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GS 1: ANCIENT HISTORY
THE HINDU PAGE: 3

2,000-year-old Megalithic rock-cut chamber comes to light in Kasaragod

The Hindu Bureau
KASARAGOD

A laterite rock-cut chamber, believed to be nearly 2,000 years old and linked to the Megalithic period, was unearthed on Sunday during excavation work for the construction of a compound wall at Panayal in Kasaragod district of Kerala.

The structure was discovered on a private property. Nandakumar Koroth, archaeologist and faculty member of the History department at Nehru Arts and Science College, Kanhangad, inspected the site and confirmed that the find is a Megalithic laterite rock-cut chamber.

The laterite rock-cut chamber was discovered at Panayal in Kasaragod during construction work. SPECIAL ARRANGEMENT

Mr. Koroth said the circular inner chamber had been carved out of laterite rock, with its entrance sealed by a stone slab. A circular aperture of around five cm in diameter is seen at top, designed to allow a person to descend into the chamber. A shaft, around three feet deep, leads to circular burial chamber. As the interior is filled with soil, no urns or artefacts are presently visible.

Megalithic communities dug such chambers by interring pottery as part of ritual belief systems. Locally, these chambers are known as 'Muniyara', 'Pandava cave', 'Peeranki cave', 'Nidhikuzhi', and 'Kalppathayam'.

K. Krishnaraj, archaeologist and officer in charge of the Pazhassi Raja Archaeological Museum, said further excavation will be done in the coming days. "We are expecting that there will be materials and evidence, which will shed light on the past," he said.

Several umbrella stones, another Megalithic monument, have been discovered in the nearby areas.

GS 3: INTERNAL SECURITY
THE HINDU PAGE: 4

Centre inks ₹5,000-cr. deal to strengthen maritime security

Coast Guard to get six ALH Mk-III helicopters from HAL; Russian Shtil missiles to be installed on Navy's frontline warships; acquisitions aim to enhance air defence and generate job opportunities

Saurabh Trivedi
NEW DELHI

The Defence Ministry on Tuesday signed contracts worth ₹5,083 crore for the acquisition of six Advanced Light Helicopters Mk-III (maritime role) for the Indian Coast Guard and Shtil surface-to-air vertical launch missiles for the Indian Navy.

The contract for the six choppers, along with operational role equipment, an engineering support package, and performance-based logistics support, valued at ₹2,901 crore, has been signed with Hindustan Aeronautics Ltd.

Indigenous push

The purchase comes under the category of indigenously designed, developed, and manufactured products, the Ministry said.

The twin-engine helicopters incorporate state-of-the-art features superior to the airborne platforms currently in operation, and are capable of undertaking a wide spectrum of maritime security missions from shore-based airfields as well as from ships at sea.

Winged watch: The ALH Mk-III choppers will enhance protection of artificial islands and offshore installations. L. BALACHANDAR

Their induction is expected to significantly enhance the Indian Coast Guard's capability to ensure the safety and protection of artificial islands, offshore installations, and fishermen, as well as safeguarding the marine environment, the Ministry said. The project envisages supply of equipment from more than 200 MSMEs and is expected to generate approximately 65 lakh man-hours of employment.

The contract reinforces the government's commitment to Aatmanirbhar Bharat, or resilient India, and the Make-in-India initiative, while strengthening the country's maritime security architecture, it added.

Separately, the contract for the procurement of Shtil missiles and associated missile holding frames, valued at ₹2,182 crore, has been signed with JSC Rosoboronexport, a state-run company of the Russian Federation.

The acquisition is aimed at substantially enhancing the air defence capabilities of warships on the front line against a wide spectrum of aerial threats, the Ministry said.

Rapid reaction

The system will bolster the layered air defence architecture aboard Indian Navy platforms by providing rapid-reaction, all-weather engagement capability and improved survivability in contested maritime environments. The contract underscores the long-standing defence partnership between India and Russia.

The contracts were inked in the presence of Defence Secretary Rajesh Kumar Singh at South Block in New Delhi.

GS 2: INTERNATIONAL RELATIONS
THE HINDU PAGE: 5

Understanding geopolitical factors behind India's silence over Khamenei death

NEWS ANALYSIS

Suhasini Haidar
NEW DELHI

The Union government has come under attack from Opposition parties for its silence on the killing of Iran's Supreme Leader Khamenei.

Though External Affairs Minister S. Jaishankar spoke with his Iranian counterpart, Abbas Araghchi, there was no mention in any of the readouts of a condolence message or the condemnation of the U.S.-Israeli strikes in the heart of Tehran.

"The trend towards killing or abducting leaders of sovereign countries needs to be countered if we are to live in a civilised world, and not in the jungle. If countries do not come together to oppose this trend, they themselves may be 'on the menu' next," said one former Ambassador well-versed in international law who asked not to be named.

What then explains the absence of any comment from India over the assassination of Iran's leader, or the deadly strikes on schools and hospitals? The External Affairs Ministry did not respond to requests for a reasoning on its statements.

When asked, experts said there were several factors behind India's decision not to comment directly on the killings in Iran. "First, the challenge of navigating today's complex geopolitics. Second, a circumscribed relationship overall with Iran in recent decades, despite the Chabahar port. And third, Khamenei's criticism of India on the issues of Kashmir and the treatment of minorities," former Ambassador to Iran Rakesh Sood told *The Hindu*.

In the streets: People staging a protest in J&K on Tuesday over the assassination of Iran's Supreme Leader Khamenei. IMRAN NISSAR

Ties with Israel

India has had a close security relationship with Israel for decades, but this has exponentially improved in the past few years. With Mr. Modi's visit to Jerusalem last week, and his address to the Knesset, where he proclaimed India stands "with Israel, firmly, with full conviction, in this moment, and beyond", New Delhi appears to be abandoning its traditional regional balance in favour of Israel. It is significant that after the initial strikes by Israel and Iran's retaliatory strikes across the region, Mr. Modi spoke to Mr. Netanyahu and other Gulf Cooperation Council (GCC) leaders, but not to his Iranian counterpart.

India's ties with Iran have weakened concurrently, not as much due to ties with Israel, but over the tightening of U.S. sanctions on Iran. As a result, after zeroing out oil imports from Iran in 2018, India-Iran trade has wound down from about $17 billion in 2018 to about $1.68 billion in 2025, and investments in Iranian oil and gas fields have been frozen.

India-Iran relations had weathered many political storms in earlier decades. However, more recently, New Delhi had taken umbrage to Khamenei's comments about internal developments in India, including criticism of the Centre's Kashmir policy in 2017 and after the Article 370 amendments in 2019, as well as his statement in March 2020 referring to the Delhi riots as proof of a "massacre of Muslims" in India.

Indians in Gulf region

India's silence may also be explained by its desire to not upset ties in the Gulf region, especially the UAE and Saudi Arabia, where Iran has targeted U.S. bases, oil facilities, and infrastructure. In particular, India's ties with the UAE have been strengthened by a defence partnership announced in January. Government officials told *The Hindu* that it was not possible to take any step that could jeopardise the safety of 10 million Indians who live and work in West Asia.

The Modi government has only just begun to restore ties with the Trump administration after the U.S.'s reduction of tariffs, and agreement on trade announced in February. In addition, the U.S. has included India in its Pax Silica critical technology supply chain. Given the Trump administration's mercurial nature, and threats of sanctions on any engagement with Iran, New Delhi may prefer playing safe.

GS 3: SCIENCE AND TECHNOLOGY
THE HINDU: 8

India's need for a mandatory R&D disclosure standard

George Akerlof's classic 1970 paper, The Market for Lemons, showed that when buyers cannot tell high-quality products from low-quality ones, they discount everything and good products exit the market. The same logic applies to corporate research and development (R&D) today. Corporate R&D intensity in India stagnates at 0.23% of GDP, far below global peers, due not only to firms' risk aversion but also to the lack of information in capital markets to price innovation. When innovation is invisible, it is systematically undervalued. When undervalued, it is underproduced. Worse, in the absence of structured disclosure, there is no mechanism to systematically weed out low-quality, copycat or purely rent-seeking "innovation" projects.

Varun Aggarwal

is Co-founder, FAST-India and Change Engine

Aditya Sinha

writes on macroeconomic and geopolitical issues

Structured research and development (R&D) reporting will improve transparency, funding and innovation outcomes

Fuelling growth

An analysis by Brown and Martinsson (2018, Management Science) shows that when transparency and quality of disclosures improve, R&D intensity rises sharply, by 6%-12% of average R&D intensity in OECD economies and 3%-14% in large cross-country firm samples. This is especially true in equity-dependent, innovation-driven sectors. Crucially, capital expenditures on tangible assets do not rise in the same way, confirming that transparency pushes investment specifically towards risky, uncertain innovation rather than brick-and-mortar assets.

Recent evidence from China makes this point very clear. Mandated disclosures on the Shanghai Stock Exchange spurred higher innovation, especially in non-state, high-tech, and financially constrained firms (Liu, Ye & Liu, 2023, China Journal of Accounting Research). There is also a caveat, especially in cases such as pharma; once firms are required to reveal detailed pipeline information, disclosure becomes a Bayesian signal that prompts industry-wide learning. Companies update their beliefs after observing competitors' project quality, overlap, and timelines; weaker or cash-constrained firms recognise when their projects are dominated and rationally terminate or scale them back. The result is portfolio purification – low-quality, duplicative, or high-risk projects are pruned early, capital shifts toward stronger scientific bets, and safety improves, though fewer long-shot projects survive because the learning effect outweighs pure competitive pressure. Crucially, this does not weaken the case for R&D disclosures. Transparency reallocates innovation effort toward higher-quality opportunities, enhances investment efficiency, and improves social outcomes.

The framework

India's R&D ecosystem today operates under the opposite condition. To correct this structural information failure, we propose the Mandatory R&D and Technology Disclosure Standard, under the Securities and Exchange Board of India's Listing Obligations and Disclosure Requirements Regulations, (LODR) 2015. This will not be a mandate on how much firms must invest in R&D, nor will it direct the technological pathways they should pursue. Instead, it will require listed entities to disclose a structured set of innovation metrics across five critical dimensions: first, R&D expenditure (capital and revenue) with segment-level granularity, enabling investors to separate genuine research spending from general operating costs; second, patent activity, including filings, grants, expirations, and maintenance, allowing assessment of IP pipelines; third, technology workforce composition, which signals capability depth; fourth, Technology Readiness Level (TRL) status of major innovation projects, providing a standardised view of pipeline maturity; and fifth, innovation turnover, measured as the percentage of revenue derived from products introduced in the past five years. These disclosures are routine in some geographies but absent in India, leaving analysts and investors to operate in a data-poor environment. Also note, we are not pushing for disclosures of proprietary information.

Before full implementation, the Board should require these disclosures.

The Board should mandate these disclosures before full implementation. This can be made public on a voluntary basis for the first two years, to familiarise firms and build data quality. After this transition period, disclosure should be made mandatory.

The rationale for adopting the R&D standard rests on five arguments. First, structured disclosure reduces information asymmetry. In simple terms, when investors cannot tell which companies are genuinely innovating and which ones are not, they treat everyone as average. This mispricing discourages firms from investing in technology because they know the market cannot tell the difference.

Second, better disclosure lowers the cost of capital. When companies are more transparent, big investors feel more confident, share prices become more stable, and firms can raise money more cheaply. This matters even more for companies whose value lies in intangibles such as R&D, design, or patents.

A boost for market discipline

Third, transparency strengthens market discipline. When innovation metrics such as R&D spend, patent counts, or project maturity are visible to investors, firms with weak performance feel pressure from shareholders, boards and competitors to improve. Korea saw this effect clearly after introducing mandatory intangible disclosures under the Korean International Financial Reporting Standards (K-IFRS), companies increased R&D once they knew everyone could see the numbers.

Fourth, disclosure improves innovation productivity and efficiency. According to the OECD's 2021 Intangibles Report, countries that make innovation reporting compulsory get more patents and better commercial outcomes for every rupee, or dollar, spent on R&D, because transparency leads to more efficient allocation of research funds.

Fifth, mandatory disclosure is a non-distortionary policy instrument. It does not force companies to spend more, it does not cost the government money, it does not favour any sector, and it allows firms complete freedom in how they innovate. All it does is to ensure that the market has accurate information, after which investors, not the state, decide how to reward or penalise firms. '

Markets cannot make lemonade from invisible lemons. India should shine a light on R&D. It would definitely ensure that the orchard grows, the juice flows, and innovation flourishes.

GS 2: SOCIAL JUSTICE
INDIAN EXPRESS: 8

MARCH 4 IS WORLD OBESITY DAY

India ranks 2nd globally for overweight, obese children

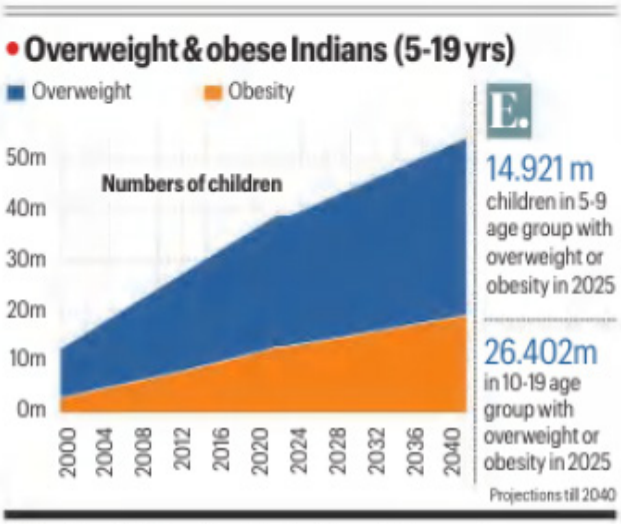
The number will go up to 56 mn by 2040, predicts World Obesity Atlas 2026

Anuradha Mascarenhas
Pune, March 3

INDIA NOW ranks second after China for children who are overweight and living with obesity, beating the US and other Western nations, according to the World Obesity Atlas 2026.

In India, altogether 14.9 million children in the 5-9 age group, and more than 26 million children in 10-19 age bracket were overweight or obese in 2025. Worldwide, the atlas found that more than one in five (20.7%) among 5-19 age group were living with obesity or were overweight, an increase of 14.6% since 2010.

Of eight countries projected to have more than 10 million children with high BMI by end of 2025, China, India and the US each had over 10 million children living with obesity. China leads both categories, with 62 million children with high BMI and 33 million with only obesity, followed by India (41 million high BMI; 14 million obesity) and the US (27 million high BMI; 13 million obesity).



The Atlas presents a series of childhood obesity prevalence projections for the period 2025 to 2040. Estimates suggest that by 2040, 20 million children in India will be living with obesity and 56 million will be overweight and living with obesity. In the same period, children aged 5-19 years are projected to develop risk factors associated with high BMI.

This includes hypertension, increasing from 2.99 million to 4.21 million, hyperglycaemia from 1.39 million to 1.91 million and high triglycerides from 4.39 million to 6.07 million. "Most alarming is pace of change. India is among the fastest rising countries in the world for children who are overweight and living with obesity, with annual increases, on average, of almost 5%. These trends are not inevitable — they are linked in large part to an environment that fails to provide access to healthy foods and activities," said Johanna Ralsom, CEO of World Obesity Federation.

Explaining India's ranking, Ralsom said it is because of the country's population size. India now ranks first within the WHO South-East Asia Region with more than 45 million young people (0–19 years) overweight or living with obesity.

Childhood obesity exposes the young to similar risks of chronic illnesses as adults, including hypertension and cardiovascular disease. It is estimated that by 2040, over 57 million children will show early signs of cardiovascular diseases (high triglycerides), while over 43 million will show signs of hypertension. World Obesity Federation predicts by 2040, 507 million children will be living with obesity or be overweight.

As per the report, 74% of those aged 11 to 17 years fail to meet recommended physical activity levels. Only 35.5% of school-age children (primary and secondary) receive school meals. Children aged 6-10 years consume an average of 0-50 ml of sugary drinks/day. Around 32.6% of infants up to five months are breast-fed sub-optimally. About 13.4% of women aged 15-49 years are exposed to high BMI. About 4.2% of women aged 15-49 years live with Type 2 diabetes.

The World Obesity Atlas shows that urgent, coordinated action is needed to protect India's next generation. Stronger prevention policies, including healthier school food environments, protection from marketing of unhealthy foods, and fiscal measures such as taxes on sugar-sweetened beverages. Early screening and care in primary health systems can also change this trajectory. "India has opportunity to lead the region in reversing these trends, but action cannot wait," Ralsom said.

GS 2: INTERNATIONAL RELATIONS
INDIAN EXPRESS: 10

As Iran confronts existential threat, its minorities will shape the contest

RAJA MANDALA
BY C RAJA MOHAN

US PRESIDENT Donald Trump's telephone conversations with Kurdish leaders in the last few days have highlighted the role of minorities in shaping Iran's political future. Media reports say Trump spoke with two influential Kurdish figures — Masoud Barzani and Bafel Talabani — operating in the borderlands between Iran and Iraq.

Kurds are the only large nationality in the Middle East without a state of their own. Kurdish geography — straddling Turkey, Syria, Iraq and Iran — has always cast a large shadow on the Middle East's politics. Several Iranian Kurdish groups, operating from the adjoining autonomous Kurdistan Region of Iraq, have waged intermittent insurgencies against Tehran for decades. As the US-Iran conflict escalates, the Kurds insist on having a voice in any political rearrangement of Iran after the fall of the Islamic Republic.

This brings us to a question often debated in Israel and the US: Can Iran's ethnic and sectarian divides be leveraged to produce regime change? Probing the internal contradictions of an adversary — its domestic cleavages as well as the fragility of its alliances — has been integral to strategy since antiquity. It remains central today in the contest between the US-Israel coalition and Iran.

Washington's hope is that internal opposition will weaken the regime from within as it comes under external military pressure. Tehran's calculus is no different. It is betting that a regional escalation and rising costs for Arab allies will strain the US coalition and provoke political backlash at home.

By firing missiles and drones at Gulf cities and targeting American assets across Arab lands, Iran has sharpened domestic questions in the US about the wisdom of Trump's war. It has also exposed the contradiction between Trump's promise to end America's wars and his decision to initiate a major conflict with Iran with no clear strategy for victory.

Can Washington do the same with Iran? That Iran is divided at home is not in doubt. Revolutions have rarely reconciled universalist rhetoric with internal diversity. The communist regimes in Russia and China — despite promises of equality and autonomy — struggled to accommodate their many nationalities, a tension still visible in Russia's war in Ukraine and China's policies in Xinjiang and Tibet.

A revolution grounded in religion might appear better placed to manage co-religionists who differ from the majority. Yet Iran's 1979 Islamic Revolution, despite its claims to speak for all Muslims, has never fully secured the affections of its religious and ethnic minorities. Iran's internal diversity is striking: Persians form about 60 per cent of the population; minorities include roughly 16 million Azeris, 8-10 million Kurds, around 3-4 million Arabs (many in oil-rich Khuzestan), 1.5-2 million Baluch, and several other smaller communities. Although Iran is predominantly Shia, it has, alongside Sunni Muslims, Christians, Zoroastrians and Bahá'ís.

These internal fissures — both ethnic and religious — have long as structural vulnerabilities. The strategic logic is straightforward: Empowering internal divisions is far less costly than invasion or occupation. Great powers — imperial and regional — have all been tempted by this logic. But its historical record is mixed; the persistence of the idea does not guarantee predictable outcomes.

Since 1979, the Islamic Republic has managed minorities through a combination of coercion and co-option. Economic neglect, cultural restrictions and securitisation have produced deep resentment — especially in Kurdish, Baluch and Arab-majority regions. Of all minority communities, the Kurds — comprising nearly 10 per cent of Iran's population — remain the most politically active. Unsurprisingly, they figure prominently in the US and Israeli calculus on weakening Tehran. But the degree of resentment varies across Iran's minorities. The Azeris, nearly 19 million strong and the largest non-Persian group, remain relatively well integrated in the Islamic Republic.

Iran's minorities do not form a unified bloc. The regime's internal repression has intensified radicalisation, but it has not generated mass separatism. Still, some in Washington and Tel Aviv sense opportunity. A strand of Israeli strategic thinking has long argued that Iran's challenge is not only ideological. Its size, energy resources and national power potential make a unified Iran a formidable neighbour. A fragmented Iran, this view holds, would be easier to manage over the long term.

Critics counter that such schemes underestimate the strength of Iranian national identity. Iran is diverse, but its sense of nationhood runs deep. Talk of partitioning the country is profoundly who oppose the Islamic Republic. Minority leaders, meanwhile, remain wary of exiled figures like Reza Pahlavi, whom they see as centralising nationalists reluctant to accommodate genuine autonomy.

Washington confronts a similar dilemma. It has long viewed minorities as leverage, yet these communities lack a shared political vision. Kurdish aspirations differ sharply from those of the Baluch or Arabs; the Azeris are strongly invested in the Iranian state. This lack of coherence limits the utility of any minority-based strategy.

At the same time, there is no escaping an important regional reality — the growing fragmentation of the Greater Middle East. The writ of central authority has collapsed in Yemen, Libya, Syria and Sudan. Iraq and Lebanon remain deeply divided along sectarian and ethnic lines. Even the once-solid state structures of the Sahel — from Mali to Niger — are fraying. The region-wide pattern is one of competing pressures: Central governments struggling to preserve territorial integrity while religious, ethnic and tribal identities push for autonomy or dominance.

Nation-building across the post-colonial world has always wrestled with these twin imperatives: Centralisation for state-building, and accommodation of minorities for the widest possible political legitimacy. Only a few have managed the balance successfully. As the Islamic Republic now confronts an existential threat from the US-Israel attacks, Iran's minorities will inevitably shape both the internal contest and the broader evolution of political modernisation in the Middle East.

A strand of Israeli strategic thinking has long argued that Iran's challenge is not only ideological. Its size and national power potential make a unified Iran a formidable neighbour. A fragmented Iran would be easier to manage

The writer is contributing editor on international affairs for The Indian Express and is associated with the Institute of American Studies, Jindal Global University, and the Council on Strategic

GS 2: INTERNATIONAL RELATIONS
INDIAN EXPRESS: 11 & 16

India and Canada can be friends in need

SNEHA BHAGAT

AS THE world order unravels under the pressures of great-power politics — starkly illuminated by the recent escalation in West Asia — a fundamentally structural shift is unfolding in New Delhi. In the first leg of his consequential trip to three Indo-Pacific countries, India, Australia, and Japan, Canadian Prime Minister Mark Carney is walking the talk he delivered in Davos. Calling out polarising global narratives, Carney proposed the formation of variable geometries — flexible, functional partnerships capable of bypassing deep structural fissures. This trip to India has emerged as the central pillar of that effort.

A flurry of MoUs — spanning renewable energy to critical minerals, technology, etc — signals a profound shift. The relationship is moving beyond traditional complementarities and into an era defined by interconnected national innovation ecosystems. Once characterised by the exchange of Canadian pulses and potash for Indian pharmaceuticals, economic relations between Ottawa and New Delhi are now being woven around the nodes of the techno-economy. The presence of senior executives from Canada's nine major pension funds in Carney's delegation, representing an investment footprint in India that already surpassed $110 billion in 2024, underscores that this is a structural alignment of long-term capital.

The newly launched Canada-India Talent and Innovation Strategy is the clearest manifestation of the leap from transactional buyer-seller exchange into an active, integrated co-creation of value and prosperity. The Indian diaspora in Canada is not a one-way transfer of human capital, but a vector for brain circulation. Indian scholars, engineers, and researchers are actively co-creating intellectual property, bridging Canada's highly capitalised innovation markets with India's unmatched capacity for scale.

This is no longer a one-way street; it is an

> PM Carney's visit to New Delhi marks the formalisation of a reality that, in a world defined by great-power conflict, middle and rising powers can no longer afford to be spectators

institutionalised corridor, evidenced by the establishment of a new Dalhousie University innovation campus with the Indian Institute of Technology and Indian Institute of Science Education and Research in Tirupati, the injection of $100 million from the University of Toronto for joint scholarships, and HCL Technologies committing to drastically expand its Canadian workforce.

Advanced technological ecosystems require a secure foundation. This is where the material techno-economic complementarities between India and Canada are not only mutually beneficial but also align with the global green energy transition goals. The formalisation of the Terms of Reference for a CEPA — slated for conclusion this year — provides the necessary legal scaffolding to transition bilateral supply chains from a vulnerable just-in-time model to a resilient just-in-case framework. It is also a step towards an ambitious goal of doubling bilateral trade.

Geopolitically, Canada is firmly anchoring itself in the Indo-Pacific region; its new status as a dialogue partner in the Indian Ocean Rim Association (IORA), combined with a trilateral MoU on Technology and Innovation with India and Australia, operationalises the variable geometries Carney envisioned. Carney's visit to New Delhi, therefore, marks the formalisation of a geopolitical reality. Through deep technological co-creation, resource sovereignty, and flexible institutional frameworks, India and Canada are forging a resilient partnership not just to weather the coming global storms but to actively author the economic and technological landscape of the Indo-Pacific.

The writer is assistant professor, JNU

• ENERGY

Canada uranium deal key to nuclear expansion plans

Despite sizeable deposits, India depends on imported uranium for its nuclear power plants owing to the low quality ore in the country

AMITABH SINHA

ONE OF the major outcomes of the just-concluded visit of Canadian Prime Minister Mark Carney to India was an agreement between the Department of Atomic Energy and a Canadian company for the long-term supply of uranium to power India's nuclear reactors. Cameco, the Canadian company, will provide 22 million pounds (about 10,000 tonnes) of uranium, the main fuel in nuclear reactors, between 2027 and 2035. The contract is worth 2.6 billion Canadian dollars ($1.9 billion).

Incidentally, this is India's second major uranium supply deal within a month. Two weeks ago, it was revealed that India had finalised a similar agreement with Kazakhstan's state-owned company Kazatomprom. The scale of that deal is not yet public.

Both Cameco and Kazatomprom have supplied uranium to India in the past. The latest contracts for larger orders, spread over the next decade, are extremely critical for India's plans to rapidly ramp up its nuclear power production by more than 10 times by 2047.

Dependence on imports

Despite the sizeable presence of uranium deposits, India remains dependent on imported uranium for its nuclear power plants. Domestic uranium deposits possess low-quality ore, about 0.02 to 0.45%, compared to the global average of about 1 to 2%.

Some mines in Canada have ore grades that have as high concentrations of uranium as 15%, according to information provided to a parliamentary panel by the Uranium Corporation of India Ltd (UCIL), India's state-owned miner of uranium. As a result, domestic uranium costs much more than imported fuel.

Presently, more than 70% of India's uranium requirements are being met through imports. But the domestic production, despite being expensive, is also extremely important; it is essential to meet the requirements of India's weapons programme, besides providing a cushion against supply disruptions of any nature.

Domestic uranium production is also being ramped up in view of the planned expansion of the nuclear energy sector. The government aims to increase the installed capacity of nuclear energy from the current 9 gigawatt to 100 GW by 2047.

However, even in the best-case scenario, domestic fuel is not viewed as catering to more than 30% of the needs of nuclear power plants in the future.

India consumes about 1,500 to 2,000 tonnes of uranium every year. In 2025, India's uranium requirement was 1,884 tonnes, according to the World Nuclear Association, a global industry organisation. According to estimates put forward by the UCIL, the annual domestic uranium requirement in the coming years could rise to 5,400 tonnes, of which about 30% could be produced domestically.

Prime Minister Narendra Modi and Canadian Prime Minister Mark Carney in New Delhi on Monday. AN

• RELIANCE ON IMPORTED URANIUM

India's uranium imports in previous years

Year	Company, Country	Quantity (metric tonnes)
2020-21	Kazatomprom (Kazakhstan)	1,000
2020-21	Cameco (Canada)	1,000
2023-24	Navoiyuran (Uzbekistan)	350
2024-25	Navoiyuran (Uzbekistan)	250

SOURCE: DEPARTMENT OF ATOMIC ENERGY IN RESPONSE TO A PARLIAMENT QUESTION

INDIA'S MAIN SUPPLIERS
- Russia
- Uzbekistan
- Kazakhstan
- Canada

Russia supplies uranium for the Kudankulam reactors, for which it has a life-time supply agreement.

Demand & supply

India consumes about 1,500 to 2,000 tonnes of uranium every year.

•

Over 70% of India's uranium requirements are being met through imports.

Diversifying and expanding production

The domestic production of uranium in India is concentrated mainly in Jharkhand and Andhra Pradesh, where seven mines are operational. Meghalaya, Rajasthan, Telangana and a few other states also have some deposits. Current estimates point to about 4.3 lakh tonnes of uranium ore in Indian deposits, of which more than 80,000 tonnes are in the mines allocated to the UCIL. About 40% of the reserves have already been extracted from these mines, according to UCIL. Explorations are being conducted in as many as 15 states in search of additional uranium deposits.

The new uranium contracts, including the one signed with the Canadian company, are an attempt to diversify India's supply lines, besides meeting the projected, enhanced requirements for nuclear fuel in the coming year. In Canada's case specifically, it also marks a return to normalcy in a bilateral relationship that has been extremely troubled in recent times.

Cameco had supplied uranium to India as recently as 2020-21. India and Canada have a very long relationship in the nuclear sector, dating back to the 1950s. India's second nuclear reactor, CIRUS (Canada India Reactor Utility Service), was a collaborative venture with Canada. Canada also helped in setting up nuclear reactors at the Rajasthan Atomic Power Project in the 1960s.

With this latest agreement with Cameco, India is now sourcing uranium from at least four countries — Uzbekistan, Kazakhstan, Canada and Russia, which has a lifetime supply commitment for the reactors being set up at Kudankulam in Tamil Nadu. More supply agreements, potentially in countries such as Australia or the US, could come through in coming years. Indian companies are also studying the feasibility of exploring and mining uranium in other countries.

Three-stage nuclear programme

India's ultimate ambition is to complete its long-desired three-stage nuclear programme, driven chiefly by thorium, not uranium. India has very large reserves of thorium, making it a very attractive proposition in terms of energy security and energy independence. For that, however, India will need to develop special nuclear reactors based on technology that is proven, but not currently in use.

The current operational nuclear reactors in India comprise only the first stage of the Indian programme. The first step towards the second stage has been taken with a prototype fast-breeder reactor, which is close to becoming operational, in Kalpakkam. The third stage of reactors, which will use thorium as the main fuel, is supposed to be some distance away.

The three-stage programme was conceptualised as far back as the 1950s, and India is the only country currently pursuing this goal. But progress on that front has been extremely slow until now.