CURRENT AFFAIRS: 16.05.2026

West Asia crisis opens space for fertiliser policy reform

When product availability is itself a problem, how much can one subsidise?

Why in News?

The Prime Minister's push for halving **chemical fertilizers** requires systemic restructuring to dampen overconsumption of fertilizers and incentivize precise nutrient management, balancing agricultural productivity with national economic resilience.

Summary

- India's dependence on imported chemical fertilizers creates significant **fiscal strain** and **supply chain risks** due to geopolitical tensions.
- To ensure **food security**, the government is promoting **Nano-fertilizers**, **natural farming**, and **precision soil testing** to correct alarming **NPK imbalances**.
- Structural reforms like **Direct Benefit Transfer (DBT)** are now vital to foster sustainable, **high-efficiency agriculture**.

What Concerns are Associated with Chemical Fertilizer Use in India?

- **Supply Chain Vulnerabilities:** India suffers from a **chronic lack of natural reserves** for rock phosphate, potash, and elemental sulphur, leading to a **heavy reliance on imports**.
  - Although India has supply agreements with **Morocco, Saudi Arabia, and Qatar**, its heavy dependence on imports makes it vulnerable to geopolitical tensions in West Asia, particularly the closure of the **Strait of Hormuz**, a critical transit route handling around 30% of global fertilizer trade, threatening the supply of phosphoric acid and potash.
- **Fiscal Strain:** For the **Kharif 2026** season, the Union Cabinet approved a massive **₹41,534 crore** subsidy for Phosphatic and Potassic (P&K) fertilizers—an increase of over ₹4,300 crore from the previous year.
  - It exerts significant pressure on the national exchequer, widening the **fiscal deficit** by **diverting critical capital** from long-term infrastructure investment into **immediate consumption support**.
- **Subsidy Imbalances:** A major policy concern is that Urea is still **not** under the **Nutrient-Based Subsidy (NBS)** framework. This makes Urea significantly cheaper than NPK or DAP, incentivizing farmers to over-apply nitrogen. In some regions, the NPK ratio has reached an alarming **34:10:1**, far from the ideal **4:2:1**.
  - The **nitrogen use efficiency (NUE)** of urea is remarkably low, with **only about one-third of Nitrogen being absorbed** by plants; the rest is lost via **ammonia volatilisation or nitrate leaching** into groundwater.
- **Soil Health and Yield Saturation:** In states like **Bihar** and Punjab, increasing the dose of fertilizers no longer results in a proportional increase in crop yield because the soil's **organic carbon** is depleted.

- **Soil Health Card** data increasingly shows widespread deficiencies in micronutrients like **Zinc, Boron, and Sulphur**, which chemical fertilizers alone do not replenish.

- **Transition Challenge:** Some studies by **ICAR** have noted inconsistent performance of **Nano Urea** and **Nano DAP** in low-fertility soils when conventional urea is replaced by more than 50%.
  - Effective use of **nano-fertilizers** requires **foliar spray technology** (like drones), which many small-scale farmers still find difficult to access or afford.

Chemical Fertilizers

- **About: Chemical fertilizers** (synthetic or inorganic fertilizers) are **manufactured** substances containing high concentrations of essential plant nutrients. Unlike organic fertilizers (like manure or compost), which are derived from biological matter, chemical fertilizers are produced through **industrial processes**.
- **Big Three Nutrients (NPK):** Chemical fertilizers are designed to provide three primary macronutrients that plants need in large quantities:
  - **Nitrogen (N):** Essential for leaf growth and the "green" parts of the plant. The most common form is **Urea**.
  - **Phosphorus (P):** Critical for root development, flowering, and seed formation. Common forms include **DAP** (Di-ammonium Phosphate).
  - **Potassium (K):** Helps with overall plant health, disease resistance, and water regulation. Usually applied as **MOP** (Muriate of Potash).
- **Industrial Production Method: Haber-Bosch Process** is the most famous method, used to create nitrogen fertilizers by capturing nitrogen from the air and combining it with hydrogen (usually from **natural gas**) under high pressure.
- **Difference from Organic Fertilizers:**

Feature	Chemical Fertilizer	Organic Fertilizer
Origin	Synthetic/Man-made	Plant or animal waste
Release Speed	Immediate	Slow (requires soil microbes to break it down)
Bulk	Compact and easy to transport	Bulky and harder to handle

- **Industrial Innovation:** The push for **Nano-Fertilizers** (Nano Urea and Nano DAP) and **neem coated urea** is a macroeconomic game-changer that aims to increase "Nutrient Use Efficiency" (NUE).
  - By reducing the physical volume of traditional bulk fertilizers, India is lowering its logistics costs, decreasing warehouse requirements, and cutting down on the massive foreign exchange outflow used for imports.

What is the Significance of Fertilizers for India's Agricultural Productivity and Macroeconomic Health?

- **Impact on Agricultural Productivity:** Fertilizers are the "fuel" for India's **high-yielding variety (HYV) seeds**. Chemical fertilizers provide concentrated doses of Nitrogen (N), Phosphorus (P), and Potassium (K) that natural manure cannot supply at scale.
  - With **limited arable land**, fertilizers allow for multiple cropping cycles per year (Rabi, Kharif, and Zaid) by **quickly replenishing** soil nutrients between harvests.
  - Beyond food grains, fertilizers are essential for the production of **oilseeds**, **pulses**, and fodder, which support India's massive dairy sector—the largest in the world.
- **Food Security:** With a population exceeding **1.4 billion**, fertilizers are indispensable for maintaining the **surplus production of staples like rice and wheat**, which are essential for the **Public Distribution System (PDS)**.
- **Poverty Alleviation:** Higher yields translate to higher rural incomes. Since a large portion of the Indian workforce is still dependent on agriculture, **fertilizer availability** directly impacts rural consumption and GDP growth.
  - Agriculture employs **42%** of India's workforce and contributes **17-18%** to the country's GDP.
- **Inflation Control:** Agricultural productivity is the primary defense against food inflation that helps keep the **Consumer Price Index (CPI)** stable. By preventing supply shocks in staples like wheat and rice, the government can maintain a predictable **monetary policy** and avoid "**food-price-driven**" economic volatility.

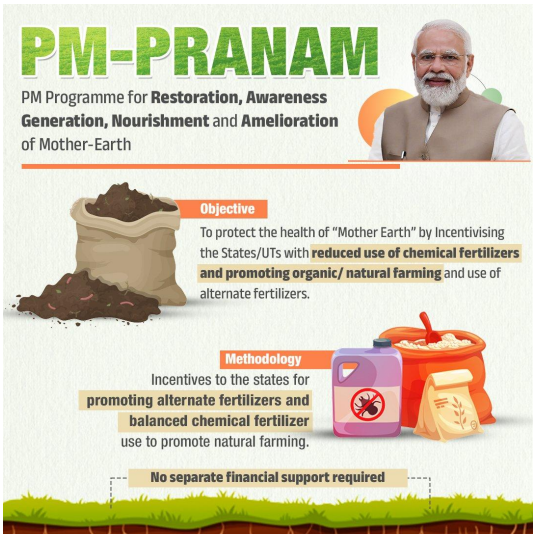
PM-PRANAM Scheme

What is the PM-PRANAM Scheme?

- **About: PM-PRANAM** (Programme for Restoration, Awareness, Nourishment, and Amelioration of Mother Earth) was approved in **June, 2023** to **reduce chemical fertilizer use** by incentivizing states to adopt **alternative fertilizers.**
  - It is operational for a period of **3 years** (FY 2023-24 to FY 2025-26).
- **Target Savings:** The ultimate goal of PM-PRANAM is to **achieve a ₹20,000 crore reduction in fertilizer spending,** a significant target that reflects the long-term strategy to reduce chemical fertilizer dependency while promoting sustainable agriculture.
  - It encourages the **balanced use of chemical fertilizers** alongside **biofertilizers and organic fertilizers** through **organic and natural farming practices.**
- **Tracking Mechanism:** The **Integrated Fertilisers Management System (iFMS)** is the platform envisaged to track the use of fertilisers.

How Can the PM-PRANAM Scheme Contribute to Sustainable Agricultural Practices in India?

- **Reduction in Chemical Fertilizer Use:** PM-PRANAM encourages States to minimize excessive chemical inputs like urea, **DAP (Diammonium Phosphate)**, **NPK (Nitrogen, Phosphorus, Potassium)**, and **MOP (Muriate of Potash)**, thereby reducing environmental risks like **soil degradation, water contamination,** and **biodiversity loss.**
  - A state's **urea consumption reduction** will be measured against its **three-year average** to determine **eligibility for subsidy savings and grants.**
- **Resource Conservation Technologies:** The Centre grants **50% of subsidy savings** to states, with **70% allocated for assets** supporting **alternative fertilizer technology and production**, and **30% for rewarding farmers, panchayats, and stakeholders** involved in fertilizer reduction and awareness.
- **Organic and Alternative Farming:** The scheme strongly supports the shift towards **organic farming** and sustainable alternatives, aiming to improve soil health and decrease dependency on synthetic fertilizers.
- **Positive Environmental Impact:** The scheme is being financed by **savings from existing fertilizer subsidies from the Ministry of Chemicals & Fertilizers**, with **no separate budget** allocated for PM-PRANAM.
  - It helps **mitigate water contamination, soil salinity, and biodiversity loss** associated with **electricity subsidy to farmers**.



Nano Fertiliser

Why in News?

Indian Farmers Fertiliser Cooperative (IFFCO) is setting up its **first overseas nano fertiliser plant** in **Brazil** through a joint venture, following successful exports to over **40 countries**, including the **US**, **Brazil**, and **Nepal.**

- It will be located in **Curitiba (Parana, Brazil)** with an **annual production capacity of 4.5 million litres.**

Note

- **Brazil**, a major producer of **corn, soybean, sugarcane**, and **coffee**, has seen a **20% cut in urea and DAP usage**, a **10% yield increase** in corn and soybean, and a **7% rise** in sugarcane output with the use of **Indian nano fertilisers**.
  - As a result, **Brazilian farmers** are increasingly interested in **boosting productivity** while **reducing fertilizer use.**

What is Nano Fertiliser?

- **About:** Fertilisers coated with **nanomaterials** (particles ranging from **1 to 100 nanometres**) are known as **nanofertilisers**.
  - These nanomaterials enable the **controlled release of nutrients**, improving their **availability to plants over a longer period.**
- **Nanomaterial Components:**
  - **Inorganic Materials:** Metal Oxides (e.g., **Zinc oxide (ZnO), titanium dioxide (TiO2))**, **Silica Nanoparticles** and **Hydroxyapatite Nanohybrids**.
  - **Organic Materials: Chitosan** (**natural biopolymer** derived from **chitin** found in **crustacean exoskeletons**), Carbon-based Nanomaterials (e.g., **carbon nanotubes (CNTs)**, **fullerenes**, and fullerols).
- **Types of Nanofertilizers:**
  - **Nanoscale Coating Fertilisers:** It uses **nanoparticle coatings** for **controlled nutrient release**.
  - **Nanoscale Additive Fertilisers:** It binds nutrients to **nano-sized adsorbents** for **gradual availability**.
  - **Nanoporous Materials:** It enables **slow nutrient release**, enhancing **plant absorption.**
- **Nano Fertiliser Adoption in India: Nano Urea** (2021) and **Nano DAP** (2023) are witnessing steady adoption, with **FY25 sales** reaching **26.5 million bottles** of Nano Urea Plus and **9.7 million bottles** of Nano DAP.
  - **IFFCO** also plans to launch **Nano Zinc** and **Nano Copper**.
- **Need of Nano Fertilisers in India:** India's heavy subsidies on conventional fertilisers (from **0.6%** in FY14 to **0.9%** in FY23 % of GDP), have led to a **Rs 1.67 trillion subsidy burden** in 2025–26, straining public finances.
  - **Nano fertilisers** offer a sustainable solution by **reducing import dependency** (e.g., DAP) and delivering nutrients more efficiently—**500 ml Nano Urea equals 45 kg conventional urea**—boosting efficiency.
- **Challenges with Nano Fertiliser Adoption:**
  - **Limited Farmer Awareness: Skepticism and resistance** from farmers used to traditional methods hinder adoption of nano fertilisers.

- **Inconsistent Results:** A **Department of Fertilizers audit** reported **25–50% variation** in nitrogen savings, raising scientific skepticism about nano urea's quality and effectiveness.
- **Food Chain Risks: Nanoparticles** may **bioaccumulate** in plants, posing risks to the **food chain**, **human health**, and the **environment**.

Q. With reference to chemical fertilizers in India, consider the following statements: (2020)

1. At present, the retail price of chemical fertilizers is market-driven and not administered by the Government.
2. Ammonia, which is an input of urea, is produced from natural gas.
3. Sulphur, which is a raw material for phosphoric acid fertilizer, is a by-product of oil refineries.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 2 only

(d) 1, 2 and 3