

Causes and Consequences of Ecological Imbalances in India : A Review

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ABSTRACT

Ecology is the science which deals with various ecosystems in the world. Ecological balance has been defined as a state of dynamic equilibrium within a community of organisms in which genetic, species and ecosystem diversity remain relatively stable, subject to gradual changes through natural succession. It is a stable balance in the numbers of each species in an ecosystem. The most important point being that the natural balance is maintained in an ecosystem. Ecological imbalance between the natural factors and human activities is socio-ecological crisis. This implies that the balance between the environment and society is broken. The extent of the ecological imbalance may be different in different areas. This situation can lead to the destruction of humanity. The reasons for ecological imbalance are connected with the increasing industrialization, deforestation, degradation of land and soil erosion, irrational waste of natural resources, pollution- all this because of what ecological disaster is happening. Unjustified deforestation leads to the vanishing of animals and birds. All these factors leads to changes in the eco-

logical balance. In this paper an attempt is made to understand the causes and consequences of ecological imbalances in India.

Keywords : Ecology, Ecosystem, Ecological Imbalance, Degradation, Deforestation.

INTRODUCTION

Ecology is a science that studies the interdependent and interconnected relationships between the organisms and their physical environment on the one hand and among the organism on the other hand. Ecology lays more emphasis on the study of unity and balance of environment. An ecosystem can be categorized into its abiotic constituents, including soil, water, minerals, climate, sunlight and all other non-living elements and its biotic constituents, consisting of all its living organisms. Thus, the scope of ecology has been extended from the scientific study of mutual relationships of biotic and abiotic components of the whole biosphere. Ecological balance has been defined as the balance between production and consumption of each element in the ecosystem. This balance may be disturbed due to the introduction of new species, the sudden death of some species, natural hazards and man-made causes. So, ecological imbalance refers to that state when an ecosystem is unable to adjust with environmental changes (Viswanathan and Anbu 2019). The ecological crisis mostly arising out of increased human impacts on natural/ecological resources.

Ecological imbalance is when a natural or human-caused disturbance disrupts the natural balance

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of an ecosystem. A disturbance is any change that causes a disruption in the balance of an ecosystem. The examples of natural disturbances are volcanic eruptions, floods, natural fires and the examples of human-caused disturbances are the introduction of a new species, logging a forest, pollution, overhunting of a species. After a disturbance occurs, an ecosystem can recover back to a balanced state. But if an ecosystem has a severe disturbance or is constantly having new disturbances, it may never recover back to a state of ecological balance (Kataria 2015).

Objectives

To analyze the causes of ecological imbalances in India. To understand the consequences of ecological imbalances in India.

MATERIALS AND METHODS

For this research paper the data are collected by using secondary sources collected from various books, National and International Journals, published Government reports, publications from various websites and so on.

The paper is divided in two sections: Section one gives the causes of ecological imbalances in India and section two tries to sketch the consequences of ecological imbalances in India.

Section I: Causes of ecological imbalances in India

The following points highlight the main factors responsible for ecological imbalance in India. The factors are :

Degradation of land and soil erosion

The Ministry of Agriculture, Government of India, has reported about the serious problem of land degradation and soil erosion as given in the following Table 1.

The Table 1 shows that about 174 million hectares (i.e., 53% of the total geographical area) of land in India is facing the serious problem of land degradation. Out of which 144 million hectares is subjected

Table 1. Problem of land degradation and soil erosion.

Heads	Area (in million tonnes)
Total geographical area	329
Area subjected to water and wind problems (soil erosion)	144
Area degraded through special problems (ravines, salinity, water logging)	30
Annual average rate of encroachment of table lands by ravines (hectares)	8000
Average area annually subjected to damages through shifting cultivation	5
Annual average area affected by floods	8
Annual average cropped area affected by floods	4
Total drought prone area	40

to soil erosion through water and wind and the rest 30 million hectares is subjected to other problems. Moreover, intense population pressure on land has led to conversion of forest and permanent pastures into crop lands leading to indiscriminate grazing.

Deforestation

Since independence large scale deforestation has been continuing due to over exploitation and mismanagement of forest resources. During the first two decades of planning, from 1951 to 1972, India lost about 3.4 million hectares of forestland. Out of which about 70% of that area was lost to river valley projects, roads and communications and industries. Deforestation is still continuing at a rapid scale. The problem has reached to such a proportion that it has totally disturbed the ecological balance of the country. The National Committee on Environmental Planning has remarked that total land surface having adequate tree cover is not more than 12% of the total geographical area of the country. Although, the official statistics shows that it is 22% of the total geographical area. The scale of deforestation in Himalayan ranges from Kashmir to North-East India is very high. All these have led to an ecological imbalance in the country (United Nations Environment Program Report 2012).

Faulty utilization of water resources

India is still suffering from flood and droughts due to faulty utilization of water resources. Since independence, too much importance was laid on the

expansion of big dams. But these gigantic dams have displaced cores of tribal people, drowned million hectares of rich forest areas, failed to prevent and control floods. It often created destructive flash flood in the downstream valley. As per the recent estimate, it is found that area affected by floods in India has increased from 20 million hectares in 1971 to 40 million hectares at present. Moreover, these huge dams and multi-purpose projects have created an environmental impact in the form of degradation of soil due to continuous water logging and increasing soil salinity (Chopra 2016). The main portion of mounting salinity affected places lies in the Indo-Genetic plains of UP, Punjab and Haryana.

Environmental problems from faulty mining practices

Large scale extraction of minerals is creating serious environmental problems, ruining the country's land, water, forest and air (Khan 2002). Large scale mining has resulted in conversion of agricultural and forest land into stockyards townships, roads and railway lines and removed vegetation and top soil. The disposal of mining waste, mineral dust from mines are constantly polluting air and also reducing agricultural productivity. Underground mines are often creating subsidence of land due to its over exploitation. Mining activity is also polluting water resources as the rain waters, passing through mineral wastes are flowing into rivers and streams. Mining operation has also resulted large scale deforestation and soil erosion. It is also responsible for various health hazards to human beings in the form of respiratory problem and other illness. Thus in the new Mineral Policy (1993) attempts have been made to check this environmental pollution arising out of mining operations and to follow some reclamation measures.

Industrial and atmospheric pollution

The unplanned and uncontrolled expansion of industries and ill-maintained automobiles are creating huge atmospheric pollution in our country. It leads to huge environmental problems (Timmy and Satake 1998). The major atmospheric pollutants consist of carbon dioxide, carbon monoxide, sulfur dioxide, oxides of nitrogen, hydrocarbon and metallic traces. Moreover,

some specific pollutants are also being mixed with atmosphere which comprises lead from automobile emission, urea dust from fertilizer factory, cement and lime dust from cement factories, increasing radiation of nuclear power stations. Besides, industrial wastes coming out of fertilizer factories, paper mills and leather factories are constantly being discharged in rivers, lakes and seas, creating enormous health hazards for the inhabitants of the country (Vennila *et al.* 2014).

Section II: Consequences of ecological imbalance

Some significant impacts of imbalanced ecosystems and polluted environment are as follows:

Impact on human health

Polluted air, water and soil create numerous harmful chemical and biological agents that have a negative impact on human health (Naik and Tiwari 2005). A wide range of communicable diseases can be spread through the elements of environment polluted by human and animal waste products. This is clearly evidenced by the plagues of the Middle Ages, when the disease spread through rats that were fed on contaminated human waste.

Global warming

Although carbon dioxide is almost completely transparent to visible light, it strongly absorbs and reradiates the infrared radiation. Thus carbon dioxide acts like the glass of a green-house and on a global scale, tends to warm the air in the lower levels of the atmosphere. This phenomenon is known as the "green-house effect". In addition to carbon dioxide, water vapor and ozone also absorb the infrared radiation emitted by the surface of the earth and help to keep the earth warm. There is enough evidence to show that the temperature of the entire earth has risen during the recent decades. For instance, glaciers in both hemispheres are receding. There occurred an increase in the mean annual air temperature of about 0.5°C during 1885-1940. The highest increase in the annual mean temperature occurred in the Northern Hemisphere between 40°N and 70°N latitudes, where the average rise in temperature was 0.9°C and aston-

ishing increase in the average winter temperature of 1.6°C.

Soil degradation

The protection of soil against the hazards of degradation is essential if the productivity of soil has to be sustained. Soil degradation has many causes, but the immediate concerns are improper land use, soil erosion, acidification, salinization, water-logging and chemical degradation (Kiran 2019). Soil erosion is the washing or blowing away of the surface soil. Erosion may take place under natural conditions, but it is greatly increased when human activities cause disappearance of the protective cover of natural vegetation. Acidification and salinization directly reduce soil fertility. They may be caused by acid rain and accumulation of water soluble salts in the soil. Chemical degradation of soil may occur if the nutrients in the soil are leached out or harmful chemicals like DDT and radioactive substances. Soil erosion is a global problem.

Desertification

Desertification results from the combined effect of two factors; severe recurrent droughts and human over-exploitation of dry lands. The cures for desertification have been known for a long time. They consist of the reverse processes, i.e., biological recovery of environmental conditions, naturally or artificially induced (Madhusudan and Raman Shankar 2003). Considerable experience in combating desertification has been acquired by the US, Australia and Israel but corrective measures are expensive though net benefits would certainly exceed the costs.

Depletion of the ozone layer

Following the predictions in 1974 that chlorofluoro carbons as well as some other gases like methane, ammonia and nitrous oxide, diffused to the stratosphere, would lead to the depletion of the protective ozone layer, a group of experts prepared a World Plan of Action on the Ozone Layer. Under this Plan, a Co-ordinating Committee on the Ozone Layer was established, which subsequently produced assessments of the ozone layer and its impacts.

Contamination of food

Chemical contaminants reach food and livestock feed from many sources. Pesticides used in farming often find their way into crops. In addition, veterinary drugs and animal growth promoting chemicals may pass into meat and dairy products like milk and butter. Some food preservatives like sodium nitrite, chemicals and materials contained in food packaging may also enter the packaged food. Crops may be chemically contaminated by the airborne deposition of industrial emissions or by industrial effluents.

CONCLUSION

The Earth's organisms interact with their environment in a delicately balanced cycle. Plants use energy from the sun and they become food for other creatures. The cycle continues as plant and animal life forms die and get consumed by micro-organisms, cycle of life is in jeopardy from humanity's overuse of natural resources and damage to the ecosystem from pollution. So we all are take oath about maintaining balanced ecosystems for our next generations.

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