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Demographic issues and analysis

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Abstract

India has an extremely large population, high population density, and a very high rate of natural increase. As is evident, India needs to lose population rather gain population. According to statistics, if India continues at this rate of population increase, by 2050 India will have a population of around 1,748,000,000. India's high fertility rate of 2.6 percent also does not help the cause as the fertility rate needed to sustain population is roughly 2.1 percent. India should be trying to have a fertility rate below 2.1 percent to relieve India from the negative effects of too much population. With too large an increase of population, percentage of increase and fertility rate, rapid population growth over next few years if no restriction is made it will result in the dwindling of Indian resources, hygiene levels will decrease, epidemics will spread quickly and new epidemics have a greater chance of developing and standards of life, health, and all other aspect of life will greatly plummet. This paper gives some keys associated with demographic issues.

Keywords: birth rate, death rate, migration, emigration.

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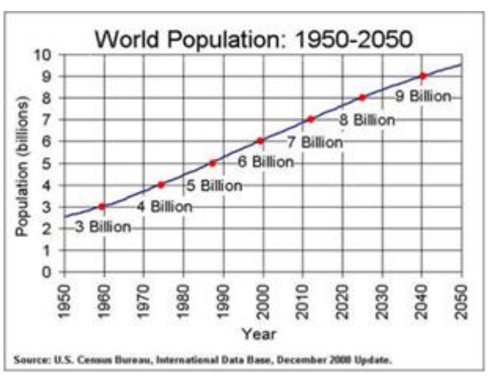
Introduction: Demography is the science of populations. Demographers seek to understand population dynamics by investigating three main demographic processes: birth, migration, and aging (including death). All three of these processes contribute to changes in populations, including how people inhabit the earth, form nations and societies, and develop culture. Today, there is growing interest among the public in demography, as “demographic change” has become the subject of political debates in many developed countries. While demography cannot offer political advice on how to tackle demographic change, demographers seek to describe the phenomena related to this change, and to understand their causes. Using reliable data and the statistical processing of these data, modern demographic research embraces many scientific disciplines, including mathematics, economics.

Demographic analysis uses administrative records on births, deaths, migration, and Medicare to develop an independent estimate of the population. Demographic analysis is a benchmark to evaluate the population figures from the census. First developed in 1955, and later improved through continued research at the Census Bureau and elsewhere, Demographic Analysis estimates are considered to be the standard for judging the completeness of the census count.

Demographic Data sources: The data can be collected by the following methods-population census (measures population stock), vital registration (measures population flow/change), special surveys (usually surveys).



Effects of demographic issues: unemployment, resource utilization, decreased production and increased costs, poverty, illiteracy.

Statistical Analysis:

Geometric and Exponential Population Models:

Objectives:

- Understand the demographic processes that affect population size, including raw birth and death rates, per capita birth and death rates, and rates of immigration and emigration.
- Explore the derivations of geometric (discrete-time) and exponential (continuous-time) models of populations.

The study of population dynamics has been and continues to be an important area of investigation in ecology. The term population dynamics means change in population size (number of individuals) or population density (number of individuals per unit area) over time. In general, population dynamics are influenced by four fundamental demographic processes: birth, death, immigration (individuals moving into the population), and emigration (individuals moving out of the population). We will ignore immigration and emigration so that we may concentrate on births and deaths. For many populations (e.g., the human population of the earth) this is a realistic simplification. Fortunately, the addition of immigration and emigration does not complicate the models very much.

We will begin by developing a model in discrete time. That is, we will treat time as if it moved in steps, rather than continuously. This allows us to use difference equations rather than differential equations, and thereby avoid the calculus. It is also a natural way to work in spreadsheets, and is realistic for many populations that have seasonal, synchronous reproduction. Strictly speaking, the discrete-time model represents geometric population growth. Later, we will develop a continuous-time model, properly called an exponential model. The discrete time geometric model developed in this exercise behaves very much like its continuous-time exponential counterpart, but there are some interesting differences.

Geometric and Exponential Population Models 2 Model Developments:

To begin, we can write a very simple equation expressing the relationship between population size and the four demographic processes. Let

- Pt = population at time "t"
- Po= population at an earlier time "0"
- B = births between time "0" and time "t"
- D = deaths between time "0" and time "t"
- I = immigration between time "0" and time "t"

- O = emigration between time “o” and time “t”
- Population change Pt=Po + B – D + I- O
- Let b =number added per unit time
- B= (Pt-Po)/t

Geometric (Discrete-Time) Model of Population Growth: A per capita rate is a rate per individual; that is, the per capita birth rate is the number of births per individual in the population per unit time, and the per capita death rate is the number of deaths per individual in the population per unit time. Per capita birth rate is easy to understand, and seems a reasonable thing to model because reproduction (giving birth) is something individuals rather than whole populations do. Per capita death rate may seem strange at first; after all, an individual can die only once. But remember, this rate is calculated per unit time. You can think of per capita birth and death rates as each individual’s probability of giving birth or dying in a given unit of time. Keeping in mind that per capita rates are per individual rates, we can translate the raw rates Bt and Dt into per capita rates, which we will represent with lower-case letters (bt and dt) to distinguish them from the raw numbers. To calculate per capita rates, we divide the raw numbers by the population size.

Geometric change-the population changes step by step is

- Pt=Po(1 + rg)^t
- Where rg= geometric rate of growth.

This model is useful for three reasons:

1. It provides a starting point for a more complex and realistic model in which per capita rates of birth and death do change over time.
2. It is a good heuristic model that is, it can lead to insights and learning despite its lack of realism.
3. Many populations do in fact grow as predicted by this model, under certain conditions and for limited periods of time.

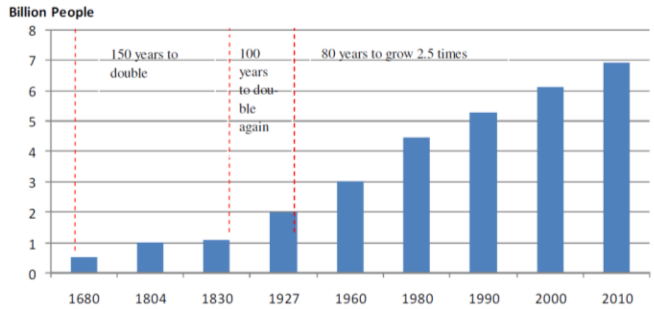


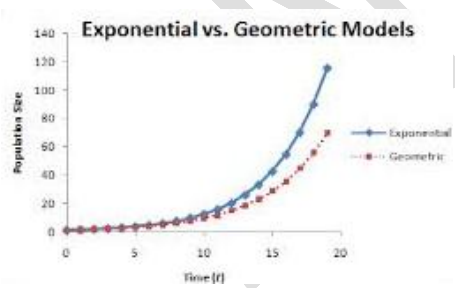
Figure: World population growth – it has been Geometric not Arithmetic

Exponential (Continuous-Time) Model of Population Growth: Population growth can also be modeled in continuous time, which is more realistic for populations that reproduce continuously, rather than seasonally. Continuous-time models also allow use of the calculus, which provides many powerful analytical tools. Exponential change occurs when the growth rate of the value of a mathematical function is proportional to the function's current value. Exponential decay occurs in the same way when the growth rate is negative. In the case of a discrete domain of definition with equal intervals, it is also called **geometric growth** or **geometric decay** (the function values form a geometric progression).

Exponential change-The population changes instantaneously and continuously

- Pt =Po e^rt
- Where r= 1/t ln(Pt\Po).

Relation between rates of change geometric and exponential:



rg=e^r -1

since $\square^{\square} = 1 + \frac{\square}{1!} + \frac{\square^2}{2!} + \frac{\square^3}{3!} + \cdots, \; -\infty < \square < \infty,$ where rg>r.

Measures of population control:

Social measures: minimum age of marriage, raising the status of women, spread of education.

Economic measures: more employment opportunities, development of agriculture and industry, standard of living, urbanization.

Other measures: family planning, use of resources, incentives, recreational facilities.

The following table describes the unemployment percentage of major states and India also.

State	Labor force participation rate(%)	unemployment
Andhapradesh	60.6	7.9
Karnataka	58.2	2.5
Maharastra	49	4.4
Rajasthan	56.2	20.4
India	51.4	9.9

Conclusions: One of the major problem India facing is "Increasing-Population", due to huge population it is also facing some other problems like poverty, illiteracy, unemployment etc. if this continues then India will be still developing country rather developed country. Certain measures should be taken for the welfare of the society, state, country and the whole World. It is the duty of both the individual and government to control the population. By following principles we can overcome the problem of demographic issues.1.securing basic welfare of rights, 2.democracy, 3.improved quality of life, 4.quality services

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