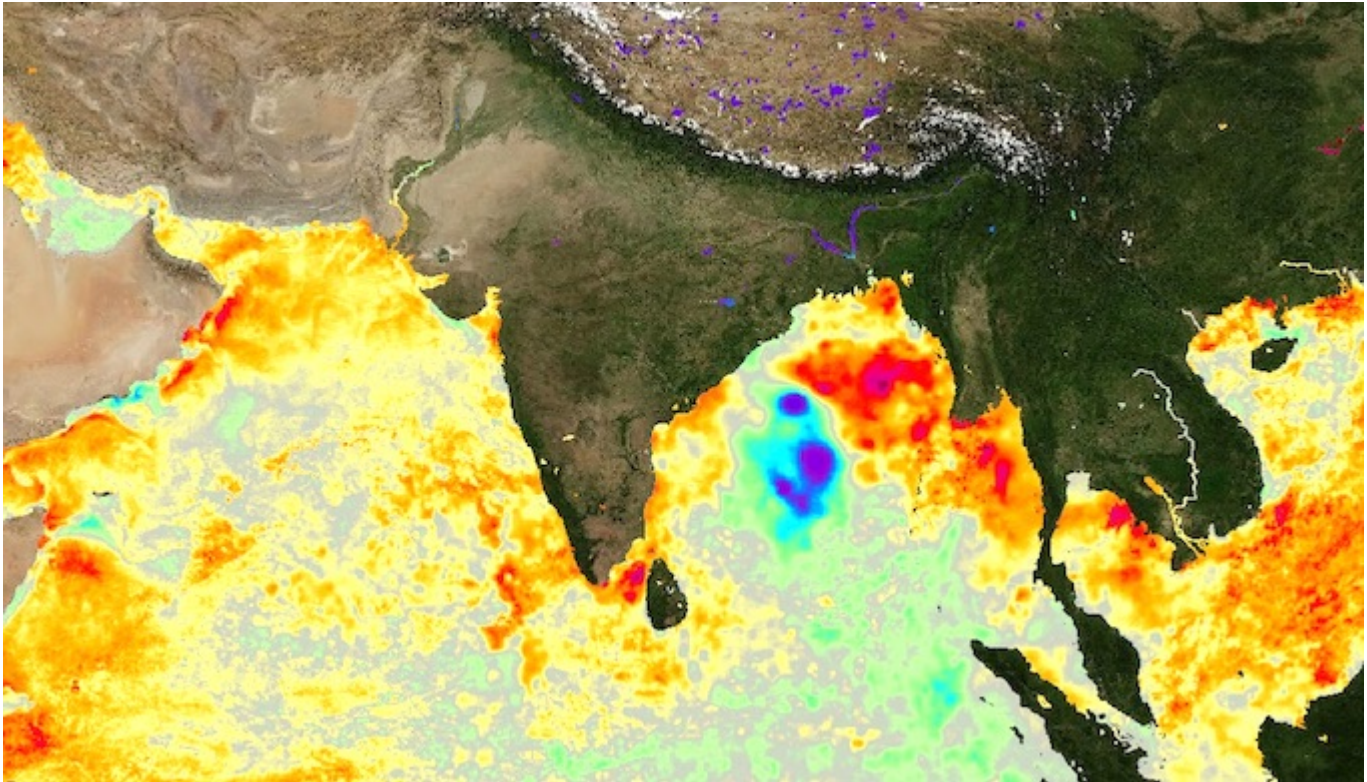


India's rivers are heating up due to climate change, shows study

(GS Paper 3, Environment)

Why in news?

- Climate change may turn India's rivers into hostile environments for aquatic life by 2070-2100, scientists warned in a new study.
- River water temperatures may increase during the period and dissolved oxygen levels may decrease.



Key Highlights:

- Under a high-emissions scenario, **average river water temperatures are expected to climb 7 degrees Celsius in summer**, reaching close to 35°C by 2070-2100.
- An increase in air temperature aggravates river water temperatures.
- Dissolved oxygen levels can drop to 7.3 milligrams / litre of water from 7.9 mg / l at present under a high emissions scenario.
- Aquatic organisms use dissolved oxygen to breathe. But oxygen becomes less soluble in warmer and polluted waters. **The riverine species cannot survive for long when the level of dissolved oxygen drops below 4-5 mg / l of water.**

River basins studied:

- The study covered seven Indian basins: Ganga, Narmada, Cauvery, Sabarmati, Tungabhadra, Musi and Godavari.
- Currently, the average river water temperature varies between basins. For example, it is 30.34°C in Cauvery and 27.97°C in Musi.

Basis of study:

- They used computer-modelling to predict river water temperatures and dissolved oxygen levels across the seven basins.
- Using data on air temperatures, the team predicted the historical, present and future river water temperatures for each of the seven basins. This was then converted into dissolved oxygen levels.

Observations:

- The algorithm predicted that the summer river water temperature for the Cauvery, Godavari, Tungabhadra, Sabarmati, Musi, Ganga and Narmada basins are expected to increase by 0.5°C, 1.9°C, 3.1°C, 3.8°C, 5.8°C, 7.3°C and 7.8°C, respectively, from 2071-2100.
- The study only considered the impact of air temperature on river water temperature. But a **nearby thermal plant, groundwater and pollutants can also create fluctuations**.
- The dissolved oxygen levels for Cauvery, Godavari, Tungabhadra, Sabarmati, Musi, Ganga, and Narmada basins will likely rise by 0.1 per cent, 3.3 per cent, 5.3 per cent, 6.4 per cent, 5.8 per cent, 12 per cent and 12.5 per cent, respectively, for the same period.

Saturation level:

- Dissolved oxygen saturation levels can go down by 2-12 per cent during 2070-2100. The saturation level gives us an idea of the maximum limit of dissolved oxygen level a river water body can have.
- Saturation level, **varies naturally with temperatures, pressures and salt levels**. Each river will have its own saturation limit.
- For every 1°C increase in river water temperature, there will be about a 2.3 per cent decrease in dissolved oxygen saturation level concentrations over Indian catchments under climate signals.
- Saturation levels help define the maximum permissible limits and standards for various river usages, the researchers said, adding that this has not been assessed under climate change.

Limitations:

- The researchers acknowledge that the lack of data on river flow was a significant limitation of the study.
- Flow data may play a vital role in predicting river water temperatures and that low flows significantly impact the Indian rivers in the summer.

India needs to do to reduce its fertiliser bill

(GS Paper 2, Governance)

Context:

- No country has as much area under farming as India. **At 169.3 million hectares (mh) in 2019**, its land used for crop cultivation was **higher than that of the US (160.4 mh), China (135.7 mh), Russia (123.4 mh) or Brazil (63.5 mh)**.
- With its **perennial Himalayan rivers and average annual rainfall of nearly 1,200 mm** against Russia's 475 mm, China's 650 mm and the US's 750 mm; **India has no dearth of land, water and sunshine** to sustain vibrant agriculture.
- But there's **one resource in which the country is short and heavily import-dependent i.e. mineral fertilisers**.

India's fertilizers import & production statistics:

- In 2021-22, India imported 10.16 million tonnes (mt) of urea, 5.86 mt of di-ammonium phosphate (DAP) and 2.91 mt of muriate of potash (MOP). **In value terms, imports of all fertilisers touched an all-time high of \$12.77 billion last fiscal.**
- In 2021-22, India also produced 25.07 mt of urea, 4.22 mt of DAP, 8.33 mt of complex fertilisers (containing nitrogen-N, phosphorus-P, potassium-K and sulphur-S in different ratios) and 5.33 mt of **single super phosphate (SSP)**. **The intermediates or raw materials for the manufacture of these fertilisers were substantially imported.**

Use of LNG in production of urea:

- Take urea, whose primary feedstock is natural gas. In 2021-22, India imported 23.42 mt of liquefied natural gas (LNG) valued at \$13.47 billion. As per the petroleum ministry's data, **the fertiliser sector's share in the consumption of re-gasified LNG was over 41 per cent**. The industry's LNG imports would have, then, been worth more than \$5.5 billion.

Manufacture of DAP:

- For DAP, domestic manufacturers import intermediate chemicals, namely **phosphoric acid and ammonia**. Some even produce phosphoric acid by importing rock phosphate and sulphuric acid. The latter can be further made from the import of sulphur.
- During the last fiscal, 6.44 mt of phosphoric acid, 2.31 mt of ammonia, 9.66 mt of rock phosphate, 1.92 mt of sulphuric acid and 1.90 mt of sulphur were imported into the country.

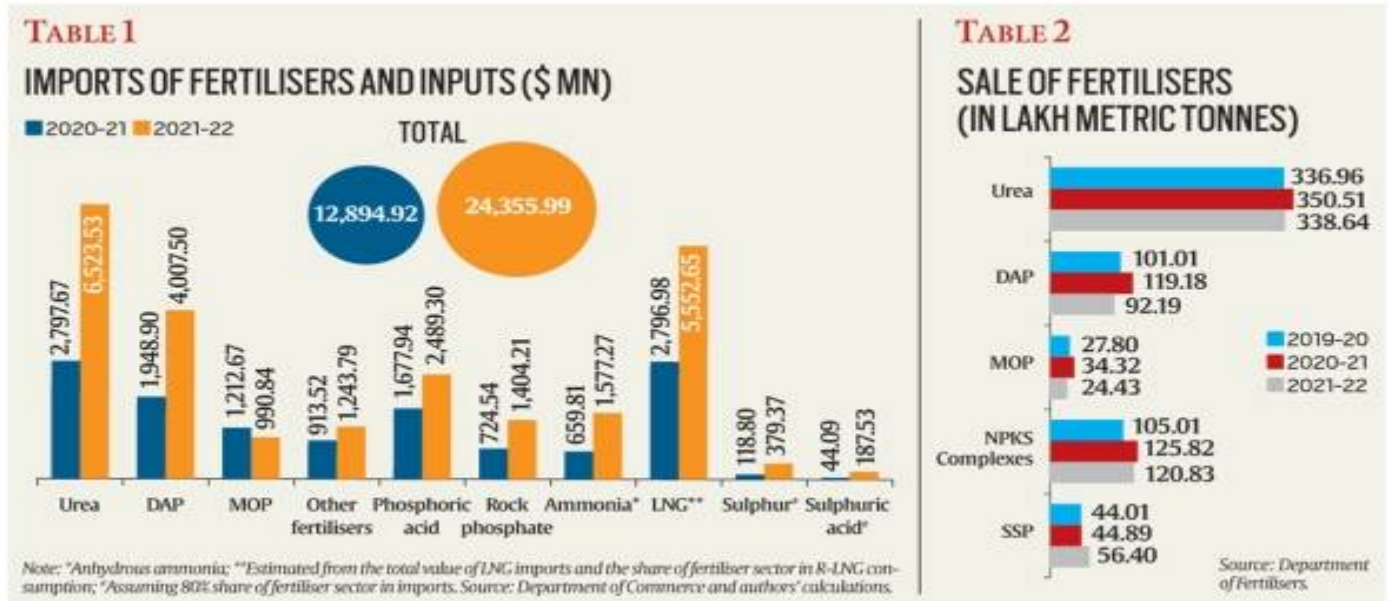


Table 1 shows the total value of fertiliser imports by India, inclusive of inputs used in domestic production, was a whopping \$24.3 billion in 2021-22. There are two costs here:

Cost on import:

- The first is **foreign exchange outgo**: Imports are mostly from
- China, Oman, UAE and Egypt (urea);
- China, Saudi Arabia and Morocco (DAP);
- Belarus, Canada, Russia, Israel and Jordan (MOP);
- Qatar, US, UAE and Nigeria (LNG);
- Morocco, Jordan, Senegal and Tunisia (phosphoric acid);
- Saudi Arabia and Qatar (ammonia); and
- Jordan, Morocco, Egypt and Togo (rock phosphate).

Fiscal cost:

- The second cost is fiscal. Fertilisers are not only imported, but Indian farmers also pay below what it costs to import or manufacture using imported inputs.
- The difference is paid as a subsidy by the government. That bill was Rs 1,53,658.11 crore or \$20.6 billion in 2021-22 and projected at Rs 2,50,000 crore (\$32 billion) this fiscal.

Concerns:

- Both costs are unsustainably high to bear for a mineral resource-poor country. India is feeling it, especially with global prices of urea, DAP, MOP, phosphoric acid, ammonia and LNG soaring two to two-and-a-half times in the last year (they have softened a bit of late).
- There was a time farmers had to be incentivised to use chemical fertilisers for boosting crop yields.
- Today, they have to be restrained from over-application. Farmers should know India imports half of its natural gas requirement and hardly has any mineable rock phosphate, potash or elemental sulphur reserves.

Roadmap for reducing fertilizer consumption in India:

- There is a need, first of all, **to cap or even reduce consumption of high-analysis fertilisers** – particularly urea (46 per cent N content), DAP (18 per cent N and 46 per cent P) and MOP (60 per cent).
- One way to do this is by **incorporating urease and nitrification inhibition compounds** in urea. These are basically chemicals that **slow down the rate at which urea is hydrolysed** (resulting in the production of ammonia gas and its release into the atmosphere) and nitrified (leading to below-ground loss of nitrogen through leaching).
- By **reducing ammonia volatilisation and nitrate leaching**, more nitrogen is made available to the crop, enabling farmers to harvest the same, if not better, yields with a lesser number of urea bags.
- Together with products such as **liquid “nano urea”** – their ultra-small particle size is conducive to easier absorption by the plants than with bulk fertilisers, translating into higher nitrogen use efficiency – it is possible to achieve a 20 per cent or more drop in urea consumption from the present 34-35 mt levels. That works out to 6.5-7 mt fewer imports, equivalent to \$4.5-5 billion at current prices.

Promoting SSP:

- A second route is by **promoting sales of SSP (containing 16 per cent P and 11 per cent S) and complex fertilisers** such as “20:20:0:13” and “10:26:26”. DAP use should be restricted mainly to paddy and wheat; other crops don’t require fertilisers with 46 per cent P content.
- India can also import more rock phosphate to make SSP directly or it can be converted into “weak” phosphoric acid. The latter, having only about 29 per cent P (compared to 52-54 per cent in normal “strong” merchant-grade phosphoric acid), is good enough for manufacturing “20:20:0:13”, “10:26:26” and other low-analysis complex fertilisers.
- As regards MOP, roughly three-fourths of the imported material is now applied directly and only the balance is sold after incorporating into complexes. It should be the other way around.
- India, to re-emphasise, needs to wean its farmers away from all high-analysis fertilisers. That movement, to use more NPKS complexes and SSP.
- It requires a concerted push, alongside **popularising high nutrient use-efficient water-soluble fertilisers** (potassium nitrate, potassium sulphate, calcium nitrate, etc) and **exploiting alternative indigenous sources** (for example, potash derived from molasses-based distillery spent-wash and from seaweed extract).

Way Forward:

- Finally, no plan to cap/reduce consumption of high-analysis fertilisers can succeed without farmers knowing what is a suitable substitute for DAP and which NPK complex or organic manure can bring down their urea application from 2.5 to 1.5 bags per acre.
- It calls for agriculture departments and universities not just revisiting their existing crop-wise nutrient application recommendations, but disseminating this information to farmers on a campaign mode.

Open network for digital commerce

(GS Paper 3, Economy)

Context:

- The government of India announced the launch of the pilot phase of **open network for digital commerce (ONDC)** in five cities in late April with an aim to “democratise” the country’s fast growing digital e-commerce space that is currently dominated by the two U.S.-headquartered firms, Amazon and Walmart.

What is ONDC?

- ONDC is a **not-for-profit organisation** that will offer a network to enable local digital commerce stores across industries to be discovered and engaged by any network-enabled applications.
- It is **neither an aggregator application nor a hosting platform**, and all existing digital commerce applications and platforms can voluntarily choose to adopt and be a part of the ONDC network.

Replication of UPI System:

- The ONDC aims to enable buying of products from all participating e-commerce platforms by consumers through a single platform. Currently, a buyer needs to go to Amazon, for example, to buy a product from a seller on Amazon.

- Under ONDC, it is envisaged that a buyer registered on one participating e-commerce site (for example, Amazon) may purchase goods from a seller on another participating e-commerce site (for example, Flipkart).
- The ONDC model is **trying to replicate the success of the Unified Payments Interface (UPI)** in the field of digital payments. UPI allows people to send or receive money irrespective of the payment platforms they are registered on.
- The open network concept also **extends beyond the retail sector**, to any digital commerce domains including wholesale, mobility, food delivery, logistics, travel, urban services, etc.

ABOUT ONDC

-  Assigned to Quality Council of India (QCI)
-  Nine member council to design & accelerate adoption
-  Aims to digitize entire commerce value chain, standardize operations, optimize logistics

What led to formation of ONDC?

- The Department for Promotion of Industry and Internal Trade (DPIIT), under Ministry of Commerce and Industries, conducted an outreach during the outbreak of the COVID-19 pandemic to understand its impact on small sellers and hyperlocal supply chain functioning.
- Post which, it found that there is a **huge disconnect between the scale of online demand and the ability of the local retail ecosystem** to participate.
- Following this, consultations were held with multiple ministries and industry experts and “ONDC was envisioned to revolutionise digital commerce in India,” as per the strategy paper.
- ONDC has been envisaged as an entity which should be able to work without the need for day-to-day guidance and advisory from the shareholders/members.
- The independence of the management is linked to the financial independence of the entity, and therefore, the entity will be required to get funding independently and have a self-sustaining financial model.

What is the current status?

- Presently, ONDC is in its **pilot stage in five cities** — Delhi NCR, Bengaluru, Bhopal, Shillong and Coimbatore with a target of onboarding around 150 retailers.
- The government has also **constituted an advisory council to analyse the potential of ONDC** as a concept and to advise the government on measures needed to accelerate its adoption.
- Over the next five years, the ONDC expects to bring on board 90 crore users and 12 lakh sellers on the network, enabling 730 crore additional purchases and an additional **gross merchandising value (GMV)** of ₹3.75 crore.
- The GMV for the digital commerce retail market in India was ₹2.85 lakh crore (\$38 billion) in 2020, which is only 4.3% of the total retail GMV in India.

What are the likely benefits of ONDC?

- The ONDC will **standardise operations like cataloguing, inventory management, order management and order fulfilment**, hence making it simpler and easier for small businesses to be discoverable over network and conduct business.

- However, experts have pointed out some likely potential issues such as getting enough number of e-commerce platforms to sign up, along with issues related to customer service and payment integration.

RBI warns of risks from cross-border outsourcing of IT services

(GS Paper 3, Economy)

Why in news?

- Recently, the Reserve Bank of India (RBI) has warned of risks from cross-border outsourcing of information technology (IT) services and recommended that regulated entities closely monitor such operations.
- The RBI's observations come at a time when it is considering a mandate for domestic processing of payment transactions in order to ring-fence India's local payment systems.



Institutions directed by the RBI:

- The provisions of the RBI's draft master directions are applicable to **scheduled commercial banks, local area banks, small finance banks, and payments banks**.
- Primary urban cooperative banks with asset size of more than Rs 1,000 crore, non-banking financial companies in top, upper and middle layers and credit information companies are also included.
- All-India financial institutions, such as the National Housing Bank and the National Bank for Agricultural and Rural Development, too, fall under the ambit of the draft directions.

Key Recommendations:

- The RBI has recommended that regulated entities **build appropriate contingency and exit strategies**. Additionally, firms should ensure that availability of records and the supervising authority would not be affected in the event of liquidation of the service provider.
- The RBI said that in principle, agreements should only be entered into with parties operating in jurisdictions generally upholding confidentiality clauses and agreements.

- However, the jurisdiction of the courts outside India, where data is stored and/ or processed, shall not extend to the operations of the regulated entity in India, on the strength of the fact that the entity's data is being stored and/ or processed there, even though the actual transactions are undertaken in India.
- The right of audit and inspection of service providers in different jurisdictions shall be ensured.

Background:

- In its Payments Vision Document released earlier, it said that in light of emerging geo-political risks, options would be explored to ring-fence domestic payment systems.
- The RBI, in particular, flagged the fact that global card networks stopped processing transactions in Russia following sanctions on the country by the US.

Way Forward:

- The broad aim of the RBI's draft directions is to ensure that outsourcing arrangements of regulated entities neither diminish the ability to deliver on obligations nor impede effective supervision.