

BIODIVERSITY AND ECONOMIC GROWTH

By:

Shahid Saleem

Biodiversity loss and other environmental problems that the world is facing today are the products of hundreds of years of human development and social change. As the world's population has expanded at unprecedented rates and new technologies have been developed which allow for expanded extraction of the world's resources, the average material well-being of the mankind has improved, but at what cost to the natural world?

The purpose of this paper is to identify factors that have caused biodiversity loss by exploring the link between biodiversity and economic growth.

Biological diversity is a very broad term. According to the United Nations Convention on Biodiversity (1992), biodiversity is the “variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and ecosystems”. Thus, biodiversity includes the species, genes and the ecosystems of the world, as well as the processes of production and decomposition that the environment provides.

The role of biodiversity in the provision of ecosystem services has been summarized by the Millennium Ecosystem Assessment (MEA) as follows:

Supporting role: includes the underpinning of ecosystems through structural, compositional and functional diversity;

Regulatory role: includes the influence of biodiversity on the production, stability and resilience of ecosystems;

Cultural role: includes the aesthetic, spiritual and recreational benefits incurred by humans from biodiversity;

Provisioning role: includes the direct and indirect supply of food, fresh water, fibre etc. The fresh water ecosystems, i.e. rivers, lakes, aquifers and wetlands, provide vital ecosystem services, including the support of important fisheries and the provision of drinking water.

In addition to this, Biodiversity has some intrinsic values that are independent of any human benefits and which cannot be readily quantified. For example, it has been argued that the health and wellbeing of other species should be valued in itself (MEA, 2005).

Biodiversity loss

Loss of biodiversity basically refers to the losses in the variety of life, including species, genes and ecosystems, either through human activities or otherwise. Since there is little or no data on the amount of species lost within a given ecosystem, the exact measurement of loss of biodiversity is not possible. However the available statistics indicate that forests especially tropical forests, coastal and inland wetlands, coral reefs, and other ecosystems are being converted and degraded at rates that are much higher by historical standards.

Deforestation, or forest cover loss is an important indicator of biodiversity loss as the forests contain 60% of the flora and fauna, playing a major part in climate regulation and providing an important sink for carbon dioxide. Tropical forests have declined by one-fifth during the 20th century, and the rate is accelerating. In the 1980's tropical deforestation occurred at a rate of 0.9% a year (FAO) Food and Agricultural Organisation, causing severe ecological and economic costs in the form of lost watershed protection , local climate change, lost coastal protection and fishing grounds. According to the Food and Agricultural Organization (FAO, 2005), about 9400000 ha of forests were deforested annually across the world over the period 1995-2000. The annual deforestation rate was the highest in Africa followed by South America, North and Central America, Asia and Oceania. Europe was the only one to register an increase in the forest cover at 900000 ha annually (FAO, 2005). This is evident from the table and the figure given below.

Table 1: Annual deforestation rate over the period 1995-2000

Continents	Annual deforestation
Africa	5300000 ha
South America	3700000 ha
North and Central America	600000 ha
Asia and Oceania	400000 ha
Europe	-900000 ha*

*Negative sign indicates increase.

Source: FAO, 2005.

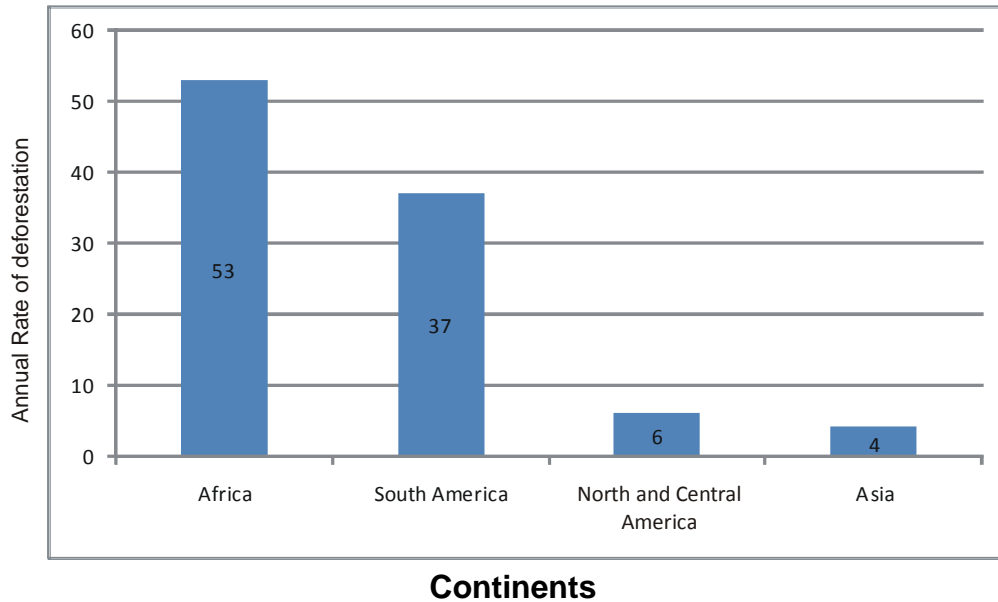


Figure 1: Annual rate of Deforestation over the period 1995-2000 in lacs.
Source: Food and Agricultural Organization 2005.

Deforestation has disastrous consequences on species and tropical forest ecosystem services. It is reported that 12 % of bird species, 25 % of mammals and 32 % of amphibians are threatened with extinction over the next century (WRI, 2005).

Another estimate suggests that if the present rate of deforestation continues approximately one quarter of the world, plant species will be lost over the next 20 years (IUCN, 1990).

Causes of Biodiversity Loss

There are many economic, political, social, demographic and climatic factors that are causing biodiversity loss. Here, three major factors are being discussed:

1. Climatic change

The world is experiencing major changes in climate, for example, rising temperatures, heavy precipitation, land slides, rise in the sea level, heat waves, wild fires, droughts, floods and tsunamis. All these changes are having negative effects on biodiversity. The concentration of carbon dioxide in the atmosphere affects the rate and efficiency of photosynthesis and water use, which in turn affects the productivity of plants, animals and other ecosystem processes. Biodiversity is expected to decrease in the future, due to multiple pressures, in particular, increased land-use intensity and the associated destruction of natural or semi-natural habitats. Climate change has shown the greatest impact on

South Asia. The recent storms in the Arabian Peninsula that affected all the countries touching its coast, the melting glaciers in the Himalayas resulting in increased water flows, have caused widespread destruction of crops, livestock and human lives thus adding to the loss of biodiversity.

2. Population explosion

Most researchers recognize population growth as an important factor causing biodiversity loss and environmental degradation. Concerns over the consequences of population growth can be traced back to the period of Thomas Malthus (1776-1834), who said that uncontrolled population growth results in over-use of natural resources. A number of studies have been conducted since then which indicate statistically significant relationship between deforestation and population growth. There is enough evidence to prove that population growth does contribute to deforestation and biodiversity loss. As human population increases, demand for food, land, energy, water and other natural resources increases as well. This causes a direct pressure on land, making it inevitable to cut down forests for creating colonies and towns for people to live in. Land use changes, vegetation shifts, over-harvesting of trees and species, increased fishing activities, eutrophication of marine environments, and increased demand for consumer goods leads to the loss of biodiversity.

3. Economic growth

Economic growth is a process whereby an economy's real national income increases over a long period of time and if its rate of growth of national income is higher than its rate of growth of population, its per capita income also increases. In order to increase the national income the resources of the economy, that is the natural, human and the financial resources must be utilized in the best possible way. However, during the process of production depletion of resources does take place. There is sufficient historical evidence to prove that economic growth results in greater levels of biodiversity loss and environmental degradation. But the relationship between economic growth and environmental degradation is not so simple. As societies develop, their social, political and economic characteristics change. Hence, in the early stages of development the biodiversity loss is less, in the intermediate stage it becomes high, and at a later stage it starts declining. In the long run, new ideas and technological advancements transform the economies in such a way that when they reach a high level of economic growth, they start valuing biodiversity and therefore, start emphasizing on biodiversity conservation.

Table.2 Economic Growth, Population Growth and Biodiversity Loss

Country	Population Growth	GNI per capita	Biodiversity loss (Annual Deforestation%)*
Burundi	3.5	110	3.2
Togo	2.8	360	2.9
Bangladesh	1.8	470	0.1
Pakistan	2.3	870	1.6
Nigeria	2.4	930	2.4
India	1.4	950	-0.4
China	0.6	2360	-1.7
Uruguay	0.1	6380	-4.4
Malaysia	1.9	6540	0.4
France	0.7	38500	-0.5
Germany	0	38860	-0.2
USA	0.9	46040	-0.1
UK	0.5	42740	-0.6
Canada	1.0	39420	0.3
Mauritania	2.8	840	2.4
Niger	3.5	280	2.3
Philippines	2.0	360	2.95

Source: World Development Report 2008 & 2009.*Negative values indicate increase in the forested area.

It can be seen from the given table that Burundi which is the poorest country with a per capita income of \$110 has the highest rate of population growth (3.5%) along with a high rate of deforestation (3.2%). While countries with the highest per capita income (like USA, UK and Germany) have very low rate of population growth with negative rate of deforestation indicating increase in the forested area. This proves the fact that rich countries value biodiversity more and are taking measures for biodiversity conservation.

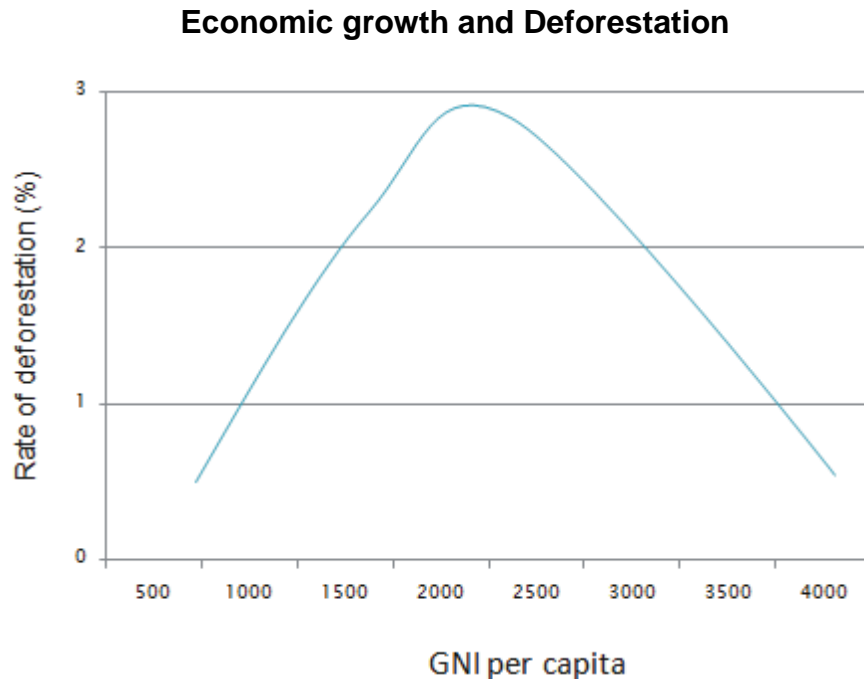


Figure.2 Relationship between economic growth and deforestation.

The above figure too shows that at low levels of income per capita the rate of deforestation increases. After reaching a certain level of economic growth, the rich countries start emphasizing on biodiversity conservation, hence the rate deforestation starts declining.

CONCLUSIONS

The above statistical analysis shows that human population and economic growth have a major impact on biodiversity. Countries with high rate of growth of population have a high rate of deforestation while those with low rate of population growth have a negative rate of deforestation.

Another interesting result is the relationship between affluence and deforestation. Countries with low per capita income have high rates of deforestation and the rich countries have negative rates of deforestation indicating an increase in forested area. This goes to prove that the developed countries value biodiversity more than the poor countries of the world.

RECOMMENDATIONS

- Population growth must be controlled by creating awareness, increasing literacy rates and population control measures.

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- Setting up of protected areas and habitats for the protection of wildlife should be given priority.
 - The attitudes of the local people towards biodiversity conservation in general and wildlife protection in particular, need to be changed through education.
 - Collection of reliable statistical data on animals, endangered species, deforestation, fisheries etc is very essential as these data can shed light on the health of the ecosystem. This is especially important for research and for appropriate policy formulations.
 - There is a need for commitment on the part of the governments to take action at the national level, for the conservation and sustainable use of biodiversity. Targets need to be set in the annual development plans for achieving a significant reduction in the current rate of biodiversity loss. The less developed countries like Pakistan should be more active in formulating such policies as biodiversity can play a critical role in overall sustainable development and poverty reduction.

