



Towards Effective Soil Management

This editorial is based on [“Poor soil management will erode food security”](#) which was published in The Hindu on 05/12/2022. It talks about the Soil degradation and its consequences on human and ecosystem health.

For Prelims: Soil Management, Food and Nutrition Security, Carbon sink, Overuse of Agrochemicals, Soil Health Card Scheme, Deforestation, Hidden hunger, Paramparagat Krishi Vikas Yojana, Neem Coating of Urea, Nutrient Based Subsidy (NBS) Scheme National Mission for Sustainable Agriculture (NMSA).

For Mains: Significance of Healthy Soil, Challenges Associated with Soil Health, Recent Government Initiatives to Improve Soil Health.

87% of life forms on this planet – **human beings, microbes, worms, insects, birds, animals, and plants** on the planet are sustained by a thin layer of crust “**soil**”. And that is in grave danger right now.

In the last 40 years, **40% of the world’s topsoil has been lost**. The [United Nations](#) says we have soil left only for approximately **80 to 100 harvests**, which means just another **60 years of agriculture**. After that, we will not have the soil to produce food.

30% of India’s land is already degraded, and **90% of India’s states are seeing soil turn to desert**. So, protecting the soil for the future generations of this land is the most important **not only for food and nutrition security** but for **humanity** as well.

What is the Significance of Healthy Soil?

- **Food and Nutritional Security:** Shedding light on the importance of soil management, the **UN says there are more living organisms in a tablespoon of soil than the people on Earth**.
 - Soil holds **minerals, organic components, and organisms** and needs to be protected from degradation to ensure **nutrient-rich plant life on Earth**.
 - They support **healthy plant growth and enhance its nutritional value**.
- **Carbon Sink:** The **soil stores carbon**, making it the **second largest carbon sink** after the oceans, helping to keep a landscape resilient to droughts and floods.
- **Nature’s Filter: Dust, chemicals, and other contaminants** are removed from surface water by soils, making underground water some of the cleanest on earth.
- **Livelihood and Settlement:** Soil supports **buildings and highways** thus contributing to the economy of our cities.
 - For instance, the **rich, deep fertile soils of the Ganga plain**, especially its delta, and the **coastal plains of Kerala** support high population density through agricultural prosperity.

What are the Challenges Associated with Soil Health?

- **Overuse of Agrochemicals:** The [overuse of agrochemicals](#) contributes to **soil acidification**, resulting in a reduction of organic matter in the soil (humus content), stunting plant growth and even causing greenhouse gases to be released.
 - The analysis of the [Soil Health Card Scheme](#) shows alarmingly low levels of **soil organic carbon (SOC)** across India (an important indicator of soil health).
- **Deforestation:** Due to **rapid deforestation**, and [urbanisation](#), forests are being converted to farms, and farms into residential areas, that is **degrading soil health to a large extent**.
 - Soil degradation has been indirectly affecting **2 billion people worldwide** who are **reported to suffer from a lack of micronutrients**, a problem labelled as '[hidden hunger](#)' because they are difficult to detect.
- **Waterlogging: Excessive irrigation** causes waterlogging that is often **accompanied by soil salinity** as waterlogged soils **prevent leaching of the salts imported by the irrigation water**.
 - Waterlogging **impedes the ability of soil to provide an optimum medium for plant growth** and alters its physical and chemical properties to a large extent.
- **Climate Change Impact:** Though, climate change is a slow process involving relatively small **changes in temperature and precipitation** over a long period of time, nevertheless these slow changes in climate influence the **various soil processes particularly those related to soil fertility**.

What are the Initiatives to Improve Soil Health?

- [Paramparagat Krishi Vikas Yojana](#)
- [Neem Coating of Urea](#)
- [The Nutrient Based Subsidy \(NBS\) Scheme](#)
- [National Mission for Sustainable Agriculture \(NMSA\)](#)
- [World Soil Day - 5 December](#)
- [Soil Health Card Scheme](#)
- [Digital Agriculture](#)

How Soil Health can be Further Improved?

- **Agroforestry:** The **inclusion of trees and shrubs** into farming practices can **reduce runoff, increase infiltration** and reduce soil loss through their barrier effect.
 - They also help maintain the **soil organic matter** through decay of pruning and **root residues**.
- **Regular Soil Audits:** A specialised body is needed both at the **central as well as at state level for the management of soils**. With the help of local panchayats, they should be responsible for monitoring soil quality and **performing regular soil audits**.
- **Crop Rotation and Reforestation:** Rotating in high-residue crops such as **corn, hay, and small grain can help to reduce erosion** as the layer of residue protects topsoil from being **carried away by wind and water**.
 - **Restoration of a degraded ecosystem** and protection of the existing ones ensures sufficient soil erosion control. A recent study shows that a **properly planted and maintained tree reduces erosion by 75%**.
- **Towards Smart Agriculture:** India is known for its diversity of farming practices. It is important to get **diverse points of view engaged in a national-level dialogue** to find suitable solutions for **soil management and sustainable farming**.
 - India needs to move towards **smart and precision farming** using sensors and other scientific tools to **manage soil health and use appropriate herbicides and pesticides**.
 - The [Food and Agriculture Organization](#) 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**, is a good step in this direction.
- **Carbon Farming:** There is need to practice [carbon farming methods](#) of agricultural management that can help the **land store more carbon** and **reduce the amount of GHG that**

it releases into the atmosphere, in a way maintaining soil health and atmospheric stability.

- **Multi Sectoral Approach to Soil Management:** 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**.
 - Consumers and citizens **can contribute by planting trees to protect topsoil**, developing and maintaining **home/kitchen gardens**, and consuming **foods that are mainly locally sourced and seasonal**.

Drishti Mains Question

Identify various reasons for soil degradation and suggest effective soil management measures.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Consider the following statements: (2017)

The nation-wide 'Soil Health Card Scheme' aims at

1. expanding the cultivable area under irrigation.
2. enabling the banks to assess the quantum of loans to be granted to farmers on the basis of soil quality.
3. checking the overuse of fertilisers in farmlands.

Which of the above statements is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Mains

Q. How far is the Integrated Farming System (IFS) helpful in sustaining agricultural production? (2019)