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Daily News Analysis

The Hindu Important News Articles & Editorial For UPSC CSE

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France is considering India's Pinaka multi-barrel rocket launcher system as part of its military upgrade, evaluating it alongside other global systems.

- This reflects deepening India-France defence ties, with expanded cooperation across land, air, and naval forces.

France evaluating India's Pinaka rocket system for its use

Dinakar Peri
NEW DELHI

France is considering India's Pinaka multi-barrel rocket launch (MBRL) system for its requirements and is soon going to carry out a detailed evaluation of the system, according to a senior French Army officer.

"Indians presented to my Chief of Army Staff last February the Pinaka. It is very interesting for us. We are organising evaluation of 3-4 best providers of this system, India being among them," Brigadier-General Stephane Richou, French Army staff general international affairs, told *The Hindu* in an interview. "We have a special mission that is going to come to India in the coming weeks, to evaluate both the launcher and the ammunition... We are considering the possibility among several other systems that we are considering."

Noting that procurement processes take a lot of time, he said it was in the initial stage.

Brigadier-General Richou was in India last week for the 20th Army to Army staff talks.

Importance of ties

"I come here with a letter signed by my Chief of Army, to be delivered to the Indian Army Chief inviting him to France next year," he said, stressing the importance of the India-France relationship. "We have lot of avenues of cooperation," he said, adding, "Open the eyes and the arms... and we can cooperate as strong as the cooperation that exists between Air Force and Navy."

France has announced plans to replace its M270 Lance-Roquettes Unitaire (LRU) rocket systems in service.

The French Army has 13 upgraded M270 systems and since the beginning of the war in Ukraine, six systems were transferred to Ukraine.

Parading Pinaka: The Pinaka rocket system during the 75th Republic Day parade in Delhi. SHIV KUMAR PUSHPAKAR

Armenia became the first export customer for the indigenously developed Pinaka with interest expressed by several countries in the system.

The Indian Army has four Pinaka regiments in service and six more are on order.

The Pinaka Mk1 has a range of 38 km and it can fire a variety of ammunition. Several extended range ammunition are under development.

Trials for guided extended range Pinaka rockets are in the final stages which would increase the range to over 75 km. Eventually, the plan is to increase the range to 120 km and then to 300 km.

While noting that land cooperation is not as visible as the Air Force and Navy cooperation, the visiting officer said what they are looking for is not visibility but for partnership. "Lot of things are converging to make us strengthen our ties," Brigadier-General Richou stated.

The seventh edition of the bilateral Army exercise Shakti was held at Meghalaya in May. He said the next edition of Exercise Shakti would focus on high altitude warfare.

Four broad domains

On the focus of the staff talks, he said there were four broad domains in the cooperation – capability; education, information and training; equipment and understanding between the senior leadership.

On the global geopolitical situation and the discussions over that, he said they spanned various issues and with a reference to the United Nations Interim Force In Lebanon (UNIFIL) said, "France is one of the most important countries, and I have colleagues from the Army, we are standing between Lebanon, Hezbollah and Israel and we stay there... the international law has to be respected... We are near the Indian position."

His remarks come against the backdrop of the recent attacks on the UNIFIL in the ongoing Israeli offensive in Lebanon. India has 903 troops under the UNIFIL, while France has 665 troops.

India and France are currently in advanced stages of negotiations for 26 Rafale-M fighter jets and three additional Scorpene-class conventional submarines for the Indian Navy. Discussions are also under way for the co-design and co-development of a jet engine for India's Advanced Medium Combat Aircraft that is under development.

Pinaka Multi-Barrel Rocket Launch (MBRL) System

- **Developed by:** Defence Research and Development Organisation (DRDO) of India.
- **Purpose:** Provides the Indian Army with a rapid-fire, multi-target engagement capability.
- **Configuration:** The system comprises a multi-barrel rocket launcher capable of firing 12 rockets in 44 seconds.

Operational Range:

- **Pinaka Mk1:** 38 km range.
- Pinaka Mk2 (Extended Range): Under final trials; range of up to 75 km.
- **Future Variants:** Expected to reach ranges of 120 km and potentially up to 300 km.
- Ammunition Compatibility: Can fire various types of warheads, making it versatile for different mission profiles.
- **International Interest:** Armenia is the first export customer; France is considering it among other options.

- **Key Features:** Enhanced accuracy with a guidance kit, ability to engage multiple targets, and adaptability for diverse battlefield requirements.
- **Strategic Importance:** Strengthens India's self-reliance in defence technology under the 'Aatmanirbhar Bharat' initiative.

Page 07 : Prelims Fact

Gluten is a protein complex found in grains like wheat, barley, and rye that gives dough its elasticity.However, for people with coeliac disease, gluten triggers severe autoimmune reactions, and a strict gluten-free diet is required to manage symptoms.

WHAT IS IT?

Gluten: animator of the dough

Many cereal grains — but in particular barley, wheat, and rye — contain specific proteins that, when mixed with water and kneaded, create an elastic mass. This mass is called gluten. Two important types of these proteins are gliadins and glutenins. At the microscopic level, gluten is an elastic mesh of the protein molecules.

It allows the dough to rise and gives it its chewy character. The ability of gliadins and glutenins to create gluten makes them prized ingredients in the food industry.

This said, gluten is equally infamous for the allergic reaction it induces in some people. An enzyme called protease helps digest proteins, but it doesn't do a good job of breaking down gluten. When such gluten reaches the small intestine, the body can develop gastrointestinal problems.

The most well-known of these problems is coeliac disease (pronounced "see-lee-ack"). It's characterised by a severe allergic reaction in the small intestine, prompting the immune system to produce a large number of antibodies that attack the body's own proteins. The disease is present in around 2% of the general population.

Its primary symptoms are severe loose diarrhoea and anaemia, but there are other symptoms too. In fact, while doctors can diagnose coeliac disease using a blood test, an endoscopy, and/or a test looking for genetic predisposition to the condition, diagnosis is often delayed, and the symptoms are often misattributed to a different cause.

Maintaining a diet very low in gluten is the only effective way to treat coeliac disease at present.

- Vasudevan Mukunth

Gluten is infamous for the allergic reaction it induces in some people. VICTOR RODRÍGUEZ IGLESIAS/UNSPLASH

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with the subject 'Daily page'

What is Gluten?

- Gluten is a protein network found in cereal grains, particularly barley, wheat, and rye.
- It forms when proteins gliadins and glutenins combine with water, creating an elastic structure.

Role in Food

- Gluten gives dough its elasticity and chewy texture, allowing it to rise during baking.

- Due to these properties, it is widely used in the food industry to enhance texture and volume.

Gluten and Health Concerns

- Gluten is difficult to break down completely, as protease enzymes struggle to digest it.
- When undigested gluten reaches the small intestine, it can lead to gastrointestinal issues.

Coeliac Disease

- Coeliac disease is an autoimmune disorder affecting around 2% of people; it's triggered by gluten.
- Symptoms include severe diarrhoea and anaemia, though other symptoms may appear.
- Diagnosis involves blood tests, endoscopy, or genetic testing, but delays and misdiagnoses are common.

Treatment

- Currently, a strict gluten-free diet is the only effective treatment for coeliac disease.

Page 09 : GS 2 : Social Justice – Health

Recent trends in government health spending across low-income and lower middle-income countries (LICs and LMICs) show a decline in health funding, particularly after the pandemic.

- A World Bank report highlights this worrying shift, which challenges the progress toward Sustainable Development Goals (SDGs) for health.India is also affected by these trends.

Declining health spending risks SDG goals

Pre-pandemic gains are eroding. In India, the share of health in the budget dropped below the 2% mark after the pandemic

DATA POINT

The Hindu Data Team

Recent trends in government health spending across low-income countries (LICs) and lower middle-income countries (LMICs) reveal worrying shifts as nations approach the deadline for the Sustainable Development Goals. A World Bank paper examines government health spending in 63 LICs and LMICs by analysing data from 2019 to 2023, with comparisons to pre-pandemic trends from 2015 to 2019.

The study highlights an initial spike in health spending during the pandemic followed by a steady decline. While early spending cuts appeared temporary, the analysis indicates these reductions are more permanent, challenging the necessary momentum for health-related SDG targets. In particular, LICs and LMICs are seeing declines in health spending per capita.

Between 2019 and 2023, government health spending per capita grew only modestly, constrained by a decreasing share of health within overall government budgets as general government expenditure rose faster than health spending. This shift reversed the pre-pandemic trend where health had steadily gained priority in national budgets. The impact was starkest in LICs, where health funding remained minimal and heavily reliant on external aid.

The paper underscores risks for 35 nations, including India, where government health spending per capita and health spending's budget share have dropped. In 23 of these countries, projections by the International Monetary Fund indicate a likely contraction in government budgets from 2023 to 2029, potentially forcing policymakers to make difficult trade-offs to keep health spending on track.

In 2023, average real government health spending per capita continued its decline from the peaks observed during the pandemic response **(Chart 1)**. In LICs, spending surged in 2020 but since fell back to nearly pre-pandemic levels, reaching approximately $10 per capita in 2023. Similarly, in LMICs, spending dropped from its 2021 peak.

The recent, prolonged decline in government health spending has resulted in only modest growth rates during the pandemic and recovery period. From 2019 to 2023, the average real annual growth rate of government health spending per capita was a mere 0.4% in LICs and slightly higher at 0.9% in LMICs.

These modest growth rates stand in sharp contrast to the pre-pandemic period. Between 2015 and 2019, the average real annual growth of government health spending per capita was significantly higher, at 4.2% in LICs and 2.4% in LMICs **(Chart 2)**.

In 2023, the share of general government spending allocated to health continued to decline from its pandemic peak **(Chart 3)**. In LICs, this decrease began notably in 2021, with the health spending share dropping to 5.6%. In LMICs, the decline started a year later and was less pronounced, with the government health spending to general government expenditure ratio falling to 6.5% in 2023. These reductions were driven by negative growth in government health spending per capita, while general government expenditure per capita remained largely stagnant or saw modest growth in most years since 2021.

India is one of the LMIC countries where health spending has significantly decreased since its peak during the pandemic. **Chart 4** shows the trend in health spending as a percentage of the total budget over the years. Health's share in the budget surpassed the 2% mark in FY18 and remained elevated during the pandemic years, only to drop to 1.75-1.85% in the years that followed.

Health spending on life support

The data for the charts were sourced from the World Bank paper titled 'Peaks, declines and mounting risks' and India's Budget documents

RISING HEALTH RISK: India is one of the LMIC countries where health spending has significantly decreased since its peak during the pandemic.

Chart-1 The average real government health spending per capita by income group (constant US$ 2023). Includes data for 63 countries.

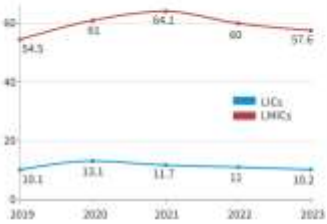


Chart-2 The average annual growth rate of real GHS per capita by income group (in %)

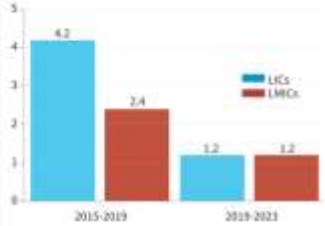


Chart-3 The average government health spending to government health expenditure ratio by income group (in %)

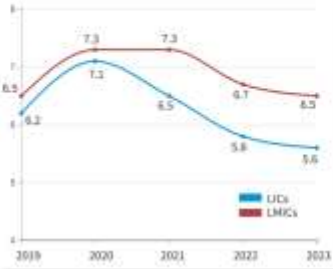
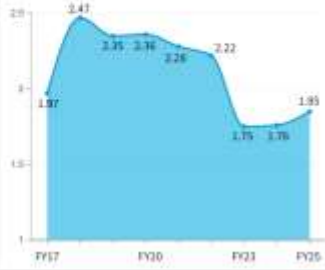


Chart-4 The share of health expenditure in total expenditure in India (in %). Figures for FY24 are revised estimates; for FY25, they are budget estimates



Study Overview:

- A World Bank study examines government health spending in 63 low-income countries (LICs) and lower middle-income countries (LMICs) between 2019 and 2023.

- It compares post-pandemic trends with pre-pandemic data from 2015 to 2019, focusing on the implications for achieving the Sustainable Development Goals (SDGs) related to health by 2030.
- The study reveals a concerning decline in health spending per capita in these countries, particularly as the deadline for SDGs approaches.

Pandemic Spending Surge and Subsequent Decline:

- There was an initial surge in government health spending during the pandemic in 2020.
- However, this spike was followed by a steady decline in health expenditures after the peak pandemic years.
- The reduction in health spending is now more permanent, reversing the pre-pandemic trend where health had gained a greater share in national budgets.
- This decline poses risks to achieving health-related SDG targets, especially in LICs and LMICs.

Modest Growth in Health Spending:

- From 2019 to 2023, government health spending per capita grew modestly.The average annual growth rate of health spending per capita was just 0.4% in low-income countries (LICs) and 0.9% in lower middle-income countries (LMICs) .
- This growth rate is significantly lower than the pre-pandemic period, where LICs saw a 4.2% growth and LMICs saw 2.4% growth from 2015 to 2019.
- The slowdown in health spending growth highlights the increasing strain on public health systems in these countries.

Declining Share of Health in Government Budgets:

- As general government expenditure grew faster than health spending, the share of government budgets allocated to health has decreased.
- In LICs, health spending as a share of total government expenditure dropped to 5.6% in 2023, a notable decline from its pandemic peak.
- LMICs saw a similar trend, with health spending as a share of the budget declining to 6.5% in 2023.
- These reductions reflect challenges in maintaining adequate funding for health while general government budgets remain largely stagnant or show modest growth.

Challenges Faced by LICs and LMICs:

- The decline in health spending per capita is particularly pronounced in LICs, where health funding has historically been low and highly dependent on external aid.
- In LMICs, while the decline is less severe, it still presents significant challenges in sustaining health improvements.
- Projections indicate that many countries, including India, are likely to experience further budget contractions from 2023 to 2029, which may require difficult trade-offs in funding priorities.

India's Declining Health Spending:

- India is among the LMICs where government health spending has significantly decreased since its pandemic peak.
- Health's share in the Indian budget dropped from over 2% during the pandemic to around 1.75–1.85% in subsequent years.
- This decline underscores the challenges India faces in maintaining its health budget allocation, particularly as the country grapples with increasing healthcare demands

Page 10 : GS 3 : Indian Economy – Infrastructure – Energy

India has substantial wind energy potential, yet a significant portion remains untapped.

- Recent policies aim to encourage repowering of outdated wind turbines to improve efficiency.
- However, challenges in land availability, infrastructure, and financial incentives persist, hindering the full realisation of the country's wind energy potential.

On improving wind energy generation

What is Tamil Nadu's wind power capacity? What about national wind energy capacity? What does repowering and refurbishing of wind turbines mean? Why are wind energy generators opposing the new policy of the Tamil Nadu government?

EXPLAINER

M. Soundariya Preetha

The story so far:

Tamil Nadu, which is a pioneer in wind mill installations, has wind turbines that are over 30 years old. The Tamil Nadu government released the "Tamil Nadu Repowering, Refurbishment and Life Extension Policy for Wind Power Projects - 2024" in August this year. However, wind energy generators have opposed the policy, approached the Madras High Court and got a stay. They have demanded a policy that will "promote wind energy generation".

What is the wind energy capacity and potential in India?

The National Institute of Wind Energy (NIWE) says that India has wind power potential for 1,163.86 GW at 150 metres above ground level, and is ranked fourth in the world for installed wind energy capacity.

At 120 metres above ground level, which is the normal height of wind turbines now, the potential is 695.51 GW, including the 68.75 GW from Tamil Nadu. Only about 6.5% of this wind potential is used at the national level and nearly 15% in Tamil Nadu. Gujarat, Tamil Nadu, Karnataka, Maharashtra, Rajasthan, and Andhra Pradesh are the leading States for installed wind energy capacity, collectively contributing 93.37% of the country's wind power capacity installation. Tamil Nadu has seen the installation of wind turbines since the 1980s, and today it has the second largest installed wind energy capacity with 10,603.5 MW, according to data available with the Ministry of New and Renewable Energy (MNRE). Of the 20,000 wind turbines in the State, nearly 10,000 are of small capacities, that is less than one MW.

How are wind turbines maintained?

Wind turbines that are more than 15 years old or have less than 2 MW capacity, can be completely replaced with new turbines, which is known as repowering. They can also be refurbished by increasing the height of the turbine, changing the blades, installing a higher capacity gear box, etc., to improve the energy generated. These can be done for standalone wind mills, or a group of wind mills owned by multiple generators. When wind energy generators take up safety measures in the old turbines and extend its life, its called life extension.

Powerhouse: Wind turbines along the Kadayanallur-Tenkasi highway in Tamil Nadu. JOTHI RAMALINGAM. G

The MNRE first came out with a "Policy for Repowering of the Wind Power Projects" in 2016 and based on consultations with stakeholders, released the "National Repowering & Life Extension Policy for Wind Power Projects -2023". The NIWE estimates the repowering potential to be 25.4 GW if wind turbines of less than 2 MW capacity are taken into consideration.

What does repowering and refurbishing entail?

Wind energy generators say that when turbines were installed in the 1980s, potential wind sites were mapped and the mandatory gap required between two wind mills were determined based on the technology available then. All the turbines were in the sub one MW category. Over the years, the wind mill manufacturing sector has matured and technology has evolved. Habitations have come up between wind sites, posing new challenges, and wind energy evacuation and transmission infrastructure close to the wind sites needs to be strengthened to match the generation.

Sources in the wind energy industry point out that a 2 MW wind turbine is usually 120 metres high and requires 3.5 acres of land. It can generate upto 65 lakh units of power. A 2.5 MW turbine, which is available in the market now, is 140 metres high and can generate 80 lakh units. It requires five acres. So, when an existing wind turbine is to be repowered by replacing it with a high capacity turbine, more land is required.

Further, at Aralvaimozhi in Tamil Nadu, a high potential wind site, the 48 MW installed capacity now is made up of mostly 250 KW turbines and the potential at the site is for 100 MW. A project to have three sub-stations of 230 KVA each at ₹800 crore was sanctioned six years ago and is yet to take off for multiple reasons. In Tamil Nadu, wind mills installed after 2018 do not have banking facility. When a turbine is repowered, it will be treated as a new installation and the generator cannot bank the energy generated. This impacts the financial viability of the project, say the sources.

What is the way forward?

Among the wind energy generating States, the repowering potential is the highest in Tamil Nadu with over 7,000 MW of installed capacity that can be replaced or refurbished. If the small turbines are repowered or refurbished, the contribution of wind energy to total energy consumed during the peak windy seasons can go up easily by 25%, says wind energy consultant A.D. Thirumoorthy.

While there have been generators which have replaced turbines in the past without government support, the policy itself does not promote wind energy generation, claim the generators. It should look at challenges on the field and consider how the wind energy potential can be harnessed fully by the generators. "No industry or energy generator will want to invest in a project that is not financially viable. The repowering policy is not commercially beneficial," said a textile mill owner in Coimbatore who has invested in wind energy.

THE GIST

- The National Institute of Wind Energy (NIWE) says that India has wind power potential for 1,163.86 GW at 150 metres above ground level, and is ranked fourth in the world for installed wind energy capacity.
- Among the wind energy generating States, the repowering potential is the highest in Tamil Nadu with over 7,000 MW of installed capacity that can be replaced or refurbished.
- Wind turbines that are more than 15 years old or have less than 2 MW capacity, can be completely replaced with new turbines, which is known as repowering.

Maintenance, Repowering, and Refurbishment of Wind Turbines

- Wind turbines with capacities under 2 MW or more than 15 years old can undergo repowering (full replacement) or refurbishment, which may involve upgrading turbine height, blades, and gearboxes to increase energy output.
- Repowering also extends to individual or groups of wind mills, allowing older units to generate more power efficiently.
- Life extension involves safety upgrades to extend the operational life of existing turbines.

Wind Energy Capacity and Potential in India

- India has substantial wind power potential, estimated at 1,163.86 GW at 150 metres above ground level, as reported by the National Institute of Wind Energy (NIWE).
- India ranks fourth globally in installed wind energy capacity, reflecting its prominence in renewable energy production.
- With turbines typically installed at 120 metres, the country's potential is currently at 695.51 GW.
- Leading states are Gujarat, Karnataka, Maharashtra, Rajasthan, and Andhra Pradesh contributing significantly to installed capacity.
- However, only about 6.5% of this potential is presently utilized, highlighting the scope for expansion in wind energy usage.

National Policy on Repowering Wind Projects

- The Ministry of New and Renewable Energy (MNRE) introduced its first policy on wind project repowering in 2016, with an updated "National Repowering & Life Extension Policy" released in 2023 after consultations with stakeholders.
- According to NIWE estimates, turbines under 2 MW capacity offer a repowering potential of approximately 25.4 GW.
- Despite the policy framework, wind energy producers often encounter limitations on the ground, which affect the practical implementation of repowering projects.

Challenges and Constraints in Repowering

- Wind energy sites established in the 1980s have turbines of smaller capacities, under one MW, set up with spacing and infrastructure designed according to older technology.
- New turbines, such as the 2 MW models at 120 metres high that require 3.5 acres of land, or the 2.5 MW models requiring five acres, pose land and spacing challenges.
- Infrastructure updates, like transmission capacity and energy evacuation facilities, have not kept pace with generation capabilities, impeding effective utilisation of wind potential.
- A delayed infrastructure project involving sub-stations at high-potential wind sites, sanctioned years ago, exemplifies these hurdles.

Policy and Financial Viability Concerns

- Policy challenges include the lack of a banking facility for energy generated from repowered turbines, impacting the financial feasibility of repowering projects.
- For wind energy producers, financial incentives and policy support remain critical for the viability of repowering, which could contribute significantly to overall energy output during peak seasons.

Page 11 : Prelims Facts

Climate change is increasing the frequency and severity of lightning strikes globally, with significant fatalities reported, particularly in India.

- Lightning rods are essential in preventing strikes by directing them safely to the ground, but their effectiveness depends on proper installation and maintenance.

Purple skies: Lightning strikes above the City skyline in Mumbai on October 24 evening. PTI

How do lightning rods prevent lightning strikes from reaching people?

While a lightning strike occurs between a cloud and an object on or near the ground, it takes the path of least resistance, which means it moves towards the closest object with the highest electric potential

Yasodevan Mukunth

Climate change is making lightning strikes around the world more common and deadlier. Every year, around 24,000 people around the world are killed by such strikes; in India, lightning strikes killed 2,887 people in 2022. There have been petitions to declare this phenomenon a natural disaster in India so that its survivors can access institutional mechanisms for protection. Against this backdrop, lightning rods are important for their ability to keep lightning away from people.

What is lightning?

Lightning is an electrical discharge between charged particles in a cloud and the ground. Objects can be classified as electrical conductors or insulators, but this depends on the electrical energy acting on the object. For example, the air around us is an electrical insulator: it doesn't transport electric charges. But if it is subjected to a high voltage of around 3 million V/m, its insulating properties break down and it can transport a current.

Lightning strikes are possible because electrical charges can build up in a cloud beyond the ability of air to keep resisting their movement.

What is a lightning rod?

While a lightning strike occurs between a cloud and an object on or near the ground, it takes the path of least resistance, which means it moves towards the closest object with the highest electric potential.

"The reason lightning strikes the rod has to do with its shape. Lightning rods are pointy and pointed things create stronger electric fields near them," IIT Kanpur assistant professor of physics Adhip Agarwala said. "It's like saying the flow of water speeds up near a nozzle. The electric field is the force that acts on molecules of air, so it becomes strongest near the lightning rod. This force ionises the air near the rod first and provides a route for the current to flow."

Think of a lightning strike as the extended hand of someone who wants to be pulled out of a pool. If there are many hands offering to help, the lightning's hand will reach for the strongest one. A lightning rod is an electrical conductor that takes advantage of this fact with one addition: engineers install it on building tops in a way that it's the first hand the lightning encounters on its way down. This is also why it's risky to stand under trees in an otherwise open field, like a farm.

Where does the current in a lightning rod go?

Heat energy always flows from a warmer object to a cooler object. Liquid water flows from a place with a higher gravitational potential to a lower one. Similarly, an electric current flows from a place with higher electric potential to a place with lower electric potential.

Fortunately, we have an abundant source of lower electric potential: the earth. The lightning rod is connected to a wire that drops through the length of the building into the ground, where it dissipates its electric charges into its surroundings. The idea here is that electrifying the earth will need virtually infinite amount of charges, so it's treated as a bucket that will never fill up.

However, some parts of the bucket may still be better at receiving the charges than others.

If a strike induces a large current in a grid-connected electrical system, engineers connect the wire to a line that allows only high currents, thus diverting them away from devices that can handle only low currents. Such setups are called lightning arresters.

Can lightning evade a lightning rod?

A lightning strike may evade a lightning rod if the rod is installed at the wrong height or angle or too close to another structure, isn't properly grounded, if there are multiple thunderstorms in an area, if it has a flawed design, or if it has become misshapen and/or corroded due to lack of maintenance.

It can also fail if an electrical discharge ascends from the ground to meet a descending strike, risking bypassing the rod, or if a strike is more attracted to the side of a tall building than to the top.

Over the years engineers have devised new incentives for lightning to prefer a lightning rod over other structures nearby. Among others, they make sure a lightning rod is available for lightning to strike within the minimum distance the strike travels in each step it takes towards the ground.

What dangers does a lightning rod pose?

The lightning rod and the components connected to it are designed to carry a lightning strike into the ground. This means catching the strike and safely transporting it. If the wire bends in a U shape at any point, the two arms of the U should be far apart to prevent the current from arcing across and shorting the conductor. The charges should also not be able to arc through any other objects nearby. Engineers also bury the grounding wire in a part of the crust with higher electrical conductivity so that the wire dissipates charges faster. In the 1960s, a U.S. engineer named Herbert Uller developed a system later called a concrete encased electrode: it has the properties of a good grounding material, including better electrical conductivity than soil.

The International Electrotechnical Commission publishes standards that specify the design limits and points of failure engineers can consider when installing lightning rods, and the priorities that planners and policymakers should adopt – informed by technical considerations – when estimating risk and liability.

What is Lightning?

- Lightning is an electrical discharge between charged particles in a cloud and the ground.

- Air, an electrical insulator, breaks down under high voltage, allowing current to flow.
- Lightning strikes occur when electrical charges build up in a cloud beyond the air's resistance.

What is a Lightning Rod?

- A lightning rod is an electrical conductor installed on building tops to divert lightning strikes.
- Lightning prefers the path of least resistance, and the rod's pointed shape creates a stronger electric field, ionising the air and offering a route for the current to flow.

Where Does the Current Go?

- The lightning rod is connected to a wire leading to the ground, where the electric charges dissipate.
- This process uses the earth as an infinite source of lower electric potential.

Can Lightning Evade a Lightning Rod?

- Lightning can bypass a rod if it's poorly installed, improperly grounded, or damaged.
- Multiple thunderstorms, faulty design, or a strike targeting a nearby structure can also cause evasion.

Essentials of Lightning Rods

- The rod and its components are designed to carry lightning safely to the ground.
- Proper installation with well-maintained wires and grounding is essential to avoid accidents.

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Daily News Analysis

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States and the Centre's fetter of 'net borrowing ceiling'

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The central government, in 2023, imposed a 'Net Borrowing Ceiling' (NBC) on the State of Kerala to restrict the maximum possible borrowing that the State can make under the law. This ceiling is 3% of the projected Gross State Domestic Product (GSDP) for FY2023-24. The NBC now encompasses all borrowing avenues, including open market loans, financial institution loans, and liabilities from the public account of the State. Furthermore, to stop States from circumventing the borrowing cap through State-owned enterprises, the ceiling has been extended to cover certain borrowings by these entities as well.

This has been a huge blow to the financial position of the State, with Kerala finding it difficult to meet its expenditure. In addition, this has restrained the State from investing further in developmental and welfare activities. It has also ignited political and legal controversies which have created an incompatible situation between the Centre and the State. Kerala approached the Supreme Court of India on the issue of the encroachment on the executive power that is conferred on the State under Article 293 of the Constitution of India to borrow on the security and guarantee of the Consolidated Fund. The State has alleged that the State's fiscal autonomy, as guaranteed and enshrined in the Constitution of India, has been illegally curtailed by the Centre. This has been the first case in the history of the Court wherein Article 293 has come up for interpretation.

Borrowing powers and provisions

Chapter II of Part XII of the Constitution deals with the borrowing powers of the Centre and States. Article 292 speaks about the borrowing power of the central government which entitles the central government to borrow loans upon the security of the Consolidated Fund of India. Article 293 empowers the State government to borrow within the territory of India upon the security of the consolidated fund of the State. In both cases, the extent of borrowing may be fixed from time to time by a law enacted by Parliament and the State legislature, respectively. As in Article 293(2), the Government of India may grant loans to any State subject to conditions laid down by any law made by Parliament up to the limits fixed under Article 292.

The central government can also provide guarantees upon the Consolidated Fund of India in respect of loans raised by any State. Article 293(3) imposes a restriction on the State government if the repayment of loans or a guarantee which has been given by the Government of India (if taken by the predecessor government is still outstanding). In such a case, the consent of the central government is essential to raise such a loan. The central government is afforded broad discretion over "consent" by specifying that it may be granted subject to any conditions as the Government of India deems appropriate.

The Centre's NBC step and, subsequently, Kerala's move to approach the higher judiciary on the issue, highlight the need to revisit Article 293 of the Constitution

Article 293 of the Constitution is adopted from Section 163 of the Government of India Act, 1935. In the Constituent Assembly, while Article 293 (draft Article 269) was debated on August 10, 1949, a member, Ananthasayanam Ayyangar, noted that the issue of borrowings and loans requires greater scrutiny as borrowing imposes heavy obligations on not only the present generation but also future generations. He suggested that a commission akin to the Finance Commission may be constituted.

Section 163(4) of the Government of India Act, 1935 stated that while exercising the power conferred under Section 163(3) regarding 'consent', the Federation shall not refuse or make unreasonable delay in granting the loan or providing guarantee, or impose any unreasonable conditions when sufficient cause is shown by the provinces. If any dispute arises out of the matter stated it was to be referred to the Governor-General whose decision shall be final.

But this clause was not adopted into the Constitution. The reason was that this provision was included in the Government of India Act, 1935 as it expected that a different agency that was not a national of India would be in charge of the administration. But after the Independence, it was felt that such a provision was not necessary as State governments replaced the provinces and a national government was established at the Centre.

Eliminating revenue shortfall

To implement the mandates in Article 292, the Fiscal Responsibility and Budget Management (FRBM) Act, 2003 was enacted to maintain financial restraint by establishing goals such as the elimination of revenue shortfall and the reduction of fiscal deficit. To eliminate the revenue shortfall and the budgetary deficit, a target of 3% of GDP is established for the Centre's yearly fiscal deficit ratio (FD). As in the Centre's directives, States enacted their own pieces of legislation to control their fiscal deficit. The FRBM Amendment Act, 2018 required the central government to ensure that the fiscal deficit did not surpass 3% of GDP and that the total public debt did not surpass 60% of GDP. By 2025-26, the government expects to reduce the fiscal deficit to less than 4.5% of GDP. The Centre's restriction on the borrowing limits of the States so as to attain fiscal consolidation by restricting the fiscal deficit, and without considering the financial position of States, is an encroachment of the autonomy of States. It also lowers their ability at budget balancing.

The issue of the borrowing power of States guaranteed under Article 293 of the Constitution is before the Supreme Court in the case filed by the State of Kerala. As the interpretation of Article 293 of the Constitution of India raises key questions about fiscal decentralisation, State fiscal autonomy and past borrowing practices, the Court has referred the issue of a State's borrowing powers to a Constitutional Bench. The matter also touches on whether the fiscal regulations imposed by the Centre have negatively impacted the Reserve Bank of India's control over fiscal consolidation.

Contemplating the transforming economic, political, and fiscal landscape in India, it is time to revisit Article 293 of the Constitution. Section 163(4) of the Government of India Act, 1935 warns the unnecessary refusal or delaying or the imposing of conditions in granting loans by the Centre. Similarly, a remedial measure, as mentioned in Section 163(4), could have been adopted in the Constitution when a dispute arises.

There is a need to strengthen this Article

Article 293 of the Constitution must be strengthened in the following manner.

As suggested by Ananthasayanam Ayyangar, a commission akin to the Finance Commission is essential to decide any issues that may arise regarding the approval of a loan upon considering the financial position of States as well as the Centre's goal of limiting fiscal deficit.

There must be proper guidelines which are to be adhered to when the Centre exercises the wide powers granted under Article 293(4) of the Indian Constitution – crucial in maintaining a balanced fiscal framework between the Centre and the States, and which enhance cooperative federalism. Otherwise, there could be arbitrary decision-making that may disrupt fiscal discipline, leading to either unchecked borrowing or overly restrictive conditions.

When exercising the wide powers granted under Article 293(4), the Centre should adhere to the following guidelines: transparency in decision-making thereby ensuring that the procedures and standards for accepting or rejecting governmental borrowings are transparent to the public; having a consultative process, where there is consultation with State governments before prescribing any terms or limitations on borrowing which enhances cooperative approach; ensuring equitable treatment where there an employment of borrowing terms and restrictions applied uniformly for all States to eliminate prejudice or favouritism; an admiration for fiscal autonomy, ensuring that there is financial autonomy for a State, the restrictions are reasonable and do not unduly hamper a State's ability to manage its finances effectively.

Adhering to these guidelines can ensure that the Centre's powers under Article 293(4) are exercised fairly, transparently and in a manner that supports balanced fiscal management and cooperative federalism.

GS Paper 02 : Indian Polity – Federal Structure

UPSC Mains Practice Question: Discuss the implications of Article 293 on the financial autonomy of Indian states. In light of the Kerala borrowing cap case, examine how federal fiscal policies impact cooperative federalism.. (150 words/10m)

Context :

- In 2023, the central government imposed a borrowing cap on Kerala, restricting its financial autonomy and sparking a constitutional debate on Article 293.
- Article 293 governs state borrowing powers.
- Kerala challenged this cap, arguing it limits the state's fiscal independence.
- The Supreme Court has referred the issue to a Constitutional Bench.

Overview of the Net Borrowing Ceiling on Kerala

- In 2023, the central government imposed a Net Borrowing Ceiling (NBC) on Kerala, capping the state's borrowing at 3% of its projected Gross State Domestic Product (GSDP) for FY2023-24.
- This NBC includes all forms of borrowing, such as open market loans, loans from financial institutions, and public account liabilities, extending to certain borrowings by state-owned enterprises to prevent circumvention of the limit.
- The ceiling has constrained Kerala's financial capacity, restricting developmental and welfare investments, and has led to political and legal controversies over state fiscal autonomy.

Kerala's Legal Challenge and Article 293 Interpretation

- Kerala challenged the NBC in the Supreme Court, claiming that it infringes upon the state's executive power under Article 293, which allows states to borrow on the security of their Consolidated Fund.
- Article 293 empowers states to borrow domestically, and the state argued that the Centre's restrictions on this ability infringes on their constitutionally guaranteed fiscal autonomy.
- This is the first case where Article 293 is being interpreted by the Court, raising significant questions about state financial independence.

Borrowing Powers under the Constitution

- Chapter II of Part XII of the Indian Constitution outlines the borrowing powers of the Centre and states.
- Article 292: Empowers the Centre to borrow on the security of the Consolidated Fund of India.
- Article 293: Grants states the authority to borrow within India on their Consolidated Fund's security.

- Article 293(3): If a state has outstanding loans from the Centre, it requires the Centre's consent for new borrowing, and the Centre can attach conditions to this consent.
- This provision was inspired by Section 163 of the Government of India Act, 1935, but lacks the clause preventing arbitrary delays or conditions that existed in the original Act.

Fiscal Responsibility and Budget Management Act, 2003

- The Fiscal Responsibility and Budget Management (FRBM) Act, 2003 was implemented to manage financial discipline, aiming for the elimination of revenue and fiscal deficits.
- The Act set a target for the Centre to maintain its fiscal deficit at 3% of GDP.
- The FRBM Amendment Act, 2018 established that the Centre's fiscal deficit must not exceed 3% of GDP, and total public debt should stay below 60% of GDP by FY2025-26.
- The Centre's enforcement of borrowing limits on states for fiscal consolidation has restricted states' budgetary independence.

Supreme Court Case and Fiscal Autonomy Concerns

- Kerala's Supreme Court case questions if Centre-imposed fiscal regulations conflict with states' fiscal rights under Article 293.
- The Court has referred the issue to a Constitutional Bench, considering broader implications for fiscal decentralisation and autonomy.
- The case also examines the impact of these regulations on the Reserve Bank of India's role in fiscal consolidation.

Suggestions for Strengthening Article 293

- Establishment of a Borrowing Commission: A commission, similar to the Finance Commission, could be established to resolve borrowing disputes, balancing both state and Centre interests.
- Guidelines for Centre's Power under Article 293(4):
  - Transparency in decision-making – making the criteria for borrowing approvals and rejections clear.
  - Consultation with states before imposing any borrowing terms or conditions.
  - Uniform application of terms to prevent discrimination and ensure fairness.
  - Preservation of state fiscal autonomy by implementing only reasonable restrictions on borrowing.
- Following these guidelines could promote cooperative federalism and balanced fiscal management between the Centre and states, ensuring that Centre's Article 293(4) powers are applied in a fair and transparent manner.