



## Population Growth, Environmental Degradation and Human Health: A Perspective from the State of Arunachal Pradesh, India

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### Abstract

As the human population doubles every few decades, so its impact on the environment increases at a faster rate. Humans cannot escape the decree of population growth; when population increases, the resources required for its sustenance also increases, therefore human has made a remarkable impact on the environment primarily through the use of natural resources and production of wastes. This paper examines the impact of population growth in one of frontier states of north-east India, i.e. Arunachal Pradesh on the environment and the attendant result on human health. Rapid growth of human population has been identified as underlying environmental problems in the state. The paper recommends measures to limit rapidly growing population as well as strategies to reduce the negative impact of human activities on the environment.

**Keywords:** Arunachal Pradesh; Population Growth; Environment; Degradation; Health.

### Prologue

The generic concept of population has traditionally been used as a highly abstract view of a phenomenon comprising recognizable individual elements and concerned with highly general aspect of the distribution and change. This paper however focuses on the human population which differ from plant and animal in a number of ways, particularly in its ability to make remarkable impact on the environment through her activities. Therefore, the term population in demographic usage refers to the total number of people resident in a particular area at a particular time. Population growth on the other hand simply refers to addition to or subtraction from the existing population through the interaction of the three elements of population change namely- Birth, Death and Migration.

According to 2011 Population Census, Arunachal Pradesh has a total population of over 13.82 Lakh people which is approximately 0.11% of total Indian Population and a growth rate of 25.92%. This remarkable growth in human population has caused much concern especially about the strains it places on the resources of the environment and the quality of people's lives.

Population is a major source of Environmental degradation which impacts primarily on the environment through the use of natural resources and production of waste and is associated with environmental stress such as reduction of ecosystem complexity, loss of biodiversity and the alteration of the all-important biogeochemical cycle (Asthana & Asthana, 2006).

Environmental degradation in Arunachal Pradesh results from factors such as economic growth, population growth, urbanization, intensification of Agriculture, rising energy use and transportation. It is therefore safe to conclude that environmental changes in Arunachal Pradesh are a result of the dynamic interplay of socio-economic, institution and technological activities.

Human health and wellbeing is appreciably affected by the environment. Asthana and Asthana (2006) asserted that Malnutrition and diseases caused by contaminated environment, human wastes, and airborne diseases form the core of the disease pattern of the developing world. That is to say that contaminated environment due to human activities has resulted in several cases of ill-health, morbidity and shortening of lifespan. Hence, this paper examines population growth and its attendant impact on human health and total wellbeing with particular reference to the Indian state of Arunachal Pradesh.

### Conceptual Outline

This paper will rest on two basic conceptual frameworks namely that of the demographic transition theory and the concept of ecosystem.

The demographic transition theory has been described as the theory of reduced growth rate through development (Fellmann, Getis and Getis, 2005). This theory traces the levels of human fertility and mortality presumably associated with industrialization and Urbanization. Over time the model assumes that high birth and death rate will gradually be replaced by low rates.

The theory has four stages; the first stage of the demographic transition model is characterized by high birth rate and high but fluctuating death rate. The second stage states that death rate drops due to improved sanitation and control of infectious diseases but Birth remains high, thus there is a rapid increase in numbers. For the third stage, birth rate decline as a result of improved education which led to better standard of living and improvement in the adoption of family planning methods, therefore population growth is less rapid. The fourth stage is marked by low birth and death rates and, consequently, by a low rate of natural increase or by decrease, if death should exceed those of births (Fellman, Getis and Getis 2005).

It becomes necessary to point out that Arunachal Pradesh which is currently in stage three o to experience increase in human population far into the future due to effect of past high fertility. The negative impact of human activity on the environment is inevitably the result of increase in human population.

### **Concept of Ecosystem**

The ecosystem is a complex system in which interaction between the different components of the environment occurs. It refers to any spatial unit which includes the living and non-living constituent interacting with each other and producing an exchange of materials between the two (Asthana and Asthana, 2006).

The non-living or abiotic component of an ecosystem are mineral nutrients, temperature, light, water and air etc. while the living component of the ecosystem is made up of population of different organisms which occurs in the system.

In the ecosystem, green plants alone are able to trap solar energy. The transfer of energy from green plant through series of organisms which consumes food energy and in turn are themselves consumed, constitute the food chain.

However this natural flow of energy in the ecosystem is being disrupted through increase in human activities which is as a result of increase in human population. It is the argument of this paper that the growth of human population impacts on the ecosystem negatively.

### **Population Growth Trend in Arunachal Pradesh**

The growth of population in an area reflects the history of the people's responses to the environmental possibilities within the area. Population growth refers to the numerical change in the size of a region's population between two periods. The rate of growth is usually expressed in percentage.

Arunachal Pradesh's demographic history reveals that, from a population of 3,36,558 persons in 1961, the state's population rose to 10,97,968 in 2001, more than thrice the 1961 within 40 years. In 2011, Arunachal Pradesh recorded a total population figure 1,382,611 comprising of 720,232 males and 662,379 females. This translates in decadal growth rate of 25.92% percent over 2001 census figure. The sustained population increase as illustrated above raised challenges which should be taken seriously given the difficult environment and decaying facilities provided for the rising numbers.

### **Reason for the Population Growth in Arunachal Pradesh**

The rapid population growth in Arunachal Pradesh result from an inter-play of many factors over the years, the death has been declining. Today the infant mortality rate is 77/1000 live births (Census of India, 2001). The outcome of this combination is the large natural increase in the population. Some of the reasons advance to explain the low mortality rate include improved agriculture and enhanced food security, better nutrition, improvement in general sanitation among the people and better medical care and the scientific breakthrough in techniques for controlling infectious diseases.

Of particular importance are the place of vaccination, immunization and the use of insecticides to subdue mosquitoes and other insect vectors. The disastrous effect of wars, famines and other natural disasters have greatly been curtailed due to international co-operation and improved transportation and information technology, coupled with the impact of industrialization that has added to the range of consumable and capital goods available for use.

### **The Human Population as a Source of Environmental Degradation**

The human population issue is the underlying issue of the environment, because most current environmental damages from the very large number of people on the earth, ultimately we cannot expect to solve the problem of environmental degradation without first limiting the total number of people on the earth to the amount the earth can sustain (Botkin and Keller, 1998).

Asthana and Asthana (2006) described the impact of human being on the environment under two broad subheadings-

- I. Reduction in ecosystem complexity and diversity.
- II. Changes in Biogeochemical cycles.

#### **I. Reduction in Ecosystem Complexity and Diversity**

Man has been over simplifying the structural component and diversities which occur in undisturbed natural ecosystem. Through agriculture and other human establishment, Man has been able to alter the flora and fauna over a large surface area. The complicated many tiered tropic structure of a natural system is reduced to two link; primary producer and man.

Also man tends to over simplify the microbial community present in soil bodies through the use of chemical fertilizers and intensive agriculture leading to depletion of organic materials on which microbial population depend for nutrition while insecticides washed down into water and the soil kill susceptible organism directly.

Man has also affected the diversity of animal by taking few species, domesticated and protected them to form a huge population. Those species which are left out are finding it difficult to cope with stress imposed by human activities. A number of plant and animal have become extinct or at the verge of extinction due to over simplification of the ecosystem.

#### **II. Changes in Biogeochemical Cycles**

The complete pathway through which chemical elements flows in the earth system is called the biogeochemical cycle. Ruthless exploitation and pollution of the environment has disturbed the operation of the all important biogeochemical cycle (Botkin and Keller, 1998). Examples of this cycle include; the carbon cycle, oxygen cycle, the phosphorus cycle, nitrogen cycle, the sulphur cycle and the cycles of other trace element. Taking the carbon cycle as a case study, Carbon occurs as carbon dioxide in the atmosphere, as organic compounds in plants and animal bodies, in coal and petroleum deposits and as inorganic carbonate in water rocks, shells and testes etc. Human activity has led to an

enhanced rate of input of carbon into atmosphere, which has caused a measurable rise in the concentration of atmospheric carbon dioxide. This is due to increased use of organic matter, coal, petroleum and natural gas as fuel and the combustion of carbonate rocks for the manufacture of cement and lime (Asthana & Asthana 2006).

While a small rise in the concentration of carbon dioxide in the atmosphere may have no effect on plants and animal, a high concentration of carbon dioxide in the atmosphere acts like a big blanket around the globe which obstructs loss of heat from earth surface, it will cause an effect like that of a green house in which the glass enclosed space gets heated up due to its insulation from outside environment. This effect is referred to as glass house effect or simply as global warming.

Changes in the concentration of other elements such oxygen, nitrogen, phosphorus etc. in difference to the naturally required concentration has lead to one harm or the other in the environment which either directly or indirectly affect the human health.

### **The Degraded Environment and Human Health in Arunachal Pradesh**

The three components of the environment which include the Atmosphere (Air), the Hydrosphere (water) and the Lithosphere (Land) play very important roles in the survival of man. Therefore the desecration of these spheres of life impacts negatively on human health. Taking water as a case study, Guinness and Nagle (2002) opined that the world's fresh waters are closely linked to human health. They further stated that 25,000 people die every day because of poor water quality. Over 1,700 million people lack clean water, over 1200 million lack proper sanitation, 3 million people die of diarrhoea each year and 200 million people suffer from schistosomiasis each year.

As in many other states of India, water pollution in Arunachal Pradesh results from urbanization, industrialization, intensification of agriculture etc. There is a wide spread pollution by sewage, nutrient, toxic metal, industrial and agricultural chemicals as well as domestic sewages.

The land component of the environment is not left out. As the population of the state increase and agriculture developed, the human impact on land is accelerated as natural vegetation is being destroyed and replaced with cultivated species. The impact of agricultural development on the environment includes activities which contribute to soil erosion, land salinization and loss of nutrients.

The third component of the environment which is the Air has two sources of pollutants i.e. the natural as well as the human related sources. However, it is the human component that is most abundant in urban area and that leads to the most severe air pollution problem for human health. These air pollutants includes those from smokestacks of industries at industrial sites, agricultural areas sprayed with insecticides and herbicides as well as these trucks, buses, and other form of vehicles (Smith and Enger, 2004).

Air pollutants affect the human health in various ways, for instance sulphur oxide (So<sub>2</sub>) causes severe damage to human and other animal lungs. Nitrogen oxides cause irritation of eyes, nose, throat, and lungs, increases susceptibility to viral infection, including influenza (which can cause bronchitis and pneumonia).

Also carbon monoxide is a very toxic air pollutant. Carbon monoxide and haemoglobin in the blood have very high natural attraction for one another. Haemoglobin in human blood will take up carbon monoxide nearly 250 times more rapidly than it will by oxygen. Many people and sometimes a whole family have been accidentally suffocated by carbon monoxide produced from incomplete combustion of fuels in campers, tents and houses.

### **The Way Ahead**

Having established a link between human population and a degraded environment as well highlighting the effect a degraded environment on the human health, it becomes necessary to suggest a way out so as to achieve a sustainable environment in the state of Arunachal Pradesh.

Underlying every environmental problem is the issue of human population growth. Therefore, any attempt to solve this problem must start by addressing issue of rapid population growth in Arunachal Pradesh. This paper hereby suggests that:

- i. The simplest and one of the most effective means of controlling population growth in Arunachal Pradesh is to delay the age of first childbearing. Women should be encouraged to be educated; this will make the delay to occur naturally.
- ii. Family planning is another effective means of regulating birth. Awareness campaign should be intensified in the state (Family Care International 1994; Population Report 2002). National policy on population can also be reviewed to assign a particular number of children to a couple and not just to a woman.
- iii. Improving the economic status of women would lead to improved financial standing which could allow them have fewer children (WHO, 1998).
- iv. As to solve the problem of environmental degradation, it is suggested that alternative source of energy should be developed to reduce the risk posed by use of hydrocarbon as fuel.
- v. Environmental education should be encouraged. People need to be thought how to use the resources of the environment without causing damage to the environment. This can be achieved through media publication and other means of creating awareness which include building Environmental Education into the school curricula.
- vi. Environmental law which have been enacted should be thoroughly enforced through task forces.
- vii. The multinational companies and other industries with tendencies to generate pollution should be forced to carry out Environmental Impact Assessment (EIA) and put in place mitigation measures before carrying out production.
- viii. Finally the state government need to invest more in health system as the current level of investment in health is low. Improving the health sector will afford those already affected as well as those that will be affected by polluted environment the opportunity to get treatment.

## Epilogue

There is no contradiction that the population of Arunachal Pradesh is growing at a very fast rate. The obvious implication of this growth rate is that much pressure is placed on the resource of the environment leading to environmental degradation, which invariably affects the human health. It is, therefore, necessary to put in place measures to first solve the population problems before proceeding to solving the damage done to the environment as well as the resultant health problems. This paper has been able to establish a link between population growth and environmental degradation in Arunachal Pradesh; it has also brought to the spotlight some of the health problems that are outcomes of the polluted environment. The paper has also suggested some ways out of these problems.

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