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Human population and environment

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Abstract
Due to huge number of human beings, drying of fossil fuels, overgrazing of pastures, increasing pollution parallel to industrial growth, reduction in the number of sea fish, larger ozone holes, global warming, rising sea level, famines etc. will create unrest and eventually make countries go to war. Thus, the increase in population is putting an unwanted pressure on nature and on limited natural resources. In this paper, to highlight this very alarming nature of environmental problems, some features of human population – density of population, life expectancy, rural-urban population, and urban poverty – are studied and tabulated with environmental issues. It is suggested that unless we do not control population the problem of environment cannot be solved. Thus, this is the need of the hour that we spread maximum awareness about environmental issues, guide people about the use of eco-friendly technologies and collectively promote sustainable use of natural resources for the sustaining of human life on this beautiful planet.

Keywords: density, life expectancy, rural-urban population, urban poverty, environment

1. Introduction
Our global human population, 6.9 billion at present, will cross the 8 billion mark by 2050. The needs of this huge number of human beings cannot be supported by the Earth's natural resources. In the near future, fossil fuel from oil fields will run dry. It will be impossible to meet the demands for food from existing agro systems. Pastures will be overgrazed by domestic animals and industrial growth will create ever-greater problems due to pollution of soil, water and air. Seas will not have enough fish. Larger ozone holes will develop due to the discharge of industrial chemicals into the atmosphere, which will affect human health. Global warming due to industrial gases will lead to a rise in sea levels and flood all low-lying areas, submerging coastal agriculture as well as towns and cities. Water 'famines' due to the depletion of fresh water, will create unrest and eventually make countries go to war. The control over regional biological diversity, which is vital for producing new medicinal and industrial products, will lead to a grave economic conflicts between biotechnologically advanced nations and the bio-rich countries. Degradation of ecosystems will lead to extinction of thousands of species, destabilizing natural ecosystems of great value. These are only some of the environmental problems related to an increasing human population and more intensive use of resources that we are likely to face in future. These affects can be averted by creating a mass environmental awareness movement that will bring about a change in people's way of life (UGC, 2013).
The main aim of this paper is to show the growth of population in the world and particularly in India. The features of population in India are explained and these features are analyzed in context to the environmental problems. At the end, some concluding suggestions are also made on the basis of the analysis. The paper is divided into four sections. Second section shows the size of human population in this world. In third section four features of human population are explained and these features are analyzed in context to the environmental issues and final section concludes. Some suggestions and recommendations are also made in this section.

2. Size and growth of global population
Average annual growth rate of world population is 1.2 per cent from the year 2000 to 2010. As in the Table 1, the population of the world in 1 A.D. was 170 million, which became 265 million in 1000 A.D., then increased to 6,080 million in 2000 and finally reaches to 6,855 million in 2010. In 2010 out of 6,855 million people, 817 million people live in low income countries (LIC), 2,467 million people live in lower middle income countries (LMC), 2,449 million people live in upper middle income countries (UMC) and 1,123 million people live in high income countries (HIC) as shown in Figure 1. Low income countries, lower middle income countries, upper middle income countries and high income countries are defined by World Bank as the countries whose per capita gross national income in the year 2010 is less than $1,005,

$1,006-$3,975, $3,976-$12,275 and more than $12,276 respectively. At all, it can be said that 16.38 per cent population of this world live in developed countries like, Australia, Canada, France, Germany, Japan, New Zealand, Oman, United Kingdom, United States etc. whereas 83.62 per cent population live in underdeveloped and developing countries like, Brazil, China, Ethiopia, India, Malaysia, Pakistan, Tanzania, Thailand etc. Poverty and inequality in income is also a cause of biodiversity loss.

Table 1: Size of Population from year 1A.D. to present (in millions)

Year	Population (Number in Millions)
0001	170
1000	265
1500	425
1900	1,625
1950	2,516
1990	5,292
2000	6,080
2008	6,692
2010	6,855

Source: Kremer (1993); World Bank (2012).

2.1 Size of Population in Top 10 Most Populated Countries

Size of population of top 10 most populated countries of the world is shown in the Table 2. It is clear in the Table 2 that out of top 10 most populated countries of the world only two countries, United States and Japan, are High Income Countries. On the other side, eight countries are Middle Income Countries and Low Income Countries.

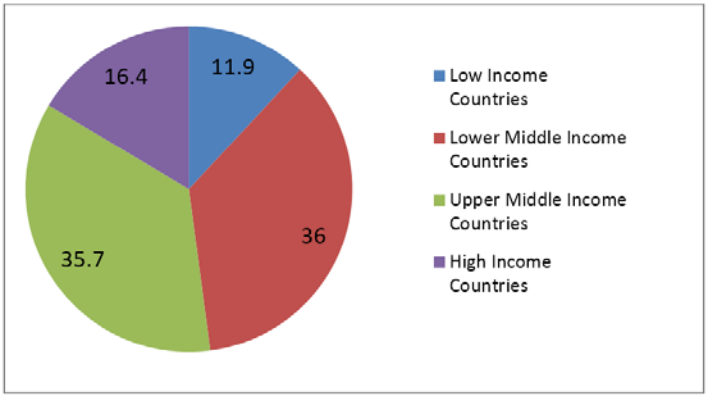

Fig 1: Per Cent of Population Living in Low, Middle and High Income Countries

Source: World Bank (2012).

2.2 Size and Growth of Population in India

India comes next only to China as regards the size of its population. India's population increased rapidly in the post-independence period. Since 1951 population has been increasing constantly. Between 1971-81, growth rate of population was 24.8 per cent and between 1981-91 it was 23.8 per cent. The population of India was estimated to 102.9 crore in 2001 which increased to 121.02 crore in 2011. First census in India took place in 1891. Size and growth of population in India from 1891 to 2011 is shown in Table 3 and Figure 3.

Table 2: Size of Population with their GNI Per Capita in Top Ten Most Populated Countries of the World in 2010

Country	Population in 2010 (millions)	GNI Per Capita in 2010 (US $)	Category
China	1,338	4,260	UMC
India	1,771	1,340	LMC
United states	310	47,140	HIC
Indonesia	233	2,580	LMC
Brazil	195	9,390	UMC
Pakistan	173	1,050	LMC
Bangladesh	164	640	LIC
Nigeria	158	1,180	LMC
Russian Federation	142	9,910	UMC
Japan	127	42,150	HIC

Source: World Bank (2012).

Table 3: Size and Growth of Population in India from 1891 to 2011.

Year	Population (in crore)	Increase in Population (in crore)
1891	23.87	---
1921	25.13	1.26
1931	27.90	2.77
1941	31.87	3.97
1951	36.11	4.24
1961	43.92	7.81
1971	54.82	10.90
1981	68.33	13.51
1991	84.63	16.30
2001	102.90	18.27
2011	121.02	18.12

Source: Census of India (2011).

The growth of population of India is classified into three periods:

(i) Period of Stable Population (1891 to 1921): Between 1891 and 1921 rate of growth of population in India was slow. In these 30 years, population increased by 1.26 crore. It was so because in these years, calamities and epidemics, like famines, plague, malaria etc. took a heavy toll of human lives.

(ii) Period of Growth of Population (1921 to 1951): Since 1921, population has been increasing at a rapid rate. The trend of growth of population in India since 1921 has been consistently on the rise. That is why Census Commissioner has referred to the year 1921 as "Year of Great Divide". This increase was higher than that of the previous thirty years.

(iii) Period of Population Explosion (1951 to 1981): In this period population increased at a very fast rate.

(iv) Period of High Growth but with Signs of Slowing Down (1981 to 2011): In this period, birth rate has started slowing down. But because of fall in death rate, population growth rate has not shown much decline.

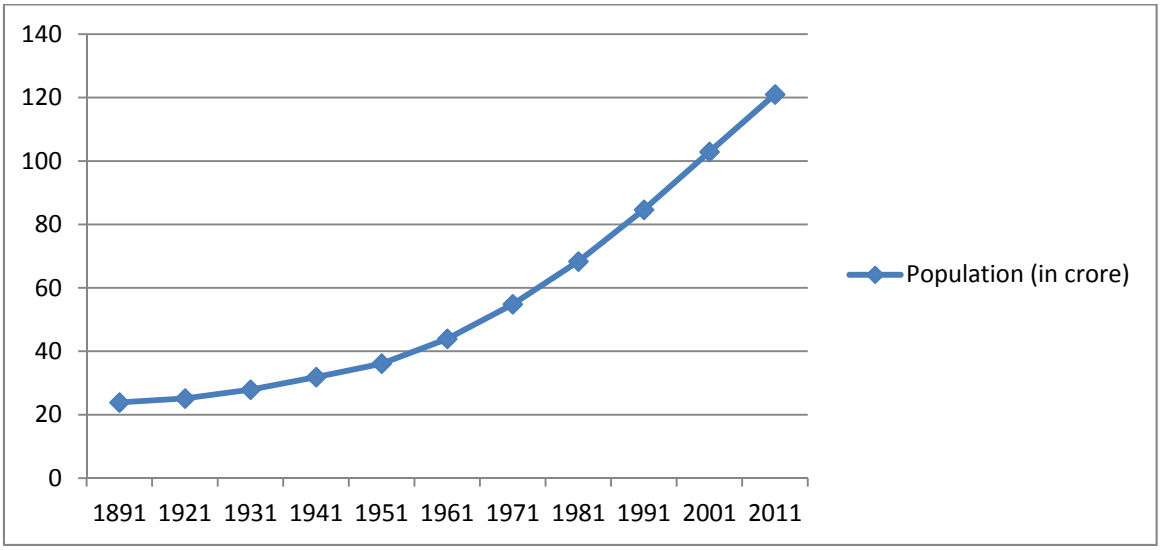

Fig 3: Size of Population in India from 1891 to 2011

Source: Census of India (2011).

Thus, it can be said that population of India is very high and it is also increasing at an alarming rate. This population size of the world is creating a pressure on the global natural resources and one of the most important reasons of environmental problems. In the second section of this paper four of the features of human population are explained and then each feature is analyzed in context to the environmental problems.

3. Features of population and environmental problems

Everybody knows that the increase in population is putting an unwanted pressure on nature and on limited natural resources. Land size is limited and rather declining, forest areas are being converted into concrete areas, ice caps are melting, sea level is rising and so on. Now the question is whether every type of human being is responsible for environmental loss. To study this very nature of human beings some features of human population are studied and tabulated with environmental issues in the following paragraphs.

(i) Density of Human Population: Density of population refers to average number of people living per square kilometre. Density of population in a country is measured by dividing its total population by total area in square kilometer. As per World Development Report, 2012 density of population of the World in the year 2009 is 52. Table 4 shows the density of population of top 10 countries.

Table 4: Top 10 Countries with Highest Density of Population

Country	Density of Population (2009)	Category
Singapore	7,125	HIC
Bangladesh	1,246	LIC
Netherlands	490	HIC
Lebanon	413	UMC
Rwanda	405	LIC
India	389	LMC
Haiti	364	LIC
Belgium	356	HIC
Japan	350	HIC
Israel	344	HIC

Source: World Bank (2012).

In Table 4, it is shown that in case of density the number of high income countries is five. This is because the density of population is independent from economic development of the country. Density of population of Germany is 235 and of United Kingdom it is 256 and these countries are economically rich. On the other hand, density of population of United States of America is 34 and of Canada is 4 and these countries are also economically prosperous. On the contrary, density of population of Afghanistan is 46 and that of Burkina Faso it is 58 but these countries are economically poor. On the other hand, density of population of Bangladesh is 1,246 and that of Rwanda it is 405 and these countries are also poor. It is very interesting that because of its vast land area most populated country of the world, China, has no place in top 10 countries with highest density of population. The density of population in China is 143 in the year 2009.

Density of population in India has been increasing continuously. It implies that availability of land per person has been falling. In 2011, density of India's population was 382 per square kilometer. Continuous increase in the density of population in India is shown in Table 5.

Table 5: Density of Population in India from 1951 to 2011

Year	Density of Population
1951	117
1961	142
1971	177
1981	216
1991	274
2001	324
2011	382

Source: Census of India (2011).

Rapid rate of population growth gives rise to food problem in underdeveloped countries. Rise in the rate of food production is less than the rise in the rate of population growth. Per capita availability of foodgrains goes on falling. On account of low per capita availability of food, people do not get sufficient nutritive diet. It tells upon their health and their productivity falls. Fall in productivity means low per capita income and hence poverty. To meet their food shortage, underdeveloped countries are compelled to import foodgrains. Thus, a large part of foreign exchange and foreign capital is spent on the import of foodgrains. Acute shortage of foodgrains is felt for the import of heavy machines and raw materials which are badly needed for economic growth.

With increase in population, supply of labour also increases correspondingly. But due to lack of capital resources in an underdeveloped country, it becomes difficult to provide gainful employment to all working population. Unemployed

persons go to areas which are sensitive from the viewpoint of environment. For example, hilly regions and thick forests are used for the purposes of living. They cut the forests for cultivation and thus pose a danger to the environment.

(ii) Life Expectancy: Expectation of life refers to the average life of the people of a country. In World expectation of life of the people is 69.8 years. In some countries of the World life expectancy is more than that of the global life expectancy. For instance, in Japan 82 years, in Australia it is 81.9 years, in Sweden 81 years, in Canada 80 years, in America 78 years, in England 77 years, in Sri Lanka 74.9 years and in China 73.5 years. In India expectation of life of the people is very short but rising. It has improved, as a result of planned efforts, from 33.0 years in 1951 to 65.4 years in 2011. Average life expectancy in India is shown in Table 6.

Table 6: Life Expectancy in India from 1951 to 2011

Year	Life Expectancy (Years)
1951	33.0
1961	41.0
1971	52.0
1981	54.0
1991	59.0
2001	64.0
2011	65.4

Source: Census of India (2011).

As for as human health is concerned it is a matter of pride that average life is increasing. On the other hand it also means that more people will live on this planet for a long time, again a harm to the nature and scarce natural resources. It looks somewhat difficult to justify this above statement but it is a fact that man has became a most dangerous animal to exploit natural resources for his own greed. Thus, for a healthy living life he should change his living styles as are recommended in the last section of this paper.

(iii) Rural-Urban Population: Ratio of urban population to the total population of a country is an index of the industrialization of that country. As industries gather momentum in a country, ratio of urban population goes on rising. In 1975 only 27 per cent of the people in the developing world lived in urban areas. By 2000 this had gone to 40 per cent and by 2030 well informed estimates state that this will grow to 56 per cent. For instance, in India in 1961, 17.3 per cent population was in urban areas but now in 2011 this figure increased to 31.2 per cent as shown in Table 7.

Table 7: Per Cent of Rural and Urban Population in India from 1951 to 2011

Year	Ratio of Rural Population (%)	Ratio of Urban Population (%)
1951	82.7	10.8
1961	82.0	17.3
1971	80.1	18.0
1981	76.7	19.9
1991	74.3	23.3
2001	72.2	25.7
2011	68.8	31.2

Source: Census of India (2011).

Two main causes of rise in urban population in India are migration effect and attraction effect. Rural life in India suffers from many difficulties, such as, less opportunities of employment, low level of income, lack of educational and training facilities, lack of health and medical facilities etc. In order to get rid of these difficulties rural people migrate to urban areas. Also, urban living has its own attraction, such as educational, medical and health facilities, job opportunities, development of railways, recreation centres, restaurants and parks etc. Rural people are very much tempted by these allurements and decide to settle in towns and cities. According to a report by National Sample Survey, main cause of rural male to migrate to urban areas is employment and rural female is wedding ties. The developed world is already highly urbanized with 75 per cent of its population living in the urban sector.

With a view to making optimum use of resources and generating employment opportunities, decentralization of industries is very essential. Besides, to avoid the evil effects of urban living, it is necessary that more and more civic amenities like electricity, roads, education, medical and health facilities should be provided at the rural level. Agriculture should be made more progressive and small industries should be developed in the villages. This will halt the tendency to migrate to urban areas. The government has realized this fact in every developing country and has been taking necessary measures to check migration to big towns and cities. With this end in view, villages are being developed.

As for as economic development is concerned the above logic seems to be very very relevant but it should be kept in the mind that as a village grows as a town, and as a town grows into a city it not only spreads outwards into the surrounding agricultural land or natural areas such as forests, grasslands and wetlands but also grows skywards with high rise air tight buildings. The village and town also lose their open spaces and green cover unless these are consciously preserved. This destroys the quality of life in the urban area.

(iv) Urban Poverty: The number of poor people living in urban areas is rapidly increasing. A third of the poor people in the world live in urban centers. These people live in hutments in urban slums and suffered from water shortages and unsanitary conditions. In most cases while a slum invariably has unhygienic surroundings, the dwellings themselves are kept relatively clean. It is the 'common' areas used by the community that lacks the infrastructure to maintain a hygienic environment. During the 1990s countries that have experienced an economic crisis have found that poor urban dwellers have lost their jobs due to decreasing demands for goods, while food prices have risen. Well paid and consistent jobs are not as easily available in the urban centers at present as in the past few decades.

One billion urban people in the world live in inadequate housing, mostly in slum areas, the majority of which are temporary structures. However, low income groups that live in high rise buildings can also have high densities and live in poor unhygienic conditions in certain areas of cities. Illegal slums often develop on Government land, along railway tracks, on hill slopes, riverbanks, marshes, etc. that are unsuitable for formal urban development. On the riverbanks floods can render these poor people homeless. Adequate legal housing for the urban poor remains a serious environmental concern.

Urban poverty is even more serious than rural poverty, as unlike the rural sector, the urban poor have no direct access to natural resources such as relatively clean river water, fuelwood and non wood forest products. The urban poor can only depend on cash to buy the goods they need, while in the rural sector they can grow a substantial part of their own food. Living conditions for the urban poor are frequently worse than

for rural poor. Both outdoor and indoor air pollution due to high levels of particulate matter and sulphur dioxide from industrial and vehicle emissions lead to high death rates from respiratory diseases. Most efforts are targeted at outdoor air pollution. Indoor air pollution due to the use of fuel wood, waste material, coal, etc. in 'chulas' is a major health issue. This can be reduced by using better designed smokeless' chulas, hoods and chimneys to remove indoor smoke.

With the growing urban population, a new crisis of unimaginable proportions will develop in the next few years. Crime rates, terrorism, unemployment, and serious environmental health related issues can be expected to escalate. This can only be altered by stabilizing population growth on a war footing (UGC, 2013).

3.1 Environmental Issues and Human Health

Environment related issues that affect our health have been one of the most important triggers that have led to creating an increasing awareness of the need for better environmental management. Changes in our environment induced by human activities in nearly every sphere of life have had an influence on the pattern of our health. The assumption that human progress is through economic growth is not necessarily true. We expect urbanization and industrialization to bring in prosperity, but on the down side, it leads to diseases related to overcrowding and an inadequate quality of drinking water, resulting in an increase in waterborne diseases such as infective diarrhoea and air borne bacterial diseases such as tuberculosis. High-density city traffic leads to an increase in respiratory diseases like asthma. Agricultural pesticides that enhanced food supplies during the green revolution have affected both the farm worker and all of us who consume the produce. Modern medicine promised to solve many health problems, especially associated with infectious diseases through antibiotics, but bacteria found ways to develop resistant strains, frequently even changing their behaviour in the process, making it necessary to keep on creating newer antibiotics. Many drugs have been found to have serious side effects. At times the cure is as damaging as the disease process itself. Thus development has created several long-term health problems. While better health care has led to longer life spans, coupled with a lowered infant mortality, it has also led to an unprecedented growth in our population which has negative implications on environmental quality. A better health status of society will bring about a better way of life only if it is coupled with stabilising population.

4. Conclusion and suggestions

In this way it is concluded that size and growth of population is a major cause of environmental problems. On the sake of economic development the scientists are making advanced to advanced technologies without thinking its long term environmental effects. Because of rise in population some of the species of animals and birds are becoming extinct or they displace from one place to another place. Species are also forcibly transformed from one place to another place when people travel from one country or place to another country or place. Air tightness of buildings in so called apartments are creating many health problems. Because of rise in human population deforestation is going on at a massive scale. Single roads are made two lanes, two lanes are converted into four lanes and four lanes are converted into six or eight lanes and trees are axed in lakhs and crores of numbers. With deforestation pollinators are declining which are very useful for agricultural crops. Ecological footprint shows that in India with human population 1164.67 million the demand for ecological footprint is 0.91 gha/per but the biocapacity that is generation is only 0.51 gha/per. Human population is also one of the main reasons of rise in carbon dioxide. Charles D. Keeling curve shows this rise in carbon dioxide. More human population means pilgrimage people are also rising. When these people go for their so called *tirath yatras* they pollute the ecological resources like the holy river Ganga. Prof. James (USA) said that 90 per cent of mankind will be wiped out if the heating of climate will not stop. Are the human beings waiting for that day?

If we cannot reduce population then we should enhance consciousness and we should try to understand the definition of happiness. It is in discussion in these days especially in economically developed nations that what is the definition of well being. Is it objective well being or subjective well being? A latest survey states that people are more happy in Bangladesh rather than in developed nations. If we understand the true meaning of happiness then from now immediately we should change our lifestyle which should be based on a sustainable development not on short term development. Everyone needs to keep informed about what is happening with the environment and population. Things are changing fast. Some types of information several years old are no longer valid. Population numbers and the trends of family size and population change rapidly. The status of the resources in the world are changeable, especially food production, forest cover, cropland, and degrees of hunger and famines. Local environmental and population problems change. There will be an increased demand for forest products and for conversion of cropland into other uses. Our wildlife ecosystems must be protected for watershed and to prevent soil erosion. We also need them for wildlife enjoyment and survival of species on whose well-being and interrelatedness we depend. Local programs to recycle, reduce and reuse are essential for two reasons: they lower the consumption of resources, and they teach everyone that resources are limited. It is a constant reminder by Scott Miller that environmentally we are overpopulated. Globally, the importance of small families cannot be exaggerated. There is no way to get people out of poverty and for women to gain economic and social status in developing countries unless the population is reduced through voluntary reduction of family size. Attempts to improve living conditions are constantly being erased by the increase of population.

Finally, it is suggested that unless we do not control population the problem of environment cannot be solved. Thus, this is the need of the hour that we spread maximum awareness about environmental issues, guide people about the use of eco friendly technologies and collectively promote sustainable use of natural resources for the sustaining of human life on this beautiful planet.

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