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सत्यमेव जयते



MK Yadav Sir

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LIVE MINT

Page 4

OVERNIGHT INDEXED SWAP

(Syllabus: GS Paper 3 - Economy)

OIS market sees rate cuts before 2023 end

Reuters
feedback@livemint.com

India's overnight indexed swap (OIS) rates are pricing in interest rate cuts by the Reserve Bank of India (RBI) with a clear timeline after the central bank kept rates unchanged last week, analysts said.

OIS rates, often seen as the clearest indication of future policy rate actions, are interest rate derivative products that move as per the expectations of rate trajectory.

"Swap markets are more aggressive in terms of rate cut expectations, as they are pricing in the same from October," said Abhishek Upadhyay, senior economist at ICICI Securities Primary Dealership.

Analysts add that swaps are now pricing in rate cuts before the end of 2023.

Swap rates plummeted after RBI on Thursday surprised market participants by keeping the repo rate unchanged at 6.50%. Before that, the RBI had delivered six consecutive hikes of an aggregate of 250 bps in fiscal 2023.

The two-year swap rate dropped 25 basis points (bps) to 6.15% since Wednesday's close, which is also its lowest level in eight months.

The more liquid, one-year swap rate plunged 27 bps to 6.53%, while five-year OIS rate dropped 21 bps in same period and was trading at 6.05%.

Swaps have seen continuous receiving pressure over past month as turmoil in the global banking sector led to bets that rate hikes may pivot sooner than expected globally.



Swap rates plummeted after the RBI kept the repo rate unchanged at 6.50%. MINT

Since early March, 1-year swap has eased 60 bps and 5-year OIS has eased 70 bps.

"Apart from local factors, swaps also consider global developments, and in the US, people are expecting rate cuts to begin in the next few months," said Upadhyay.

Even with the RBI Governor specifying that the current rate action was just a pause and not a pivot, market participants are considering this as an end to the rate hike cycle.

"The two-year swap has already priced in two cuts of 25 bps each in next one year," said Vijay Sharma, senior executive vice president at PNB Gilts.

Some economists also expect inflation to have peaked and growth to falter, forcing the RBI to pivot soon.

Nomura expects India's annual retail inflation to average 4.9% in the current financial year, sharply below 6.7% in fiscal 2023. It also sees growth at 5.3%, sharply below the central bank's estimates of 6.5%.

Context: India's **overnight indexed swap (OIS) rates** are pricing in interest rate cuts by the Reserve Bank of India (RBI) with a clear timeline after the central bank kept rates unchanged last week.

Overnight indexed swap

- **About**: An overnight indexed swap (OIS) is an **interest rate swap (IRS)** over some given term, e.g. 10Y, where the periodic fixed payments are tied to a given fixed rate while the periodic floating payments are tied to a floating rate calculated from a daily compounded overnight rate over the floating coupon period.
  - An **interest rate swap (IRS)** is a type of Interest Rate Derivative (IRD).
  - An interest rate swap is a **contract between two counterparties** who agree to exchange the future interest rate payments they make on loans or bonds. These two counterparties are banks, businesses, hedge funds, or investors.
  - To RBI, **rupee Interest Rate Swap (IRS) market** is the most liquid among interest rate derivative markets.
- **Key Features:**
  - The interest of the overnight rate portion of the swap is **compounded and paid at reset dates**, with the fixed leg being accounted for in the swap's value to each party.
  - The **floating leg's present value (PV)** is determined by either compounding of the overnight rate or by taking the geometric average of the rate over a given period.
  - Like other interest rate swaps, an interest rate curve must be produced to **determine the present value** of cash flows.
  - The fixed rate of OIS is typically an interest rate considered less risky than the **corresponding interbank rate (LIBOR)** because there is limited counterparty risk.

ECONOMIC TIMES

Page 9

BOT MODEL

(Syllabus: GS Paper 3 - Infrastructure)

Talks Begin to Make BOT Rules More Investor Friendly

Stakeholders' inputs sought; industry keen on specific PPP law

Twesh.Mishra
@timesgroup.com

New Delhi: The government has initiated discussions on possible changes in the build-operate-transfer or BOT framework, looking to reduce reliance on the engineering, procurement and construction or EPC mode amid growing fiscal pressures, people familiar with the development said.

The govt has relied on EPC mode in past few years to hasten highway construction as private investors stayed away

It has sought inputs from the stakeholders on the changes required to rekindle private participation in the sector.

The Centre commissions national highways through EPC, BOT and hybrid annuity model (HAM) agreements with road developers.

It has heavily relied on the EPC mode in the past few years to hasten highway construction as the private sector stayed away.

"The government is keen to revive the BOT... The idea is to understand the issues industry is facing," said a government official.

Industry, on its part, has sought a specific public-private partnership (PPP) law that would address the issues related to contracts and ensure smooth implementation.

New Routes

Highway builders seek:

- New PPP law to prevent disruption
- Assured and timely land acquisition
- Minimising delays for railway and forest clearances
- Cost escalation provision in toll concession agreement



The National Highways Builders Federation (NHBF), in a presentation to the finance ministry, has called for a specific PPP law, which would ensure smooth implementation of the projects without hindrances from any government instrumentalities or local disturbances.

The NHBF has flagged key legal and regulatory issues that are faced during structuring and implementation of a highway project, including delays due to land acquisitions, forest clearances, utility shifting, and railway bridges approvals and clearances.

According to the highway builders, most projects are delayed due to hindrances in handing over the entire land, resulting in pushing ahead of commercial operation date.

"This results in an increase in interest cost, cost of construction and revenue loss. The authorities need to proactively engage with the private entity for prompt compensation as per contract instead of pushing it to arbitration and litigation," the NHBF presentation, seen by ET, said. Another concern flagged by the highway builders is the need to allow pass through of basic raw material costs in BOT (toll) concession agreements.

Experts say key risks need to be addressed by the government to encourage private participation.

According to Jagannarayan Padmanabhan, senior director, Crisil Market Intelligence and Analytics, land availability, total project cost, and possible competing roads are the key risks that need to be addressed by the government to encourage private participation in road building.

Context: The government has initiated discussions on possible changes in the **build operate-transfer or BOT framework,** looking to reduce reliance on the engineering, procurement and construction or EPC mode amid growing fiscal pressures.

- The Centre commissions national highways through **EPC, BOT and hybrid annuity model (HAM)** agreements with road developers.

Build-operate-transfer (BOT) model

- **About**: It refers to the **initial concession by a public entity** such as a local government to a private firm to both build and operate the project in question.
  - After a **set time frame**, typically two or three decades, control over the project is returned to the public entity.
- **Mechanism**: Under the BOT model, a private player is **granted a concession to finance,** build and operate a project for a specified period of time (20 or 30 year concession period), with the developer recouping the investments by way of user charges or tolls charged from customers using the facility, and thereby taking on a certain amount of financial risk.
  - The **BOT (toll) model** was the preferred model for road projects, accounting for 96% of all projects awarded in 2011-12.
  - But this progressively reduced to nil. When the interest in BOT projects started to wane, road construction shifted to the traditional **engineering, procurement and construction (EPC) model,** with the HAM model being devised later.
  - Under the EPC model, the government pays the entire cost, thereby insulating the contractor entirely from financial risk.

BUSINESS STANDARD

Page 3

SPECTRUM

(Syllabus: GS Paper 3 - Infrastructure)

1200 MHz spectrum in 6GHz band needed for communication: COAI

Industry body argues 6 GHz last remaining mid-band spectrum range available for 5G deployment

SUBHAYAN CHAKRABORTY
New Delhi, 10 April

The Cellular Operators' Association of India (COAI) has written to the telecommunications (telecom) secretary, reiterating its position that telecom operators be considered for the larger share of mid-band spectrum in 6 gigahertz (GHz), arguing that at least 1200 megahertz (MHz) of spectrum needs to be allocated for mobile communications in India in the 6GHz band.

Currently, only 720 MHz is available in the mid-band in India, it said.

COAI, which represents the three private telecom service providers (TSPs) — Reliance Jio, Bharti Airtel, and Vodafone Idea — on Monday said that 5G download speeds would be reduced to 50 per cent of their optimal levels if the government allocates less spectrum than what is needed in the 6 GHz band. Telecom companies (telcos) would face 60 per cent higher annual costs without it, it said.

The government is currently in the process of deciding which sector to reserve the spectrum for. A committee formed under the Wireless Planning and Coordination wing of the Department of Telecommunications (DoT) is considering the issue.

In its submissions to the committee, COAI has said mid-bands like 6 GHz are ideal for commercial success and deployment of 5G new radio, the global standard for a unified 5G wireless air interface and 5.5G, the next level in the current 5G network, along with 6G in future.

This is because mid-bands provide a balance of wide coverage and capacity which is critical to the rapid and cost-efficient deployments of 5G.

"We understand that the government is considering vacating the spectrum from broadcasters or satellite users in the C band i.e., 3670-4000 MHz for 5G/6G use. However, even this spectrum from the C band will not be enough to reach the required 2GHz spectrum for international mobile telecommunications (IMT) in mid-band," COAI said in the letter.

6 GHz is also the last remaining mid-band spectrum range where city-wide coverage can be provided with mobile networks. "6 GHz is the only mid-band spectrum range where a contiguous bandwidth to the order of 300-400 MHz per TSP is possible to make it available for the evolving demands towards 2030," said COAI.

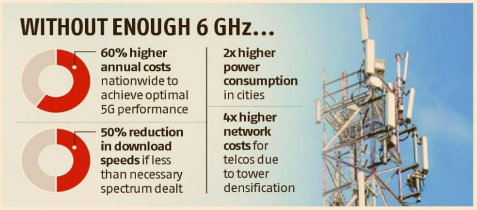
DoT has now reserved the 6 GHz spectrum range and it was not available in the last round of 5G auctions.

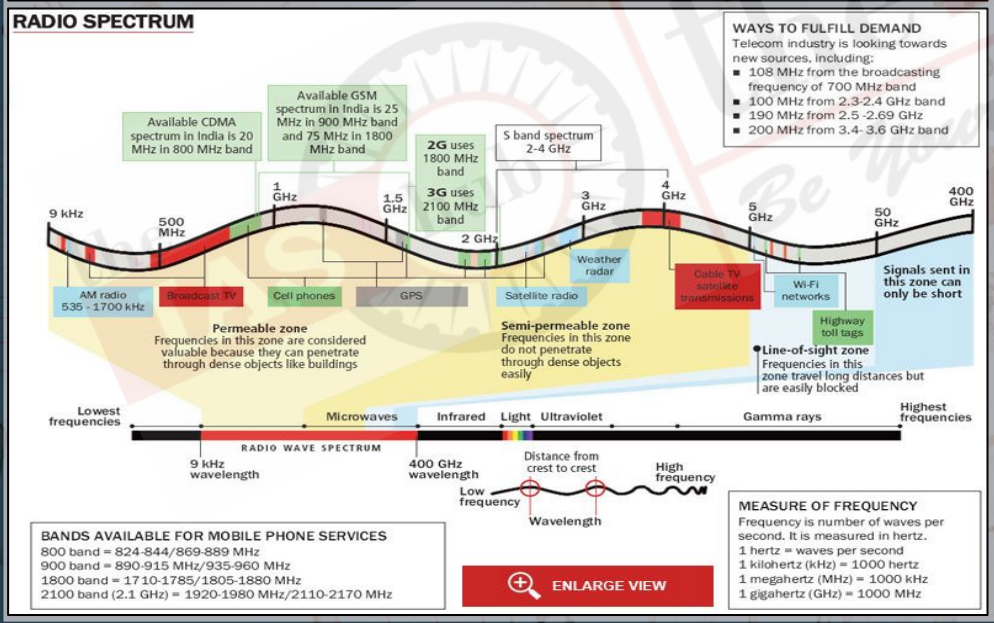
Focus on 6 GHz

For higher advanced technology like 5G and 6G, spectrum requirements shift to higher bands like millimetre waves which have greater capacities to carry data, but lack coverage reach since they can be effectively transmitted over a smaller range.

In essence, TSPs would need to erect more towers and radios in urban areas without access to enough 6 GHz bands. Any shortage of 6 GHz spectrum would compel TSPs to densify networks to meet the IMT-2020 performance requirement for 5G.

IMT-2020 (IMT-2020 Standard) are the mandated requirements issued by the International Telecommunication Union (ITU) in 2015 for 5G networks, devices, and services.





Context: The **Cellular Operators´ Association of India (COAI)** has written to the telecommunications (telecom) secretary, reiterating its position that telecom operators be considered for the larger share of mid band spectrum in 6 gigahertz (GHz), arguing that at least 1200 megahertz (MHz) of spectrum needs to be allocated for mobile communications in India in the 6 GHz band.

- Currently, only **720 MHz is available** in the midband in India.

Spectrum

- **About**: It is the **invisible radio frequencies (used for communication)** that wireless signals travel over.
  - The frequencies we use for wireless are only a portion of what is called the electromagnetic spectrum (encompasses other frequencies we interact with daily).
  - **VIGBYOR** represents colors that make up the visible part of spectrum.
  - Other parts of spectrum carry broadcast radio and television or serve other everyday functions.
  - The entire **electronic spectrum** ranges from three Hz (extremely low frequency) to 300 EHz (gamma rays). The portion used for wireless communication sits within that space and ranges from about 20 KHz to 300 GHz.
- **3 categories:** Different bands have slightly different characteristics. Generally in case of communication the spectrum is divided in three categories: **low, mid, and high-band spectrum.**
  - **Low-band spectrum (under 3 GHz):** Travels longer distances with minimal signal interruption. **Most wireless networks are built primarily on low-band spectrum,** and the wireless industry has used this spectrum to build high-speed wireless networks
  - **High-band spectrum (above 24 GHz)**: It travels much shorter distances (e., in meters), but offers high capacity and ultra-fast speeds.
  - **Mid-band spectrum (between 3 and 24 GHz)**: It blends the characteristics of both low- and high-band spectrum—providing a mix of coverage and capacity.

PIB

April 11

VIBRANT VILLAGES PROGRAMME

(Syllabus: GS Paper 3 - Infrastructure)

Union Home Minister and Minister of Cooperation, Shri Amit Shah launches the 'Vibrant Villages Programme' at Kibithoo - a border village in Arunachal Pradesh today

Context: The Union Home Minister and Minister of Cooperation launched the **'Vibrant Villages Programme'** at Kibithoo - a border village in Arunachal Pradesh.

- He also inaugurated 9 **micro hydel projects** of Arunachal Government and 14 **infrastructure projects** Indo-Tibetan Border Police (ITBP) worth Rs.120 crore.

Vibrant Villages Programme

- **About**: It has been announced in the **Finance Minister's Budget Speech 2022.**
  - It is a **Centrally Sponsored Scheme.**
  - **Existing schemes will be converged** and their outcomes will be defined and monitored on a constant basis.
- **Objectives**: To enhance infrastructure in villages along India's border with China, in states like **Himachal Pradesh, Uttarakhand, and Arunachal Pradesh.**
  - Border villages with sparse population, limited connectivity and infrastructure often get left out from the development gains.
- **Coverage**: The programme envisages **coverage of border villages** on Northern border having sparse population, limited connectivity and infrastructure, which often get left out from the development gains.
- **Activities**: Construction of **village infrastructure, housing, tourist centres, road connectivity**, provisioning of decentralized renewable energy, direct to home access for Doordarshan and educational channels, and support for livelihood generation.
  - **Additional funding** for these activities will be provided.

TIMES OF INDIA

Page 1

NATIONAL PARTY STATUS

(Syllabus: GS Paper 2 - Polity)

AAP gets 'national party' status, but EC strips TMC, NCP, CPI of tag

Bharti.Jain@timesgroup.com

New Delhi: The Election Commission (EC) on Monday downgraded the status of Trinamool Congress, CPI and NCP from 'national party' to 'state party', while recognising AAP as a 'national party'. This decision could impact their campaigns for the 2024 general elections.

EC took the step based on these parties' performances in the past two Lok Sabha polls and 21 state elections, and "after following due process and giving ample opportunity to the affected parties", an EC functionary told **TOI**.

To get national tag, a party should fulfil conditions of Para 6A, 6B and 6C of the Election Symbols (Reservation and Allotment) Order, 1968 and be a 'state party' in at least four states. AAP is a 'state party' in Delhi, Punjab, Goa and Gujarat, and TMC in Bengal, Tripura and Meghalaya. NCP has the tag in Maharashtra and Nagaland but no longer in Goa, Manipur, Meghalaya.

▶BRS derecognised, P 24

6 NAT'L PARTIES

- ➤Tag entitles a party to a **common poll symbol across India**, more star campaigners, free air time on nat'l media for campaigns & office space at subsidised rate in Delhi
- ➤One condition for nat'l tag is that it must be a 'state party' **in at least 4 states**
- ➤6 nat'l parties now are **BJP, Cong, BSP, CPM, NPP, AAP**
- ➤**Trinamool Cong** exploring legal options to **challenge EC decision**, party sources say

Context: The Election Commission (EC) downgraded the status of Trinamool Congress, CPI and NCP from 'national party' to 'state party', while **recognising AAP as a 'national party'.**

- AAP is a 'state party' in Delhi, Punjab, Goa and Gujarat, and TMC in Bengal, Tripura and Meghalaya. NCP has the tag in Maharashtra and Nagaland but no longer in Goa, Manipur, Meghalaya.

National party Status

- **About**: A national party would be one that has a **presence 'nationally',** as opposed to a regional party whose presence is restricted to only a particular state or region.
- **Criteria**: The **ECI has laid down the technical criterion** for a party to be recognised as a national party.
  - As per the **ECI's Political Parties and Election Symbols, 2019 handbook**, a political party would be considered a national party if:
    - it is 'recognised' in **four or more states**; or
    - its candidates polled **at least 6% of total valid votes in any four or more states** in the last Lok Sabha or Assembly elections and has at least four MPs in the last Lok Sabha polls; or
    - it has won **at least 2% of the total seats in the Lok Sabha** from not less than three states.
  - To get national tag, a party should fulfil conditions of Para 6A, 6B and 6C of the Election Symbols (Reservation and Allotment) Order, 1968 and be a state party' in at least four states.
- **State party:** To be **recognised as a state party**, a party needs:
  - **at least 6% vote-share** in the last Assembly election and have at least 2 MLAs; or
  - **have 6% vote-share** in the last Lok Sabha elections from that state and at least one MP from that state; or
  - **at least 3% of the total number of seats or three seats**, whichever is more, in the last Assembly elections; or
  - **at least one MP for every 25 members** or any fraction allotted to the state in the Lok Sabha; or
  - **have at least 8% of the total valid votes** in the last Assembly election or Lok Sabha election from the state.

THE HINDU Page 12

PREVENTIVE DETENTION
(Syllabus: GS Paper 2 - Polity)

'Preventive detention gives arbitrary power to state'

Krishnadas Rajagopal
NEW DELHI

The Supreme Court on Monday observed in a judgment that preventive detention laws in India are a colonial legacy and confer arbitrary power to the state. A 27-page judgment authored by a Bench led by Justice Krishna Murari described preventive detention laws as "extremely powerful". They have an ability to provide the state with unfettered discretion, the court warned.

"In such a circumstance, where there is a possibility of an unfettered discretion of power by the government, this court must analyse cases arising from such laws with extreme caution, to ensure that there are checks and balances on the power of the government," Justice Murari wrote.

The court said judges should ensure that the government has followed every procedure of law while flexing preventive detention powers against individuals. "Every lapse in procedure must give rise to a benefit to the case of the detenue," Justice Murari observed.

Context: Preventive detention laws in India are a colonial legacy with a great potential to be abused and must be used only in the rarest of rare cases, the Supreme Court said.

- The top court said courts must analyse cases arising from such laws with extreme caution to ensure there are checks and balances on exercise of power of the government.

Preventive Detention

- **About**: **Detention** in its simplest sense means to curb the liberty of an individual i.e. without the knowledge of that individual. There are 2 types of Detention:
  - **Preventive Detention**
  - **Punitive Detention**
- **Constitutional Provisions:** **Article 22 of the Indian Constitution** provides protection against arrest and detention in certain cases.
  - **Article 22 (1) of the Indian Constitution** says an arrested person cannot be denied the right to consult, and to be defended by, a legal practitioner of his choice.
    - It allows for preventive detention and restriction on personal liberty for reasons of state security and public order.
  - **Article 22 (4)** states that no law providing for preventive detention shall authorise the detention of a person for a longer period than three months unless:
    - An **Advisory Board** reports sufficient cause for extended detention.
    - Such a person is detained in accordance with the provisions of any law made by the Parliament.
    - The **44th Amendment Act of 1978** has reduced the period of detention without obtaining the opinion of an advisory board from three to two months. However, this provision has not yet been brought into force, hence, the original period of three months still continues.
  - **Under Entry 9 of List I (better known as the 'Union List'),** Parliament has the exclusive power to enact a law for preventive detention for the reasons connected with defence, foreign affairs, or security of India.
  - On the other hand, **under Entry 3 of List III (the 'Concurrent List'),** both Parliament and State Legislature have powers to enact such laws for the reasons related to maintenance of public order or maintenance of supplies or services essential to the community.
- **Legal Provisions:** Parliament passed a legislation named **Preventive Detention Act, 1950** which talks about the detention of a person on the grounds of defense, foreign affairs or the security of the state.
  - Under **Section 151 of The Criminal Procedure Code, 1973 (CrPC)** preventive detention is action taken on grounds of suspicion that some wrong actions may be done by the person concerned.

INDIAN EXPRESS Page 9

UN DEMOCRACY FUND

(Syllabus: GS Paper 2 - International Organisations)

In New Delhi, George Soros is old, dangerous and on a watchlist — at UN, he isn't a problem

India fourth highest donor to UN Democracy Fund, which funds at least 68 projects worldwide linked to George Soros's Open Society Foundation

NIRUPAMA SUBRAMANIAN & SHYAMLAL YADAV
CHENNAI, NEW DELHI, APRIL 10

IN SYDNEY in February, External Affairs Minister Dr S Jaishankar, when asked about George Soros's criticism of Prime Minister Narendra Modi and the government, called him "old, rich, opinionated and dangerous." A man "sitting in New York," investing in "shaping narratives" about a government he didn't like. That sharp rebuff went viral, like quite a few of Jaishankar's recent retorts.

Here's a paradox.

India is among the top contributors to the UN Democracy Fund (UNDEF) whose mission is to promote democracy across the world through local and international NGOs and civil society organisations (CSOs) — many of these are linked to Soros's philanthropic empire, an investigation by *The Indian Express* has revealed.

Since UNDEF's inception in 2005, India has contributed over $32 million to it and remains its fourth largest contributor.

Last year, when it contributed $150,000 to the fund – the 4th highest among 45 donors, after US, Sweden and Germany — India's Permanent Mission to the UN proudly announced in a statement: "India acknowledges that sustained support for UNDEF is particularly important in this crucial time for democracy efforts worldwide. India expresses steadfast support for UNDEF as it plays a distinct role in complementing other UN efforts to strengthen democratic governance around the world."

CONTINUED ON PAGE 2

UN DEMOCRACY FUND (UNDEF)
was created in 2005 to support democratisation efforts around the world.

$32 mn	276	68
India's contribution to the Fund since 2005	projects received UNDEF funds since 2015	of the projects are executed by organisations linked to Soros

Scan for the full list of 68 organisations and their affiliation with Soros's OSF, its regional subsidiaries and partners



In 2016, India put Soros's OSF on a watchlist. *Reuters file*

UN fund launched in 2005 on sidelines of India-US N-deal

EXPLAINED

NIRUPAMA SUBRAMANIAN
CHENNAI, APRIL 10

INDIA AND THE US were prime movers behind the UN Democracy Fund in 2005, when they were negotiating the civilian nuclear co-operation deal. As Joint Secretary (Americas) at the time, S Jaishankar was a lead negotiator.

That India, a founding member of UNDEF, has no objections to the Fund giving grants to NGOs funded by George Soros, while he is put on the watchlist in India underlines a contradiction that's not new.

The imperatives of the Modi government's high table diplomacy and its domestic political ideology diverge noticeably, requiring Delhi to deploy a soft

CONTINUED ON PAGE 2

Context: India is among the top contributors to the **UN Democracy Fund (UNDEF)** whose mission is to promote democracy across the world through local and international NGOs and civil society organisations (CSOs) - many of these are linked to Soros's philanthropic empire, an investigation has revealed.

- George Soros is a Hungarian-American businessman and philanthropist.

United Nations Democracy Fund

- **About**: The **United Nations Democracy Fund (UNDEF)** was created by UN Secretary in 2005 as a United Nations General Trust Fund to support democratization efforts around the world.
- **Objectives**: UNDEF supports projects that strengthen the voice of civil society, **promote human rights,** and encourage the participation of all groups in democratic processes.
  - The large majority of UNDEF funds go to **local civil society organizations** - both in the transition and consolidation phases of democratization.
  - In this way, UNDEF plays a **novel and unique role in complementing the UN's other,** more traditional work—the work with Governments—to strengthen democratic governance around the world.
- **Funding**: UNDEF subsists **entirely on voluntary contributions** from Governments; in 2015, it reached almost 170 million dollars in contributions and counts more than 40 countries as donors, including many middle- and low-income States in Africa, Asia and Latin America.
- **Advisory Board**: The **Secretary-General's Advisory Board**, UNDEF's main governing mechanism, is composed of 19 members including the United States, India, Japan, Qatar, Australia, Germany and France.

PIB April 11

EXERCISE COPE INDIA
(Syllabus: GS Paper 2 - International Relations)

EXERCISE COPE INDIA 2023

Context: **Exercise Cope India** 23, a bilateral Air Exercise between the **Indian Air Force (IAF) and the United States** Air Force (USAF) is being held at Air Force Stations Arjan Singh (Panagarh), Kalaikunda and Agra.

Key Points

- Cope India began in **2004** as a **fighter training exercise.**
- The last edition of the exercise was held in **2019**.
- The exercise aims to **enhance mutual understanding** between the two Air Forces and share their best practices.
- The first phase of the exercise will **focus on air mobility** and will involve transport aircraft and Special Forces assets from both the Air Forces.
- Both sides will field the **C-130J and C-17 aircraft**, with the USAF operating an MC-130J, as well.
- The exercise also **includes the presence of Japanese Air Self Defence Force aircrew**, who will participate in the capacity of observers.

Other Exercises between India and the US

- **Exercise Tiger Triumph**: Humanitarian Assistance and Disaster Relief exercise.
- **Exercise Vajra Prahar**: Special Forces' Exercise.
- **Yudh Abhyas**: Joint military training).
- **Malabar Exercise**: Quadrilateral naval exercise of India, USA, Japan and Australia.
- **Red Flag**: US' multilateral air exercise.

DTE

APRIL 11

ENVIRONMENT IMPACT ASSESSMENT

(Syllabus: GS Paper 3 - Env & Eco)

Centre made over 100 changes in Environment Impact Assessment Notification in past 5 years

The year 2022-23 saw the highest number of changes introduced in the notification

By Nivit Kumar Yadav, Anubha Aggarwal
Published: Monday 10 April 2023



Context: Records of the Union Ministry of Environment, Forest and Climate Change (MoEFCC) show that in the last five years, some 110 changes have been introduced in the **2006 EIA notification** vide office memorandums.

- **Office memorandums** are available in public domain but the changes introduced in them do not have to undergo public consultation since they are not considered an act of change in law.

Environment Impact Assessment

- **About**: It is a process of evaluating the likely **environmental impacts of a proposed project or development,** taking into account inter-related socio-economic, cultural, and human-health impacts, both beneficial and adverse.
  - EIA is a tool used to assess the **positive and negative environmental, economic, and social impacts** of a project.
  - This is used to **predict the environmental impacts of a project** in the pre-planning stage itself so that decisions can be taken to reduce the adverse impacts.
- **EIA Notification 2006:** The Environment Impact Assessment (EIA) Notification, 2006, is the **governing legal instrument** to grant green clearance for establishment or expansion of an industry on the basis of the expected environmental impact of the project.
  - The notification was introduced in **1994**, and after several amendments, was revised in 2006.
  - **Key Features:**
    - **Decentralisation of Project Clearances**: It classified the developmental projects in two categories:
      - **Category A (national level appraisal):** projects are appraised by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC).
      - **Category B (state level appraisal):** State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) provide clearance to the Category B projects.
    - **Introduction of Different Stages:** The Amendment introduced four stages into EIA Cycle; Screening, Scoping, Public hearing and Appraisal.
      - **Category A projects** require mandatory environmental clearance and thus they do not have to undergo the screening process.
      - **Category B projects** undergo a screening process and are further classified into B1 (Mandatorily requiring EIA) and B2 (Not requiring EIA).
    - **Projects with Mandatory Clearance**: Projects such as **mining, thermal power plants, river valley, infrastructure** (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units are mandated to get environment clearance.

DST

April 11

RAMAN SPECTROSCOPY

(Syllabus: GS Paper 3 - Sci & Tech)

New low-cost substrates can enhance sensitivity of analytical tools for detecting toxic pollutants

Context: Scientists have developed a new low-cost substrate that can increase the sensitivity of **Surface-enhanced Raman spectroscopy (SERS)** - a vital analytical and sensing tool for detecting molecules.

- It can aid **rapid detection of toxic pollutants** present in water, food, etc.
- **Surface-enhanced Raman spectroscopy (SERS)** has emerged as a vital analytical and sensing tool for detecting molecules.
- Scientists have designed an efficient SERS substrate based on unique sea **urchin morphology of molybdenum trioxide** for the rapid detection of industrial pollutants.

Raman Spectroscopy

- **About**: C.V. Raman discovered Raman spectroscopy in 1928 to **study the vibrational, rotational, and low-frequency modes of the molecules.**
  - It finds **application mainly in chemistry** to get the information related to fingerprints.
- **Principle**: The principle behind Raman spectroscopy is that the **monochromatic radiation** is passed through the sample such that the radiation may get reflected, absorbed, or scattered.
  - The **scattered photons** have a different frequency from the incident photon as the vibration and rotational property vary. This results in the change of wavelength,, which is studied in the IR spectra.
  - The difference between the incident photon and the scattered photon is known as the **Raman shift.** When the energy associated with the scattered photons is less than the energy of an incident photon, the scattering is known as Stokes scattering.
  - When the energy of the scattered photons is more than the incident photon, the scattering is known as **anti-Stokes scattering.**
- **Types of Raman Spectroscopy:**
  - Resonance Raman Spectroscopy (RRS)
  - Surface-enhanced Raman Spectroscopy (SERS)
  - Micro-Raman Spectroscopy
  - Non-linear Raman Spectroscopic Techniques
- **Applications of Raman Effect:**
  - **Raman amplification:** this is based on the Raman scattering where the lower frequency photons are pumped to a high-frequency regime with a surplus amount of energy. This method is applicable to telecommunications.
  - **Supercontinuum generation:** In optics, supercontinuum is formed using the Raman spectra, which results in smooth spectra as the initial spectra are built spontaneously which is later amplified to higher energy.
  - **Raman spectroscopy works on the basis of Raman effect** and finds applications in various fields like in nanotechnology to understand the structure of nanowires, in biology and medicine where the low-frequency DNAs and proteins are studied and chemistry to understand the structure of molecules and their bonds.
  - Raman scattering is used in remote **sensing and planetary exploration.**
  - Raman scattering is used to **sense the minerals in Mars.**

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