



Combating the Desertification Demon

This editorial is based on [“A quarter of India’s land is undergoing desertification. Stop this. Trees defend against soaring heat”](#) which was published in Times on India on 31/05/2024. The article brings into picture the looming threat of desertification in India and the need for reversing this menace.

For Prelims: [Desertification](#), Salinity Ingress, [United Nations Convention to Combat Desertification](#), [Land degradation neutrality](#), [14th Conference of Parties](#), [Bonn Challenge](#), [Compensatory Afforestation Fund](#), Biosaline Agriculture, Halophytes.

For Mains: Factors are Leading to Desertification in India, Land Degradation Neutrality Targets.

Desertification is a silent crisis gripping India with a staggering **25% of its landmass** undergoing this process. While scorching summer temperatures and record highs grab headlines, the underlying issue- **unchecked desertification**, demands immediate attention because this insidious process silently transforms fertile lands into arid wastelands.

Desertification is not merely an environmental concern, it poses a significant threat to India's [food security](#), **economic stability**, and the very foundation of its [agricultural prowess](#). More than **half of the degraded land in the country is either rainfed farmland**, responsible for the food security of the country, or forest land that offers the best defense against climate change. Therefore, effectively addressing desertification is crucial for ensuring the long-term sustainability of India's land resources and the well-being of its population.

What is the Status of Desertification in India?

- **Status:** Almost all Indian states have witnessed an increase in degraded land over the past 15 years.
 - **Rajasthan** accounts for nearly 22-23% of the degraded land in the country, followed by **Maharashtra and Gujarat**.
 - According to the **2021 estimates of ISRO**,
 - **Mizoram** has been experiencing one of the fastest rates of desertification in India.
 - Between **2003-05 and 2018-19**, 0.18 million hectares were degraded, a rise of over 188%.
 - **Arunachal Pradesh** saw a 46% increase in land degradation between 2003-05 and 2018-19.
 - **Nagaland's** desertified area increased by 29.4%.
- **Affected Land Types:**
 - **Rainfed Farmland:** Around **37 million hectares** of degraded land is unirrigated agricultural land, where water erosion (80%) and wind erosion (17%) are the main causes of degradation.
 - **Forest Land:** Approximately **21 million hectares of forest** land (30% of total forest

area) is degraded, primarily due to vegetation degradation (96%) caused by deforestation and overgrazing.

What Factors are Leading to Desertification in India?

- **Deforestation and Forest Degradation:** India's **insatiable appetite for timber** and land for agriculture and settlement has led to rampant deforestation. According to a recent report by the **IISc.'s Energy and Wetlands Research Group**, Western Ghats lost **5% evergreen forest cover**.
- **Overexploitation of Groundwater:** Excessive extraction of groundwater for **irrigation and industrial purposes** depletes water tables, leading to land subsidence and reduced soil moisture.
 - **Example:** The decline of water levels in aquifers across **Punjab and Haryana** due to over-extraction for agriculture has contributed to desertification concerns in these regions.
 - A study from the **Central Ground Water Board** found that Punjab's groundwater levels could drop nearly **1,000 ft by 2039**.
- **Salinity Ingress in Coastal Areas:** In coastal regions like Gujarat and Tamil Nadu, the intrusion of seawater into groundwater aquifers and agricultural lands has led to **soil salinization and reduced productivity**.
 - As per an estimate **627 villages of Saurashtra and Kutch** region are highly affected by salinity ingress.
- **Mining and Industrial activities:** Unregulated **mining** and industrial operations have resulted in soil contamination, air pollution, and the degradation of surrounding lands, contributing to desertification.
 - **Example:** The mining activities in the **Jharia coalfields of Jharkhand** have led to land subsidence, soil contamination, and desertification in the surrounding areas.
- **Inadequate Implementation of Land Degradation Neutrality:** India has adopted the **United Nations Convention to Combat Desertification (UNCCD)** and committed to achieving **land degradation neutrality**, but the implementation of related programs and policies has been inadequate in many regions.
- **Urbanization and Infrastructure Development:** Rapid urbanization and the construction of large-scale infrastructure projects, such as highways, airports, and industrial corridors, have led to the loss of productive agricultural lands and the disruption of natural ecosystems, exacerbating desertification.
 - **Example:** The **Delhi-Mumbai Industrial Corridor project**, spanning across several states, has resulted in the acquisition of vast tracts of fertile land, contributing to land degradation and desertification in the surrounding areas.
- **Invasion of Alien Plant Species:** The introduction and spread of **invasive alien plant species**, often facilitated by human activities and climate change, have disrupted native ecosystems and contributed to desertification.
 - **Example:** The invasion of the highly adaptable **Prosopis juliflora (mesquite)** in the arid and semi-arid regions of India has led to the displacement of **native vegetation, soil degradation, and desertification**.

What is Land Degradation Neutrality?

- **About:** LDN is a state where the **amount and quality of land resources** necessary to support ecosystem functions and services, and enhance food security, remain stable or increase within specified temporal and spatial scales and ecosystems.
- **Objective:** The concept aims to ensure that the **amount of healthy and productive land remains stable** or increases by reversing land degradation through sustainable land management practices.
- **International Commitment:** LDN became a target for the **Sustainable Development Goal 15 in 2015**, and countries have committed to setting voluntary targets to achieve "no net loss" of land by 2030.
- **India's LDN Target:** India has committed to halt any further land degradation and rehabilitate at least **26 million hectares** of degraded wasteland, forest, and agricultural land by 2030
 - India plans to increase forest cover and undertake large-scale afforestation efforts to combat land degradation.
 - This includes initiatives like the **Compensatory Afforestation Fund (CAF) and the Green**

What are the Major International Initiatives to Curb Desertification?

- **United Nations Convention to Combat Desertification (UNCCD):** It was established in 1994, the sole legally binding international agreement linking environment and development to sustainable land management.
 - India is a signatory to the UNCCD.
 - The [14th Conference of Parties \(COP14\)](#) in India focused on the theme "**Restore land, sustain future.**"
- **Large-Scale Restoration Initiatives:**
 - The [Bonn Challenge](#) aims to bring 350 million hectares of deforested and degraded land into restoration by 2030.
 - Achieving that outcome would **sequester up to 1.7 billion tonnes** of carbon per year, equivalent to 14% of global emissions.
 - The **African Forest Landscape Restoration Initiative (AFR100)** aims to restore 100 million hectares of degraded landscapes in Africa by 2030.

What Measures Should India Adopt to Tackle Desertification?

- **Promote Agroforestry and Reforestation with Native Species:** Implementing large-scale agroforestry initiatives, integrating trees and shrubs into agricultural systems, to restore soil fertility, reduce erosion, and create microclimate conditions that combat desertification.
 - Successful agroforestry initiatives in **Niger, Mali, Burkina Faso, Senegal, Ethiopia, and Malawi** can be a prominent model.
- **Seed Biopriming and Seed Encapsulation:** Developing and promoting the use of seed biopriming techniques, which involve **treating seeds with beneficial microorganisms** to improve seed viability and water-use efficiency in desertified areas.
- **Fog Harvesting Nets:** Installing specialized mesh nets in arid regions to capture **moisture from fog**. The collected water can then be used for irrigation purposes or to support native vegetation, promoting plant growth and reversing desertification trends.
- **Biosaline Agriculture and Halophyte Cultivation:** Investing in research and development of biosaline agriculture, which involves cultivating salt-tolerant crops (halophytes) in saline or degraded soils.
 - Halophytes like **Salicornia and Atriplex** can be grown for food, fodder, and biofuel production, providing economic opportunities in desertified regions.
- **Establishing Desertification Adaptation Zones:** Identifying and designating specific areas as "**Desertification Adaptation Zones,**" where targeted interventions, such as sustainable agriculture practices, soil conservation measures, and ecosystem restoration, are strictly implemented.
 - Providing incentives and support to local communities within these zones to encourage their active participation in desertification control efforts.
 - Comprehensive measures in Ningxia province of China involving local communities can be an example.
- **Establish Desertification Early Warning Systems:** Develop advanced monitoring and early warning systems that integrate remote sensing, ground-based sensors, and environmental data to **detect and predict desertification trends in various regions.**
 - Using this information to guide decision-making and implement timely interventions can mitigate the impacts of desertification.
- **Desert Tourism with a Conservation Focus:** Designing **responsible desert tourism** programs that raise awareness about desertification and generate revenue for local communities.
 - These programs can **incentivize conservation efforts** and promote sustainable practices within the tourism industry.

Drishhti Mains Question:

Examine the primary challenges India faces in combating desertification and evaluate the effectiveness of Land Degradation Neutrality targets in addressing these challenges.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Consider the following pairs: (2014)

Programme/Project Ministry

1. Drought-Prone Area - Ministry of Agriculture & Farmers Welfare
2. Desert Development Programme - Ministry of Environment, Forests & Climate Change
3. National Watershed Project Development for Rainfed Areas - Ministry of Rural Development

Which of the above pairs is/are correctly matched?

- (a) 1 and 2 only
(b) 3 only
(c) 1, 2 and 3
(d) None

Ans: (d)

Mains

Q. The process of desertification does not have climate boundaries. Justify with examples. (2020)

Q. In what way micro-watershed development projects help in water conservation in drought-prone and semi-arid regions of India? (2016)