



A GEOSPATIAL ANALYSIS OF THE EXPANDING HUMAN POPULATION ACROSS THE WORLD

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Abstract:

The population continues to rise, but slower than in recent years. In recent years, many countries' growth has slowed due to lower infertility rates. Contrarily, Sub-Saharan Africa is predicted to have the fastest expansion in population over the next several decades. In many countries and locations where fertility is rapidly declining, population momentum is crucial in anticipating future population increases. Fertility is decreasing, yet the global population is aging unprecedentedly, and smaller dwellings are becoming more common. There has been a rise in cross-border emigration since the turn of the century. Due to rising rural-to-urban migration, the world's population is becoming more urban. Uncertainty about future births, deaths, migration patterns and other potential consequences contributes to the population's uncertain future growth. Population control legislation may come from international agreements on climate change and environmental protection. The on-going epidemic is also having an effect on fertility rates.

Keywords: *infertility; population momentum; smaller dwellings; migration; climate change.*

Introduction:

Future fertility, mortality, and migration trends will be determined by the link between the nation's existing age structure and future changes in these variables. According to scientific research, population expansion has a favourable influence on a country's economy, ecology, health, and overall quality of life. Understanding people's growth patterns and future trends are required for the 2030 Agenda for Sustainable Development (Agenda 2030) and other long-term development objectives (Gu et al., 2021). This page presented an overview of the most important characteristics of current and projected population growth trends for the whole globe, critical areas, and specific nations. The United Nations Population Division's WPP 2019 (2019 Revision of World Population Prospects), which focuses on 201 countries and territories having 90,000 or more people by mid-2020, is the most credible data source.

Objectives of the Study:

1. To find out the global population rate of increase in a few decades.
2. To determine how much the rate of growth in the world population.
3. To assess the role of fertility, mortality, and migration of population indices for the world population growth.
4. To find out the estimated and projected population of the world scenario.

Methodology:

We prepared this article based on secondary data from population prospects, 2019, and various journals. Different types of statistical techniques like comparative and composite line graphs are designed by the statistical tool of SPSS software.

The Global Population is increasing at a More Sluggish Pace:

The United Nations estimates that the global population will have increased to 7.8 billion by 2020, up from 7 billion in 2010, 6 billion in 1998, and 5 billion in 1986. In the subsequent ten years, the world's population will have climbed to 7.8 billion, rising from 7 billion in 2010 (Barbieri et al., 2021). From 2015 to 2020, the average annual growth rate was about 1.1%, and it has been slowly declining since then. Developing nations account for more than 60 of the 73 countries and areas with lower growth rates in 2010–2020 than in the preceding decade. A total of 201 countries and territories were investigated. The decline in fertility rates is strongly tied to the slower population growth rate. The worldwide fertility rate in 2020 was 2.4 births per reproductive-age woman, down from 2.7 births per reproductive-age woman in 2000, 3.7 births per reproductive-age woman in 1980, and 5.0 births per reproductive-age woman in 1950. The overall fertility rate in high-income and upper-middle-income nations has remained below replacement, guaranteeing a continuous

supply of new generations in low-mortality countries (2.1 births per woman). These countries' overall fertility rates have fallen below appropriate levels over many decades, with some countries having birth rates of 1.5 and others are having birth rates of less than 1.5. In an entire contemporary demographic shift, many elements lower fertility rates. Modernization has improved food security, nutrition, and public health due to technical and societal advancements. Advances in safe and effective family planning technology and services have made it possible for couples to have the number of children they wish without having too many (Gu et al., 2021). These characteristics have influenced young couples' attitudes and behaviours toward marriage and children and the number and timing of births. As a result of these factors, fertility has decreased, resulting in a demographic change. By 2020, all nations and regions should have finished or be in

the midst of their demographic transition. Even if fertility rates fall drastically, there is no question that the global population will continue to rise. This is the driving force behind future population growth, resulting from the present population's age structure. Population momentum may account for more than two-thirds of the 1.9 billion people expected to join the world's population between 2020 and 2050. According to projections, an additional 1.3 billion people will be born between 2020 and 2050, accounting for 17% of the global population in 2020. Over-replacement fertility and reducing mortality are expected to contribute 317 million (or 16 percent of real growth) and 295 million (or 15 percent) to the projected rise in 2020–2050, respectively. Because of the above-replacement levels, fertility and mortality rates are expected to grow by roughly 4% in 2020.

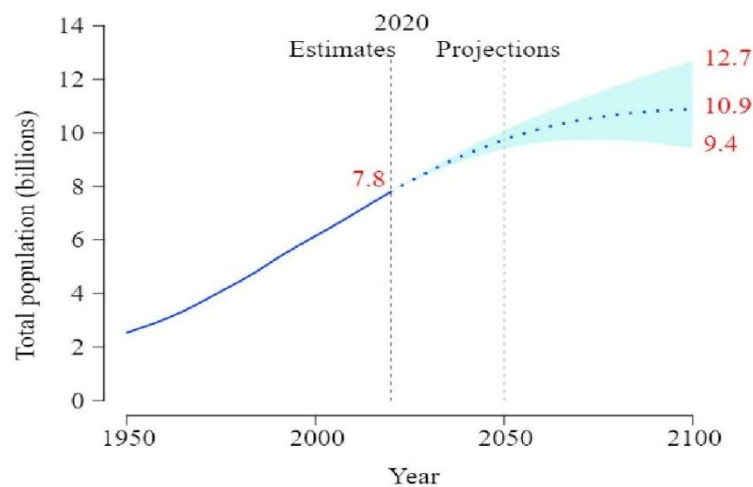


Fig: 1 World population growth, 1950–2100.

Source: Based on the 2019 World Population Prospects

It is becoming more likely that the global population will continue to expand slower than in previous decades. Nonetheless, their 95% projection figures for 2050 and 2100 are 9.4 and 10.1 billion and 9.4 and 12.7 billion, respectively. By 2050, the world's population will have grown to 9.7 billion people, and by 2100 (Lal et al., 2016), it will have grown to 10.9 billion. Their 95% forecast ranges for 2050 and 2100, on the other hand, might be between 9.4 and 10.1 billion people. A simplified version of the diagram is shown in Figure 1.

Significant differences in growth patterns across regions and countries:

The expected population trends in the United States differ significantly by area and nation. According to projections, most countries and

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territories throughout the globe are predicted to increase until 2050. In the second half of the century, it is expected that more than half of the countries and regions will decrease. Sub-Saharan Africa is anticipated to account for the most significant proportion of global population increase among the eight SDG regions analyzed. It is expected that its share of the worldwide population will increase over time. People living in other SDG zones, on the other hand, are likely to see their global stakes diminish over time. According to the World Bank, Sub-Saharan Africa accounts for more than three-quarters of the 54 nations with double-digit annual growth rates between 2020 and 2050. Between 2020 and 2050, the world population will grow by almost two billion people, with the bulk of this growth happening in Sub-Saharan African (SSA) nations (regardless of scenarios). This proportion is expected to climb to almost 90% by 2050–2100.

Sub-Saharan Africa is predicted to add between 23 and 38 million individuals to the world population per year. The people of Sub-Saharan Africa are anticipated to increase from 1.1 billion in 2020 to 3.8 billion by 2100. (This is analogous to Europe and North America.) The estimate has

a 95 percent confidence interval of \$3.2 billion to \$4.8 billion for the current year. Even in Europe and Northern America, population levels are expected to remain constant by 2100. (Figure 2).

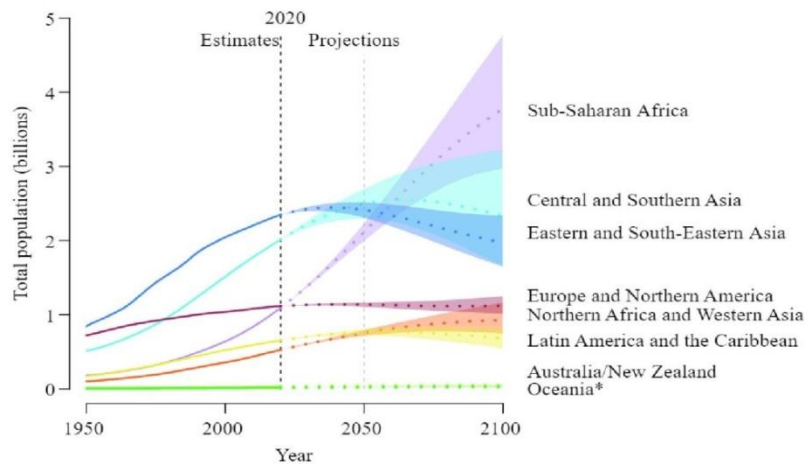


Fig: 2 1950–2100 population increase by Sustainable Development Goals.

Source: Drawn from the World Population Prospects 2019

In certain developing nations, a youthful population may help economic development by increasing the number of youngsters entering school and joining the labour. On the other side, many countries with large youth populations face difficulties, including limited access to education for children (especially girls) and high neonatal, child, and maternal mortality rates (Gu et al., 2021). High fertility has also resulted in unintended pregnancies and births, which might have allowed couples to pursue alternate routes of human development if fertility had been lower. It's worth noting that the bulk of global

population growth will soon be accounted for by a small number of populous (or fast-growing) nations. Nine countries (India, the United States, Indonesia, Pakistan, Nigeria, Egypt, the Democratic Republic of the Congo, and the United Republic of Tanzania) will account for more than half of global population growth between 2020 and 2050, according to the World Population Prospects 2019 medium edition. (India, the US, Indonesia, Pakistan, Nigeria, Ethiopia, Egypt (Gu et al., 2021), the Democratic Republic of Congo, and Tanzania) Except for the United States, every country has low or low-middle income. High fertility rates, maternal mortality rates, and unmet family planning service requirements make the SDGs challenging to attain in many countries.

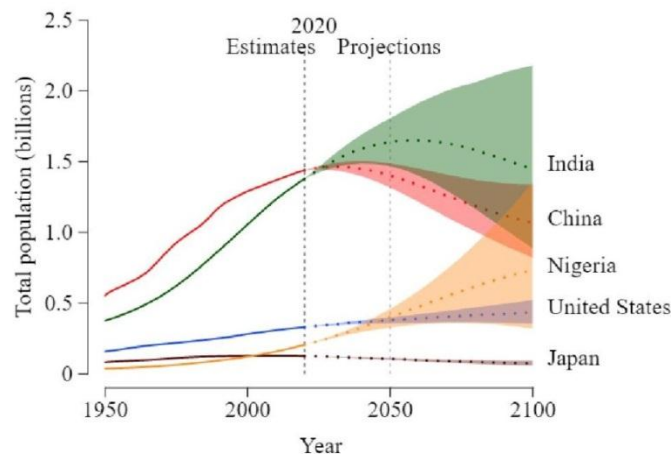


Fig: 3 Population growths for selected populous countries, 1950–2100.

Source: Drawn from the World Population Prospects 2019

Between 2020 and 2050, the populations of specific nations are predicted to drop, while others are expected to grow. According to the International Panel on Climate Change (IPCC), the number of countries and places with negative population growth rates is expected to expand from 18 to 46 during the next three decades (2020–2050), with many Asian countries leading the way. During this period, the number of countries and places with negative population growth rates is expected to increase from 18 to 46. It is estimated that most Latin American and Caribbean states will expand between the years 2020 and 2050, but it is also anticipated that a few of these nations will contract between the years 2050 and 2100.

China will have 1.43 billion people by 2020, making it the world's most populous nation in the modern period. In previous decades, China has also played an essential role in fuelling the global population increase. China's population is anticipated to shrink slightly to 1.40 billion people by 2050, down from 1.46 billion in 2030, according to the medium form of the World Population Prospects 2019 (Figure 3). On the other hand, China is predicted to surpass Japan as the world's biggest country with a dwindling population in the following decades, making it the world's most populated shrinking nation (30 million by 2050) (Lombardo, 1985). Furthermore, by 2100, a fourth of China's existing population will be gone. According to the United Nations Development Program, India will surpass China as the world's most populated nation by 2025–2030, with 1.64 billion people. India's population is expected to fall from 1.65 billion people in 2055–2060 to around 1.35 billion in 2075–2080 as fertility rates decline. China's population loss will be the second-largest between 2050 and 2100, with India shedding 1.45 billion people. Brazil and Bangladesh are anticipated to lose the third and fourth most inhabitants in the 2050–2100 decade (Richard W. Johnson, 2010). However, it is critical to remember that future population increase is unknown and humanity's long-term destiny is broader. China is anticipated to have a population of 1.32 to 1.50 billion people by 2050 and 0.82 to 1.33 billion by 2100 (Gu et al., 2021). India's population will expand from 1.47 billion in 2050 to 1.81 billion in 2100 in the next half-century. (See Fig. 3 for further information.)

Population Growth and Population Momentum:

Population momentum, future fertility and death rates, and migratory patterns are all factors that

influence population increase. The current population structure generates "population momentum," a natural driving force for population growth that boosts people even while fertility remains at replacement levels. Individuals with an older age structure may have slowed or perhaps stopped developing (Bongaarts & O'Neill, 2018). The contributions of various nations and areas to future population increase vary substantially due to these factors. According to current forecasts, population growth in Sub-Saharan Africa will reach 40% in 2020 due to population momentum, while population growth due to increasing fertility (above replacement level) will get 53% in 2020 in this region. To put it another way, death and migration have little influence on the overall population. Due to low fertility and population momentum, Europe's population will decline between 2020 and 2050 (Flanders, 2022). Although there may be some offset in population losses owing to more significant death and migration, the people will most certainly continue to fall. Between 2020 and 2050, the population of North America is predicted to grow, with reduced mortality rates and more significant positive net migration and population momentum, to varying degrees. Low fertility's negative effect, on the other hand, is expected to be entirely balanced by its positive contribution. Population increase in Eastern and South-Eastern Asia will reach 5% and 3% by 2020 and 2050, respectively, due to demographic momentum and lowering mortality rates. Negative growth will account for 5% of the region's current carrying capacity due to low fertility in certain areas. The economy is not significantly impacted by migration. Even if China's trends are comparable to those of the rest of the site, the actual levels vary (Haggag, 2021). Japan's design style is more in line with Europe's than it is with that of their geographical location. Even though fertility is predicted to have little influence on future development, a quarter of the existing population of Central and Southern Asia is expected to be added to the current total. Neither mortality nor migration has significantly impacted climate change in this area (Gu et al., 2021). Population growth in Latin America is mainly driven by population momentum, with a minor but critical contribution from mortality reduction. Fertility is responsible for 5% of the current population, and it is expected to play an important role in population reduction.

Many countries are concerned about exponential population aging:

Due to development and the demographic shift, fertility rates have decreased, and mortality rates have improved in many countries. As a consequence, the general population's life expectancy has increased. In 2020, global life expectancy will have increased by 7 years, compared to a 30-year rise in the previous decade. According to historical data, throughout the last several centuries, the average life expectancy of people born in the best-performing

nations increased by two to half years every decade. Life expectancy at birth is expected to increase from 73 to 77 years in 2050 and 82 years in 2100. Life expectancy at birth is anticipated to reach 95 years in Japan, the Republic of Korea, Singapore, and Spain by 2100(Gu et al., 2021). On the other side, several African nations are expected to have less than 80 years of life expectancies.

TABLE 1. Distribution of countries by the percent of the population aged 65 or older for selected years.

| Percent of the old-age population | 1950 | 2000 | 2020 | 2050 | 2100 |
|-----------------------------------|-------|-------|-------|-------|-------|
| Levels | | | | | |
| <7 | 76.6 | 66.2 | 49.7 | 22.9 | 0.0 |
| 7–14 | 23.4 | 22.4 | 21.4 | 19.4 | 13.4 |
| 14–21 | 0.0 | 11.4 | 23.9 | 20.4 | 15.9 |
| 21–28 | 0.0 | 0.0 | 4.5 | 22.4 | 19.5 |
| ≥28 | 0.0 | 0.0 | 0.5 | 14.9 | 51.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| The world | 5.1 | 6.9 | 9.3 | 15.9 | 22.4 |

Note: The distributions are calculated among 201 countries and areas. The old-age percentages refer to the proportion shared by the population aged 65 or older out of the total population.

As a result, the number of persons aged 65 and above has increased dramatically. An aging population is defined as the percentage of persons aged 65 and above (or in old age) more than 7% of the total population. Assume that the shares of people are over 14 percent, 21 percent, and 28 percent, respectively. The labels "old," "super-aged," and "ultra-aged" are all used to characterize the groupings of persons discussed above. The global percentage of individuals aged 65 and more will rise to 9.3 percent in 2020, up from 6.9% in 2000 and 5.1% in 1950. (See Table 1) By 2100, 15.9% of the world's population will be 65 or older, up from 15.9% in 2050(Liu & Raftery, 2020). The elderly make up a considerable part of the population in several industrialized nations (or countries experiencing substantial fertility reductions). According to the World Population Prospects, Japan's old-age balance was 28.4 percent in 2020, up from 17.0 percent in 2000 and 4.9 percent in 1950. (WPP). According to the figures in Table 1, by 2050, 58 percent of nations will be in an aging society, with around 15 percent of these countries being in an ultra-aged community. In 2020, just 30% of nations will have an aging society, and only one country will be ultra-aged in 2010. (Japan). Due to the world's aging organizations, more than half of the world's population is anticipated to live in ultra-aged civilizations by 2100(Botha & Mokone, 2021). The aging population has substantially impacted numerous areas, including health care, retirement, social security systems, housing, and financial planning. Developing

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countries face more challenges than developed countries because of the short time frame and lack of time to plan for population aging. They need to do this before being considered to be in a stable financial position ("aging before rich"). The majority of modern nations, with a few notable exceptions (such as Japan), take anything from 40 to 120 years to transition from a rapidly aging population (7 percent) to elderly people (14 percent). The transition from an aging civilization (14 percent) to a super-aged society may take 20 to 50 years to complete (21 percent)(Gu et al., 2021). It will take the majority of emerging nations anything from 15 to 35 years to transition to an aging population, while countries that already have a population will require anywhere from 10 to 30 years to convert to a super-aged population. The number of years necessary to convert an already super-aged population into an ultra-aged population will be less than the number of years required to transform an aging society into a super-aged community, according to specific empirical data and expected trajectories of mortality and fertility(Gu et al., 2021). Some nations, particularly those with more developed economies, have adjusted their pension systems and mandatory retirement ages to retain current public pension systems. Low fertility and longer lifespans may result in a "second economic dividend," in which human capital investment increases by increasing human capital investment. For example, population aging is often followed by improving health in many

older people's communities (also known as "compression of morbidity"). As people's health and life expectancy improve, their capacity to enter the workforce grows, potentially alleviating some of the detrimental constraints on economic growth(Ullah, 2021). Second dividends are expected to provide more significant advantages and continue longer than first dividends, allowing policymakers to maximize the transition from a first to a sustained payment. The study's findings back up this assertion.

The Importance of Immigrants from Other Countries:

By 2020, it is expected that 281 million people will be residing outside of their native countries, up from 108 million in 2000. In several nations, notably in Africa, international migration has played a substantial role in population increase. However, it has no direct influence on global population increase, and in most nations, its impact on population growth is modest compared to other demographic factors. The influx of foreign labour migrants, for example, has been blamed for the rapid population rise in the Gulf States. During the last twenty years, labour immigrants have made up more than three-quarters of the working-age population of Qatar, the United Arab Emirates, and Bahrain(Gu et al., 2021).

The bulk of foreign migrants is housed in just 20 nations worldwide. The United States has received almost 10 million immigrants, followed by Germany, Saudi Arabia, Russia, and the United Kingdom. Moreover, a third of the world's migrant population comes from just four countries: India, Mexico, China, and Russia. Most international migrants live in high-income countries, with Europe, North America, and the Middle East hosting the most. Male international migrants account for a considerably more significant proportion of all international migrants than female international migrants. People migrate to another nation for various reasons, the most common of which are a job or a family obligation. However, the number of people forced to flee their homes due to humanitarian crises has risen dramatically in different parts of the world, from 17 million in 2000 to 34 million by 2020. According to the 2030 Agenda for Sustainable Development and other publications such as the Global Compact for Safe, Orderly, and Regular Migration, migration has the potential to benefit both the country of origin and the nation to which migrants ultimately relocate(Gu et al., 2021).

However, the number of individuals forced to escape their homes owing to humanitarian situations has increased substantially over the globe, rising from 17 million in 2000 to 34 million by 2020. Because most migrants are of working age, positive net migration may produce labour shortages and population declines in destination countries, delaying the pace at which those countries' populations' age. Large-scale out-migration may result in brain drains in the nations and regions of origin since migrants tend to be healthy, well-educated young people. As a result, the countries' populations and areas where the brain drain originates may grow older and slower. On the other hand, migration influences people who return to their native nations and regions and their socio-economic development and mortality rates. These elements contribute to their respective countries' and territories' long-term growth. While ensuring that no one is discriminated against is vital to achieving the Sustainable Development Goals (SDGs), migrant rights must also be appropriately safeguarded(Farrell & Westlund, 2018). Obstacles to their rights are eliminated, allowing them to integrate more fully into society and get the same advantages as native-born citizens, such as health care and education.

An Urbanizing World:

The fundamental driver of the geographical redistribution known as urbanization has been international or intra-regional migration. The number of people who have migrated to the city due to internal or domestic migration is a systematic approach to measure this. Understanding long-term patterns of urbanization and long-term trends in population size and composition is essential for making well-informed choices because of the interconnectivity of these three aspects. Similar to international migration, internal migration inside a country has no impact on the country's population. For emerging nations like China, rural-to-urban migration, which has been demonstrated to affect the overall population of origin and destination cities, is a significant driver of urbanization.

TABLE 2. Distribution of countries by percentage urban for selected years.

| Percentage urban | 1950 | 2000 | 2020 | 2050 |
|----------------------------------|-------|-------|-------|-------|
| Levels | | | | |
| <20 | 38.3 | 7.5 | 4.0 | 0.0 |
| 20–30 | 18.9 | 12.4 | 9.0 | 3.5 |
| 30–50 | 22.4 | 23.4 | 19.9 | 12.9 |
| 50–70 | 13.9 | 27.4 | 28.9 | 24.9 |
| ≥70 | 6.5 | 29.4 | 38.3 | 58.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| By selected regions | | | | |
| World | 29.6 | 46.7 | 56.2 | 68.4 |
| More developed regions | 54.8 | 74.2 | 79.1 | 86.6 |
| Less developed regions | 17.7 | 40.1 | 51.7 | 65.6 |
| Europe | 51.7 | 71.1 | 74.9 | 83.7 |
| Northern America | 63.9 | 79.1 | 82.6 | 89.0 |
| Australia/New Zealand | 76.2 | 84.5 | 86.3 | 91.0 |
| Latin American and the Caribbean | 41.3 | 75.5 | 81.2 | 87.8 |
| South-Eastern Asia | 15.6 | 37.9 | 50.0 | 66.0 |
| Sub-Saharan Africa | 11.1 | 31.4 | 41.4 | 58.1 |

Source: United Nations (2018)

The number of people moving to cities worldwide is expanding exponentially. More than half of the population will live in cities by 2020, up 50 percent from 2007 and 43 percent in 1990. Figure 2 is an example of this. By 2050, this number is predicted to rise to almost 68%. Depending on where you live, the speed of urbanization and expansion might vary considerably. By 2020, 80 percent of people in North America, Latin America, and the Caribbean, 75 percent in Europe, and 40 percent in Sub-Saharan Africa will live in cities. Between 2000 and 2020 (Gu et al., 2021), more than 40 nations saw annual urbanization growth rates of greater than 1%. Between 2020 and 2050, urbanization rates are expected to increase by 0.01 percent every year. Developing nations are likely to expand at a far higher pace than developed countries in the future. China will be the most critical contributor to global urbanization due to its high rural-to-urban migration rates. According to a new analysis, China will be the leading source of global urbanization by 2050. In the coming years, India, on the other hand, will overtake China as the world's largest single donor. This will be the third-largest contributor to Nigeria's urbanization during the next three decades (Gu et al., 2021).

Increasing Proportions of Households with Decreasing Size:

People live in groups called "families" or "homes" in most cases because they are all related by blood or marriage. Other types of population expansion include dynamic changes in the number and composition of households. When it comes to long-term sustainable development, individuals are not the most

incredible unit. Families purchase and use a variety of energy-related commodities, including water, food, transportation, and social services. The graph below demonstrates how the average household size has decreased gradually over many decades. In 1960, the average number of people living in a Brazilian household was 5.1; by 2010, it had plummeted to 3.3. The United Kingdom and the United States had similar values of 3.8 and 3.2, respectively, whereas the United States had 3.5 and 2.6. Indian households have shrunk in size, from 5.8 people per home in 1980 to about 4.5 people per home today. According to new research, Chinese families have dropped from an average of 4.7 in 1981 to 3.2 in 2010 and 2.62 in 2020. The number of households has grown faster than the rate of population expansion in recent years, owing to smaller houses. The present trend of faster family expansion will continue shortly. According to 2010 estimates, the average household size in all nations varied from 2.1 in Finland and Germany to 8 in Afghanistan, with the average falling in the middle. If the average household size had been 2.5 persons (Gu et al., 2021), the number of families worldwide would have increased by 0.8 billion (41%), reaching 2.7 billion in 2010. Reduced fertility, rising divorce rates, more internal and international mobility, and a shift away from traditional notions of where one should live are all contributors. The composition of homes, especially the living arrangements of the elderly, is becoming increasingly significant as the public becomes more aware. Individual choices, requirements, financial resources, and cultural conventions all play a part in how individuals choose to live as they age. Many Asian, African, Latin American,

and Caribbean nations and regions have substantial numbers of adult children and grandchildren, accounting for more than 40% of the population (and even reaching over 80 percent in some countries). In Europe and the United States, however, the elderly have a low homeownership rate. Living alone or with a partner is the most common option for elderly people. According to World Bank statistics, many elderly individuals in developing nations opt to live with or without their spouses. Individuals in China, for example, have progressively increased the proportion of persons living with their spouses or alone, from 25% in 1982 to 35% in 2010. According to studies, older adults' living arrangements are linked to a variety of health outcomes and the need for legal services; thus, in an era of rapid population aging, the growing number of households and shrinking size of those households could have significant implications for long-term care, housing, and social service planning, among other things. Due to energy consumption and long-term care, household size and composition must change, and living arrangements for older adults are crucial for long-term growth (Gu et al., 2021).

Concluding Remarks:

The world's population is predicted to increase dramatically this century. In numerous countries, the decline in fertility rates has hampered economic progress. The region is expected to grow faster than the rest of the globe due to slower fertility declines and high fertility rates in individual nations in Sub-Saharan Africa. Furthermore, these countries have a more enormous need to focus on improving women's well-being and expanding the availability of safe and effective contraception choices. The first demographic dividend (population bonus) refers to a period of quick and persistent declines in infertility, which may result in a large labour force compared to the number of children and the elderly at any one moment. As a nation expands, the majority of its workforce approaches retirement age. The phrase "second demographic dividend" refers to a new window of opportunity for economic development in a nation produced by better resources available to its citizens. Many impoverished countries are getting their first taste of prosperity. According to the World Bank, many wealthy nations have joined the global economy (or will soon enter). There should be no question about the importance of demographic dividends as a source of economic development. Each

opportunity has many possibilities to be taken advantage of, and they won't endure indefinitely. Demographic dividends can only be achieved if the government implements relevant policies in other related areas and can do so. Many variables, like women's labour force participation and education levels, urbanization, capital (particularly foreign direct investments), high technology, and international commerce, all influence the findings of demographic dividends study in a specific country. To get the most out of demographic dividends, countries must build socio-economic policy packages around their population trends and characteristics rather than the other way around. Improving education, empowering women, generating employment, and attracting foreign direct investment may all be high priorities during a country's first (window) stage of development. Individuals of all ages may benefit from the potential of living to a later age due to a long-term care system, the promotion of home and community-based social services, and the establishment of age-neutral social circumstances. Individuals' ages at which they begin to suffer the consequences of old age will definitely climb if they live longer and healthier lives, as will the breadth, duration, and timing of these (window) periods. Not only are the three demographic components (fecundity, mortality, and migration) unknown, but other variables such as economic development and technological improvement may have a significant impact on population increase as well. By the middle of 2021, the epidemic would have killed over 3.8 million people, with the elderly bearing the brunt of the toll. Over the last 1.5 years, excess fatalities have varied from 5 per million people in certain nations to over 1,000 per million people in others. According to the World Bank, lockdown measures have significantly decreased internal and international migration in most countries. For some years, migration numbers may not return to pre-COVID-19 pandemic levels. The influence of the epidemic on reproductive health is yet too early to draw any conclusions. Underage marriages and teenage pregnancies are likely to rise due to the pandemic. On the other hand, evidence from several nations shows that fertility will fall when the epidemic started in 2020. A high fertility rate is predicted soon following a tragedy or outbreak based on historical precedence. Furthermore, a country's birth rules impact future population growth patterns. Due to a loosening of the country's birth regulations, couples may now have three children at the same

time in China. Because China has such a massive percentage of the world's population, any relaxation of China's birth policy would impact the country's future population growth and the global population trajectory. The shifting demographics of the family unit must be taken into account when forecasting future population increases. We must first learn how to correctly alter our consumption patterns to contribute to attaining the Sustainable Development Goals. The rules that govern urban growth ensure that everyone has affordable access to housing, education, healthcare, good vocations, and comfortable and productive settings in which to live and work. The needs of those living in poverty in metropolitan areas and those of other vulnerable groups should get special consideration. Global challenges such as climate change and environmental deterioration have emerged. Many people believe that urbanization and population growth contribute significantly to greenhouse gas emissions, influencing the climate and natural environment (Lal et al., 2016). As the world's population grows faster, climate change and increasing greenhouse gas emissions become more vulnerable. Consequently, it may be required to slow the human population increase to minimize long-term global emissions and free up resources for climate change adaptation. It is expected that the world's population will continue to grow during the next century. Nations must implement comprehensive policies tailored to their own circumstances to meet the difficulties of developing people and achieve the Sustainable Development Goals (SDGs).

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