NEXT IAS

DAILY EDITORIAL ANALYSIS

TOPIC

OVERUSE OF NITROGEN IMPACTING SOIL HEALTH

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Context

- The Union Minister for Agriculture and Farmers' Welfare launched the **rabi campaign, "Khet Bachao Abhiyan" (Save the Farm Campaign)** in Karnal, Haryana.
  - The focus of the campaign is to **correct the imbalanced use of chemical fertilisers,** which is harming soils and groundwater and polluting the air.

Indian Council for Research on International Economic Relations (ICRIER) Recent Policy Brief:

- It compared **actual nutrient use in 20 major states** with crop- and irrigation-specific norms between **2009-10 and 2024-25.**
- **NPK:** The N:P:K ratio stands at 10.5:4.1:1, against a derived normative 2.8:1.5:1.
  - **NPK refers to the three primary macronutrients** essential for plant growth: Nitrogen (N), Phosphorus (P), and Potassium (K).
- **Nitrogen Use:** Nationally, nitrogen use has moved from **7% below its recommended dose to 6% above it.**
  - Eleven of 20 major states, led by Jharkhand (72%) and Punjab (65%), overuse nitrogen.
  - Nitrogen's share in NPK use is back to about 67%— the 1970-71 level.
- **Phosphorus:** The phosphorus deficit has narrowed only from 29 to 22%, while the potassium deficit has deepened from 48 to 72%: Farmers apply just 9 kg of potash per hectare against a need of 32 kg.
  - Every state under-applies potash; Haryana and Jharkhand apply barely a tenth of what their crops need.

Reasons for Overuse of Nitrogen

- **Nutrient-Based Subsidy (NBS) scheme:** NBS let the prices of phosphatic and potassic fertilisers float with world markets, but kept urea out at a fixed price.
  - Between 2010-11 and 2024-25, Diammonium Phosphate **(DAP) prices nearly tripled** to Rs 54/kg, and **Muriate of Potash (MOP) rose six-fold** to Rs 52/kg, while the **price of nitrogen in urea rose by just 1%.** Farmers respond to relative prices.
- **Nitrogen also makes the crop look green,** while the damage from missing potash shows up later, and quietly.

Concerns

- **High Fiscal Burden:** Heavy subsidy on urea increases the government's fertilizer subsidy bill and strains public finances.
- **Imbalanced Fertilizer Consumption:** Excessive use of urea (nitrogen) compared to phosphatic and potassic fertilizers disturbs the N:P:K ratio, reducing soil productivity.
- **Low Nitrogen Use Efficiency (NUE):** Only a part of applied urea is utilized by crops; the rest is lost through volatilization, leaching, and denitrification.
- **Soil Degradation:** Continuous overuse leads to soil acidification, micronutrient deficiency, and long-term fertility decline.
- **Environmental Pollution:** It causes water pollution (eutrophication) due to nitrate runoff, and emits nitrous oxide (N_2O), a potent greenhouse gas.
- **Import Dependence & External Vulnerability:** Reliance on imported urea and natural gas exposes India to global price volatility and supply disruptions.

Government Initiatives

- **Neem-Coated Urea (NCU):** Mandatory coating of urea with neem to reduce nitrogen loss, improve efficiency, and prevent diversion to non-agricultural uses.

- **Nutrient-Based Subsidy (NBS) Scheme:** Promotes balanced fertiliser use (N:P:K) by subsidising phosphatic and potassic fertilisers, reducing overdependence on urea.
- **Direct Benefit Transfer (DBT) in Fertilisers:** Subsidy is transferred to companies after sale to farmers, ensuring transparency and reducing leakages/diversion.
- **Promotion of Nano Urea:** Developed by Indian Farmers Fertiliser Cooperative Limited, Nano Urea reduces conventional urea requirement while maintaining crop yield.
- **Soil Health Card Scheme:** Provides farmers with soil nutrient status, encouraging judicious and need-based fertiliser use.

Recommendations

- **Shift to Direct Benefit Transfer (DBT):** Replace input-based subsidies with per-hectare direct transfers that are neutral across nutrients and crops.
  - Gradually bring urea under the Nutrient-Based Subsidy (NBS) regime to reduce its price advantage and encourage balanced fertiliser use.
- **Strengthen PM-PRANAM:** Expedite the implementation of the PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth (PM-PRANAM) to incentivise states that reduce excessive chemical fertiliser consumption.
- **Promote sustainable technologies:** Redirect fertiliser subsidy savings towards drip irrigation, customised and coated fertilisers, biofertilisers, nano fertilisers and nitrogen-efficient seeds.
- **Adopt the 4R principle:** Promote the right fertiliser source, rate, time and place through soil testing and plot-specific recommendations. Crop rotation with pulses can also reduce nitrogen requirements for subsequent crops.

Conclusion:

- India must shift its focus from the **quantity of fertilisers consumed to the balanced supply of nutrients.**
- Rationalising subsidies, promoting sustainable farming and incentivising states can protect soil health while ensuring long-term food security.

Source: IE

Daily Mains Practice Question

[Q] India's fertilizer use remains heavily tilted towards nitrogen even after several policy attempts to promote balanced nutrition. Discuss its agronomic, fiscal and environmental consequences, and suggest reforms to correct it.