5. Farming Technology to Stop Desertification - Environment

Researchers in Rajasthan have developed a "soilification technology" using polymers and bioformulations to successfully grow wheat on desert land. This breakthrough offers a promising new tool to combat desertification, which affects nearly 25% of India's land, and helps meet the national goal of restoring degraded land. In a major agricultural breakthrough, researchers from the Central University of Rajasthan (CUoR) have successfully grown wheat on desert land. This was achieved using an innovative 'soilification technology' powered by an indigenous bioformulation, offering new hope in the fight against desertification.

The Challenge of Desertification in India

Desertification, defined as land degradation in arid and semi-arid areas, is a significant environmental threat in India.

Extent of the Problem - According to the Space Applications Centre (ISRO), about 30% of India's total geographical area (nearly 96.40 million hectares) suffers from land degradation. Of this, nearly 25% of the country's area is affected by desertification.

Hotspot Region - Rajasthan's drylands are a major concern, contributing to over 23% of the total desertified area in India.

National Commitment - India has pledged to restore 26 million hectares of degraded and deforested land by 2030 under the Bonn Challenge.

Breakthroughs in Farming Technology

Two recent experiments in India showcase innovative approaches to making agriculture viable in challenging environments.

Feature	Soilification Technology (Rajasthan)	AI & Precision Farming (Baramati, Maharashtra)
Core Technology	Material science and microbiology.	Artificial Intelligence (AI) and the Internet of Things (IoT).
Key Innovation	Modifying desert sand into fertile soil using eco-friendly polymers and indigenous bioformulations.	Using AI-driven tools (supported by Microsoft and Oxford University) to analyze real-time data for farm management.
Primary Goal	To improve the water retention capacity and microbial activity of sandy soil, making it suitable for crop growth.	To optimize the use of resources like water and pesticides, and improve crop planning and risk management.
Reported Outcome	Successful cultivation of wheat on previously barren desert land.	Up to 40% increase in crop yield, along with reduced input costs and water usage.

Other Key Technologies for Combating Desertification

Besides these breakthroughs, several other technologies are crucial in the fight against land degradation.

Precision Agriculture - The use of drones, sensors, and GIS mapping to precisely monitor soil moisture, nutrient levels, and crop health, enabling targeted interventions.

Micro-Irrigation Systems - Technologies like drip and sprinkler irrigation deliver water directly to the plant roots, significantly reducing water wastage and preventing soil salinity.

Soil Conservation Techniques - Practices like zero-tillage (planting crops without disturbing the soil), contour bunding, and mulching help retain soil moisture and prevent erosion.

Agroforestry - Integrating trees with crops on the same land. This practice prevents wind and water erosion, enhances soil carbon, and improves biodiversity.

Climate-Smart Farming - Adopting drought-resistant crop varieties, such as millets, which are well-suited for arid regions. This was a key focus of the International Year of Millets 2023.

Major Government Initiatives

The Indian government has launched several national missions and schemes to combat

desertification and promote sustainable agriculture.

National Action Plan on Desertification - This is India's overarching framework to align with its commitments under the UN Convention to Combat Desertification (UNCCD), including the Bonn Challenge pledge.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - Focuses on improving water use efficiency at the farm level through micro-irrigation and other measures.

National Afforestation Programme & Green India Mission - Aim to increase the country's forest and tree cover to combat land degradation and sequester carbon.

Soil Health Card Scheme - Provides farmers with detailed information about their soil's nutrient status, encouraging balanced fertilizer use and improving soil health.

Technology Development and Transfer Programme - This program is actively promoting and scaling up the new Desert Soilification Technology to reclaim degraded land, support climate-resilient agriculture, and create sustainable livelihoods in desert-prone regions.

Source - https - //www.thehindu.com/news/cities/Delhi/new-farming-technology-holds-potential-to-stop-desertification/article70099654.ece