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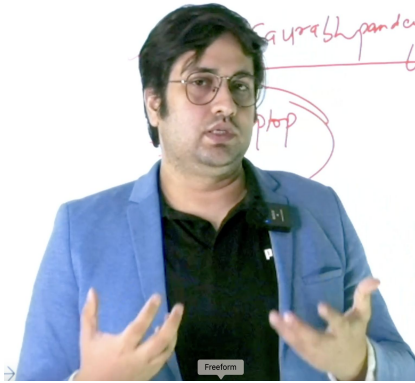


By saurabh Pandey

THE HINDU

Target Mains -2025/26 -

Q. Explain the impact of migration on Agriculture in india .

Bihu beats

Rhythmic spirit: A troupe performs for Rongali Bihu, which marks the Assamese New Year, in Guwahati on Monday. RITU RAJ KONWAR

Bohag Bihu or Rongali Bihu

- Bohag Bihu or Rongali Bihu also called Xaat Bihu is a traditional ethnic festival celebrated in the Northeastern Indian state of Assam and other parts of Northeastern India by the indigenous ethnic groups of Assam, and marks the beginning of the Assamese New Year.

Miniature laser grown onto silicon chip could revolutionise computing

Computing may be set for the next great breakout, with scientists growing lasers directly onto a standard silicon chip, making it easy to integrate with current manufacturing infrastructure; information will be carried by photons, which are particles of light, that will replace electrons

Tejasri Gururaj

The invention of silicon chips revolutionised communications. Even today they are the cornerstone of the technologies we use to move information around the world.

The way they work has changed significantly, however. They have become better: for a long time this was because experts improved the hardware to operate as efficiently as possible. But more recently, researchers have started to replace the electrons with photons, the particles of light, as the agents responsible for storing and manipulating information.

Thus today we have silicon photonics with valuable applications in data centres and sensors as well as potential ones in quantum computing.

Silicon photonics is quickly gaining traction due to the many advantages it offers over traditional semiconductor chips.

In a study in *Nature*, scientists from the US and Europe reported that they had successfully fabricated the first miniaturised lasers directly on silicon wafers, marking a significant advance in silicon photonics.

Photons carry information faster, with greater data capacity and lower energy losses than electrons.

But photons aren't silver bullets. A significant challenge associated with using photons is integrating the source of these particles – a light source – with the silicon chip itself.

Currently, engineers' best bet is to attach a separate laser light source to the chip.

The resulting device operates more slowly than a chip with an integrated light source because of the small but significant mismatches that arise due to being manufactured independently. Separately manufacturing and attaching the lasers is also more expensive.

In the new study, the researchers surmounted this problem by "growing" the laser directly on a silicon chip, in a process that is also more scalable.

The research team also conducted its entire process in a standard complementary metal-oxide-semiconductor (CMOS) manufacturing line, which the technology industry currently uses to manufacture electronic chips.

Thus, the new technique could be compatible with existing manufacturing methods.

Getting on the chip

A typical silicon chip has four components: a source to produce the electrons or photons, waveguides, modulators, and photodetectors.

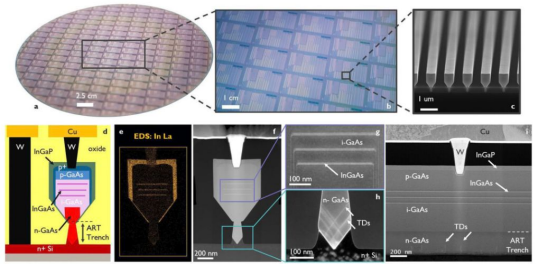
In a photonic chip, a laser is the light source. This is the hardest part to make on the silicon chip itself.

The waveguides act as paths for the photons, similar to how wires are paths for electrons.

Modulators are devices that encode information onto light (or decode information from a light signal).

They do this by transcribing the information in some physical property of the light, like varying its intensity, wavelength, or phase. (Similarly, they extract information by "reading" these variations in an incoming carrier signal.)

Finally, photodetectors convert light into electrical signals.



Top, L-R: photograph of a fabricated 300-mm silicon wafer containing thousands of GaAs devices; close-up view of a fabricated 300 mm wafer showing multiple dies; and scanning electron micrograph of a GaAs nano-ridge array before encapsulation. The bottom row shows various components of chip. ARXIV:2309.04473V1

Switching the laser on

In its simplest form, a laser – an acronym of 'light amplification by stimulated emission of radiation' – works by amplifying light in a process called stimulated emission.

Here, an electron in a higher energy level is "kicked" by an incoming photon to lose some energy and drop to a lower energy level. This energy lost is in the form of another photon whose energy matches that of the incident photon. When this process occurs repeatedly, the population of electrons generates a coherent beam of light. This is a laser.

Silicon itself can't emit light efficiently as it has an indirect bandgap. In other words, in a silicon atom, an electron in a higher energy level cannot drop to a lower one on its own; instead, it requires an additional particle to help release the electron's energy and drop down.

Most lasers use semiconductor materials like gallium arsenide to produce the light. These materials have a direct band gap, meaning that electrons inside the material can drop from a higher energy level to a lower one by emitting a photon.

Direct band-gap materials allow electrons to directly emit photons without requiring them to be kicked, converting more electrical energy into light without additional interactions. Thus, the laser is more energy-efficient.

Integrating gallium arsenide with silicon is a major challenge because of the different arrangement of atoms in each of the elements. When gallium arsenide is grown layer by layer on silicon, the mismatch in the crystal structure of the materials causes imperfections where the atomic patterns don't line up properly.

Imagine trying to fit two puzzle pieces together when they are not part of the same puzzle.

When electrons encounter these defects, they lose energy as heat rather than as light, rendering the laser less efficient.

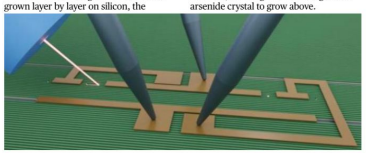
The photonic silicon chip is novel because it's the first demonstration of a fully monolithic laser diode on a silicon wafer. The team's process is also scalable and cost-effective

In the trenches

In their study, the researchers successfully created a chip that consisted of a silicon wafer base, nanometre-sized ridges through which photons travelled, and a small region that produced these photons.

The idea of the ridges came from a 2007 study, in which researchers from AmberWave Systems Corp. found that if gallium arsenide is deposited on silicon at the bottom of a narrow, deep trench surrounded by an insulating material, the defects become 'trapped,' meaning they don't interfere with the laser's ultimate operation.

So the researchers carved nanometre-wide ridges in a 300-mm-long silicon wafer and applied silicon dioxide as the insulating material. Any defects were confined to the bottom of these trenches, allowing a defect-free gallium arsenide crystal to grow above.



A 3D drawing of a wafer-scale test configuration depicting light radiated upwards by the left facet and collected by a multimode fibre and three electrical probes driving the nano-ridge laser and monitoring the ridge photodiode. ARXIV:2309.04473V1

Next, on the same wafer, the researchers deposited three few-atoms-thick layers of indium gallium arsenide (i.e., gallium arsenide where 20% of gallium atoms had been replaced with indium to achieve optimal light emission). These layers together functioned as the laser.

Finally, the team deposited a layer of indium gallium phosphide on top of the whole setup for protection.

To make the laser work, the researchers added electrical contacts connected to an external current source. When a current flowed into the indium gallium arsenide region, the latter emitted photons that flowed through the waveguides.

Solving a long-standing problem

The researchers were able to embed 300 functional lasers on a single 300-mm silicon wafer.The size of the wafer is important because it's the industry standard in modern semiconductor manufacturing and can thus be integrated without demanding significant changes.

The laser produced light with a wavelength of 1,020 nm, which is well-suited for short-ranged transmissions between computer chips.

Thus, the researchers expect their chip could lead to a substantial improvement in computing performance and reduce energy consumption in data centres.

The threshold current required to run the laser was as little as 5 mA, comparable to that required for an LED in a computer mouse. The laser's output was around 1MW.

The laser could continuously operate for 500 hours at room temperature (25° C). At around 55°C, its efficiency dropped.

While this duration is promising, recent research on optical silicon chips has demonstrated continuous operation at temperatures up to 120°C, highlighting ongoing challenges in developing stable semiconductor lasers.

In sum, the photonic silicon chip is novel because it's the first demonstration of a fully monolithic laser diode on a silicon wafer of this size. The team's process is also scalable and cost-effective.

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The Revolution of Silicon Chips in Communications

Introduction to Silicon Chips

- Silicon chips have revolutionized communication, evolving from bulky computers to modern smartphones.
- The journey began with the transistor, leading to enhanced chip efficiency and faster communication

From Electrons to Photons

- Silicon Photonics: Transition from electrons to photons, offering potential for future data transmission.
- Advantages: Higher speeds, greater data capacity, and lower energy losses

Breakthroughs in Silicon Photonics

- Miniaturized Lasers: Integration of lasers on silicon wafers marks a significant advancement.
- Photon Role: Potential to revolutionize data storage and manipulation

Challenges in Integrating Photonic Sources

- Current Solutions: Separate laser sources attached to chips, leading to slower operations and higher costs

The Structure of a Photonic Chip

- Key Components: Light source, waveguides, modulators, and photodetectors.
- Waveguides & Modulators: Pathways for photons and encoding information onto light

The Science Behind Lasers

Laser Function: Amplifies light through stimulated emission, creating a coherent beam.
Silicon's Indirect Bandgap: Challenges in light emission, addressed by materials like gallium arsenide

Innovative Solutions in Laser Integration

Gallium Arsenide: Overcoming atomic structure mismatches with innovative techniques.

The Future of Silicon Photonics

Quantum Computing: Potential applications in revolutionizing information processing.

Conclusion

Silicon chips have transformed communications, with silicon photonics poised to further this revolution

What are silicon photonics?
Silicon photonics is a technology that uses light (photons) instead of electricity (electrons) to transmit data, offering faster and more efficient communication.
What are the advantages of using photons over electrons?
Photons can carry more data at higher speeds and with lower energy losses compared to electrons, making them ideal for modern communication systems.
What challenges do researchers face in silicon photonics?
One major challenge is integrating light sources directly onto silicon chips, as current methods often involve separate components that can slow down performance.
How do lasers work in silicon photonics?
Lasers amplify light through stimulated emission, where electrons drop to lower energy levels, releasing energy in the form of coherent light.
What potential applications does silicon photonics have?
Beyond data centers, silicon photonics has potential applications in quantum computing, sensors, and advanced communication technologies.

Women transplant paddy at Pathukannu near Puducherry, on April 09, 2020. KUMAR S.S.

'Land-holding farmers doing non-farming activities helps efficiency'

R. Sujatha

Land-holding farmers who engage in non-farming activity tend to improve labour efficiency on their farms, a recent study has found.

The study aimed to understand the impact of multiple job holding on farm labour use efficiency. The researchers used data from the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) of farmers from States such as Odisha, Maharashtra, Telangana, Andhra Pradesh, Bihar, Jharkhand, Karnataka, and Madhya Pradesh for the period between 2010 and 2014.

"This is important as participation in non-farm activities alters farmers' labour allocation decisions between farm and non-farm activities," the researchers said in their paper.

The data came from the Village Dynamics in South Asia Project. The researchers adopted data envelopment analysis to estimate labour use efficiency. This is a mathematical technique that compares the efficiency of multiple workers doing the same kind of task without having to get into exactly how they do it.

Anviksha Drall, assistant professor of economics at the National Law School of India University, Bengaluru; and Sabuj Kumar Mandal, associate professor in the Department of Humanities and Social Sciences at IIT-Madras, conducted the study.

Their article, 'Does multiple job holding raise labour use efficiency of farm operators? Evidence from rural India?'

When farmers migrated, either within their State or outside, they gained new knowledge about farming practices that they applied to their own farms when they returned

was published in the peer-reviewed journal *Applied Economics*.

The researchers found that when farmers migrated, either within their State or outside, they gained new knowledge about farm practices that they applied to their farms when they returned. Often, farmers had time on their hands after sowing seeds. In the intervening months, their family carried on the agricultural work. Large farmers with financial wherewithal hired labour to work in their absence, Mr. Mandal said.

Ms. Drall said, "The study recommends promoting structured non-farm employment opportunities in rural areas to maximise positive spillover effects on farming."

Mr. Mandal added: "Farming is becoming riskier because of climatic shock and price fluctuation. Farmers are diversifying into non-farm activities, either by starting a family occupation such as carpentry, craftsmanship, or a salon, or they migrate. When they migrate, they learn how those in other states conduct their farming activities and the use of technology."

The migration and multiple job holding help in two ways: to invest in new farming practices and improve labour efficiency. "We argue that instead of concentrating only on farming, you can diversify into non-farming activities," Mr. Mandal explained.

"But to start a business, you need money. Farmers face credit constraints. Therefore, we suggest that governments should come in and help farmers to diversify into non-farming activity," he added.

The researchers said they deliberately selected data from villages in semi-arid and humid tropics in the country. Households were chosen randomly based on village listing in each selected village.

Impact of Non-Farming Activities on Labour Efficiency in India

Study Overview

🌾 Focus: Examines the influence of non-farming activities on labour efficiency among land-holding farmers in India.
📊 Data Source: Utilizes data from the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), covering Indian states from 2010 to 2014.

Methodology and Findings

🌍 Migration Benefits: Migrant farmers acquire new agricultural skills, which they implement upon returning, improving their farming techniques.
💼 Non-Farm Diversification: Advocates for structured non-farm employment to enhance farming benefits, especially in the face of climate change and market volatility.
💰 Financial Constraints: Highlights the credit challenges farmers face when starting non-farm ventures, suggesting a need for government intervention to support income diversification.

Summary: The study indicates that non-farming activities boost labour efficiency for Indian farmers, emphasizing the importance of government support for diversification.

What a post-Assad Syria means for China

Over the past two years, China's foreign policy has been consistent in the manner of largely supporting the Arab positions over Gaza, which included hosting Hamas in Beijing, amongst other Palestinian entities, to try and mediate. Its position in Arab hearts and minds has grown and recent surveys have put the United States below its eastern competition in popularity. However, the fall of Bashar al-Assad's regime in Syria has opened a core security crisis for the Chinese by way of a stronger political position for Uyghur militants in the 'new' Damascus under President Ahmed al-Sharaa.

Kabir Taneja

is Deputy Director and Fellow, Strategic Studies Programme, Observer Research Foundation

A new Syria, where a military and polity are being rebuilt, has renewed security concerns for China

Getting a safe space

As in multiple reports, Uyghur militants belonging to the East Turkistan Islamic Movement (ETIM) – also known as the Turkistan Islamic Party (TIP) – have scored prominent positions in the revised Syrian army. Ahmed al-Sharaa took over in a largely unchallenged juggernaut when his group, the Hay'at Tahrir al-Sham (HTS), arrived in the Syrian capital without any major battles. The HTS has been at the centre of the anti-Assad movement since the initial stages of the Arab Spring led by Al Sharaa (better known then as Abu Mohammed al Jolani, and his cohort of fighters from across the world). This was a time when Syria was a hotspot of global jihadist movements and the so-called Islamic State (IS) controlled large swathes of territory across the Levant region.

Al Sharaa, who has had stints with the IS and al Qaeda, developed his own support base over time. The HTS also offered safe space for those who were seeking shelter or ideological patronage. Here, Uyghurs militias found the opportunity to construct their own sanctuary while offering tactical backing to the HTS. During the period beginning 2011, Uyghur militias were intricately woven into IS ecosystems. Propaganda videos and publications featuring Uyghur fighters were actively promoted – these ranged from well produced videos of Uyghur fighters taking on Assad's military to ideological propaganda translated into the Uyghur language in audio and text formats. More recently, in 2017, the IS released a targeted video showing Uyghur fighters in training and threatening 'rivers of blood' against the Chinese state. In the immediate past, China has seldom featured in IS propaganda as the Washington-Beijing contestation has taken centre stage.

Fast forward to 2025, and Syria's military and polity are being rebuilt. The first is arguably a more delicate endeavour than the second, with bringing a wide variety of warring factions to rally behind one leader being easier said than done. In Syria's 'new' military, those who fought alongside Al Sharaa have been given precedence irrespective of their nationality. The journey, from jihadists to generals for many, has been taking place swiftly since January. One of the biggest representations overall is by the Uyghurs – nearing 2,000 in number by some estimates. At least one of the known 50 high-ranking commander-level appointments is an Uyghur – Abdulaziz Dawood Khodaberdi (known as Zahid), who has been recognised as a former commander of ETIM in Syria.

Impact of big power competition

For Beijing, this elevation opens an automatic fault line with Damascus, with which it has enjoyed friendly relations in the past. One of the core reasons why China rallied behind America's 'war on terror' narrative was to use American hegemony to deliver on its own counter-terror interests. In 2002, the U.S. had classified ETIM as a terror organisation, only to remove it in 2020 based on the argument that no credible evidence of ETIM's existence was available for over a decade and that China was using it as a bogey to clamp down on Uyghurs in its restive Xinjiang province. The advent of big power competition between the U.S. and China has in fact only given militant groups more manoeuvring space globally. Previously, Beijing has made handling of ETIM a top priority in its relations with the new Taliban-led government in Afghanistan. However, most militant groups now in charge of para-states, tend to always first prioritise their support for those who fought with them in the trenches. Soon after the Taliban took charge of Kabul in August 2021, it was reported that the group had relocated Uyghur militants away from Afghanistan's narrow 76-km long border with China in the Badakhshan province. Unlike the Taliban, the new regime in Syria has taken a different approach – elevating the Uyghurs to official ranks.

The western game plan

The Chinese government has raised this issue in the United Nations as western and regional powers alike rush to engage with Al Sharaa. The western engagements in play are to solidify two fronts. First, to place basic security in the embattled state and stem any mass migration. Second, to make sure Russia, Iran, and, by association, China remain in the peripheries and maintain minimal influence. These larger geopolitical aims have allowed now former designated terrorists to metamorphose into statesmen overnight.

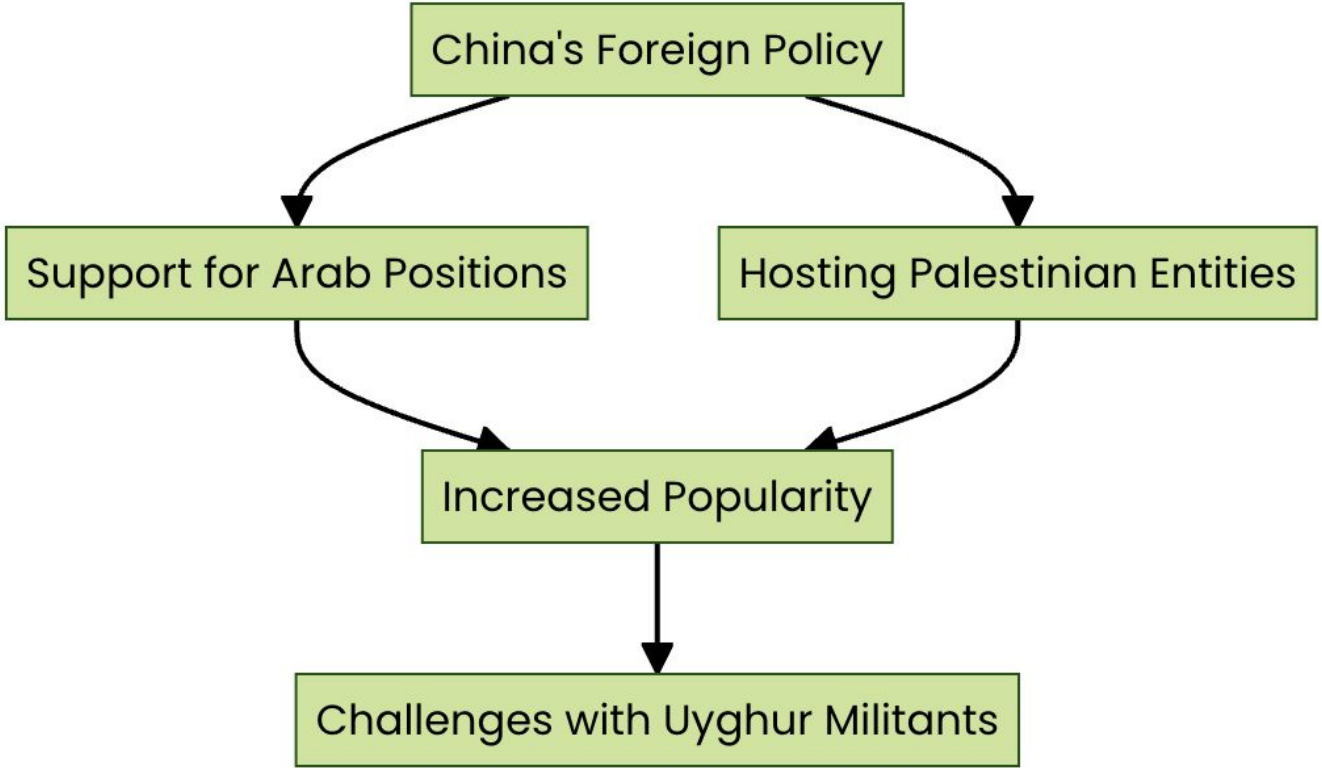
The challenge for Chinese diplomacy continues here. One of the main regional powers that is still kinetically and overtly active in Syria is Israel. But both China and Israel have been at odds over China's stance on Gaza and the issue of Palestine. Even on the Arab side, Saudi Arabia, and the United Arab Emirates, amongst others, who have previously given Beijing a pass over Xinjiang, have accepted al Sharaa, thus limiting Beijing's options and forcing a strategic re-think moving forward.

China’s Foreign Policy: Navigating the Arab Landscape and Uyghur Militants

Introduction

- China has been increasingly active in the Middle East, aligning with Arab positions on Gaza.
- Hosting Hamas and other Palestinian entities in Beijing to mediate and strengthen ties.
- Surveys show China gaining popularity in the Arab world, sometimes surpassing the United States.
- The fall of Bashar al-Assad in Syria complicates China's position, especially with the rise of Uyghur militants.

China's Influence in the Middle East:



China’s Support for Arab Positions

Hosting Hamas and Palestinian Entities:

- China acts as a mediator, enhancing its role in the Arab-Israeli conflict.
- Strategic move to increase influence in a traditionally U.S.-dominated region.

Growing Popularity in the Arab World:

- China's non-interventionist approach and focus on economic partnerships boost its image.
- Surveys indicate a favorable view of China over the U.S. in many Arab nations.
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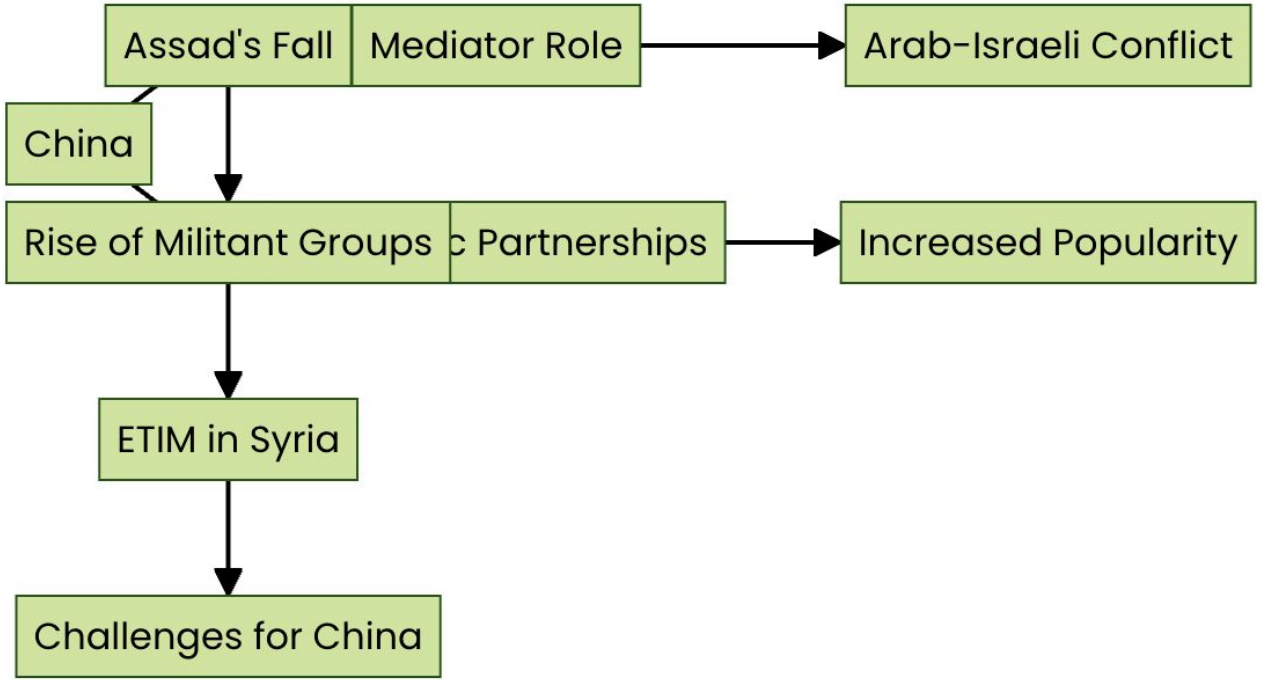
China's Diplomatic Strategy:



The Fall of Bashar al-Assad’s Regime

The Rise of Uyghur Militants in Syria:

- Assad's fall opens doors for militant groups, including ETIM.
- ETIM seeks an independent state for Uyghurs in Xinjiang, complicating China's objectives.

The East Turkistan Islamic Movement (ETIM):

- ETIM gains significant positions in the new Syrian military, raising alarms in Beijing.
-

The New Syrian Military Landscape

Ahmed al-Sharaa's Leadership:

- Hay'at Tahrir al-Sham (HTS) controls the Syrian capital, providing a platform for factions like Uyghur militants.

Uyghurs in Command Positions:

- Reports of 2,000 Uyghur militants integrated into the Syrian military, some in high-ranking roles.
- This poses a significant concern for China regarding separatist sentiments.

The Impact of Big Power Competition

China’s Relationship with Damascus:

Historically friendly, but Uyghur militants challenge this relationship.

China's support for U.S. terrorism narratives shifts with new dynamics.

The U.S. and ETIM Classification:

U.S. removed ETIM from the terrorist list in 2020, complicating China's counter-terrorism efforts

The Western Game Plan

Engaging with Al Sharaa:

Western powers engage with Syria to stabilize and limit Russia, Iran, and China's influence.

Geopolitical Aims and Challenges:

Complex alliances and rivalries with Israel's involvement and shifting stances of Saudi Arabia and UAE

Conclusion

- China’s foreign policy in the Middle East is at a crossroads.
- Gains in Arab favor are challenged by the rise of Uyghur militants in Syria.
- China must balance regional interests with security concerns from militant groups.

Western Strategy:

Unnecessary change

Amending the RTI Act through the Data Protection Bill is unwarranted

That the Right to Information Act and the use of RTIs have enhanced the accountability of those in governance in India goes without saying. In the last few years there have been attempts to dilute the provisions of the Act, a landmark one that was passed 20 years ago. Clearly, some in governance and administration have treated the Act and its provisions on transparency and disclosure to be encumbrances. A significant threat has now emerged in the amendment to Section 8(1)(j) of the Act, which has been introduced in Section 44(3) of the Digital Personal Data Protection (DPDP) Act, 2023. The Act itself is an outcome of *K.S. Puttaswamy* (2017), a judgment that upheld the right of privacy as a fundamental right under Article 21 of the Constitution. Section 8(1)(j) of the RTI Act allows government bodies to withhold "information which relates to public information" provided its disclosure is not related to public interest or results in an unnecessary invasion of privacy. While doing so, it provides the safeguard that if the Public Information Officer or an appellate authority finds public interest in disclosing such information, it could still be available. This safeguard is important. Some information related to public servants, such as college degrees or caste certificates, might be private, but as a recent and controversial case of a bureaucrat using a fake caste certificate showed, such information could be released in public interest. Section 44(3) of the DPDP act amends Section 8(1)(j) by allowing government bodies to simply withhold "personal information" without the safeguard provisions on public interest or other such exceptions.

In a letter to Congress leader Jairam Ramesh, Union Minister of Information and Broadcasting, Ashwini Vaishnaw defended the amendment, saying that Section 44(3) was aimed at preventing the RTI Act's "misuse" and was to harmonise the requirement of right to privacy and the right to information. He also said that information such as salaries of public officials would still remain accessible through Section 3 of the DPDP Act. But by amending the RTI Act itself – an outcome that was never the intention of *K.S. Puttaswamy* – and by defining "personal information" vaguely in Section 44(3) of the DPDP Act, authorities could deny RTI requests of previously public data by classifying them as "personal" – and lessen public scrutiny. The RTI Act already harmonises concerns related to the right to information and privacy by subjecting them to the question of public interest. Therefore, the amendment using the DPDP Act is unnecessary and unwarranted. The government must take the concerns of civil society and transparency activists and remove the provision amending the RTI Act, in the DPDP Act.

The Right to Information Act: A Pillar of Accountability in India

Introduction to the RTI Act

- The Right to Information (RTI) Act, enacted in 2005, has been a game-changer in India's governance landscape. It empowers citizens to seek information from public authorities, thereby promoting transparency and accountability. But, as we celebrate its 20th anniversary, we must also confront the challenges it faces today.

The Importance of RTI in Governance

Enhancing Transparency and Accountability

- The RTI Act has significantly enhanced the accountability of those in governance. It has transformed the relationship between the government and citizens, making it more transparent. Imagine being able to question the decisions of public officials and demand answers! That's the power the RTI Act gives to the common man.

The Role of RTIs in Citizen Empowerment

- RTIs have empowered citizens to hold their leaders accountable. Whether it's about the allocation of funds or the implementation of welfare schemes, the RTI Act has become a tool for the people to ensure that their rights are respected.

Recent Attempts to Dilute the RTI Act

The Digital Personal Data Protection Act, 2023

A significant threat has emerged with the introduction of Section 44(3) of the Digital Personal Data Protection (DPDP) Act, 2023. This amendment to Section 8(1)(j) of the RTI Act raises alarms about the future of transparency in governance.

Section 8(1)(j) of the RTI Act Explained

Safeguards for Public Interest

Section 8(1)(j) allows government bodies to withhold information that relates to public interest if its disclosure could invade privacy. However, it also provides a safeguard: if a Public Information Officer finds that public interest outweighs privacy concerns, the information can still be disclosed.

The Controversial Case of Caste Certificates

Take, for instance, the recent case of a bureaucrat using a fake caste certificate. This incident highlighted the importance of transparency in public service. While some information may seem private, it can be crucial for public interest.

The Threat of Section 44(3) of the DPDP Act

Implications of the Amendment

The amendment introduced in Section 44(3) allows government bodies to withhold “personal information” without considering public interest. This change could lead to a significant reduction in the information available to the public, effectively stifling scrutiny

JAKARTA

Qatar set to invest $2 billion in Indonesia sovereign wealth fund

REUTERS

Indonesian President Prabowo Subianto said Qatar is set to invest $2 billion in his country's new sovereign wealth fund as he looks to boost economic growth. He said on Sunday he had a "productive" meeting with Qatar Emir Sheikh Tamim bin Hamad Al-Thani and that the country would invest in the Danantara Indonesia fund. AFP

A sovereign wealth fund

- A sovereign wealth fund is owned by the general government, which includes both central government and sub-national governments.
- Includes investments in foreign financial assets.
- They invest for financial objectives.

These key elements exclude:

- Public pension funds, which are ultimately owned by the underlying policy holders.
- Central bank reserve assets, which are not invested

Caspian Sea: Environmental Challenges and Impacts

Key Environmental Concerns

🌡️ Rising Temperatures: Increased evaporation due to hotter temperatures is affecting the Caspian Sea.
📉 Projected Decline: A global warming cap of 2°C could still result in a 5-10 meter drop in water levels.
🌊 Severe Impact of Higher Temperatures: Exceeding a 2°C rise may lead to a 21-meter decline by 2100.
🦭 Threat to Caspian Seals: Lower water levels threaten the breeding habitats of Caspian seals.
🐟 Sturgeon Access Restricted: Reduced water levels limit sturgeon access to spawning rivers.
🏝️ Loss of Coastal Lagoons: Coastal lagoons may disappear due to declining water levels.
🔍 Environmental Consequences: The ecological balance in the region is at risk.

Summary: The Caspian Sea is experiencing significant water level declines due to rising temperatures, posing threats to local wildlife and ecosystems


KIEV
UKRAINE
KAZAKHSTAN
MOL.
CHISINAU
ROM.
SEA OF AZOV
Crimea
RUSSIA
BUL.
BLACK SEA
CASPIAN SEA
UZBEKISTAN
GEORGIA
TBILISI
TURKMENISTAN
ANKARA
ARMENIA
AZERBAIJAN
BAKU
YEREVAN
TURKEY
CYPRUS
SYRIA
IRAQ
IRAN
TEHRAN

Electroreception in Fruit Fly Larvae

Diverse Species and Electroreception

🦈 Electroreception in Various Species: Not only sharks, bees, and platypus, but also fruit fly larvae can detect electric fields.

Research Insights

🧪 Study Location: Conducted at the University of California, Santa Barbara.
⚡ Behavioral Observations: Larvae reoriented and moved towards the negative electrode in an electric field.

Neuronal and Microscopic Findings

🧠 Neuronal Mechanism: Key neurons for electroreception are located on either side of the larva’s head.

🔬 Microscopic Evidence: The head segment of the larva showed a response to the electric field under a microscope.

Neuron Activation and Experimentation

🧬 Neuron Activation: A single neuron in the cluster responded to the electric field, activating when the electrode was behind the head and inhibiting when in front.

✅ Controlled Experiments: Researchers confirmed the larvae's response to the electric field by eliminating other factors.

Summary: Fruit fly larvae possess the ability to sense electric fields through specific neurons in their head, enabling them to move towards negative electric potentials.

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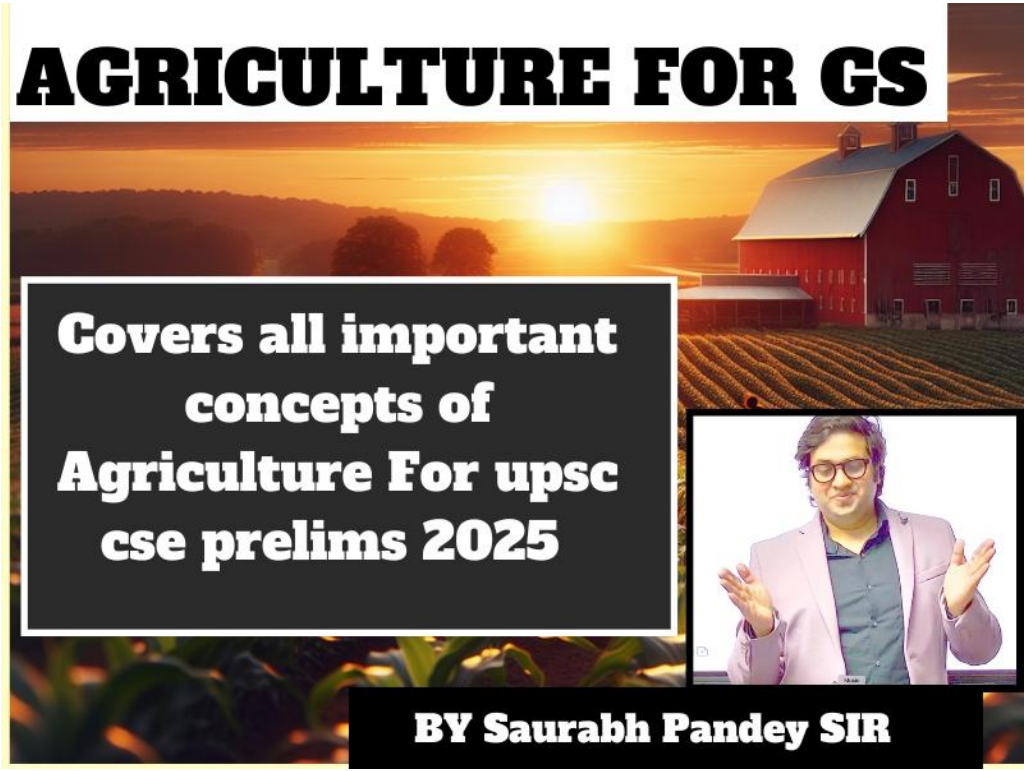
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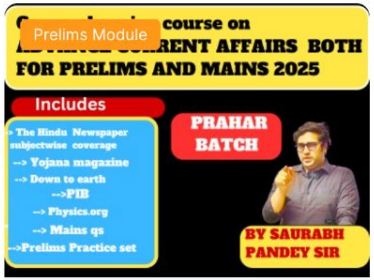

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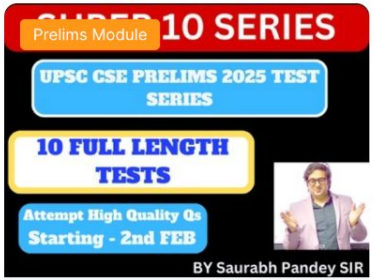

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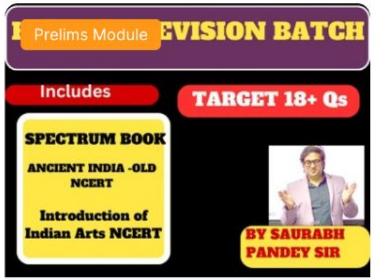

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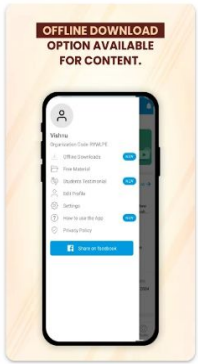

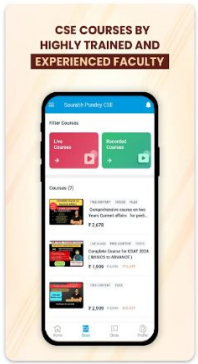

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