

Desertification: Perspectives of land degradation

Anoop Kumar

Head, Geography Department, Govt. PG College, Khetri, Distt. Jhunjhunu(Raj.)

Abstract: *Desertification has been the culprit behind severe ecological losses. Local biotic gets damaged by undesirable changes in the structure and composition of vegetation. Some delicate and vulnerable grasses and shrubs may go extinct and most of the fauna becomes endangered. The mutual interaction between flora and fauna gets imbalanced.*

Keywords: land degradation, flora and fauna

1. Introduction

Desertification is a complex phenomenon and some of its facets still require explanation. Desertification is not just desert expansion of popular imagination. Instead it is an essentially subtle, dispersed and continuous process which mainly occurs nearby as well as far away from desert fringes, with the outright conversion of fertile lands into desert only taking place in extreme cases. It is a process of deterioration in ecosystems that can be measured by reduced productivity of desirable plants, undesirable alterations in biomass and the diversity of micro and macro flora and fauna, accelerated soil deterioration, and increased hazards of human occupancy.

2. Defining the problem

Desertification is frequently regarded as a process but it is also used to describe an end state of a process or processes, for example in Aubreville's original usage where he referred to the creation of the desert conditions in humid parts of Western Africa. The extent of accelerated soil erosion induced by indiscriminate felling and burning of forest and woodland in Africa and changes in the soil-water budget and hydrological cycle were understood as some of the factors leading to land degradation. There was also a growing recognition of the part played by human activities and climate changes such as prolonged or frequent droughts aggravating land degradation. This led to formally defining desertification as "land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities", which is used as the basis of the UNCCD. Mainguet argued that desertification is best reserved for the ultimate step of land degradation, the point where land becomes irreversibly sterile in human terms and with respect to reasonable economic limitations. UNCOD definition of desertification is – "the diminution or destruction of the biological potential of land that can lead ultimately to desert-like conditions. It is an aspect of the widespread deterioration of ecosystems and has diminished or destroyed the biological

potential i.e. the plant and animal production, for multiple purposes at a time when increased productivity is needed to support growing population in quest of development".

FAO/UNEP (1984) defined the problem from a more human perspective—

"A comprehensive expression of economic and social processes as well as those natural and induced ones which destroy the equilibrium of soil, vegetation, air and water, in the areas subject to edaphic and/or climatic aridity. Continuous deterioration leads to a decrease in, or destruction of the biological potential of the land, deterioration of the living conditions and an increase of desert landscape" (Thomas & Middleton, 1994).

3. Land degradation

Land degradation means reduction or loss in arid, semi-arid and dry sub-humid areas of the biological or economic productivity and complexity or rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation pattern such as---

- a) Soil erosion caused by wind and/or water;
- (b) Deterioration of the physical, chemical and biological or economic properties of the soil;
- (c) Long-term loss of natural vegetation.

Dry-land refers to the arid, semi-arid and dry sub-humid areas in which the annual precipitation to potential evapotranspiration falls within the range from 0.05 to 0.65. Certainly, the opinion that desertification is primarily man-made is very common, especially since the UNCOD and some authors even include it as part of their definition.

There is little hard evidence on the actual “causes “ of desertification, but there are reasons to believe that some human activities such as agriculture, wood-cutting, or even some forms of tourism may have negative impact on fragile ecosystem

There are also various non-objective reasons for claiming that desertification must be man-made. If desertification results primarily from the impact of individual and societies on the environment, then some action could be taken to correct the problem and avoid further degradation, although the question of responsibilities must then be addressed. The definition of desertification is very much a question of perception. And to a large extent, the disagreement between different authors results from a different choice of definition. In fact, a definition always, by nature, a conventional starting point: no value may be attached to it and no definition may be claimed to be better than the other per se. This being so, many different definitions of desertification have been proposed, and it may well be that some of them might be more useful than others for limited group of users, in specific situations or for particular purposes. In short, it may not be possible or even desirable to design a unique definition of desertification.

Thus the problem of desertification in the areas surrounding the desert areas is becoming rampant and at present severely affecting the local natural ecosystem. Surprisingly, the problem has been neglected so far, though it raises alarm to the scientists, administrators and the planners.

4. The Beginning

The desertification process usually begins with degradation of vegetation in the initial stage. First of all, the de-vegetation is to be done while cultivating the land. Trees and shrubs are cleared for cropping and grazing, cut for fuel wood or fodder. Degradation of vegetation also involves change to a less productive type of vegetative cover. The perennial grasses may be replaced by less palatable grasses and thorny, stunted shrubs and this is a feature of less productive ecosystems of dry lands.

Overgrazing often leads to erosion of the soil. Grazing land degradation by livestock grazing exposes the soil to erosion by wind and water. Sand dunes begin movement if cultivated continuously. Because de-vegetation of sand dunes results into their re-activation. Likewise, increase in irrigated crippling might seem a logical way to solve problems of dry lands.

Poor management of irrigation in dry lands results in multitudes of problems. Irrigated cropping may turn land into desert. During the long dry season, the temperature

increases the evaporation of soil-moisture and brings more water from lower layers of soil. Depletion of groundwater table occurs if discharge exceeds the recharge and it usually happens in these lands.

Another problem is to assess the decline in biological productivity or production potential, characteristic of a long-term process of degradation, rather than a short-term decline in level of production that commonly occurs during a drought. Although crop yields will fall sharply in course of a drought, the decline should only be temporary and is normally reversed when the drought ends.

5. Measuring the process

Extent and degree of desertification usually manifests in the form of agro-potential and quality and availability of natural resource. The high fluctuations of rainfall year by year jeopardize the marginal lands. Below average rainfall periods accentuate the intensive exploitation of land in the form of cropping and grazing. Farmers generally find it very difficult to maintain their landholdings in a sustainable way. Marginal lands could not sustain the productivity levels and soon gives way to dropping yields. Fallow lands, pastures and grazing lands experience gradual reduction and land once gone to cultivation do not go back to its previous category. Sand dunes also become victim of this encroachment as farmers require more and more land in order to obtain sufficient production. Furthermore, the irrigation in the form of canals boring wells enables the farmers to overcome the difficulties imposed by marginal lands and it provides a sound basis for this expansions. Though, very little land could be said to be irreversibly desertified, nevertheless the damage to the local ecological system remain unimpaired and also the land becomes prone to further ecological damages. Economic feasibility of land is prime concern in considering the reversibility of degraded land. The productivity of land is not very high in arid and semi-arid lands. Reversibility is, in fact, a function of technology and the ensuing economic returns.

Furthermore, one has to assess the scale of desertification; one has to rely upon criteria to distinguish between lands, which is ‘slightly’, ‘moderately’ or ‘severely’ affected. We badly need a more rigorous definition of this process in terms of measurable characteristics called “desertification indicators”.

6. Controlling the menace

In 1977, the U.N. Conference on Desertification (UNCOD) was held in Nairobi and attended by official representatives of 95 countries, 50 U.N. offices and a myriad of NGOs. It was to produce an effective, comprehensive and co-

ordinated programme for addressing the problem of land degradation. UNCOD was an outcome of extensive studies and consultations undertaken at the global, regional and local level involving scientist, policy and decision makers and experts from R&D institutions and other organizations from all over the world. Desertification is not certainly new and may have been occurring for millennia; according to Spooner, it can be traced back to the medieval period and probably the monolithic. Desertification has certainly turned out to be regarded as one of the biggest environmental issues of the last five decades and is in the World Bank's top ten of major global environmental problems. Desertification has also burgeoned as a theme of investigation in the scientific and academic world.

According to a UN committee, the problem of desertification has to be taken seriously by the Governments. Otherwise, desertification would entail grave food security problem. Land degradation is taking place in most parts of the world. Food-grains production is falling. Favouring cash crops, deforestation, mining policies and reckless exploitation of natural resources are responsible for food security/food crisis.

In 1992, UNEP produced a World Atlas of Desertification. The studies indicated that over the preceding 20 years, the problem of land degradation had continued to worsen. In the past, dry-lands recovered easily following long droughts and dry periods. Under modern conditions, however, they tend to lose their biological and economic productivity quickly unless they are managed in a sustainable manner. The studies further indicated that over-cultivated, overgrazing, deforestation and poor irrigation practices are degrading dry-lands in every continent. The major factors for this are population (human and livestock) pressures, inappropriate land use and agricultural practices, social conflicts and drought. Desertification is recognized as a major global concern affecting over 250 million people directly and with over one billion (more than one-fifth of the world's population) at risk, changing the traditional lifestyle, culture and composition of the rural societies.

The UN Conference on Environment and Development (also known as the Earth Summit) held in Rio de Janeiro, Brazil in June 1992 provided a platform for addressing a number of major global environmental concerns such as climate change, biodiversity, deforestation. The Rio Summit also highlighted the problem of desertification and recommended that the United Nations General Assembly establish an inter-governmental Negotiating Committee to prepare a Convention to Combat Desertification. India was an active member of this process and became a signatory on 14th October 1994. India ratified the convention on 17th

December 1996 and it came into force in our country with effect from 17th March 1997.

The Great Green Wall initiative is an effort operational in 20 countries of Africa, aiming at restoring 100 million hectares of land. Likewise, Chinese government is planting trees along the Gobi desert border to control the desert expansion. The outcomes of such restoration have been mixed. For example, in East Africa, mesquite trees were planted to control desert expansion but it became problematic. Substantial support has been received by small farmers of Africa by the Great Green Wall initiative. Farmers managed their land to maximize harvesting of water and it also helped tree regrowth and other greenery.

Conclusion

Mankind faces great ecological challenges caused by indiscriminate use of technology for the so-called economic development. Man has indeed learned to live a life free from ignorance, illness and illiteracy, but what was created to increase human happiness and make the earth a better place to live in is also creating a threat to its very survival. For benefit of automobiles we pay in the pollution of air. For benefits of industry, we destroy vegetation which helps to protect the soil from erosion, waste and desolation. Half-baked solutions can be more dangerous in their application to human life than no solutions at all; for life itself has a self balancing mechanism which should not be disturbed at all. A new order has to start from a re-organization of our technology, rather than complete rejection to it. Technology is not going to bring about paradise unless it is controlled for the better advantage of man. One has to analyze the social context and consequences of all forms of development policy. At every stage one should ask the questions: What price shall we pay in human terms? What advantages we get? What impact our policies will have on ecology?

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