



Trend And Effect of Population in India: A Scenario Analysis

R. K. Mandal¹

ABSTRACT

*Population growth is critical for sustainable development in the true sense. Overpopulation indicates a scenario in which the population of a living species exceeds the carrying capacity of its ecological niche. So far, India's family planning programmes have seen only limited success because the programmes have not tackled the issue in a holistic way. **Methodology:** The paper aims to examine the trend and effect of population in India. This study is descriptive in nature based basically on data of secondary sources collected from government offices, books, articles, various census reports, and websites published in different times. **Result and Discussion:** India occupies 2.4 per cent of the world's land area and supports over 17.5 per cent of the world's population. There are some vital impacts of overpopulation such as Food Shortage, Deforestation, Water shortage, Energy, Extinction, etc. **Conclusion:** Stabilising population is an essential requirement for promoting sustainable development. India's population policy needs to be based on concrete measures that not only help to solve our population problem but also helps the poor to improve their lives in tangible and meaningful ways.*

I. INTRODUCTION

Overpopulation is a generally undesirable condition where an organism's numbers exceed the carrying capacity of its habitat. The term often refers to the relationship between the human population and its environment, the Earth, or smaller geographical areas such as countries. The recent rapid increase in human population over the past two centuries has raised concerns that the planet may not be able to sustain present or larger numbers of inhabitants. The Inter Academy Panel Statement on Population Growth has stated that many environmental problems, such as rising levels of atmospheric carbon dioxide, global warming, and pollution are aggravated by the population expansion. Other problems associated with overpopulation include the increased demand for resources such as fresh water, food and shelter, starvation and malnutrition.

¹ Dr. R. K. Mandal, Principal, Jamini Mazumder Memorial College, Patiram, Dakshin Dinajpur, West Bengal, India, E-mail: rkm_1966@yahoo.co.in, Orchid:<https://orcid.org/0000-0001-9621-7084>

Consumption of natural resources is faster than the rate of regeneration (such as fossil fuels), which decreases the living conditions of the people. Population and environmental pollution are positively correlated. Population and lifestyle play a critical role in the state of our environment. Population policies are as critical to governance as they are to the protection and accessibility to land for food production. A healthy environment is paramount to developing poor nations. They will also be critical for sustainable development in the true sense. The statement by the Secretary General encompasses the areas of concern and work of the United Nations Population Fund (UNFPA) - in fact the MDGs were partly modelled on the UNFPA Program of Action adopted at the 1994 International Conference on Population Development (ICPD) in Cairo, which guides the organisation's work. Population growth and its implications are at the heart of the concept of sustainable development which is defined as "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs."

More than 99 per cent of the world's food supply comes from the land, while less than 1 per cent is from oceans and other aquatic habitats. The continued production of an adequate food supply is directly dependent on ample fertile land, fresh water, energy, plus the maintenance of biodiversity. As the human population grows, the requirements for these resources have also to grow. But the resources have to grow up to a certain limit beyond which it is not possible to grow. Overpopulation indicates a scenario in which the population of a living species exceeds the carrying capacity of its ecological niche. Since human habitat and livelihood are closely interconnected with the surrounding ecosystem, increased pressure from population can cause irreversible damage to fragile ecosystems. Technological advances of developed countries lead to more exploitation of natural resource than the so-called developing countries. So the problem is not simply population growth but finding the right balance between population growth and sustainable development. Halting population growth in many countries is a vital part of living sustainably. In some societies, population growth has already slowed or stopped. Typically, the empowerment of women and improved availability of contraception have played major roles. Overpopulation does not depend only on the size or density of the population, but on the ratio of population to available sustainable resources. It also depends on the way resources are used and distributed throughout the population. There is a growing imbalance between the demands of human populations and the resources that support human life. Fresh water, land, finite resources like fossil energy are depleting very fast because of increased pressure to meet the growing demand of an expanding population (Dutta and Mandal, 2018).

The objective of the paper is to examine the general view of trend and effect of population in India.

II. METHOD AND MATERIALS

This study is descriptive in nature based basically on data of secondary sources. The data of secondary sources are collected from government offices, books,

articles, various census reports, and websites published in different times. But the main source of population data is the population census.

Analysis: The different materials collected from the various sources have been scrutinized, processed, organized and tabulated logically and systematically under appropriate heads of rows and columns of statistical tables in such a way to use the different statistical tools for calculation and thereby to get the results. In addition to graphical representations, simple numerical calculations like percentages, exponential growth rate and decadal variation of population, etc. have been calculated.

Population growth (ΔP) is determined by four factors, births (**B**), deaths (**D**), immigrants (**I**), and emigrants (**E**). Using a formula expressed as

$$\Delta P \equiv (B - D) + (I - E)$$

In other words, the population growth of a period can be calculated in two parts, natural growth of population ($B-D$) and mechanical growth of population ($I - E$), in which Mechanical growth of population is mainly affected by social factors, e.g., the advanced economies are growing faster while the backward economies are growing slowly even with negative growth.

In demographics, decadal population growth rate (PGR) is the rate at which the number of individuals in a population increases in ten years as a fraction of the initial population. Specifically, PGR ordinarily refers to the change in population over a unit time period, often expressed as a percentage of the number of individuals in the population at the beginning of that period. This can be written as the formula:

$$\text{PGR} = \frac{P(t_2) - P(t_1)}{P(t_1)}$$

Where $P(t_2)$ = Population of Current Census Year and $P(t_1)$ = Population of Previous Census Year

III. RESULT AND DISCUSSION

India has over 16% of the world population, but its land area is merely 2.4% of the land area of the world. India is the second most populated country in the world behind China and in the next six years i.e., by 2024, India would exceed China. High population is a problem about which successive governments have been aware and it is not that steps aren't being taken to address it⁶. Moreover, the economic impact to people on earth becomes more pronounced with increased population growth. This is especially true for poorer populations who live without the basic resources, such as clean water, food and medical care, necessary to sustain life as well as providing for a higher quality of life. Unchecked population growth can negatively impact on the environment. Aspects of the environment that population growth impacts includes resource use, habitat destruction, habitat fragmentation, pollution and public health problems. Further, as more carbon dioxide is produced by the machinery of civilization, the impact on the

climate is beginning to be seen with global temperatures on the rise. Trees that once helped to create oxygen are being stripped away every day. However, unchecked population growth can negatively impact on the environment. As the human population increases, the population of animal life decreases. As more humans occupy the earth, they need more space and more resources, including minerals that are taken from areas that sustain a multitude of species. As these incursions continue and increase, animals move closer to becoming endangered. As populations in cities grow, urban sprawl also grows, resulting in the destruction of critical habitat for a number of plant and animal species. A large population puts a great strain on resources. Non-renewable resources, such as fossil fuels and freshwater, are particularly affected. Another impact of overpopulation is habitat fragmentation. Habitat fragmentation refers to natural habitats that are broken into separate pieces due to the construction of buildings, roads and other man-made objects. Overpopulation has a negative impact on the environment due to pollution. The more people there are, the more resources they use, and the more pollution that results. This pollution may include air pollution due to increased fossil fuel emissions from vehicles, or land or water pollution due to increased amounts of waste. In some cases, unchecked population growth may lead to public health problems. For example, in many developing countries, populations do not have access to clean water sources. Water pollution, caused by a lack of proper sanitation, can easily lead to the spread of disease. Some vital impacts of over population are discussed below.

Food Shortage: Especially with increasing trends of consumption of over population, it will eventually be impossible to sustain food production to meet the increasing demand. Land available for agriculture or cattle grazing will continue to decrease.

Deforestation: The harvesting of the Earth's forests causes land degradation and erosion. Land degradation can strip the soil of nutrients and limit it from further agriculture or grazing. Erosion leaves less land for food production, contributes to flooding, etc.

Water shortage: The supply of renewable fresh water per capita is decreasing at an unsustainable rate. Over-development, depletion of natural resources, and acid rain caused by air pollution are all contributing factors to a decreasing water supply.

Energy: An increasing world population will not have access to electricity or other energy sources at current energy production and usage rates. The combustion of traditional energy sources such as coal, natural gas and oil contributes to air pollution and releases greenhouse gasses into the atmosphere.

Extinction: As development continues to encroach upon the natural habitats of indigenous plants and animals, many species are becoming extinct. This is damaging to ecosystems as a whole and can destroy potential nutritional resources.

India is a union of twenty-nine states and seven union territories. The Indo-Gangetic plains have one of the world's biggest stretches of fertile flat-deep alluvium and are among the most densely populated areas of the world. The eastern and western coastal regions of Deccan plateau are also densely populated regions of India. The Thar desert

in western Rajasthan is one of the most densely populated deserts in the world. The northern and north-eastern states along the Himalayas contain cold arid deserts with fertile valleys. These states have less population density due to indomitable physical barriers.

India occupies 2.4 per cent of the world's land area and supports over 17.5 per cent of the world's population. India has more arable land area than any country except the United States and more water area than any country except Russia, Canada and the United States. Indian life revolves mostly around agriculture and allied activities in small villages, where the overwhelming majority of Indians live. As per the 2001 census, 72.2 per cent of the population lives in about 638,000 villages⁵ and the remaining 27.8 per cent lives in more than 5,100 towns and over 380 urban agglomerations. The number of districts increased from 593 in 2001 to 640 in 2011.

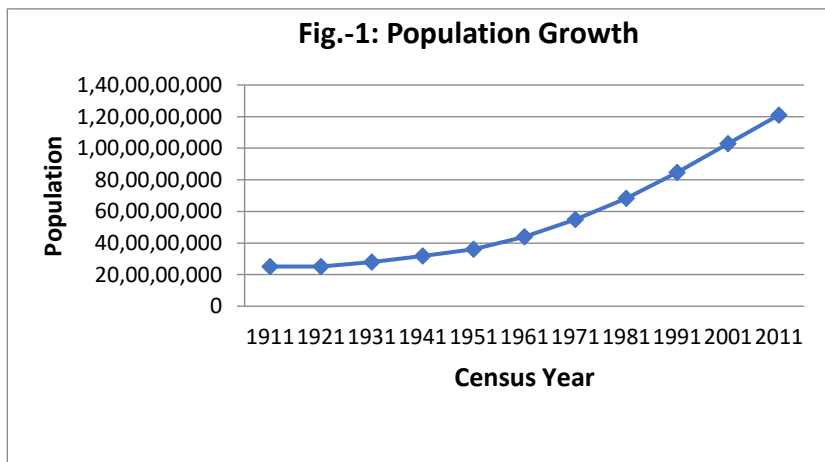
It is primarily concerned with establishing linkages between population growth trends and patterns with social and economic development process in the country. India, it may be pointed out, was the first country in the developing world to recognise the role of population factors in the process of socio-economic development and to adopt a comprehensive population policy as a part of social and economic development as early as in 1950. An analysis of Indian experience, therefore, may provide valuable insight about population and development interrelationship and can contribute toward integrating population factors in the social and economic development planning process.

One may mention here some extensive studies made by Ricardo and Malthus during 18th century which suggested that population growth beyond a limit was a major obstacle in improving standards of living of the majority of human race. In fact the law of diminishing returns propounded by Malthus led to the conviction that, sooner or later, human population will outgrow the subsistence required for its survival and so, ultimately, there will be misery and vice throughout the world (Malthus, 1798). However, conclusion derived by Malthus has been a subject of bitter criticism from many angles since the days of Malthus. This criticism, in any case, has kept Malthusian perspective about population and its impact on social and economic development alive till today. In addition to this criticism, there have been events in the history of mankind which have repeatedly given fresh lease of life to the debate on the impact of population and population related factors on the process of social and economic development.

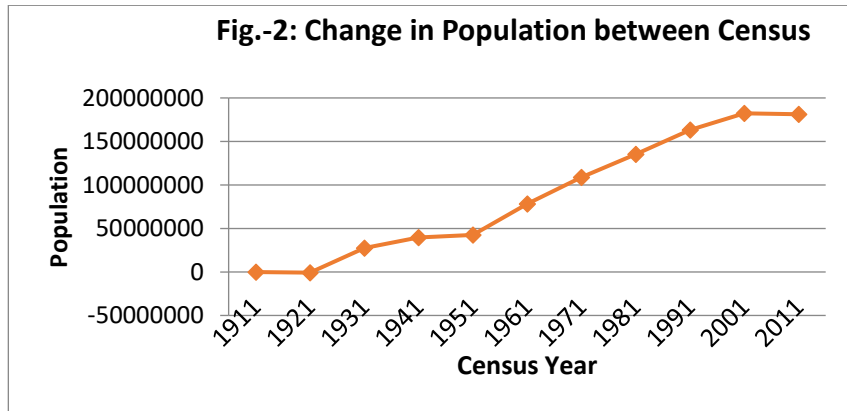
Table-1: Population of India as per Census Report Since 1911 to 2011

Census Years	Population	Change in Population between Census	Decennial Growth Rate	Annual Growth Rate
1	2	3	4	5
1911	252,093,390	0	0	0
1921	251,321,213	-772,177	-0.3063	-0.003063
1931	278,977,238	27,656,025	11.0042	1.10042
1941	318,660,580	39,683,342	14.2246	1.42246
1951	361,088,090	42,427,510	13.3143	1.33143
1961	439,234,771	78,146,681	21.6420	2.1642
1971	548,159,652	108,924,881	24.7988	2.47988
1981	683,329,097	135,169,445	24.6588	2.46588
1991	846,421,039	163,091,942	23.8673	2.38673
2001	1,028,737,436	182,316,397	21.5397	2.15397
2011	1,210,193,422	181,455,986	17.6387	1.76387

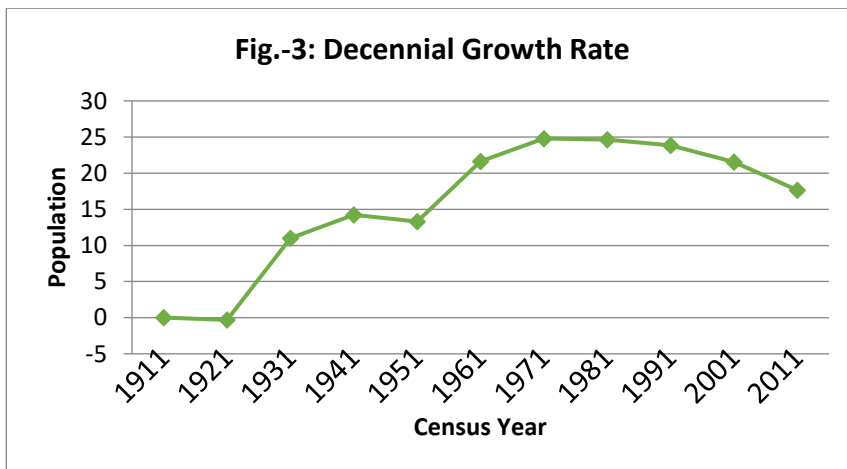
Source: Registrar General of India, Census 2011, Provisional Population Totals, N.B.: Figures in Col.3, Col.4 and Col.5 are calculated with the help of Microsoft Office Excel.



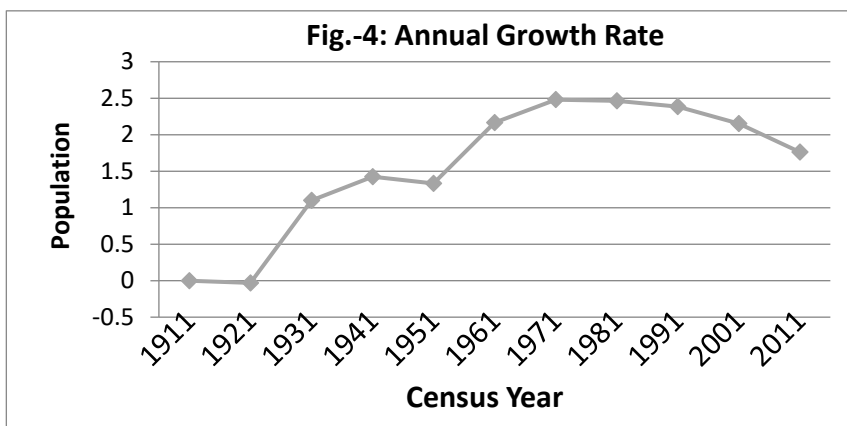
Drawn From Table-1.



Drawn From Table-1.



Drawn From Table-1.



From Table-1 and Fig.-1, 2, 3 & 4: As per 2011 Census, India with 1,210,193,422 (1.21 billion) people is the second most populous country in the world, while China is on the top with over 1,350,044,605 (1.35 billion) people. As per the provisional report published during 31st March, 2011, India showed a decadal growth rate of 17.64 % for the entire population as compared to 21.15 % in Census 2001. The report says, during the last decade of 2001 to 2011, population in India grew by 181 million. Therefore, during the decade of 2001–2011, India's annual population growth rate has slowed down from 2.15 per cent to 1.76 per cent. While the national average for sex ratio shows an increase from 933 in year 2001 to 940 in year 2011, the 2011 census shows a sharp decline in child sex ratio, the number of females per thousand males in a population between age group 0–6 years.

The Fig.-1 shows the upward trend of population growth of India during last 100 years. In the beginning of the twentieth century, the country's population was 238.4 million in the year 1901 which increased to 1210.19 million in the year 2011 showing an increase of 407.64 per cent, i.e., over 4 times within a span of 110 years. Again if we consider 100 year from year 1911 to year 2011, population has increased 4.8 times. Each year India adds more people to the World's population than any other country. India's population rose to 1.21 billion people over the last 10 years from 2001 to 2011, which is an increase by 181 million. Before independence the figure was 318.7 million in the year 1941 and just after independence, the number increased to 361.1 million in the year 1951. Population increased 13 million from year 1901 to year 1911 but it was 181 million from year 2001 to year 2011. The decade 1911 – 1921 was exceptional because in this decade the population decreased by 772,177 i.e., 0.77 million.

The Fig.-2 shows the change in population between consecutive census years. We assume zero change during the decade 1901 – 1911. So the curve has started from the origin. But there was a negative growth of population during the decade 1911-1921 on account of which the curve is slightly moves downward and after that it moves upward rising as the change in population between consecutive census years was more and more.

Fig.-3 & Fig.-4 show the Decennial Growth Rate and Annual Growth Rate respectively since the census year 1911. We assume zero in the census year 1911 for the Decennial Growth Rate and Annual Growth Rate respectively and after that we see the trends for the both. Both were negative in the census year 1921 as the growth in population during the decade 1911-1921 was negative. As a result both the curves start from the origin and move downward. But from the census year 1931, both the curves move upward with frequent up and down.

IV. PREDICTION OF POPULATION IN 2021 CENSUS

If we take the average of Change in Population between Censuses from 1931 to 2011, we get it like 106541356.6. Now we add the population of 2011 Census with this average, we will get the population like 1,316,734,779 in 2021 Census. Practically it will be less than actual value, as because the Change in Population between consecutive censuses was less in previous censuses. Again if we add simply the Change in Population between 2001 and 2011 with the population of 2011 census, we will get the population like 1,391,649,408 in 2021 Census. Therefore, the population will be more or less 1,391,649,408 in 2021 Census. Again we can predict the population in subsequent census years through regression analysis with the help of least square method. We will get the more or less same values. However, the population will cross 1.5 billion in 2031 Census. Due to COVID-19, the population census is not functioning. After the population census is over, the real picture will come out.

V. COMMENT

Presently, India represents almost 17.51 per cent of the world's population, which means one out of six people on this planet live in India. Although, the crown of the world's most populous country is on China's head for decades, but India will be the top position by 2031 Census. With the annual population growth rate at 1.76 per cent in the year 2011, India is predicted to have more than 1.53 billion people by the end of 2031 Census.

China's one-child policy was a major example of social engineering and the subject of human rights concerns. Given the significance of the policy, it is important to ascertain the attitudes of Chinese citizens. Announcing in 1980, China's one-child-per-couple policy was formulated in the wake of the Cultural Revolution (1966-76) as an emergency measure to slow rapid population growth and to facilitate modernization goals (Wang, 2005; Croll, 1984). This draconian policy met with strong resistance, especially in China's vast rural areas where the peasant family remains the primary locus of economic activity and old-age support. After a few years of the announcement of the policy, a quite but significant retreat took place to modify the radical and unrealistic stance. In China's privileged urban sectors, the population continued to be subject to the one-child policy. Couples in rural china were allowed to have two children if they met certain criteria, most notably if they lived in a poor area or had only a daughter. Exemption to the one-child rule often came with a spacing requirement, stipulating a minimum of four or six years between the first and second birth. Modifications to the state policy of population control have been left to each province under the general principle of slowing down population growth and encouraging only one child per couple (Gu Bachang, *et al.*, 2007). Our neighbour country, China is very much conscious for its population growth while India is very much reluctant to its population policy.

VI. REASON FOR POPULATION GROWTH

The population growth in India can largely be experienced with the variations in birth and death rates. In 1911, India's population was little more than 252 million. But in 2011, India's population was 1210.193 million. India's population has increased by 4.8 times with span of 100 years from 1911 A D to 2011 A.D. Early marriages, lack of awareness, poverty and illiteracy, illegal migration and development of medical science are the main reasons for the growth rate of population.

So far, India's family planning programmes have seen only limited success because the programmes have not tackled the issue in a holistic way. There have been a few incentives for the poor to keep their families small. There has been little attention paid to enforce a liveable minimum wage, so that children are not pushed into work early. There has been little attention paid to guaranteeing jobs or decent schooling for those amongst the poor who do adopt family planning methods and restrict their birth rates. There has also been little attention to the need for old age pensions, for affordable health-care and disability insurance so that the poor feel secure enough not to want to have more children as "insurance" for the future.

India was the first country to launch an official programme of family Planning as early as 1952 as a part of its five-year plan. It has increased its investments in the programme from plan to plan and until 31st March of 2001 and during the financial year 2000-01, approximately of the tune of Rs. 15,000 crore have been spent for the purpose. This family welfare programme is supposed to include various child survival measures. The impact of these programmes on fertility seems to be lower than expected or targeted in every plan period, the impact on infant mortality rate is still lower. The demographic goal of achieving a crude birth rate of 25 in the country as a whole was set in 1962 to be achieved by 1972, as a part of the 3rd Five Year Plan but not achieved by the end of 10th Five Year Plan.

Another main cause for high population growth is the non-effectiveness of family planning measures. The religiously orthodox and conservative people are against the use of family planning measures. Indian Muslims have a higher birth rate as well as fertility rate than the Hindus (Muslim women having fertility rate of 4.4 as compared to 3.3 among Hindus women). According to a survey conducted among the Muslims by the Operations Research Group in 1978, although a majority of both male and female respondents were aware of modern family planning methods, they were either against using them on religious grounds or they lacked clear and adequate knowledge about them⁴.

VII. CONCLUSION

Stabilizing population is an essential requirement for promoting sustainable development. As the world population continues to grow geometrically, great pressure is being placed on arable land, water, energy, and biological resources to provide an adequate supply of food while maintaining the integrity of our ecosystem. Population Matters seeks an optimal balance, offering the best quality of life, not the greatest quantity of possessions. This implies modest but reasonably comfortable standards of

living free from hunger or insecurity, which enables fulfillment without increasing physical consumption.

India's population policy needs to be based on concrete measures that not only help to solve our population problem but also helps the poor to improve their lives in tangible and

meaningful ways. In this regard, our film industry and television industry also need to play a socially responsible role in creating the value-systems that not only rewards small families but also makes society collectively responsible for looking after the poor when they do adopt socially responsible measures. Blaming or ridiculing the poor and denying them their democratic rights will not be helpful in this regard.

REFERENCES

- Dutta P.C. (2002): "Population Growth and Environmental Crisis in North East India: Problems and Remedies" in B. J. Deb(ed.), *Development Priorities in North East India*, Concept Publishing Company, New Delhi.
- Dutta, P.C. and Mandal, R.K. (2018): *Population, Energy and Biodiversity under Sustainable Development*, Discovery Publishing, New Delhi, p.57.
- Malthus, T. R. (1798): *An Essay on the Principle of Population*, Cambridge University Press.
- Gu Bachang, Wang Feng, Guo Zhigang & Zhang Erli (2007): "China's Local and National Fertility Policies at the End of the Twentieth Century", *Population and Development Review*, , pp. 129-147, Vol.-33, No. 1 , March.

WEBSITES

1. Rosenberg, M. (2007, September 09) : "Thomas Malthus on Population", Retrieved June 20, 2009. from About.com " Geography Web site"
2. "World Population Prospects". United Nations. <http://www.un.org/popin/>. Retrieved 30 November 2011.
3. <http://www.prb.org/Educators/TeachersGuides/HumanPopulation / Population Growth/Question Answer.aspx>. Retrieved 2007-03-31.
4. <https://www.yourarticlelibrary.com/population/5-main-causes-of-population-growth-in-india-explained/43909>
5. Number of Villages Census of India: Number of Villages Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
6. <https://www.oneindia.com/india/why-is-indias-population-so-high-and-how-do-we-deal-with-it-2731672.html>