

# **Environmental Challenges in the 21<sup>st</sup> Century**

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## ***Abstracts***

*Environmental challenges are universal. Many of them are harmful for us and also for the future generations. This article describes the major environmental challenges that we are facing today and the challenges that we are likely to face later in this century. This article addresses the global environmental challenges with a greater focus on the developing countries.*

**Keywords:** *Population, pollution, natural resources, urbanization.*

## **Introduction**

The environment has a profound effect on all the living creatures. When we consider a time span of 50 years, 10 years, or even one year, what we can observe is that there is a staggering pressure on global resources. The world population is constantly rising. Over the years the world's forest shrank by a considerable amount. Continuous pollution of air and water endangers our health and our future. Countless species of animals and plants have been wiped out from earth, many of them had potential for agriculture and medicine. Greenhouse gases released around the globe by power plants, automobiles and burning forests affect our health and our climate, potentially causing many billions of dollars in damage from rising sea levels and changing storm patterns. Dangerous chemicals such as PCBs and DDT that are banned in certain countries, but still used in many others, travel long distances through the air and water. Over fishing of the world's oceans has put thousand of people out of work. This paper focuses on some of the major factors affecting the environment and some of the solutions available to reduce some of the environmental problems.

## **Root Causes of Environmental Crisis**

### **Religious Root**

Some scholars think that early Christian teaching shaped many people's attitudes towards nature, which in turn fostered the creation of exploitive systems of science and technology that are largely responsible for the destruction of environment.

### **Cultural Root**

Other scholars believe that the spread of democracy, which put landowner ship and wealth in the hands of many, and the industrial revolution, which made mass production of goods possible and spread wealth throughout society, are roots of the environmental crisis.

### **Biological and Evolutionary Roots**

Human populations, like those of other organisms, expand if there are adequate supplies of resources and no other controls. For humans, technology has greatly facilitated population growth and greatly increased our environmental impact.

### **Psychological and Economic Root**

Human attitudes and beliefs are also responsible for many unsustainable practices. Daniel, apathy, inability to respond to suitable threats, greed, acquisitiveness, and others influence our economic systems, laws, and way of life in profound ways. In short, they worsen our biological imperialist tendencies.

## **Population**

The United Nations (UN) projected that by the year 2050 the global population will be approximately between 7.9 to 12 billion. The UN foresees faster growth in urban areas, with a rapid expansion in the number of mega-cities with population of 10 to 20 million or more. Population pressures of this magnitude will tax the natural and institutional resources. Growing demands on resources, including water, electricity, oil, timber, hydrocarbons, and food will require the anticipation and resolution of conflicts over competing users and the prevention of harm to people and the environment. High population growth and urbanization results in more and more energy demand, economic expansion and waste generation.

People in all countries should have access to the basic requirements of life: a balanced diet, clean water, decent shelter, and clothing. Over the next century, it will become difficult to meet these basic needs, especially in less developed countries. The social, economic, and political problems resulting from the continued population growth in these countries will affect the countries that have achieved stabilized populations and high standard of living. For these reasons population growth should be of concern to the entire world community.

As our numbers increasing during the next 10 years, environmental degradation, hunger, persistent poverty, and health issue will continue to challenge us. On a national level, developing countries have the largest rates of population increase and often have the fewest resources to support their growing numbers.

### **Population and World hunger**

Population, hunger, poverty, and environmental problems are interrelated. Population growth is the root cause of the world's food problem. The relationship between hunger and population may be affected by economic development as well as by poverty and uneven distribution of resources.

The relationships among population growth, use of natural resources and environmental

degradations are also complex. The resources that are essential to individual's survival are small, but a rapidly increasing number of people tends to overwhelm and deplete a country's soils, forest resources and degrade the global environment through extravagant consumption and "throwaway" lifestyles.

Rapid population growth can cause natural resources to be over exploited. The effects of population growth on natural resources are particularly in developing countries

### **Population and Urbanization**

The social, environmental, and economic aspects of population growth are influenced not only by an excess of people but also by the geographical distribution of people in rural areas, a cities, and towns. Throughout recent history, people have migrated to cities. Most people residing in a rural areas have occupations that involve harvesting natural resources-such as fishing, logging, and farming. In urban areas, most people have jobs that are not connected with natural resources.

Today many developed and developing countries facing many problems. Most people who are living in cities have lack of shelter for living. Homelessness is more pronounced in the cities of developing nations and peoples sleeps in the streets each night.

The effect of population growth and urbanization on the environment within the next few years will be much worse than that we are seeing today. It is in the developing countries where this will be reflected in its worst form. The developed countries like the United States and several European countries have a much better infrastructure in place to accommodate the growth.

The faster urban growth in developing nations has outstripped the capacity of many cities to provide basic services. It has also outstripped their economic growth. Consequently, cities in challenges than are cities in developed developing nations are faced with graver countries.

These challenges include substandard housing for most residents, high unemployment, and inadequate or nonexistent water, sewage, and waste disposal. Rapid urban

growth also strains school, medical, and transportation systems. The second UN Conference on Human settlement, which was held in Istanbul, Turkey, in 1996 (Raven 1998) considered these urban issues and others, such as poverty, crime, and the potential of epidemics in a densely populated city.

Economic development can be a powerful force for reducing population growth. Hunger and malnutrition cause mental and physical retardation, which contribute to widespread poverty, population growth, and environmental destruction.

The challenge today is to find sustainable ways to feed new world residents as well as the millions of world residents who are malnourished and undernourished (Chiras1998),

Providing adequate food, nutrition, environment and health security to the growing population in the developing countries, which is expected to grow from 5 billion to over 9 billion by 2050 is undoubtedly going to be the greatest challenge of the new millennium. Doubling food grain productivity to over 4 tons/ha. on a sustainable basis is possible only through the initiation of a new "Ever Green" revolution, which can ensure of prevention of environmental degradation by combining technological tools of bio-technology and space technology (Internet)

## **Pollution**

Air is polluted by various pollutants like ozone, carbon monoxide, sulfur dioxide, lead, arsenic, asbestos, benzene dioxin, nitrogen dioxide, particulate matter, etc. The sources of pollutants that cause water pollution vary (chemicals from fertilizers, human and animal wastes and toxic poisonous chemicals pollute water). In some cases water pollutants may come from pipe discharging in to river, a boat, irrigation ditch, underground storage tanks, or other single source called a 'point source' of pollution. But frequently the pollutants come from varied sources, collectively called a 'non point source' that could include industries, agriculture, and other human activities. Point source problems are easier to correct compared

to non point source problem, which require a lot of cooperation by every part of the society.

air pollution by automobiles is a worsening problem everyday in the developing countries. Increasing number of automobiles with lack of infrastructure is making this problem worse. Investing more in public transportation system and giving incentives to people for using the public transportation is an effective way to reduce this problem in the long term. Another solution that developing countries can adopt is to provide incentives to automobile manufacturers for adopting the regenerative braking technology to manufacture automobiles using hybrid technology. Hybrid technology uses both electricity and gasoline to power the automobile. When the breaks are applied the breaks are turned to a generator that in turns generates electricity, which is used to charge the battery. This technology is found very effective in automobiles driven in high traffic congestion areas where breaks are used frequently.

## **Energy**

No other generation has got our challenge to master the environmental problem and create a sustainable energy system on board the spaceship Earth. The number of automobiles has increased exponentially and still growing everyday without an infrastructure that can handle this growth. The effect of this is two fold. The lack of infrastructure is resulting in traffic jams, which in turn increases the fuel consumption and adds to air pollution. Although some of the developed countries are already doing research and development to mitigate the shortage of oil, the technology has not yet developed to resolve this issue. Some of the achievements we have made so far are the invention of ethanol fuel, bio-diesel, hydrogen and fuel cells, and hybrid technology, which uses regenerative braking technology to generate electricity to power the battery in an automobile.

Sustainable development is all about amalgamating economic and social development with protection of the environment and justice between generations.

Our information society depends on a reliable energy supply. At the same time there are nearly two billion people around the world who are in dire need of modern forms of energy to improve quality of life.

Aided by modern technology, mankind inflicts ever increasing traces on the environment. International Cooperation on climate, development, trade, security, and defense will increasingly affect energy systems around the world.

Future energy system changes will take place in a world where most of the attention is shifting towards developing countries. These densely populated and economically expanding nations will take an ever increasing part of the energy markets. The radical reduction of environmental effects and simultaneous care for the energy needs of a global population, will subject the energy system to enormous changes.

We should look at energy as a resource for sustainable development-not as a problem-a resource which benefits health and environment, economy and safety.

After coal, oil, natural gas and nuclear fission in the 18<sup>th</sup>, 19<sup>th</sup>, and 20<sup>th</sup> centuries, in addition to aggressive striving for energy efficiency as well as utilization of allsorts of renewable energies, the 21<sup>st</sup> century may be the century of hydrogen.

Hydrogen is nothing new. Henry Cavendish and Antoine Lavoisier discovered it in the 1780s. Until now, only one industrial branch is energetically dependent on hydrogen, the space businesses. The automobile needs hydrogen to reduce the threat of climate change. Hydrogen supported fuel cells open up highly efficient energy conversion near the consumer. Hydrogen and electricity have much in common; they strengthen the energy economy; they are being generated from all sorts of primary energies. Once generated, they are environmentally and climatically clean.

During the last few years the climate issue has been highlighted, which in turn will change the conditions for the use of alternative source of energy. It is hydrogen time - the transfer in to the hydrogen energy economy may be the energy center piece of the 21<sup>st</sup> century.

## Global Warming and Climate Change

Materials are one part of modern ecological challenge. The other is energy. We are significantly changing the chemical composition of the atmosphere. The earth has a natural temperature control system. Certain atmospheric gases are critical to this system and are known as greenhouse gases. On an average, about one third of the solar radiation that hits the earth is reflected back to space. Of the remainder, atmosphere absorbs some but the land and the oceans absorb most. The earth's surface becomes warm and as a result emits infra red radiation. The green house gases trap infrared radiation, thus warming the atmosphere. Naturally occurring greenhouse gases include water vapor, carbon dioxide, ozone, methane, and nitrous oxide and together create a natural green house effect. However, human activities are causing green house gas levels in the atmosphere to increase (United Nations Environmental Program - UNEP).

The Intergovernmental Panel on Climate Changes (IPCC) foresees temperature rises during this century of 1.4 to 5.8 degree Celsius. Constant changes in the environment significantly change the chemical composition of the atmosphere. By 2030, the carbon dioxide concentrations will have doubled as compared to pre-industrial levels (Weizsacker 2003). This is primarily due to fossil fuel combustion, land use conversion and cement production

The effect of climate change might result in flooding, cyclone, sea level rise, heat or cold waves, water shortage, fires, hail, windstorm, permafrost melting, etc, to name a few. To stop the dangerous trends of climate change, IPCC recommends a reduction of green house gas emission by around 50-80 percent by the middle of our century.

Climate change is also expected to lead to increases in the potential transmission of many infectious diseases, including malaria, dengue, and yellow fever, extending the range of organisms such as insects that carry these diseases in to the temperature zone, including parts of the United States, Europe, and Asia.

Regional changes in crop yields and productivity are expected to occur in response to climate change. There is likely to be an

increased risk of famine, particularly in subtropical and tropical semi-arid and arid locations. In the future climate change also could lead to shifts in river flow and water supply, with serious implications for human settlements and agriculture.

Climate change is also likely to affect human infrastructure, including transportation, energy demand, human settlements (especially in developing countries), the property insurance industry, and tourism. Adaptation to the inevitable impacts and mitigation to reduce their magnitude are both necessary. Because of the need for urgent action, the greatest challenge is to move rapidly to much increased energy efficiency and to non fossil-fuel energy sources (Internet)

### Loss of Biodiversity

Rapid lose of biodiversity is the most alarming effect of civilization and economic growth. Due to the destruction of natural habitats, which have been the home to hundreds of thousands of biological species, some of them rather inconspicuous but nevertheless important in the interlinking webs of ecosystem, we are losing several plants and animals daily. Habitat destruction mostly results from land conversion for mining, agricultural use, forest monocultures, or settlements. The major reason for the massive land conversion and massive habitat destruction is the tremendous flows of material which are induced by our modern consumer society.

The next most important cause is commercial harvesting and hunting. Commercial hunting and harvesting of wild species have occurred for centuries This includes past activities, such as whale hunting, and present activities, such as commercial fish harvesting, pouching of endangered species, sports hunting, introduction of foreign species, use of pesticides, control of insects pests, and pollution.

In order to save the remaining biodiversity, this material flow should be drastically reduced or completely stopped.

### Conclusion

Even though environmental problems are universal, the poorest countries are the most vulnerable to environmental changes. Economics play a major role in driving environmental changes, as individuals act in their self-interest with minimal regard for others or for future generations. Even though developing countries have well laid down policies, at times poor governance makes them ineffective. We must work to preserve the rich diversity of life if our generation and future generations are to lead a healthy, eco-friendly life.

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