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- GOLD
- Two Narratives in the Israel-Hamas Conflict
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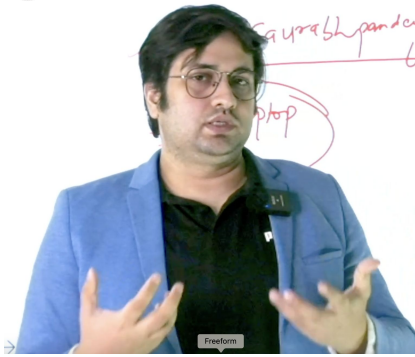
- Mains



By saurabh Pandey

THE HINDU

Kazakhstan - first Nuclear Power station

Halari Donkeys 🐴

Salt Pans

Plant response towards Warming

Oysters

Hepatocellular carcinoma

The coyote

Target Mains -2025/26 -

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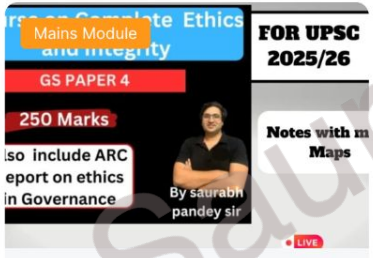

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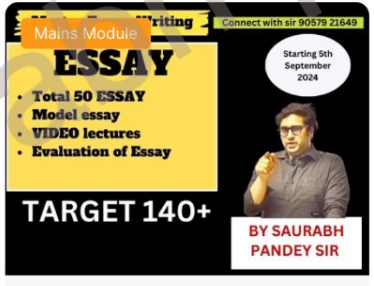

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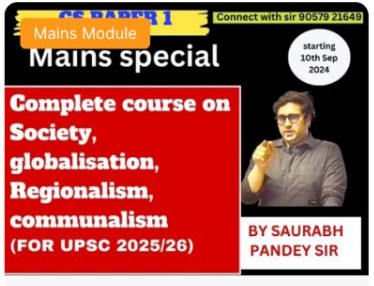

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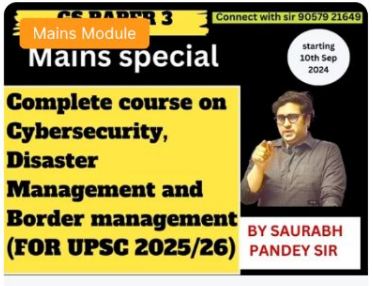

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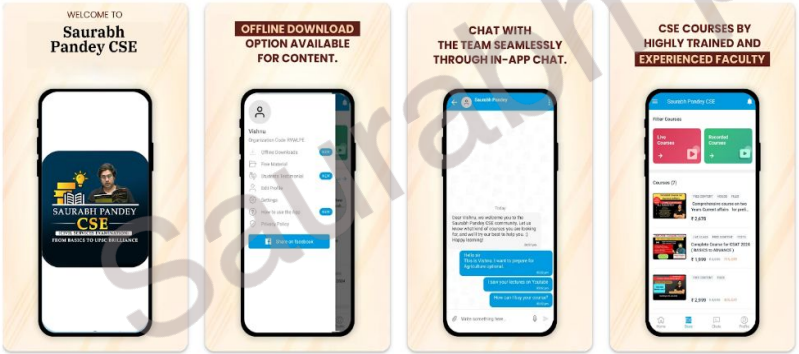

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Excavations commence at Doddalathur megalithic burial site in Hanur taluk

The Hindu Bureau
MYSURU

A team of history and archaeology scholars and students from the University of Mysore have embarked on an excavation of megalithic burial sites in Chamarajanagar district.

The excavations are being conducted at Doddalathur village, located in a small valley formed by the Male Mahadeshwara Hill ranges in Hanur taluk of Chamarajanagar district, in association with the Mythic Society, Bengaluru.

V. Shobha, Chairperson of the Department of Studies in Ancient History and Archaeology, University of Mysore, who is involved with the project, said that to the west of the village was a small hillock and in the adjacent fields were hundreds of burials of the megalithic period which corresponded to the Iron Age. The burials consisted of circles made of large boulders and hence the name "megalithic". Since iron technology came into use during this period, it was also known as Iron Age, and in South India, this period had been broadly placed in the time bracket of 1200 BC to 300 CE, said Ms. Shobha.

A megalithic burial site near Hanur in Chamarajanagar district will be excavated for research and further studies. SPECIAL ARRANGEMENT

She pointed out that Doddalathur megalithic burial site was discovered by C. Krishnamurti of the Archaeological Survey of India in 1961.

The site once had more than 1,000 burials, according to the local villages but many had vanished in recent years owing to expansion of agriculture and cultivation activities, settlement and land development projects, Ms. Shobha added. But the site had potential for excavation as a majority of the burials are still intact despite disturbances, she said.

Superintending Archaeologist C.B. Patil (retd.), ASI, is the co-director of the excavation, and the project hopes to throw more light on the megalithic-iron age culture in the hilly regions of southern Karnataka.

Another purpose is to provide field training to the students of archaeology. The excavations, which began on October 3, will continue for two months.

Topic→ Dodd Alathur Excavation

🏺 A team from the University of Mysore is excavating megalithic burial sites in Chamarajanagar district.

🏞️ The excavation site is located in Doddalathur village, nestled in a valley formed by the Male Mahadeshwara Hill ranges.

⏳ The burials date back to the Iron Age, approximately between 1200 BC and 300 CE, characterized by circles of large boulders.

🔍 The site was initially discovered in 1961 by C. Krishnamurti from the Archaeological Survey of India and once had over 1,000 burials.

🌾 Many burials have been lost due to agricultural expansion and land development, but many remain intact for excavation.

Megalithic

Overview of Megalithic Structures

Definition: Large stone constructions often used for ceremonial, religious, or burial purposes.

Locations: Found globally, particularly in Europe, Asia, and Americas.
Historical Significance: Reflects ancient civilization's engineering and cultural practices.

Key Themes

Archaeological Findings:

- **Burial Sites:** Studies show diverse burial practices, such as in Spain's Megalithic Necropolis of Panoría.
- **Social Structures:** Evidence of gender roles and social organization from findings in burial sites.

Cultural Importance:

- **Religious Significance:** Many megalithic structures served as places of worship.
- **Cultural Heritage**: Represents the identity and history of ancient peoples.

Technological Insights:

- **Engineering Feats:** Advanced techniques used in construction, predating modern scientific understanding.
- **Materials:** Exploration of stone types and sourcing methods used in construction.

Scientists are working on a way to detect cancer with sound waves

Biopsies are cumbersome, painful, and potentially injurious. Research has found that high-energy ultrasound can break off a small piece of cancerous tissue into droplets and release their contents into the bloodstream. The team could then test the blood for biomarkers specific to cancer

Joel P. Joseph

Scientists have developed a new technique to detect cancers. The method uses ultrasound to turn a small part of our body's tissue into droplets that are released into the blood. These bubbles contain molecules like RNA, DNA, and proteins that allow the scientists to identify particular types of cancer.

Roger Zemp, associate professor of electrical and computer engineering at the University of Alberta, Canada, led a recent study describing such a technique. He presented his team's findings at the joint meeting of the Acoustical Society of America and the Canadian Acoustical Association at Shaw Centre in Canada on May 13.

A summary of the findings was also published in the *Journal of the Acoustical Society of America* earlier this year.

Break-off, blood, biomarker

Doctors have been using ultrasound to take pictures of internal organs. The technology converts the sound waves reflected by surfaces inside the body to an image, just the way bats use ultrasound to sense their surroundings.

This said, the gold standard to detect many cancers is a biopsy. Doctors extract a small piece of tissue or cells using a large needle from the part of the body where cancer is suspected to be present. In vitro tests can confirm if the tissue or cells are cancerous and, if so, what kind of cancer it is.

Now, Zemp and his colleagues at the university are figuring out a way to use ultrasound to perhaps someday replace biopsies, which are cumbersome, painful, and potentially injurious. They have found that high-energy ultrasound (at frequencies greater than those used in ultrasound scans) can break off a small piece of cancerous tissue into droplets and release their contents into the bloodstream. The team could then test the blood for biomarkers – certain biomolecules like DNA, RNA, or proteins – specific to cancer.

"Ultrasound can enhance the levels of these genetic and vesicle biomarkers in blood samples by over 100-times," Zemp said in a press release. This method could allow clinicians to use blood samples to detect specific cancer types and even the mutations they contain, which are currently undetectable in blood.

He estimated the technique could help clinicians avoid nearly half of all biopsies.

'New kind of readout'

In the most advanced use of the technique, Zemp and his colleagues detected the presence of a single cancer cell circulating in the blood. When cancer progresses and spreads, cancer cells move to parts of the body other than their original site via the blood. But scientists and clinicians have struggled to spot these cells in the blood because they're very small in number. A few tests are still sensitive enough to detect them, but they're expensive. For example, the 'CellSearch' test costs $10,000 (₹ 8.4 lakh).

But Zemp & co. were able to detect a cancer cell in the blood samples of a prostate cancer patient using their technique. The team passed ultrasound waves through blood samples isolated from the cancer patients. The waves shredded the circulating cancer cells and released the biomarkers they contained into the blood. The team looked for and confirmed the presence of these biomarkers. Zemp estimated this version of the test would cost a hundred times less, around $100 (Rs 8,400).

The researchers are now trying to expand their findings to other types of cancer, particularly breast cancer and melanoma.

"We hope our ultrasound technologies will benefit patients by providing clinicians a new kind of molecular readout of cells and tissues with minimal discomfort," Zemp said in the same release.

A technician prepares to use an ultrasonogram device that creates an image of the body's insides using ultrasound waves. ELEN SHER/UNSPLASH

Doctors use ultrasound to take pictures of internal organs. The technology converts the sound waves reflected by surfaces inside the body to an image, just the way bats use ultrasound to sense their surroundings

Needed: large cohorts

Himanshu Shekhar, assistant professor of electrical engineering, and Karla Mercado-Shekhar, assistant professor of biological sciences and engineering, both at IIT Gandhinagar, said the effort was promising and considerably more advanced than previous work in this field.

"The ability to perform ultrasound-aided detection using drawn blood samples is most exciting because of the simplicity of this approach. The main advantage of this approach is its non-invasiveness, which will prevent patient discomfort," Shekhar said.

Mercado-Shekhar said the approach could be extended to monitoring cancer progression and treatment response. However, she cautioned that more studies in a large cohort of patients would be required before doctors start using this tool in the clinic.

Clinical trials with large cohorts of patients with different types of cancer and healthy people across different ethnic groups and geographies are important to ensure the technique can produce accurate results for different cancer types and prove that it's sensitive to their varying biomarker thresholds.

Brian Tysinger, a research assistant professor of public policy, and Jakub Hlavka, associate professor of population and public health sciences, both at the University of Southern California, underscored this point in an article published by the US National Academies Press in May 2022: "Lack of representative studies on screening for cancer or cardiometabolic disease may lead to recommendations that fail to consider earlier ages or lower biomarker thresholds to start screening that might be warranted in some populations."

About five years

There has been a push of late for more accessible and affordable cancer screening methods.

The U.S. National Cancer Institute recently launched its 'Cancer Screening Research Network'. In 2025, the network will start a pilot study to evaluate a battery of screening tests to spot cancer early and accurately with a cohort of 24,000 people.

The study is expected to be completed in four years.

The network may later support similar trials for screening methods developed by individual research groups, potentially including the ultrasound-based one.

"If results of clinical trials are favourable, the researchers will likely pursue regulatory approval in collaboration with industry partners, and subsequently, this technique could be available commercially in about five years," Mercado-Shekhar said.

(Joel P. Joseph is a freelance science journalist and researcher. joelpjoseph2009@gmail.com)

THE GIST

Ultrasound can enhance the levels of biomarkers over 100-times. This method could allow clinicians to use blood samples to detect specific cancer types and even the mutations, which are currently undetectable in blood

Researchers were able to detect a single cancer cell circulating in the blood. Scientists have struggled to spot these cells because they're small in number. Some tests can detect them but they are extremely expensive

Ultrasound-aided detection using blood samples is important because of its simplicity. The main advantage is its non-invasiveness, which will prevent patient discomfort

Topic →New Ultrasound Technique for Cancer Detection

Overview of the Technique

Ultrasound Method: Converts tissue to droplets released into the blood.
Components: Bubbles containing **RNA**, **DNA**, **and proteins**.
Usage: Identifies types of cancer.

Current Cancer Detection Methods

Traditional Biopsy:

Involves a large needle to extract tissue.
Considered the gold standard.

Ultrasound Imaging:

Converts sound waves into images.
Used for taking pictures of internal organs.

Advantages of the New Technique

Noninvasive: Reduces patient discomfort compared to biopsies.
Real-time Diagnostic: Quick identification of cancer types.
Potential for Broader Detection: Could improve screening effectiveness.

WHAT IS IT?

Gold: what makes it so desirable?

Vasudevan Mukunth

Gold is a precious metal famed for its use in jewellery and as a form of investment. Its atomic number is 79, and its Latin name is 'aurum', thus its symbol on the periodic table, Au.

Some 10% of all the gold produced around the world is used every year in industry thanks to the metal's many desirable properties. For example, gold doesn't dissolve in strong nitric acid whereas most metals do; this is why the term "acid test" is used to refer to a test of someone's character. Among the noble metals, only platinum is less reactive. Gold does dissolve in a solution of nitric acid and hydrochloric acid that alchemists called aqua regia, or "royal water." It also dissolves in some alkaline solutions and in mercury, is malleable, ductile, corrosion-resistant, and a good conductor of electricity. It is commonly used in industry to form connectors in computers.

South Africa has produced most of the world's gold since the late 19th century, but today the largest producer is China (no. 6 on this list is the small country of Ghana). The cost of extracting and refining gold depends on where it is found, although gold nuggets are typically found in mountainous areas that also have quartz veins.

The Nobel Prize medal. ANGELA WEISS/AP

Each of the Nobel Prizes to be awarded from October 7 will include a medal of electrum, an alloy of gold and silver, plated with 24 carat gold.

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Topic→ GOLD

🏅 Gold's Characteristics: Gold is a precious metal with the atomic number 79 and the Latin name 'aurum', symbolized as Au on the periodic table.

💍 Jewellery and Investment: It is widely recognized for its use in jewellery and as a form of investment.

⚙️ Industrial Use: Approximately 10% of gold produced globally is utilized in various industries due to its desirable properties, including being corrosion-resistant and a good conductor of electricity.

🌍 Global Production: South Africa was the leading gold producer since the late 19th century, but currently, China holds the title, with Ghana also being a notable producer.

🔬 Chemical Properties: Gold is resistant to strong nitric acid and can dissolve in aqua regia, a mixture of nitric and hydrochloric acids, as well as in some alkaline solutions and mercury.

🏆 **Nobel Prizes: Each Nobel Prize awarded from October 7 will feature a medal made of electrum, an alloy of gold and silver, plated with 24-carat gold.**

⛰️ **Extraction Locations: Gold nuggets are typically found in mountainous regions with quartz veins, and the cost of extraction varies based on location.**

Summary: Gold is a valuable metal known for its use in jewellery, investment, and industry, with unique chemical properties and significant global production trends.

A three-tier war in West Asia with no endgame

Stanly Johny

In an essay in *Foreign Affairs* magazine in October 2023, U.S. National Security Adviser Jake Sullivan wrote, "...Although the Middle East remains beset with perennial challenges, the region is quieter than it has been for decades... The Israeli-Palestinian situation is tense, particularly in the West Bank, but in the face of serious frictions, we have de-escalated crises in Gaza." A few days after the piece was sent to press, on October 7, Hamas launched its deadliest attack in Israel, killing at least 1,200 people and taking some 250 people hostage, triggering the latest spell of war in the Israel-Palestine conflict. A year later, West Asia (or the Middle East, as Mr. Sullivan calls it) is deadlier today than it has been in decades.

Mr. Sullivan's October 2023 prognosis was not entirely unfounded if the region is seen from an American perspective. The Abraham Accords, signed in 2020 by Israel, the UAE, Bahrain, and Morocco, announced a new age of Arab-Israel partnership. Saudi Arabia was in an advanced stage of normalising ties with Israel, as Crown Prince Mohammed bin Salman himself put it. At the G20 Summit in Delhi in September 2023, U.S. President Joe Biden announced an ambitious economic corridor that sought to connect India's western coast to Europe through the Persian Gulf, Jordan, and Israel. But what Mr. Sullivan, the Arabs, and the Israelis overlooked was the Palestine question.

Two narratives

Israel believed that it had established a new status quo – occupation without consequences. The Arabs believed that the Palestine issue had lost its geopolitical currency and that they could go ahead with formalising their decades-long back-room relationship with Israel. The U.S. wanted to bring the Sunni Arabs and the Israelis, two pillars of its West Asia strategy, closer in its bid to reshape West Asia and isolate Iran. But by carrying out a murderous attack in Israel, Hamas not only torpedoed this status quo, but also triggered a chain of events that led to a wider regional conflict, reinforcing the old argument that there will not be peace and stability in West Asia unless the Palestine question is addressed.

But Israel has a different narrative. It has always sought to delink Palestinian militarism from its occupation of the Palestinian territories. Before October 7, Israel had been treating Palestinian violence as a security nuisance. But after the Hamas attack, the first large-scale one in Israel proper since 1948, the narrative shifted. Now, Israel is fighting an "existential war" against terror. Israel marched to Gaza with fire and fury. Over the past 12 months, the Israel Defence Forces (IDF) have killed more than 41,000 Palestinians (more than 110 every day) and injured nearly 1,00,000 Palestinians. Nearly the whole population of Gaza (2.3 million) has been displaced.

This is a conflict loop where no side is deterring its rival. With no way to break out of the loop, Israel chose to climb up the escalation ladder

Octopus doctrine

As the onslaught on Gaza began, Hezbollah, the Iran-backed Lebanese militia group, opened a "support front" in Israel's north. Israel expanded the war, defying pressure from the U.S., by doubling down on its assault on Hezbollah and taking the war to Iran by attacking its embassy complex in Damascus. In retaliation, Iran launched direct attacks against Israel. Now, Israel is fighting a three-tier regional war in West Asia.

Israel has different objectives at each tier, which collectively make for its strategy to alter the balance of power in West Asia to further its advantage. At the bottom tier, Israel went to Gaza with two declared objectives – to destroy Hamas and secure the release of hostages. In the middle, it wants to push Hezbollah from the border region of Lebanon and stop the Shia militia from launching rockets into Israel so that the displaced residents of the Upper Galilee region can return to their homes. At the top, it wants to weaken Iran, its main regional rival. Israel sees the conflict, as the former Prime Minister Naftali Bennett put it, as a war against a rival octopus. Iran is the head of the octopus and the militias (Hamas, Hezbollah, Houthis, Hashad al-Shabi, etc.) are the tentacles. In the three-tier war, Israel wants to destroy or degrade the tentacles and weaken the octopus and thereby reshape West Asia. Is this an achievable goal?

After 12 months of fighting in Gaza, which has been under an Israeli blockade since 2007 and has been besieged by Israel since October 7, 2023, Israel is yet to meet its objectives in the 365 sq. km enclave, sandwiched between the Mediterranean Sea and Israel proper. Prime Minister Benjamin Netanyahu wants to obliterate Hamas, but now even the IDF says this is not an achievable objective. More than 100 hostages, many of them believed to be dead, are still in Hamas's captivity. Hezbollah says it will not stop firing rockets into Israel unless Israel ceases fire in Gaza. Israel cannot do this unless it meets its goals in Gaza.

Mr. Netanyahu chose to expand the war to Lebanon not because he is achieveing his objectives, but because he is far from doing so. Granted that Israel's back-to-back attacks on Hezbollah, including its killing of Hassan Nasrallah, perhaps the second most influential figure in Iran's axis after Ayatollah Khamenei, was a huge setback for both Hezbollah and Iran. When Hezbollah was in shock after the killing of its leader, Israel launched a ground invasion of Lebanon. Here, Israel faces two questions. First, will the decapitation of Hezbollah's leadership help Israel finish the war in Gaza? Second, will the decapitation of Hezbollah's leadership help Israel defeat Hezbollah in Lebanon? The answer to the first question is an outright no. The second question will be answered in the coming weeks, months, or years.

History suggests decapitation hardly works in destroying or deterring militias. Nasrallah took over Hezbollah after Israel killed the group's co-founder, Abbas al-Musawi. That did not stop Hezbollah from becoming what it is today: the most powerful non-state militia in the region. Israel killed two of Hamas's founding leaders in 2004. But that did not stop Hamas from driving the Israelis out of the enclave in 2005, capturing the territory in 2007, and carrying out the cross-border attack on October 7 last year. If Israel has not destroyed Hamas in the besieged Gaza in 12 months, how is it going to stop Hezbollah from firing rockets from Lebanon? After Nasrallah was killed, Hezbollah has launched hundreds of rockets into Israel.

The Iran question

This takes us to the third problem: Iran. The IDF has great firepower. Israel has proved in the past that it can carry out pinpointed attacks inside Iran, which shows the deep penetration of its intelligence in the Islamic Republic. Israel is set to carry out a decisive attack in Iran, in retaliation for the October 1 ballistic missile attacks by the Iranians. But will that deter Iran from launching another attack or supporting the axis? If it doesn't, what Israel, Iran, and the region as a whole will get is a shooting match between the two most powerful actors of West Asia. If Iran's already porous deterrence is weakened further in the shooting match, there is a high possibility that Iran will change its nuclear doctrine. Israel does not have a clear endgame vis-à-vis Iran, unless there is a regime change in Tehran.

This is a conflict loop where no side is deterring its rival. With no way to break out of the loop, Israel chose to climb up the escalation ladder. To dial down the heat in the region, there has to first be a ceasefire in Gaza. For long-term stability, the Palestine question needs to be addressed. Israel is ready for neither now; it is seeking to reshape West Asia in its favour instead. The last time a country tried to do so was the U.S. And the world's most powerful nation failed.

stanly.johny@thehindu.co.in

Topic→ Two Narratives in the Israel-Hamas Conflict

Israel's Perspective 🌍

Establishment of new status quo: *Occupation without consequences*

Shift to an *existential war* against terror post-Hamas attack

Objectives:

Destroy Hamas 💣

Release hostages

Military actions:

Increased attacks on Gaza

Death toll of over 41,000 Palestinians

Displacement of nearly entire Gaza population

Delink Palestinian militarism from occupation

Arab Perspective 🕌

- Belief that the Palestine issue has lost *geopolitical currency*
- Formalizing relationships with Israel
- Perception of Hamas's attack as a disruption of the status quo
- Concerns over lack of peace and stability until the Palestine question is addressed

U.S. Strategy 🇺🇸

- Aim to bring Sunni Arabs and Israelis closer
- Reshape West Asia and isolate Iran
- Reaction to Hamas attack triggering wider regional conflict

Three-Tier Regional War

Bottom Tier:

Target: Hamas in Gaza

Objectives:

Destruction of Hamas

Hostage negotiations

Middle Tier:

Focus on Hezbollah

Prevent rocket launches into Israel

Top Tier:

Weakening Iran

Strategic reshaping of West Asia

Octopus Doctrine 🐙

Israel's multi-tiered strategy:

***Bottom tier*: Focus on Gaza**

***Middle tier*: Push back Hezbollah from the border**

***Top tier*: Weaken Iran and its influence**

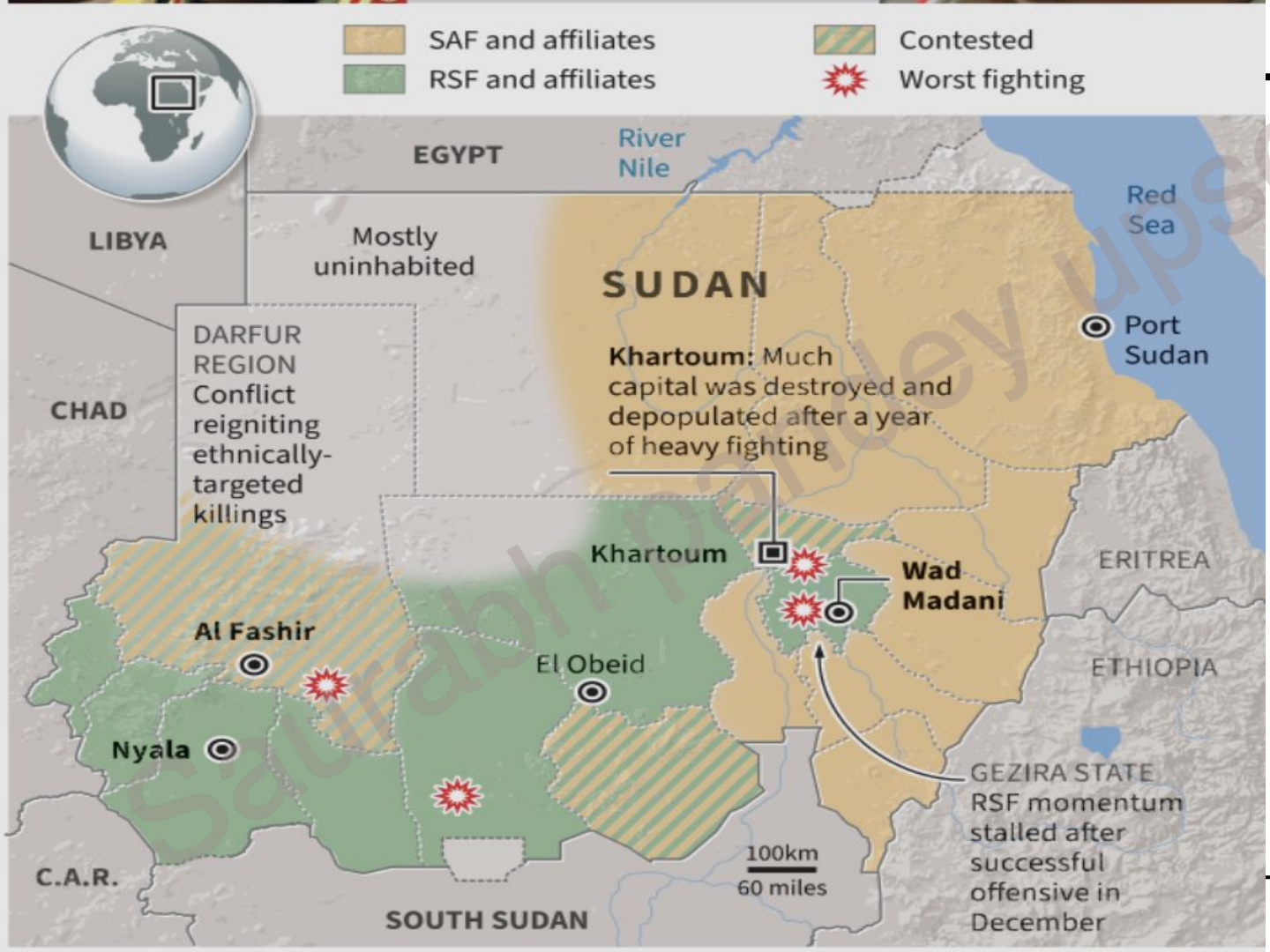
Comparison of Iran to the head of an octopus, with its militias as tentacles

Challenges ⚖️

Achieving military objectives in Gaza

Ongoing conflict with Hezbollah and its support for Hamas

Complexity of addressing Iran’s influence in the region



Topic → Cochin port

🚢 **Cancellations Impacting Cochin Port:** A wave of ship cancellations threatens Cochin Port during the cruise season due to the Red Sea crisis.

🌊 **Alternative Routes:** Shipping lines are opting for longer routes around Africa to avoid the strait of Bab al-Mandab, where Houthi attacks have occurred.

📉 **Previous Season's Losses:** Last season, 10 vessels canceled their visits to Cochin Port, affecting the port's revenue from cruise tourism.

💰 **Financial Implications:** The cruise season typically generates significant income for local businesses, with potential losses of ₹15-20 lakh in ship handling charges and ₹1 crore from canceled overland tours.

🚢 **Impact on Employment:** Extended shipping routes lead to longer contracts for crew members, causing delays in employment for new seamen.

📈 **Rising Freight Costs:** The geopolitical crisis has caused a spike in shipping freight rates, negatively affecting global maritime trade.

🌍 **Tourism and Economic Effects:** The cancellations not only impact cruise lines but also local tourism, affecting guides, tour operators, and taxi services.

Summary: The ongoing Red Sea crisis is causing significant ship cancellations at Cochin Port, leading to financial losses and employment issues in the cruise and maritime sectors.

Topic → Dry Port Development

🚢 Dry Port Development: Telangana is set to establish dry port facilities to enhance logistics services for its industries.

🏗️ Public-Private Partnership: The dry port will be developed in collaboration with private entities, as stated by a senior official from the Telangana Industrial Infrastructure Corporation (TGIIC).

📦 Customs Efficiency: Exporters will be able to complete all customs formalities at the dry port, leading to time and cost savings.

🌍 Export Routes: Currently, exports from Telangana are routed through ports in Tamil Nadu and Andhra Pradesh, highlighting the need for local facilities.

A dry port is an inland terminal that is meant to provide connectivity to a sea port by rail or road, thus serving as trans-shipping hub for sea cargo. An exporter can complete all customs formalities at the dry dock, saving time and cost

🏞️ **Logistics Park Proposal: A 1,400-acre multi-modal logistics park near Nalgona was approved in July 2021, aimed at boostin logistics capabilities.**

📈 **Logistics Sector Growth: Telangana's logistics sector is growing at an annual rate of 12%, driven by the state's industrial strengths in various sectors.**

⚙️ **Future Plans: The current government plans to expedite the dry port project and is exploring additional dry port setups to facilitate exports.**

Summary: Telangana is advancing plans to establish dry port facilities to enhance logistics and export efficiency, with a focus on public-private partnerships and infrastructure development.

Topic → Lake Uru Uru, Bolivia

Environmental Issues and Restoration Efforts 🌍

Pollution: Various sources indicate that Lake Uru Uru is heavily polluted with waste, primarily plastics.

Cleanup Initiatives: Local communities, particularly indigenous women, are leading efforts to clean the lake.

Flamingo Habitat: The lake serves as a habitat for flamingos and other wildlife, which are affected by pollution.

Topic →Doukhobor

Overview of Doukhobor

Faith: A pacifist Christian sect.
History: Exiled from Russia centuries ago.
Current Status: Facing potential extinction, especially in Georgia.

Key Themes

Cultural Heritage:
- Unique traditions.
- Language preservation.

Community Challenges:
- Declining population.
- Loss of cultural identity.

Historical Context:
- Internment and reparation issues in British Columbia.
- Historical struggles in Georgia.

Recent Developments

News Highlights:

Doukhobor faith nearing disappearance in Georgia.

Criticism of reparation plans for internment victims in Canada.

Ongoing reflections and stories from surviving members.

Future Considerations

Preservation Efforts:

Community initiatives to maintain cultural identity.

Educational programs on Doukhobor history.

Advocacy:

Legal support for surviving members.

Awareness campaigns about Doukhobor contributions.

Topic-- Kazakhstan - first Nuclear Power station

🗳️ Kazakhstan held a referendum on building its first nuclear power station to increase power generation capacity.

🌍 As the world's leading uranium producer, Kazakhstan is looking to expand its energy resources.

⚛️ The new power station is proposed to be located on the shores of Lake Balkhash, with China, France, Russia, and South Korea as potential builders.

☢️ The country has a sensitive history with nuclear power, having experienced around 450 Soviet-era nuclear tests that exposed 1.5 million people to radiation.

⚠️ Opponents of the nuclear project express concerns about potential environmental disasters, but their ability to campaign has been limited due to arrests.

Summary: Kazakhstan's referendum on its first nuclear power station reflects its ambitions to enhance energy capacity, despite historical sensitivities and opposition concerns.

Nomadic life: A Halari donkey herder with his livestock at the Bhanvad grasslands in Gujarat.

Social animals: A drove of Halari donkeys form a line to cross a waterbody in the grasslands.

Pets and pats: A herder feeds roti made of pearl millets to his drove of Halari donkeys.

Brains and brawn

The endangered Halari donkeys, native to the Halar region of Gujarat, are considered to be intelligent animals which work closely with human beings

Vijay Soneji
soneji.v@thehindu.co.in

Donkeys are intelligent animals which work closely with human beings. They are social animals and form close bonds with people, supporting them for transport needs.

One of the most beautiful breed of donkeys is found in the Halar region of Gujarat. Considered endangered, the surviving population of the Halari donkey numbers fewer than 500. The average Halari donkey is white in colour, and is larger and more resilient than other donkey breeds. It is an important domestic animal in the semi-arid landscape of Jamnagar and Dwarka districts in Gujarat's Saurashtra region.

Hamirbhai Bhundiya, a herder, sends out a unique call, upon hearing which his drove of Halari donkeys rush to him like they are his pets. He feeds them *bajra rotla* (roti made of pearl millets).

The close bond he shares with his donkey drove is to be seen to be believed. Three of his donkeys died in the recent floods, a loss which has left him deeply troubled.

Local people narrate stories about these animals being used for the building of dams, forts, hilltop temples, rest houses, and dharamshalas. The donkeys, they say, have impressive ability to carry loads of stone and sand.

Today, one will have to shell out over ₹1 lakh to buy a Halari donkey. There is also demand from other parts of the country to set up Halari donkey dairies.

Halari donkey milk is known for its sweetness. Milk powder made from it can fetch upwards of ₹7,000 a kg in the international market, and is used for cosmetic purposes.

The Sahjeevan Trust has worked to conserve this breed in collaboration with the Animal Husbandry Department of the Gujarat government. They work along with the National Bureau of Animal Genetic Resources for the conservation of this endangered animal.

Under this project, they have identified pure-bred Halari male and female donkeys for breeding and conservation. Their efforts resulted in an increase in the number of Halari donkeys, says Ramesh Bhatti, programme director, of the Sahjeevan Trust.

But experts say that these efforts are not sufficient to really make a difference, and that it would need the depth of the resources of the State government. They call for establishing breeding farms for the Halari donkeys in their native tract of the Halar region.

Rich produce: A herder sells Halari donkey milk which is known for its sweetness.

Topic →Halari Donkeys 🐴

Overview of Halari Donkeys

- Origin: Indigenous to Gujarat, India
- Significance: Known for their milk and traditional uses
- Conservation Status: Endangered breed

Key Aspects of Halari Donkeys

- Milk Production:
  - High value: ₹7,000 per litre
  - Growing demand for donkey milk
- Cultural Importance:
  - Celebratory events like "Godh Bharai" (baby shower)
  - Community awareness programs
- Conservation Efforts:
  - Initiatives to protect the breed
  - Meetings held for conservation strategies

Market Trends

Donkey Milk Market:

- Increasing interest in health benefits
- Potential for commercial dairy setups

Research and Development:

- Studies on donkey milk benefits
- Collaboration with agricultural scientists for AI in breeding

Challenges

Endangerment:

- Risk of extinction due to low population

Market Awareness:

- Need for public education on benefits

Why is salt pan land being used for homes?

What is the Maharashtra government doing to relocate people via the Dharavi Redevelopment Project? Why is the move controversial? What are urban planners and environmentalists saying? Are salt pan lands ecologically important?

Vinaya Deshpande Pandit

The story so far:

The Maharashtra government has issued a GR (Government Resolution) allocating 255.9 acres of salt pan land, distributed over three land parcels in Mumbai's eastern suburbs, for the construction of rental houses in the Dharavi Redevelopment Project through a lease agreement.

What are salt pans?

Salt pan lands are ecologically important salt marshlands. They are low-lying areas around the shore that are used for salt cultivation. They act as holding ponds and work as a sponge for the absorption of rain. They are a coastal area's natural defence against flooding. They help intertidal activity, and are home to diverse flora and fauna.

Salt pan lands are a coastal area's natural defence against flooding, say environmentalists

On relocating: Salt pan workers in Mumbai in 2019. PRASHANT NAKWE

What does the decision entail?

The government has allocated 255.9 acres of salt pan land distributed over three land parcels – 120.5 acres of Arthur Salt Works land at Kanjur, 76.9 acres of Jenkins Salt Works land at Kanjur and Bhandup, and 58.5 acres of Jamasp Salt Works land at Mulund – to Dharavi residents. Maharashtra has almost 13,000 acres of salt pan land, of which over 5,000 acres are in Mumbai. The DCPR-2034 (Development Control and Promotion Regulations) document says 1,781 acres of that land can be developed. The land parcels allocated for rental housing for the Dharavi project are under the ownership of the Central government. After the Maharashtra government sought these parcels from the Centre, the Union Cabinet approved the proposal in September 2024.

What are the terms for allocation of land?

Four conditions have been put forth for the allocation of the land which will be given at a concessional rate of 25% of the prevailing rate. The State government will collect the land revenue from the Dharavi Redevelopment Project Private Limited (DRPPL), the special purpose vehicle (SPV), and pay it to the Central government. The DRPPL will bear the cost of resettlement of the labourers working on the land, and other incidental costs for the acquisition of the land. But the court cases and other legal matters will be handled through the Dharavi Redevelopment Project (DRP), a government body. The land will be used for rental housing, slum rehabilitation, and affordable housing for economically weaker sections. The DRPPL is an SPV in which an Adani Group entity holds 80% stake and the State government has a 20% stake. The land will be leased to the Maharashtra government for a period of 99 years, and it cannot be used for commercial activities.

What are the concerns?

Urban planners and environmentalists say that an impact assessment study needs to be done before opening up large packs of land for intensive activities like housing. They also say that the salt pan lands on the Eastern Express Highway have played an important role in keeping the eastern suburbs free from flooding. The most important demand with respect to the Dharavi project has been for in-situ rehabilitation. Urban planners point out that handing over land parcels in different parts of the city for a developer will lead to formation of ghettos. They also say that the impact of hyperactivity on ecologically sensitive areas needs to be studied.

What lies ahead?

The Centre will hand over the land to the State government, which will give permission to DRPPL to go ahead with the construction after their plans are approved. For that, the DRPPL will have to seek an approval from the Ministry of Environment, Forest and Climate Change. Environmentalists claim that the entire process from here on can be challenged in the court of law. As per the GR issued by the government of Maharashtra, the litigation will be taken care of by DRP, the government body.

Topic→Salt Pans and Dharavi Redevelopment Project

Overview

Salt Pans: Ecologically important areas for salt cultivation
Ecological Role: Natural defense against flooding, sponge for rain absorption
Flora & Fauna: Home to diverse species

salt Pans

- Ecological Importance 🌿
  - Salt marshlands
  - Low-lying coastal areas
  - Absorb rainwater
- Functions 💧
  - Natural flood defense
  - Support intertidal activities
  - Habitat for diverse flora and fauna

Researchers find mechanisms behind plant response to warming

The Hindu Bureau

Microscopic pores on the surface of leaves called stomata help plants 'breathe' by controlling how much water they lose to evaporation. These stomatal pores also enable and control carbon dioxide intake for photosynthesis and growth.

Key mechanism

With global temperatures, widening stomatal pores are considered a key mechanism that can minimize heat damage to plants. University of California San Diego researchers have constructed a detailed picture of increased stomatal 'breathing' and transpiration processes in response to elevated temperatures. Their findings (*New Phytologist*) identify two paths that plants use to handle rising temperatures.

For decades, scientists struggled to find a clear method to decipher the mechanisms underlying rising temperature-mediated stomatal openings due to the intricate measurement processes required.

The difficulty is rooted in the complex mechanics involved in setting air humidity (also known as the vapor pressure difference, or VPD) to constant values while the temperature increases, and the trickiness of picking apart temperature and humidity responses.

The researchers developed a novel approach for clamping the VPD of leaves to fixed values under increasing temperatures. They then teased out the genetic mechanisms of a range of stomatal temperature responses, including factors such as drought hormones, carbon dioxide sensors, and temperature-sensitive proteins.

The researchers found that carbon dioxide sensors are a central player in the stomatal warming-cooling responses, and can detect when leaves undergo rapid warming.

This starts an increase in photosynthesis in the warming leaves, which results in a reduction in carbon dioxide. This then initiates the stomatal pores to open, allowing plants to benefit from the increase in carbon dioxide intake.

Interestingly, the study also found a second heat response pathway.

Under extreme heat, photosynthesis in plants is stressed and declines, and the stomatal heat response was found to bypass the carbon dioxide sensor system and disconnect from normal photosynthesis-driven responses. Instead, the stomata employ a second heat response pathway, not unlike gaining entry through a backdoor to a house, to 'sweat' as a cooling mechanism.

Topic-- Plant response towards Warming

Stomata Function: Microscopic pores on leaves, called stomata, regulate water loss and carbon dioxide intake for photosynthesis and growth.

🔥 Heat Damage Mitigation: Widening stomatal pores help minimize heat damage to plants in response to rising global temperatures.

🧬 Research Findings: University of California San Diego researchers identified two pathways plants use to manage increased temperatures, published in *New Phytologist*.

🔍 Complex Measurement Challenges: Scientists faced difficulties in understanding stomatal responses due to the intricate relationship between temperature and humidity (vapor pressure difference).

⚙️ Novel Approach: Researchers developed a method to maintain constant vapor pressure difference while increasing temperature, allowing for clearer analysis of stomatal responses.

🧪 Genetic Mechanisms: The study revealed that drought hormones, carbon dioxide sensors, and temperature-sensitive proteins play significant roles in stomatal responses to heat.

💧 Dual Response Pathways: Under extreme heat, plants can bypass normal carbon dioxide sensor responses and utilize a secondary pathway to cool down through increased transpiration.

Summary: Researchers have uncovered how plants adapt their stomatal responses to rising temperatures, revealing complex mechanisms that regulate water loss and carbon dioxide intake

Oyster reefs once thrived along Europe's coasts

Oysters once formed extensive reefs along much of Europe's coastline – but these ecosystems were destroyed over a century ago, new research shows. Based on documents from the 18th and 19th Centuries, the study reveals that European flat oysters formed large reefs of both living and dead shells, providing a habitat supporting rich biodiversity. The researchers found evidence of reefs almost everywhere, from Norway to the Mediterranean, covering at least 1.7 million hectares, an area larger than Northern Ireland.

Topic--Oysters

🦪 Oysters once created extensive reefs along much of Europe's coastline, which have been destroyed over a century ago.

📜 New research is based on historical documents from the 18th and 19th centuries.

🌊 European flat oysters formed large reefs consisting of both living and dead shells.

🌱 These reefs provided a habitat that supported rich biodiversity.

🌍 Evidence of these reefs was found from Norway to the Mediterranean.

📏 The reefs covered at least 1.7 million hectares, an area larger than Northern Ireland.

🏝️ The destruction of these ecosystems has significant implications for marine biodiversity.

Summary: Oysters once created vast reefs across Europe, supporting rich biodiversity, but these ecosystems have been largely destroyed over the past century.

Diabetes and obesity increase risk of liver cancer relapse

Hepatocellular carcinoma, a type of liver cancer associated with hepatitis infections, is known to have a high recurrence rate after cancer removal. A study revealed that the risk of recurrence after two years postoperatively was approximately 1.5 times higher in the case of comorbid obesity and 1.3 times higher in the case of diabetes mellitus. In addition, the risk of recurrence after five years postoperatively was 3.8 times higher in the case of comorbid obesity and two times higher in the case of comorbid diabetes alone.

Topic → Hepatocellular carcinoma

- 🦠 Hepatocellular carcinoma is a type of liver cancer linked to hepatitis infection
- 🔄 The cancer has a high recurrence rate after surgical removal.
- 📈 After two years, the recurrence risk is 1.5 times higher in patients with comorbid obesity.
- 📊 The recurrence risk is 1.3 times higher in patients with diabetes mellitus after two years.
- ⏳ After five years, the recurrence risk is 3.8 times higher in patients with comorbid obesity.
- ⚖️ The recurrence risk is two times higher in patients with diabetes alone after five years.
- 🏥 Comorbid conditions significantly impact the recurrence rates of hepatocellular carcinoma.

Summary: Hepatocellular carcinoma has a high recurrence rate post-surgery, significantly influenced by comorbid obesity and diabetes

Question Corner

Puppy dog eyes

Did 'puppy dog eyes' expression evolve exclusively in dogs due to domestication?

New research reveals that coyotes, like domestic dogs, can produce the famous "puppy dog eyes" expression. The study challenges the hypothesis that this facial feature evolved exclusively in dogs due to domestication. The researchers examined the levator anguli oculi medialis (LAOM), the muscle responsible for raising the inner eyebrow to create 'puppy dog eyes', in coyotes. They discovered that coyotes also possess a well-developed LAOM. The researchers compared the facial muscles of coyotes, dogs, and gray wolves. While dogs and coyotes possess a well-developed LAOM, the muscle is either modified or absent in gray wolves. This challenges the hypothesis that human-driven selection was responsible for the development of the inner brow raiser in dogs. Instead, the LAOM might have likely been present in a common ancestor of dogs, coyotes, and gray wolves but was later lost or reduced in wolves.

Readers may send their questions / answers to questioncorner@thehindu.co.in

Topic → The coyote

🐺 Species Information: The coyote (Canis latrans) is a canine species native to North America, also known as the American jackal, prairie wolf, or brush wolf.

🌍 Conservation Status: It is listed as "least concern" by the International Union for Conservation of Nature due to its wide distribution and abundance.

🏙️ Urban Adaptability: Coyotes are highly adaptable and have successfully expanded into urban environments, with sightings in cities becoming common.

🦴 Physical Characteristics: Males weigh between 8 to 20 kg (18 to 44 lb) a
females between 7 to 18 kg (15 to 40 lb), with fur color varying from light gra
to red or fulvous.
🐾 Social Structure: Coyotes exhibit flexible social organization, living in family units or loose packs of unrelated individuals.

🍖 Diet: Primarily carnivorous, their diet includes deer, rabbits, rodents, and occasionally fruits and vegetables.

⚔️ Threats and Hybrids: Humans pose the greatest threat to coyotes, followed by cougars and gray wolves; they can also hybridize with gray wolves and eastern/red wolves, creating "coywolf" hybrids.

Summary: The coyote is a versatile and adaptable North American canine species, recognized for its ecological role, varied diet, and social structures, while facing threats primarily from humans

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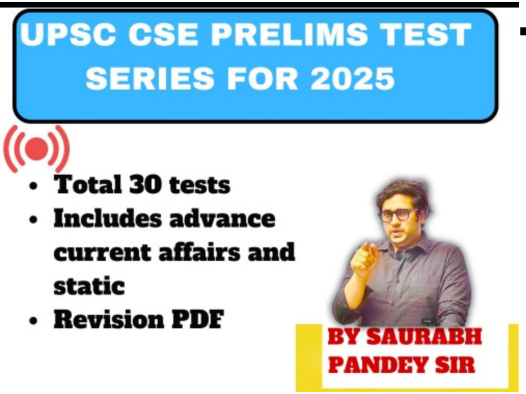

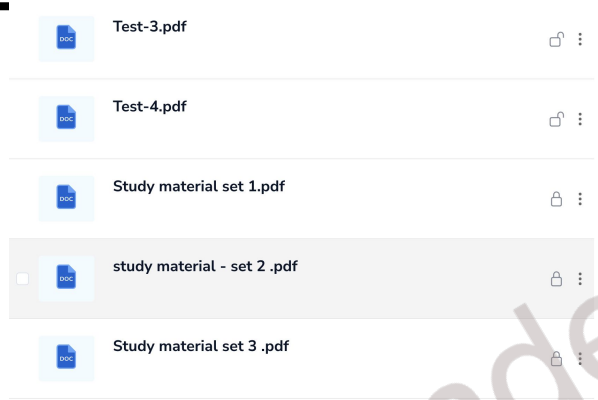

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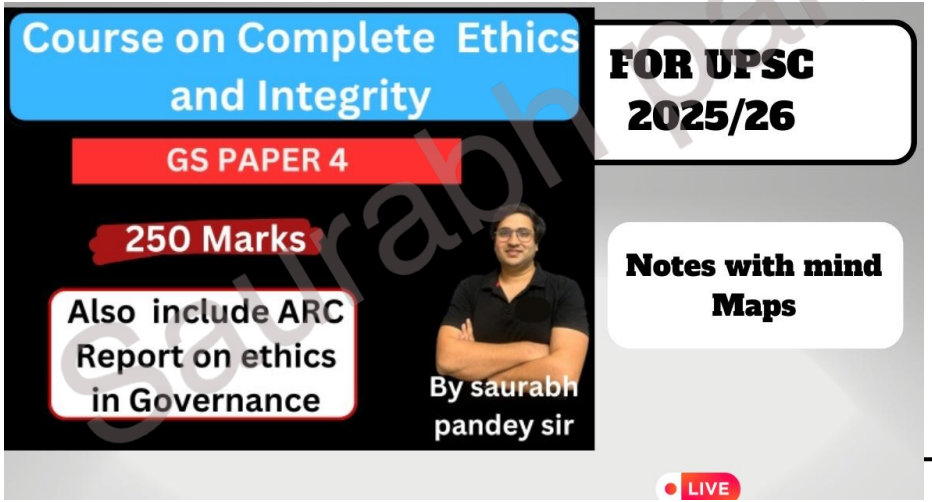

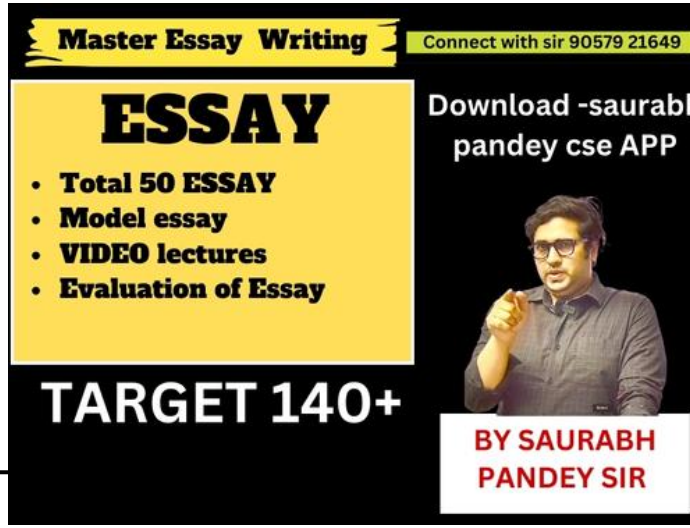

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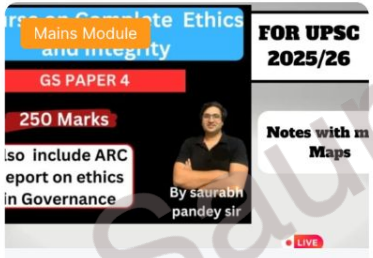

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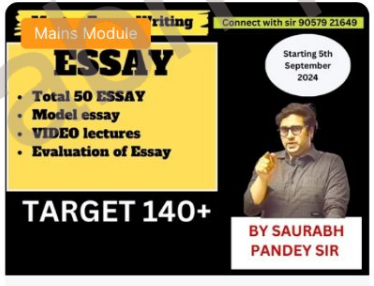

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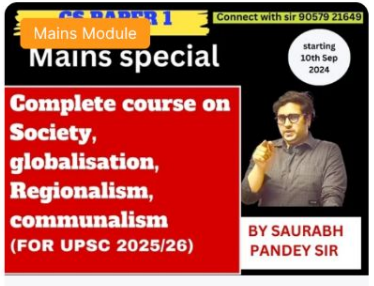

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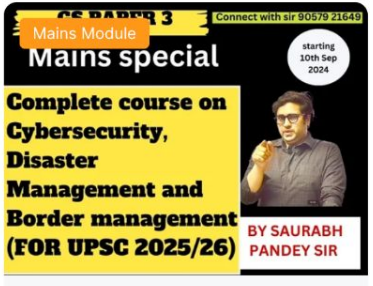

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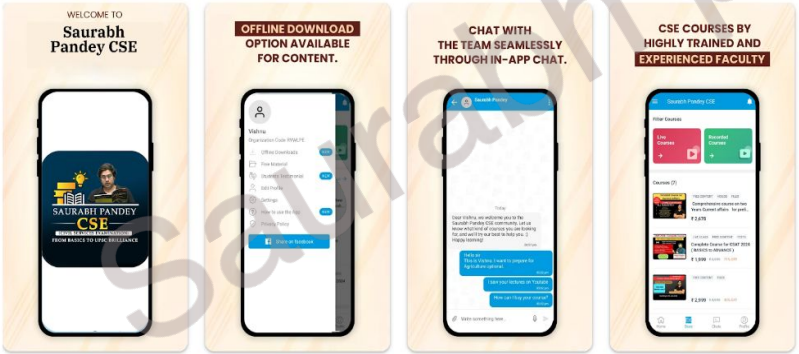

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