Population growth

- Population growth is often characterized as exponential; that is, it increase (or decrease) by a fixed percentage of the existing total number over a unit period of time.

- Mathematically, this can be expressed as

$$P = P_0 e^{rt}$$

Where:

P = future size of the population

P_0 = current size of the population

t = number of years for the extrapolation

r = assumed constant growth rate for each of the t year (as a fraction)

e = base of natural logarithms

- The growth rate r is usually expressed as a percent increase per year, or

  As the increase in the number of people per 1000 population per year. Currently, the world population growth rate is approximately 1.7 % per year, or 17 people per year per 1000 population.

- For any country, the growth rate of a population is determined by four principal components: birth, deaths, immigration, and emigration. **Growth rate** can be defined by the equation:

$$r = (b - d) + (i - e)$$

where:

b = birth rate

d = death rate

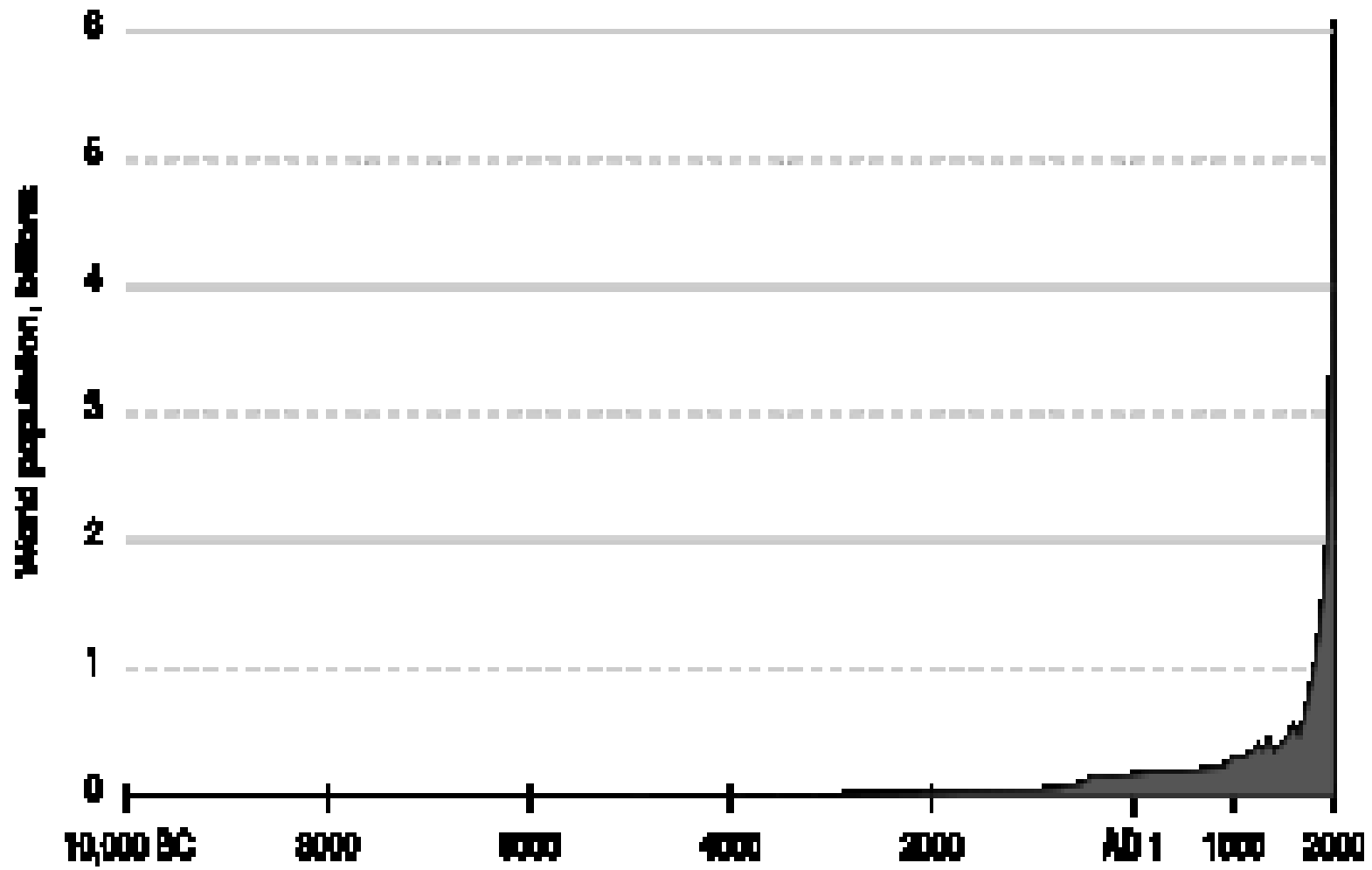i = immigration rate

e = emigration rate

Ancient (non-civilized) era (from evolution to about 9000 BC)

• This refers to the earliest period of human history. Then man was living in jungle (uncivilized) culture and style. They were mainly hunters.

• **Total population ≈** less than one million

• Population density ≈ 1/sq. km

• Average rate of growth ≈ less than 0.0001 % per year.

- **Agriculture developing era (between about 9000 BC to 1600 AD)**
- Man now learnt agricultural practices. The field was cultivated and cops ere grown. It was this era when human population had started increasing. In this regard, the other estimates are as follows:
- Total population ≈ 100 million by 1 A.D.
- Population density ≈ 2 people or more/ sq. km
- Average rate of growth ≈ less than 0.03 % per year.

Era of Industrial revolution (between about 1600 AD to 1950)

- The era was of scientific developments and industrial advances. The industrial revolution had started in full place. New inventions and product manufacturing had started particularly in Europe. People had started realizing the importance of medicine, sanitation, health care etc.

- Advanced methods of agriculture were undertaken leading to increase in production of the food.

- In this human population growth had undergoes a faster rise.

- Total population ≈ 900 million by 1800 AD.

  ≈ 1800 million by 1900 AD

  ≈ 3 billion by 1960

- Average growth rate ≈ 0.1 % year by 1600 AD

  ≈ 2 % per year by 1950 AD

- Modern industrial era (from about 1950 AD till date)
- Total population ≈ 6.215 billion by the middle of 2002 AD
- Average rate of growth ≈ 1.3 % in 2000 AD
- **Futuristic projection**
- Total population is likely to be ≈ 8 billion by the year 2025
- Contribution of developing countries in increasing the world population is ≈ 95 %.

Population growth

- Population growth rate in India is 1.7 % against the growth rate of 1.3 % in the world population.

- Population of India in 1921 was about 25 crores.

- It was 84 crores in 1991, and 102.7 crores in 2001.

- It is likely to cross 128 crores mark in 2021.

Variation among nations: Variation of population among different countries:

Courtiers of the same continent	Population (in million)	Countries of other Continent	Population (in million)
Asia:			
China	1285.0 *	USA	285.9
India	1025.1	Brazil	172.6
Indonesia	214.8	Russia	144.7
Pakistan	145.0	Mexico	100.4
Bangladesh	140.4	Nigeria	116.9
Japan	127.3	Germany	82.0
* China's population is (≈ 20 % of world population) and (≈ 33 % of Asian population)			

15th Indian National census

- The 15th Indian National census began on May 1, 2010.

- Census has been conducted in India since 1872 and 2011 marks the first time biometric information was collected.

- The census was conducted in two phases. According to the provisional reports released on March 31, 2011, the Indian population **increased to 1.21 billion** with a decadal **growth of 17.64%.** Adult literacy rate increased to 74.04% with a decadal growth of 9.21%.

Scope and process

- **2.7 million officials** visited households in about **7,000 towns and 600,000 villages,** classifying the population according to gender, religion, education and occupation.
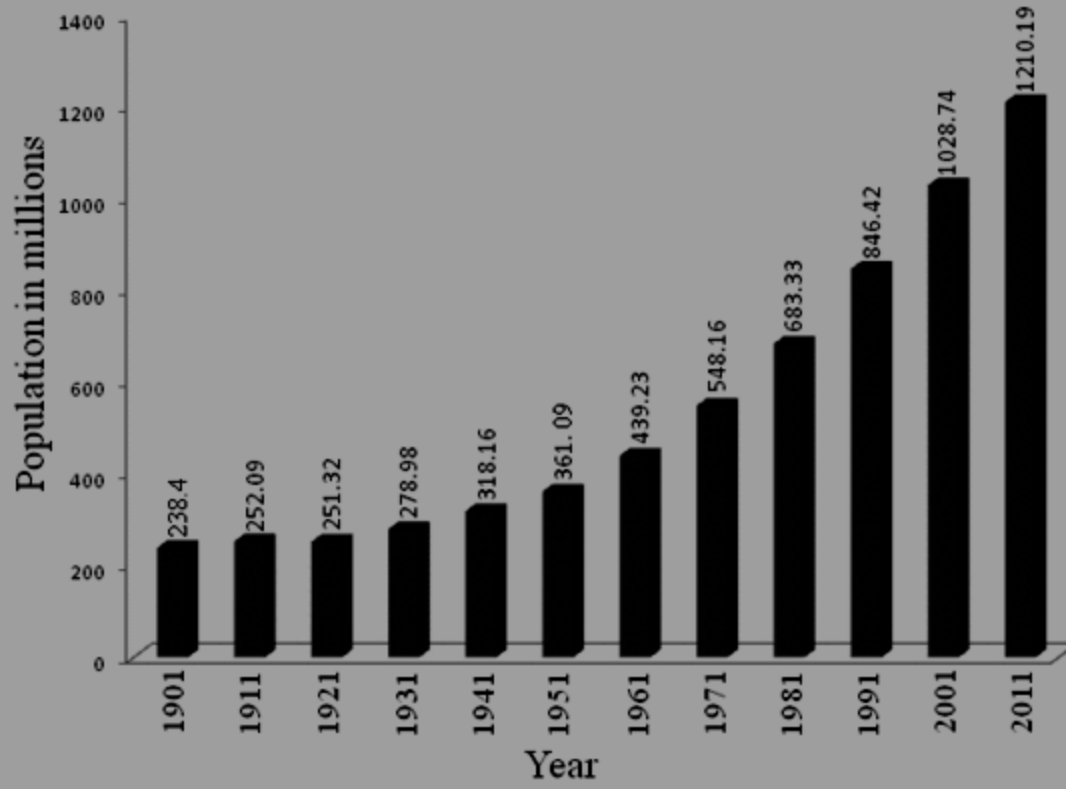
Census report

Provisional data from the census was released on March
be released in 2012.[4]

Population	Total	1,210,193,422
	Males	623,724,248
	Females	586,469,174
Literacy	Total	74.04%
	Males	82.14%
	Females	65.46%
Density of population	per sq. km	382
Sex ratio	per 1000 males	940 females

- **Population**
- The population of India at 0:00 hours of 1st March, 2011 was 1,210,193,422.

- It added 181 million to its population since 2001, slightly lower than the population of **Brazil.**
- India with 2.4% of the world's surface area accounts for 17.5 % of its population.
- **Uttar Pradesh** is the most populous state with roughly 200 million people.
- A little more than 6 out of every 10 Indians live in **Uttar Pradesh**, **Maharashtra**, **Bihar**, **Andhra Pradesh**, **West Bengal**, **Madhya Pradesh** and **Tamil Nadu.**

Automobile Pollution

• Population of car in world in Jan, 2000--- More than 40 Crore

•Population of other automobile (Jan, 2000)---- more than 16 Crore

•Population of automobiles in India (Jan, 2000)--- about 4 Crore

•Population density of cars / 100 person in 1999 are:

             USA = 54

             Japan = 28

             India = 04