later in life* (Yusuf, Martins and Swanson, 2014).

Age, ethnicity, sex etc. all are the ascribed characteristics of a person.

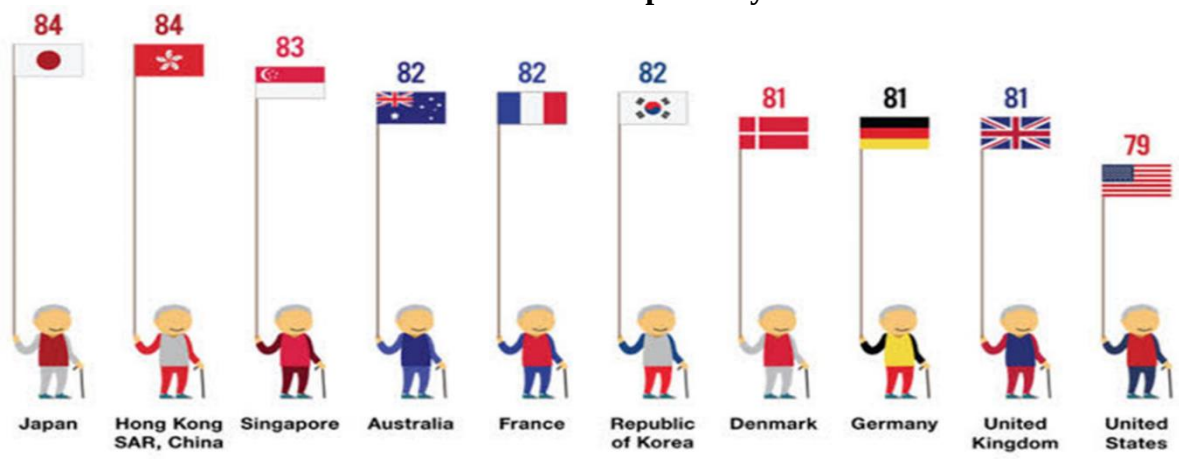
Achieved characteristics *are those characteristics that a person takes on voluntarily that reflects personal abilities and efforts* (Yusuf, Martins and Swanson, 2014).

For example, place of residence, occupation, marital status and educational attainment etc.

7. Life Expectancy

The average number of years that people in a given population are likely to live (Yusuf, Martins and Swanson, 2014).
This may be estimate at birth or some other age. U.S. males born in 2019 can expect to live 75.7 years, and females can look forward to 80.6 years.

Source: World Bank Life Expectancy at Birth 2020



Life Expectancy rate of Countries of South Asia 2020

Country	Life Expectancy
India	68.7
Pakistan	66.5
Bangladesh	71.7
Iran	76.7
Afghanistan	64.9
Nepal	69.5
Sri Lanka	73.8
Bhutan	71.7
Maldives	77.8

8. Migration (Internal and International)

The movement of people into and out of a specified territory (Yusuf, Martins and Swanson, 2014).

Migration is of two types, i.e.

i. Internal Migration
ii. International Migration

Internal migration is the change of permanent residence within a country, involving a geographical move that crosses a political boundary, usually a county or county-type geographical unit.

In-migration *refers to the residential migration of people to an area of destination* (Yusuf, Martins and Swanson, 2014).

Out-migration *involves the residential migration of people from an area of origin* (Yusuf, Martins and Swanson, 2014).

International migration is migration that occurs between countries. Immigration refers to the migration of people into a new country for the purpose to establish permanent residence. Emigration refers to permanent departure of people from a country.

9. Fecundity

Fecundity refers to the potential or capacity of female to reproduce (Yusuf, Martins and Swanson, 2014).

The female reproductive period is from menarche to menopause, generally from the age of about 12–49 years.

10. Marriage

Marriage is the union of two or more people who cohabit and form a family (Yusuf, Martins and Swanson, 2014).

Marriage may be of a male and a female, or of more than two people. The following classification tends to be applied: never married, married, divorced/separated and widowed.

11. Natural Balance (Births minus Deaths)

The natural balance (or natural increase) is the difference between the number of births and the number of deaths recorded over a period (Yusuf, Martins and Swanson, 2014).

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Lesson 03

HISTORY AND METHODS

Topic 008: Introduction to Demography

Defining Demography?

Demography comes from two Greek words. “Demos” meaning people and “Graphos” meaning to write.

Demography is the study of human populations – their size, composition and distribution across space – and the process through which populations change (Lundquist, Anderton and Yaukey, 2015).

Demography is further divide into two types, i.e.

1. Formal Demography (Theoretical, pure or basic)
2. Applied Demography (Population Studies)

Formal demography focuses on theoretical and empirical questions of interests mostly to academic demographers. It limits its objects of study to measurement of population processes.

Applied demography focus on the questions of interest to academics as well as to others. Applied demography analyses the relationship between economic, social, cultural and biological processes influencing the population.

Demography focuses on five aspects of Human Population i.e.

1. Size
2. Distribution
3. Composition
4. Components of Population change
5. Determinants and consequences of population change.

1.Population size is simply the number of persons in an area at a given point in time.

2. Population distribution refers to how the population is dispersed in geographic space at a given point in time.

3. Population composition is usually defined in terms of ascribed and achieved characteristics that includes place of birth, sex and age, place of residence, marital status. For example, population of Pakistan consist of 64% youth, which means that 64% of country’s population is under the age of 29.

4. Components of population change comprises those factors that brings about change in a population at a certain time. These factors include Sex, Marital status, Deaths, Migration, Births etc.

5. Determinants and consequences of population change describes the factors that can bring a change in population, and the changes brought up by those factors and their effect on society is

Topic 009: History of Demography

Concerns with population and its impact have taken many forms over time. For instance, it is reported that Confucius (502–479 BC) thought that large population growth could result in lower labor productivity. Greek philosophers such as Plato 360 BC and Aristotle 354 BC were concerned with optimum population size for the wellbeing of society. Roman preoccupation with their military activity and it's financing also paid attention to population size and the tax base that it provided – first Roman census was conducted between 578–34 BC.

In the Middle Ages, population studies were carried out by Muslim scholars such as Ibn-e-Khaldun. One of the basic tools of demography is the counting of people or the census (from the Latin to assess). In the past, some form of census activities was carried out in Babylon, China, India, Greece and the Roman Empire, Japan and some European countries (e.g., Iceland in 1703 and Sweden in 1748). Colonial censuses were carried out, among other places, in North America (Virginia in 1620 and Quebec in 1665), Australia (New South Wales in 1828) and British India in 1871. The first United States census took place in 1790. Sampling was first used in a census in Norway (1900). Currently, almost every country carries out decennial census, and some, like Australia and Canada, do it every 5 years. Ancient Egypt is said to have registered its people (around 1400 BC). Family records were kept in Japan as far back as 645 AD and were re-introduced in 1868.

Population registers are now common in Scandinavian countries, and a complete enumeration of populations can now be carried out, in some countries, using these registers (e.g., Finland). In addition to the enumeration of population stocks through censuses and population registers, recording of vital events such as births, deaths and marriages has been a major source of demographic information. A well-known study of mortality was John Graunt's Bills of Mortality in England (1662). Annual reports of births, marriages and deaths in Paris became available in the seventeenth century (1670). National vital statistics registration became law in Sweden in 1748 and in England and Wales in 1874. Although vital events registration is common in most countries, comprehensive coverage of the population continues to be a challenge in many countries and their reliability may be questionable.

Topic 010: History of Demography

To overcome some of these difficulties with the vital registration system, population surveys, are carried out by countries themselves and in some cases through cooperation from international agencies such as the United Nations. Surveys have also been used to obtain information on demographic characteristics and factors associated with them. Social surveys of London were begun in 1886 and Charles Booth produced a related report in 1906. Surveys are now the most frequent source of demographic information. The study of mortality in London by John Graunt (1662) is usually singled out as a most important development in demographic analysis. His development of the concept of the probability of dying formed a springboard for the formulation of life tables and related life expectancy by Edmund Halley (1693). In addition to the development of analytical approaches to mortality and fertility, the discussion of the importance of population growth and perceived carrying capacity was anticipated by Giovanni Botero (1558) and taken up by Thomas Malthus (1798), in his arguments with concepts of population growth and limits proposed by William Goodwin (1793) and Nicolas Condorcet (1781). Leonard Euler's stable population model (1760) is another important tool of demographic analysis in the understanding

of population dynamics. This model was later re-stated in a more complete manner by Lois Dublin and Alfred Lotka (1925).

The concept of mortality as a population decrement was extended by the development of multiple decrement tables by Daniel Bernoulli to assess the impact of smallpox (1760) adjusting Halley's life tables. Among other contributions to demographic analysis, the use of indirect standardization by William Farr (1856–1859) might be mentioned, as well as the estimation of the net reproduction rate by Richard Bockh (1884). The analysis of migration was also examined and Henry Carey put forward the migration gravity model (1837–1840) that was pursued by Earnst Ravenstein in his laws of migration (1889).

The cohort-component method of population projections was used by Edwin Cannan to project the population of England and Wales (1895). projection method was further explored by Arthur Bowley in Great Britain (1924) and Pascal Whelpton (1928) in the United Sates.

In the 1950s the United Nations was instrumental in fostering the formulation of systematic collection of population information and methods of analysis. This involved the harnessing of efforts of many experts and the development of useful manuals. One outcome was the preparation of worldwide population statistics that showed both strengths and gaps in demographic statistics in different countries. The United Nations also provided technical support to developing countries to improve their capacity for the collection and analysis of demographic information. Indirect methods of the estimation of population and vital events were further developed to overcome the paucity of traditional tools such as censuses and vital events registration.

Ansley Coale and William Brass (1963, 1966) and many others developed indirect methods of estimation of population and vital events. Analysis of demographic phenomena continues to be given attention. The observation that countries experience different mortality and fertility levels (Mooted by Warren Thompson in 1929) was developed into the concept of the demographic transition by Kingsley Davis in 1945 that helped to understand the pending population explosion in the following five decades. Better insights into the factors underlying fertility levels were provided by the work of Kingsley Davis and Judith Blake (1956). This was extended by John Bongaarts and Robert Potter who devised a framework of the proximate determinants of fertility (1983).

Economic models of family formation and fertility were explored by Gary Becker (1981). John Caldwell (1976, 1982) extended the theory of demographic transition to health transition and his theory on "wealth flows" stimulated much of the recent interest in micro demographic research.

Topic 011: Methods of Demography

There are two methods of demography i.e.

1. Direct Method
2. Indirect Method

Both of the methods are discussed in detail.

Direct Method

Direct data comes from vital statistics registries that track all births and deaths as well as certain changes in legal status such as marriage, divorce, and migration (registration of place of residence).

In developed countries with good registration systems (such as the United States and the Europe), registry statistics are the best method for estimating the number of births and deaths.

A census is the other common direct method of collecting demographic data. A census is usually conduct by a national government and attempts to enumerate every person in a country. Analyses are conduct after a census to estimate how much over or undercounting took place. These compare the sex ratios from the census data to those estimated from natural values and mortality data. For example, the censuses of the People's Republic of China gather information on births and deaths that occurred in the 18 months immediately preceding the census.

Indirect Method

Indirect methods of collecting data are require in countries and periods where full data are not available, such as is the case in much of the developing world, and most of historical demography. With surveys, researchers can then indirectly estimate birth or death rates for the entire population. Other indirect methods in contemporary demography include asking people about siblings, parents, and children. There are a variety of demographic methods for modelling population processes including models of mortality, fertility, marriage, disability, population projections and momentum.

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Lesson 04

MORTALITY AND FERTILITY

Topic 012: Components of Demography

Following are the components of the demography i.e.

1. Mortality
2. Fertility
3. Migration

Through these components, demography takes place.

Mortality

The incidence of death in a country's population (Macionis, 2012).
Crude death rate is the number of deaths in a given year for every 1,000 people in a population. Mortality rate of USA is 8.880, while that of Pakistan is 6.884 in 2020.

Causes of Deaths

Usually, cause of death information is classified according to the International Classification of Diseases (ICD). This classification is produced by the World Health Organization (WHO) and revised every 10 years. Most countries use the detailed ICD or a modified and abridged version to code their causes of death data. In countries where registration of deaths is not adequate, mortality data are collected through sample surveys, and may not be available in the detailed ICD categories.

Cardiovascular diseases are the leading cause of death globally. The second biggest cause are cancers. Causes of death vary significantly between countries: non-communicable diseases dominate in rich countries, whereas infectious diseases remain high at lower incomes. The world is making progress against infectious diseases. As consequence, more people are dying from non-communicable diseases. Fewer people die at a young age. Almost half of all people who die are 70 years and older.

Leading risk factors for premature death globally include high blood pressure, smoking, obesity, high blood sugar and environmental risk factors including air pollution. For example, communicable diseases accounted for most of the deaths in the Africa region but were just over one-third of deaths in South East Asia and Eastern Mediterranean regions.

Cardiovascular diseases that were about half of the deaths in the Europe region were just over 1 in 10 deaths in the Africa region. Neoplasms (cancers) were less common in Africa, South East Asia and Eastern Mediterranean regions. The quality of mortality data, in particular for causes of death, tends to be poor in countries with low coverage of health and medical services.

Topic 013: Measure of Mortality

The child mortality rate, also under-five mortality rate, refers to the probability of dying between birth and exactly five years of age expressed per 1,000 live births. The current child mortality rate for Pakistan in 2020 is 67 deaths per 1000 live births, 1% decline from 2019. The child mortality is further divide into the following types

a) Perinatal mortality rate
b) Neonatal Mortality rate
c) Postnatal Mortality rate
d) Infant Mortality rate

a) Perinatal Mortality rate

Perinatal mortality is the endogenous causes of mortality in the first week after birth are similar to the causes of stillbirths (Yusuf, Martins and Swanson, 2014).

Perinatal mortality rate in Pakistan is 59.106.

b) Neonatal Mortality rate

A neonatal death is defined as the number of infant deaths during the first 4 weeks (28 completed days) of life (Yusuf, Martins and Swanson, 2014).

Pakistan is number three among these countries. With an estimated 298000 neonatal deaths annually and a reported neonatal mortality rate of 49 per 1000 live births, Pakistan accounts for 7% of global neonatal deaths.

c) Post-natal Mortality rate

Post-natal mortality rate refers to the period from 29 days to less than 1-year after birth (Yusuf, Martins and Swanson, 2014).

d) Infant Mortality rate

Infant mortality is the death of an infant before his or her first birthday (Poston and Bouvier, 2010).

The infant mortality rate is the number of infant deaths for every 1,000 live births. The current infant mortality rate for Pakistan in 2020 is 59.109 deaths per 1000 live births, a 1.84% decline from 2019.

Topic 014: Measure of Mortality

Further, the measure of mortality consists of following concepts:

Maternal mortality

Maternal death or maternal mortality is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of pregnancy, from any cause relate to or aggravate by the pregnancy or its management, but not from accidental or incidental causes (Poston and Bouvier, 2010).

The maternal mortality rate in Pakistan is 186 deaths per 100,000 live births. The maternal mortality rate in Pakistan is 186 deaths per 100,000 live births.

Infant Mortality

Infant mortality is the death of an infant before his or her first birthday (Macionis, 2012).

The infant mortality rate is the number of infant deaths for every 1,000 live births. The current infant mortality rate for Pakistan in 2020 is 59.109 deaths per 1000 live births, a 1.84% decline from 2019.

Child Mortality Rate

The child mortality rate, also under-five mortality rate, refers to the probability of dying between birth and exactly five years of age expressed per 1,000 live births (Lundquist, Anderton and Yaukey).

Abortion

Abortion is defined as an expulsion of a fetus from the uterus (Yusuf, Martins and Swanson, 2014). Annual abortion rate of 29 per 1,000 women aged 15–49 in Pakistan.

There are two types of abortion, i.e.

a) Induced abortion
b) Spontaneous abortion

An induced abortion is the intentional removal of a fetus from the uterus.

A spontaneous abortion is the premature and naturally occurring expulsion of a fetus from the uterus.

Standardized Mortality Ratio (SMR)

Standardized Mortality Ratio (SMR) is a ratio between the observed number of deaths in a study population and the number of deaths would be expect, based on the age- and sexspecific rates in a standard population and the population size of the study population by the same age/sex groups (Hinde, 2009).

Age-specific Mortality Rate

An age-specific mortality rate is a mortality rate limited to a particular age group.

The numerator is the number of deaths in that age group; the denominator is the number of persons in that age group in the population. For example, number of deaths among person age 0-14 in a given year devised by total number of person 0-14 in the same year.

Topic 015: Fertility-I

Fertility is the incidence of childbearing in a country's population (Macionis, 2012).

The fertility rate of Pakistan in 2020 is 3.425 births per women. Fertility rate is the number of births in a given year for every 1000 people of population.

Social demographers are primarily interested in ascertaining whether, how, and why various social, economic, cultural, and environmental factors influence both the likelihood of a woman having a baby and the number of babies she will have in her lifetime. Variables such as social class, economic status, religious beliefs, psychological disposition, attitudes about children, and many others have all been shown to be important in the decision to have a baby, as well as the number of babies (from zero to some positive number) a woman will have.

The opposite terms for fertility are *infertility* (also called childlessness) and *infecundity* (which is synonymous with sterility). Sterility implies the existence of infertility, but the reverse is not necessarily the case. A fecund woman may choose to remain infertile by not marrying or by practicing highly effective contraception. Infertility, then, is due to a voluntary decision not to have children or it is cause by (biological) infecundity.

There are seven determinants, which affect fertility i.e.

1. marriage and marital disruption,
2. contraceptive use and effectiveness,
3. smoking
4. weight
5. Alcohol
6. Age
7. Timings and frequency of sexual relations

Menarche is the beginning of the female reproductive period, signaled by the first menstrual flow (Macionis, 2012).

Menopause is the end of that period, signaled by the termination of menstruation (Macionis, 2012).

Topic 016: Fertility-II

Fertility has further concepts.

a) Crude birth rate
b) Age-specific fertility rate
c) General Fertility rate
d) Gross reproduction rate

a) Crude birth rate:

The annual number of live births per 1000 population (Poston and Bouvier, 2010).
The current birth rate for Pakistan in 2020 is 27.530 births per 1000 people, a 1.77% decline from 2019.

b) Age-specific fertility rate:

Age-specific fertility rates are useful in translating the relationship between age and fertility.

The age-specific fertility measures the annual numbers of births to a woman of specified age or group per 1000 women in that group (Yusuf, Martins and Swanson, 2014).

c) General fertility rate:

The general fertility rate is the number of live births per 1000 females of child-bearing age from the age of 15-44 (Yusuf, Martins and Swanson, 2014).

The general fertility rate is the most widely used measures of fertility. Tracking fertility rate allow beneficial planning in any region.

d) Gross reproduction rate (GRR):

It is defined as the average number of daughters per woman in a population subjected to a given set of age-specific fertility rates and assuming no mortality to the end of her reproductive period (Yusuf, Martins and Swanson, 2014).

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Lesson 05

MIGRATION – I

Topic 017: Migration

Migration is the movement of people into and out of a specified territory (Macionis, 2012).
For instance, movement of a family from Pakistan to Dubai for the employment purpose and settling there is an example of migration.

There are two types of migrations.

1. International Migration
2. Internal Migration

International migration is the movement of people between countries. Whereas, domestic or internal migration relates to population movements within a country.

Further, the concepts are also included in migration which are important to be discussed:

a) Crude Migration rate
b) Migration Ratio

I. Net migration to Natural increase
II. Net migration to Population Growth

c) Characteristic-specific Migration rate

a) Crude Migration rate:

The crude migration rate is the number of migrants during the year to the average population in that year (Yusuf, Martins and Swanson, 2014).

b) Migration ratios:

Two types of migration ratios can also be calculated:

i. Net migration with natural increase
ii. Net migration to total population growth

i) Net migration to natural increase:

The net migration to natural increase ratio stands for the births and deaths during the same period (Yusuf, Martins and Swanson, 2014).

ii) Net migration to population growth:

The net migration to population growth is define as the ratio of net migration (including statistical adjustment) during the year to the average population in that year (Yusuf, Martins and Swanson, 2014).

c) Characteristic-specific Migration rate:

Specifying one or more characteristics in the numerators and the same characteristics in the denominators would result in the corresponding characteristic-specific migration rates.
Age and/ or sex are the most commonly used characteristics.

Topic 018: Reasons of Migration-I

Never before have there been so many people living far away from their native countries. Poor living conditions, violence and armed conflicts, environmental problems, a lack of economic perspectives and the growing gap between rich and poor countries: all these factors play their part. Global mobility and the new media likewise have a great influence on current migration trends. Since man has been on earth, ethnic groups have again and again travelled to other regions in the world hoping to find a better basis for existence there.

In recent centuries wars have repeatedly triggered mass displacements of refugees. Surveys conducted by international organizations have concluded that currently over 175 million people are living far away from their native countries. 19,2 million people are considered to be "refugees" or "displaced persons".

Poor living conditions generate the urge to migrate

The term "migrant" denotes a person living outside his or her native country. Many leave their homes because there are not enough fertile pastures and arable land, food, water, work or other fundamental requirements. The consequences of environmental catastrophes, such as drought or floods, can also force thousands to leave their native countries. Today roughly two thirds of the world's population live in economically poor countries. The growing gap between rich and poor is the most significant driving force for global migration. In 1960, the income of the richest fifth of the world's population was on average 30 times higher than the poorest fifth. By the year 1990, it was already 60 times higher.

The population grows while economic development stagnates

The enormous rate of population growth and the poor perspectives for economic development in some regions give rise to a tremendous migratory pressure. Third World and former Soviet Union countries lack capital and know-how. In some countries, debts absorb a major part of the economic power. Falling raw material prices as well as the customs barriers and import restrictions imposed by the industrialized countries prevent the development of viable export industries. Unstable economic policy, a lack of legal stability and widespread corruption discourage investors and concerns from locating their long-term industrial projects in such countries.

Violence and the abuse of power force people to flee

The term "refugee" is used to describe people who are persecuted on account of their race, religion, ethnic group or political conviction. Persons whose freedom or lives are threatened in this sense have a right to protection by foreign countries on the basis of international conventions. "Displaced persons" are not fleeing from individual persecution but from escalating violence threatening large parts of the population in a certain region or country. Those affected by such conflicts mostly flee in large numbers to safe regions in their native land or in a neighboring country. In order to prevent unrest, hunger, disease and other problems, they are frequently

accommodated in refugee camps. The reception and care of large influxes of refugees severely undermine the resources of the states concerned. Refugee camps with tens of thousands of strangers often arouse feelings of insecurity in the host country's population. This can lead to political instability in the country concerned, provoking new conflicts. In such situations, nations living at peace and in stable economic conditions are called upon to show their solidarity and share the burden (e.g., with measures such as the temporary admission of displaced persons, peace missions, material and reconstruction aid).

The rich industrialized states are becoming more accessible

Tourism, television and the Internet all enhance the attractiveness of migration. They make the poorest aware of the wealth of the rich. The growth of air travel facilitates journeys to far-away industrialized countries. So far only a fraction of those willing to consider migration have actually been able to travel to their preferred destination on other continents. But this could soon change since successful emigrants transfer a considerable share of their income to their relatives at home. As a result, more and more people can afford to travel to distant countries. Asylum seekers prefer countries where many of their fellow-countrymen already live. In simple terms this means: Migration begets further migration.

Topic 019: Reasons of Migration-II

Following are some of the basic reasons, which are the cause of the migration of many of the people, i.e.

1) Higher employment:

Higher employment causes the population to migrate from poorer areas to developed areas where wages are higher and employment opportunities are more numerous and varied. Most often, the population emigrates due to unemployment, underdevelopment, unfavorable economic conditions and lack of career prospects.

At the same time, in developing countries, technology and mechanization in the agricultural sector significantly reduce the need for labor in rural areas. Hence, the population has no alternative sources of income. Such a context was present in Romania, which, due to its fresh accession to the European Union, represented an important "source" of migrants for the western countries. Such a country is Italy, where Romanians are the main minority (1.8% of Italy's total population is represented by Romanian migrant citizens)

2) More Wealth:

The cause migration stem from people has need and desire to achieve a higher standard of life. Thus, they migrate to ensure a better life for themselves and their family, in regards to the community the education system and the health system. For example, the increased level of tolerance for cultural, sexual, ethnic and religious diversity.

3) Better services:

Most of the people migrate because of the poor services available in that area/region. Those services may include healthcare, communication, transportation, trade, legal services, professional, medical care, household, food and beauty care etc. The services as health and

medical care are the top most important service that is the reason of migration from are with poor services to the area where these services are provided in better way.

4) Good Climate:

Most of the times the reason of migration can also be the climatic factor. People prefer those are areas in which there is a mild form of climate and from where one can enjoy all the seasons. The meteorological impact of climate change can be divided into two distinct drivers of migration:

1. Climate process
2. Non-climate drivers

Climate processes:

These may be sea-level rise, salinization of agricultural land, desertification and growing water scarcity, and climate events such as flooding, storms and glacial lake outburst floods.

Non-climate drivers:

Non-climate drivers include government policy, population growth, land degradation, urbanization, pollution, etc.

Topic 020: Reasons of Migration-III

Further, some of the reasons are discuss below:

5) Safer, less crime:

The focus of today's people is to reside in an area where there is high security. The people therefore move towards those area and settled there, where there is less crime. The reason behind shifting of people from their old houses to the well-established societies is that there is high security in the privately owned societies.

Factors regarding safety and security are usually of the highest importance in people`s decision to migrate, sometimes representing a matter of life and death. Persecution and discrimination based on nationality, race, religion, political beliefs or belonging to a social group, often causes people to move to other safer areas. The danger can be created by the activities of criminal groups or by war.

6) Political stability:

Political stability is important for business environments in EMEs (Emerging Market Economics), as it affects investor and consumer confidence, thus having a wider impact on the economy. The people who get politically instable in an area due to the shortage of customers or Tough competition in their work, they move to other place where there is less competition or they can get easily high number of customers.

7) More Fertile land:

When the land becomes barren and no more field can be cultivated so the people, like farmers and agriculturists, from that area migrate to the place where there is fertile land so in order to earn

wage for their living. The integration of migrant workers helps to resolve skills shortages, but can reduce internal wages, thus creating a burden for the well-being of the population.

8) Lower risk from natural hazards:

There is high migration rate in the areas where there is greater hazards of natural disasters i.e. flooding, droughts, volcanic eruptions etc. People use to move out of those areas where there is higher risk to life and property.

Drought results in food shortages and hunger; pollution of water, air and soil creates major risks to the health of the inhabitants, forcing them to migrate to low-risk areas. At the same time, natural disasters such as tsunamis, hurricanes and earthquakes, are often compelling reasons to migrate.

9) Social Acceptance:

One of the important social factors that causes migration of people is social acceptance. The people who feel themselves unaccepted by the societal norms and values and by those people who are living in that specific area, they migrate from that area.

They migrate to ensure a better life for themselves and their family, in regards to the community. It is a person's desire to live in a society where they get peace of mind and calm environment, and this kind of environment is created where there are high social contacts, which is caused when others socially accept a person.

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Lesson 06

MIGRATION – II

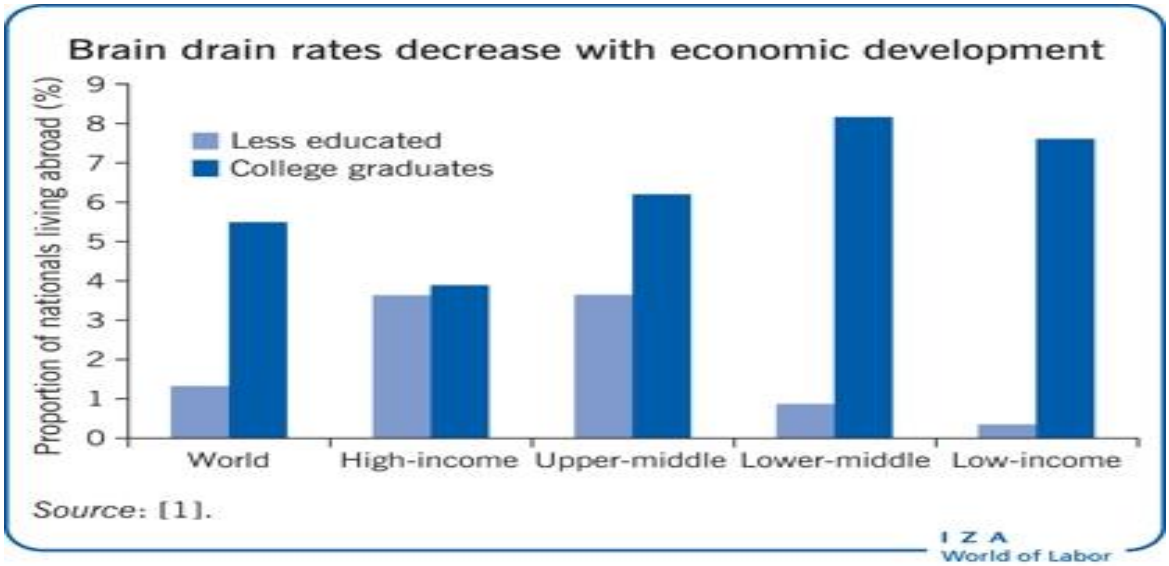
Topic 021: Brain Drain

An interesting effect of migration appears in developing countries and it stems from the fact that a large number of highly skilled and educated citizens choose to migrate - the so called "brain-drain" phenomenon.

It refers to the international transfer of human capital resources and mainly applies to the migration of highly qualified people from developing countries to developed countries.

In practice, the term is use in a narrower sense and it defines the case of migrants with university education or professionals in fields such as engineering, medicine and science.

Brain Drain can result from turmoil within a nation, the existence of favorable professional opportunities in other countries or from a desire to seek a higher standard of living.



Source: IZA World of Labor

Topic 022: What is Emigration?

Emigration is defined as movement of the people out of the territory (Macionis, 2012).

Emigration is also known as out-migration. Acting of leaving to settle in another place especially within country. It can also be both i.e., Internal or International.

The difference between migration and emigration i.e., migration is the movement of people in and out of a specified territory but the emigration is the movement of people out of the specified territory. Moreover, emigration is a specified type of migration, which deal with one type of migration. Furthermore, emigration has a fiscal impact on receiving country. At one hand they

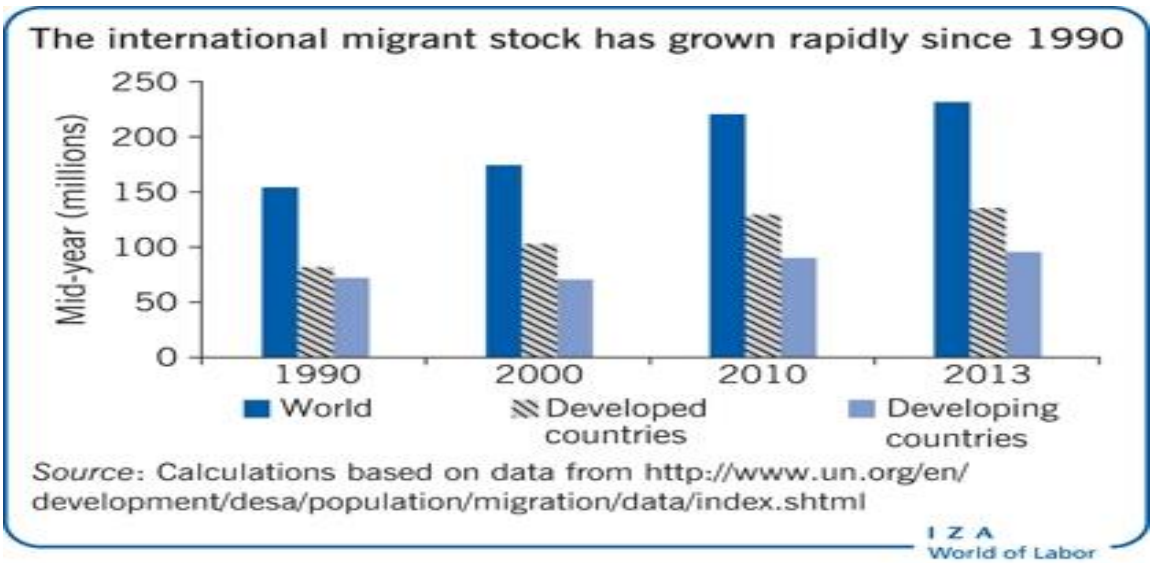
pay taxes, earn and purchase. On other hand they get access to social services provided by new country.

When people leave a country, they lower the nation's labor force and consumer spending. If the country they are leaving has an oversaturation of the labor force, this can result in the positive effect of relieving unemployment rates. On the other hand, the countries receiving the emigrants tend to benefit from more available workers, who also contribute to the economy by spending money. While emigration usually represents people leaving a country, immigration is the process of a country-receiving people who left another country. In other words, immigration is the result of emigration for the receiving country. For example, people might say they immigrated to the United States, which is where they now have permanent residence, but they emigrated from Spain. Many countries regulate the number of people that can emigrate or emigrate from one country to another.

When people immigrate to a new country, they pay taxes in the new country based on earnings, property owned, and other factors. They may also pay sales tax on purchases when applicable. These people may also qualify for social services provided by that country, such as education for dependent children or universal health care. Each country needs to ensure new tax revenues match the additional expenses for social services provided to the emigrants and their families.

When large groups of emigrants enter the job market in a new country, there is an effect on the available number of jobs and the number of wages one can ask for a particular job. The new country must have enough job openings to support emigration without damaging the chances of the native-born labor force finding employment. Additionally, if an emigrant takes a job for a lower wage than typically offered to the native labor force, it can lower wages for both emigrants and the native population.

However, at times a country might struggle to have enough workers within their labor force to satisfy the demand for jobs. In the late 1990s, the U.S. had an unemployment rate of 4%, and companies struggled to find workers. Emigration can help alleviate labor shortages during times of economic expansion while increasing consumer spending and tax revenue for state and local governments.



Source: IZA World of Labor

Topic 023: Immigration and Emigration as influence on Population Dynamics - I

Immigration is defined as the movement of the people into a territory. Immigration is also known as in-migration. It can also be both i.e., Internal and International.

Historical Perspective:

Migration has no biological or genetic component. There is no genetic propensity in people favoring or not favoring residential change. The likelihood that a person will or will not move is due entirely to factors in the physical and social environment at the areas of origin and destination and to personal factors. Bogue (1969: 753) wrote that the:

"Human organism tends to remain at rest [that is, in the same residential location] until impelled to action by some unsatisfied need or by the threat of discomfort. . . .Migration [theories thus begin] with the premise that every departure for a new community, i.e., migratory movement, is either a response to some impelling need that the person believes cannot be satisfied in his/her present residence, or is a flight from a situation that for some reason has become undesirable, unpleasant, or intolerable."

In the course of 400 years— from the late 16th through the 20th century— European migrants colonized the Americas, Australia, Oceania, the northern half of Asia, and parts of Africa. Human migrations within recorded history have transformed the entire aspect of lands and continents and the racial, ethnic, and linguistic composition of their populations. The map of Europe, for example, is the product of several major early migrations involving the Germanic peoples, the Slaves, and the Turks, among others. The overseas migration of Europeans during this period totaled about 60 million people.

From 1801 to 1914 about 7.5 million migrants moved from European to Asiatic Russia (i.e., Siberia), and between World Wars I and II about 6 million more, not counting innumerable deportees to Soviet labor camps, voluntarily migrated there. The largest migration in history was the so-called Great Atlantic Migration from Europe to North America, the first major wave of which began in the 1840s with mass movements from Ireland and Germany. In the 1880s a second and larger wave developed from eastern and southern Europe; between 1880 and 1910 some 17 million Europeans entered the United States. The total number of Europeans reaching the United States amounted to 37 million between 1820 and 1980. Since World War II the largest voluntary migrations have involved groups from developing countries moving to the industrialized nations.

Some 13 million migrants became permanent residents of western Europe from the 1960s through the '80s, and more than 10 million permanent immigrants were admitted legally to the United States in that same period, with illegal immigration adding several millions more. Slave migrations and mass expulsions also have been part of human history for millennia. The largest slave migrations were probably those compelled by European slave traders operating in Africa from the 16th to the 19th century; perhaps 20 million slaves were consigned to the Americas, though substantial numbers died in the appalling conditions of the Atlantic passage. The largest mass expulsions have probably been those imposed by Nazi Germany, which deported 7–8 million persons during World War II (1939–45), and by the Soviet Union, which forcibly expelled 9–10 million ethnic Germans from eastern Europe into Germany in the closing year of the war and afterward. Some 14 million people fled in one direction or another during the partition of British India into India and Pakistan in the late 1940s. The largest migrations in the second half of the 20th century and the beginning of the 21st century have consisted

of refugees fleeing war, such as the estimated 3–4 million people who fled Afghanistan in the 1980s and the 5–6 million who departed Syria in the 2010s.

Net Migration Rate of Southern Asian Countries, 2020

Country	Migration Rate
Pakistan	-1.016
India	-0.369
Bangladesh	-2.208
Afghanistan	-0.100
Bhutan	0.408
Maldives	7.197
Nepal	2.920
SriLanka	-4.390

Source: United Nations-World Population Prospects

Topic 024: Immigration and Emigration as influence on Population Dynamics - II

In the limiting case of low migration intensity, each location evolves independently according to its local rules and conditions, as expected. With increasing migration, the population distribution between locations changes, including the critical behavior of extinction of population for some locations for a specific set of the rules. Then, the deserted location may become populated again if the migration is still increasing as result of a pressure to move.

Countries losing people

Advantages:

1. Money sent home by migrants.
2. Decrease pressure on jobs and resources.
3. Migrants may return with new skills.

Disadvantages:

1. People of working age move out reducing the size of the country's potential workforce.
2. Gender imbalances are cause as it is typically men who seek to find employment elsewhere. Women and children are left.
3. Brain drain if many skill workers leave.

Host country:

Advantages:

1. A richer and more diverse culture.
2. Helps to reduce any labor shortage.
3. Migrants are more prepared to take on low paid, low skilled jobs

Disadvantages:

1. Overcrowding
2. Disagreements between different religions and cultures.
3. Increasing cost of services such as health care and education.

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Lesson 07

MIGRATION – III

Topic 025: Push and Pull factors of Migration

Push factors are those factors, which causes the people to migrate from that particular region (Tataru, 2020).

Pull factors are those factors, which attract people towards a particular place (Tataru, 2020).

"Push" factors are the negative aspects of the country of origin, often decisive in people`s choice to emigrate and the "pull" factors are the positive aspects of a different country that encourages people to emigrate in search of a better life.

Although the push-pull factors are apparently diametrically opposed, both are sides of the same coin, being equally important. Although specific to forced migration, any other harmful factor can be considered a "push factor" or determinant / trigger factor, such examples being: poor quality of life, lack of jobs, excessive pollution, hunger, drought or natural disasters. Such conditions represent decisive reasons for voluntary migration, the population preferring to migrate in order to prevent financially unfavorable situations or even emotional and physical suffering. One such example is the Great Irish Famine (18451849), which forced thousands of Irish families to immigrate to the United States to avoid starvation (Rosenberg, 2019)

On the other hand, the "pull factors" or attraction factors are present in the receiving states. The promise of religious or political freedom, career opportunities, quality of life and the environment are factors of attraction for immigrants.

Topic 026: Push factors of Immigration-I

1. Sub-standard level of living:

The people who face unpleasant environment and they feel that environment do not matches with their living standard, then those people migrate from that area and moves to the areas where there is pleasant environment. The lack of access to the resources that are being demanded for the status that people own also contributes to the poor standard of living, which act as a push factor for the immigration.

2. Sub-standard level of food:

People also move out of those areas where there is low quality of food provided to the residents of that area. Sub-standard level of food can cause several different diseases which can be hazard to life so in order to lower the risk of those diseases one opts to move out of that area and get settled in an area where there is better quality of food supplied.

3. Land Scarcity:

At a global scale, land is becoming a scarce resource, asserting the need for more efficient land use allocation and innovation in agriculture. Scarcity is fewer resources than are needed to fill human wants and needs. Land scarcity includes shortage of food, gasoline, water, coal, natural

resources than people of lower class who have no access to the land resources migrate to another areas where this difficulty is not being faced by them.

4. Job Scarcity:

The important reason for the migration that act as a push factor is the shortage of jobs in a specific area. When there is shortage of jobs for skilled people in an area then those people are forced to move to other places where there are sufficient opportunities of job for them.
This factor may lead to brain drain of the area from where the migration occurs.

5. Natural Disasters:

Disasters like droughts, famine, flooding etc. act as the push factors of immigration. Natural disasters act as risk factor for life and property of people. Disasters get rid of people movement out of the territory in for their survival.

Topic 027: Push factors of Immigration - II

6. Political persecution:

Political persecution is the act of a state entity controlling a citizenry by force for political reasons, particularly for the purpose of restricting or preventing the citizenry's ability to take part in the political life of a society, thereby reducing their standing among their fellow citizens. When a state faces the condition of war then people of that states migrate from that area in order to safe their life. Moreover, the people who wants to take part in political activities but are forced by the leaders to not to take part then those people move to other areas in order to experience those political activities.

7. Religious persecution:

Religious persecution is the systematic mistreatment of an individual or a group of individuals as a response to their religious beliefs or affiliations or their lack thereof. The people who faces difficulty in practicing their religious beliefs then those people migrate from that area where they do not have freedom to perform their religious activities to those areas where they have freedom to practice their religious activities.

8. Pollution:

An environmental push factor is when people have to leave to survive. Things like natural disasters, droughts, flooding, and, lack of resources are just some push factors that cause people to move. Lack of clean water for drinking, unpleasant environment etc. all are the factors that create pollution, which are the push factor for immigration.

9. Famine and Droughts:

The hazards like famine and droughts are also the life-threatening factors and these factors forces people to move out of their residential area and move to those areas where there is no such hazards faced by them.

10. Lack of educational opportunities:

The people of a specific age group i.e., students migrate from their native areas or villages to the mega cities as there is lack of higher educational opportunities in the villages. Major effects of lack of education includes poor health, lack of a voice, shorter lifespan, unemployment, exploitation and gender inequality. In order to overcome these problems students gets higher education in order to lower down the risks of these effects and for that they move to the areas where there are higher opportunities of education.

Topic 028: Pull factors of Immigration

1. Freedom for religious persecution:

People who are close to religion, use to attract towards those areas where there is freedom to perform religious activities.

2. Freedom from political persecution:

People who are highly interested in the political activities mostly likes to stay in the areas where there is freedom for carrying out political activities. People who love to stay in a peaceful environment like the states that are war-free and people are usually attracted by those states where there is less crime and free of wars.

3. Career opportunities:

The migration trend is high towards that area where there are more available opportunities for jobs. The areas where high human capital is required, there are a huge amount of jobs present which can hire skilled men who can be the source of the high profit.

4. Cheap land:

Landowners who have excess of money and want to get more land use to migrate to those areas where the price of the land is relatively low and in order to get more land they switch to those areas where land is available at cheaper rates.

5. Abundance of Food:

The people like to reside in those areas where there is highly abundance of food. The people use to move away from those areas where there are famine or people are starving.

6. Opportunity to pursue a better life:

The people use to migrate in those areas where the standard of living is high and where people are socially accepted by the society.

7. Attractive environment:

To live in a peaceful and pleasant environment is the desire of every individual. People who are more attracted to nature likes to live in those areas where the environment is delightful.

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Lesson 08

COMPOSITION OF POPULATION BY AGE AND SEX

Topic 029: Composition of Population

Population composition is the description of a population according to characteristics such as age, sex, language and caste. These data are often compared over time using population pyramids. The elements of population composition are:

1. Composition by Age
2. Composition by Sex
3. Composition by Caste
4. Composition by Language
5. Composition by Ethnicity
6. Composition by Religion

Changes in any one of the demographic processes yield equally important information about how populations are composed, that is, their structure.

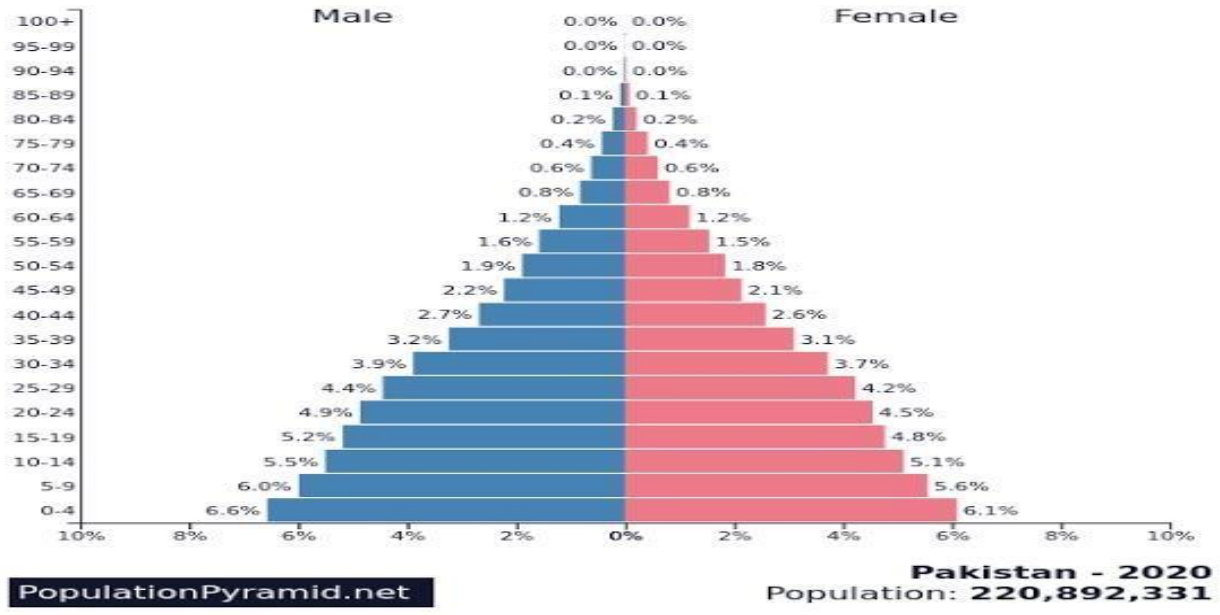
Topic 030: Composition of Population

1. **Composition of Population by Age:**

Age distribution, also called Age Composition, in population studies, the proportionate number of persons in successive age categories in a given population (Poston and Bouvier, 2010).

Age distribution differ among countries mainly because of differences in the levels and trends of fertility. A population with persistently high fertility has a large proportion of children and a small proportion of aged persons. Changes in fertility have an immediate effect on numbers of children, but many years must pass before the change affects the numbers above childhood.

Age distributions have also been influenced in varying ways by migrations, war losses, and differences in mortality—though these effects are generally less important than the influence of variations in fertility. Age distribution affects the economic and social behavior of the society. Age distribution is analyzed by the population pyramid.

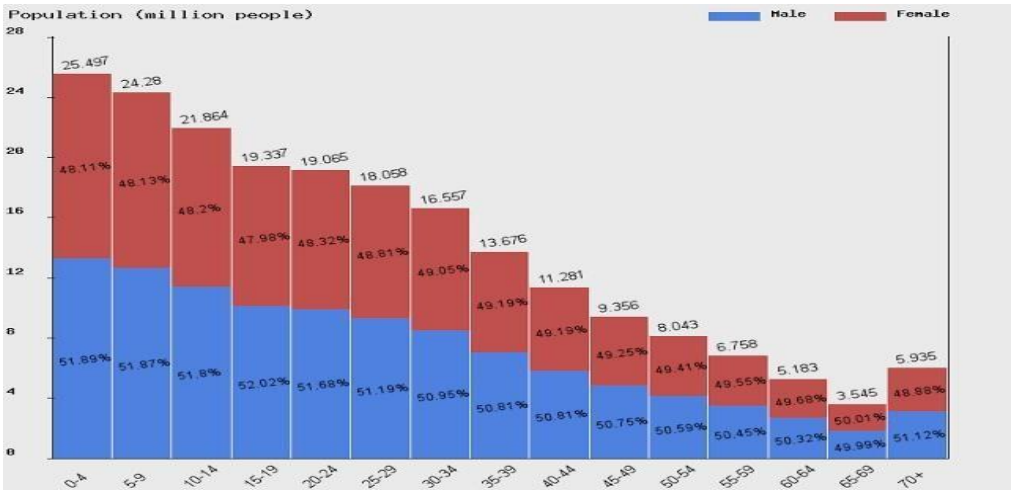


Topic 031: Composition of Population - III

2. Composition of Population by Sex:

The composition of a population as determined by the number of or proportion of males and females is known as composition of population by sex (Poston and Bouvier, 2010).

The composition of population by sex tells the relative number of male and female in a given population. Sex is an ascribed characteristic and for most people, unchangeable but there are some who do change it. Division of labor in traditional societies were based almost entirely on age and sex. The demographic processes themselves vary significantly by age and sex. With regard to fertility, more males are born than females, usually around 105 males for every 100 females. Females have lower death rates than males at every age of life. This differential has been observed through the centuries and may be attributed to both behavioral and genetic causes.



Composition of Population by Age and Sex in Pakistan, 2020

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Lesson 09

COMPOSITION OF POPULATION BY CASTE, LANGUAGE AND ETHNICITY

Topic 032: Composition of Population - IV

3. Composition of population by Caste:

The proportionate number of castes in a given population is known as the composition of population by caste (Dahal, 2003).

A caste system is social stratification based on ascription, or birth.

The popular castes of Pakistan are as follow:

Butt, Jutt, Khan, Gujjar, Sheikh, Awan, Arain, Rajpoot, Mughal, Qureshi etc.

Among different Caste systems prevalent on a global scale, the Hindu caste system in India presents a unique character. It is opposed to other societal groupings where separation is inter-racial. The castes in India divides Hindus into four main categories i.e.

1. Brahmins
2. Kshatriyas
3. Vaishyas
4. Shudras

In India, the leading positions in the competing sectors of the economy are occupied by castes belonging to the two different religious categories.

Topic 033: Composition of Population - V

4. Composition of Population by Language:

The Proportionate number of languages spoken in a given population. Roughly 7,000 Spoken languages in the world today. About 2000 of those languages have fewer than 1,000 speakers. Specialists count well over 2,000 languages are being spoken in Asia and Africa, while Europe have just 300 languages.

There are 1,300 languages that are being spoken in the Pacific region, while there are only 1,000 languages that are spoken by America. The most popular language in Pakistan is Punjabi, a language which 88% of the Population speaks. Second most popular language is Pashto, which is spoken by 15 percent of the Population. Third popular language of Pakistan is Saraiki, which is spoken by 10 percent of the Population. English is widely spoken throughout the Government of Pakistan, mainly because it is actually the official language of the Government of the country. Other spoken languages in Pakistan icludes;
Sindhi, Balochi, Hindko, Brahui, Kashmiri, Burushaski, Khowar, Shina, Batli etc.

Topic 034: Composition of Population (Part VI)

5. Composition of Population by Ethnicity:

The proportionate number of ethnic diversities in a given population. Ethnic diversity exists in countries like USA, Nepal, New Zeland, Pakistan, India etc. Most Pakistani people come from the ancestral group known as the Indo-Iranians. The largest ethnic group in Pakistan consist of those of Punjabi ethnicity. Ethnic group of Pashtuns are at second while third is the ethnic group of Sindhis. There is a special mixed ethnic group between the Punjabi ethnicity and the Sindhi ethnicity and this mixed group makes up about 10% of the entire Population. The other major Ethnic groups of Pakistan includes, Muhajirs, Saraikis, Baloch, Paharis, Hindkowans, Rajputs and other smaller groups.

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Lesson 10

COMPOSITION OF POPULATION BY SEX RATIO, RELIGION AND POPULATION PYRAMID

Topic 035: Composition of Population - VII

6. Composition of Population by Religion:

The number of religions in a given Population. There is diversity in the religions in Pakistan. The state religion in Pakistan is Islam. Other minority religions that exist in Pakistan are;
Christian, Hinduism, Sikhs, Ahmadis, Baha'is, Parsis, Buddhists.

Muslims make up around 95% of Pakistan's total population, while Christians and Ahmadis account for around 2% and the Sikhs, Hindus, Parsis and Buddhists and others make up the remaining 1-2%.

Topic 036: Composition of Population - VIII

7. Sex Ratio:

The sex ratio (SR) is the most popular index of sex composition in demographic analyses. *It is defined as the number of males per 100 females in a population* (Poston and Bouvier, 2010).

SR above 100 indicates an excess of males whereas, SR below 100 indicates an excess of females. Most societies have sex ratios at birth (SRBs) of around 105, which means, 105 boys are born for every 100 girls. China, Taiwan, South Korea, India, and several other Asian countries have been reporting abnormally high SRBs since the 1980s. A main intervention is prenatal sex identification followed by gender-specific abortion. China and Taiwan have a Confucian patriarchal tradition where son preference is strong and pervasive. Birth-planning policies, socioeconomic changes, and industrial transformations have been responsible for the rapid decline in fertility.

Types of Sex ratios:

In most species, the sex ratio varies according to the age profile of the population.[7] It is generally divided into four subdivisions:

- **Primary sex ratio** — ratio at fertilization
- **Secondary sex ratio** — ratio at birth
- **Tertiary sex ratio** — ratio in sexually mature organisms

Also called adult sex ratio and abbreviated to ASR. ASR is defined as the proportion of adults in a population that are male. Operational sex ratio abbreviated as OSR is the proportion of adults in the sexually active population that are males. 'OSR' has often been confused with 'ASR' although these are conceptually different.[9]

- **Quaternary sex ratio** — ratio in post-reproductive organisms

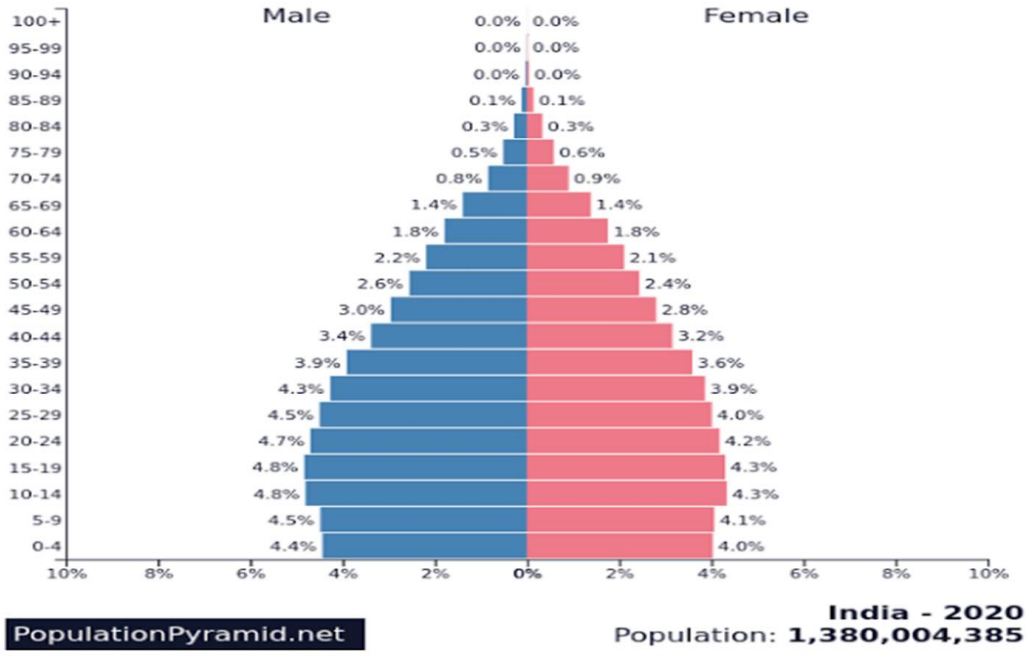
Topic 037: Composition of Population-IX

8. Population Pyramid:

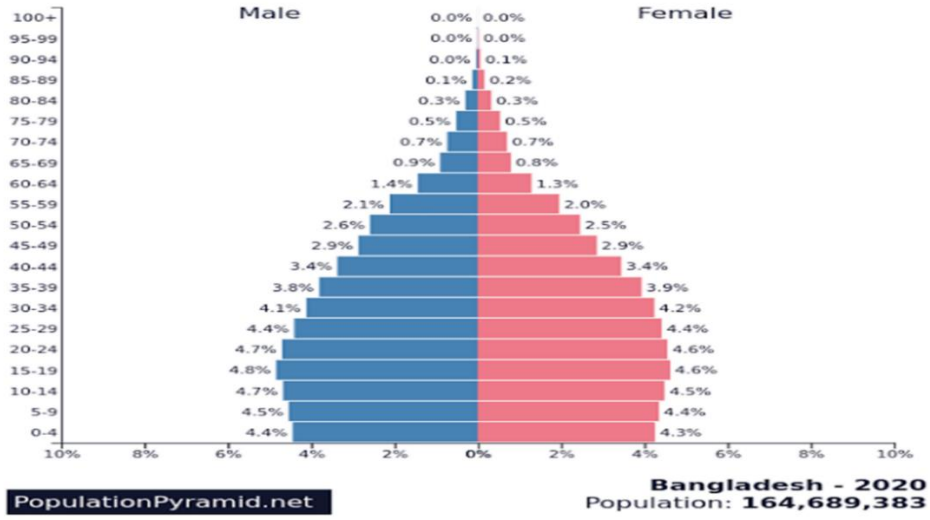
A graphic representation of the age/sex structure of the population is the age/sex pyramid, or population pyramid; it shows for a specific point in time the different surviving cohorts of persons of each sex (Poston and Bouvier, 2010).

A population pyramid is one of the most elegant ways of graphically presenting age and sex data. A population pyramid is nothing more than two ordinary histograms (bar graphs), representing the male and female populations in, usually, 1- or 5-year age categories, placed on their sides and back-to-back. The base of the pyramid, representing the size of each of the age/sex population groups, is present in either absolute numbers or in percentages. When using percentages as the metric, one must be sure to "calculate the percentages on the basis of the grand total for the population, including both sexes and all ages"

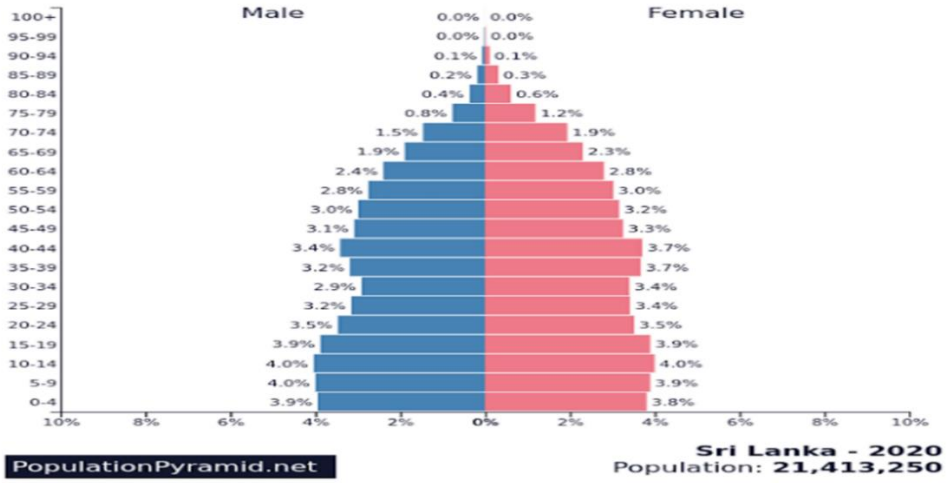
Despite their descriptive utility, however, population pyramids give only a graphic representation of age and sex structure at a particular point in time.



Source: Population Pyramid.net



Source: Population pyramid.net



Source: Population Pyramid.net

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Lesson 11

SOURCE: NATIONAL CENSUS/POPULATION CENSUS

Topic 038: Source of Population Data

Most of the data used today is in secondary form while, some demographers do gather their own data, especially those who use anthropological perspectives and who engage in ethnographic research. Following are the sources from where the data of population of a country can be get i.e.

1. Population Census
2. The Surveys
3. Registration of Births
4. Registration of Deaths
5. Registration of Marriages
6. Registration of Divorces
7. Administrative Records

National censuses and registers differ in that the former are conducted on a decennial (or, in some countries, quinquennial) basis, while the latter, theoretically at least, are compiled continuously. Actually, registration data of population events are usually compiled and published annually or monthly, but they are gathered continuously. A census may be likened to taking a snapshot of a population at one point in time, say, once every ten years, and in this snapshot getting a picture of the size of the population, its characteristics, and its spatial distribution.

A registration may be thought of as a continuous compilation of major population events, often births, deaths, marriages, divorces, and sometimes migrations. As a birth or a death occurs, it is registered with the government; the registrations thus occur continuously. Censuses and registers are intended to cover the entire population. In a national census, everyone in the population is supposed to be enumerated, and all the demographic events (births, deaths, and so forth) that occur in the population are supposed to be registered.

Surveys, on the other hand, are by definition administered to only a fraction of the population. Yet they often gather data on many of the items included in censuses and registers, plus additional items of interest to demographers not included in them.

Topic 039: Sources of Population Data - I

1. National Census/ Population Census:

A national census is "the total process of collecting, compiling, and publishing demographic, economic, and social data pertaining, at a specified time, to all persons in a country or delimited territory" (Poston and Bouvier, 2010).

The principal objective of a census is to obtain data about the size, composition, and distribution of the population. A typical census thus includes information about the size of the population and its social and geographic subpopulations, as well as data on their age and sex composition and their educational composition (levels of literacy and educational attainment and extent of school attendance). Many censuses also contain information on economically active and inactive populations, including data on the industrial and occupational composition of the working population, as well as economic (salary and income) data.

Other population data in a typical census include information pertaining to country or area of birth, citizenship, language, recent migration experience, religion, and ethnic heritage, which refers to group distinctions based on shared cultural origins.

In the actual enumeration of the population, there are two ways to count people: by following a de jure method or by following a de facto method. In the case of a de jure enumeration, the census covers the entire territory of the country and counts persons according to their "usual" or "normal" place of residence in the country.

A de facto enumeration also covers the entire territory of the country but counts each person in the population according to his/her geographical location on the day of the census undertaking.

Topic 040: Sources of Population Data - II

History of National Census:

Census taking had its origins in ancient Egypt, China, and Rome, among other places, although only a few of these enumerations have survived. There may have been a census conducted in China as early as 3000 BC, but demographic records for China and other countries for the very early periods no longer exist. Several census counts are mentioned in the Bible; one was undertaken at the time of the Exodus in 1491 BC, and another was conducted during King David's era in 1017 BC. Roman censuses were conducted quinquennially for more than 800 years. The Romans extended the census enumeration to the entire Roman Empire in 5 BC, resulting in the popular biblical census story reported in St. Luke's Gospe. It is difficult to determine when the first modern census was undertaken. Coverage was highly suspect in early efforts; women and children were seldom included.

Topic 041: Sources of Population Data - III

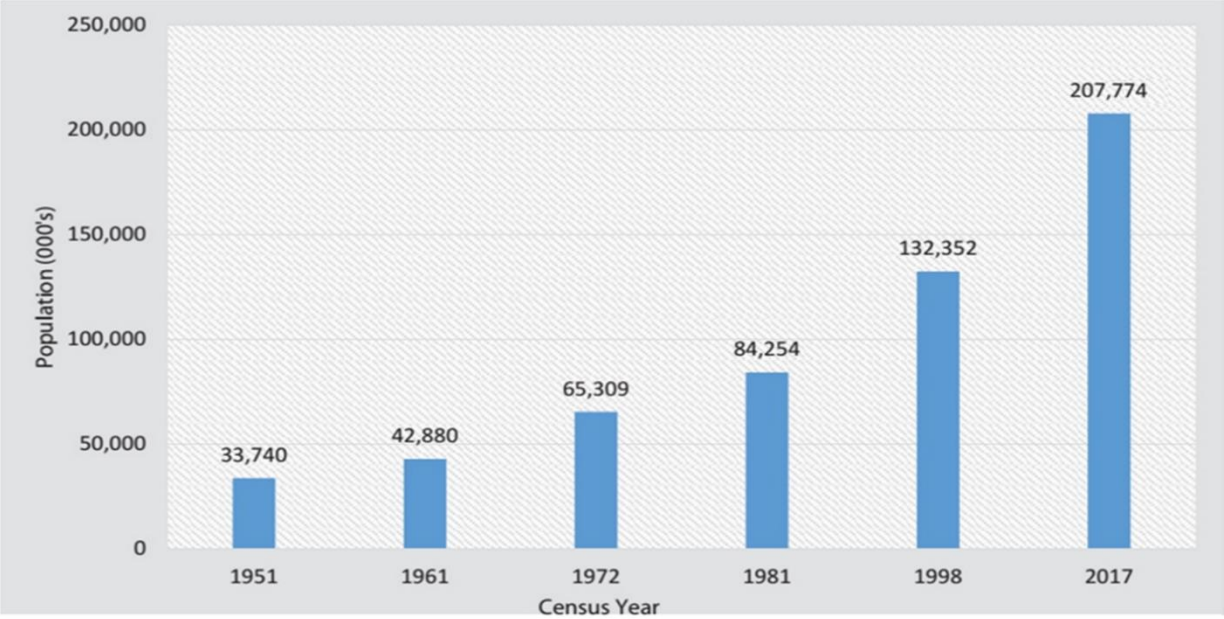
Censuses were often conducted to determine the fiscal and military obligations of the citizens. Censuses are quite expensive to conduct. Census data provide government officials with useful and necessary information about the people in their country. Governments use census data in virtually all features of public policy, for example, how many children the public schools need to serve and where to place new roads. Census results also provide the denominator data for crime rates, death rates, per capita income figures, and other statistics that are needed to administer local and national governments. Private businesses require census data for their market analyses and advertising activities. Many demographers and other social scientists use census data to test their theories and conduct their analyses.

6th Population and Housing Census of Pakistan, 2017

PROVISIONAL SUMMARY RESULTS OF 6TH POPULATION AND HOUSING CENSUS-2017			
Administrative Unit	Households	Total Population	1998-2017 Average Annual Growth Rate
Pakistan	32,205,111	207,774,520	2.40
Khyber Pakhtunkhwa	3,845,168	30,523,371	2.89
FATA	558,379	5,001,676	2.41
Punjab	17,103,835	110,012,442	2.13
Sindh	8,585,610	47,886,051	2.41
Balochistan	1,775,937	12,344,408	3.37
ICT	336,182	2,006,572	4.91

Source: Pakistan Bureau of Statistics

6th National Census of Pakistan, 2017



Source: Pakistan Bureau of Statistics

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Lesson 12

SOURCE: THE SURVEYS

Topic 042: Sources of Population Data - IV

The Surveys:

Demographers rely on another source of demographic data, sample surveys. It contains the extensive kinds of information needed to address some of the more critical demographic questions. This is particularly true with respect to the analysis of fertility, although it also applies to mortality and migration. Surveys are required for the collection of more detailed information. By administering surveys to carefully selected random samples of the larger populations, demographers are better able to uncover underlying patterns of demographic behavior than is possible with materials from censuses and registration systems.

The dated nature of censuses information also makes surveys useful tools in the compilation of demographic estimates between censuses. Surveys have a number of advantages. They tend to be less costly than censuses, can be designed with a specific purpose in mind and can dwell in depth into the subject matter. Further, they can be used in combination with demographic data obtained from other sources. After censuses are carried out, post-enumeration surveys enable the estimation of the census coverage and reliability.

When surveys include all individuals in the target population, they have the attributes of a census. Here, the concern is with surveys that use a sample of the target population to assess their characteristics. There are two major types of sample surveys: those based on probability samples and those not based on probability samples. In probability samples, each individual in the target population has an equal chance of being selected and thus the probability of selection can be estimated numerically. Non-probability samples take many different approaches and formats. Among them, convenience or accidental sampling is a non-random sample used because of ease of access to the individuals being sampled. Some enquiries use university students, because they are conveniently available subjects.

Topic 043: Sources of Population Data - V

Advantages of Surveys:

Surveys have a number of advantages, i.e.

1. They tend to be less costly than censuses.
2. Surveys can be designed with a specific purpose in mind.
3. By the help of survey, researcher can dwell in depth into the subject matter.
4. They can be used in combination with demographic data obtained from other sources.
5. After censuses are carried out, post-enumeration surveys enable the estimation of the census coverage and reliability.

High Representativeness

Surveys provide a high level of general capability in representing a large population. Due to the usual huge number of people who answers survey, the data being gathered possess a better description of the relative characteristics of the general population involved in the study. As compared to other methods of data gathering, surveys are able to extract data that are near to the exact attributes of the larger population.

Low Cost

When conducting surveys, you only need to pay for the production of survey questionnaires. If you need a larger sample of the general population, you can allot an incentive in cash or kind, which can be as low as $2 per person. On the other hand, other data gathering methods such as focus groups and personal interviews require researchers to pay more.

Convenient Data Gathering

Surveys can be administered to the participants through a variety of ways. The questionnaires can simply be sent via e-mail or fax, or can be administered through the Internet. Nowadays, the online survey method has been the most popular way of gathering data from target participants. Aside from the convenience of data gathering, researchers are able to collect data from people around the globe.

Good Statistical Significance

Because of the high representativeness brought about by the survey method, it is often easier to find statistically significant results than other data gathering methods.
Multiple variables can also be effectively analyzed using surveys.

Little or No Observer Subjectivity

Surveys are ideal for scientific research studies because they provide all the participants with a standardized stimulus. With such high reliability obtained, the researcher's own biases are eliminated.

Precise Results

As questions in the survey should undergo careful scrutiny and standardization, they provide uniform definitions to all the subjects who are to answer the questionnaires. Thus, there is a greater precision in terms of measuring the data gathered.

Topic 044: Sources of Population Data - VI

Here are some of the major surveys that are used by demographers in Pakistan i.e.

1. Demographic and Health Surveys
2. Pakistan Social and Living Measurements
3. Pakistan Economic Survey

1. Demographic and Health Surveys:

A part of the worldwide Demographic and Health Surveys (DHS) program designed to collect, analyze, and disseminate demographic data on fertility, family planning, and maternal and child health. Gathers information to estimate current levels of fertility, mortality, and migration, including the factors that affect them. Provides helpful inputs to policy formulation and to monitoring activities and researches related to health and family planning of both the government and private sectors.

DHSs are nationally representative household surveys with large sample sizes (usually between 5,000 and 30,000 households). These surveys provide data for many variables in the areas of fertility, population, health, and nutrition. Typically, the surveys are conducted every five years to permit comparisons over time.

2. Pakistan Social and Living Measurements:

PSLM Survey is a regular activity of PBS since 1 July 2015, earlier it was PSDP funded project started in July 2004 and continued up to 30 June 2015. It was designed to provide Social & Economic indicators in the alternate years at provincial and district levels. The data generated through surveys was used to assist the government in formulating the poverty reduction strategy as well as development plans at district level for the rapid assessment of programs in the overall context of Millennium Development Goals (MDGs).

As such this survey was one of the main mechanisms for the monitoring of MDGs indicator as out of 16 targets and 37 indicators adopted by Pakistan, 6 targets and 15 indicators were monitored through PSLM Surveys, which were conducted at district level and at Provincial level respectively at alternate years.

3. Pakistan Economic Survey:

Pakistan Economic Survey is a snapshot of the major economic developments that have taken place in the last one year in Pakistan and gives a glimpse of what is to come ahead in the short to medium term. It essentially lays the groundwork for the presentation of Budget.

The fundamental weaknesses of Pakistani economy: low tax to GDP ratio, poor savings rate and minimal export growth with negligible value addition etc. were further attenuated by misaligned economic policies like loose monetary policy and overvalued exchange rate, which have made it difficult to control twin deficits; the fiscal and the current account. This, in the short term, fueled demand and short-term growth, but has gradually eroded macroeconomic buffers, increased public debt and depleted international reserves. Moving along this path was unsustainable as it was moving the country towards ever slowing growth and eventual default. The shift in economic policy undertaken by the present government, through its policy of adjustments and structural reforms, has changed the course entailing readjustment in the fiscal and monetary policies.

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Lesson 13

SOURCE: REGISTRATION SYSTEM

Topic 045: Sources of Population Data - VII

3. Registration System:

Whereas censuses provide a cross-sectional (one point in time) portrayal of the size, composition, and distribution of the population, registration systems pertain to the population's demographic events (births and deaths and, in some places, migrations) and measure them as they occur.

While censuses are static, registers are dynamic and continuous. Registers apply principally to births and deaths, although many countries also maintain registrations of marriages, divorces, and abortions. Some countries maintain a migration registration system. Strictly speaking, as Lars Ostby has noted, a population register is a list (i.e., a register) of persons that includes the name, address, date of birth, and a personal identification number. Population registers are of interest to demographers because they contain birth and death records (certificates). However, not all birth and death registrations occur in the context of population registers, in fact, since a large number of countries do not maintain them, the registration of many births and deaths occurs outside population registers. In some countries, registration data can be more a source of confusion than usefulness, as far as demographic information is concerned, and care needs to be taken in testing its coverage and reliability; while in others these data are most valuable.

Topic 046: Source of Population Data - VIII

a. Registration of Births:

Birth registration is the process of recording a child's birth (Poston and Bouvier, 2010).
It is a permanent and official record of a child's existence, and provides legal recognition of that child's identity. Birth registration can present problems such as the distinction between live and stillbirths and related measures of birth and perinatal death rates. This can lead to both the under-enumeration of live births and infant mortality. Birth registration tends to record the date of the birth and sex of the issue, parents' details including age, usual residence, marital status and occupation.

Child Registration Certificate (CRC) is a registration document used to register minors under the age of 18 years. It is the fundamental right of a child to get a registration certificate from the place of origin. NADRA has been able to automate and in turn facilitate the process of acquiring Child Registration Certificates. CRC is also known as B-form. CRC can be taken by providing documented proof of childbirth from union council. Parent is required to be a holder of National Identity Card (NIC)/National Identity Card for Overseas Pakistanis (NICOP). You are required to go to any NADRA Registration Center (NRC) to apply for CRC.

Topic 047: Source of Population Data - IX

b. Registrations of Deaths:

Death registration generally records the age and sex of the individual, place of birth, marital status, occupation and cause of death. Records can suffer from various shortcomings. Further, details

regarding age, marital status and occupation can also pose challenges due to definitions and memory lapses. The cause of death is also an issue in terms of definitions. There can also be lack of coverage because, in some cases, deaths may take place without medical assessment of the cause of death.

Topic 048: Source of Population Data - X

c. Registrations of Marriages and Divorces:

The value of registration data on marriages and divorces, as a source of information on family relationships is changing considerably, as social values and partnerships evolve. Registration usually records de jure but not de facto relationships or separations. De facto marital status has risen considerably in some countries. This has led to some countries to offer legal status to cohabitation and even registration without legal marriage. Further, there may be differences in legal statutes concerning marriage and divorce within the same country and across countries. Nevertheless, marriage registration continues to provide information on a dimension of social relationships: legal conjugal status. The recorded information usually includes the date of the event and of birth and sex of the partners, their usual residence, occupation and religion, as well as any previous legal marital status. In addition, divorce may also include the information on any children involved.

The maintenance of an effective registration system probably is more of an administrative accomplishment than is carrying out decennial population censuses. Whereas a census can involve periodic crash efforts, civil registration requires maintaining a permanent bureaucracy in every locality in the country. Because of this, most countries have more confidence in data from their censuses than in data from their registration systems. This, combined with their costliness, has caused many countries to curtail their registration systems. As a result, in many developing countries registration is either weak or lacking. Only 25% of the world population lives in a country with high quality birth and death registry systems (WHO, 2012). A major challenge in recent years is the increasing substitution of mobile phones for landlines, making it difficult to track down households.

Topic 049: Sources of Population Data - XI

Administrative Records:

Administrative records are usually established for specific purposes such as government or private activities. This primary function may pose problems in the collection of demographic data because of:

1. Limited coverage
2. Concepts and definitions
3. Timeliness
4. Access
5. Consistency
6. Accuracy.

The growing use of electronic data entry and classification has also improved retrieval of these data and their manipulation for statistical purposes. Greater demand for statistics, concern with

data collection fatigue and sometimes-budgetary constraints have contributed to efforts in the use of administrative records as a source of statistics.

Administrative records collect a wide range of information at various levels from countrywide programs such as taxation and social security benefits to local government administrative concerns such as housing. Statistics from schools are a major source of information on enrolments and levels of education achieved. Hospital statistics can contribute to the assessment of dimensions of health status. Administrative records of international arrivals and departures and the granting of visas are useful in the estimation of international migration. Taxation statistics can also be used to assess levels of income and about the movement of people from year to year. The same applies to data kept by public utilities such as electricity, gas and water services.

Topic 050: Sources of Population Data - XII

Advantages of Administrative Records:

Administrative data make possible analyses at the state and local levels that are rarely possible using national survey data. Such data often contain detailed, accurate measures of participation in various social programs. They typically include large numbers of cases, making possible many different types of analyses. At the state level, such data provide effective ways for assessing state-specific programs and can be useful for several forms of program evaluation. It is often less expensive than other methods of data collection.

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Lesson 14

THEORIES OF DEMOGRAPHY AND POPULATION

Topic 051: Theories of Demography and Population

Theory and its Importance:

A theory is a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained.

A theory is a statement which describes how and why specific facts are related. Theory explains how some aspect of human behavior or performance is organized. It thus enables us to make predictions about that behavior.

Theory provides concepts to name what we observe and to explain relationships between concepts. Theory allows us to explain what we see and to figure out how to bring about change. Theory is a tool that enables us to identify a problem and to plan a means for altering the situation. Theory is to justify reimbursement to get funding and support - need to explain what is being done and demonstrate that it works - theory and research. Theory is to enhance the growth of the professional area to identify a body of knowledge with theories from both within and without the area of distance learning. That body of knowledge grows with theory and research. Theory guides research.

The theory also helps us understand what we do not know and, therefore, is the only guide to research. Relating to theory, it increases its ability to solve other problems in different times and different places.

Topic 052: Theories of Demography and Population - I

There are many theories in population dynamics, which describes various aspects of population. Among them, some of the theories are described as:

Introduction of Demographic Transition Theory:

Demographic Transition is a model used to represent the movement of high birth and death rates to low birth and death rates as a country develop from a pre-industrial to an industrialized economic system (Macionis, 2012).

Demographic Transition Model is also known as D.T.M. The theory was developed in 1929 by the American demographer Warren Thompson (1887–1973). Adolphe Landry of France made similar observations on demographic patterns and population growth potential around 1934. In the 1940s and 1950s, Frank W. Notestein developed a more formal theory of demographic transition. By 2009, the existence of a negative correlation between fertility and industrial development had become one of the most widely accepted findings in social science.

Topic 053: Theories of Demography and Population - II

1. Demographic Transition Theory:

A more complex analysis of population change is demographic transition theory, a thesis that links population patterns to a society's level of technological development. The demographic transition theory can further be elaborated at four levels of technological development.

Stage 1:

Preindustrial, agrarian societies (Stage 1) have high birth rates because of the economic value of children and the absence of birth control. Death rates are also high because of low living standards and limited medical technology. Deaths from outbreaks of disease cancel out births, so population rises and falls only slightly over time. This was the case for thousands of years in Europe before the Industrial Revolution.

Stage 2:

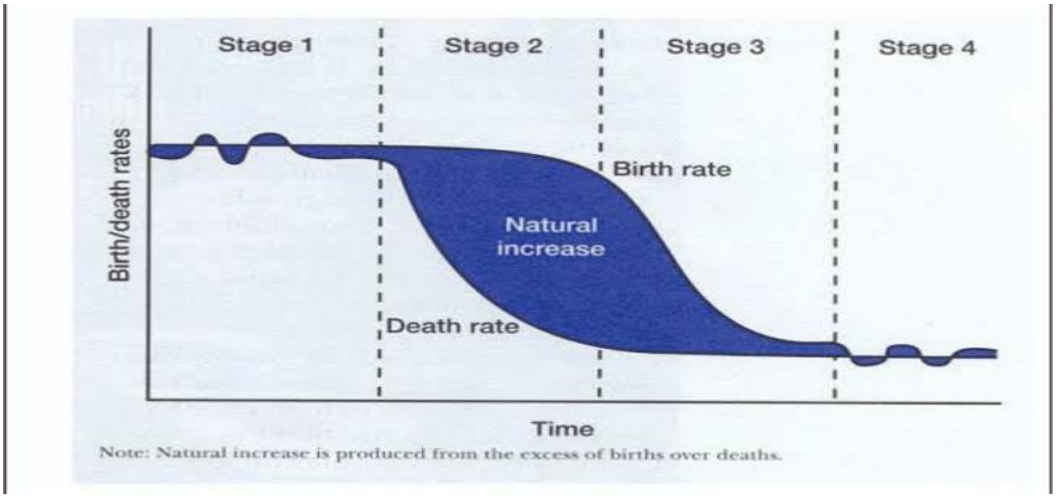
Stage 2, the onset of industrialization, brings a demographic transition as death rates fall due to greater food supplies and scientific medicine. But birth rates remain high, resulting in rapid population growth. It is pertinent to mention that there are still number of countries that remain in this stage 2 because of social and economic reasons. This includes world's poorest countries including sub-Saharan Africa, Afghanistan, Yemen etc.

Stage 3:

In Stage 3, a mature industrial economy, the birth rate drops, curbing population growth once again. Fertility falls because most children survive to adulthood and because high living standards make raising children expensive. In short, affluence transforms children from economic assets into economic liabilities. Smaller families, made possible by effective birth control, are also favored by women working outside the home. As birth rates follow death rates downward, population growth slows further.

Stage 4:

Stage 4 corresponds to a postindustrial economy in which the demographic transition is complete. The birth rate keeps falling, partly because dual-income couples gradually become the norm and partly because the cost of raising children continues to increase. This trend, linked to steady death rates, means that population grows only very slowly or even decreases. This is the case today in Japan, Europe, and the United States.



Source: Adapted from Population Reference Bureau, 1998

Topic 054: Theories of Demography and Population - III

Limitations and Criticism of Demographic Transition Theory:

Following are then limitations and criticism on the theory, i.e.

1. The DTM does not take into account migration which is a huge determinant of population growth.
2. It neglects varying factors within a country which influence birth and death rates. Natural disasters can cause high death rates and the aftermath of wars can cause baby booms. These factors can cause an increase or decrease of the rate being studied in stages it's supposed to fall or increase respectively.
3. There is no time interval between stages. NICs such as Malaysia and South Korea are advancing at a faster rate whilst in less developed countries the advancement is and has been slow. Most LEDCs are still stuck in stage 2.
4. The model assumes that all countries must follow the stages sequentially which is not always true.
5. The theory fails to give the fundamental explanations of decline in birth rates.
6. In fact, the causes of decline in birth rate are so diverse that they differ from country to country.

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Lesson 15

MALTHUS THEORY

Topic 055: Theories of Demography and Population - IV

Introduction of Malthus Theory:

Malthus theory was proposed by Thomas Robert Malthus, who was an English cleric, scholar, the economist and influential demographer. His theory stated that food production will not keep up with population growth resulting into famine, war, famine, calamity. He stressed on improvement in food production can overcome issues but the improvement could be temporary because it led to population growth, which in turn restored the original per capita production level.

In his 1798 book An Essay on the Principle of Population, Malthus observed that an increase in a nation's food production improved the well-being of the populace. But the improvement was temporary because it led to population growth, which in turn restored the original per capita production level. He believed that a balance between population growth and food supply can be established through preventive and positive checks.

1. **Preventive Checks:**

Preventive checks are applied by individuals. These checks limit the increase in birth rate, late marriages, self-restraint during married life, practice of celibacy etc. are some of the methods to be applied by the individuals to limit the size of their families and to reduce the birth rate.

2. **Positive checks:**

Positive checks are applied by Nature. They influence the growth of population by increasing the death rate.

They bring sufferings and hardship to the human beings. When population exceeds food supply, famines, epidemics, diseases, wars, earthquakes, floods etc. will occur. So, Positive checks are painful. Hence preventive checks are desirable to reduce the growth rate of population.

Topic 056: Theories of Demography and Population - V

Salient Features of Malthus Theory:

Following are the salient features of the Malthus Theory:

Population increases in Geometrical progression:

Malthus stated that population of a country always increases in geometrical progression. He considered that population doubles for every twenty-five years. He observed that population tends to increase at a geometrical progression namely 2, 4, 8, 16, 32. 64. Etc.

Food production increases in Arithmetical progression:

Another proposition of Malthus is that food production of a country increases in arithmetical progression, that is 1, 2, 3, 4, 5, 6 etc. because even with new agricultural technology, farmland is limited.

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Population exceeds food supply:

As population increases in geometrical progression and food production increases in arithmetical progression, after sometime population growth exceeds the supply of food stuffs. When the food supply becomes less compared to population growth, people face sufferings and they are plunged into starvation.

Thomas Robert Malthus warned that population increase would soon lead to social chaos. At such a rate, Malthus concluded, world population would soon soar out of control. Thus, Malthus presented a distressing vision of the future: people reproducing beyond what the planet could feed, leading ultimately to widespread starvation and war over what resources were left.

Malthus recognized that artificial birth control or self-denial might change his prediction. But he considered one morally wrong and the other impractical. Famine and war therefore stalked humanity in Malthus's mind, and he was justly known as "the dismal parson."

Topic 057: Theories of Demography and Population - VI

Criticism on Malthus Theory:

Some people criticized Malthus for ignoring the role of social inequality in world abundance and famine. Malthus theory stated that one of the reasons for limited food supply is non-availability of land. However, the amount of food supply in various countries has increased due to increased globalization. More recently, "critical demographers" have claimed that saying poverty is caused by high birth rates in low-income countries amounts to blaming the victims. On the contrary, they see global inequality as the real issue. Still, Malthus offers an important lesson. Habitable land, clean water, and fresh air are limited resources, and greater economic productivity has taken a heavy toll on the natural environment.

In addition, medical advances have lowered death rates, pushing up world population. Common sense tells us that no level of population growth can go on forever. In the world, population was rising at a rapid rate. At the same time, the food supply had also increased due to technological developments. Many times, food production had increased more than the population. For e.g., 2% of the total population is working in the agricultural sector in the US. Still, the total GDP is more than 14 trillion dollars. People everywhere must become aware of the dangers of population increase.

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Lesson 16

CORNUCOPIAN THEORY

Topic 058: Theories of Demography and Population - VII

Introduction of Cornucopian Theory:

Many arguments in support of the cornucopian position can be traced back to the work of American economist Julian Simon and American futurist Herman Kahn. Cornucopian model also refers to as Technology fix. The cornucopian viewpoint states that increase in population (demand) lead to technological innovation and substitution. The term cornucopian is derived from the ancient Greek “horn of plenty.”

Julian Simon, a noted economist, claimed in 1994, "We now have in our hands - in our libraries really - the technology to feed, clothe, and supply energy to an ever-growing population for the next 7 billion years”. Cornucopian, label given to individuals who assert that the environmental problems faced by society either do not exist or can be solved by technology or the free market.

Cornucopians hold an anthropocentric view of the environment and reject the ideas that population-growth projections are problematic and that Earth has finite resources and carrying capacity (the number of individuals an environment can support without detrimental impacts). Cornucopian thinkers tend to be libertarians. Thus, they tout capitalism as an essential feature of human progress and see no moral or practical need for legal controls to protect the natural environment or limit its exploitation.

Topic 059: Theories of Demography and Population - VIII

Salient feature of Cornucopian Theory:

Cornucopian theory scoffs at the idea of humans wiping themselves out; it asserts that human ingenuity can resolve any environmental or social issues that develop. As an example, it points to the issue of food supply. If we need more food, the theory contends, agricultural scientists will figure out how to grow it, as they have already been doing for centuries. After all, in this perspective, human ingenuity has been up to the task for thousands of years and there is no reason for that pattern not to continue (Simon 1981).

Cornucopians are confident that technology will meet the demand of individuals and society. Many cornucopians challenge the notion of a pending Malthusian catastrophe with two primary arguments. The first is a refutation of Malthus’s prediction of exponential population growth. Although the population of the planet did grow rapidly after 1800 because of medical and technological advances, population growth has slowed and evened out over time. The lack of exponential population growth is supported by statistics from international organizations such as the United Nations, which have repeatedly adjusted and lowered their world population predictions.

The second part of the cornucopian dissent has to do with the effects of population growth. Cornucopians note that although population has increased rapidly since 1800, so has the standard of living. Some cornucopians even assert that population growth might actually improve the

human condition, given the increase in goods and services over time. Cornucopians reject the notion that Earth has finite resources. This directly relates to their stance that technology can regenerate or replace any resources under pressure. In their rejection of finite resources, cornucopians also challenge the concepts of carrying capacity and American ecologist Garrett Hardin's tragedy of the commons. Cornucopians reject many of the claims that underlie arguments for environmental protection and government regulation.

Libertarian cornucopians value minimal government intervention and place high importance on individual liberty, which they view as essential to market growth and technological development. Cornucopians see private property as being vital for the market to flourish and claim that the only legitimate role for the government in reference to resources is the protection of private property.

Topic 060: Theories of Demography and Population - IX

Criticism on Cornucopian Theory:

There are several criticisms that have been leveled at the cornucopian worldview. The most common criticism is that cornucopians simply ignore evidence that is contradictory to their position and choose only examples and statistics that already support their perceptions. For example, one argument charges cornucopians with ignoring the effects of population growth on ecosystems, which are essential for the survival of humans.

Similarly, some claim that the current standard of living is overstated and ignores the living conditions of the poor around the planet. Cornucopians believe that the earth has infinite resources but that's not true in every aspect as the Earth contain several non-renewable resources which are finite and will end up at some time.

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Lesson 17

OPTIMUM THEORY OF POPULATION

Topic 061: Theories of Demography and Population - X

Introduction to Optimum Theory of Population:

The optimum theory of population was propounded by Edwin Cannan in his book Wealth published in 1924 and popularized by Robbins, Dalton and Carr-Saunders. It denotes balance population resources in any area.

The optimum theory of population states that:

"The optimum means the best and most desirable population of country which will results in a maximum man-hour production."

The optimum size of population in which along with the existing natural resources and given state of technology, yields the highest per capita income in the country. Unlike the Malthusian theory, the optimum theory does not establish relationship between population growth and food supply. It is concerned with the relation between the size of population and production of wealth. Car-sounders defines optimum population is that population which makes sure economic welfare.

The Malthusian theory is a general theory which studies the population problem of a country in keeping with its economic conditions. Thus, the optimum theory is more realistic than the Malthusian theory of population. The optimum theory indicates the situation when the size of the population is according to the natural resources of country, in that case the per capita income output will be maximum and country is said to have an ideal size of population.

Topic 062: Theories of Demography and Population - XI

Assumptions of Optimum theory of Population:

This theory is based on the following assumptions:
The natural resources of a country are given at a point of time but they change over time. There is no change in techniques of production. It assumes that proportion of working population to total population remains constant as the population of the country increases. It also assumes that as the population of the country increase, the natural resources, capital stocks and state of technology remains unchanged. The stock of capital remains constant.

The habits and tastes of the people do not change. There is not much needed as per needs of society. The ratio of working population to total population remains constant even with the growth of population. Working hours of labor do not change. Modes of business organization are constant.

Topic 063: Theories of Demography and Population - XII

Optimum Population:

The optimum population is the ideal population which combined with the other available resources or means of production of the country will yield the maximum returns or income per head. Optimum population is defined as:

"The population which just makes the maximum returns possible is the optimum population or the best possible population" (Paul, 1994).

To Dalton, "Optimum population is that which gives the maximum income per head."

Optimum population theory according to Dr Canon has direct relationship between resources of country and population of country. According to him any country can be overpopulated and under populated and then come the optimum population. If there is a period of time the per capita income of country begins to fall the country is said to be over populated. If resources of country are in abundance and there is less population, the country is said to be underpopulated. And if the size of the population is according to the size of natural resources and are fully utilized this is optimum population.

An optimum population is the certain size of population, which can operate natural resources, certain size of capital instruments and given social organizations, take the best advantage and produce the largest per capita income of consumer goods possible under the given circumstances. The optimal world population has been estimated by few authors including Paul R Ehrlich was American biologist best known for his prediction of consequences of population and limited resources.

Given the fact, the optimum world population estimation included

- Decent health and resources to everyone
- Basic rights to everyone
- Preservation of cultural and bio diversity
- Allowance of intellectual
- Artistic and technological activities

Based on this estimation, the optimum population was to be roughly around 1.5 billion to 2 billion people. The question arises how we can assess optimum population. It includes number of significant socio-economic indicators. Also, in as theory and concept of optimum population the under population and over population have disadvantages. It is only the optimum population which is best for country.

If the increase in population is followed by the increase in per capita income, the country is under-populated and it can afford to increase its population till it reaches the optimum level. On the contrary, if the increase in population leads to diminution in per capita income, the country is over-populated and needs a decline in population till the per capita income is maximized. But the optimum level is not a fixed point. It changes with a change in any of the factors assumed to be given. If due to inventions there are improvements in the techniques of production, the average product of labor might increase and push the level of per capita income upward so that the optimum point rises.

Topic 064: Theories of Demography and Population - XIII

Dalton's Formula:

John Delton was English chemist, physicist and meteorologist born in England in 1766. He was famous for his research in color blindness and atomic theory. Dalton has deduced over-population and under-population which result in the deviation from the optimum level of population in the form of a formula. The deviation from the optimum, he calls maladjustment.

Maladjustment (M) is a function of two variables, the optimum level of population and the actual level of population. When M is positive, the country is over-populated. When M is negative, the country is under-populated. When M is zero, the country possesses optimum population. Canada and Australia in today's world are good example of under population. Both have surplus amount of food, energy and mineral resources that are even exported. High level of technology and immigration chances makes this country as attraction.

Topic 065: Theories of Demography and Population - XIV

Superiority over the Malthusian Theory:

The optimum theory of population is superior to the Malthusian theory on the following grounds.

The Malthusian law is a general study of the population problem because it is applicable to all countries irrespective of their economic conditions. The optimum theory is superior to the Malthusian theory because it studies the population problem in relation to the economic conditions of a particular country. Malthus had a narrow vision. He related the growth of population to food supply. Cannan, on the other hand, had a much wider outlook. He related the problem of population to the total production of the country, both industrial and agricultural.

The Malthusian theory is a static concept which applies to a period of time. The optimum theory is a dynamic one because over a period of time the per capita income may rise with the expansion in output due to improvements in knowledge, skill, capital equipment and other elements in production. This may raise the optimum level of population. Thus, the optimum theory is more realistic. The Malthusian doctrine is simply theoretical and is devoid of all practical considerations. It regards all increases in population bad, for they bring untold miseries to the people. On the other hand, the optimum theory is very practical because it regards an increase in population not only desirable but also necessary for the maximum utilization of the country's natural resources.

The Malthusian theory of population is based on the unrealistic assumption of the niggardliness of nature. This belief arises from the operation of the law of diminishing returns in agriculture. But the optimum theory takes a realistic view when according to this the law of diminishing returns does not operate in agriculture immediately but after the optimum point is reached. Malthus was so much obsessed by the fear of over-population that he ignored a fundamental fact that a newly born child 'comes not only with a mouth and a stomach but also with a pair of hands.' The optimum population theory allays all such fears of the Malthusians by stressing the fact that increasing population increases the labor force which helps raise the optimum expansion of the country's natural resources.

Malthus was essentially a pessimist who portrayed a gloomy picture about the future of mankind which was full of misery, vice, floods, droughts, famines and other natural calamities. The optimum theory; is superior to the Malthusian theory because it does not suffer from any pessimism, rather it adopts an optimize and realistic attitude towards the problem of population when it relates population to the wealth of the country.

Topic 066: Theories of Demography and Population - XV

Criticism on Optimum Theory of Population:

Despite the superiority of the optimum theory over the Malthusian theory of population, it has serious weaknesses.

No Evidence of Optimum Level:

The first weakness of the optimum theory is that it is difficult to whether there is anything like an optimum population. There is no evidence about the optimum population level in any country. In fact, it is impossible to measure it. Thus, the optimum level of population is vague.

Correct Measurement of Per Capita Income not Possible:

Another difficulty pertains to the measurement of per capita income in the country. It is not an easy task to measure changes in the per capita income. The data on per capita income are often inaccurate, misleading and unreliable which make the concept of optimum as one of doubtful validity.

Neglects the Distributional Aspect of Increase in Per Capita Income:

Even if it is assumed that per capita income can be measured, it is not certain that the increase in population accompanied by the increase in per capita income would bring prosperity to the country. Rather, the increase in per capita income and population might prove harmful to the economy if the increase in per capita income has been the result of concentration of income in the hands of a few rich. Thus, the optimum theory of population neglects the distributional aspect of increase in the per capita income.

No Place in State Policies:

The concept of optimum population has no place in the policies of modern states. While fiscal policy aims at increasing or stabilizing the level of employment, output and income in a country, no reference is made to the optimum level of population. This theory is, therefore, of no practical use and is regarded as useless.

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Lesson 18

ZERO POPULATION GROWTH THEORY

Topic 067: Theories of Demography and Population - XVI

Introduction to Zero Population Growth theory:

The American sociologist and demographer Kingsley Davis is credited with coining the term but it was used earlier by George J. Stolnitz, who stated that the concept of a stationary population dated back to 1693. A mathematical description was given by James Mirrlees.

Zero population growth refers to a population that is unchanging – it is neither growing, nor declining; the growth rate is zero. Zero Population growth is also known as ZPG.

When zero population was first mentioned as a goal of population policy, it was not itself defended or discussed but the mean of reaching it were considered. The movement started in US in fact with so many policies in mind like restricting couples on one child policy in 60s. This was later adopted by China.

A defined goal of zero population growth is to match the replacement fertility rate, which is the average number of children per woman which would hold the population constant. This replacement fertility will depend on mortality rates and the sex ratio at birth, and varies from around 2.1 in developed countries to over 3.0 in some developing countries. Demographic balance could occur when the birth rate and death rate are equal. ZPG as a movement was linked to environmentalist and feminist movement too in England and USA in 60s.The activist of yale university were strong hold on this. These activists believed a constant increasing population will lead to many problems Like pollution, violence, loss of values, individual privacy etc. The author of the book “population bomb Paul Ehrlich was the founding father along with other activist.

Zero Population Growth also accounts for immigration (when a person migrates to a country) and emigration (when a person leaves their country to settle somewhere new). Therefore, a country that has reached zero population growth has a population where births plus immigration is equal to deaths plus emigration over the course of a year. When considering population growth in the entire world, of course, immigration and emigration do not apply and Zero Population Growth would be attained simply when the global birth and death rates are equal. The population stabilization that accompanies Zero Population Growth is often seen as a critical component to long-term sustainability for a country, region, or the world.

Topic 068: Theories of Demography and Population - XVII

Critics of Zero Population Growth:

Some of the loudest critics of the zero-population growth are as follow:

Something that Davis failed to foresee was the "Green Revolution" in agriculture. While Davis was making his doomsday predictions, an international consortium of plant scientists began breeding higher-yielding varieties of rice that would thrive in difficult growing conditions. These seeds, in combination with widespread use of chemical fertilizer and modern growing practices, led to vastly larger harvests in the developing world.

Critics of Davis and the zero-population growth use the example of the Green Revolution to assert that people – far from being "parasites" on the planet – are one of its greatest resources. People create and innovate, designing technologies and systems that have increased overall quality of life since 1968, even as the global population doubled. Other critics of zero population growth believe that low birth rates are bad for the economy. If fewer people are born each year, then a nation's population gets progressively older on average. The fear is that fewer working-age people will result in less consumption of goods and services, slowing the economy. Also, without enough young working people, there won't be enough tax revenue to support social programs for the elderly. Another criticism of the zero-population growth is that countries with lower fertility rates actually do more damage to the environment. The two greatest producers of climate changing greenhouse gasses are China and the United States who have low fertility rate.

More than 70 countries are now categorized as "low fertility" with rates of two babies per woman or less. Still, more than 60 "high-fertility" countries (i.e., more than three children per woman), mostly nations in Africa and Asia, are expected to make great economic gains over the coming decades. As these growing populations develop into global consumers, they will pose new threats to the environment.

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Lesson 19

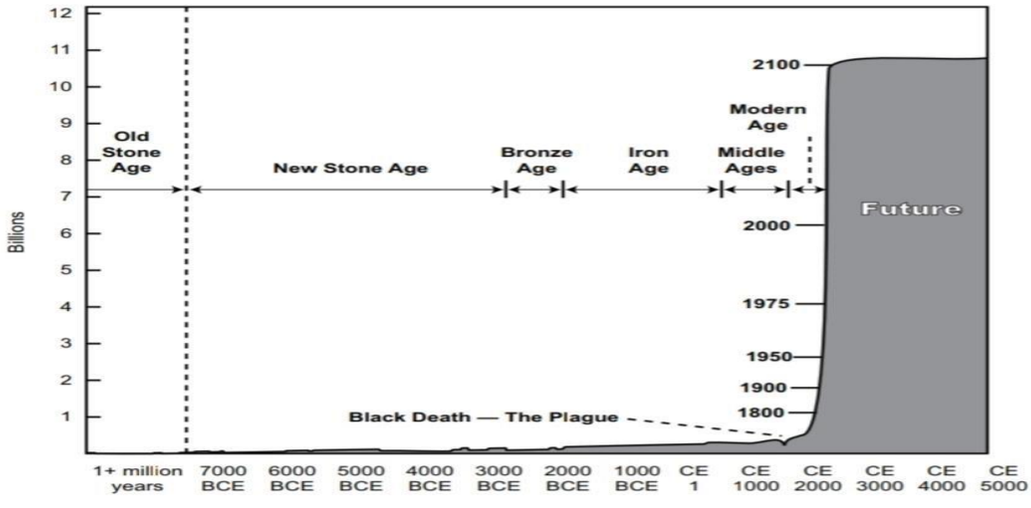
HISTORY OF POPULATION GROWTH

Topic 069: Population Growth and Distribution

History of Population Growth:

It took millions of years for the global population to reach a half billion people (about 1650), but by CE 2014 world population was over 7 billion. In just the past century 5 billion people have been added, tripling the world's population. Since the birth of a now twenty-year-old college student, the world's population has increased by nearly as many people as were alive in the world in 1900. The population is projected to continue growing into the future, albeit more slowly, leveling out at close to 10.9 billion people by the 22nd century. Clearly there was a dramatic change in the nature of population growth as the world reached modern times.

To discuss the two very different patterns of population growth before and after about 1650, we will describe these two periods separately as the "pre-modern" and then the "modern" period.



Topic 070: Population Growth and Distribution - I

Pre-Modern era Growth, Before 1650:

In the pre-modern era, from about 300,000 BCE to roughly 1650, harsh living conditions resulted in extremely high mortality rates and slow growth. After thousands of years of hunting and gathering, the development of agriculture at the beginning of the New Stone Age (i.e., 8000 BCE) led to a more reliable food supply and more stable forms of social organization. Agricultural settlements in turn were followed by urban civilizations, first in Mesopotamia, then in Egypt, Crete, India, China, and Peru, wherein populations could flourish to a greater extent. With the emergence of agrarian societies, and despite continued high mortality, world population slowly increased, growing from an estimated 5 million to perhaps 200 to 300 million by CE 1.

During the early Common Era, growth was mainly held in check by infectious disease and periodic decimating epidemics that became more common as people gathered and settled in towns and cities. However, disease was not the only hardship of life during this slow growth period.

Unfavorable climatic changes (Wrigley, 1969), periodic severe famines (Meuvret, 1965), and even lower birth rates from malnutrition (Watkins and Van de Walle, 1983) were among the myriad hardships limiting population growth. With few exceptions, this era was characterized by high birth rates and high but fluctuating death rates, resulting in slow, frequently interrupted population growth.

Topic 071: Population Growth and Distribution - II

Modern Explosion, 1650 to the Present:

The annual rate of global population growth doubled in the three centuries between 1650 and World War II, and the postwar era witnessed an even more dramatic explosion of growth rates, peaking around 1960 to 1975. Growth rates fell annually thereafter, and by 2005 had dropped substantially to 1.2% annually. The recent drop in growth rates is due primarily to declining births in almost every country, but also, in part, to the suddenly rising number of deaths from HIV/AIDS throughout the world. The number of excess deaths due to HIV/AIDS in the world reached 9.4 million between 2005 and 2010, which is the highest recorded number of excess deaths since the discovery of the first HIV/AIDS cases in the early 1980s. The overall number of HIV/AIDS deaths may decline slightly in the next decade or so, but will then increase again slowly due to population growth.

For almost all of the modern era, there are two reasons for the increasing upward slope. First is that any sustained positive rate of growth will result in the increasing upward slope of such a line.

There is an important second reason for the upward curve of this particular line. The population growth rate did not simply stay stable and positive; the growth rate itself grew through almost all of this period. As the size of the world population gets larger, the impact of *any* positive growth rate gets greater.

Since the base population on which any growth rate works is now large, even a moderate rate of growth means many people are being added.

Topic 072: Population Growth and Distribution – III

A cautionary note is appropriate: Even if the world's growth rate has peaked, the world's population size certainly has not. If the world's growth rate were cut by about half—say, to 0.7% per year—the population of the globe still would double in 100 years, then redouble, then redouble.

To clarify, although the world growth rate has slowed to almost half what it was in the 1960s, it is still positive, and the size of the world's population has steadily increased— from 3 billion in 1960, 4 billion in 1974, 5 billion in 1987, 6 billion in 1999, and to 7.2 billion in 2014. Thus, what once took thousands and thousands of years—reaching the first billion people in the world—is now happening every twelve years or so. World population in the century 1000 was estimated at 275000000 and it was 77000000 in 1760 and reached 1 billion in year 1804.

Although actual population doubling and then redoubling is not necessarily inevitable, the general rapidity of population growth is why demographers are not content with observing that the rate is no longer increasing; rather, they are trying to estimate when and how that rate will become *zero*, when the modern global population explosion will come to its end.

The slowing of population growth does not mean an end to population challenges and may lead to altogether new problems. The term “explosion” has a hysterical ring to it that annoys some demographers (e.g., Hartmann, 1995; Simon, 1986; Lam, 2011). Moreover, it may carry a negative connotation, implying a destructive and devastating event.

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Lesson 20

SOCIETIES AND POPULATION - I

Topic 073: Population Growth and Distribution - IV

Society and Technology:

The work of Gerhard Lenski (Nolan & Lenski, 2010) helps us understand the great differences among societies that have existed throughout human history. Lenski uses the term sociocultural evolution to mean changes that occur as a society gains new technology. With only simple technology, societies such as the Tuareg have little control over nature, so they can support just a small number of people.

Societies with complex technology such as cars and cell phones, while not necessarily "better," are certainly more productive so that they can support hundreds of millions of people with far more material affluence. Inventing or adopting new technology sends ripples of change throughout a society. The more technology a society has, the faster it changes. Technologically simple societies change very slowly. Modern, high technology societies change so fast that people usually experience major social changes during a single lifetime.

Drawing on Lenski's work, we will examine five types of societies defined by their technology:

1. Hunting and gathering societies
2. Horticultural and pastoral societies,
3. Agrarian societies,
4. Industrial societies, and
5. Postindustrial societies.

Topic 074: Population Growth and Distribution - V

Hunting and Gathering Society:

In the simplest of all societies, people live by **hunting and gathering**, making use of simple tools to hunt animals and gather vegetation for food. The global population of the hunting and gathering society is estimated to be 10 million.

From the time that our species appeared 3 million years ago until about 12,000 years ago, all humans were hunters and gatherers. Even in 1800, many hunting and gathering societies could be found around the world. But today just a few remain, including the Aka and Pygmies of Central Africa, the Bushmen of southwestern Africa, the Aborigines of Australia, the Kaska Indians of northwestern Canada, the Batek and Semai of Malaysia, and isolated native people living in the Amazon rain forest.

With little ability to control their environment, hunters and gatherers spend most of their time looking for game and collecting plants to eat. Only in lush areas with lots of food do hunters and gatherers have much chance for leisure. Because it takes a large amount of land to support even a few people, hunting and gathering societies have just a few dozen members. They must also be nomadic, moving on to find new sources of vegetation or to follow migrating animals.

Although they may return to favored sites, they rarely form permanent settlements.

Topic 075: Population Growth and Distribution - VI

Features of hunting and gathering societies

Hunting and gathering societies depend on the family to do many things. The family must get and distribute food, protect its members, and teach their way of life to the children. Everyone's life is much the same; people spend most of their time getting their next meal. Age and gender have some effect on what individuals do. Healthy adults do most of the work, leaving the very young and the very old to help out as they can, women gather vegetation—which provides most of the food—while men take on the less certain job of hunting. Although men and women perform different tasks, most hunters and gatherers probably see the sexes as having about the same social importance.

Hunting and gathering societies usually have a *shaman,* or spiritual leader, who enjoys high prestige but has to work to find food like everyone else. In short, people in hunting and gathering societies come close to being socially equal. Hunters and gatherers believe that many spirits inhabit the world. Hunters and gatherers use simple weapons—the spear, bow and arrow, and stone knife— but rarely do they use them to wage war. Their real enemy is the forces of nature: Severe storms and droughts can kill off their food supply in a short span of time, and there is little they can do for someone who has a serious accident or illness. Being constantly at risk in this way encourages people to cooperate and share, a strategy that raises everyone's chances of survival. But the truth is that many die in childhood, and no more than half reach the age of twenty.

During the past century, societies with more powerful technology have closed in on the few remaining hunters and gatherers, reducing their food supply. As a result, hunting and gathering societies are disappearing. Fortunately, study of this way of life has given us valuable information about human history and our basic ties to the natural world.

Topic 076: Population Growth and Distribution - VII

Horticultural and Pastoral Societies:

Some 10,000 to 12,000 years ago, as the timeline inside the back cover shows, a new technology began to change the lives of human beings. The World Population in Horticultural and Pastoral Society is estimated to be 150-175 million. There are at least 1-10 people per square mile with community sizes ranging from around 30 to several hundred.

People developed **horticulture**, the use of hand tools to raise crops. Using a hoe to work the soil and a digging stick to punch holes in the ground to plant seeds may not seem like something that would change the world, but these inventions allowed people to give up gathering in favor of growing food for themselves. The first humans to plant gardens lived in fertile regions of the Middle East. Cultural diffusion spread this knowledge to America and Asia and eventually all over the world.

Not all societies were quick to give up hunting and gathering for horticulture. Hunters and gatherers living where food was plentiful probably saw little reason to change their ways. People

living in dry regions (such as the deserts of Africa or the Middle East) or mountainous areas found little use for horticulture because they could not grow much anyway. Such people (including the Tuareg) were more likely to adopt **pastoralism**, the domestication of animals.

Topic 077: Population Growth and Distribution - VIII

Today, societies that mix horticulture and pastoralism can be found throughout South America, Africa, and Asia. Growing plants and raising animals greatly increased food production, so populations expanded from dozens to hundreds of people. Pastoralists remained nomadic, leading their herds to fresh grazing lands. But horticulturalists formed settlements, moving only when the soil gave out. Joined by trade, these settlements formed extended societies with populations reaching into the thousands.

Once a society is capable of producing a *material surplus*—more resources than are needed to feed the population—not everyone has to work at providing food. Greater specialization results: Some make crafts, while others engage in trade, cut hair, apply tattoos, or serve as priests. Compared to hunting and gathering societies, horticultural and pastoral societies are more socially diverse.

But being more productive does not make a society "better" in every sense. As some families produce more than others, they become richer and more powerful. Horticultural and pastoral societies have greater inequality, with elites using government power—and military force—to serve their own interests. But leaders do not have the ability to travel or to communicate over large distances, so they can control only a small number of people rather than rule over vast empires. Religion also differs among types of societies. Hunters and gatherers believe that many spirits inhabit the world. Horticulturalists, however, are more likely to think of one God as the creator of the world. Pastoral societies carry this belief further, seeing God as directly involved in the well-being of the entire world. The pastoral roots of Judaism and Christianity are evident in the term "pastor" and the common view of God as a shepherd who stands watch over us all.

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Lesson 21

SOCIETIES AND POPULATION - II

Topic 078: Population Growth and Distribution - IX

Agrarian Society:

About 5,000 years ago, another revolution in technology was taking place in the Middle East, one that would end up changing life on Earth. This was the emergence of **agriculture**, large-scale cultivation using plows harnessed to animals or more powerful energy sources. The estimated world population in agrarian societies is said to be 200-400 million. Today Forty percent of the total human population has been recorded by the Food and Agricultural Organization (FAO) as agricultural population. So important was the invention of the animal-drawn plow, along with other breakthroughs of the period—including irrigation, the wheel, writing, numbers, and the use of various metals—that this moment in history is often called the "dawn of civilization."

Using animal-drawn plows, farmers could cultivate fields far bigger than the garden-sized plots planted by horticulturalists. Plows have the added advantage of turning and aerating the soil, making it more fertile. As a result, farmers could work the same land for generations, encouraging the development of permanent settlements. With the ability to grow a surplus of food and to transport goods using animal-powered wagons, agrarian societies greatly expanded in size and population. About 100 C.E., for example, the agrarian Roman Empire contained some 70 million people spread over 2 million square miles.

Greater production meant even more specialization. Now there were dozens of distinct occupations, from farmers to builders to metalworkers. With so many people producing so many different things, people invented money as a common standard of exchange, and the old barter system—in which people traded one thing for another— was abandoned.

Topic 079: Population Growth and Distribution - X

Features of Agrarian Societies

Agrarian societies have extreme social inequality, typically even more than modern societies such as our own. In most cases, a large number of the people are peasants or slaves, who do most of the work. Elites therefore have time for more "refined" activities, including the study of philosophy, art, and literature.

Among hunters and gatherers and also among horticulturalists, women provide most of the food, which gives them social importance. Agriculture, however, raises men to a position of social dominance. Using heavy metal plows pulled by large animals, agrarian societies put men in charge of food production. Women are left with the support tasks, such as weeding and carrying water to the fields.

In agrarian societies, religion reinforces the power of elites by defining both loyalty and hard work as moral obligations. Many of the "Wonders of the Ancient World," such as the Great Wall of China and the Great Pyramids of Egypt, were possible only because emperors and pharaohs had almost absolute power and could order their people to work for a lifetime without pay. Of the

societies described so far, agrarian societies have the most social inequality. Agrarian technology also gives people a greater range of life choices, which is the reason that agrarian societies differ more from one another than horticultural and pastoral societies do.

Topic 080: Population Growth and Distribution - XI

Industrial Society:

Industrialism, which first took hold in the rich nations of today's world, is the production of goods using advanced sources of energy to drive large machinery. Industrial society began in 18th century in the Britain. The world population is estimated to be around 1 billion in the industrial society. Until the industrial era began, the major source of energy had been the muscles of humans and the animals they tended. Around the year 1750, people turned to water power and then steam boilers to operate mills and factories filled with larger and larger machines.

Industrial technology gave people such power to alter their environment that change took place faster than ever before. It is probably fair to say that the new industrial societies changed more in one century than the earlier agrarian societies had changed over the course of the previous thousand years. Change was so rapid that it sparked the birth of sociology itself. By 1900, railroads crossed the land, steamships traveled the seas, and steel-framed skyscrapers reached far higher than any of the old cathedrals that symbolized the agrarian age.

But that was only the beginning. Soon automobiles allowed people to move quickly almost anywhere, and electricity powered homes full of modern "conveniences" such as refrigerators, washing machines, air conditioners, and entertainment centers. Electronic communication, beginning with the telegraph and the telephone and followed by radio, television, and computers, gave people the ability to reach others instantly, all over the world.

Work also changed. In agrarian communities, most men and women worked in the home or in the fields nearby. Industrialization drew people away from home to factories situated near energy sources (such as coalfields) that powered their machinery. The result was a weakening of close working relationships, strong family ties, and many of the traditional values, beliefs, and customs that guide agrarian life.

Topic 081: Population Growth and Distribution - XII

Features of Industrial Societies

With industrialization, occupational specialization became greater than ever. Today, the kind of work you do has a lot to do with your standard of living, so people now often size up one another in terms of their jobs rather than according to their family ties, as agrarian people do. Rapid change and people's tendency to move from place to place also make social life more anonymous, increase cultural diversity, and promote subcultures and countercultures.

Industrial technology changes the family, too, reducing its traditional importance as the center of social life. No longer does the family serve as the main setting for work, learning, and religious worship. Technological change also plays a part in making families more diverse, with a greater share of single people, divorced people, single-parent families, and stepfamilies.

Perhaps the greatest effect of industrialization has been to raise living standards, which increased fivefold in the United States over the past century. Although at first new technology only benefits the elite few, industrial technology is so productive that over time just about everyone's income rises so that people live longer and more comfortable lives. Even social inequality decreases slightly, because industrial societies provide extended schooling and greater political rights for everyone. Around the world, industrialization has had the effect of increasing the demand for a greater political voice, a pattern evident in South Korea, Taiwan, the People's Republic of China, the nations of Eastern Europe and the former Soviet Union, and in 2011 in Egypt and other nations of the Middle East.

Topic 082: Population Growth and Distribution - XIII

Post-industrial Society:

Many industrial societies have now entered a new phase of technological development, and we can extend Lenski's analysis to take account of recent trends. The world population at the start of the post-industrial society was estimate to be 4.434 billion which has now increased to 7.8 billion (in 2020). A generation ago, the sociologist Daniel Bell (1973) coined the term post-industrialism to refer to the production of information using computer technology. Production in industrial societies centers on factories and machinery generating material goods; postindustrial production relies on computers and other electronic devices that create, process, store, and apply information.

Just as people in industrial societies learn mechanical skills, people in postindustrial societies such as ours develop information-based skills and carry out their work using computers and other forms of high-technology communication. A postindustrial society uses less and less of its labor force for industrial production. At the same time, more jobs become available for clerical workers, teachers, writers, sales managers, and marketing representatives, all of whom have in common jobs that involve processing information.

The Information Revolution, which is at the heart of postindustrial society, is most evident in rich nations, yet new information technology affects people in all countries around the world. A worldwide flow of products, people, and information now links societies and has advanced a global culture. In this sense, the postindustrial society is at the heart of globalization.



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Lesson 22

POPULATION GROWTH - I

Topic 083: Population Growth and Distribution - XIV

Population Growth Rate:

The average rate of change of population size during a specified period (Yusuf, Martins and Swanson, 2014).

Population growth rate is usually expressed in percentage (%). The population growth rate measures how fast the size of population is changing. Annual rate of population change in Pakistan is 2%. Annual rate of population change of USA is 0.35%.

The world's population is project to grow to 8.4 billion by 2030, up 18% on the 7.2 billion today. The highest population growth rates will continue to be in developing regions, accounting for 97% of the increase to 2030.

The worlds developing regions will see 1.2 billion people added, a 20.7% increase. While the population of developed countries will increase a mere 3.3% adding 41 million to the current 1.3 billion people.

Topic 084: Population Growth and Distribution - XV

Annual Growth Rate:

The annual average rate of change of population size, for a given country, territory, or geographic area, during a specified period. It expresses the ratio between the annual increase in the population size and the total population for that year, usually multiplied by 100 (Yusuf, Martins and Swanson, 2014).

Global human population growth amounts to around 83 million annually, or 1.1% per year. The global population has grown from 1 billion in 1800 to 7.8 billion in 2020. It is expected to keep growing, and estimates have put the total population at 8.6 billion by mid-2030, 9.8 billion by mid-2050 and 11.2 billion by 2100. The annual increase in the population size is define as a sum of differences: the difference between births less deaths and the difference between immigrants less emigrants, in a given country, territory or geographic area at a given year. Population growth rate is generally at both national and sub national represents a fundamental indicator for decision making. Its significance must be analyzed in relation to other factors affecting sustainability. Population data from the United Nations link to mid-year estimated values, obtained by linear interpolating from the corresponding United Nations fertility medium-variant quinquennial (every 5 years) population projections.

Population growth rate is generally based on either an inter-censal population growth rate calculated from two censuses, each adjusted for incompleteness, or from the components of population growth, adjusted for incompleteness when necessary, during a specific period, namely, numbers of births, deaths, immigrants, and emigrants. Unit of measurement of Annual Population Growth is Percent (%). The annual growth rate of the world was 1.1% in 2019. Annual growth

income countries was 1.2% in 2019. Annual Growth rate of low-income countries was 2.6% in 2019. The annual population growth rate of USA is 0.5% in 2019. The annual growth rate of Pakistan is 2.0% in 2019.

Topic 085: Population Growth and Distribution - XVI

Exponential Population Growth:

Exponential growth is a specific way that a quantity may increase over time. It occurs when the instantaneous rate of change (that is, the derivative) of a quantity with respect to time is proportional to the quantity itself (Yusuf, Martins and Swanson, 2014).

It is a pattern of data that shows greater increase with passing time. When resources are unlimited, populations exhibit exponential growth. In logistic growth, a population's per capita growth rate gets smaller and smaller as population size approaches a maximum imposed by limited resources in the environment, known as the carrying capacity (KKK). Exponential growth produces a J-shaped curve, while logistic growth produces an S-shaped curve. In theory, any kind of organism could take over the Earth just by reproducing. For instance, imagine that we started with a single pair of male and female rabbits. If these rabbits and their descendants reproduced at top speed ("like bunnies") for 777 years, without any deaths, we would have enough rabbits to cover the entire state of Rhode Island. And that's not even so impressive – if we used E. coli bacteria instead, we could start with just one bacterium and have enough bacteria to cover the Earth with a 111-foot layer in just 363636 hours. As you've probably noticed, there isn't a 111-foot layer of bacteria covering the entire Earth (at least, not at my house), nor have bunnies taken possession of Rhode Island.

Why, then, don't we see these populations getting as big as they theoretically could? rabbits, and all living organisms need specific resources, such as nutrients and suitable environments, in order to survive and reproduce. These resources aren’t unlimited, and a population can only reach a size that match the availability of resources in its local environment. Population ecologists use a variety of mathematical methods to model population dynamics (how populations change in size and composition over time). Some of these models represent growth without environmental constraints, while others include "ceilings" determined by limited resources. Mathematical models of populations can be used to accurately describe changes occurring in a population and, importantly, to predict future changes. Because of high costs, population census has not been conducted yearly. For example, the population census is performed every 5 years in Japan and every 10 years in the U.S. Therefore, most governments create annual population estimates by using related yearly data and by regarding the population census data as the benchmark. Furthermore, population forecasts have been performed in most developed countries and used to obtain demographic information for many economic policies including social security planning. One of the best examples of exponential growth is observed in a bacteria or a virus. For instance, a virus for example covid 19 or small pox will spread exponentially at first if no artificial immunization is available. Each infected person can infect multiple new people.

One of the best examples of exponential growth is observe in bacteria. It takes bacteria roughly an hour to reproduce through prokaryotic fission. If we placed 100 bacteria in an environment and recorded the population size each hour, we would observe exponential growth. The important concept of exponential growth is that the population growth rate, the number of organisms added

in each reproductive generation, is accelerating; that is, it is increasing at a greater and greater rate. As of 27 July 2020, Pakistan had 275,225 confirmed cases of COVID-19. Pakistan witnessed a phase of an exponential increase in cases with an average of 5.8% daily case growth trajectory until mid-June (21).

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Lesson 23

POPULATION GROWTH - II

Topic 086: Population Growth and Distribution - XVII

Interpolation and Extrapolation:

Interpolation is an estimation of a population for any date within present period (Yusuf, Martins and Swanson, 2014).

It is because of high cost of population census which are not conducted yearly as population census somewhere are performed in 5 year or 10 years' time. Therefore, governments create annual population estimate by using related yearly data and by population census data as bench mark.

If there is a generally consistent trend across a set of data points, one can reasonably estimate the value of the set at points that have not been calculated. The criticisms of using interpolation in Population analysis is that it lacks precision and does not always accurately reflect the volatility of population.

Extrapolation:

An estimation of the population for any date outside the period (in past or future) is known as extrapolation (Yusuf, Martins and Swanson, 2014).

Extrapolate is defined as speculate, estimate or arrive at a conclusion based on known facts or observations. An example of extrapolate is deciding it will take twenty minutes to get home because it took you twenty minutes to get there. Similarly, Extrapolation involves making statistical forecasts by using historical trends that are projected for a specified period of time into the future. It is only used for time-series forecasts. For cross-sectional or mixed panel data (time-series with cross-sectional data), multivariate regression is more appropriate. This methodology is useful when major changes are not expected; that is, causal factors are expected to remain constant or when the causal factors of a situation are not clearly understood.

It also helps discourage the introduction of personal biases into the process. Extrapolation can be fairly reliable, relatively simple, and inexpensive. However, extrapolation, which assumes that recent and historical trends will continue, produces large forecast errors if discontinuities occur within the projected time period; that is, pure extrapolation of time-series assumes that all we need to know is contained in the historical values of the series being forecasted. If we assume that past behavior is a good predictor of future behavior, extrapolation is appealing. This makes it a useful approach when all that is needed are many short-term forecasts. To extrapolate is to infer about population projection that is not explicitly stated from existing information. Extrapolation has higher risk of producing inaccurate results as compared to interpolation.

Topic 087: Population Growth and Distribution - XVIII

Population Doubling Time:

Doubling time is the amount of time it takes for a given population to double in size or value at a constant growth rate (Yusuf, Martins and Swanson, 2014).

We can find the doubling time for a population undergoing exponential growth by using the Rule of 70. To do this, we divide 70 by the growth rate (r).

$$Dt= 70/r$$

There are a lot of people in this world, and that number just keeps increasing. Wouldn't it be nice if we had a simple formula to help us predict just how large our population could actually get? Well, we do. Doubling time is the amount of time it takes for a value to double itself at a consistent rate of growth. It can be applied to any value that increases at a consistent rate, but we very often use it to study human population growth. Around the world, people in similar situations tend to reproduce at similar rates, and so the rates of growth throughout human history have been surprisingly consistent. So, ideas like doubling time are very useful to help us prepare for the future. What sort of infrastructure will we need?

How much space will a population need? What amount of resources will they use? These questions all require an understanding of future population sizes. So, this is an important field of study. Let's get to it, on the double.

The Rule of 70

To figure out how long it would take a population to double at a single rate of growth, we can use a simple formula known as the Rule of 70. Basically, you can find the doubling time (in years) by dividing 70 by the annual growth rate.

Imagine that we have a population growing at a rate of 4% per year, which is a pretty high rate of growth. By the Rule of 70, we know that the doubling time (dt) is equal to 70 divided by the growth rate (r). That means our formula would look like this:

$$dt = 70 / r$$
$$dt = 70 / 4$$
$$dt = 17.5$$

The population doubling time for the high-income countries is 175 years (as the annual growth rate of high-income countries is 0.4%). While the doubling time for middle income countries is 58-59 years (r=1.2%). 27 years will be taken by the low-income countries to double their population (r=2.6%). The population doubling time for USA is estimated to be 140 years (r=0.5%). The population doubling time for Pakistan is 35 years.

$$dt= 70/2$$
$$dt= 35$$

As the annual growth rate of Pakistan is 2.0%.

The larger the rate of growth (r), the faster the doubling time. Rate of growth varies considerably among different regions. The rate of growth is slow in the developed regions as compared to the developing countries. Most populations cannot double forever. Resistance factors like natural resource constraints and disease contribute to a leveling off in population size over time. When this happens, we say the population has reached it carrying capacity. This type of growth is also referred to as logistic growth.

Growth and Fold Rate:

Assuming that a population continues to increase at a particular annual growth rate of r, the number of years (n) it will take to reach z-fold its original size is: $n= \underline{LN(z)}$

r If r is expressed in percentage then: n=[LN(z)]*100 r%

The value of r will remain constant throughout the period during which the population grows z fold.

Topic 088: Population Growth and Distribution - XIX

Causes of Population Growth:

Overpopulation is an undesirable condition where the number of the existing human population exceeds the actual carrying capacity of Earth. Over the last half century, the population of the world has exploded. At the time of writing, there are seven billion people on the planet and this number is projected to grow in a short period of time. Overpopulation is caused by numbers of factors. Reduced mortality rate, better medical facilities, depletion of precious resources are few of the causes, which result in overpopulation.

It is possible for a sparsely populated area to become densely populated if it is not able to sustain life. Growing advances in technology with each coming year has affected humanity in many ways. One of these has been the ability to save lives and create a better medical treatment for all. A direct result of this has been the increased lifespan and the growth of the population.

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Lesson 24

POPULATION GROWTH – III

Topic 089: Population Growth and Distribution – XX

More hands to overcome Poverty:

When talking about overpopulation we should understand that there is a psychological component as well. For thousands of years, a very small part of the population had enough money to live in comfort. The rest faced poverty and would give birth to large families to make up for the high infant mortality rate. Families that have been through poverty, natural disasters or are simply in need of more hands to work are a major factor for overpopulation. As compared to earlier times, most of these extra children survive and consume resources that are not sufficient in nature.

A lack of educational resources, coupled with high death rates leading to higher birth rates, result in impoverished areas seeing large booms in population. The effect is so extensive that the UN has predicted that the forty-eight poorest countries in the world are also likely to be the biggest contributors to population growth. Their estimates state that the combined population of these countries is likely to balloon to 1.7 billion in 2050, from 850 million in 2010.

Topic 090: Population Growth and Distribution -XXI

Poor Contraceptive Use:

Though the availability of contraceptives is widespread in developed countries, poor planning on both partners' parts can lead to unexpected pregnancies. Poor family planning on the part of partners can lead to unexpected pregnancies though contraceptives are easily available. It is the major contributing factor that is leading to growth of population in higher number and it is proving to be the disaster to the Earth and it has frightened the world from the depletion of resources.

Statistics have shown that in Great Britain 76% of women aged between 16 and 49 used at least one form of contraceptive, leaving a quarter open to unexpected pregnancies. This issue is exceeding in underdeveloped areas. A study by the World Health Organization (WHO) shows that this usage figure drops to 43% in countries that are blight by issues like poverty, which leads to higher birth rates.

Topic 091: Population Growth and Distribution - XXII

Child Labor:

When you think of child labor, you may immediately think of child slaves who have to work all day in hard living conditions, but that is not the complete picture. Not all of the work that children do is bad. For example, it may well be that you have a part-time job after school, and that is fine. It becomes a problem when work can potentially be a danger. The danger can be physical, mental or social. It could also mean that you can no longer go to school because of work. Therefore, child labor is the work that hinders the chances, the dignity and the right to education of children between the ages of 0 and 15, and also the work that is harmful to the physical and/or mental development of these children. In addition, extreme forms of (dangerous) work, done by children

As distressing as it may be to hear, child labor is still used extensively in many parts of the world. UNICEF estimates that approximately 150 million children are currently working, primarily in countries that have few children labor laws. This can result in children being seen as a source of income by impoverished families. Furthermore, children who begin work too young also lose the educational opportunities they should be grant, particularly when it comes to birth control. Child labor is high in low-income countries as compared to middle- or high-income countries, which is the actual cause of population growth in the low-income countries.

Topic 092: Population Growth and Distribution - XXIII

Reduced Mortality rate:

At the root of overpopulation is the difference between the overall birth rate and death rate in populations. If the number of children born each year equals the number of adults that die, then the population will stabilize. Talking about overpopulation shows that while there are many factors that can increase the death rate for short periods of time, the ones that increase the birth rate do so over a long period of time. The discovery of agriculture by our ancestors was one factor that provided them with the ability to sustain their nutrition without hunting. This created the first imbalance between the two rates.

Improvement in medical technology has led to lower mortality rates for many serious diseases. Particularly dangerous viruses and ailments such as polio, smallpox and measles have been practically eradicated by such advances. While this is positive news in many ways, it also means that people are living longer than ever before. This “delay” in the cycle of life and death has led to birth rates outstripping death rates by over two to one in modern times.

Predominantly declines in mortality. For most of human history, global population growth was extremely slow, because mortality and fertility levels were in fairly close equilibrium. But recent times have taken us rapidly to 7 billion and counting. As demonstrated in the classic work of Thomas McKeown, *The Modern Rise of Population*, the only plausible explanation is declines in mortality. Consider, there are only three possible determinants of population change—fertility, migration, and mortality. Fertility may sometimes have increased marginally overall, certainly not appreciably; and migration is net zero for the planet, with mostly some out-migration for most developing countries. That leaves only mortality decrease as the primary explanation for the profound increase in population.

Moreover, reduced child mortality plays a huge role. Deaths to children under 5 typically account for at least half of all deaths in pre-transition societies, and child mortality declines have been dramatic. In addition, child survival contributes to population “momentum” because most of those surviving children will eventually have children themselves. Thus, not only does reducing mortality contribute to rapid population growth, it is the predominant cause, notwithstanding the partial virtuous cycle, that reduced child mortality may partially help over time to reduce fertility levels.

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Lesson 25

POPULATION GROWTH - IV

Topic 093: Population Growth and Distribution - XXIV

Fertility Treatments:

According to WHO data more than 180 million couples in developing countries suffer from primary or secondary infertility. The social stigma of childlessness still leads to isolation and abandonment in many developing countries.

Differences between the developed and developing world are emerging because of the different availability in infertility care and different socio-cultural value surrounding procreation and childlessness. Although reproductive health education and prevention of infertility are number one priority, the need for accessible diagnostic procedures and new reproductive technologies (ART) is very high.

With latest technological advancement and more discoveries in medical science, it has become possible for couple who are unable to conceive to undergo fertility treatment methods and have their own babies. Though it only plays a minor role in comparison to the other causes of overpopulation, improved fertility treatments have made it possible for more people to have children. Now most have the option of conceiving children, even if they may not have been able to do so without such treatments. Today there are effective medicines, which can increase the chance of conception and lead to rise in birth rate.

Topic 094: Population Growth and Distribution - XXV

Agricultural Advancement:

The industrial as well as the agricultural revolution had a big contribution to the overpopulation issue. Agriculture in its simplest form first appeared about 12,000 years ago in the Middle East. Every major advance in agriculture has allowed global population to increase. Early farmers could settle down to a steady food supply.

Irrigation, the ability to clear large swaths of land for farming efficiently, and the development of farm machines powered by fossil fuels allowed people to grow more food and transport it to where it was needed. Many anthropologists say that the carrying capacity of humans on the planet without agriculture is about 10 million. This population have reached about 10,000 years ago. At the time, people lived together in small bands of hunters and gatherers.

Typically, men hunted and fished; women gathered nuts and vegetables. Human populations have blown past this hypothetical carrying capacity. By using our brains, our erect posture, and our hands, we have been able to manipulate our environment in ways that no other species has ever done.

Topic 095: Population Growth and Distribution - XXVI

Farming

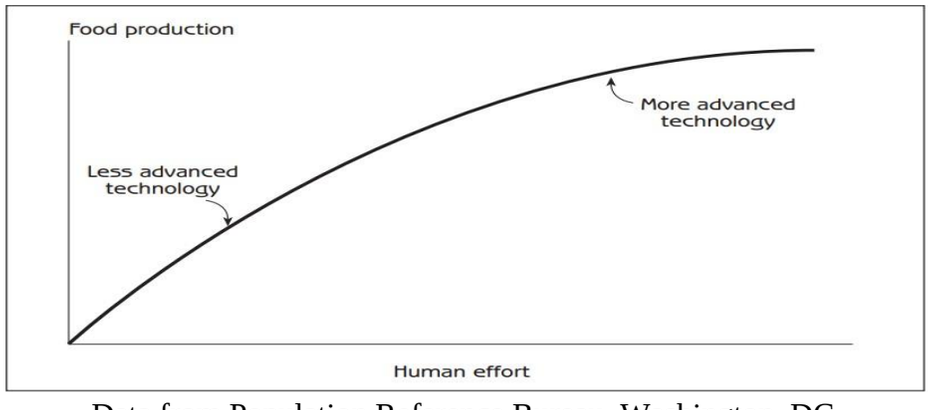
About 10,000 years ago, we developed the ability to grow our own food. Farming increased the yield of food plants and allowed people to have food available year-round. Animals were domesticated to provide meat. With agriculture, people could settle down, so that they no longer needed to carry all their possessions. They could develop better farming practices and store food for when it was difficult to grow. Agriculture allowed people to settle in towns and cities.

When advanced farming practices allowed farmers to grow more food than they needed for their families, some people were then able to do other types of work, such as crafts or shop keeping. Farming has increasingly depended on machines. Such advanced farming practices allow one farmer to feed many more people than in the past.

Topic 096: Population Growth and Distribution - XXVII

Industrial Revolution:

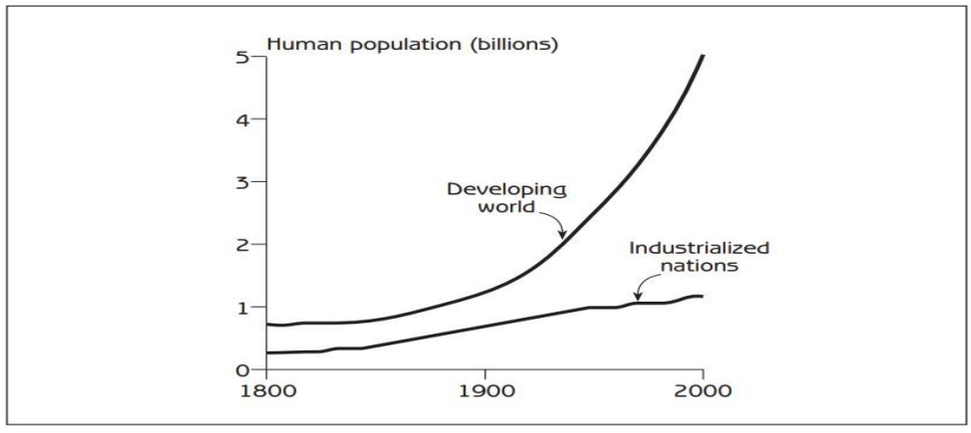
The Industrial Revolution had a major impact on agriculture. Highly productive crops such as wheat, corn, potatoes, sweet potatoes and rice, which were previously restricted to particular regions of the world where they originated, were quickly spread around the world by European trade and colonialism, giving farmers an expanded 'menu' of highly productive crops from which to choose. Mechanization gave farmers the ability to structure ecosystems more than had been possible with only human and animal labor.



Data from Population Reference Bureau, Washington, DC

The Industrial Revolution was accompanied by a scientific revolution, as well as new agricultural technologies that increased agricultural production even further. In this way, people were able to increase the percentage of the ecosystem's biological production that was available for human consumption and the carrying capacity for humans increased. Human populations increased in the areas with agriculture.

Any significant new improvement in agricultural technology generated a rapid increase in carrying capacity, and the human population of that region increased to the new carrying capacity over a period of centuries. The populations of industrialized nations continued to grow rapidly through the 19th and most of the 20th centuries.



Data from Population Reference Bureau, Washington, DC

The increase in carrying capacity since the Industrial Revolution has been so large and so continuous that the planet's human population has been able to grow exponentially for the past 250 years. Improvements in public health from the scientific revolution drastically reduced death rates in industrializing countries. Their populations increased rapidly because birth rates remained high.

Topic 097: Population Growth and Distribution - XXVIII

The Green Revolution

The Green Revolution has allowed the addition of billions of people to the population in the past few decades. The Green Revolution has improved agricultural productivity by:

Improving crops by selecting for traits that promote productivity; recently, genetically engineered crops have been introduced. Increasing the use of artificial fertilizers and chemical **pesticides**. About 23 times more fertilizer and 50 times more pesticides are used around the world than were used just 50 years ago.

Agricultural machinery: plowing, tilling, fertilizing, picking, and transporting are all done by machines. About 17% of the energy used each year in the United States is for agriculture. Increasing access to water. Many farming regions depend on groundwater, which is not a renewable resource. Some regions will eventually run out of this water source. Currently about 70% of the world's fresh water is used for agriculture.

The Green Revolution has increased the productivity of farms immensely. A century ago, a single farmer produced enough food for 2.5 people, but now a farmer can feed more than 130 people. The Green Revolution is credit for feeding 1 billion people that would not otherwise have been able to live.

REFERENCES

Human Ecology: Basic Concepts for Sustainable Development

Lesson 26

POPULATION GROWTH - V

Topic 098: Population Growth and Distribution - XXIX

Immigration:

Many people prefer to move to developed countries. The result is that those people settle over there and those places become overcrowded. Difference between the number of people who are leaving the country and the number of people who enter narrows down which leads to more demand for food, clothes, energy and homes. This gives rise to shortage of resources. Though the overall population remains the same, it just affects the density of population making that place simply overcrowded. Moreover, many people all over the world are force to leave their homes due to conflicts or famine. This problem will be even bigger in the future due to the global warming issue.

Thus, many people will try to migrate into countries which are not that much affected by the global warming problem and which provide higher living standards. This also leads to a local overpopulation of certain areas. This is particularly problematic in countries where immigration numbers far exceed emigration numbers. In some cases, immigrants may be attempting to escape overpopulation in their own countries, only to contribute to the same issues in the countries they move to. However, data also exists to show the immigration can bolster economies, with the effect in the UK being particularly pronounced.

Topic 099: Population Growth and Distribution - XXX

Better Medical Facilities:

Following this the industrial revolution started. Technological advancement was perhaps the biggest reason why the balance has been permanently disturbed. Science was able to produce better means of producing food, which allowed families to feed more mouths. Besides, medical science made many discoveries, thanks to which they were able to defeat a whole range of diseases.

Illnesses that had claimed thousands of lives until now were cure because of the invention of vaccines. Combining the increase in food supply with fewer means of mortality tipped the balance and became the starting point of overpopulation. Improvement in knowledge regarding the treatment of diseases leads to an increase in life expectancy. Increase life expectancy leads to overpopulation since with the assumption of a constant birth rate, people live longer and thus more people will populate the planet at the same time.

Topic 100: Population Growth and Distribution - XXXI

Lack of Family Planning:

Most developing nations have a large number of people who are illiterate, live below the poverty line, and have little or no knowledge about family planning. Besides, getting their children married at an early age increases the chances of producing more kids. Those people are unable to understand the harmful effects of overpopulation, and lack of quality education prompts them to

avoid family planning measures. Though, the availability of contraceptives is widespread in developed countries, poor planning on both partners' parts can lead to unexpected pregnancies.

Statistics have shown that in Great Britain 76% of women aged between 16 and 49 used at least one form of contraceptive, leaving a quarter open to unexpected pregnancies. This issue is exacerbated in underdeveloped areas. A study by the World Health Organization (WHO) shows that this usage figure drops to 43% in countries that are blighted by issues like poverty, which leads to higher birth rates.

Topic 101: Population Growth and Distribution - XXXII

Availability of Vaccines:

Vaccination is one of the most powerful means to save lives and to increase the level of health of man-kind. However, the impact of immunization against the most threatening infectious agents on life expectancy has been the object of a still open debate. Data from the United Kingdom and Scandinavian countries show that the widespread use of smallpox vaccination starting at the beginning of the nineteenth century resulted in a marked and sustained decline not only of smallpox-related deaths, but also of the overall crude death rate, and contributed greatly to an unprecedented growth of European population.

As to the present, it is estimate that 3 million children are save annually by vaccination, but 2 million still die because they are not immunized. Tetanus, measles and pertussis are the main vaccine-preventable killers in the first years of life. Data from Bangladesh show that full implementation of EPI vaccines has the potential of reducing mortality by almost one-half in children aged 1-4 years. Recent progress in the development of vaccines against agents responsible for much mortality in the developing countries. It can be forecast a further substantial reduction of deaths for infectious diseases in the next century and considerable increase in population globally.

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Lesson 27

POPULATION DECLINE

Topic 102: Population Growth and Distribution - XXXIII

Population Decline:

A population decline in humans is a reduction in a human population size caused by short term, events such as pandemic, wars, famines or other catastrophes, or by long-term demographic trends, as in sub replacement fertility rate, or persistent emigration. Even though short-term population shocks have caused terrible loss of life and human misery, sometimes lasting several centuries, over the long-term, stretching from prehistory to the present, this planet's human population has continued to grow. However, current events suggest that this long-term trend may be coming to an end. Up until the beginning, industrial revolution global population grew very slowly.

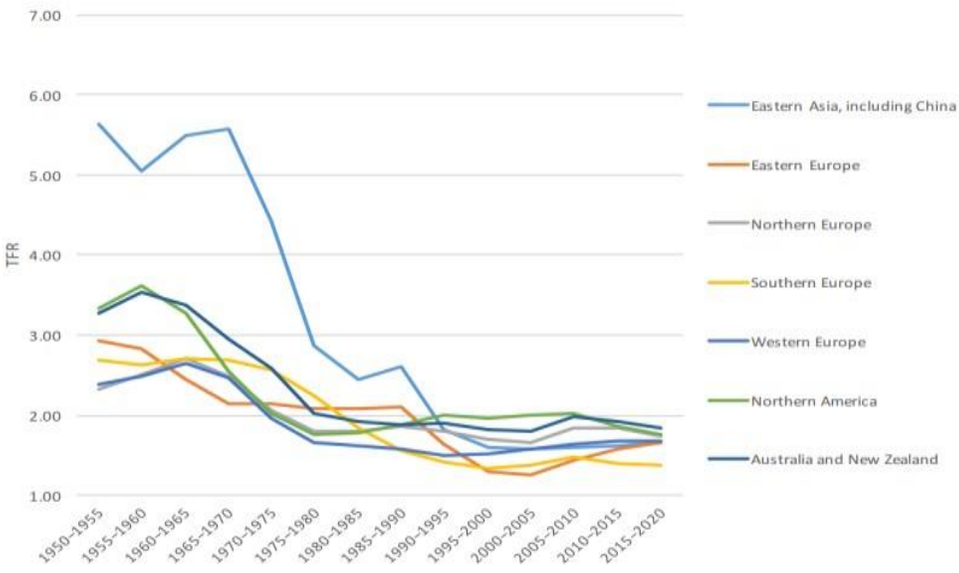
Examples of this emerging trend are Japan, whose population is currently (2015-2020) declining at the rate of 0.2% per year, and China, whose population could start declining in 2027 or sooner. Possible consequences of long-term national population decline can be net positive or negative. If a country can increase its workforce productivity faster than its population is declining, the results, both in terms of its economy, the quality-of-life of its citizens, and the environment, can be net positive. If it cannot increase workforce productivity faster than its population's decline, the results can be mostly net negative. National efforts to confront decline to-date have been focused on the possible negative economic consequences and have been centered around increasing the size of the nation's workforce and the productivity of its workers.

Topic 103: Population Growth and Distribution- XXXIV

The Global Trends in Decline in Population Growth:

Fertility decline began in many European countries in the 19th Century, closely followed by Australia and New Zealand, the United States and Canada, and subsequently Japan leading to severe population decline. By the 1970s, the fertility transition had taken place in Australia, Japan, and all highly developed countries in Europe and North America. In the 1970s, fertility in China declined dramatically following policies to promote later childbearing and smaller family sizes, including the notable introduction of the 1979 family planning policy, which generally restricted couples to a single child.

In the early 1990s, low fertility countries in Southern, Eastern and Central Europe experienced further decreases in their TFR, sometimes to as low as 1.3 children per woman and below, where they remained for decades. This marked the emergence of so-called "lowest-low fertility" by 2002, more than half of the European population lived in countries with a lowest-low period TFR. By the mid to late 2000s, these East Asian countries had the lowest period fertility globally, recording TFRs in the range of 1.04 to 1.34 children per woman between 2005 and 2010.



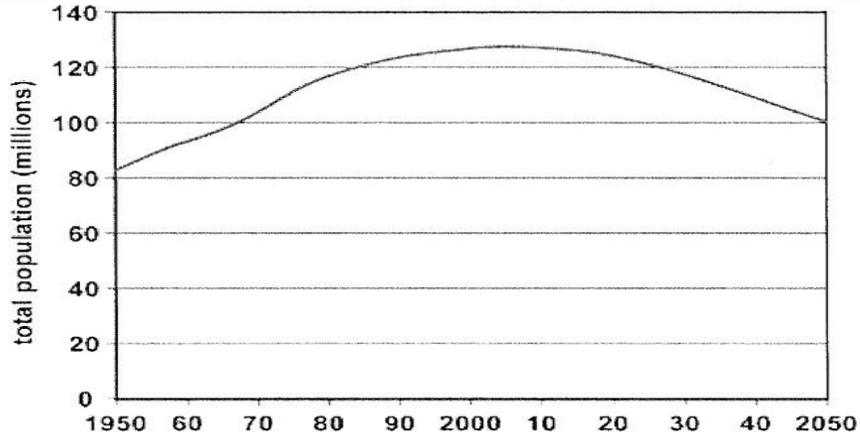
United Nations, 2019

Yet nearly half of the global population now lives in a country with a period total fertility rate (TFR) below 2.1 children per woman.

Topic 104: Population Growth and Distribution - XXXV

Case study of Japan

Japan is facing a demographic crisis. The population is aging and shrinking at a considerable pace despite the government's efforts to curtail the problem. Population peaked in 2006 at slightly over 128 million, and could shrink below 100 million by 2050 if current trends continue.



NIPSSR, Population Statistics of Japan 2003

The coming hyper-aged and depopulating society will have a drastic impact on Japan's labor force and could have grave economic and social consequences. A combination of both social and economic factors has reduced fertility rates to the lowest in Japan's history. The current fertility rate is 1.3, well below the replacement fertility rate of 2.1, and it is projected to continue to decline,

thus creating the current demographic crises. A 1989 study conducted by the Ministry of Health and Labor revealed that the fertility rate had fallen to the "shocking" level of 1.57 prompting the first measures to be taken to address the situation. Over the next eighteen years the Japanese government enacted policies to rectify the falling fertility rate, yet it continued to decline.

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Lesson 28

FACTORS OF POPULATION DECLINE

Topic 105: Population Growth and Distribution - XXXVI

Factors causing population decline

There are both social and economic reasons as to why the population has fallen so drastically in Japan. There is little doubt that these categorical causes are link. It could be argued that social causes are the greater of the two, but each category contains significant factors that played a critical role in bringing about the precipitous decline of the fertility rate.

Topic 106: Population Growth and Distribution - XXXVII

Social Factors

Increases in education and career opportunities for women have had a significant impact on marital patterns and birthrates in Japan. More women than ever before are earning college degrees, thereby creating more opportunities for themselves. In 1975, the rate of women having four years of college or more was 12.7%. By 2005, this had advanced substantially to 36.8%. Advances in educational attainment, more women are landing higher paying jobs, leading many to focus on careers rather than starting a family. In the last fifteen years, the percentage of women in their late twenties who have not married has risen from 30 to about 50 percent. However, there are additional social issues that are part of the shrinking fertility rate. Many societal constraints are embedded in the Japanese culture, and more than a few Japanese women are attempting to break free of these.

Japan is considered by many to be a very male dominated society. One backlash against this is the social phenomena of "womb-strike". Illustrating this point are the results of a recent survey, which found that only 27.9% of women thought childrearing would be enjoyable. The loss of free time was cited as the leading reason. These women claim that living at home is the best of both worlds. They have little to no housework and pay no rent, giving them more free time and money to do with whatever they want. For many Japanese women getting married and becoming a housewife is far less enticing and hardly incentive enough to leave this lifestyle behind.

Topic 107: Population Growth and Distribution - XXXVIII

Attitudes and Stereotypes

Attitudes and stereotypes are additional points of contention in Japanese society leading to lower birth rates. The unhappiness of some women with the social situation in Japan was mirrored in a recent survey. 76% of those surveyed said that Japan was not a good place to give birth and raise children. Shoshika is the Japanese term given to the trend toward having fewer children. This trend of the past few decades results from a number of related reasons.

The delay in marriage has resulted in a postponement of childbearing, which often translates into fewer children. The average age at which women bear their first child has risen from 25.7 in 1975 to 29.1 in 2005. All of these factors add to Shoshika, the trend of having fewer children.

Topic 108: Population Growth and Distribution - XXXIX

Gender Roles

Traditional gender roles are yet another aspect of the societal issues affecting fertility. Childrearing tends to be a female only task in Japan. Japanese men are rarely involved in household work, let alone assisting in childrearing. A study conducted by demographer Makoto Atoh found that Japanese husbands share of family work was conspicuously low. Time spent on family matters averaged only 20 minutes a day on weekdays. The importance of the husband's share of family work could not be more paramount.

A cross national comparison of husband's share of family work showed that countries where husbands contributed more to family work tend to have higher fertility. It is beyond doubt that the social situation of Japan needs to be re-evaluated. Attitudes, roles, and stereotypes must be changed. This will not be an easy task, but it is one that the government must tackle if it hopes to alter the downward birthrate trend.

Topic 109: Population Growth and Distribution - XL

Economic Factors

Economic issues are a factor affecting birth rate, and are far easier, as well as less controversial, for the country's leaders to address than many social issues. One of the initial ways that economics affects birth rates is through the decline in the utility of children. This is a natural result of nations making the transition from an agrarian, rural society to an industrialized urban society. This transition occurred in Japan during the early to mid-part of the 20th century and is not a direct factor leading to today's population woes, but it cannot be overlooked. More pressing than the decline in the utility of children is the incredible costs of raising children in Japan.

According to demographer Julian Chapple, "many say they would like to have more children but can't afford to. The financial burden of having children is enormous and an obvious deterrent". Childcare and education expenses are both having a negative impact on fertility rates. Childcare costs are prohibitive in Japan, and this is one challenge that the government is attempting to resolve. Since the bursting of the Japanese economic bubble during the early 90's, there has been a large degree of economic uncertainty exacerbating the problem of low fertility rates. To emphasize this, Professor of Population Economics, Naohiro Ogawa claims "increased economic insecurity reduced marital fertility in the 1990's". The downward trend of the Japanese economy has definitely been a factor contributing to the fertility rate's continued downward path.

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Lesson 29

GEOGRAPHICAL DISTRIBUTION OF POPULATION - I

Topic 110: Population Growth and Distribution - XLI

Geographical Distribution:

Understanding global population trends and anticipating the demographic changes to come are crucial to the achievement of the 2030 Agenda for Sustainable Development. The 2030 Agenda emphasizes that people are at the center of sustainable development, echoing the ideals set forth in the Program of Action of the International Conference on Population and Development adopted in Cairo in 1994. Due to medical advances, better living conditions and the increase of agricultural productivity, the world population is expected to grow. Mortality rates are decreasing and the median age of the world population increased over the last few years from 24 years in 1995 to 30.9 years in 2020.

According to the United Nations Department of Economic and Social Affairs, the number of people is estimated to grow steadily and in 2100, global population is estimated to be approximately at 10.87 billion people. The countries with highest population growth rate in 2017 were mostly African countries. The country with the highest population declines rate in 2017 was the Cook Islands. In the Cook Islands, the population decreased by about 2.79 percent compared to the previous year. Asia is the most populous continent on earth. China was the country with the largest population. In mid-2019, about 1.4 billion people lived in China.

Topic 111: Population Growth and Distribution - XLII

Urbanization:

Urbanization, the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities. The United Nation does not have its own definition of "urban" but instead follows the definitions used in each country, which may vary considerably. The United States, for instance, uses "urban place" to mean any locality where more than 2,500 people live. Moreover, a high population density in an agrarian society, dependent upon agriculture for its sustenance, is likely to be a severer constraint upon human welfare than would the same density in a highly industrialized society, in which the bulk of national product is not of agricultural origin.

Also, of significance in terms of geographical distribution is the division between rural and urban areas. For many decades there has been a nearly universal flow of populations from rural into urban areas. While definitions of urban areas differ from country to country and region to region, the most highly urbanized societies in the world are those of western and northern Europe, Australia, New Zealand, temperate South America, and North America; in all of these the fraction of the population living in urban areas exceeds 75 percent, and it has reached 85 percent in West Germany. An intermediate stage of urbanization exists in the countries making up much of tropical Latin America, where 50 to 65 percent of the population lives in cities.

Finally, in many of the developing countries of Asia and Africa the urbanization process has only recently begun, and it is not uncommon to find less than one-third of the population living in urban

areas. The rapidity of urbanization in some countries is quite astonishing. The population of Mexico City in 1960 was around 5,000,000; it was estimated to be about 17,000,000 in 1985 and was projected to reach 26,000,000 to 31,000,000 by 2000. A rule of thumb for much of the developing world is that the rate of growth of urban areas is twice that of the population as a whole. Thus, in a population growing 3 percent annually (doubling in about 23.1 years), it is likely that the urban growth rate is at least 6 percent annually (doubling in about 11.6 years).

Topic 112: Population Growth and Distribution - XLIII

Global variation in population size

The world's population continues to grow, albeit at a slower pace than at any time since 1950. The world's population reached 7.7 billion in mid2019, having added one billion people since 2007 and two billion since 1994. The growth rate of the world's population peaked in 1965-1970, when it was increasing by 2.1 per cent per year, on average. Since then, the pace of global population growth has slowed by half, falling below 1.1 per cent per year in 2015-2020, and it is projected to continue to slow through the end of this century.

The global population is expected to reach 8.5 billion in 2030, 9.7 billion in 2050 and 10.9 billion in 2100, according to the medium-variant projection, which assumes a decline of fertility for countries where large families are still prevalent, a slight increase of fertility in several countries where women have fewer than two live births on average over a lifetime, and continued reductions in mortality at all ages. There is inherent uncertainty in population projections. At the global level that uncertainty depends on the range of plausible future trends in fertility, mortality and international migration, which have been assessed for each country or area using demographic and statistical methods. It is concluded that, with a certainty of 95 per cent, the size of the global population will stand between 8.5 and 8.6 billion in 2030, between 9.4 and 10.1 billion in 2050, and between 9.4 and 12.7 billion in 2100.

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Lesson 30

GEOGRAPHICAL DISTRIBUTION OF POPULATION - II

Topic 113: Population Growth and Distribution - XLIV

Global variation in population Growth

The rate of population growth remains especially high in the group of 47 countries designated by the United Nations as least developed, including 32 countries in sub-Saharan Africa. With an average growth of 2.3 per cent annually from 2015 to 2020, the total population of the least developed countries (LDCs) as a group is growing 2.5 times faster than the total population of the rest of the world. Although the growth rate of LDCs is projected to slow in the future, the population of this group of countries is projected to nearly double in size from 1 billion inhabitants in 2019 to 1.9 billion in 2050, and to increase further to 3.0 billion in 2100. More than half of the projected increase in the global population to 2050 will be concentrated in just nine countries.

Ordered by the absolute increase in population, they are: India, Nigeria, Pakistan, Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt and the United States of America. India is expected to add nearly 273 million people between 2019 and 2050, while the population of Nigeria is projected to grow by 200 million. Together, these two countries could account for 23 per cent of the global population increase to 2050. China, with 1.43 billion people in 2019, and India, with 1.37 billion, have long been the two most populous countries of the world, comprising 19 and 18 per cent, respectively, of the global total in 2019.

They are followed by the United States of America, with 329 million in 2019, and Indonesia, with 271 million. The populations of both Pakistan and Nigeria more than doubled in size between 1990 and 2019, with Pakistan moving up in rank from the 8th to the 5th position and Nigeria from the 10th to the 7th position. After this re-ordering between 2019 and 2050, the ranking of the five largest countries is projected to be preserved through the end of the century, when India could remain the world's most populous country with nearly 1.5 billion inhabitants, followed by China with just under 1.1 billion, Nigeria with 733 million, the United States with 434 million, and Pakistan with 403 million inhabitants.

Topic 114: Population Growth and Distribution - XLV

Effect of Population Explosion

Population may be considered positive hindrance in the way of economic development of a country. In a 'capital poor' and technologically backward country, growth of population reduces output by lowering the per capita availability of capital. Too much population is not good for economic development.

Hindering Economic development

Population reduces the Rate of Capital Formation:

In underdeveloped countries, the composition of population is determined to increase capital

of dependents is very high. Nearly 40 to 50 per cent of the population is in the non-productive age group, which simply consumes and does not produce anything. In under developed countries, rapid growth of population diminishes the availability of capital per head, which reduces the productivity of its labor force. Their income, as a consequence, is reduced and their capacity to save is diminished which, in turn, adversely affects capital formation.

Topic 115: Population Growth and Distribution - XLVI

Higher Rate of Population requires more Investment:

In economically backward countries, investment requirements are beyond its investing capacity. A rapidly growing population increases the requirements of demographic investment, which at the same time reduces the capacity of the people to save. This creates a serious imbalance between investment requirements and the availability of investible funds. Therefore, the volume of such investment is determined by the rate of population growth in an economy.

Some economists have estimated that for maintaining the present level of per capita income, 2 per cent to 5 per cent of national income must be invest if population grows at 1 per cent per annum. In these countries, population is increasing at the rate of about 2.5 per cent per annum and 5 per cent to 12.5 per cent of their national income and hence the entire investment is absorbed by demographic investment and nothing is left for economic development. These factors are mainly responsible for stagnation in such economies.

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Lesson 31

GEOGRAPHICAL DISTRIBUTION OF POPULATION - III

Topic 116: Population Growth and Distribution - XLVII

It reduces per Capita Availability of Capital:

The large size of population also reduces per capita availability of capital in less developed countries. This is true in respect of underdeveloped countries where capital is scarce and its supply is inelastic. A rapidly growing population leads to a progressive decline in the availability of capital per worker. This further leads to lower productivity and diminishing returns.

Topic 117: Population Growth and Distribution - XLVIII

Adverse Effect on per Capital Income:

On a simplistic level, the relationship between growth in population and growth in per capita income is clear. After all, per capita income equals total income divided by population. The growth rate of per capita income roughly equals the difference between the growth rate of income and the growth rate of population.

Rapid growth of population directly effects per capita income in an economy. Up to 'income optimizing level', the growth of population increases per capita income but beyond that it necessarily lowers the same. In a sense, so long as the rate of population growth is lower than the per capita income, rate of economic growth will rise but if population growth exceeds the rate of economic growth, usually found in the case of less developed countries, per capita income must fall.

Topic 118: Unemployment

Growing population has forward and backward linkages with the other economic dynamics particularly poverty and unemployment. A fast growth in population means a large number of persons coming to the labor market for whom it may not be possible to provide employment. In fact, in underdeveloped countries, the number of job seekers is expanding so fast that despite all efforts towards planned development, it has not been possible to provide employment to all.

Unemployment, underemployment and disguised employment are common features in these countries. The rapidly rising population makes it almost impossible for economically backward countries to solve their problem of unemployment.

Topic 119: Population Growth and Distribution

Rapid Population Growth creates Food Problem:

Increased population means more mouths to feed which, in turn, creates pressure upon available stock of food. This is the reason, the under-developed countries with rapid growing population are generally faced with a problem of food shortage. Despite all their efforts for raising agricultural production, they are not able to feed their growing population. Food scarcity effects economic development in two respects. Firstly, inadequate supply of food leads to undernourishment of the people, which lowers their productivity. It further reduces the production

capacity of the workers. Secondly, the deficiency of food compels to import food grains, which places as unnecessarily strain on their foreign exchange resources.

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Lesson 32

PROBLEMS OF POPULATION - I

Topic 120: Population Growth and Distribution - L

Population and Farming:

In less developed countries the majority of population lives in, where agriculture is their mainstay. The growth of population is relatively very high in rural areas and it has disturbed the land man ratio. Further it has increased the problem of disguised unemployment and reduced per capita farm product in such economies, as the number of landless workers has largely increased followed by low rate of their wages.

The low farm productivity has reduced the propensity to save and invest. As a result, these economies suffer largely for want of improved farm techniques and ultimately become the victim of the vicious circle of poverty. Thus, retard farming and the process of overall development.

Topic 121: Population Growth and Distribution - LI

Population and Vicious Circle in Poverty:

Rapid growth of population is largely responsible for the perpetuation of vicious circle of poverty in underdeveloped countries. On account of, rapid growth of population people is required to spend a major part of their income on bringing up their children. Thus, savings and rate of capital formation remain low, reduction in per capita income, rise in general price level leading to sharp rise in cost of living.

No improvement in agricultural and industrial technology, shortage of essential commodities, low standard of living, mass unemployment etc. As a result, the entire economy of an underdeveloped country is surrounded by the vicious circle of poverty.

Topic 122: Population Growth and Distribution - LII

Reduction in Efficiency of Labor Force:

The labor force in an economy is the ratio of working population to total population. If we assume 50 years as the average life expectancy in an underdeveloped country, the labor force is in effect the number of people in the age group of 15-50 years.

During the demographic transitional phase, the birth rate is high and the death rate has declined and due to which the larger percentage of total population is in lower age group of 1-15 years, which is small labor force implies that comparatively there are few persons to participate in productive employment.

To overcome the demographic transition stage, it is essential for less developed countries to bring down their fertility rate. Thus, we can conclude that labor force increases with the increase in population.

Topic 123: Population Growth and Distribution - LIII

Social Infrastructure

A welfare state line India is pledge to meet social needs of the people adequately and for this, the government has to spend a lot on providing basic facilities like education, housing and medical aid. But, rapid increase in population make burden all the heavier. Rapidly growing population necessitates large investments in social infrastructure and diverts resources from directly productive assets.

Due to the scarcity of resources, it is not possible to provide educational, health, medical, transport and housing facilities to the entire population. There is over-crowding everywhere. As a result, the quality of these services goes down. To provide this social infrastructure requires huge investments.

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Lesson 33

PROBLEMS OF POPULATION - II

Topic 124: Population Growth and Distribution - LIV

Adverse Effect on Environment:

Rapid population growth leads to the environmental change. Rapid population growth has swelled the ranks of unemployed men and women at an alarming rate. Due to this, a large number of people are being pushed in ecologically sensitive areas such as hill sides and tropical forests. It leads to the cutting of forests for cultivation leading to several environmental change.

Besides all this, the increasing population growth leads to the migration of large number to urban areas with industrialization. This results in polluted air, water, noise and population in big cities and towns. Moreover, the pressure of rapid growth of population forces people to obtain more food for themselves and their livestock. As a result, they over-cultivate the semi-arid areas. This leads to desertification over the long run when land stops yielding anything.

Topic 125: Population Growth and Distribution - LV

Standard of Living:

Since one of the important determinants of the standard of living is the per capita income, the factors affecting per capita income in relation to population growth equally apply to the standard of living. A rapidly increasing population leads to an increased demand for food products, clothes, houses, etc.

But their supplies cannot be increased in the short run due to the lack of cooperant factors like raw materials, skilled labor, capital, etc. Consequently, their costs and prices rise which raise the cost of living of the masses. This brings down further the already low standard of living.

Poverty breeds large number of children which increases poverty further, and the vicious circle of poverty, more children and low standard of living continues. But Hirschman and Colin Clark opine that population pressures leading to lowering of standards will encourage the people of UDCs to work hard in order to improve their standard of living.

Topic 126: Population Growth and Distribution - LVI

Agricultural Development

In less developed countries, mostly people live in rural areas and their main occupation is agriculture and if the population increases the land-man ratio disturbed. Per capita availability of land for cultivation declined from 1.1 acre in 1911 to 0.6 acre in 1971 in our country, which makes the size of holdings very small.

The small size of holdings makes adoption of modern technology means of irrigation and mechanization impossible. This also leads to the occurrence of disguised unemployment and underemployment in the agricultural sector.

It leads to congestion moreover to reduction in land available for farming as well as for building houses, factories, hospitals, shopping centers, educational institutions, roads and railway tracks

etc. Thus, the growth of population retards agricultural development and creates many other problems.

Topic 127: Population Growth and Distribution - LVII

Obstacle to Self-Reliance:

The excessive population growth is an obstacle in the way of attaining self or reliance because it obliges us to importance and more food articles in order to meet the needs of increasing millions. On the other hand, it cuts down export surplus heavily. Reduction in exports makes us unable to pay for imports.

Due to heavy decline in export surplus, it reduces economic development leaving countries to be dependent on foreign aid. Thus, the aim of self-reliance cannot be achieved without controlling the population.

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Lesson 34

URBANIZATION - I

Topic 128: Population Growth and Distribution - LVIII

Urbanization:

With rapidly growing population, it becomes difficult to manage the adjustments that accompany economic and social change. Urbanization in UDCs creates such problems as housing, power, water, transport, etc. Besides, growing population threatens permanent environmental damage through urbanization in some rural areas.

With respect to urbanization, local and national governments plan on expanding cities and the policies they bring, affects the population size of the urban areas. With respect to urbanization, local and national governments plan on expanding cities and the policies they bring, affects the population size of the urban areas.

In densely populated cities Carbon dioxide emission decease due to public transportation that is shared and because of reduction in the use of private car. As the world second largest economy and the largest carbon emitter, China aims to take action and reduce its industrial energy demand in 2020 by 20% while increasing productivity.

Topic 129: Population Growth and Distribution - LIX

Overuse of Resources:

Rapid population growth tends to overuse the country's natural resources. This is particularly the case where the majority of people are dependent on agriculture for their livelihood. With rapidly rising population, agricultural holdings become smaller and unremunerated to cultivate.

There is no possibility of increasing farm production through the use of new land (extensive cultivation). Consequently, many households continue to live in poverty. In fact, rapid population growth leads to the overuse of land, thereby endangering the welfare of future generations.

Even in countries where natural resources are untapped such as Brazil and other Latin American countries, rapidly increasing population makes it difficult to invest in roads, public services, drainage and other agricultural infrastructure needed to tap such resources.

Topic 130: Population Growth and Distribution - LX

Defining Urban places, urban hierarchy and city systems

Overview:

The history of civilization has also been a history of urbanization, the concentration of populations in cities and suburban communities. In modern times, the industrial revolution has triggered a veritable urban explosion, first in the world's more-developed regions and then in the less-developed ones.

The UN now projects that by the year 2025, 78% of the population in the more-developed regions and 47% of the population in the less-developed regions will reside in urban areas. It is discovered

that the process of urbanization is different in the less-developed regions of the world than in the more-developed ones, and so we provide separate sections on urbanization trends in each of the two regional categories.

Topic 131: Population Growth and Distribution - LXI

What is Urbanization?

In demographic terms, the fundamental criteria are the size and concentration of the population settlement: An urban place is one that has a relatively large population density settled in an area surrounded by a less dense settlement (Lundquist, Anderton & Yaukey, 2015).

Urbanization covers following perspectives:

- Politically designated areas such as towns or cities
- The location of central features in an urban lifestyle
- A concentration of economic activities or occupations
- The presence of specific local institutions

These are certainly all correlates of the demographic criteria. Population size and density are matters of degree, and so is being urban.

Urbanization has dual meanings:

One is a present condition, or the degree of urbanization. This conventionally is measured as the percentage of the total population residing in places that are categorized as urban. The other meaning is urbanization as a process, or the pace of urbanization. This pace often is measured by the rate of change over time in the percentage of the population residing in urban places.

Topic 132: Population Growth and Distribution - LXII

History of Urbanization

Towns, and even some great cities, have been with us since antiquity. In the first century CE, for example, Rome had a population estimated at over one million, nearly as large as London in 1800 or Philadelphia in 1900. Pre-industrial population centers were, of course, very different from what we think of as a modern city. In contrast, industry brought the center of economic activity into the heart of the city, and as nonagricultural enterprises gained in importance, so did the cities. As economic activity moved into towns and cities, people followed, with hopes of securing livelihood there.

The pull of cities was often compound by a push from agricultural areas, as prime farming lands and agricultural work for growing rural populations were in increasingly short supply. Industrialization, providing livelihoods not tied to the ownership of land, opened the new urban frontier for settlement. The tremendous growth of urban areas was shape by the MDR population boom and the “second industrial revolution” that would expand the horizons of urban growth and tilt the balance to bring a majority of the world’s population into the cities. This happened first in the regions of the world that industrialized first—the present-day MDRs.

In the United States this urban explosion began after the Civil War. In 1860 less than 20% of U.S. residents were urban dwellers; by 1930 a majority of the U.S. population lived in metropolitan

areas. Urban growth was as explosive as the urban skyline. By the turn of the 20th century, three U.S. cities had more than a million residents each: New York with 3.4 million; Chicago with 1.7 million; and Philadelphia with 1.3 million. By 1950 New York had more than doubled in size and these three cities had gained as many residents as they have today (U.S. Census Bureau, 2012a; Flanders, 1998).

In just the next decade, between 2015–2025, the number of mega-cities of over 10 million is projected to increase from twenty-one to thirty-seven (or by 22%) and the population living in mega-cities by 28%. Although urbanization in the less-developed regions has historically lagged behind that in the more-developed regions, the recent pace of LDR urbanization has been higher than that of the MDRs and is project to continue. There is slightly higher absolute yearly increase in the urban percentage of the less-developed regions compared with the more-developed regions—but that increase represents a greater proportional change.

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Lesson 35

URBANIZATION - II

Topic 133: Population Growth and Distribution - LXIII

Determinants of urban transitions

In the MDRs, urban growth and the demographic transition have worked in tandem. During early stages of urban growth both the small size of urban populations and their high mortality made migration a very significant component of urban growth. Then, as many MDR cities grew to have large populations, mortality also declined, the combination of which made urban natural increase more significant in urban growth.

Currently, as urban areas grow over time in MDRs, a greater proportion of that growth is likely to come from natural increase rather than migration. This is especially true when legal barriers or economic conditions impede migration. Indeed, research indicates a slightly greater role of natural increase in recent urban growth than anticipated, with 60% due to natural increase.

In LDRs, the main component of growth into the future will also be natural increase, although rural to urban internal migration rates continue to be significant contributors to LDR urbanization.

Topic 134: Population Growth and Distribution - LXIV

Degree of urbanization:

Table 10-1 Percentage Urban Population, World Regions, 1950 to 2050

	Percentage Urban				
Region[a]	1950 (1)	1975 (2)	2000 (3)	2025[b] (4)	2050[b] (5)
World	29.4	37.7	46.7	58.0	67.2
More-Developed Regions	54.5	68.7	74.1	81.1	85.9
Less-Developed Regions	17.6	27.0	40.1	53.6	64.1
North America	63.9	73.8	79.1	85.0	88.6
Latin America and Caribbean	41.4	60.7	75.5	82.5	86.6
Europe	51.3	65.2	70.8	76.1	82.2
Oceania	62.4	71.9	70.4	71.1	73.0
Asia	17.5	25.0	37.4	53.1	64.4
Africa	14.4	25.6	35.6	45.3	57.7

[a]Sorted in order of percentage urban in 2000.
[b]Projections.

Table presents the percentage of the total population of various world regions that was urban in 1950, 1975, and 2000, and is projected to be urban in 2025 and 2050. For the world as a whole, half of the population already lives in urban places. The more-developed regions are the more urban, with nearly three of every four persons in the MDRs living in urban areas, compared with less than half of those in LDRs.

The degree of urbanization is increasing in both more and less develop regions and is project to continue to do so. The three more developed regions (North America, Latin America and the

Caribbean, and Europe) are the most urbanized. Oceania was one of the most urbanize regions in 1950 but has not experienced the same increase in urbanization over the last half of the 20th century as other MDRs or Latin America and the Caribbean.

The world as a whole became a majority urban population in 2007. The percentage urban has more than doubled for Asia and Africa in the past half century. The majority of Asia's population is project to be urban by 2020, while the majority of Africa's population is project to be so by 2035.

By 2050, more than two-thirds of the world population will be urbanize. By that time, Japan will consist of almost 100% urban dwellers.

Topic 135: Population Growth and Distribution - LXV

Urban growth and the pace of urbanization:

Urban growth has its own consequences, and the balance between urban and rural growth determines the pace of urbanization.

Table 10-2 Average Annual Rate of Change, Urban and Rural Populations, World Regions, 1950–1975, 1975–2009, and 2009–2025

	Average Annual Rate of Change (Percent)					
	1950–1975		1975–2009		2009–2025	
Region	Urban (1)	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)
World	2.91	1.39	2.40	0.85	1.76	0.12
More-Developed Regions	1.97	–0.39	0.82	–0.35	0.58	–1.01
Less-Developed Regions	3.96	1.77	3.30	1.01	2.15	0.22
Africa	4.77	1.88	3.85	1.98	3.14	1.20
Asia	3.66	1.73	3.24	0.84	2.04	–0.03
Latin America and the Caribbean	4.17	1.03	2.51	–0.15	1.22	–0.66
Oceania	2.60	0.88	1.44	1.63	1.20	1.02
Northern America	1.96	0.09	1.37	–0.01	1.11	–0.64
Europe	1.81	–0.51	0.55	–0.46	0.34	–1.10

Note: Sorted in order of annual urban change 1975–2009.

Table presents the average annual rate of change for urban and rural populations for world regions during the periods 1950 to 1975, 1975 to 2009, and projected forward to 2025.

Until 2009 the world's population as a whole continued to grow, but more so in the urban areas, increasing world urbanization. By 2025, the pace of urban growth will have slowed considerably, and growth rates for rural areas of the world will be nearing zero or negative.

In fact, by 2050 there is likely to be negative rural growth rates in some regions. The pace of world urbanization varies across Table 10-2's time span. From 1950 to 1975, the average annual rate of change for urban populations was twice that of the rural population. Then, from 1975 to 2009, as lower levels of fertility spread throughout much of the world growth slowed in both urban and rural areas.

However, the decline in rural growth was more severe than the decline in urban growth, resulting in an increase in the pace of urbanization even as urban growth slowed. The ratio of urban to rural growth from 1975 to 2009 increase to about 2.8 and is project to increase exponentially by 2025.

Topic 136: Population Growth and Distribution - LXVI

City Size:

We have dealt with the simple dichotomy between urban and rural. But cities come in many sizes, from small towns to mega-cities. Has urban growth been spread evenly over the range of city sizes, or has it favored mega-cities?

Many countries use a minimum population size to define an urban area, but that size can be 200 (as in Denmark), 2,000 (Argentina), 5,000 (India) or 50,000 (Japan) or even 100,000 (China). Some countries do not use a statistical definition but designate urban areas by administrative decision. In other countries, the sectoral employment or provision of infrastructure and services is use to determine whether settlements should be classified as urban or rural. Finally, once categorize as urban or rural, places are rarely re-categorized.

Some of this resistance may come from the allocation of fiscal transfers – consider India, where get reclassified as urban may cause places to lose government transfers, or Egypt, where get reclassified as urban would trigger additional public investment for higher-level service delivery requirements, including police stations and courthouses.

Topic 137: Population Growth and Distribution - LXVII

Mega Cities:

The postwar picture is complex. The biggest change has occurred at the high ranges of the city-size distribution, with a rapid increase of urban dwellers living in mega-cities of over 10 million. Since 1950, the proportion of people living in mega-cities has more than tripled.

Despite the fast growth of mega-cities over the latter half of the 20th century and the great amount of popular attention given to them, just over a tenth of the world's urban population are mega-city dwellers; roughly half of the global urban population lives in cities with fewer than 500,000 residents. By 2025, about one of every eight urban dwellers is expected to live in a mega-city.

Table 10-3 Number of Mega-Cities in World Regions, 1975, 2010, and 2025

	Number of Mega-Cities		
	1975	2010	2025
Region	(1)	(2)	(3)
World	3	23	37
More-Developed Regions	2	6	8
Less-Developed Regions	1	17	29
Asia	1	13	22
Latin America and the Caribbean	1	4	6
Northern America	1	2	3
Europe	0	2	3
Africa	0	2	3

Note: Regions sorted in order of the number of mega-cities in 2010.

Source: United Nations, 2012c. *World Urbanization Prospects: The 2011 Revision*. Used with permission.

The disproportionate growth of mega-cities is not equally strong worldwide. Table shows the number of mega-cities for regions of the world in 1975, 2010, and projected to 2025. Most of the

growth in mega-cities occurred between the first two time periods in less developed regions like Asia, and growth in mega-cities for the immediate future will be almost exclusively in the less-developed regions of the world.

Topic 138: Population Growth and Distribution - LXVIII

Urban Corridors:

As the number of mega-cities in Asia and elsewhere grows, they are more likely to merge and integrate into even larger global urban corridors.

Regional urbanization is so common in Asian countries, for example, that some demographers have argued that the European notion of separate cities is not appropriate in less-developed countries. Instead, they argue, we should consider broad regional urbanization trends in the LDRs.

The Pear River Delta-Yangtze River Delta-Beijing-Shenyang-Seoul-Tokyo-Taipei urban corridor and the Singapore-Kuala Lumpur corridor are two examples of linked mega-cities of regional urbanization in Asia. The Tokaido corridor stretching between Tokyo and Osaka, and the high-speed Shinkansen (bullet train) system that connects the two metropolises, epitomize the high level of urbanization in Japan.

The Boston New York-Washington, DC axis, the Chicago-Pittsburgh corridor, the Rhine Valley, and the London network are all examples of urban corridors in more-developed countries. One result of this clustering in less-developed regions will be a change in the hierarchy of the world's largest cities.

This is dramatized in Table, showing the largest fifteen cities in 1950 and as projected in the year 2025. In 1950 the top five cities, and most of the rest of the list, were in the more developed countries. By 2025, only three MDR cities will be leave on the list of most populous cities.

The rest have been replaced by LDR cities that were not even on the list in 1950. In 2025, all of the top cities will be mega-cities. These new mega-cities will be head by Tokyo, which is project to have 38.7 million people.

To give you a sense of scale, if Tokyo were a country, not a city, it would rank as the 35th most populous country in the world. Los Angeles (including Long Beach and Santa Ana), near the bottom of the list, is projected to have a mere 15.7 million.

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Lesson 36

FAMILY SYSTEM

Topic 139: Population Growth and Distribution - LXIX

Household and family structures:

The following types of families exist today, with some families naturally falling into multiple categories.
For example, a single parent family who lives in a larger, extended family. While these types of families are distinct in definition, in practice the lines are less clear.

As laws and norms change, so do family structures.

Topic 140: Population Growth and Distribution - LXX

Nuclear Family

The nuclear family is the traditional type of family structure. This family type consists of two parents and children. The nuclear family was long held in esteem by western society as being the ideal in which to raise children. Specifically, the western people think Children in nuclear families receive strength and stability from the two-parent structure and generally have more opportunities due to the financial ease of two adults.

According to 2010 US Census data, almost 70 percent of children live in a Nuclear Family Unit. Trend of nuclear family is also rising in Pakistan.

Topic 141: Population Growth and Distribution - LXXI

Single Parent Family

The single parent family consists of one parent raising one or more children on his own. This family may include a single mother with her children, a single dad with his kids, or a single person with their kids. The single parent family is the biggest change society has seen in terms of the changes in family structures.

One in four children is born to a single mother in USA. Single parent families are generally close and find ways to work together to solve problems, such as dividing up household chores.

When only one parent is at home, it may be a struggle to find childcare, as there is only one parent working. This limits income and opportunities in many cases, although many single parent families have support from relatives and friends.

Topic 142: Population Growth and Distribution - LXXII

Extended Family

The extended family structure consists of two or more adults who are related, either by blood or marriage, living in the same home. This family includes many relatives living together and working toward common goals, such as raising the children and keeping up with the household duties. Many extended families include cousins, aunts or uncles and grandparents living together.

This type of family structure may form due to financial difficulties or because older relatives are unable to care for themselves alone. Extended families are becoming increasingly common all over the world. The present pandemic has further strengthened the idea of this type of family.

Topic 143: Population Growth and Distribution - LXXIII

Childless Family

While most people think of family as including children, there are couples who either cannot or choose not to have children. The childless family is sometimes the "forgotten family," as it does not meet the traditional standards set by society. Childless families consist of two partners living and working together.

Many childless families take on the responsibility of pet ownership or have extensive contact with their nieces and nephews. The western world is seriously facing issue of low fertility due to this sort of family structure.

Topic 144: Population Growth and Distribution - LXXIV

Step Family

Over half of all marriages end in divorces, and many of these individuals choose to get remarried. This creates the step or blended family which involves two separate families merging into one new unit.

It consists of a new husband, wife, or spouse and their children from previous marriages or relationships. Step families are about as common as the nuclear family, although they tend to have more problems, such as adjustment periods and discipline issues. Step families need to learn to work together and also work with their exes to ensure these family units run smoothly.

Topic 145: Population Growth and Distribution - LXXV

Grandparent Family

Many grandparents today are raising their children for a variety of reasons. One is fourteen child is raised by his grandparents, and the parents are not present in the child's life. This could be due to parents' death, addiction, abandonment or being unfit parents. Many grandparents need to go back to work or find additional sources of income to help raise their grandchildren.

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Lesson 37

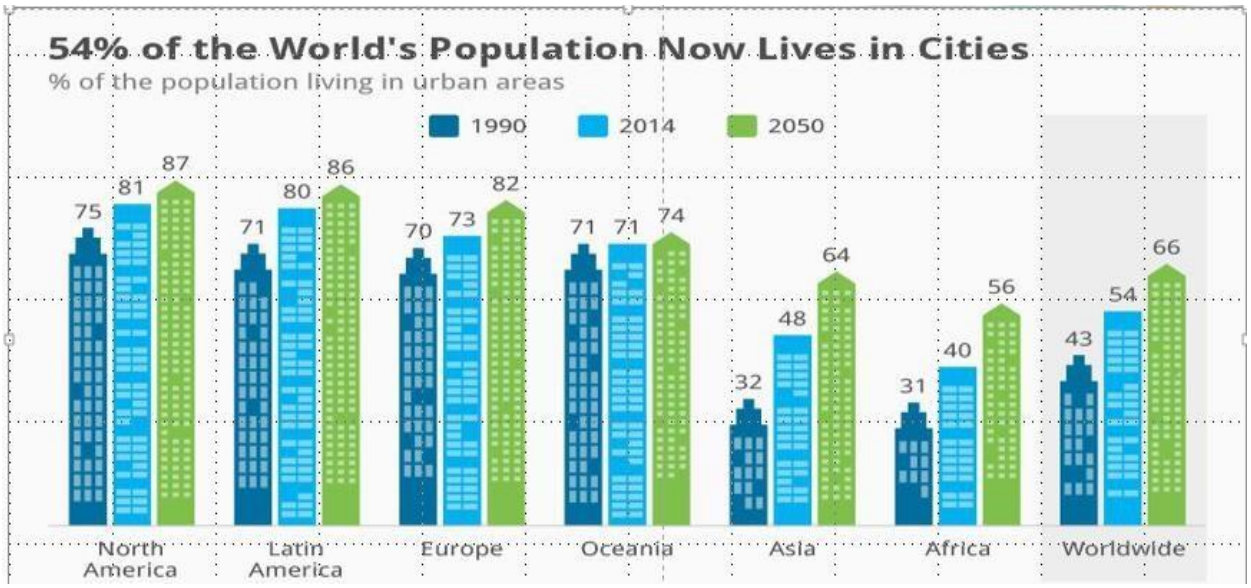
PROBLEMS OF URBANIZATION

Topic 146: Population Growth and Distribution - LXXVI

Problems of Urbanization

Overview:

Urbanization is the movement of people from the countryside or rural areas to go to more developed urban areas like towns and cities. This leads to rapid growth in these areas. The movements are usually motivated by the belief that urban areas have more to offer in terms of growth, job opportunities, and development than the rural areas.



Source: United Nations

Urbanization primarily stems from the industrial revolution as it played a big part in bringing people from rural areas to the developing industrial urban areas, which had factory jobs that rendered agricultural jobs less popular. In modern times, urbanization is taking place on a large global scale as most of the development projects tend to focus more on towns and cities.

This is also evident in both developing and developed countries as governments and municipalities allocate urban areas more resources than rural areas, which encourages urbanization. Currently, half of the total population of the world lives in urban cities, a trend that is definitely going to continue for years to come. Despite urbanization creating opportunities for people who take the leap to look for greener pastures in urban areas, it is often face with lot of challenges.

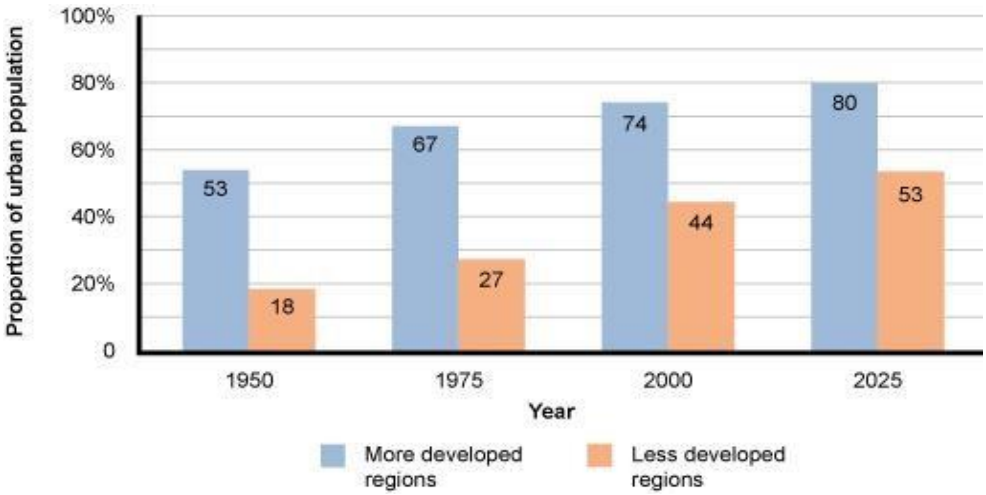
Topic 147: Population Growth and Distribution - LXXVII

Urbanization problems in less developed nations

Following are the urbanization problems that are face in less developed nations:

Governmental Concerns:

Until recently, governments of less-developed countries did not generally consider urban growth to be a problem. International agreements about urban growth, such as the United Nations' Agenda 21 (United Nations, 1996), led to the United Nations Conference on Sustainable Development (or RIO+20) resolution The Future We Want (United Nations,2012a), which encourages urban growth but in the form of more sustainable cities.



Source: United Nations

Urban settlements are credit for 80% of the world's Gross Domestic Product (GDP). However, while the positive urban-GDP relationship may apply to overall trends, a recent report from the World Bank showed no clear relationship between urbanization and GDP growth in sub-Saharan African countries

By the 21st century, urban growth of the degree that many countries have experienced has been increasingly recognize as unsustainable. Grave concerns have emerged over many city problems, such as

- Urban poverty,
- Homelessness
- Unemployment,
- Crime
- Inadequate sanitation, and so on, which have resulted from rapid urban growth.

As a result, much of the international policy regarding urbanization for the last several decades has focused on sustainable management of urban growth, ways to address urban poverty, and bridging the divide between urban and rural areas. Because urbanization is occurring so rapidly

problems of urbanization. Indeed, 83% of LDR countries report concern over their urbanization patterns compared to 58% of MDRs

These concerns have produced:

1. Policies to control out-migration from rural areas through transforming the rural economy,
2. Policies to limit the growth of large cities through migration control, and
3. Policies that try to slow the growth of large cities by redirecting migration flows to mid-sized cities and smaller urban centers

Over the past decades, internal migration to the major cities has grown steadily and trends toward rapidly developing urban centers and population concentration therein have continued unabated.

Topic 148: Population Growth and Distribution - LXXVIII

Out-Migration from Rural

The country of origin can suffer from the selective loss of its young adults, especially because emigrants often are the best educated and perhaps the most ambitious. This also is the case in most rural-to-urban migrations. Because of the agrarian nature of most rural areas, the loss of productive agricultural workers is of special concern to the communities of origin and to the rest of the nation.

On the positive side, migrants to urban areas often remain in contact and send remittances back to their families or villages, and migrants from many rural areas often move to urban areas only on temporary basis, returning for seasonal agricultural labor. However, when agricultural productivity suffers from out-migration, the negative impact on those remaining in rural areas is only partly compensated by remittances sent back by migrants.

Moreover, many who do migrate and who maintain contact with home tend to become a successful elite from the village perspective. Providing financial support to their kin can exacerbate income disparities and relative deprivation at the village level, spurring others from the village to migrate in turn.

Topic 149: Population Growth and Distribution - LXXIX

In-Migration to the Cities

Rural-to-urban migrants in LDRs are usually motivated either by a desire to have a better job or to get a better education. Obviously, many succeed in these goals; otherwise, the migration streams would eventually dry up. Positive selection of the most educated and ambitious from the villages contributes to a more productive urban workforce. Thus, in the long term, receiving cities should benefit. If that is so, then why are rural-to-urban migration and rapid city growth considered problematic?

Part of the problem is simply coping with the speed of population growth and the resulting infrastructure needs in the short term. Rapidly growing cities in the LDRs seem never to catch up with the need for rapidly developing social services, health needs, housing, infrastructure, and especially employment opportunities; and they characteristically develop budget deficits in their attempts. City economies may grow more slowly than urban populations and are thus incapable of providing immediate employment opportunities for all migrants. Although many migrants may

benefit from moving to urban areas, others enter the informal sector and do not earn a sufficient wage to avoid poverty, or they remain unemployed.

The problem of supplying urban jobs relates to a concern over "premature" urbanization. Urbanization on a massive scale occurred fairly late in the industrialization and technological development of the present MDRs. In LDR cities, however, the massive influx from villages came before cities had industrial economy jobs for migrants to fill. A symptom of this is the large proportion of the workforce in LDR cities in service jobs, as opposed to manufacturing jobs.

Topic 150: Population Growth and Distribution - LXXX

Mal-distribution of Cities

Another concern relates to LDR city size and location. There is a tendency for a country's largest city and/or its capital to grow disproportionately large. This splitting of the urban population in a few huge groups means that whatever benefits come from urbanization are not spread throughout the country.

Urban problems also are generally easier to manage in mid-sized cities. The dominant cities in many LDRs were located primarily for the convenience of colonial powers. What may be need are decentralized cities located more favorably to the development of the domestic economy and tied more closely to the largely rural domestic resources that support any large urban cluster.

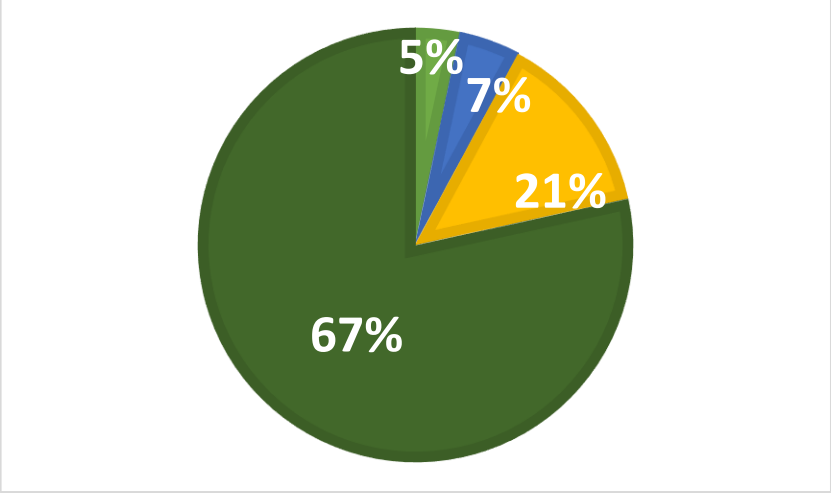
Another concern over particularly large concentrations of urban populations is their vulnerability to natural disasters. Of urban centers with one million people or more, 60% are expose to one or more natural hazard, namely flooding and drought, but a substantial number are also located in cyclone or earthquake zones. Such was the case for the 2011 Tohoku earthquake and tsunami in Japan.

Topic 151: Rural- Urban Migration in Pakistan

Overview:

Rural-urban migration is a form of so-called internal migration which means a movement within a country and which stays in contrast to international or intercontinental migration.

Graph: Rural-urban Migration in Pakistan



It refers to the movement of people from the countryside respectively the rural areas into the cities, often the metropolitan cities of a country. This change of residence is often connected with the migration of labor and a career change from primary to second or third sector - not necessarily, though, as it can refer to the migration of people who are not working in agriculture or farming as well. In Pakistan, mobility is predominantly local or involves short distances only.

Only 19% of the internal migrants crossed provincial boundaries. 29.8% of the flow was from rural to urban areas. The remainder of the volume of internal migration was shared equally by inter-city and urban-to-rural migrants. Some important push and pull factors of migration are discovered from literature.

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Conserve energy future. com

Lesson 38

CAUSES OF MIGRATION

Topic 152: Causes of Migration

It is interesting to know why some people migrate while others do not. The important factors which motivate people to move may broadly be classified into five groups discussed below:

- Economic Factors
- The push factors
- The Pull factors
- Demographic Factors
- Socio-cultural Factors

Despite the relevance of non-economic factors most of the studies indicate that migration is primarily motivated by economic factors.

In large number of developing countries, low agricultural income, agricultural unemployment and underemployment are considered basic factors pushing the migrants towards prosperous or dynamic areas with greater job opportunities.

Causes of Migration: Economic Factors

Even the pressure of population resulting in a high man-land ratio has been widely recognized as one of the important reasons of poverty and rural out migration.

Thus, almost all studies concur that most of the migrants (excluding forced and sequential migrants) have moved in search of better economic opportunities.

Topic 153: Causes of Migration: The Push Factors

The Push factors are those that compel a person, due to different reasons, to leave that place and go to some other place. For instance, low productivity, unemployment and underdevelopment, poor economic conditions, lack of opportunities for advancement, exhaustion of natural resources and natural calamities may compel people to leave their native place in search of better economic opportunities.

In most developing countries, due to population explosion land-man ratio has declined resulting in significant increase in unemployment and underemployment. Introduction of capital-intensive methods of production into the agricultural sector, and mechanization of certain processes reduce labor requirements in rural areas.

The non-availability of alternative sources of income (non-agricultural activities) in rural areas is also important factor for migration.

In addition to this, the existence of the joint family system and laws of inheritance, which do not permit the division of property, may also force many young men to move out to cities in search of jobs (Gursharan,2009).

Topic 154: Causes of Migration: The Pull Factors

Refer to those factors which attract the migrants to an area, such as, opportunities for better employment, higher wages, facilities, better working conditions and amenities etc. There is generally city ward migration, when rapid growth of industry, commerce and business takes place. Migration from the countryside to the cities bears a close functional relation to the process of industrialization, technological advancement and other cultural changes which characterize the evolution of modern society in almost all parts of the world.

Under the capitalistic model of development, there is a tendency for large proportion of investments to concentrate in the urban centers which encourage people to move to urban areas in the expectation of higher paid jobs (Gursharan,2009). In recent years, the high rate of migration of people from India as well as from other developing countries to U.K., U.S.A., Canada and Middle East is due to the better employment opportunities, higher wages and the chances of attaining higher standard of living.

Sometimes the people are also attracted to cities in search of better cultural and entertainment activities. Thus, pull factors operate not only in the rural-urban migration, but also in other types of domestic as well as international migration (Gursharan,2009).

Topic 155: Causes of Migration: Demographic Factors

The differences in the rates of population increase between the different regions of a nation have been found to be a determinant in the internal migration. Fertility and the natural increase in population are generally higher in rural areas which drift the rural population towards the city (Gursharan,2009).

Paucity of domestic labor supply promoted immigration to several countries like Canada, The United States, New Zealand, Australia and gulf countries etc. Other important demographic factor in internal migration is marriage (Gursharan,2009). The female migration is largely sequential to marriage, because it is a Hindu custom to take brides from another village. According to National Sample Survey, more than 46 per cent migration to urban areas is caused by marriage. The custom of women returning to her parents to deliver her first child also accounts for significant internal migration.

Topic 156: Causes of Migration: Socio-cultural Factors

Social and cultural factors also play an important role in migration. Sometimes family conflicts, the quest for independence also cause migration especially, of those in the younger generation (Gursharan,2009). Improved communication facilities, such as, transportation, impact of the television, the cinema, the urban oriented education and resultant change in attitudes and values also promote migration.

Topic 157: Causes of Migration: Political Factors

Sometimes even political factors encourage or discourage migration from region to another (Gursharan,2009). Hence, the political background, attitudes and individual viewpoint of the people exercise a significant influence on the migration of the people (Gursharan,2009).

Topic 158: Causes of Migration: Miscellaneous Factors

In addition, a number of other factors, such as the presence of relatives and friends in urban areas who mostly provide help, desire to receive education which is available only in urban areas are factors responsible for migration (Gursharan,2009). Migration is considerably influenced by factors such as the closeness of cultural contracts, cultural diversity etc.

Topic 159: Suggestions to control migration from rural to urban

- Provide basic amenities to the rural public at their doorsteps improve their living conditions (Ikramullah,2011).
- Provide non-farm income opportunities to them
- Introduce some land reforms
- Beside this, subsidized electricity, education and other basic amenities would definitely do some good for solving the problem (Ikramullah,2011).
- None of these policy prescriptions, except land reforms, are harmful for others.
- However, if wisely undertaken, land reforms could also be made acceptable to the people apparently loosing land (Ikramullah,2011).

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Lesson 39

METROPOLITAN - I

Topic 160: Population Growth and Distribution: Metropolitan

The metropolitan, also called metropolis are described something that's characteristic of a city. The word metropolitan comes from metropolis, which in Greek means mother city, made up of mētēr meaning mother, and polis meaning city (Dictionary.com).

A person who lives in a metropolis, or city, is also called a metropolitan (Dictionary.com).

A person who lives in a metropolis, or city, is also called a metropolitan. It is a major city together with its suburbs and nearby cities, towns, and environs over which the major city exercises a commanding economic and social influence. (Dictionary.com).

Topic 161: Metropolitan Areas

Most metropolitan areas are attached by one core city such as Paris metropolitan area (Paris), Mumbai Metropolitan Region and New York metropolitan area (New York City) (Dictionary.com).
Metropolitan areas may exceed to population of 1 million and above.

Topic 162: Metropolitan Person

An inhabitant of a metropolis. a person who has the sophistication, fashionable taste, or other habits and manners associated with those who live in a metropolis (Dictionary.com).

Topic 163: Difference between a City and Metropolitan

City

A city is a legally defined place with its own borders and government.
It will generally have a city council, mayor, police department and all that sort of stuff (Reddit.com).

Metropolitan

A metropolitan area is just an area where a bunch of people live. It's generally made up of a bunch of surrounding cities, suburbs & some of the unincorporated areas around them. They're usually named after the largest city or the most important one at the "core" (Reddit.com).

For example, the city of Los Angeles covers 503 square miles and has 3.8 million people in it.
The LA metro area is about 4800 square miles and nearly 13M people and includes other cities like San Bernadino that are 60 miles east of the core city itself (Reddit.com).

Topic 164: Characteristics of the Metropolitan

The characteristics of the Metropolitan of several aspects such as the amount of population, economic activities, mobility, activities of the population, and the structure of the region (Pack, 2005).

The amount of the total population

The magnitude of population becomes a major consideration in determining the aspects of the definition of a metropolitan (Pack, 2005).

However, some urban experts set different limits for the determination of the minimum number of metropolitan area population (Pack, 2005).

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Reddit.com

Lesson 40

METROPOLITAN - II

Topic 165: Difference between a City and Metropolitan

City

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Metropolitan

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However, some urban experts set different limits for the determination of the minimum number of metropolitan area population (Pack, 2005).

Topic 167: Economic Activity

In the metropolitan area occurs agglomeration residential areas and jobs.

That is, the metropolitan area is an urban area with a specializing in social and economic activities function (Pack, 2005).

The economic specialization is the industrial and services sectors. Industrial activities and services is the dominant sector in the growing metropolitan region (Pack, 2005).

Topic 168: Mobility of People's Activities

One characteristic of the metropolitan area is shown in the form of ease of mobility seen in few forms (Winarso et al, 2006), namely:

1. Occupational mobility (mobility Employment), characterized by the ease with which people move workplace without having to move residence because of the many types and variations of jobs available (Pack, 2005).

2.Housing Mobility (Residential Mobility), occurs in line with the mobility of the workplace, a tool for increasing housing choices.

3.Mobility trip (Trip Mobility), occurs because of the mobility of the workplace and residence (Pack, 2005).

Topic 169: Advantages of Living in Metropolis Regions

Advantages of Living in Metropolis Regions

- Major Job Opportunities
- Choices to meeting new people
- Varieties and choices
- Better infrastructure
- Better education opportunities
- Better health opportunities

Topic 170: Metropolitan Problem

Metropolitan problem

- Fiscal Problems
- Crowding
- Expensive Housing
- Homelessness
- Traffic and Transportation
- Air Pollution
- Mental Health Problems
- Public Education
- Crime

(Garling & Steg,2007).

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Lesson 41

PAKISTAN'S POPULATION GROWTH

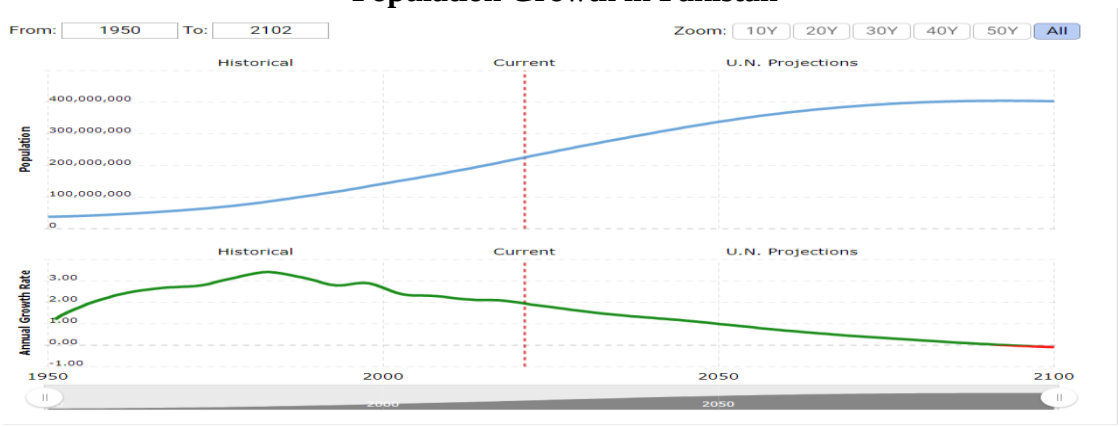
Topic 171: Pakistan's Population Growth of Last 10 Years

Pakistan's population growth of last 10 years:

Pakistan - Historical Population Growth Rate Data		
Year	Population Growth Rate	Growth Rate
2021	225,199,937	1.95%
2020	220,892,340	2.00%
2019	216,565,318	2.04%
2018	212,228,286	2.08%
2017	207,906,209	2.10%
2016	203,631,353	2.11%
2015	199,426,964	2.11%
2014	195,305,013	2.11%
2013	191,260,806	2.13%
2012	187,280,129	2.15%
2011	183,340,174	2.18%
2010	179,424,641	2.22%

Source: United Nations-World population prospects

Population Growth in Pakistan

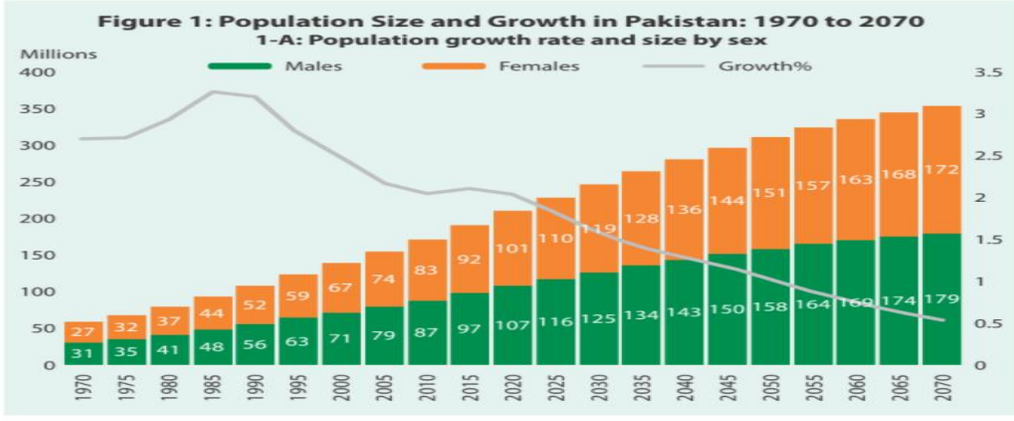


Source: United Nations-World population prospects

The current population of Pakistan in 2021 is 225,199,937, a 1.95% increase from 2020.
The population of Pakistan in 2020 was 220,892,340, a 2% increase from 2019 (United Nations-World population prospects).
The population of Pakistan in 2019 was 216,565,318, a 2.04% increase from 2018.
The population of Pakistan in 2018 was 212,228,286, a 2.08% increase from 2017 (United Nations-World population prospects).

Topic 172: Structures and Features of Population of Pakistan

Structure and features of population of Pakistan



Source: United Nations-World population prospects

Topic 173: Mortality Trends

Mortality Trends

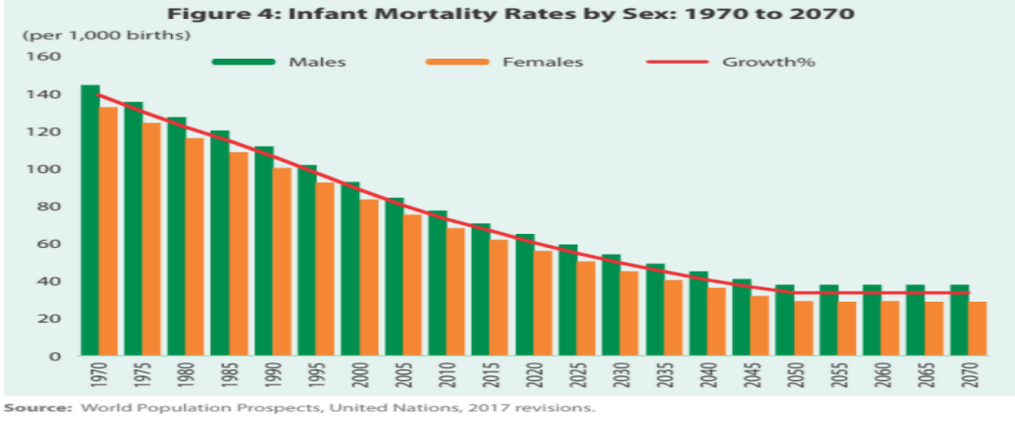


Table 2: Infant Mortality Rate (per 1000 live births)(as of 2019)

Country	Mortality Rate
Bangladesh	26.9%
Sri Lanka	7.5%
India	32.0%
Nepal	27.8%
Pakistan	61.2%

Source: World Bank Development Indicators Database.

The infant mortality rate is **the number of infant deaths for every 1,000 live births**.The infant mortality rate for Pakistan in 2021 was **57.998 deaths per 1000 live births**, a 1.88% decline from 2020. The infant mortality rate for Pakistan in 2020 was 59.109 deaths per 1000 live births, a 1.84% decline from 2019.

The infant mortality rate is high due to insecurity and lack of access to decent health care facilities are hindering proper care for thousands of infants across the country. Pakistan **allocates less than one percent of its GDP on health** and experts say that's kept the high infant mortality rate from improving.

Topic 174: Overpopulation in Pakistan

Overpopulation in Pakistan

Studies show that poverty is one of the main causes of overpopulation, especially in countries where there are already issues of low literacy and a lack of resources.



Source: Globalvillagespace.com

Pakistan is plagued by myriad socio-economic problems, with its population being 5th highest in the world. With the current 2.1 percent population growth rate, the country's population is estimated to double in 30 years by 2050 (The news International,2021).

Topic 175: Mortality Trends

Mortality Trends

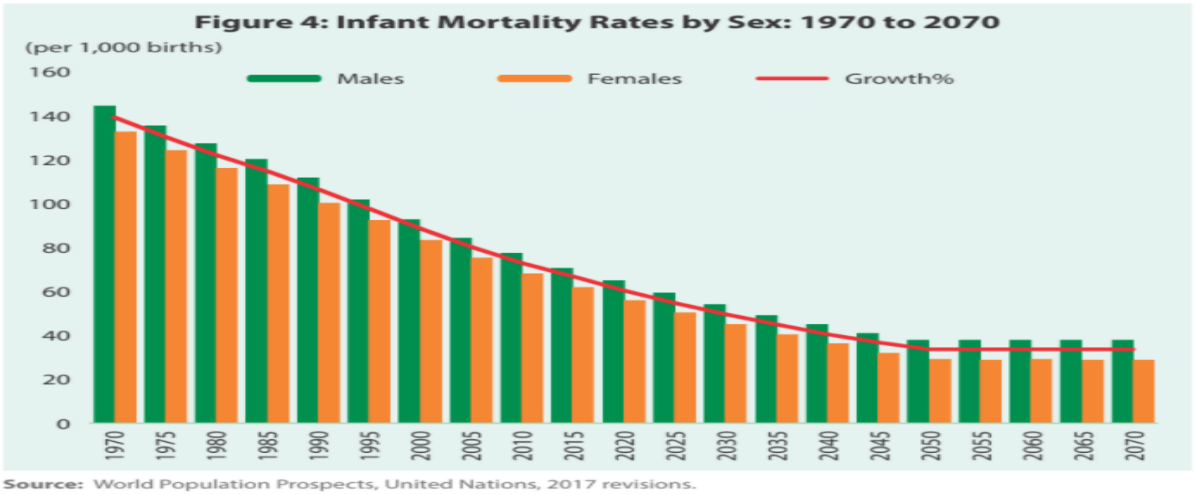


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Topic 176: Overpopulation in Pakistan

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The news International, 2021

United Nations-World population prospects

Lesson 42

CAUSES OF OVER POPULATION IN PAKISTAN

Topic 177: Overpopulation in Pakistan: Causes

Causes of Overpopulation in Pakistan

Lack of Women Empowerment



Source: Zaraimedia.com

The decision-making power of women is almost zero. Women are not allowed to take decisions regarding their reproductive life. They are forced to bear children until the wish for a boy comes true of in-laws, thus contributing in overpopulation. Moreover, women are not empowered enough to oppose the decisions of their husbands and parents. Women are forced to get pregnant despite of their personal will. Thus, lack of women empowerment leads to the increase in population.

Topic 178: Poor Response from the Government

Poor Response from the Government

Since we have been conducting census, the governments has no idea of what the current population is – this just shows how neglectful the government has been towards the growing population of Pakistan – no heed is being paid to the causes of overpopulation (Parhlo.com)

Illiteracy among the Masses in Pakistan

Pakistan's adult literacy rate is approximately at 60% – that leaves the other 40% illiterate – literally, that means the adults cannot sign their own names on a paper. Regarding the circumstances of over-population, one can only imagine what values the other 40% holds (Economic Survey, 2020)

Topic 179: Imbalance between Birth and Death Rate

Imbalance between Birth and Death Rate

Since there is a vast imbalance between birth rate and death rate in Pakistan, more than 31/1000 at the peak of its times, more people are being born than dying in the country – which is leading to overpopulation in the country.

Topic 180: Lack of Family Planning

Lack of Family Planning

The masses of Pakistan have no idea about family planning – they are not used to the term “bachay do hi achay!” – Although there are several government schemes, but in vain due to socio cultural factors.

Topic 181: Technological Advancement in Fertility Treatment

Technological Advancement in Fertility Treatment

There have been some breakthroughs in medical science lately that have led to advancement in fertility. These can make barren women fertile and also increase the age of a woman to be able to give birth, it is not rare seeing a couple in their late 50s giving birth to their 7th or 8th child.

Topic 182: Increase of Immigration and Afghan Refugees

Increase of Immigration and Afghan Refugees

It is not just the general Pakistani public, the country caters to the largest numbers of immigrants in the world – especially Afghan refugees, which have led to an increase in the overpopulation of this small country.

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Lesson 43

EFFECTS OF OVERPOPULATION IN PAKISTAN

Topic 183: Effects of Overpopulation in Pakistan

Effects of over population in Pakistan

Unemployment, Under-employment and Disguised-unemployment

It is impossible to provide jobs to such highly growing population in Pakistan. It results in unemployment, under-employment and disguised-unemployment. Rate of unemployment in Pakistan is 5.79% (Labor Force Survey, 2017, 18).

Topic 184: Low Growth of Agriculture Sector

Low Growth of Agriculture Sector

Very fast growth rate of population is a pressure on land. It caused to use of agricultural products at domestic level, increase in the landless workers and shortage of food. Growth rate of agriculture sector is 3.81 (Economics Survey 2017, 18).

Topic 185: Low Saving and Low Investment

Low Saving and Low Investment

The rapidly increasing population increases the expenditure of government. It reduces the saving and investment. Low level of saving & investment means economic backwardness.

Topic 186: High Rate of Inflation

High Rate of Inflation

There is more demand for goods due to more population. More demand results in more prices and inflation in the country. Rate of inflation is approximately 10% in Pakistan (Pakistan Bureau of Statistics, 2021).

Topic 187: Pollution

Pollution

There is not any effective system to control the pollution. Capitalists install industries with billion dollars of resources but do not install treatment plants of million rupees. The rapid growth of population creates pollution, unplanned colonies and environment problems (Economics and Education, 2012).

Pollution due to overpopulation is considered as one of the main issues in Pakistan as it hinder the growth and development of the country and suitable measures are not been taken by the government. An increase in population will inevitably create pressures leading to more

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deforestation, decreased biodiversity, and spikes in pollution and emissions. Each spike in the global population has a measurable impact on the planet's health.

Topic 188: Backward Social Infrastructure

Backward Social Infrastructure

Rapidly growing population creates economic and social problems such as housing, education, health, transport, water, power etc. (Economics and Education, 2012).

Topic 189: Vicious Circle of Poverty

Vicious Circle of Poverty

Very high rate of population growth lowers the per capita income, which caused in low saving and low investment that result in low rate of capital formation. All this forms the vicious circle of poverty.

Topic 190: Low Living Standard

Low Living Standard

Rising population is a big obstacle in the provision of the basic facilities of life in developing countries like Pakistan. So, rising population means low living standard. Approximate poverty ratio of Pakistani population stand at 40 percent (World Bank, 2020).

Topic 191: Adverse Balance of Payment

Adverse Balance of Payment

Over populated nation has to import various items to support a huge population. On the other hand their export decreases. Due to over population our balance of payment is unfavorable in case of Pakistan. At present value of deficit in balance of payment is USD 2.5 billion (CEIC, 2021).

Topic 192: Reduction in Wage Rate

Reduction in Wage Rate

High growth rate of population is caused in more labour force and unemployment. There is absence of skill and training that leads to low wage rate. Although Pakistan has revised it from 17500-20000 this year (Wage Indicator 2021).

Topic 193: Increase in Dependence Ratio

Increase in Dependence Ratio

Rapid rise in population growth increases the dependency ratio of unemployed population to employed population. Labour force is 64.39% of the population in Pakistan and remaining population is depending upon them (World Bank, 2020).

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Lesson 44

MEASURES TO CONTROL OVERPOPULATION

Topic 194: Measures to Control Overpopulation-I

Measures to control over population

Following measures are suggested by the people and experts to check the rapidly raising population:

Control the Birth Rate

The high birth rate should be discouraged to reduce the population size. In 2020, birth rate for Pakistan was 27.4 per 1000 people.

Birth rates differ from country to country based on religious and political views. Policymakers in countries with high birth rates are often interested in controlling their birth rates since rapid population growth can lead to several unwanted economic, environmental, and public health consequences. Pakistan launched one of the first population control programs in the 1950s, yet has lagged far behind other countries in effectively implementing or developing its understanding of the control of birth rates.

Topic 195: Measures to Control Overpopulation-II

Use of Medicines

More contraceptive medicines should be introduced to people. By using these medicines; people will control the birth rate.

Topic 196: Measures to Control Overpopulation-III

Late Marriages

Marriages should take place in late age to control the rapidly rising population. It will be helpful to control the over-population (Economics and Education, 2012).

Topic 197: Measures to Control Overpopulation-IV

Health Center

Government should open the health clinics in all the regions of the country. These clinics will be useful for reducing the high birth rate (Cesur et al., 2019).

Topic 198: Measures to Control Overpopulation-V

High Literacy Rate

Government should provide the more educational facilities to the backward population. This will provide the true picture of the economy, resources and population growth rate. Literacy rate is 59.13% in Pakistan (Express Tribune, 2021).

Topic 199: Measures to Control Overpopulation-VI

Change in Socio Cultural Practices

The certain socio cultural factors and behavioral traits influence very highly on high population growth in Pakistan like wish of son, more marriages, and early marriages thinking of having more children to strengthen agricultural background and its activities etc.

Topic 200: Measures to Control Overpopulation-VII

Family Planning and Government Policies

Nearly one in five married Pakistani women have an unmet need for family planning and contraceptive prevalence rate in country has almost remained static that is approximately 25 percent. Rural areas particular have lower usage of contraceptive.

Topic 201: Measures to Control Overpopulation-VIII

Increase in Employment

More employment opportunities must be provided to the young, talented, trained and educated population. Current employment rate projections in 2021 would be 5.1 according to IMF. It will be helpful to decrease the fast birth rate (IMF, 2020).

Topic 202: Measures to Control Overpopulation-IX

Two Children Policy

Government may have to think and make legislation like China who even restricted on one child policy for many years till 2015 but now after achieving low population growth rate, china is back to its policy of 2 children.

Topic 203: Women Empowerment and Gender Development

Women Empowerment and Gender Development

Women constitute almost half of the population in Pakistan. The more they are empowered, the more they can be decisive about their own life. In addition to that, job provision and employment for women will restrict them to give birth to many children (UNDP, 2019).

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Lesson 45

MEASURES TO CONTROL OVERPOPULATION-II

Topic 204: History of Population Planning in Pakistan

History of Population Planning in Pakistan

In 1950, Pakistan's population reached 37 million people, making it the world's 13th most populous country (Hardee & Leahy, 2007).

Though Pakistan was one of the first Asian countries to begin a family planning program with some help from international donors, fertility has declined slower than in neighboring countries (Hardee & Leahy, 2007).

In 2020 Pakistan had increased in world population ranking to 5th, with over 220 million people and the United Nations (UN) has projected that in 2050 it will move into 3rd place with around 292 million people.

Between 1998 and 2019, Pakistan's average population growth rate was 2.40%. For a population of over 220 million, this is a growth of about 5.28 million people per year.

Topic 205: History of Population Planning in Pakistan: Beginning

History of Population Planning in Pakistan: Beginning

The planners in Pakistan had realized the economic consequences of a rapid population growth by the early 1950s. The fear of population growth was pointed out when the First Five-year Plan (1955-60) for Pakistan was launched and this concern for rapid population growth grew with every successive plan.

The Family Planning Association of Pakistan (FPAP), now called "Rahnuma", was founded in Lahore by Saeeda Waheed in 1953. Waheed, a member of the All Pakistan Women's Association, began advocating for birth control when her maid died from an attempt to abort her own pregnancy.

The FPAP was unsuccessful in changing family planning policies until President and military leader Ayub Khan took interest in the problem of overpopulation in the late 1950s. Khan spoke at the FPAP's first national seminar in 1959, speaking on the 'menace over overpopulation.

Soon after the seminar, the National Board of Family Planning was established as a policy-advising body for the federal government.

Topic 206: Family Planning Amid Political Turmoil in 1970s

While the country was split apart and international assistance halted due the situation in Bangladesh, the Pakistan People's Party took power of the Pakistani government.

Its leader, Zulfiqar Ali Bhutto, needed to gain legitimacy and popularity by taking an anti-American, anti-capitalist, and anti-Ayub Khan-stance (Policy-making in Pakistan's population

programme). However, Bhutto found that he could not fund many of his socialist promises, and so allowed economic assistance from USAID.

Over the 15-year span of 1964-1979, USAID "spent over $30 million on Pakistan's population programme; during 1965–75 US AID provided 40% of total programme inputs".

Topic 207: The 5th and 6th Five Year Plan and Family Planning

There was disruption and delay in the preparation of the Fifth Five-year Plan (1978-83) which was launched in 1978. The fifth plan was not a bold document as far as family plan.

The population policy for the Sixth Five-year Plan (1983-88) provided for the interaction of fertility management with other development programmes.

This policy stated that population

i. is a national responsibility
ii. aims at behavioral change favoring the small family norm within an acceptable socio-cultural framework
iii. constructs a programme based on local needs by enlisting community participation and devolving responsibility and authority
iv. solicits involvement of a range of target groups and NGOs for expanded coverage
v. seeks integration of activities with the programme of other departments for diversification
vi. makes women participants and beneficiaries of the programme
vii. devises a communication strategy to remove public misgivings, create demand and promote these approaches

Topic 208: The Seventh and Eight Five-year Plan

The Seventh Five-year Plan (1988-93) was a continuation of the population policy and approach adopted in the sixth plan. Fertility management was the key development.

For the Eight Five-year Plan (1993-98) active participation of federal and provincial Ministries, Departments was mandated to provide family planning services through their service outlets. An Inter-Ministerial Committee consisting Ministers for Planning and Development, Education, Health, Information and Population Welfare was set up for effective implementation of population welfare programme. Similar committees were set up at provincial and distrtict levels.

Topic 209: Family Planning Progress till Date

Dating from 2002, Pakistan's current family planning policy reflects the government's concern with rising population trends and poverty.

The policy's goals include reducing population growth (from 2.1 percent in 2002 to 1.3 by 2020), reducing fertility through voluntary family planning (from 4 births per woman in 2004 to 2.1 births per woman by 2020), and as a signatory to the Programme of Action developed at the International Conference on Population and Development in Cairo in 1994.

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In 2009 the Ministry of Population sought to revise the Population Policy. However, under the 18th Amendment to the Constitution, the Ministry was devolved and its responsibilities were shifted to Provincial Population Welfare Departments. In 2013 some of the provinces - notably Punjab - reported that they were developing their own population policies.

The lady health worker programme established in 1994, The maternal and child health care programmes are positive initiatives of government.

Pakistan committed to working toward achieving universal access to reproductive health and raising the contraceptive prevalence rate to 55% by 2020. Pakistan will take forward its 2011 commitment with the provinces for all public and private health facilities to offer birth spacing services.

Topic 210: Rural and Urban Healthcare Disparities

Rural and Urban Healthcare Disparities that Contribute to Pakistan's High Child infant and maternal mortality

One of Pakistan's largest problems is its rapidly expanding population and their limited access to necessary essentials such as readily available healthcare, doctors, and basic sexual education. There is a visible disparity between service provision and awareness at rural urban areas in country. (UNICEF.org).
Infant mortality is the death of an infant before his or her first birthday. As per UNICEF the infant mortality in country is estimated 67.2 per 1000 live birth.
The rural urban disparity is clear here as Pakistan demographic and health survey report of 2018 reveals that disparity.
The infant mortality in rural Pakistan stands at 68/1000 live birth where as it is 50/1000 live birth in urban areas.
Similarly, the under-five mortality in rural Pakistan stands at 83/1000 and 56/1000 live birth in urban areas.
As per Pakistan demographic and health survey report of maternal health in 2019, the maternal deaths stans at 158/100,000 women in rural areas and in urban Pakistan it is 199/100.000.

Topic 211: Prime Reasons of rural urban disparities in country

- Religious influences.
- Less government attention on rural areas
- Role of feudal

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