



Desertification- An Ecological Cataclysm

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Abstract-

Deserts are amid "fragile ecosystems". Desertification includes land degradation in arid, semi-arid and dry sub humid areas resulting from various factors, including climatic variations and anthropogenic happenings. The trend is more likely to become irreversible if the environment becomes drier with prolonged droughts, and the soil becomes further degraded through erosion and compaction. Drought drains a land of its life-supporting capabilities and declining groundwater tables, increasing erosion, and the disappearance of native vegetation characterise the process.

Desertification has affected as much as one-sixth of the world's population, seventy percent of all drylands, and one-quarter of the total land area of the world. This has resulted in widespread poverty as well as in the degradation of billion hectares of rangeland and cropland. Desertification became well known in the 1930's, when parts of the Great Plains in the United States turned into the "Dust Bowl" as a result of drought and poor practices in farming, although the term itself was not used until almost 1950. During the dust bowl period, millions of people were forced to abandon their farms and livelihoods. Greatly improved methods of agriculture and land and water management in the Great Plains have prevented that disaster from recurring, but desertification presently affects millions of people in almost every continent.

The present paper is an introspection unfolding the impact of desertification in various deserts of the world and remedial measures for repairment.

Key words- Land Degradation, arid, semiarid, ,anthropogenic

Introduction-

Desertification involves the process of depletion of terrestrial resources of a comparatively dry area in becoming gradually arid. It loses it's biodiversity which is a consequence of variety of factors, such as global climate change due to anthropogenic factors. Desertification is a significant universal ecological catastrophe. Drylands occupy approximately 40–41% of Earth's land area and are home to more than 2 billion people. It has been estimated that approximately 10–20% of drylands are already degraded, the total area affected by desertification being between 6 and 12 million square kilometres, that about 1–6% of the inhabitants of drylands live in desertified areas, and that a billion people are under threat from further desertification.

Desert Biodiversity -

Flora that survive in hot deserts must be specialized to deal with high temperatures and very little water. This typically means cacti. Cacti don't have true leaves; rather, they have spines, which help protect them from being eaten. The chloroplasts, or specialized cells that perform photosynthesis (or derive energy from the sun) of cacti have been modified to store water. Also, these plants have a shallow root system that can rapidly absorb water during

the rare times of rain. You may also find shrubs and desert grasses that have adapted to high heat and little rain in hot deserts. The animals found in desert ecosystems are also highly specialized to this unique environment. Animals that have evolved to live in the desert are called xerocoles. The main reasons these organisms can survive in the desert is because they don't sweat and can retain water. Camels can survive in temperatures up to 120°F without breaking a sweat! However, these large mammals are a rarity. Most animals found in hot deserts are much smaller, such as rodents, rabbits and coyotes. The animals all have very large ears; this helps them evaporate off heat and keep them cool. Numerous insects, mainly scorpions, ants, beetles, and reptiles are occupants of such harsh environments.

Global review of desertification

Sahara Desert

The outcome of global warming and human actions are self revealing in the Sahara desert. The major characteristics of the desert include a dry climate, hot temperatures, and low rainfall thus droughts are not an abnormal phenomena. On an average Africa has lost approximately 650,000 km² of its productive agricultural land over the past 50 years. The propagation of desertification in this area is considerable. Since 1900 the Sahara desert has expanded by 250 km to the south over a stretch of land from west to east 6,000 km long which indicates that aridness is spreading fast in the Sahara Desert. Almost 70% of the arid area has depleted and water resources have vanished, leading to soil dereliction. In recent years development projects have started in the deserts of Algeria and Tunisia using irrigated water pumped from underground aquifers. These schemes often lead to soil degradation and salinization because of "drainage" problems.

Climatic desiccation over the past 5000 years, and intense human hunting over the past 100 years, has destroyed most of the wildlife. Presently vast portions of the Sahara, merely rock, sand and sparse vegetation are residual remnants.

Gobi Desert

Gobi desert is the fastest spreading desert on Earth; according to some researchers, the Gobi Desert swallows up over 1,300 square miles (3,370 km²) of land annually. Many villages have been abandoned due to desertification. Deforestation, overgrazing, and overuse of water by people are some of the leading factors responsible for desertification. The problem is a resultant impact of aeolian desertification, water and soil loss, due to water erosion, salinization due to poor

water management and rock desertification. Additionally, afforestation can exceed the land's carrying capacity, dooming the trees to an eventual death without constant human intervention. People crowded into the natural sand dunes and the Gobi to plant trees, which have caused a rapid decrease in soil moisture and the groundwater table causing desertification.

Sonoran Desert

Mining, overgrazing, and off-road automobile routine is leaving a major imprint in the fragile desert, thus exhausting the biodiversity of the desert. The primary source of desertification in the is overgrazing. In the Sonoran Desert, much of the vegetation has been consumed by grazing cattle. As a result, the desert's flora diversity declining leading to loosening of soil and thus resulting in enormous topsoil attrition. Crop production potential, surface water quality, and the condition of drainage networks have dwindled. Wildfires also causes deterioration of deserts which lead to loss of vegetation, soil erosion, invasion of weeds, and loss of sustainability of land. Off-roading contributes to erosion, it crushes and/or loosens plants, and reduces hiding cover for animals, doing nothing but destroying the

desert's habitat. Mining is one of many attributing factors to desertification in the Sonoran Desert. No protective covers will exist to prevent injury or death of migratory birds that may be exposed to acidic mine pond waters. From this analysis, it is clear that building mines in the Sonoran Desert do nothing to the wildlife besides destroy part of their habitat and injure and/or kill the animals and plants that exist there.

Atacama Desert

Desertification in Atacama Desert grows by over a meter a day. Prevailing winds carry air toward the mountain range. As the air rises, the air cools, water vapor condenses, and clouds form. On this side of the mountains, called the windward side, precipitation falls in the form of rain or snow. The windward side of a mountain range is moist and lush because of this precipitation. Once the air passes over the mountain range, it moves down the other side, warms, and dries out. This dry air produces a rain shadow. Land in a rain shadow is typically very dry and receives much less precipitation and cloud, creating desert conditions on the leeward side of the range cover.

Kalahari Desert

In terms of desertification, Botswana is one of the most seriously affected countries in the Kalahari Region of Southern Africa. Problems include overstocking, large-scale vegetation depletion and changes, especially around water points, and accelerated soil erosion by wind, sheetwash and gulying. Part of the desertification problem is natural in such a semi-arid and drought-prone environment. But the greater part is due to pressure of commercial exploitation of a fragile ecosystem. Owing to the increasing pressure of the already crowded communal grazing areas of the east, owners of large herds have, in the last three decades, been moving westwards, establishing permanent cattle posts in the Kalahari sandveld and spreading conditions of overstocking and degradation of vegetation on a large scale. There has been considerable uncontrolled development of cattle posts in areas set aside for wildlife management, resulting in the emergence of land use conflicts and extensive degradation of the tree savannas.

Thar Desert

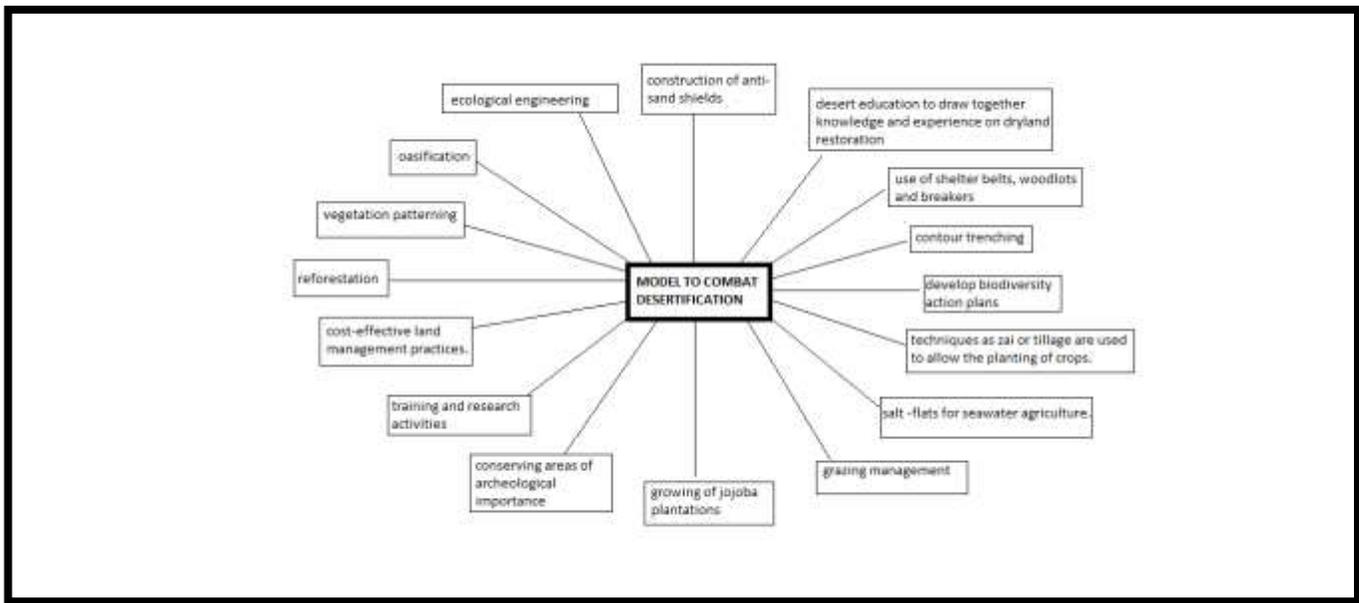
Northwestern India's Thar Desert is expanding in both east and northeast directions. The Thar Desert, also known as the Great Indian Desert, is a large, arid region in the northwestern part of the Indian subcontinent. In order to understand desertification processes in the Indian context, it is necessary to know the geomorphic processes under natural set-up and acceleration to the processes through human interventions. Water Erosion, Wind Erosion/Deposition, Mining, Vegetation Degradation. The common grazing lands around the villages are now some of the very severely degraded sites, as these are highly exploited and most neglected. Many good grazing lands have also been encroached upon for agriculture.

Victoria desert

Desertification in Australia is a resultant phenomenon due to a series of nuclear weapon trials were conducted, The presence of plutonium-239 is of special concern, due both to its long half-life and the risks posed by inhalation. Rocket and weapons testing range, primarily through road-building, off road vehicles presents a probable threat of disruption in the vicinity of the region. The main sources of widespread disturbances come from wild animals.

Managing Desertification-

Desertification is a Geohazard which affects the functioning of a community or a society. It involve widespread human, material, economic or environmental impacts, which exceed the ability of the affected community or society to cope using its own resources. Managing it is a major challenge which requires instantaneous maneuvering and requires various methodologies to be accomplished. A model is attempted to understand ways of combating desertification,



The result of desertification is barren land that cannot be used for crop and food production or other agricultural purposes. Prevention methods have been introduced and tend to be more successful than attempts to restore already damaged regions, which can be costly and yield limited results. Construction of Anti-sand shields, Growing of Jojoba plantations, Developing Biodiversity Action Plans Reforestation, Desert Education to draw together knowledge and experience on dryland restoration, Use of shelter belts, woodlots and breakers. Techniques as zaï or tillage are used to allow the planting of crops, contour trenching, salt-flats for seawater agriculture, Grazing management, Ecological engineering, Oasification, Vegetation patterning, Cost-effective land management practices, Training and research activities, Conserving areas of archeological importance are efforts taken to protect and conserve arid areas.

Desertification Debate –

While considerable progress has been made in combating desertification, the results of most anti-desertification efforts have not yet achieved the expected results. The constraints against combating desertification include climate, government policy and population growth. But, perhaps, the greatest constraint is the void and confusion created by the breakdown of traditional structures and the lack of adequate institutional capacity and mechanisms for implementing community based natural resource projects (Pilane 1997). Also, there are influential skeptics who currently believe that the nature and extent of desertification in the country have been exaggerated, a factor that could influence the pace of development, especially, of government's action in fully implementing appropriate policies such as those outlined in the country's blueprint, the National Conservation Strategy (NCS). However, given the strength of the economy, the political will, the democratic governance and the environmental consciousness prevailing among the political leadership and educated elite at present, there appears to be good prospects for sustained effort and possible

Conclusion –

Desertification the world's most alarming global environmental problems is also the primary cause of environmentally induced Managing spreading of deserts can be controlled if one utilizes the resources wisely, stop illegal mining, use those plant species which can easily adapt in local climatic condition, work as a sand binder and decrease dependence on natural resources. Restoring and maintaining the health of these resources by incorporating resource efficiency is a key element of sustainable development. It is not only needed to adequately feed current and projected populations, but also to provide a better quality of life to our future generations. Resource efficiency should comprise technical efficiency of resource use , the resource productivity, or extent to which economic value is added to a given quantity of resources and the extent to which resource extraction or use has negative impacts on the environment .

References

1. Mayell, Hillary (April 26, 2001). "Shrinking African Lake Offers Lesson on Finite Resources". National Geographic News. Retrieved 20 June 2011.
2. "Sustainable development of drylands and combating desertification". Retrieved 21 June 2016.
3. "The Desert Will Win". FIGU-Landesgruppe Canada. Retrieved 2016-11-20.
4. Helmut J. Geist, and Eric F. Lambin. "Dynamic Causal Patterns of Desertification." *BioScience* 54.9 (2004): 817 . Web.

