

Demographic Transition And India: A Statistical Analysis

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Abstract

In the history of every country, it experienced, experiencing or will experience the cycle of demographic transition. India is not an exception to this experience, as at this stage the nation is in the late transition stage with declining trends in the population growth, birth and death rate'. As we know, in the pre-independence period the birth and death rates were at higher levels i.e. almost 50 per 1000 population. Death rate out marks the birth rate, because of that the population growth rate was sluggish and stable or India experienced zero growth rate at that time. This stage is known as pre-transitional equilibrium with zero or stable population growth. After independence, because of the development in the medical and health facilities along with the ample provision food, death rate declines drastically. On the other hand, the birth rate continued with the same magnitude of pre-independence period, which resulted in to population explosion with high growth of population and the stage is known as early transition stage. The late transition stage was started in the decade 1991, with declining trends in the death rate along the birth rate, which resulted in to the declining population growth rate which will continue up to mid-21st century. The last stage i.e. the stage of post transitional equilibrium is yet to come. According to United Nation's estimates and projections of population, India is experiencing substantial decline in its population growth from 1991(23.57%) to 2021(15.44) with its annual exponential growth rate of 2.14% to 1.41% for the same period. The United Nation's 2019 estimates suggested that, India would continue to increase until the year 2061 when its population would reach 1650 million. India may experience a decline in its total population after 2061 to achieve final stabilization to enter the fourth stage, which is known as post transition equilibrium.

Keywords

Demographic transition, population growth, population growth rate, birth rate, death rate, pre-transition stage, transition stage, post-transition stage, pre-transition equilibrium, post-transition equilibrium, pre-independence period, post-independence period, population explosion, developed countries, underdeveloped countries, globalization, world community, unemployment.

Introduction

The demographic transition is based on the trends of two demographic characteristics i.e. the birth rate and the death rate which suggests the country's population growth cycle through various stages as that country develops economically. Almost every country in the world experiences this cycle of demographic transition i.e. stable, low and high population growth in its history. This model is used to represent the changes in birth and death rates as the economy of a county develops from agricultural to industrial. It works on the premise that the birth and the death rates are connected and correlated with the stages of development of that country. The causes or the reasons could same or different along with same or different magnitude. It is of vital importance to examine the relative performance of developing country like India on the World scenario.

Objective

The objective of this paper is to examine and explain the demographic transition model with special reference to India.

Methodology

To calculate the population growth rate, exponential population growth rate, birth rate and

death rate related statistical methods are used.

- 1) To calculate the rate of population growth following formula is used.

$$r = \frac{P_n - P_o}{P_o} \times 100$$

Where,

r = Growth of population in percent

P_n = Population in latest period

P_o = Population in the past

- 2) Birth rate is also calculated with the help of following formula.

$$CBR = \frac{B}{P} \times 1000$$

Where,

CBR = Crude Birth Rate

B = Total number of births during census year

P = Total population during same census year

- 3) Death rate is also calculated with the help of following formula.

$$CDR = \frac{D}{P} \times 1000$$

Where,

CDR = Crude Death Rate

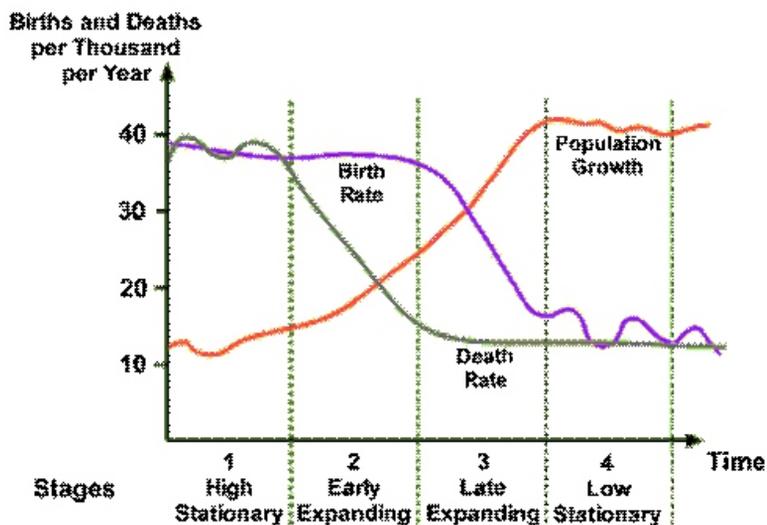
D = Total number of deaths during census year

P = Total population during same census year

The Concept Of Demographic Transition

Frank w. Notestein, an American demographer proposed a precise framework and presented a systematic formulation of the theory in 1945. According to the theory, the demographic transition of a nation can be described with the help of growth rates if the country has a regular conduction of census for a reasonably long period. In the history of every country in the world the cycle of demographic transition takes place in a three stages i.e. Stage of Pre-Transitional Equilibrium or High Stationary/ Stable Population Growth, Stage of Transitional High Population Growth or population Explosion and finally stage of Post-Transitional Equilibrium or Low Transitory Stable Population Growth.

Demographic Transition Model



(Source- Barcelona Field Studies Centre, geographyfieldwork.com.)

The first stage i.e. Pre-Transitional Equilibrium starts with stable population growth, which is attributed to the agrarian peasant economy characterized by high birth and high death rates. The death rate fluctuates in response to the variation in harvests, the incidents of epidemics, poor diet, primitive sanitation and inadequate medical and public health facilities. The birth rates are high only because of a functional response to high mortality. The ideals of prolific fertility are, therefore ingrained in social customs and beliefs which are reinforced by the economic advantage of having a large number of children.

The second stage i.e. Stage of Transition began to occur with the modernization, improved public health, better diet, and higher income which leads to a marked reduction in mortality that gradually raised life expectancy of the people. However, the decline in death rates is not immediately accompanied by the decline in fertility. The agrarian society starts undergoing changes and becomes interdependent on high level of production, highly industrialized, market oriented and urbanized economies. In this situation the death rates registers striking reductions, which is a consequence of better and regular supply of food along with improved medical knowledge and facilities. The acceptance of small size family comes initially in the higher income groups of urban areas and then spreads towards lower income groups of the small cities and eventually to rural areas. As a result, the growing birth rates and falling death rates lead to sharp increase in population growth ever in the history, which is known as Population Explosion.

Final and third stage i.e. Post-Transition Equilibrium starts with the second Stable Population Growth, which is entered with the influence of modernization and development in every sector of the society and causes decline in the birth rates, which is accompanied by the lower death rates leading to very little or stable population growth. The reforms in the birth and death rates in this stage are totally devoted to the change of agricultural economy into industrial economy.

Demographic Transition And The World

Almost each and every country in the world have followed or will follow the demographic transition theory along with high levels of birth and death rates to low levels. These changes have resulted in the form of improved health conditions and extended longevity in the peoples. This cycle of demographic transition is the general historical experience of almost every developed country in the world. In case of developing countries this transition is stopped at the second stage with spread of modern technology in every field of society. As a result the death rates, particularly infant mortality is declined significantly and rising birth rates resulted in population explosion. On the other hand, the positive thing is that the selected developing countries recorded a declining trend of population growth.

As far the developed countries especially European Countries are concerned international migration played a dominant role in reducing the surplus population by encouraging migration to New World like America, Australia and other Colonial States. The migration took place on permanent basis reducing the population pressure on homelands and developed countries got rid of the surplus population and unemployment. Finally when the stage of development was attained the third stage of demographic transition was set in with stable population growth.

Population growth in developing countries is never crossing the second stage of demographic transition. According to United Nations in the last 70 years world population has increased three times to attain above 7 billion marks and it is 7,795,753,000 in September 2021. More shocking is that 3/4 of total world population is living in developing countries adding more than 80 million people every year with the growth rate of 1.05%. World population will therefore continue to grow in the 21st century, but at a much slower rate compared to a growth rate of 2% in 1960. The United Nations projects world population to reach 8 billion in 2023, 9 billion in 2037 and 10 billion in 2057. In 2021, about 60% population of the world lives in Asia, 17.2% in Africa, 9.6% in Europe, 8.4% in Latin America, 4.7% in North America and 0.6% in Oceania. .

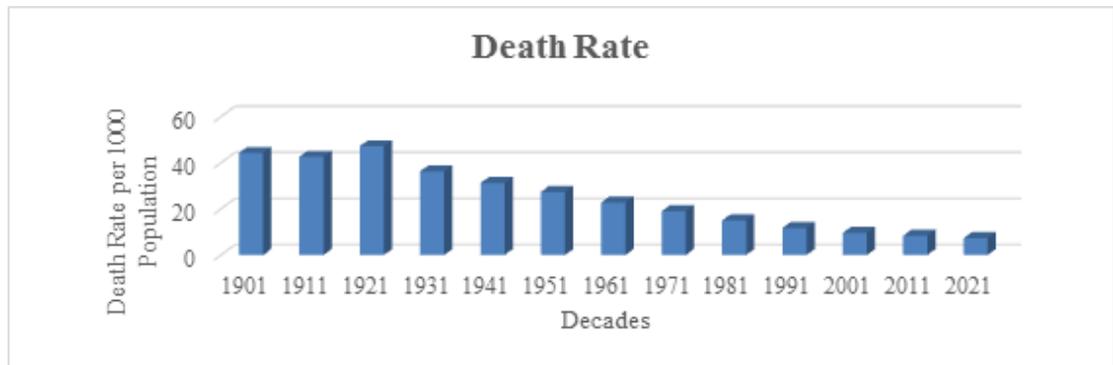
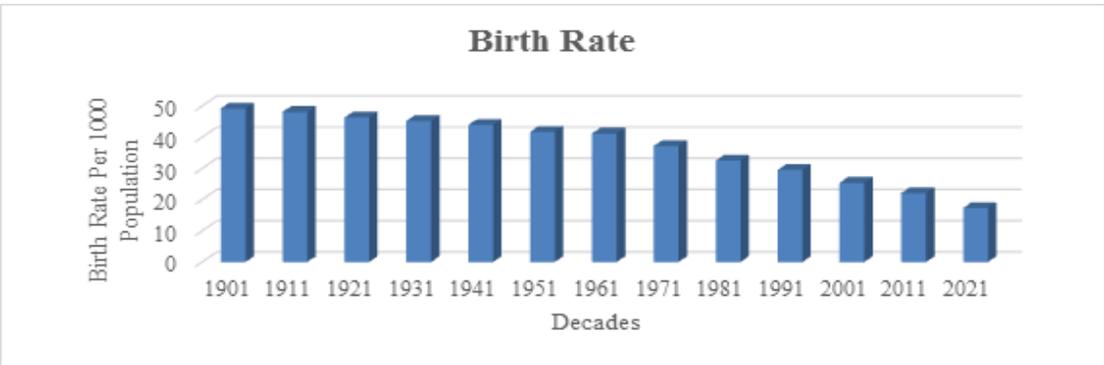
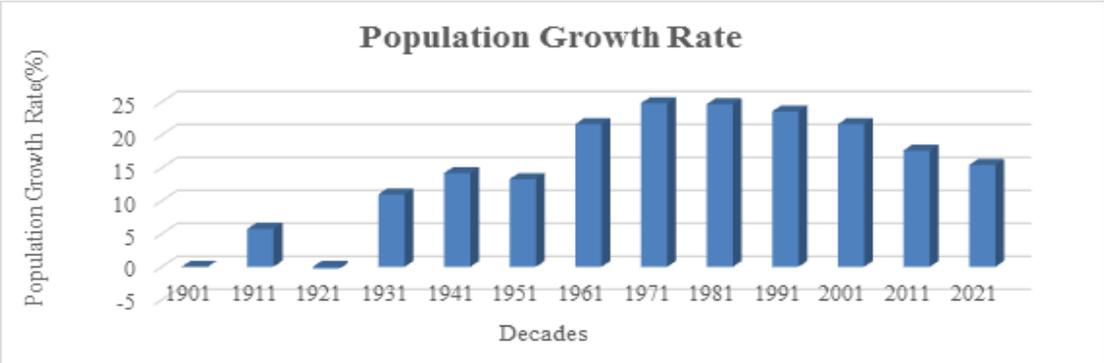
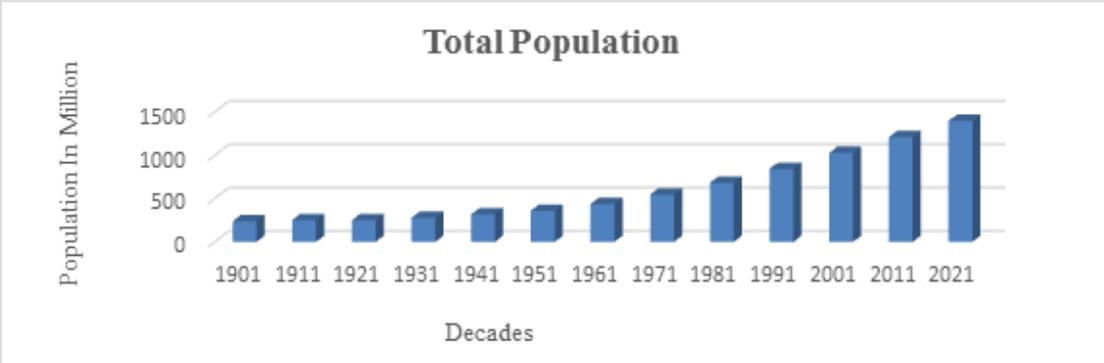
Demographic Transition And India

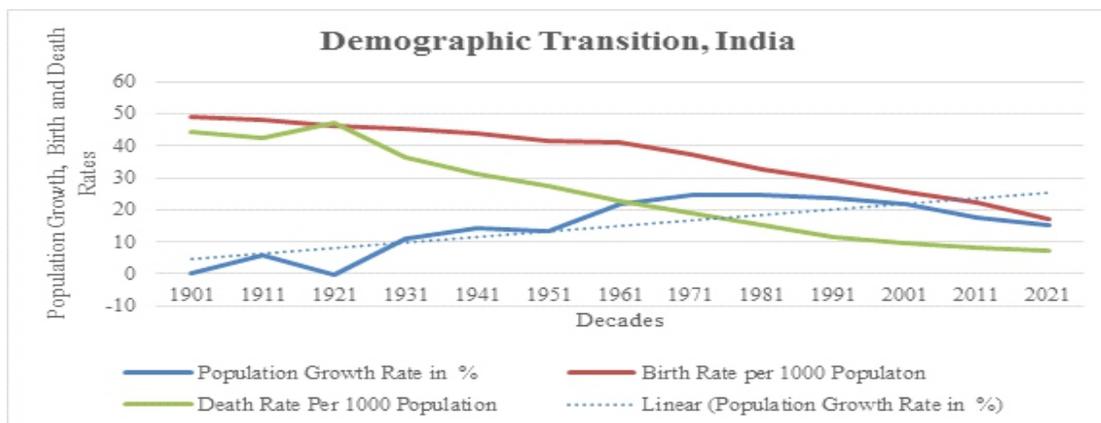
India, the second most populated country in the World, covers 2.4% area and 18% population of the World. The census data for India reveals high population growth in spite of population controlling measures implemented over a years. The following table shows the decennial actual population and population growth rate which is increasing continuously over a period of time with only exception of 1921. At the beginning of 20th century, India had 238 million population which was transferred into 1 billion at the end of same century. The world population three times i.e. from 2 to 6 billion, the Indian population leaped five times to reach 1 billion mark. The last census, which was conducted in 2011, India recorded 2.21 billion of peoples, with the decennial growth of 17.5%. And at the beginning of current decade, i.e. in the 2021, India reached up to 1.39 billion of peoples, with the growth rate of 15.44% as estimated by the United Nations. In 1901, the population of India was 238 million, which was reached to 252 million in 1911, with the growth of 5.75%. The decade 1921, which is known as The Divide of Indian Census, the population was actually declined with -00.31% of growth rate. In the period of 1931 to 1971 population increased with alarming rate. And from 1981 population though increased but the rate of increase was declining. It is very clearly seen that India is still in the late second stage of demographic transition with declining but high growth rate of 5.75% in 1911, 24.80% in 1971 and 15.44 in the decade 2021. Birth Rate shows quite high values in the early decades with almost 50 births per 1000 population. But at the end of 20th century and at the outset of 21st century it was considerably declined to 17.3. With the exception of 1921(47.2) the Death Rate shows continuous and gradual decline from 44.3 in 1901 to 7.3 in 2021.

Population growth in India

Sr No	Decades	Total Population	Absolute growth of Population	Population Growth Rate %	Exponential Growth Rate %	Birth Rate Per 1000	Death Rate Per 1000
1	1901	238396327	-	-	-	49.2	44.3
2	1911	252093390	13697063	05.75	0.56	48.1	42.6
3	1921	251321213	-772177	-00.31	-0.03	46.3	47.2
4	1931	278977238	27656025	11.00	1.05	45.2	36.3
5	1941	318660580	39683342	14.22	1.33	43.9	31.2
6	1951	361088090	42427510	13.31	1.25	41.7	27.4
7	1961	439234771	78146681	21.64	1.96	41.2	22.8
8	1971	548159652	108924881	24.80	2.22	37.2	19.0
9	1981	683329097	135169445	24.66	2.20	32.5	15.0
10	1991	844387888	161058791	23.57	2.14	29.5	11.7
11	2001	1027015247	182627359	21.63	1.95	25.4	09.6
12	2011	1210854977	183839730	17.64	1.62	22.1	08.4
13	2021	1396383360	151800887	15.44	1.41	17.3	07.3

(Source- Census of India, 2011)





1) Pre-transition Stage (Pre-Transitional Equilibrium)

Pri-Transition stage is also called as Pre-Transitional Equilibrium, which occurred in the Pre-Independence Period of India with sporadic, irregular and slow growth of population when compared with the growth rates observed during the consequent periods. This stage witnessed primitive agrarian society with meager medical and health facilities along with epidemics and food shortage. Because of that, in this stage Birth and Death rates, both are high and fluctuating and are over 35 per 1000 population. The high birth rate was counterbalanced by high death rate, as a result population growth is slow and stable. At the beginning of 20th century, from 1901 to 1941 the birth and Death Rates are high and above 35 per 1000 population and fluctuating. Because of that, the growth rate of population was almost stable with very little increase. This period witnessed first stage of demographic transition, with high Birth and Death rates along with very negligible population growth. All the decades in this period, except 1921, which showed negative population growth. That's why the decade 1921 is known as a “The Great Demographic Divide” Indian census history. The growth rate of population for India was ranging in between 5.75% to 13.31%. In this period, the population growth rate increased up to 14.22% in 1941 and fall down to -00.31% in 1921. This abnormal mortality is due to epidemics like Plague, Cholera, Malaria, Influenza, small pox etc. In addition, thousands of Indian peoples and soldiers lost their lives due to natural calamities like famines and World War I which caused negative growth rate in population.

2) Transition Stage (Stage of Population Explosion)

Transition Stage is also known as A Stage of Extreme Changes or The Stage of Population Explosion. In this stage, the transition starts in the early decades of Post-Independence period with decline in the death and birth rates. As far the demographic transition in India is concerned, this stage is divided in to two sub-stages i.e. Early Transition Stage and Late Transition Stage.

Earlt Transition Stage

In the early transition stage or the early expanding stage, though the birth rate starts to decline, it declines very slowly or moderately and on the other hand, the death rate starts falling considerably, which leads to accelerated population growth. The birth rate is above 35 and the death rate is above 15 for per 1000 population. Though the transformation in the society is started, the characteristics like traditional society, primitive economy, poverty, low level of urbanization along with mass illiteracy persisted. From 1951 up to 1981 with the 24.66% of growth rate, 32.5 and 15 birth and death rates per 1000 population India was in this stage. In this stage, that India recoded an extreme population growth rate of 24.80 % along with the birth and death rates of 32.5 and 15 per 1000 population respectively, in the decade 1981.

Late Transition Stage

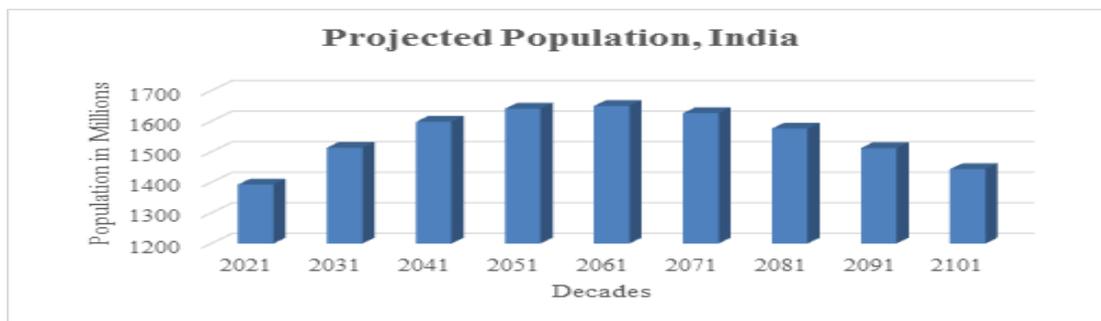
The late transition means a little more advanced stage of early transition stage, which starts with the drastic decline in the death rate and continuation of sluggish decline in the birth rate. The late transition

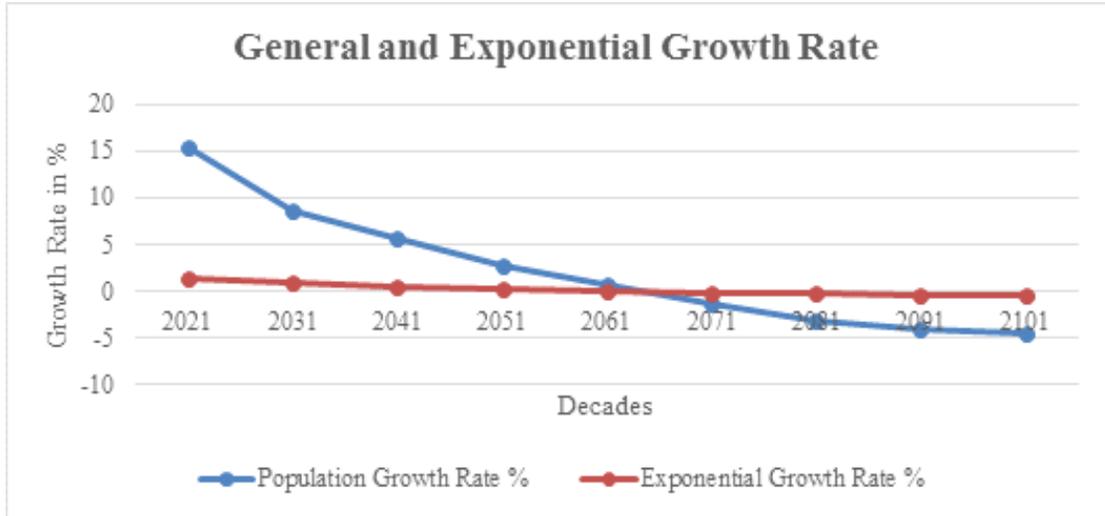
stage is also known as late expanding stage with declining growth rate, in which death rate has declined significantly i.e. under 15 and birth rate continued gradual creeping dawn, which is under 30 per 1000 population. This phase was started from the census year 1991, which continued to till date i.e. 2021. Although, in this stage the rate of growth of population was still very high, it shows signs of declining trend. In the decade 1991 the birth and death rates were 29.5 and 11.7 respectively per 1000 population along with the growth of 23.57%. Since the death rate has declined fairly, the birth also witness accelerated decline, which initiates an era of drastic declining rate natural increase. The growth rate of population, which was reached at the peak in the previous two decades, started to decline significantly with continuation to allow the nation to complete its cycle of demographic transition in the near future. Along with the initiation of agricultural and industrial development India witnessed the characteristics of growing literacy, growing urbanization and growing income. Because of the changing socio-economic scenario, the birth rate, death rate and the growth rate of India recoded the lowest figures in 2021. According to United Nations, in September 2021, the birth and death rates are 17.3 and 7.3 respectively per 1000 population along with the growth rate of 15.44%.

Post-transition Stage (Post-Transitional Equilibrium)

Sr No	Decades	Total Population In millions	Absolute growth In Millions	Population Growth Rate %	Exponential Growth Rate %
1	2021	1393.0	182.8	15.4	1.41
2	2031	1513.7	120.7	08.7	0.83
3	2041	1598.3	84.6	05.6	0.54
4	2051	1641.2	42.9	02.7	0.26
5	2061	1650.3	09.1	00.6	0.06
6	2071	1626.4	-23.9	-01.4	-0.15
7	2081	1576.1	-50.3	-03.1	-0.31
8	2091	1512.4	-63.7	-04.0	-0.41
9	2101	1443.5	-68.9	-04.6	-0.47

(Source- Census of India, UN's Population Estimates)





The doctrine of demographic transition theory advocates that a rise in per capita income, industrialization and urbanization i.e. the up gradation of socio-economic status leads to reduced values of birth and death rates from higher, which ultimately resulted in to zero or stable population growth. This stage is known as post transition stage or post transitional equilibrium or stage of stable population growth. As far India is concerned, at the beginning of the 20th century, India recorded 238 million population, which crossed the mark of one billion on the verge of 21st century and reached up to 1396 million in September 2021. In the pre-independence period i.e. up to 1951, India was in the first stage of demographic transition with higher birth and death rates along with the sluggish and fluctuating population growth rate.

From 1951 second stage i.e. early transition stage was started and continued till 1991 with higher birth rate and declining death rate which ultimately resulted in to extreme population growth rate or population explosion. In the decade 1951 the birth and death were 41.7 and 27.4 respectively per 1000 population. The population growth rate was 13.31% and the exponential growth was 1.25%. The decade 1971 recorded extreme higher values of absolute and exponential growth rates of 24.80% and 2.22% respectively in the period under study. This trend was persisted up to 1991 with more than 2% exponential population growth rate. The late transition stage was started in the decade 1991 with declining natural and exponential growth rates along with declining trends of birth and death rates also. This stage is still persisted with substantial decline in the natural growth rate, exponential growth rate, birth rate and death rate.

The third stage i.e. post-transition stage or post transitional equilibrium or the stable population growth with lower values of birth and death rates is yet to come, but it is not far away according to the estimates of United Nation's. The United Nation's 2019 assessment suggested that the growth rate of population of India would continue to increase until 2061, at that time the population of India would reach up to 1650 million. India may experience a negative growth rate or a decline in its total population in 2061-2071 and reach population of 1444 million's in the year 2101. Thus, India is likely to enter in the third stage or post transitional equilibrium or zero growth rate in the next 50 or 60 years.

Conclusion

Above discussion put forth the fact that the developing country like India is already over populated and the trend never going to stop in the near future. The international community has expressed concerns about the rising population and high growth rate in India. More importantly there is a very little scope for reducing the pressure of growing population because these countries already have very large size of population and restrictive nature of migration laws, which are posed in the developed countries. The brain drain from developed countries represents not only human resource loss but could prove to be a serious constraint on the future economic progress of these countries. The serious problem of the country like India is how to accommodate these millions of unskilled peoples having perpetual poverty and underemployment.

In the pre-independence period, the growth of Indian population was quite sluggish and stable because the high birth rate was out marked by the high death rate. In the early post-independence period birth rate continued with the high values, on the other hand death rate shows tremendous downfall initiating the way of population explosion. The late post-independence period witnessed gradual decline in also in the birth rate but the gap between birth and death rates was too wide, that the population grows with considerable growth rate. From 2001 the population growth slowed down considerably, however, the nation continued to add large size of population annually to its already existing large size of population. The estimation of United Nation's indicated that the population of India would recoded a peak in 2061 to 2071 and then it would decline negatively to reach 1.44 billion at the beginning of 21st century.

It may thus concluded that in the presence of restricted international migration the only viable solution is the reduction in birth rate, overcoming poverty and unemployment through effective policies and awareness in the people about reduction in fertility. Thus, India's experience will pose significant challenges for the World community and the concern about the rising population size also.

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