



## 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 India Mission](#).

## 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)**