



SOIL DEGRADATION - GS III MAINS

Q. Soil is facing increasing threats from human activities, putting our food security, ecosystem health and climate resilience at stake. Examine (15 marks, 250 words)

News: *Preserving and restoring soil health is crucial for a prosperous and sustainable future*

What's in the news?

- Soil is a finite medium that provides habitat for millions of microorganisms.
- As the foundation of life on Earth, soil plays a pivotal role in supporting agriculture, biodiversity and overall ecosystem health.
- Soil is facing increasing threats from human activities, putting our food security, ecosystem health and climate resilience at stake.
- With pressing population needs and greed, soil productivity is consistently decreasing.

Key takeaways:

- Application of excessive chemical fertilisers and pesticides, deforestation, improper land use, soil compaction by machinery, water logging, lack of cover crops in the field, mulching and most importantly, excluding organic matter from the crop care regime are some of the factors responsible for soil degradation.

Importance of Soil:

- Healthy soils are essential for our **survival**.
- They support healthy **plant growth** to enhance both our nutrition and water percolation to **maintain groundwater levels**.
- Soils help to **regulate the planet's climate by storing carbon** and are the second largest carbon sink after the oceans.
- They help **maintain a landscape** that is more resilient to the impacts of droughts and floods.
- Soil is the **basis of food systems** and hence, soil health is critical for healthy food production.

Soil Degradation:

- Soil degradation is referred to as the **decline in the fertility of the soil**.
- Soil degradation is a major factor causing harm to the available soil resources base in India
- Today, nutrient loss and pollution significantly threaten soils, and thereby **undermine nutrition and food security globally**.



Causes of Soil Degradation:

- The main drivers contributing to soil degradation are
 - Industrial activities
 - Mining
 - Waste treatment
 - Deforestation
 - Agriculture
 - Shifting cultivation
 - Frequent cropping
 - Unscientific rotation of crops
 - Burning of crop residues
 - Excessive use of fertilizers and pesticides and
 - Irrigation with contaminated wastewater
 - Waterlogging
 - Fossil fuel extraction
 - Processing and transport emissions
 - Soil erosion
 - Runoff and leaching.

Impacts of Soil Degradation:

- Soil degradation in some form or another affects around 29% of India's total land area. This in turn affects **various aspects of life** such as
 - Declining agricultural productivity
 - Desertification
 - Affecting in-situ biodiversity conservation
 - Reducing water quality
 - Affecting the socio-economic well-being of land dependent communities.
- **Nearly 3.7 million hectares suffer from nutrient loss in soil (depletion of soil organic matter, or SOM).**
- Impacts of soil degradation are far reaching and can have irreparable consequences on human and ecosystem health.

India's Conservation Strategy:

- The Government of India is implementing a **five-pronged strategy** for soil conservation. This includes
 - Making soil chemical-free
 - Saving soil biodiversity
 - Enhancing soil organic matter
 - Maintaining soil moisture
 - Mitigating soil degradation
 - Preventing soil erosion.



1. Soil Health Card:

- Earlier, farmers lacked information relating to soil type, soil deficiency and soil moisture content.
- To address these issues, the Government of India launched the Soil Health Card (SHC) scheme in 2015.
- The SHC is used to **assess the current status of soil health, and when used over time, to determine changes in soil health.**
- The SHC displays soil health indicators and associated descriptive terms, which guide farmers to make necessary soil amendments.

2. PMKSY:

- Pradhan Mantri Krishi Sinchayee Yojana aims to **prevent soil erosion, regeneration of natural vegetation, rainwater harvesting and recharging of the groundwater table.**

3. NMSA:

- The National Mission for Sustainable Agriculture (NMSA) has schemes **promoting traditional indigenous practices** such as organic farming and natural farming, thereby **reducing dependency on chemicals** and other agri-inputs, and decreasing the monetary burden on smallholder farmers.

4. Collaboration with FAO:

- The Food and Agriculture Organization of the United Nations (FAO) undertakes multiple activities to support the Government of India's efforts in soil conservation towards fostering **sustainable agrifood systems.**
- The FAO is collaborating with the National Rainfed Area Authority and the Ministry of Agriculture and Farmers' Welfare (MoA&FW) to develop forecasting tools using data analytics that will aid vulnerable farmers in making informed decisions on crop choices, particularly in rainfed areas.

5. Working with target States:

- The FAO, in association with the Ministry of Rural Development, supports the Deen Dayal Antyodaya Yojana-National Rural Livelihoods Mission's (DAY-NRLM) Community Resource Persons to increase their capacities towards **supporting on-farm livelihoods for the adoption of sustainable and resilient practices, organic certification and agri-nutri-gardens.**
- The FAO works in eight target States, namely, Madhya Pradesh, Mizoram, Odisha, Rajasthan, Uttarakhand, Chhattisgarh, Haryana and Punjab, for boosting **crop diversification and landscape-level planning.**
- In Andhra Pradesh, the FAO is partnering with the State government and the Indian Council of Agricultural Research (ICAR) to **support farmers in sustainable transitions to agro-ecological approaches and organic farming.**



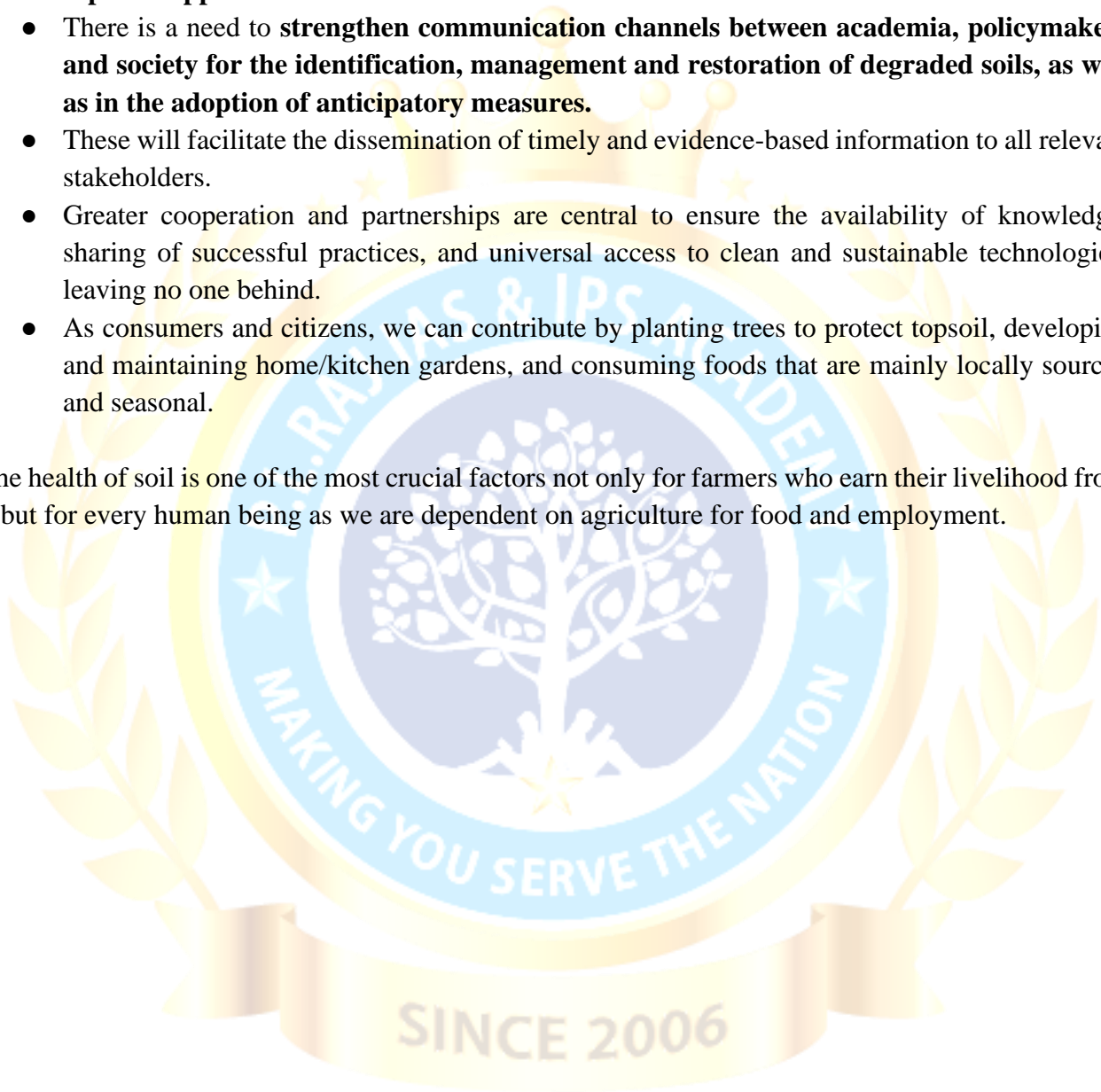
6. Conservative Agricultural Practices:

- Contour bunding, regulated forestry, cover cropping, Contour terracing, controlled grazing, crop rotation, and mixed farming are in line with preventing soil degradation.
- The government needs to encourage these methods in order to conserve soil.

7. Participative approach:

- There is a need to **strengthen communication channels between academia, policymakers and society for the identification, management and restoration of degraded soils, as well as in the adoption of anticipatory measures.**
- These will facilitate the dissemination of timely and evidence-based information to all relevant stakeholders.
- Greater cooperation and partnerships are central to ensure the availability of knowledge, sharing of successful practices, and universal access to clean and sustainable technologies, leaving no one behind.
- As consumers and citizens, we can contribute by planting trees to protect topsoil, developing and maintaining home/kitchen gardens, and consuming foods that are mainly locally sourced and seasonal.

The health of soil is one of the most crucial factors not only for farmers who earn their livelihood from it but for every human being as we are dependent on agriculture for food and employment.



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