PLUTUS IAS

CURRENT AFFAIRS

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IMPORTANCE OF SOIL FOR ENSURING FOOD SECURITY

THIS ARTICLE COVERS 'DAILY CURRENT AFFAIRS' AND THE TOPIC DETAILS OF "IMPORTANCE OF SOIL FOR ENSURING FOOD SECURITY ". THIS TOPIC IS RELEVANT IN THE "AGRICULTURE" SECTION OF THE UPSC CSE EXAM.

WHY IN THE NEWS?

The exponential growth of the human population has undeniably exerted immense pressure on the Earth's ecosystems, leading to significant biodiversity loss. Over the span of just a few centuries, humanity has witnessed a staggering increase in population numbers, from one billion in 1804 to over eight billion today.

This rapid population growth has necessitated extensive agricultural expansion to meet the escalating demands for food production. To prevent mass famines and starvation, vast tracts of land have been cleared for farming, often at the expense of precious forest habitats. Unfortunately, this race to feed a burgeoning population has resulted in the loss of numerous species and genetic diversity.

Even with traditional and organic farming methods, it would have been impossible to sustainably support such a vast population. As Norman Borlaug, renowned as the father of the Green Revolution, aptly observed, the Earth's carrying capacity for human inhabitants is limited. Without scientific advancements in agriculture, the prospect of widespread starvation would have been a stark reality.

In essence, while human ingenuity and technological innovations have averted immediate food crises, they have also underscored the urgent need for sustainable agricultural practices and conservation efforts to safeguard the planet's biodiversity for future generations.

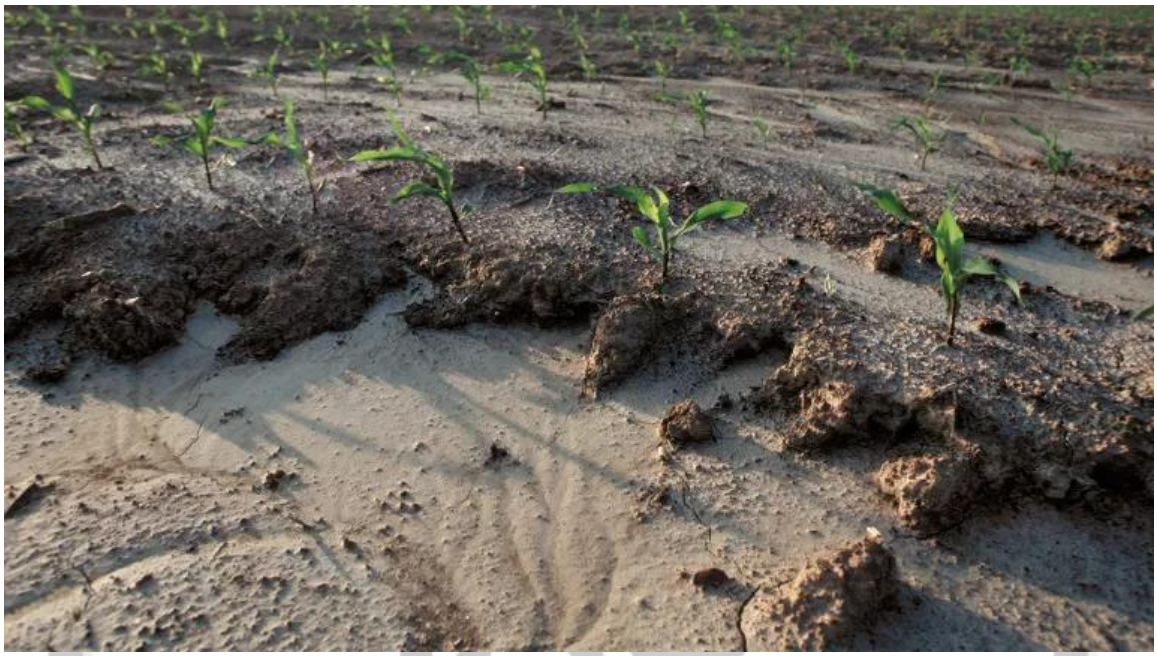
THE DETRIMENTAL IMPACT OF FERTILIZERS OVERUSE

The detrimental impact of inappropriate policies on our planet remains a pressing concern, particularly evident in the agricultural sector. One glaring example is the heavy subsidization of chemical fertilizers, particularly urea, which has resulted in imbalanced nutrient use and significant soil degradation.

This skewed approach to nitrogen (N), phosphate (P), and potash (K) usage has left Indian soils severely depleted, craving organic carbon for sustenance. Renowned soil scientist Rattan Lal emphasizes that the optimal level of soil organic carbon (SOC) should ideally range between 1.5 to 2 percent. However, the harsh reality is that more than 60 percent of Indian soils possess SOC levels below 0.5 percent, indicating a critical state of soil health akin to an intensive care unit (ICU).

Despite these alarming indicators, policymakers have largely overlooked the urgent need for policy reform in agricultural subsidies. Mere rhetoric surrounding "prakritik kheti" or natural farming fails to address the root causes of soil degradation. What is imperative is a strategic shift in policy, particularly concerning chemical fertilizer subsidies.

A straightforward redirection from heavily **subsidizing N, P, and K prices towards direct income transfers to farmers,** coupled with market-driven pricing of these essential nutrients, holds promise for reversing soil degradation trends. However, such a transition necessitates meticulous groundwork, including comprehensive land records, crop monitoring systems, and irrigation infrastructure assessments.



IMPACT OF INTENSIVE AGRICULTURE ON SOIL DEGRADATION

Agriculture plays a significant role in soil degradation in India due to various practices and factors associated with farming activities. Here are some ways agriculture impacts soil degradation in the country:

1. **Soil Erosion**: Intensive tillage practices, such as plowing and land preparation, contribute to soil erosion by exposing the soil to wind and water erosion. Additionally, monoculture cropping and continuous cultivation without adequate soil conservation measures lead to the depletion of soil organic matter and soil structure, making it more susceptible to erosion.
2. **Soil Compaction**: Heavy machinery used in modern agriculture, such as tractors and harvesters, can cause soil compaction, particularly in mechanized farming systems. Soil compaction reduces soil porosity, restricts root growth, and impairs water infiltration and drainage, leading to reduced soil fertility and productivity.
3. **Chemical Inputs:** Excessive use of chemical fertilizers, pesticides, and herbicides in agriculture can degrade soil quality and fertility over time. Chemical fertilizers, if not applied judiciously, can lead to soil acidification, nutrient imbalances, and soil salinity. Pesticides and herbicides may accumulate in the soil, disrupting soil microbial communities and beneficial organisms.
4. **Soil Salinization and Alkalization**: Poor irrigation practices, such as over-irrigation and inadequate drainage, can lead to waterlogging and salinization of soils in irrigated areas.

Salinization occurs when salts accumulate in the soil profile, inhibiting plant growth and reducing crop yields. Alkalization, characterized by an increase in soil pH, can also occur in arid and semi-arid regions due to the accumulation of soluble salts.

5. **Deforestation and Land Conversion:** Clearing forests and converting natural ecosystems for agriculture leads to soil degradation by exposing the soil to erosion, nutrient depletion, and loss of soil organic matter. Deforestation disrupts the soil ecosystem and reduces biodiversity, making the soil more vulnerable to degradation processes.
6. **Overgrazing:** Grazing pressure from livestock can degrade soil quality by trampling vegetation, compacting soil, and accelerating erosion. Overgrazing reduces ground cover, increases soil exposure to erosion agents, and disrupts nutrient cycling processes, leading to soil degradation in grazing lands.
7. **Loss of Soil Biodiversity:** Intensive agriculture practices, such as monocropping and chemical inputs, can reduce soil biodiversity by negatively impacting soil microbial communities, earthworm populations, and beneficial organisms essential for soil health and fertility.

OTHER FACTORS FOR SOIL DEGRADATION

- **Deforestation and Land Conversion:** Clearing forests for agriculture, urbanization, and industrial development leads to soil erosion and loss of soil fertility. Deforestation disrupts the natural ecosystem and exposes the soil to erosion by wind and water.
- **Unsustainable Agricultural Practices:** Intensive farming methods, such as excessive use of chemical fertilizers, pesticides, and irrigation, contribute to soil degradation. These practices often lead to soil salinity, alkalinity, and acidity, reducing soil fertility and productivity over time.
- **Soil Erosion:** Soil erosion occurs due to water runoff, wind, and human activities like overgrazing and deforestation. This process removes the topsoil layer, which is rich in nutrients, organic matter, and microorganisms essential for plant growth.
- **Waterlogging and Salinization:** Poorly managed irrigation systems, coupled with excessive groundwater extraction, can lead to waterlogging and salinization of soils, particularly in areas with high groundwater tables. Salinization occurs when soluble salts accumulate in the soil, rendering it unsuitable for agriculture.
- **Industrial Pollution:** Industrial activities, including mining, chemical manufacturing, and waste disposal, can contaminated soils with heavy metals, toxic chemicals, and industrial pollutants. These pollutants degrade soil quality and pose risks to human health and the environment.
- **Urbanization and Construction Activities:** Urban expansion and construction projects often involve land excavation, soil compaction, and soil sealing, leading to loss of arable land, soil compaction, and reduced soil permeability.
- **Climate Change:** Climate change exacerbates soil degradation through extreme weather events such as floods, droughts, and cyclones. These events intensify soil erosion, alter soil moisture levels, and disrupt soil microbial communities, impacting soil health and productivity.
- **Overexploitation of Natural Resources:** Unsustainable extraction of natural resources such as sand, gravel, and minerals destabilizes soil structure, alters hydrological cycles, and accelerates erosion processes.

WHAT CAN BE DONE?

1. **Conservation Tillage:** Adopting conservation tillage practices, such as no-till or reduced tillage, minimizes soil disturbance and maintains crop residues on the soil surface. This helps to protect the soil from erosion by wind and water, while also improving soil structure and organic matter content.

2. **Cover Crops:** Planting cover crops, such as legumes or grasses, during fallow periods or between cash crops, helps to provide soil cover and reduce erosion. Cover crops help to stabilize soil, enhance soil structure, and prevent nutrient leaching.
3. **Crop Rotation:** Implementing crop rotation systems helps to diversify cropping patterns and reduce soil erosion. Rotating crops with different root structures and growth habits can help to break disease cycles, improve soil health, and minimize erosion risk.
4. **Contour Farming:** Adopting contour farming practices involves planting crops along the contour lines of the land to minimize water runoff and soil erosion. Terracing, bunding, and constructing grass waterways are also effective techniques to reduce erosion on sloping terrain.
5. **Agroforestry:** Integrating trees or shrubs into agricultural landscapes through agroforestry systems helps to stabilize soil, reduce water runoff, and enhance biodiversity. Agroforestry practices such as alley cropping and windbreaks provide additional benefits such as shade, habitat for beneficial organisms, and supplemental income for farmers.
6. **Buffer Strips:** Establishing vegetative buffer strips along water bodies, field margins, and erosion-prone areas helps to trap sediment, filter runoff, and prevent soil erosion. These buffer strips can consist of grasses, shrubs, or trees depending on the site conditions.
7. **Soil Conservation Structures:** Installing soil conservation structures such as check dams, contour bunds, and retention ponds helps to control water runoff, reduce soil erosion, and promote groundwater recharge. These structures are particularly effective in areas prone to flash floods and soil erosion.
8. **Education and Extension:** Providing farmers with training, education, and extension services on soil conservation practices and sustainable land management techniques is essential for promoting adoption and implementation. Farmer field schools, demonstration plots, and farmer-to-farmer learning networks can facilitate knowledge sharing and capacity building.

Ankit Kumar

SC DISMISSED THE PLEA FOR 100% VERIFICATION OF VVPAT

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WHY IN THE NEWS?

The Supreme Court dismissed the plea for complete verification of Voter Verified Paper Audit Trails (VVPATs) in Indian elections. It also turned down the proposal to revert to the previous ballot paper system for elections, which had been advocated by opposition parties in recent times.

MORE ABOUT THE CASE AND DIRECTIONS ISSUED BY THE COURT

- This ruling doesn't change the voting process for citizens but brings about significant post-election modifications. Under the new provisions, **candidates ranking second or third in the election results can now request EVM verification**, enhancing transparency and accountability. This verification involves engineers from the manufacturing company examining the microcontroller program of EVMs, with candidates covering the costs, which are refundable if tampering is discovered.
- The court's refusal to mandate 100% VVPAT slip counting was based on various factors.

1. Counting all VVPAT slips would considerably extend the counting process and delay result announcements, **doubling the required manpower and potentially introducing errors or manipulation.**
2. The court noted that the **current 5% verification process hasn't revealed any discrepancies between EVM and VVPAT records**, indicating the effectiveness of the existing system. Hence, no need for 100% verification.

- In response to petitions, the Supreme Court directed the Election Commission to implement new measures to bolster the electoral process's integrity. For the first time, the **EC was instructed to secure and store symbol loading units (SLUs) for 45 days post-results declaration**, providing a safeguard for potential election petitions. Moreover, candidates now have the right to request EVM verification, further fortifying the verification process and ensuring result accuracy.
- Additionally, the **court proposed exploring the use of counting machines for tallying VVPAT slips instead of manual counting**, potentially introducing a more efficient and accurate method. The discussion during the proceedings also highlighted the idea of incorporating barcodes on VVPAT slips to facilitate machine counting, underlining the court's emphasis on leveraging technology to enhance electoral verification.

PREVIOUS JUDGEMENTS REGARDING VVPAT

CHANDRABABU NAIDU AND OTHERS V. UNION OF INDIA AND ANOTHER (2019)

- In this case, the petitioners advocated for a 50% randomised verification of VVPAT slips in each General and Bye Election, as opposed to one EVM per assembly constituency or segment in a parliamentary constituency.
- The Supreme Court stressed the significance of ensuring precise electoral outcomes and proposed increasing the number of machines subjected to VVPAT verification to instil greater confidence among political parties and voters.
- The Court ordered the augmentation of the number of EVMs subjected to VVPAT verification from one to five per Assembly Constituency or Assembly Segments in a Parliamentary Constituency, thereby enhancing the verification process and upholding the integrity of election results.

SUBRAMANIAN SWAMY V. ELECTION COMMISSION OF INDIA (2013)

- In this case, the Court highlighted the necessity of a paper trail as an essential element for conducting free and fair elections. The judgement underscored the pivotal role of VVPAT in

ensuring transparency and integrity in the electoral process, establishing a precedent for the adoption of VVPAT in elections.
- This case laid the groundwork for the obligatory utilization of VVPATs in elections, bolstering the credibility and reliability of the electoral system.

ABOUT WORKING OF THE SYMBOL LOADING UNIT (SLU)

- The SLU **serves the purpose of loading the candidates' symbols onto the VVPAT**. It is a small device, approximately the size of a matchbox, initially connected to a laptop or personal computer. A symbol-loading application is then utilized to load a bitmap file containing the candidates' names, serial numbers, and symbols onto the SLU. Subsequently, the SLU is connected to the VVPAT to transfer the file onto the paper audit machine, all under the supervision of a district election officer.
- SLUs are employed only a few days before polling in a specific seat, during the commissioning of EVMs, and the establishment of the list/order of contesting candidates on the ballot unit and the VVPAT. Candidate-setting can occur anytime between five to two days before the voting for a seat. Once the SLU is utilized to load symbols onto the VVPAT, the EVM is prepared for use. After this process, the SLU holds no relevance to the actual voting procedure.

ABOUT VVPAT

- The Voter Verified Paper Audit Trail (VVPAT) is a crucial component of the electoral process, designed to **enhance transparency, integrity, and trustworthiness in elections.** VVPAT machines provide voters with a physical paper record of their vote, **allowing voters to verify that their choice has been accurately captured by the Electronic Voting Machine (EVM)** before casting their ballot.
- The concept of VVPAT emerged as a response to concerns about the reliability and accountability of EVMs, particularly regarding the lack of a paper trail to independently verify electronic votes. The implementation of VVPAT technology **aims to address these concerns by providing voters with tangible proof of their vote, thus increasing confidence in the electoral process.**
- In operation, VVPAT machines are connected to EVMs and are activated once a voter casts their vote electronically. After the voter makes their selection on the EVM, the **VVPAT machine prints a paper receipt containing the name and symbol of the chosen candidate.** This paper receipt is displayed behind a transparent window for the voter to verify. Once the voter confirms that the printed receipt matches their selection, it is deposited into a secure compartment within the VVPAT machine.
- The introduction of VVPAT machines has been a significant development in electoral technology, particularly in countries like India, where electronic voting is widely used. VVPAT technology adds a layer of transparency and accountability to the electoral process.

PRELIMS PRACTISE QUESTION

Q1. Consider the following statements:

1. The Election Commission of India comprises five members.
2. The election timetable for both general elections and bye-elections is determined by the Union Ministry of Home Affairs.
3. The Election Commission is responsible for addressing disputes concerning the division or amalgamation of officially recognised political parties.

How many of the above statements are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

Answer: A

MAINS PRACTISE QUESTION

Q1. In your opinion, what innovative measures could the Election Commission implement to make the voting process more accessible and convenient for citizens?

Himanshu Mishra