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MK Yadav Sir

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OPERATION MEGHDOOT

(Syllabus: GS Paper 3 – Security)



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Siachen: 40 years of Op Meghdoot

April 13, 2024 marks four decades since the Indian Army pre-empted Pakistan and occupied the Siachen glacier on the Saltoro ridge, overlooking the Nubra valley in the Karakoram ranges. While a ceasefire is in place, the operation continues to this day.

FULL CONTEXT

Shekhar Puri

"The land is so barren and the passes so high that only the best of friends and fiercest of enemies come by" — reads a Ladakhi saying at Kumar post, a military outpost located at an altitude of 15,632 feet. The saying captures the conflict on the icy glacier between India and Pakistan. April 13, 2024 marks four decades since the Indian Army pre-empted Pakistan and occupied the glacier on the Saltoro ridge, overlooking the Nubra valley in the Karakoram ranges. Extreme weather is the biggest enemy on the glacier. Around 1,000 soldiers have lost their lives, succumbing not to the vagaries of extreme weather.

Conflicting claims

Siachen, in Balti language means "land of roses" — 'Sia' is a kind of rose bushes that grows in the region and 'Chen' means "in abundance". However, it is known for being the world's highest and coldest battlefield. It sits at a very strategic location with Pakistan on the left and China on the right.

Siachen is a legacy of the Partition, between India and Pakistan. While the Line of Control (LoC) was delineated and accepted by both sides upto NJ-9842 as part of the 1972 Simla agreement, the glacier itself was left unmarked. India claims the area based on the Jammu and Kashmir Accession Agreement of 1947 and the Karachi Agreement of 1949 that did not define the ceasefire line beyond NJ-9842 as running "Northwards to the glaciers". On the other hand, Pakistan interprets it as 'North Eastwards' to claim the area beyond the Saltoro Ridge and beyond Siachen as its own. This would give Pakistan direct connectivity to China as well as strategic oversight over the Ladakh region and the crucial Leh-Srinagar highway, posing a serious threat to India.

The genesis of Operation Meghdoot

In the 1970s and 1980s, Pakistan began allowing foreign mountaineering expeditions, resorting to cartographic aggression, to add credence to its claims. Following trailblazer inputs of lieutenant military action by Pakistan in early 1984, India elected to pre-empt it.

Mountaineering expeditions led by Col. Narinder 'Bull' Kumar to the Siachen Glacier and subsequently the Commandant of the High Altitude Warfare School (HAWS) in the early 1980s helped immensely in the planning process leading up to Operation Meghdoot. Based on these recce reports, the Indian Army launched 'Operation Meghdoot' on April 13, 1984 to capture the 76.4-km-long glacier. This was accomplished after a tough battle in which Lt Col Yogesh Kumar Joshi (retired as Lt Gen) planted the Indian flag at Bilafond La at an altitude of 18,000 feet. Personnel from the Ladakh Scouts were also deployed via Chemkah helicopter by the Indian Air Force (IAF).

Although the operation began in 1984, IAF helicopters were already operating in the glacier with the first landing of a Cheetah helicopter in October 1978. Following the initiation of Operation Meghdoot, IAF's tactical and strategic airlifters, An-12s, An-32s and E-76s transported stores and troops and air-dropped supplies to high altitude airfields, then reborn Mi-8, Mi-17, Cheetah and Chetak helicopters ferried men and material to the icy heights on the glacier, far above the limits helicopters were meant to be operated. Soon, about 3000-odd troops were positioned on the Saltoro ridge, on both the western flanks of the glacier, the line of encounter in a consonant on Operation Meghdoot.

In June 1987, Indian troops captured the Quaid post at 21,153 feet under Operation Rajiv. The post was later renamed the Bana top, in honour of then Naib Subedar Bana Singh (later Subedar Major and Hony Captain) from Jammu and Kashmir Light Infantry (JAK LI) who was also conferred the Param Vir Chakra, the highest gallantry award in India, for leading the attack in an impossible situation by scaling a 1,500-feet ice wall.

From 1984 to 2003, both sides were exchanging fire regularly. The guns finally fell silent in 2003 after the ceasefire agreement along the LoC and the 80-km long Actual Ground Position Line (AGPL) in Siachen. While the LoC has flared up at multiple occasions, ceasefire along the AGPL has held since. Operation Meghdoot remains the only one witnessing the longest continuing operation in the world.

A test of endurance

The actual Army posts are located at heights of 18,000 feet and above, with the Bana post being the highest on the glacier and Indira Col the highest point. At 19,600-19,800 feet, Indian and Pakistani troops are deployed at 21,000 feet and beyond, it is only India.

Operations on the glacier remain a test of human endurance and skill. It was especially so in the early days of Operation Meghdoot with limited high altitude clothing and equipment. While in the initial months, IAF operations saw the employment of helicopters and transport aircraft, the fighters entered the fray when a detachment of Hunter aircraft from No. 20 Squadron undertook combat operations in September 1984 from the high altitude airfield at Leh. In the next couple of years, the Hunters flew over 700 sorties from Leh carrying out fighter sweeps and simulated strikes to keep the adversary at bay. Later, few armament sorties were carried out at the high altitude firing range at Kar Teo, south of Leh, according to the IAF. The IAF deployed the Cheetal helicopters in the 1990s and 2000s. These are the helicopter with a re-engineered engine offering better reliability and load carrying capability at high altitude.

Recent developments on the glacier

A lot has changed over the last four decades, especially in terms of technology, improvement in facilities and logistical support to ensure smooth operations and ease lives. Some of the significant changes have been in the areas of habitat, communications, mobility, logistics and medical support and green initiatives.

The glacier is also bearing the brunt of climate change.

In 2012, the snout, which is the starting point of the glacier at the base camp, had receded by over a kilometre from where it originally was in 1984.

Illustrating on major enhancements in the habitat, Lt Gen Joshi says that mobile and data connectivity has improved considerably. "The introduction of VSAT technology has revolutionised communication on the glacier, providing troops with data and internet connectivity. This leap in technology has enhanced real-time situational awareness, telemedicine capabilities, and the well-being of our soldiers by keeping them connected with their families," one official said.

In addition to All Terrain Vehicles (ATVs) and ATV bridges improving mobility across the glacier, the induction of Chinook heavy-lift helicopters and logistic drones has significantly improved the supply of essential provisions to personnel deployed in posts that are cut off during winters. New logistics chains have been established for the supply of fuel for forward posts. The availability of special clothing, mountaineering equipment, advanced rations and timely weather updates ensure that soldiers are better prepared to withstand temperatures that fall to -60 degrees.

Today, nearly all the aircraft of the IAF including Rafale, Su-30MKI, Chinook, Apache, Advanced Light Helicopter Mk III & Mk IV, Light Combat Helicopter (LCH), Light Utility Helicopter (LUH), ILH and Ar-32 operate in support of Operation Meghdoot, the IAF said. Helicopters continue to remain the lifeline on the glacier supporting troops in remote posts. IAF's Mi-helicopter and along with the Army aviation continues to play a stellar role.

On the medical front, in addition to telemedicine nodes established by the IMD for forward posts, the medical facilities in the Siachen base hospital have some of the best medical and surgical specialists in the country. Army officials say it includes state-of-the-art high-altitude pulmonary oedema (HAPO) chambers, and oxygen generation plants besides life support systems.

What next?

Siachen along with Sir Creek have often been referred to as "low-hanging fruits" in the Indo-Pakistan conflict, especially considering the much more complicated Kashmir issue.

India and Pakistan have had dialogues on Siachen at the level of Defence Secretaries. On occasions when demilitarisation of the glacier was mooted, India while expressing willingness has called for authenticating the AGPL as a first step, which Pakistan has refused.

In January 2026, then Army Chief Gen. Manoj Mukund Naravane termed Siachen as the place from where a collusion threat from China and Pakistan was monitored while stressing on the importance of keeping that particular area always in India's possession.

Hailan overlooks Shaksgam valley which is part of Pakistan Occupied Kashmir (PoK) ceded by Pakistan to China. Siachen was ceded by Pakistan to China in 1963 – a year after the Indo-China war. The 2020 standoff with China in Eastern Ladakh, and the continuing tensions all along the Line of Actual Control have only further complicated any settlement of Siachen.

Siachen is probably not so 'low hanging' any more.



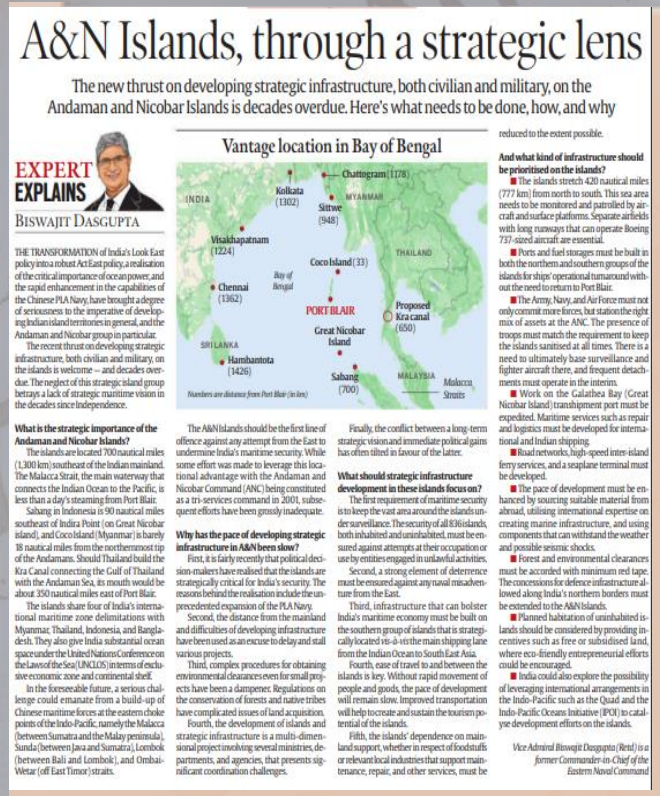
Context: The Indian Army recently marked the 40th anniversary of the commencement of 'Operation Meghdoot', which secured the Siachen Glacier.

Operation Meghdoot

- **Launched**: April 13, 1984
- **Joint Military Action**: Operation Meghdoot demonstrated exceptional coordination between the Indian Army and Air Force.
- **Response to Cartographic Aggression**: Operation Meghdoot was India's response to Pakistan's attempts to alter maps in the Ladakh region.
- **Historical Context:** Siachen has been disputed since the Karachi Agreement of 1949 due to its harsh terrain and extreme weather.
- **Pre-emptive Action**: Indian forces took action to secure strategic heights on Siachen based on intelligence about impending Pakistani military moves.
- **Objective**: The operation aimed to prevent Pakistan from seizing key passes, namely Sia La and Bilafond La.
- **Outcome**: Indian forces successfully gained control over the entire Siachen Glacier, securing a crucial strategic advantage.
- **Strategic Importance of Siachen**: It dominates several key areas, including Shaksgam Valley, Gilgit Baltistan routes, and Karakoram Pass, enhancing India's defensive position.
- **Control of Indian Territory:** Siachen's strategic location also allows observation of Indian territory occupied by Pakistan, such as Gilgit Baltistan.

IMPORTANCE OF A&N ISLANDS

(Syllabus GS Paper 2 – IR)



A&N Islands, through a strategic lens

The new thrust on developing strategic infrastructure, both civilian and military, on the Andaman and Nicobar Islands is decades overdue. Here's what needs to be done, how, and why

EXPERT EXPLAINS

BISWAJIT DASGUPTA

THE TRANSFORMATION of India's Look East policy into a robust Act East policy, a realisation of the critical importance of ocean power, and the rapid enhancement in the capabilities of the Chinese PLA Navy, have brought a degree of seriousness to the imperative of developing Indian island territories in general, and the Andaman and Nicobar group in particular.

The recent thrust on developing strategic infrastructure, both civilian and military, on the islands is welcome — and decades overdue. The neglect of this strategic island group betrays a lack of strategic maritime vision in the decades since Independence.

What is the strategic importance of the Andaman and Nicobar Islands?

The islands are located 700 nautical miles (1,300 km) southeast of the Indian mainland. The Malacca Strait, the main waterway that connects the Indian Ocean to the Pacific, is less than a day's steaming from Port Blair.

Sabang in Indonesia is 90 nautical miles southeast of Indira Point (on Great Nicobar island), and Coco Island (Myanmar) is barely 18 nautical miles from the northernmost tip of the Andamans. Should Thailand build the Kra Canal connecting the Gulf of Thailand with the Andaman Sea, its mouth would be about 350 nautical miles east of Port Blair.

The islands share four of India's international maritime zone delimitations with Myanmar, Thailand, Indonesia, and Bangladesh. They also give India substantial ocean space under the United Nations Conference on the Laws of the Sea (UNCLOS) in terms of exclusive economic zone and continental shelf.

In the foreseeable future, a serious challenge could emanate from a build-up of Chinese maritime forces at the eastern choke points of the Indo-Pacific, namely the Malacca (between Sumatra and the Malay peninsula), Sunda (between Java and Sumatra), Lombok (between Bali and Lombok), and Ombai-Wetar (off East Timor) straits.

Vantage location in Bay of Bengal

The A&N Islands should be the first line of offence against any attempt from the East to undermine India's maritime security. While some effort was made to leverage this locational advantage with the Andaman and Nicobar Command (ANC) being constituted as a tri-services command in 2001, subsequent efforts have been grossly inadequate.

Why has the pace of developing strategic infrastructure in A&N been slow?

First, it is fairly recently that political decision-makers have realised that the islands are strategically critical for India's security. The reasons behind the realisation include the unprecedented expansion of the PLA Navy.

Second, the distance from the mainland and difficulties of developing infrastructure have been used as an excuse to delay and stall various projects.

Third, complex procedures for obtaining environmental clearances even for small projects have been a dampener. Regulations on the conservation of forests and native tribes have complicated issues of land acquisition.

Fourth, the development of islands and strategic infrastructure is a multi-dimensional project involving several ministries, departments, and agencies, that presents significant coordination challenges.

Finally, the conflict between a long-term strategic vision and immediate political gains has often tilted in favour of the latter.

What should strategic infrastructure development in these islands focus on?

The first requirement of maritime security is to keep the vast area around the islands under surveillance. The security of all 836 islands, both inhabited and uninhabited, must be ensured against attempts at their occupation or use by entities engaged in unlawful activities.

Second, a strong element of deterrence must be ensured against any naval misadventure from the East.

Third, infrastructure that can bolster India's maritime economy must be built on the southern group of islands that is strategically located *vis-à-vis* the main shipping lane from the Indian Ocean to South East Asia.

Fourth, ease of travel to and between the islands is key. Without rapid movement of people and goods, the pace of development will remain slow. Improved transportation will help to create and sustain the tourism potential of the islands.

Fifth, the islands' dependence on mainland support, whether in respect of foodstuffs or relevant local industries that support maintenance, repair, and other services, must be reduced to the extent possible.

And what kind of infrastructure should be prioritised on the islands?

- The islands stretch 420 nautical miles (777 km) from north to south. This sea area needs to be monitored and patrolled by aircraft and surface platforms. Separate airfields with long runways that can operate Boeing 737-sized aircraft are essential.
- Ports and fuel storages must be built in both the northern and southern groups of the islands for ships' operational turnaround without the need to return to Port Blair.
- The Army, Navy, and Air Force must not only commit more forces, but station the right mix of assets at the ANC. The presence of troops must match the requirement to keep the islands sanitised at all times. There is a need to ultimately base surveillance and fighter aircraft there, and frequent detachments must operate in the interim.
- Work on the Galathea Bay (Great Nicobar Island) transhipment port must be expedited. Maritime services such as repair and logistics must be developed for international and Indian shipping.
- Road networks, high-speed inter-island ferry services, and a seaplane terminal must be developed.
- The pace of development must be enhanced by sourcing suitable material from abroad, utilising international expertise on creating marine infrastructure, and using components that can withstand the weather and possible seismic shocks.
- Forest and environmental clearances must be accorded with minimum red tape. The concessions for defence infrastructure allowed along India's northern borders must be extended to the A&N Islands.
- Planned habitation of uninhabited islands should be considered by providing incentives such as free or subsidised land, where eco-friendly entrepreneurial efforts could be encouraged.
- India could also explore the possibility of leveraging international arrangements in the Indo-Pacific such as the Quad and the Indo-Pacific Oceans Initiative (IPOI) to catalyse development efforts on the islands.

Vice Admiral Biswajit Dasgupta (Retd) is a former Commander-in-Chief of the Eastern Naval Command

Context: Recently, the evolution of **India's Look East policy to an Act East policy**, coupled with heightened awareness of maritime power and advancements in the Chinese PLA Navy, underscores the urgency of developing Indian island territories, especially the Andaman and Nicobar group.

Strategic Importance of the Andaman and Nicobar Islands

- **Geopolitical Proximity**: The Andaman and Nicobar Islands are positioned 700 nautical miles southeast of the Indian mainland, strategically located near major maritime routes.
- **Control over Strategic Waterways**: Located close to the Malacca Strait, a crucial waterway connecting the Indian Ocean to the Pacific, the islands offer control over this vital maritime passage.
- **Influence over Regional Dynamics**: Proximity to Sabang in Indonesia and Coco Island in Myanmar provides strategic leverage in regional geopolitics, particularly in Southeast Asia.
- **Potential Impact of Infrastructure Projects**: The proposed **Kra Canal by Thailand**, if constructed, could significantly alter regional dynamics, positioning the islands as a key hub in the new maritime route.
- **Maritime Boundary Advantage**: The islands' position enables India to assert control over maritime boundaries, sharing borders with Myanmar, Thailand, Indonesia, and Bangladesh, thereby enhancing its maritime security.
- **Expanded Maritime Jurisdiction**: By extending India's exclusive economic zone and continental shelf under UNCLOS, the islands offer substantial ocean space, further consolidating India's maritime influence.

Steps that needs to be taken

- Establish airfields with long runways for Boeing 737-sized aircraft to monitor and patrol the vast sea area spanning the islands.
- Construct ports and fuel storages in both northern and southern island groups to facilitate operational turnaround for ships.
- Increase military presence and deploy appropriate assets at the Andaman and Nicobar Command (ANC) to ensure island security.
- Expedite the development of the Galathea Bay transhipment port and maritime services for international and Indian shipping.
- Develop road networks, high-speed inter-island ferry services, and a seaplane terminal to improve connectivity within the islands.

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CAFE NORMS

(Syllabus: GS Paper 3 – Env & Eco)

India aims for European standards in fuel economy

Subhash Narayan & Rituraj Baruah
subhash.narayan@livemint.com



It might take two-three years for the new norms to become applicable. MINT

NEW DELHI: In a move designed to support India's ambitious climate targets and lower carbon emissions, the central government is planning to introduce the next stage of norms for fuel economy or efficiency of automobiles.

The third phase of corporate average fuel economy, or CAFE-III norms, is being prepared by the road transport and highways ministry and the Bureau of Energy Efficiency (BEE), two people aware of the matter said, adding that the new norms may take effect in 2027.

"Work is underway in terms of specifications and technicalities, and giving the OEMs (original equipment manufacturers) a roadmap in terms of adapting to the updated norms," a road ministry official, one of the two people cited above, said on condition of anonymity. "It would take two-three years for the new norms to become applicable," the person said.

Queries sent to the road ministry and BEE remained unanswered till press time.

The existing CAFE-II norms took effect in 2022. These norms are relevant for petrol, diesel, CNG (compressed natural gas), LPG (liquefied petroleum gas), hybrid and electric passenger vehicles. Vehicles covered under these norms include those having up to nine seats including the driver's seat and a gross vehicle weight not exceeding 3,500 kg.

Commercial vehicles with gross weight of 12 tonne or more are covered under separate fuel efficiency guidelines that were finalized in August 2017. Further, for vehicles with weight of 3.5 to 12 tonne, norms are still in the making, according to the BEE website.

Under the current CAFE-II norms, the cap on emission by passenger vehicles was pegged at 113 gm CO2 per km. It was brought down from 130 gm CO2 per km under CAFE-I norms, which had come into effect in 2017. The permitted emission levels in Europe are 95 gm CO2 per km, which India will try and match with the CAFE-III norms, and talks are underway with OEMs, said another person aware of the matter.

"The current FE (fuel economy) standards are so lenient that these cannot push technological innovations to maximize fuel and carbon savings from ICE vehicles, nor can they require large-scale electrification of car fleet to meet fleet-wide fuel efficiency targets," said Anumita Roychowdhury, executive director, research and advocacy, Centre For Science and Environment.

"We are losing out on the opportunity to leverage these norms to accelerate electrification of car fleet. As noted in Europe, much more stringent fuel economy or carbon dioxide reduction targets have speeded up electrification. India needs to quickly tighten the norms, especially now when our market is shifting steadily towards heavier cars and SUVs, with a fuel economy penalty," Roychowdhury added.

Context: In a move designed to contribute to India's ambitious climate targets and lower carbon emissions, the central government is planning to introduce the next stage of norms for fuel economy or efficiency of automobiles.

Purpose of CAFE regulations:

- The CAFE (Corporate Average Fuel Efficiency) regulations aim to reduce the overall COx (Carbon Oxides) from the vehicle's exhaust.
- The reduced carbon footprint leads to increased fuel economy.
- These regulations were first implemented on 1st April 2017 with BS4 exhaust emission norms.
- It was decided the highest carbon footprint allowed was 130gm per km till 2022. After that, the till will be further reduced to 113gm per km.
- CAFE regulations are in power for all engines. Diesel, Petrol, as well as CNG.

Corporate Average Fuel Economy

- **About**: CAFE stands for Corporate Average Fuel Efficiency/Economy, focusing on the weighted average of emissions and economy for the entire fleet.
  - BS6, however, targets specific emissions like hydrocarbons, sulfur, and NOx.
- **CAFE's Priority:** CAFE norms prioritize fuel consumption, emphasizing the quantity of fuel consumed.
- **Importance of CAFE**: It regulations play a crucial role in reducing overall fuel consumption and emissions. They contribute significantly to environmental conservation efforts.
- **Fairness to Manufacturers**: Indian automotive manufacturers face challenges in meeting CAFE norms, which are stringent but environmentally necessary.
  - Compliance with these norms is essential for safeguarding the environment.
- **Combined Impact**: The integration of CAFE regulations with BS6 norms can lead to a substantial decrease in emissions.
  - While CAFE focuses mainly on COx emissions, BS6 addresses a broader range, including NOx and SOx.

BBC

Apr 15

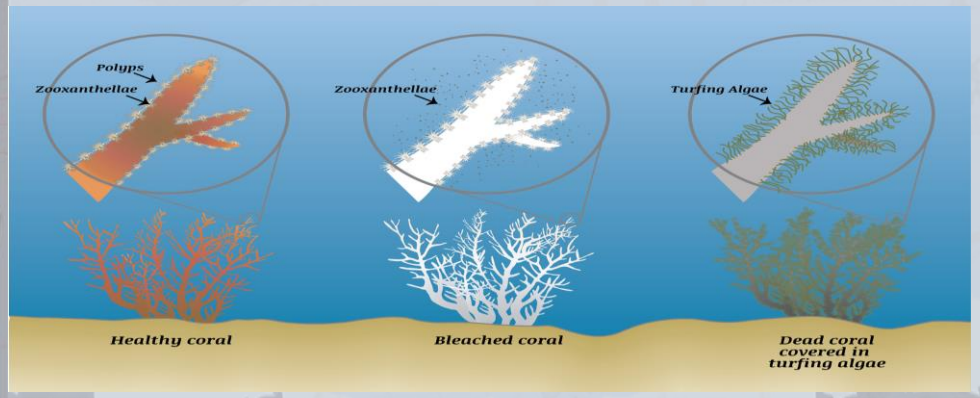
CORAL BLEACHING

(Syllabus: GS Paper 3 – Env and Eco)

Coral bleaching: Fourth global mass stress episode underway - US scientists

Mass Coral Bleaching

- **First Mass Bleaching:** The 1998 event occurred due to the El Niño weather pattern, heating up sea surfaces in the Pacific Ocean.
  - Resulted in the death of 8% of the world's coral.
- **Second Mass Bleaching**: Occurred in 2002, showing a trend of increasing frequency.
  - Signaled a shift towards more closely spaced bleaching events.
- **Third Mass Bleaching**: Affected reefs across regions including Guam, the Western Pacific, North and South Pacific, and the Indian Ocean.
  - The global temperature in 2017 reached the third-highest recorded level.



Context: Recently, along coastlines stretching from Australia to Kenya to Mexico, numerous colorful coral reefs worldwide have recently turned ghostly white, marking what scientists describe as the fourth global bleaching event in the past three decades.

- It has triggered the fourth global mass coral bleaching event, according to the US National Oceanic and Atmospheric Administration (NOAA).

Coral Bleaching

- **About**: When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae microscopic algae called zooxanthellae living in their tissues, causing them to turn completely white.
- **Causes**:
- **Temperature Sensitivity**: A mere one-degree Celsius increase in temperature over a four-week period can trigger coral bleaching events.
- **Transparency and Skeleton Exposure**: Bleached corals become transparent, exposing their white skeletons as a result of expelling algae.
- **Additional Stress Factors**: Apart from temperature, changes in water quality, increased sun exposure, and extreme low tides can also induce coral bleaching.

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ARTICLE 32 AND 226

(Syllabus: GS Paper 2 – Polity)

Rely on Constitution for social, economic justice: SC judges

Abraham Thomas
letters@hindustantimes.com

NEW DELHI: While constitutional courts have used articles 32 and 226 (both relating to power of courts to enforce fundamental rights) to render transformative justice, there was need to introspect as questions can be raised on priorities of courts when a petition by a business house is entertained at the cost of a poor prisoner seeking premature release, two judges of the Supreme Court said on Monday.

Speaking at a lecture series organised in memory of BR Ambedkar, the architect of the Constitution, justices BR Gavai and AS Oka spoke on the topic "Article 32: History and the Future" and said the Constitution should be used as a weapon to achieve social and economic justice and fulfil the dream of our founding fathers.

"In the last 75 years, articles 32 and 226 have been used by the Supreme Court and high courts for achieving transformative justice," said justice Gavai, who hails from the scheduled caste community and is in line to become the



Justices BR Gavai , AS Oka

chief justice of India in May next year. He listed out a string of cases decided by the courts under article 32 to expand the fundamental rights of citizens in the Constitution to include right to education, right to food, potable water, clean environment, and dignity of life.

He said: "The credit of origin of Article 32 goes to BR Ambedkar...The journey of Article 32 has been in furtherance of the dream of our Constitution makers to use Constitution as a weapon to achieve social and economic justice and to end inequalities in the society." Justice Oka addressed the issue of article 32 from a practical perspective. "On completing 75 years of independence, we must have a debate on enforcement of fundamental rights by courts," he said. "This is the time to introspect... Under Article 32, if we start giving priority to cases of business houses, questions will be raised."

Without citing any specific case or instance, he said, "If there is a powerful businessman, he will be backed by powerful lawyers to argue how a case under Article 32 is made out. This consumes a lot of time of the courts. When this happens, look at the plight of other litigants, including prisoners denied premature release. Can we actually devote time meant for entertaining genuine article 32 petitions by entertaining petitions by businessmen."

Context: Recently, two Supreme Court judges highlighted the need for introspection regarding court priorities, as they questioned the decision to entertain a petition from a business house over a poor prisoner seeking premature release, despite the transformative justice rendered through articles 32 and 226.

Article 32

- **About:** Article 32 of the Indian Constitution grants the Supreme Court of India the authority to safeguard and uphold fundamental rights.
- **Right to Constitutional Remedies**: Termed as the "Right to Constitutional Remedies," Article 32 allows individuals to directly approach the Supreme Court in cases of fundamental rights violation.
- **Also known as:** Heart and Soul' of the Indian Constitution by Dr B. R. Ambedkar.
- **Supreme Court's Authority**: As the ultimate protector of fundamental rights, the Supreme Court has the power to issue writs, orders, or directions.
    - Both the High Courts and the Supreme Court can be approached for violation or enactment of fundamental rights through five kinds of writs: Habeas Corpus, Mandamus, Prohibition, Certiorari and Quo-Warranto
- **Scope of Fundamental Rights**: The rights protected under Article 32 encompass various freedoms, including equality, freedom of speech and expression, protection against discrimination, and the right to life and personal liberty.
- **Exclusive Jurisdiction**: The Supreme Court's jurisdiction under Article 32 is exclusive and extends to matters concerning the violation of fundamental rights, ensuring a centralized mechanism for addressing such issues.

Article 226

- **About:** It grants exceptional authority to the High Courts, providing them with the power to issue writs, orders, and directions.
- **Upholding Fundamental Rights**: The primary purpose of Article 226 is to enable the High Courts to enforce fundamental rights guaranteed by the Constitution and to ensure justice prevails in society.
- **Issuance of Writs**: Under Article 226, High Courts can issue 5 kind of writs.
- **Extensive Jurisdiction:** The jurisdiction conferred upon the High Courts by Article 226 is broad, encompassing both civil and criminal matters, thereby solidifying their role as a cornerstone of the Indian legal framework.

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HYDROCARBON

(Syllabus: GS Paper 3 – Sci and Tech)

How does hydrocarbon extraction happen?

Hydrocarbons are found in underground reservoirs created when a more resistant rock type overlays a less resistant one, in effect creating a lid that causes hydrocarbons to accumulate below it

Vasudevan Mukunth

Over millennia, mighty geological processes in the earth's crust heated and compressed together pieces of life-forms that had been dead for a while. Eventually, this mulch of organic matter accumulated as hydrocarbons inside rock formations. The two Industrial Revolutions were the result mainly of people finding a way to extract these hydrocarbons and using them to drive many great engines, whose foul breath polluted the air and water and eventually gave us global warming.

Where are hydrocarbons located?

The most common forms in which these hydrocarbons exist in subterranean rock formations are natural gas, coal, crude oil, and petroleum. They are usually found in underground reservoirs created when a more resistant rock type overlays a less resistant one, in effect creating a lid that causes hydrocarbons to accumulate below it. Such formations are important because otherwise, the hydrocarbons would float to the surface and dissipate.

Experts use the tools, methods, and techniques of the field of petroleum geology to assess these rocks, including to check for their porosity and permeability. If a rock formation is highly porous, it could hold a larger quantity of hydrocarbons. Similarly, the more permeable a rock is, more easily the hydrocarbons will flow through it. The primary source of hydrocarbons in this rocky underground is called kerogen: lumps of organic matter. Kerogen can be deposited from three possible sources: as the remains of a lake (lacustrine), of a larger marine ecosystem, or of a terrestrial ecosystem. Rocks surrounding the kerogen can become warmer, more compact over time, exerting forces on the kerogen that cause it to break down. Lacustrine kerogen yields waxy oils; marine kerogen, oil and gas; and terrestrial kerogen, light oils, gas, and coal. The rock containing the kerogen is called the source rock, and petroleum geologists are tasked with looking for it, understanding its geophysical and thermal characteristics, and characterising its ability to yield hydrocarbons. They also undertake modelling activities informed by observational data and dig smaller exploration wells to estimate the amount of hydrocarbons there, and report it to the relevant regulatory body.

Once a particular location is determined to be a profitable source of hydrocarbons, drilling can begin.

How are the hydrocarbons accessed?

Drilling and reservoir engineers are responsible for extracting as much of the hydrocarbons as is gainful without damaging the reservoir, to which end they deploy a variety of methods.

The first task is to create a production well, the principal hole through which the reservoir will be drained to the surface; its location is chosen to maximise the amount of drainage. The well is created with a drilling machine. The drill consists of the drill pipe, the drill collars towards the bottom, and the drill bit at the bottom. The drill bit is the object that breaks through the rock, creating a hole as it tunnels further down.



The outline of an oil pump. GTOGWOTO

Once the tunnelling is underway, engineers lower steel casings that are slightly less wide than the hole itself into the tunnel, and pump cement slurry in the gap between the outer edge of the tunnel and the casings. As the cement solidifies, it protects the upper parts of the tunnel from caving in and prevents fluids in the surrounding soil from entering the well. The tunnel is also filled with drilling fluid, which reaches and swirls around the drill bit. Its primary purposes are to keep the bit from overheating and to bring the pieces of rock being cut away with it when it is pumped to the surface, where they can be removed from the tunnel.

The pressure at which the drilling fluid is delivered needs to be carefully controlled or it could force the hydrocarbons in the source rock to rush into the gap between the casing and the drill string (pipe + collar + bit) and erupt on the surface like a volcano of oil.

Modern drilling setups include mechanical valves called blowout preventers to trap the gushing in the borehole, and manage the equipment already inside as necessary.

The process of recording the rock cuttings by depth and studying their properties is called mud logging.

As the drill bit descends, the length of the drill pipe is increased by tacking on extensions; it can also be pulled up if it needs replacing.

Today, all of these processes are conducted by sophisticated drilling rigs, which also come with generators and batteries to power various steps of the drilling process. These rigs can also be installed offshore, with additional facilities to boost their stability and aid extraction through the water column.

How are the hydrocarbons extracted?

Once the production well has been drilled, it has to be prepared to drain the hydrocarbons – a step called completing. Here, engineers remove the drill string out of the borehole and punch small holes into the casing. More often than not, the pressure inside the well is sufficiently lower than in the surrounding rock for the hydrocarbons to start flowing into the well and rise up on their own. And as they rise, they are forced to exit at the top via a narrower tube – which is installed to, among other things, encourage the fluids to flow in only one direction (out).

The flow of hydrocarbons ends the completion stage and begins the production stage, when the most important aspects of the extraction operation are the systems at the well's head controlling its outflow using valves. Sometimes, the pressure difference may be too low to bring the hydrocarbons to the surface. A common solution in some oil-rich sites is to use pump jacks, facilities seen dotting the American midwest with a hammer-shaped piston moving up and down in languid fashion. They draw mechanical power from, say, an engine to lift up hydrocarbons from the bottom of a well. Some long-standing wells may require additional components or having old ones replaced to get more hydrocarbon out of them; these tasks are called workovers.

The production profile of a well can be split into three phases: primary, secondary, and tertiary, depending on the methods required to maintain production. The primary phase banks on natural processes, like pressure differences between the reservoir and the well and less dense compounds floating to the top. Secondary interventions are concerned with inducing artificial pressure in the rock to maintain the differential (for example, by injecting water into it or diluting the hydrocarbon mix to help it flow better). The tertiary phase is focused on forcing the remainder into the well. Steam injection is a common example of such an enhanced recovery method. An on-site gas turbine generates electricity while its waste heat is routed to a steam generator. The resulting steam is pumped into the rock: its heat makes heavy-oil hydrocarbons less viscous and more willing to flow while its pressure pushes them out. When recovering petroleum, for example, the well may yield about 8%, 48%, and 15% of its hydrocarbon volume in three respective phases.

What happens when a well is depleted?

As the extraction rates indicate, a well needn't be fully depleted before the extraction process ends. The process's economics matter greatly: the contractor may stop extraction if it's no longer profitable to keep extracting from a well.

A well thus abandoned needs to be plugged so that its contents – both the hydrocarbons and the gases accumulating in the borehole – don't escape into their surroundings. These plugs can be temporary, in case the project proponent wishes to recommission it later, or permanent. A common issue with improperly plugged wells is that the plugs deteriorate and fail, either because of quality issues or due to nearby disturbances.

The most exhaustive way to conclude operations at a well, whether on land or offshore, is to decommission it, but this process is expensive and often commercially infeasible for the proponent. Improperly abandoned wells are a major source of methane emissions – to go with the emissions released during the production and use of various components required to extract hydrocarbons.

One 2018 study estimated that 9,000 oilfields in 90 countries released 1.7 billion tonnes of carbon dioxide in 2015 alone.

Context: Recently, humanity harnessed hydrocarbons, formed over millennia, to fuel engines during the two Industrial Revolutions, leading to widespread environmental pollution and the onset of global warming.

Hydrocarbon & its exploration

- **About**: It is defined as a class of organic chemicals comprising solely carbon (C) and hydrogen (H) elements.
- **Composition**: Hydrocarbons consist of carbon atoms that bond together to create the compound's structure, with hydrogen atoms bonding to them in various arrangements.
- **Location**: Hydrocarbons primarily exist in subterranean rock formations.
- **Forms**: They are commonly found as natural gas, coal, crude oil, and petroleum.
- **Formation**: Reservoirs are created underground when a more resistant rock overlays a less resistant one, causing hydrocarbons to accumulate beneath.
- **Significance**: These formations prevent hydrocarbons from floating to the surface and dissipating.
- **Primary Source**: The main origin of hydrocarbons in underground rocks is **kerogen.**
  - **Sources of Kerogen**: It can originate from lacustrine (lake), marine, or terrestrial ecosystems.
- **Uses**: Hydrocarbons form the primary components of petroleum and natural gas. They function as fuels and lubricants, and also serve as essential raw materials for manufacturing plastics, fibers, rubbers, solvents, explosives, and various industrial chemicals.

DTE

Apr 15

PAHARIYA TRIBE

(Syllabus: GS Paper 2 – Vulnerable Section)

Seeds of solace

Context: The Pahariya tribe in Jharkhand strives for seed self-sufficiency by storing indigenous varieties in community-managed seed banks.

Pahariya Revolt

- **About**: The Pahariyas' Rebellion occurred in 1778 in the Raj Mahal Hills region, present-day Jharkhand, India, instigated by the encroachment of British authority on Pahariya territory.
- **British Response**: In response to the rebellion, British authorities declared the Pahariya-inhabited region as "damni-kol," or forbidden territory, acknowledging the Pahariyas' resistance and agreeing not to extend their administration further into the area.
- **Significance of Damni-kol**: Designating the region as damni-kol aimed to establish a buffer zone between British territories and the Pahariya stronghold, intending to prevent further conflicts and maintain stability.

Pahariya Tribe

- **About:** The Pahariya Tribe primarily resides in Jharkhand and West Bengal, with smaller communities in Uttar Pradesh, Maharashtra, and Odisha.
- **Agricultural Practices**: They practice jhum cultivation, involving the temporary clearing of land through burning vegetation for agricultural purposes.
- **Types of Pahariyas** in Jharkhand
  - **Mal Pahariya**: Residing in the southern hills of Damin-i-koh and south and east of Santhal Parganas, they belong to the Proto-Ostroloid race.
  - **Shauria Pahariya (or Maler Paharia)**: Predominantly found in Santhal Parganas.
- **Migration and Settlement**: Initially located in Karnataka, they now inhabit the mountains of Rajmahal and Santhal Parganas.
- **Language and Communication**: The Pahariyas communicate in their native language, "Malto," influenced by Havli and Chharisgarhi.
- **Religious Beliefs**: They worship various deities including household, clan, and village gods such as Mait, Maa, Gangadi, Sunadi, Rupadi, and Budharaj.

LIVEMINT

Apr 15

EXO-ATMOSPHERIC MISSILES

(Syllabus: GS Paper 3 – Sci and Tech)

Iran-Israel crisis: Tel Aviv claims air-defence system stopped '99% of missiles'. What is Exo-Atmospheric Interception?

Context: Recently, Israel announced that its air-defense system, utilizing exo-atmospheric interceptors, successfully neutralized '99% of missiles' launched by the Islamic Republic of Iran.

Exo-Atmospheric Missiles

- **About:** It also known as anti-ballistic missiles (ABMs), play a crucial role in defense systems worldwide.
- **Surface-to-Air Design**: These missiles are specifically engineered as surface-to-air weapons tailored to intercept incoming ballistic missiles.
- **Primary function**: To intercept and destroy ballistic threats during either the mid-course or terminal phase of their trajectory.
- **Target Specificity**: While capable of countering various types of ballistic missiles, they are particularly designed to combat intercontinental ballistic missiles (ICBMs).
- **Operation Beyond Earth's Atmosphere**: Exo-atmospheric interceptors operate beyond the Earth's atmosphere, where they engage incoming threats.
- **Advanced Sensor Technology**: Equipped with infrared sensors and radar systems, these missiles can detect and track ballistic threats efficiently.
- **Hypersonic Speed and Guidance**: Traveling at hypersonic speeds, they utilize sophisticated guidance systems to accurately maneuver and intercept high-speed targets.
- **Solid Rocket Boosters**: These missiles employ a three-stage solid rocket booster to propel themselves out of Earth's atmosphere at near-hypersonic velocities.
- **Sophisticated Target Tracking**: Upon reaching space, ABMs activate their sensors to identify and track incoming threats, employing inbuilt rocket motors for precise navigation towards their targets.

FINANCIAL EXPRESS
Apr 15

SHRINKFLATION
(Syllabus: GS Paper 3 – Economy)

Shrinkflation makes its way back into FMCG

Context: As input prices, which were benign for a few quarters, turn inflationary, the spectre of shrinking packs looms large within the fast-moving consumer goods (FMCG) segment.

Shrinkflation

- **About**: It occurs when goods decrease in size while maintaining the same price, effectively reducing the value consumers receive.
- **Hidden Inflation**: It's a form of concealed inflation where producers opt to shrink product sizes rather than directly increasing prices.
- **Price Dynamics**: Although the absolute price remains constant, the price per unit of weight or volume rises due to the reduced size of the product.
- **Reasons Behind Shrinkflation**: Rising production costs and market competition are the primary drivers of shrinkflation.
- **Higher Production Costs**: Increased costs of ingredients, raw materials, energy, and labor prompt manufacturers to downsize products to maintain profit margins.
- **Causes of Shrinkflation**:
  - **Increased Costs**: Higher expenses in production lead to companies reducing product sizes to maintain profitability.
  - **Intense Market Competition**: Pressure to keep prices competitive drives companies to shrink product sizes rather than increase prices.
  - **Changing Customer Demands**: Evolving preferences may prompt companies to alter product formulations, resulting in size adjustments to meet demand.
- **Impacts of Shrinkflation:**
  - Shrinkflation risks alienating customers who perceive they're receiving less for the same price.
  - It complicates measuring price changes and inflation accurately, as product sizes may vary without reflecting in the price point.

PADMA AWARDS
(Syllabus: GS Paper 1 – Awards)



Padma Ceremony on April 22; Govt Says No Poll Code Violation As Awards Declared Earlier

Rahul.Tripathi@timesgroup.com

New Delhi: The Padma Awards ceremony at the Rashtrapati Bhavan is scheduled to be held on April 22, after the first phase of polling on April 19, said those aware of the developments, adding that the Election Commission of India (EC) has been intimated since model code of conduct is in force.

Prime Minister Narendra Modi and other cabinet members are expected to attend the daylong event, they added. The awards were announced early this year on the eve of the Republic Day.

According to officials, the awardees will be informed about the ceremony to be held next week as many of them will be required to arrange their logistics which will be coordinated by the Union home ministry. As per the norms, the willingness of the person to be conferred with the awards and his/her presence is sought at the President's house where the ceremonies have been held on two different occasions in the past.

On the model code of conduct, officials explained that since awards have been already declared, there are no violations of any rules.

Recently, President Droupadi Murmu conferred Bharat Ratna, the country highest civilian award, to former prime ministers P V Narasimha Rao and Chaudhary Charan Singh, senior BJP leader L K Advani, agriculture scientist M S Swaminathan and former Bihar chief minister Karpoori Thakur. The awards were given after the announcement of Lok Sabha election dates on March 16, 2024, they added.

In 2023, the President gave away the Padma Awards in two ceremonies, first being held on March 23 and, second on April 5, 2023. However, due to ongoing general elections, the schedule has been delayed this year, another official explained. A total of 132 eminent personalities were among the Padma Awardees this year.

Among them are former Vice President M Venkaiah Naidu, actors Vyjayantimala Bali and Konidela Chiranjeevi, Sulabh International founder late Bindeshwar Pathak, first woman judge of Supreme Court late M Fathima Beevi and Bombay Samachar owner Hormusji N Cama, Actor Mithun Chakraborty, Foxconn Chairman Young Liu from Taiwan, BJP veteran Ram Naik, late actor Vijaykanth, singer Usha Uthup and philanthropist Kiran Nadar were also awarded the coveted civilian award.

The awards are conferred in three categories, Padma Vibhushan, Padma Bhushan and Padma Shri.

MODI, MINISTERS TO ATTEND

Prime Minister Narendra Modi and other cabinet members are expected to attend the day-long event

Context: The Padma Awards ceremony at Rashtrapati Bhavan is set for April 22, recently informed sources mentioned, following the initial polling phase on April 19, with the Election Commission of India duly notified due to the active model code of conduct.

Padma Awards

- **About**: These Awards are one of the highest civilian honours of India announced annually on the eve of Republic Day.
- **Categories:** Padma Vibhushan, Padma Bhushan, and Padma Shri.
- **Who decide**: All nominations received for Padma Awards are placed before the Padma Awards Committee.
- A**warded by**: President:

Padma Vibhushan

- **About:** It stands as India's second-highest civilian award, trailing only the Bharat Ratna.
- **Instituted on:** 2 January 1954
- **Eligibility**: All individuals, regardless of race, occupation, position, or gender, are eligible for consideration for the Padma Vibhushan.
- **Exceptions to Eligibility**: Government servants, excluding doctors and scientists, along with those employed in Public Sector Undertakings (PSUs), are not eligible for the Padma Vibhushan.

Padma Bhushan

- **About:** It is the third-highest civilian award in India, instituted in 1954.
- **Criteria for Award**: It is bestowed for distinguished service of a high order to the nation in any field, excluding public sector undertakings.
- **Eligibility**: Recipients include individuals from various sectors, including government servants like doctors and scientists.

Padma Shri Awards

- **About**: It is the fourth-highest civilian award of the Republic of India after the Bharat Ratna, Padma Vibhushan, and the Padma Bhushan.
- **Recognition**: contributions in various spheres of activity including the arts, education, industry, and social service, among others.
- **Eligibility**: All persons without distinction of race, occupation, position, or sex.
- **Not Eligible**: Government servants including those working with PSUs.

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