



SC Upholds EVM and VVPAT System

For Prelims: [Electronic voting machine](#), [Voter verifiable paper audit trail](#), [Election Commission of India](#), Subramanian Swamy v. Election Commission of India, [Representation of the People Act, 1951](#), Dinesh Goswami Committee

For Mains: Electoral Reforms in India, Transparency in Elections.

[Source: TH](#)

Why in News?

Recently, the Supreme Court in *the Association of Democratic Reforms v. Election Commission of India Case, 2024*, upheld the [electronic voting machine \(EVM\) system](#), rejecting a return to paper ballots. Also, the Court rejected the request for **100%** cross-verification of EVM votes with [Voter verifiable paper audit trail \(VVPAT\)](#) slips, maintaining the current random **5% verification** in Assembly constituencies.

- However, the Court issued a series of directions to the [Election Commission of India](#) (ECI) to strengthen the existing system.

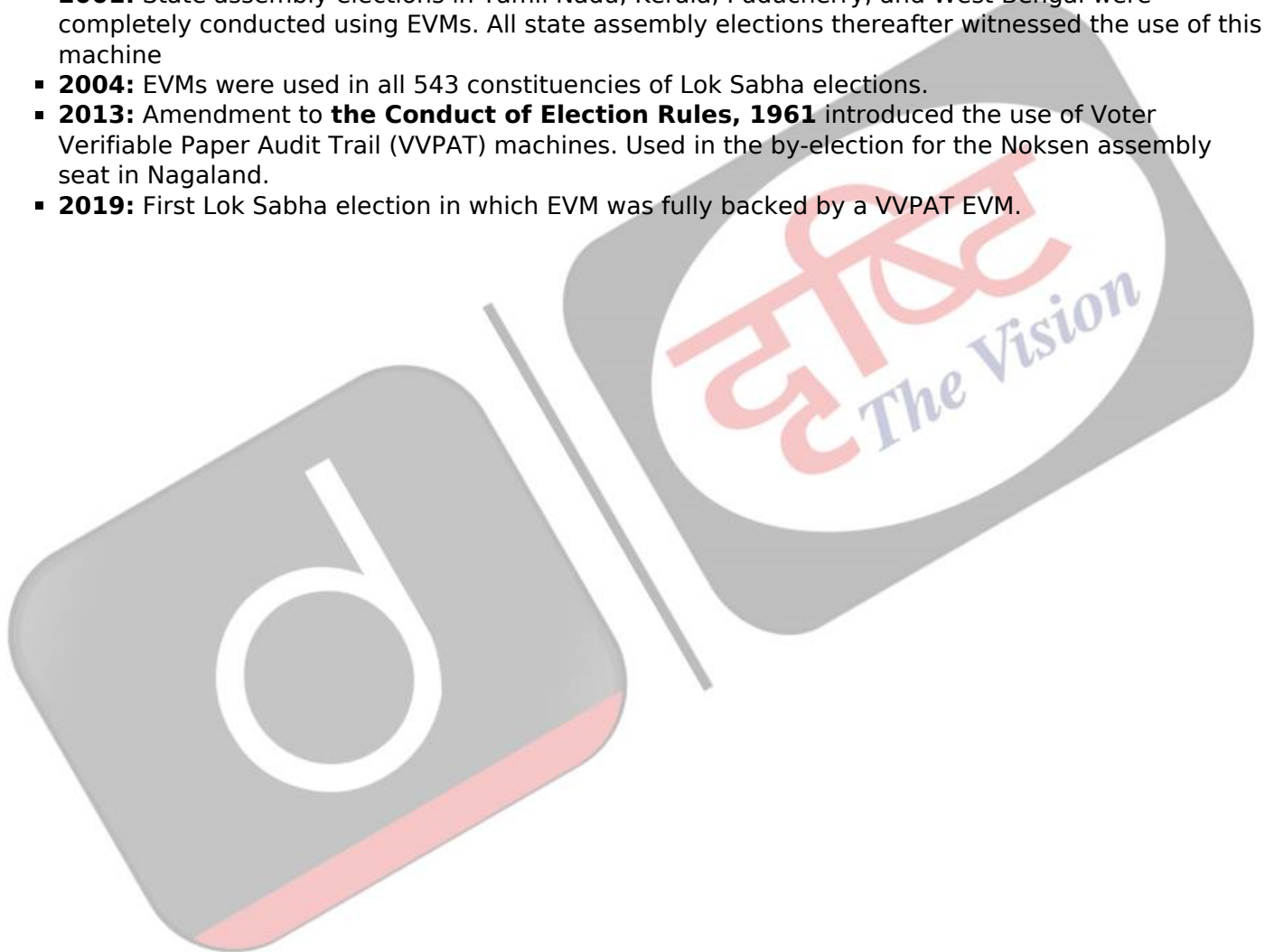
What is the Supreme Court's Current Observation on EVM and VVPATs?

- **Insufficient Evidence to Question Polling System:** The Court, drawing from a range of legal precedents, emphasised that there is **insufficient evidence** to question the current polling system, particularly after the implementation of VVPATs.
 - In the 2013 case of *Subramanian Swamy v. Election Commission of India*, the Court declared that a paper trail is essential for ensuring fair elections.
 - Subsequently, in 2019, when addressing a petition advocating for a 50% cross-verification of EVM votes with VVPAT slips in each Assembly constituency, the **Court favoured increasing the number of polling stations conducting VVPAT verification** from 1 per Assembly constituency to 5.
- **Neutrality of EVM Microcontrollers:** SC observed that the microcontrollers programmed separately by **EVM manufacturers** are neutral, as they do not favour any political party or candidate but only record the buttons pressed by voters.
 - SC also pointed out that any unauthorised attempt to access the EVM's microcontroller or memory triggers the **Unauthorized Access Detection Mechanism (UADM)**, rendering the EVM permanently disabled.
- **Security Measures in EVMs:** Highlighting the security measures, the court noted that the program installed in the EVMs is securely hashed and burned into a **One Time Programmable microcontroller chip during manufacturing**, eliminating any possibility of tampering.
 - Additionally, all three units of the EVM - **the ballot unit, control unit, and VVPAT** - have microcontrollers with firmware that cannot be altered after delivery to the ECI by the manufacturer.

How EVMs and VVPAT were Introduced in India?

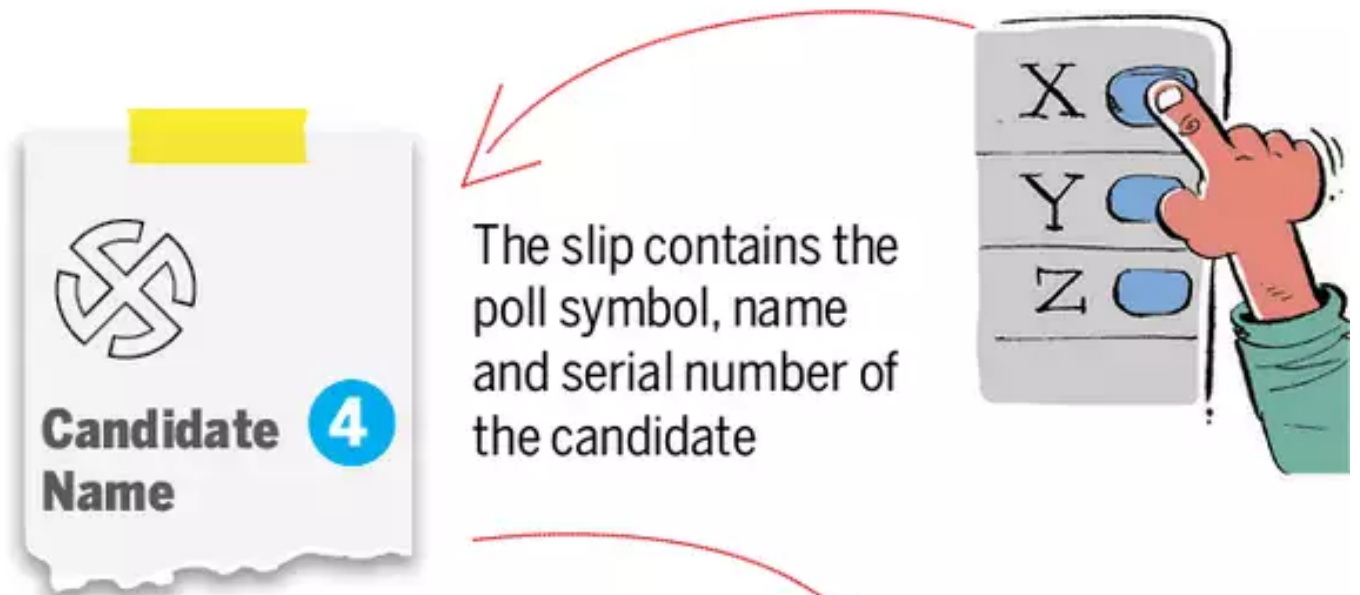
- **1977-1979:** The idea of EVM was conceived in **1977** and a prototype was developed by Electronics Corporation of India Ltd (ECIL), Hyderabad, in 1979.
- **1980:** The Election Commission demonstrated an EVM on 6th August 1980. After consensus on its use, the ECI issued directives under **Article 324 for the use of EVMs**.
- **1982:** EVMs were used in 50 polling stations during elections in the Parur seat of Kerala. The Supreme Court ruled against the legality of EVMs' use.
- **1988:** A section of the [Representation of the People Act, 1951](#) was amended in december 1988 and a new section, 61A, was included in the law, empowering the EC to use EVMs. The amendment came into force on 15th March 1989.
- **1990:** An Electoral Reforms Committee under Dinesh Goswami was constituted, which recommends a technical examination of EVMs. The Technical Expert Committee recommended EVMs "**without any further loss of time marking it technically sound, secure and transparent**".
- **1998:** EVMs were used in 16 Assembly elections across Madhya Pradesh, Rajasthan and New Delhi.
- **2001:** State assembly elections in Tamil Nadu, Kerala, Puducherry, and West Bengal were completely conducted using EVMs. All state assembly elections thereafter witnessed the use of this machine
- **2004:** EVMs were used in all 543 constituencies of Lok Sabha elections.
- **2013:** Amendment to **the Conduct of Election Rules, 1961** introduced the use of Voter Verifiable Paper Audit Trail (VVPAT) machines. Used in the by-election for the Noksen assembly seat in Nagaland.
- **2019:** First Lok Sabha election in which EVM was fully backed by a VVPAT EVM.

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How do VVPAT machines work?

When a voter presses a button in the EVM, a paper slip is printed through the VVPAT



It allows the voter to verify his/her choice. After being visible to the voter from a glass screen for 7 secs, the ballot slip will be cut and dropped into the box and a beep will be heard. VVPAT machines can be accessed by polling officers only



Note:

- The **paper ballot system** is a traditional voting method where **voters mark their choices on physical paper ballots**, which are then manually counted by election officials to determine the results.
- This system is transparent but **can be time-consuming and prone to errors** during counting.

How is EVM better than the Paper Ballot System?

- **Accuracy and Reduced Errors:** EVMs eliminate the possibility of human errors such as miscounting, double voting, or invalid votes due to unclear markings.
 - The digital nature of EVMs ensures **precise tabulation of votes**, leading to more accurate election results compared to manual counting.
- **Faster Counting and Results:** EVMs significantly reduce the time required for vote counting as compared to traditional paper ballots, allowing for quicker declaration of election outcomes.
 - This swift counting process helps in **minimising uncertainties** and delays associated with manual counting methods.
- **Environmentally Friendly:** EVMs contribute to environmental sustainability by **reducing paper usage**, thus lowering the environmental impact associated with printing and managing large quantities of paper ballots.
 - The shift towards electronic voting aligns with global efforts to promote eco-friendly practices in electoral processes.
- **Enhanced Security Measures:** EVMs incorporate advanced security features such as **encryption, secure booting, and tamper detection mechanisms**, making them less susceptible to tampering or fraud which is very likely in paper ballot systems through booth capturing, **pouring ink into ballots and ballot box stuffing**.
 - The digital encryption of votes ensures the integrity and confidentiality of the electoral process, enhancing overall security and trust in election outcomes.



ELECTORAL REFORMS IN INDIA

ELECTORAL REFORMS ARE CHANGES MADE TO IMPROVE THE ELECTION PROCESS AND ENSURE FAIRNESS.

Electoral Reforms Before 1996

- ↳ **Model Code of Conduct (1969):** Guidelines to regulate political parties and candidates prior to elections
- ↳ **61st Constitutional Amendment Act (1988):** Lowering of the voting age from 21 to 18 years
- ↳ **Electronic Voting Machines (EVMs) (1989):** Switched from individual colored ballot boxes to ballot papers, and later to EVMs
- ↳ **Booth Capturing (1989):** Provision for adjournment of poll or countermanding of elections in such cases
- ↳ **Elector's Photo Identity card (EPIC) (1993):** Electoral roll is the basis to issue EPIC to registered electors
- ↳ **ECI- A Multi-member Body (1993):** Election commissioners were appointed in addition to CEC

Electoral Reforms of 1996

- ↳ **Time-limit for By-elections:** Elections must occur within 6 months of any vacancy in a legislative house
- ↳ **Listing of Names of Candidates:** Contesting candidates categorized into 3 groups for listing
 - ↳ Recognised & registered-unrecognised political parties
 - ↳ Other (independent)
- ↳ **Disqualification for Insulting the National Honour Act, 1971:** Leads to election disqualification for 6 years upon:
 - ↳ Insulting the National Flag, Constitution of India or preventing the singing of National Anthem

Electoral Reforms After 1996

- ↳ **Vote Through Proxy (2003):** Service voters in Armed Forces & forces under Army Act can vote by proxy
- ↳ **Allocation of Time on Electronic Media (2003):** Equitable sharing of time on electronic media during elections to address the public
- ↳ **Introduction of Braille Signage Features in EVMs (2004):** To facilitate the visually impaired voters to cast their votes without an attendant

Electoral Reforms Since 2010

- ↳ **Voting Rights to Indian Citizens Living Abroad (2010)**
- ↳ **Online Enrollment in Electoral Roll (2013)**
- ↳ **Introduction of NOTA option (2014)**
- ↳ **VVPAT Voter Verified Paper Audit Trail (2013):** Introduction of VVPAT with EVMs to conduct free and fair elections
- ↳ **Photos of Candidates on EVMs and Ballot Papers (2015):** To prevent confusion in constituencies with namesake candidates
- ↳ **Introduction of Electoral bonds (2017 Budget):** An alternative to cash donations for political parties
 - ↳ Declared as unconstitutional by SC (2024)
- ↳ **Launch of Electronic EPIC (2021)**
- ↳ **Home Voting for People with Disabilities & Those Above 85 years of Age (2024)**

IMPORTANT COMMITTEES/ COMMISSION

| Committees/ Commission | Year | Purpose |
|---|------|--|
| ■ Tarkunde Committee | 1974 | ■ By Jaya Prakash Narayan (JP) during the "Total Revolution" movement. |
| ■ Dinesh Goswami Committee | 1990 | ■ Electoral Reforms |
| ■ Vohra Committee | 1993 | ■ On the Nexus between Crime and Politics |
| ■ Indrajit Gupta Committee | 1998 | ■ State Funding of Elections |
| ■ Second Administrative Reforms Commission of India | 2007 | ■ Report on Ethics in Governance (Headed by Veerappa Moily) |
| ■ Tankha Committee (Core Committee) | 2010 | ■ To look into the whole gamut of the election laws & electoral reforms. |



Drishti IAS

Read more: [Electoral Reforms in India](#)

Drishti Mains Question:

How do Electronic Voting Machines (EVMs) and Voter Verified Paper Audit Trail (VVPAT) systems enhance transparency in the electoral process? Discuss the significance and challenges related to these technologies in promoting public trust and confidence in election results.

UPSC Civil Services Examination Previous Year Questions (PYQ)

Prelims:

Q.1 Consider the following statements: (2017)

1. The Election Commission of India is a five-member body.
2. The Union Ministry of Home Affairs decides the election schedule for the conduct of both general elections and bye-elections.
3. Election Commission resolves the disputes relating to splits/mergers of recognised political parties.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
(b) 2 only
(c) 2 and 3 only
(d) 3 only

Ans: (d)

Mains:

Q.1 To enhance the quality of democracy in India the Election Commission of India has proposed electoral reforms in 2016. What are the suggested reforms and how far are they significant to make democracy successful? **(2017)**

NABARD's Climate Strategy 2030

For Prelims: [National Bank for Agriculture and Rural Development](#) , [Green financing](#), [Greenwashing](#), [Solar-powered irrigation](#), [Climate-smart agriculture](#)

For Mains: NABARD's Climate Strategy, Challenges Related to Green Financing

Source: NABARD

Why in News?

Recently, [National Bank for Agriculture and Rural Development \(NABARD\)](#) unveiled its Climate Strategy 2030 document which aims to address India's need for [green financing](#).

What is NABARD's Climate Strategy?

- **About: NABARD's Climate Strategy 2030** is structured around four key pillars:
 - **Accelerating Green Lending:** Focusing on increasing green financing across various sectors.
 - **Market-Making Role:** Playing a broader role in creating a conducive market environment for green finance.
 - **Internal Green Transformation:** Implementing sustainable practices within NABARD's operations.
 - **Strategic Resource Mobilisation:** Mobilising resources effectively to support green initiatives.
- **Objective:** This strategy is designed to tackle the financial gap between the required investment for **sustainable initiatives** and the current inflow of green finance.
 - India requires approximately **USD 170 billion annually by 2030**, aiming for a cumulative total of over USD 2.5 trillion.
 - However, current green finance inflows are critically insufficient, with only about **USD 49 billion garnered as of 2019-20**.
 - Also, the majority of funds in India are earmarked for mitigation efforts, with only **USD 5 billion allocated towards adaptation and resilience**.
 - This reflects minimal private sector engagement in these areas due to challenges in bankability and commercial viability.

Note:

- NABARD is the apex development bank focusing on rural sector finance in India.
- Established in **1982** under the **National Bank for Agriculture and Rural Development Act**, it provides financial support for agriculture, small industries, cottage industries, and rural projects as mandated by Parliament.
- It is headquartered in Mumbai.

What is Green Financing?

- **About:** Green financing refers to the mobilisation of financial resources to support investments that have a **positive environmental impact**.
 - These investments can range from **renewable energy projects** and **energy efficiency initiatives** to sustainable infrastructure development and **climate-smart agriculture**.
- **Significance:** The traditional financial system often prioritises short-term profits over long-term environmental sustainability. Green financing aims to bridge this gap by:
 - **Facilitating the Transition to a Low-carbon Economy:** By channelling funds towards renewable energy and clean technologies, green financing helps reduce reliance on fossil fuels and mitigate greenhouse gas emissions.
 - **Promoting Climate Adaptation and Resilience:** Investments in green infrastructure like **flood defences and early warning systems** can help communities adapt to the changing climate and reduce the impact of natural disasters.
 - **Unlocking New Economic Opportunities:** The shift towards a green economy creates new markets for clean technologies and sustainable practices, stimulating innovation and job creation.
- **Challenges Related to Green Financing:**
 - **High Initial Costs:** Green projects often require **higher initial investments** compared to conventional projects, which can deter investors despite long-term cost savings and environmental benefits.
 - **Mismatched Timeframes:** Green projects often have **longer payback periods** and may not align with short-term investment horizons or financial targets of investors and financial institutions.
 - **Lack of Standardisation and Greenwashing:** The absence of globally accepted standards for **green investment** leads to ambiguity and inconsistency in evaluating their

environmental impact and financial performance.

- Also, without clear and standardised criteria, there is a risk of [greenwashing](#), where **investments are misrepresented as environmentally friendly** without delivering substantial sustainability benefits.

How Green Financing Can be Improved?

- **AI-powered Risk Assessment for Green Projects:** Developing AI algorithms that can **assess the environmental and financial risks** associated with green projects with greater accuracy and efficiency.
 - This can encourage traditional financial institutions to participate in green financing.
- **Satellite Data-driven Sustainable Investment Decisions:** Leverage satellite imagery and data analytics to **assess the environmental impact of potential investments** in areas like deforestation or sustainable agriculture, providing investors with data-driven insights.
- **Green Infrastructure Bonds with Government Guarantees:** Developing green infrastructure bonds with **partial government guarantees** to mitigate risk for private investors and incentivise participation in large-scale sustainable infrastructure projects.
- **Micro-grants for Grassroots Green Initiatives:** Establishing micro-grant programs to support local communities in developing and implementing small-scale green projects like [rainwater harvesting](#), [solar-powered irrigation](#), or **community composting initiatives**.
- **Green Impact Scores for Financial Products:** Implementing a system where financial products earn "**green impact scores**" based on their environmental footprint. This allows consumers to make informed choices and prioritise green options.

[Drishti Mains Question:](#)

Discuss innovative methods for promoting green financing in the context of sustainable development to facilitate the transition towards a greener economy?

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Mains

Q. Explain the purpose of the Green Grid Initiative launched at the World Leaders Summit of the COP26 UN Climate Change Conference in Glasgow in November 2021. When was this idea first floated in the International Solar Alliance (ISA)? **(2021)**

FSSAI Raises Pesticide Limits in Herbs and Spices

For Prelims: [Food Safety Standards Authority of India \(FSSAI\)](#), [Pesticide Poisoning](#), [Codex Alimentarius](#), [Food Safety and Standards Act, 2006](#), [State Food Safety Index](#).

For Mains: Threat of pesticide poisoning, FSSAI mandate and its working in ensuring food safety.

[Source: DTE](#)

Why in News?

The recent decision of the [Food Safety Standards Authority of India \(FSSAI\)](#) to raise the **maximum residue limit (MRL)** of pesticides has sparked outrage from activists and scientists due to potential health risks and trade implications.

- The FSSAI order increased the **maximum residue limit (MRL)** of [pesticides](#) allowed in herbs and spices by tenfold, from 0.01 mg/kg to 0.1 mg/kg.

What is the Issue Regarding the FSSAI Order?

- **Inconsistencies in FSSAI's Previous Stance:**
 - The [FSSAI's order contradicts its own previous stance](#). In April 2022, the authority acknowledged the **lack of field trial data for most Indian pesticides** and advocated using Maximum Residue Limits (MRLs) established by [Codex Alimentarius](#).
 - However, the **latest order deviates** from this approach for spices and herbs.
- **Data Transparency and Reliability:**
 - The maximum residue limit (MRL) of **pesticides for food and commodities, including spices and culinary herbs**, is specified under the **Food Safety and Standards (Contaminants, Toxins and Residues) Regulation, 2011**, based on **field trial data** received through the **Central Insecticides Board and Registration Committee (CIBRC), Union Ministry of Agriculture and Family Welfare**.
 - But there is an **issue of conflict of interest** as these studies often come from the pesticide companies themselves.
 - The **Centre's Monitoring of Pesticide Residues at the National Level (MPRNL)** checks the amount of pesticide in our food, but **it does not test spices and lacks comprehensive data**.
- **Impact on Consumers and Trade:**
 - Countries with **stricter pesticide** regulations like **Europe, have rejected Indian products exceeding their MRLs**, as exemplified by recent recalls of Indian food products containing excessive pesticide residues.
 - E.g. In **April 2024**, few popular spices firms in India, have been **banned in Singapore and Hong Kong** for allegedly containing the **pesticide 'ethylene oxide' beyond permissible limits**.
 - **Ethylene Oxide** is a **harmful pesticide** unfit for human consumption and whose long-term exposure can cause **cancer**.

What is Pesticide Poisoning?

- **About :**
 - Pesticide is any **chemical or biological substance** intended to prevent, destroy or **control damage from pests** which has both agricultural and non-agricultural uses.
 - They also **pose serious risks to human health** and the **environment**, especially when they are misused, overused, or sold illegally.
- **Pesticide Regulation in India:**
 - Pesticides are **regulated under the Insecticides Act, 1968** and the **Insecticides Rules, 1971**.
 - The **Insecticides Act of 1968** covers the registration, manufacture and sale of pesticides in India.
 - The Act is administered by the **Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare**.
- **Types of Pesticides:**
 - **Insecticides:** The chemicals that are used to **protect plants from insects and pests** are known as Insecticides.
 - **Fungicides:** This class of crop protection chemicals is used to **control the spread of fungal diseases** in plants.
 - **Herbicides:** Herbicides are **chemicals that kill or control the growth of weeds** in the cultivation area.
 - **Bio-Pesticides:** They are pesticides of biological origin, i.e., derived from [animals](#), [plants](#), [bacteria](#) etc.
 - **Others:** This includes plant growth regulators, nematicides, rodenticides and fumigants.

- **Concept of Pesticide Poisoning:**
 - Pesticide poisoning is a term that refers to the **adverse effects** of exposure to **pesticides on humans or animals**.
 - Pesticide exposure can cause **adverse health effects** including **cancer, effects on reproduction, and immune or nervous systems**.
 - According to the [World Health Organization \(WHO\)](#), pesticide poisoning is one of the leading causes of death among agricultural workers worldwide.
- **Types of Pesticide Poisoning:**
 - **Acute poisoning** occurs when a person ingests, inhales, or comes into contact with a **large amount of pesticide in a short period**.
 - **Chronic poisoning** occurs when a person is **exposed to low doses of pesticide over a long period**, which can cause damage to various organs and systems in the body.

What is the Food Safety and Standards Authority of India?

- **About:**
 - The [Food Safety and Standards Authority of India \(FSSAI\)](#) is a **statutory body** formed under the [Food Safety and Standards Act, 2006](#).
 - The Food Safety and Standards Act, 2006 **replaced acts** like the Prevention of Food Adulteration Act, 1954, Fruit Products Order, 1955, Meat Food Products Order, 1973.
 - It operates under the **Union** [Ministry of Health and Family Welfare](#).
- **Mandate:**
 - The FSSAI has the mandate of **regulating the manufacture, storage, distribution, sale, and import of food articles**, and also **establishing standards** to ensure food safety.
- **Structure and Organization:**
 - It is made up of **22 members** and a **Chairperson**. **One-third** of the members must be **women**.
- **Functions:**
 - **Setting Food Safety Standards:** It has the **power to lay down regulations** to implement food safety standards in the country.
 - **Food Testing Accreditation:** It has the power to set up **guidelines** for the **accreditation of food testing laboratories** in the country.
 - **Inspecting Authority Powers:** Food safety officers have the right to enter and inspect any place where food products are manufactured, stored, or exhibited.
 - **Food Safety Research:** The Research and Development division of FSSAI is responsible for **research in the field of food safety standards**. They continuously try to **adopt international food standards**.
 - **Identifying Threats:** The FSSAI is required to **collect data regarding food consumption**, contamination, emerging risks, etc.
- **Events and Campaigns of FSSAI:**
 - [World Food Safety Day](#).
 - [Eat Right India](#).
 - [Eat Right Station](#).
 - [Eat Right Mela](#).
 - [State Food Safety Index](#).
 - [RUCO \(Repurpose Used Cooking Oil\)](#).
 - [Food Safety Mitra](#).
 - [100 Food Streets](#).

Drishti Mains Question:

Q. Elaborate on pesticide poisoning in the context of FSSAI's recent order on increasing the maximum residue limit (MRL) of pesticides allowed in herbs and spices.

Prelims:

Q. Consider the following statements: (2018)

1. The Food Safety and Standards Act, 2006 replaced the Prevention of Food Adulteration Act, 1954.
2. The Food Safety and Standards Authority of India (FSSAI) is under the charge of Director General of Health Services in the Union Ministry of Health and Family Welfare.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (a)

Mains:

Q.1 Elaborate the policy taken by the Government of India to meet the challenges of the food processing sector. **(2021)**

PayU Gets Approval as Payment Aggregator

Source: BS

Why in News?

Fintech firm PayU has recently announced that it has received in-principle approval from the [Reserve Bank of India \(RBI\)](#) to operate as a [payment aggregator \(PA\)](#), under the **Payment and Settlement Systems(PSS) Act, 2007**.

- The **in-principle approval from RBI** permits PayU to onboard new merchants, yet **final approval typically takes six months to a year**.

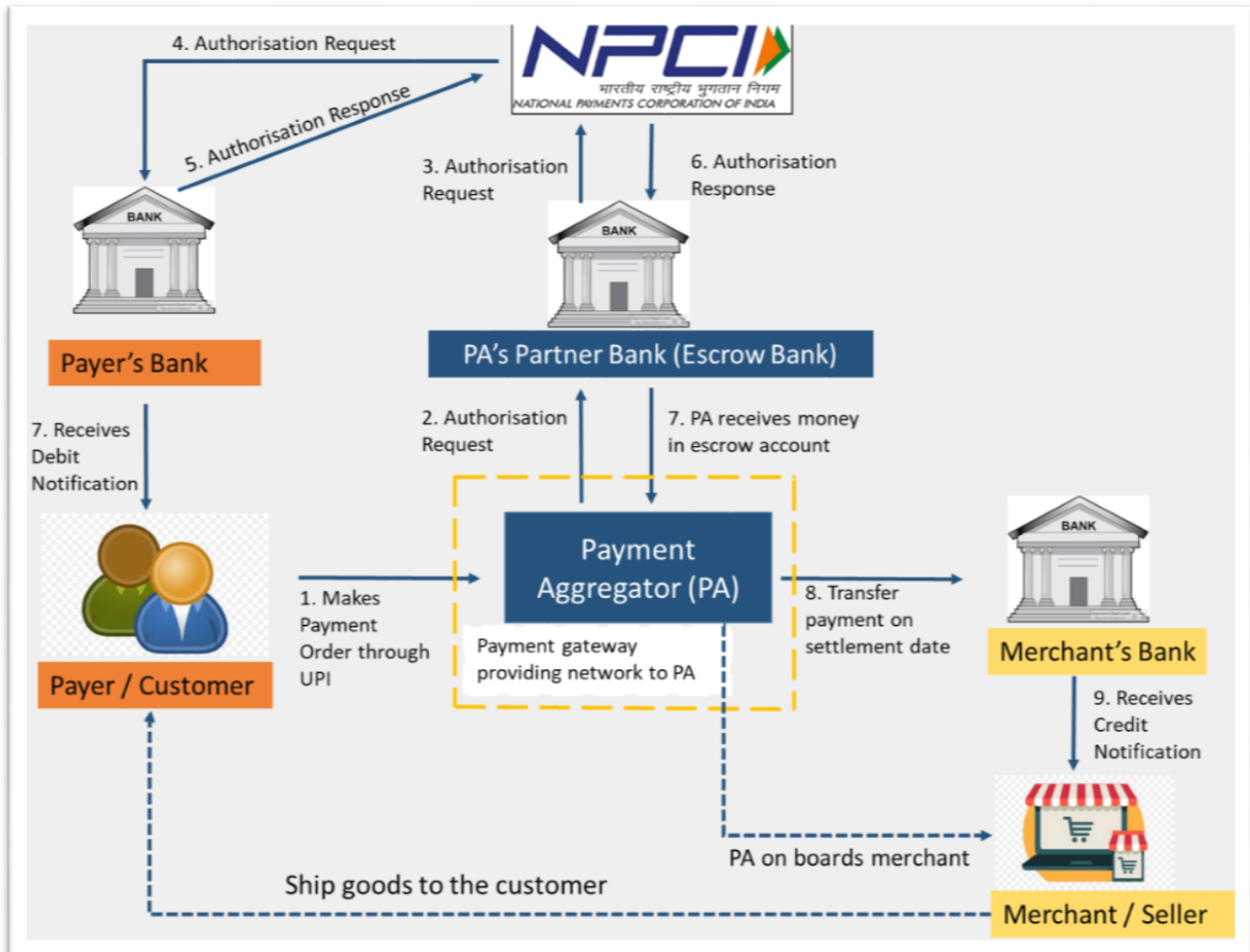
What is a Payment Aggregator?

▪ **About:**

- PA acts as an **intermediary between businesses and financial institutions**, handling payment processing on behalf of merchants.
 - A payment aggregator simplifies the process of accepting electronic payments for businesses.
- Payment aggregators streamline the payment acceptance process, allowing businesses to avoid the complexities of establishing direct relationships with financial entities.
- They enable businesses to accept various payment methods, including credit cards, debit cards, e-wallets, and bank transfers, through a single platform.
- Some examples of payment aggregators include Google Pay, Amazon Pay, Phone pe, and PayPal.

▪ **Capital Requirements:**

- New PAs must have a **minimum net worth of Rs 15 crore** at the time of application and **reach Rs 25 crore by the end of the third financial year** post-authorisation.
- **Authorisation Process:**
 - While banks provide PA services as part of their normal banking relationship and do not require separate authorisation, non-bank PAs must obtain authorisation from the **RBI under the Payment and Settlement Systems Act, 2007 (PSS)**.
- **Settlement and Escrow Account Management:**
 - Non-bank PAs are mandated to maintain funds collected in an **escrow account** with a **scheduled commercial bank**.
 - PAs must adhere to specific timelines for settling funds with merchants based on the transaction lifecycle and agreed-upon terms.



End to end non-bank payment aggregator transactional flow

The blue dotted lines in the fig. do not form part of payment system, but forms an important part of legal basis in merchant on-boarding process and shipment of goods to the customers in a PA business model.

Note:

- Unlike PAs, **Payment Gateways (PG)** provide technology infrastructure to route and facilitate the processing of online payment transactions **without handling funds**.
 - Payment Aggregators, on the other hand, **allow merchants to have multiple payment options** on their portal, covering the functionality of a payment gateway.

| Basis of Distinction | Payment Gateway | Payment Aggregator |
|----------------------|---|---|
| Role | A network bridging the gap between the merchant and the | A solution streamlining end-to-end payment processes. |

| | | |
|--------------------------|--|--|
| | bank. | |
| Payment Options | Primarily debit/credit card payments. | Offers multiple options: UPI, debit/credit cards, net banking, etc. |
| Integration | Merchants integrate each payment method or bank separately. | Integration requires partnering with just one service provider. |
| Services Provided | Transaction processing services. | Provides transaction processing along with additional services like access to reports, customer support, etc. |
| Funds Handling | Does not store funds ; securely transmits encrypted payment data. | Handles funds through its Merchant Identification Number (MID). Transactions processed through the aggregator's system. |
| Examples | Axis Bank, HDFC Bank, MPGS (Mastercard Payment Gateways). | PhonePe PG, Stripe, Cashfree. |

Payment and Settlement Systems (PSS) Act, 2007

- The PSS Act, 2007, provides for the regulation and supervision of payment systems in India and designates the RBI as the authority for that purpose and all related matters.
- The Reserve Bank is authorised under the Act to constitute a Committee of its Central Board known as the **Board for Regulation and Supervision of Payment and Settlement Systems (BPSS)**, to exercise its powers and perform its functions and discharge its duties under this statute.
- According to Section 4 of the PSS Act, 2007, **only the Reserve Bank can authorise the operation of a payment system**. Any person wanting to operate a payment system must apply for authorization under Section 5 of the PSS Act, 2007.
- The PSS Act 2007 **does not prohibit foreign entities from operating a payment system in India**. The Act does not discriminate/differentiate between foreign entities and domestic entities.
- Operating a payment system without authorization, non-compliance with Reserve Bank directions, or violating any provisions of the PSS Act, 2007 can result in criminal prosecution initiated by the Reserve Bank.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q1. With reference to digital payments, consider the following statements: (2018)

1. BHIM app allows the user to transfer money to anyone with a UPI-enabled bank account.
2. While a chip-pin debit card has four factors of authentication, BHIM app has only two factors of authentication.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (a)

Q2. Which of the following is a most likely consequence of implementing the 'Unified

Payments Interface (UPI)'? (2017)

- (a) Mobile wallets will not be necessary for online payments.
- (b) Digital currency will totally replace the physical currency in about two decades.
- (c) FDI inflows will drastically increase.
- (d) Direct transfer of subsidies to poor people will become very effective.

Ans: (a)

Q3. Consider the following statements: (2017)

1. National Payments Corporation of India (NPCI) helps in promoting the financial inclusion in the country.
2. NPCI has launched RuPay, a card payment scheme.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (c)

DURGA II Laser Weapon

[Source: TW](#)

Why in News?

Recently, the [Defence Research and Development Organisation \(DRDO\)](#) has sought USD 100 million from the Ministry of Defence to develop a high-power laser weapon, named **Directionally Unrestricted Ray-Gun Array (DURGA) II**, a lightweight directed energy weapon (DEW).

- It is a 100-kilowatt lightweight DEW and **can be used by armed forces**.
- It aims to provide the Indian armed forces with **cutting-edge technology capable of neutralising various threats, including drones, missiles, and artillery shells**.

What are Directed-Energy Weapons (DEWs)?

- **About:**
 - It is a type of weapon system that **emits highly focused energy**, typically in the form of **lasers, microwaves, or particle beams**, to incapacitate or destroy targets.
 - Unlike traditional firearms or explosives which rely on **kinetic energy (physical impact)**, **DEWs use directed energy** to achieve their effects.
- **Types:**
 - **Laser Weapons:** It uses a **concentrated beam of coherent light** to heat and damage the target.
 - They can be used for various purposes, including **target destruction, missile defence**, and disabling electronics.
 - **Microwave Weapons:** They emit **electromagnetic radiation** in the microwave frequency range to disrupt or damage electronic systems, such as **computers, sensors**,

or communication devices.

- **Particle Beam Weapons:** They accelerate **charged or neutral particles** to high velocities and direct them towards the target to cause damage through **kinetic energy transfer or ionisation effects**.

▪ **Advantages:**

- It has advantages including **precision targeting, rapid engagement**, reduced collateral damage, and potentially lower costs per shot.
 - DEWs are believed to be the sole **answer to virtually 'unstoppable' hypersonic missiles**.
- They have **applications in military defence, homeland security**, space exploration, and law enforcement.
- It transmits **lethal force at the speed of light**.
- These weapons are **not affected by the constraining effects of gravity** or atmospheric drag, making them **extremely precise**.

▪ **Challenges:**

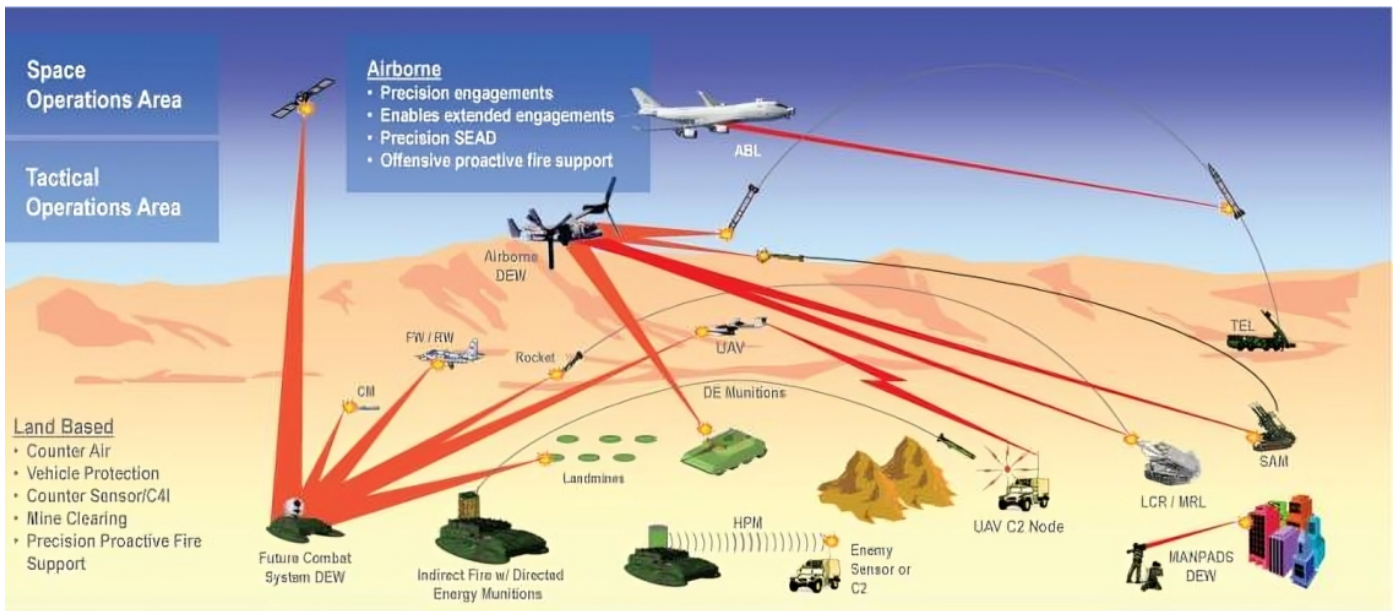
- **Limited Range:** Most DEWs have limited range, and their effectiveness **decreases with increasing distance** between the target and the weapon.
- **High Cost:** It **can be expensive** to develop and manufacture, and the cost may not be justified by their effectiveness in some situations.
- **Countermeasures:** It can be countered by using **reflective materials** which can reduce their effectiveness.
 - Its effectiveness can be influenced by factors such as **atmospheric conditions, including fog, rain, and dust**.
- **Arms Race:** The development of DEWs may lead to an arms race among nations.
 - Examples such as **the current nuclear race among nations**.

▪ **Significance for India:**

- The application of this technology in the **defence industry** can transform the way wars will be fought enabling India to produce **cutting-edge platforms, weapons, sensors, and networks essential to fight and win a future war**.
- DEWs could act as a **deterrent against hostile nations** such as China, and Pakistan by increasing India's defence capabilities.
- **Other Countries with DEWs:**
 - **Russia, France, Germany, the United Kingdom, Israel, and China** are reportedly among the countries that have programmed to develop DEWs or Laser Directed Energy Weapons.
 - Earlier, the US also accused Cuba of carrying out sonic attacks (**Havana Syndrome**).

Note:

- The **global DEW market** was worth USD 4.1 billion in 2020 and is forecasted **to reach USD 15.5 billion by 2027**, with a CAGR of 19.63%.



UPSC Civil Service Examination, Previous Year Questions(PYQs)

Prelims:

Q1. With reference to Agni-IV Missile, which of the following statements is/are correct? (2014)

1. It is a surface-to-surface missile.
2. It is fuelled by liquid propellant only.
3. It can deliver one-tonne nuclear warheads about 7500 km away.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (a)

Q2. What is "Terminal High Altitude Area Defense (THAAD)", sometimes seen in the news? (2018)

- (a) An Israeli radar system
- (b) India's indigenous anti-missile programme
- (c) An American anti-missile system
- (d) A defence collaboration between Japan and South Korea.

Ans: c

Virtual Private Network

[Source: TH](#)

Why in News?

Russia's tightening grip on **online content** in recent years has led to a significant surge in [Virtual Private Network \(VPN\) usage](#) among citizens seeking unrestricted access to information and media platforms.

What is a VPN?

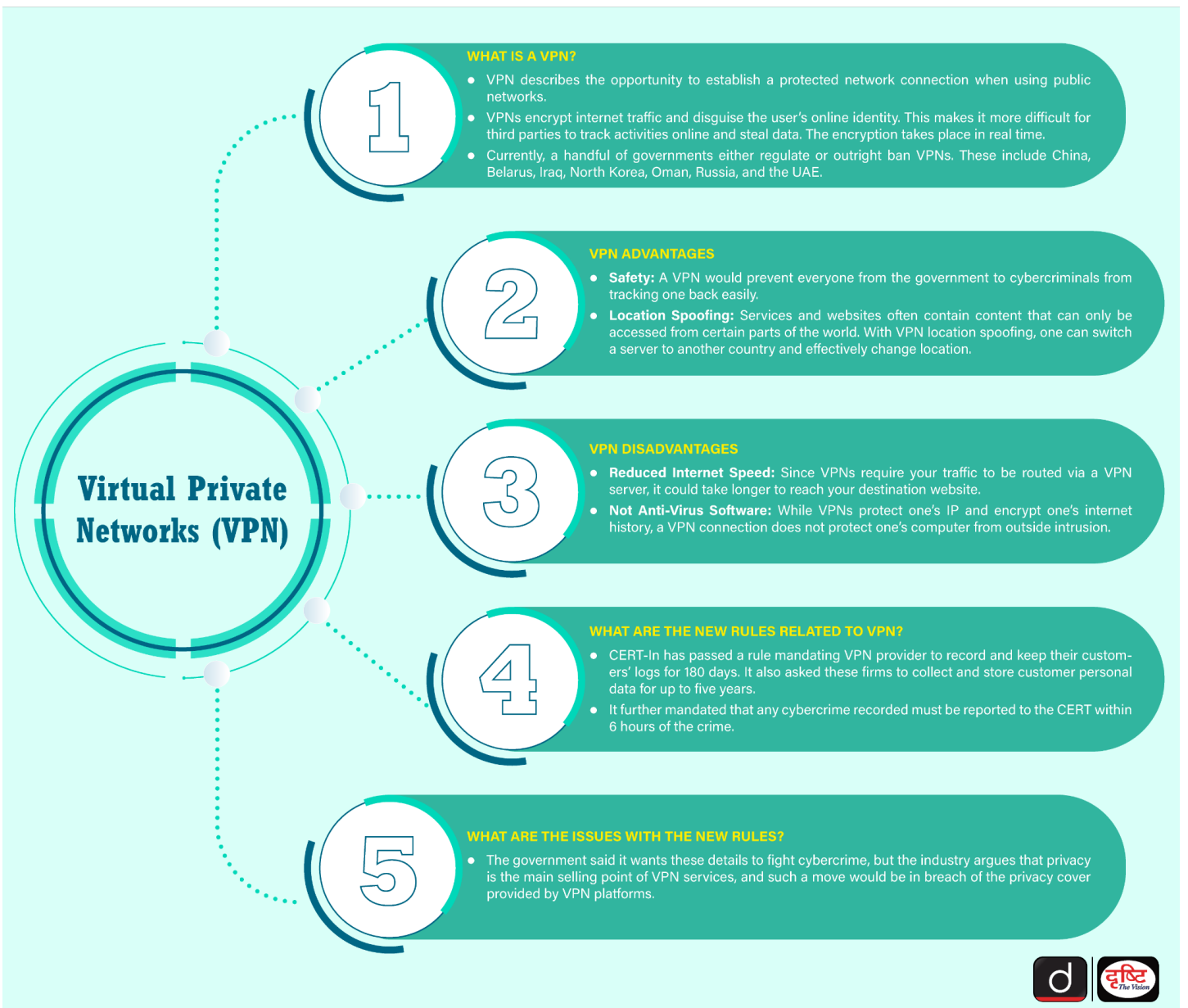
- **About:** A **VPN** is a technology that establishes a **secure and private connection between a user's device and the internet**. VPNs encrypt the internet traffic and disguise the user's online identity.
 - VPNs can **bypass geo-restrictions** and censorship. By connecting to a VPN server in a different location, users can access content and websites that may be restricted or blocked in their region.
- **Mechanism:**
 - **Encryption:** When a user connects to a VPN, all data transmitted and received is encrypted.
 - Encryption **converts data into a code** that only the user's device and the VPN server can decipher using a decryption key.
 - **Secure Tunneling:** Encrypted data travels through a **secure tunnel to the VPN server**.
 - This tunnel prevents unauthorised parties like [Internet Service Providers \(ISP\)](#), hackers or government agencies from intercepting or monitoring the user's online activities.
 - **IP Address Masking:** The user's real IP address, which can reveal their location and device information, is **replaced with the IP address of the VPN server**.
 - This masking process enhances user privacy and makes it difficult for websites to track the user's actual location.

What are Other Key Technologies Similar to VPN?

- [Smart Domain Name System \(DNS\)](#): It provides a proxy server resource for additional protection of a user's identity by masking a **user's ISP-generated DNS address** with a different address, generated by the Smart DNS device, before sending the user request to the internet.
- [The Onion Router](#): It protects user data by encapsulating the data in **multiple layers of secure encryption**, using the **Onion Protocol**, as it routes the data from sender to receiver.
 - The process ensures that a user's identity is protected from ISPs and advertisers.
- **Proxy Servers:** Proxy servers act as intermediaries between a user's device and the internet.
 - They can be used to hide the user's IP address, bypass content filters, and improve speed by caching frequently accessed web pages.

Note:

- In 2022, the **Indian Ministry of Electronics and Information Technology** introduced regulations mandating VPN providers, data centres, virtual service networks, and cloud providers to record users' personal details for five years.
- They must also log usage patterns, and service purposes, and report cybersecurity incidents to CERT-In within six hours.



UPSC Civil Services Examination, Previous Year Question

Q. What is "Virtual Private Network"? (2011)

(a) It is a private computer network of an organization where the remote users can transmit encrypted information through the server of the organization.

(b) It is a computer network across a public internet that provides users access to their organization's network while maintaining the security of the information transmitted.

(c) It is a computer network in which users can access a shared pool of computing resources through a service provider.

(d) None of the statements (a), (b) and (c) given above is a correct description of Virtual Private Network.

Ans: (b)

Bogota's Water Rationing Crisis

[Source: DTE](#)

Bogota (capital of Colombia) recently commenced water rationing due to dwindling reservoir levels.

- The crisis underscores the critical need for prioritising land management and adapting to evolving climate realities.
- While the recent El Nino phase's impact has strained resources, including **potable water and energy**, collaborative measures and conservation remain imperative to mitigate future risks and ensure sustainable resource management.
- Bogota is one of the highest capital cities in the world located on a plateau in the Andes known as the **Altiplano Cundiboyacense**.



Exoskeleton Technology

[Source: PIB](#)

Bengaluru hosted the inaugural international workshop on '**Emerging Technologies & Challenges for Exoskeleton**' organised by the [Defence Research & Development Organisation \(DRDO\)](#) on 15th April 2024.

- Exoskeletons are **wearable devices** designed to **facilitate fundamental human actions** and used in a diverse range of fields such as **Medical, Military, Rescue, operations, Industrial and Consumer uses**.
 - In the medical field, these are used in **occupational therapy, augmentation and rehabilitation medicine** to help people who have suffered some kind of accident and need to walk or function normally again.
 - **Paediatric exoskeletons** are designed for children with mobility problems, such as those affected by spinal muscular atrophy (SMA), Spinal cord injuries, Cerebral palsy, Muscle atrophy and Muscular dystrophy.
- There are numerous **industrial applications**, including assisting workers who undertake repetitive tasks such as paint spraying, welding, assembly line material handling etc.
- Exoskeletons are used in the **military**, as they help to reduce the physical burden on soldiers, and augment their strength for walking long distances.
- They can be used to help pre-fighters and other **rescue** workers survive dangerous environments.

Read More: [Policy Watch: Robotics and Automation in India](#)

Miyawaki Method

Source: [Outlook](#)

Recently, the **Embassy of Israel** in India, in collaboration with a non-profit entity, has officially joined the '**Million Miyawaki**' project as a part of the **Earth Day** celebration.

- Under this project, efforts are made at planting a million trees in Delhi-NCR by creating 'forest-like' **Miyawaki plantations** of 600 trees each, with a variety of up to 30 different locally sourced species like **Anjan, Amala, Bel, Arjun and Gunj**.
 - It was named after Japanese botanist **Akira Miyawaki**, this method involves planting **two to four different types of indigenous trees** within every square meter.
 - This **method rapidly increases green cover on small plots** by promoting **self-sustaining tree growth** to full maturity within three years, eliminating the need for regular maintenance.
- The dense green cover of indigenous trees plays a key role in **absorbing the dust particles** of the area where the garden has been set up. The plants also help in **regulating surface temperature**.
- **Earth Day** is celebrated on 22nd April every year as an international event around the world to pledge support for environmental protection.

The Miyawaki method for restoring tropical forests



Germinate the seeds in a nursery. When two to three leaves have sprouted, move the seedlings to pots. Cultivate the seedlings in pots until their root groups generally fill the containers,



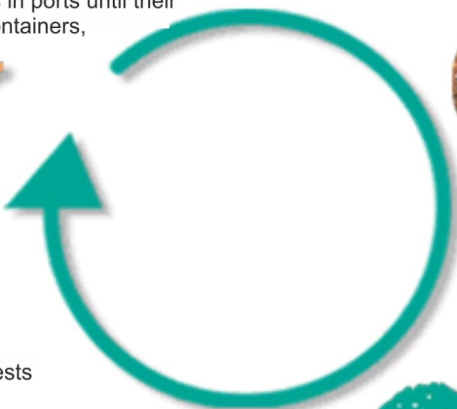
Cultivate under nets designed to cut out 60 percent of the sunlight for one to two months



Cultivate under nets designed to cut out 40 percent of the sunlight for one to two months.



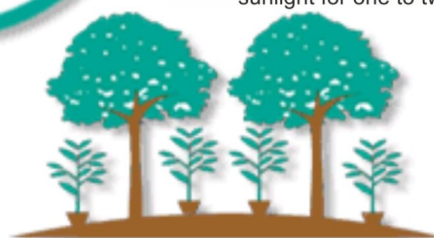
Obtain seeds from natural tropical forests



"No management is best management"



Plant and conduct maintenance for one to two years. From the third year entrust the trees to natural management. At this point the rule is "No management is the best management"



Adapt to the natural environment in an existing forest (period of between one week and one month).

Read More: [Miyawaki Plantation Method](#)

India's Forex Reserves Drop

Source: [IE](#)

India's [forex reserves](#) fell by USD 2.282 billion to USD 640.334 billion in the week ending 19th April 2024, as per the [Reserve Bank of India \(RBI\)](#).

Components of Reserves:

- **Foreign currency assets** decreased by USD 3.793 billion to USD 560.86 billion.
- **Gold reserves** increased by USD 1.01 billion to USD 56.808 billion.
- **Special Drawing Rights (SDRs)** decreased by USD 43 million to USD 18.034 billion.
- Reserve position with the [International Monetary Fund \(IMF\)](#) declined by USD 2 million to USD 4.631 billion.

Factors Influencing Decline:

- This decrease was primarily attributed to strategic interventions by the **central bank**, which deployed the **reserves to defend the rupee** amidst economic uncertainties and currency depreciation.
- The RBI intervenes in the market to [manage liquidity](#), including **selling dollars** to prevent sharp [rupee depreciation](#) and prevent excessive volatility in the exchange rate.
- It can be noted that in April 2024, India's forex kitty had reached an all-time high of USD 645.6 billion.

Raja Ravi Varma's Indulekha

Source: [TH](#)

- Recently, amidst celebrations marking the **176th birth anniversary of renowned artist Raja Ravi Varma (29th April 1848)**, the unveiling of the first true copy of his iconic painting "**Indulekha**" is set to take place at Kilimanoor Palace, Travancore, the artist's birthplace.
- Indulekha, a portrayal of the protagonist from **O. Chandu Menon's seminal Malayalam novel**, holds cultural and literary significance as a symbol of early modern literature in the region.
 - The unreleased painting of Indulekha garnered attention upon its emergence into the public domain in 2022.
- Raja Ravi Varma is considered the **father of modern Indian art**, as he combined **Indian iconography with Western realism**. His influence is seen in diverse fields such as art, literature, advertising, textiles, and comic books.
- Raja Ravi Varma, born into an aristocratic family in Kerala, started his professional art career at 22 and mastered **oil painting**.
 - Varma was **among the first Indian artists to use oil paints** and is considered a **representative of the Europeanised school of painting in India**.
- Varma built his reputation through royal patronage, he received significant commissions from **Maharana Fateh Singh and Sayajirao Gaekwad III**.
- **Works:** Damayanti Talking to a Swan, Shakuntala Looking for Dushyanta, Nair Lady Adorning Her Hair, and Shantanu and Matsyagandha.
- **Recognition: Kaiser-i-Hind Gold Medal** by the British colonial government in 1904 and in 2013, a crater on the planet Mercury was named in his honour.



India's Outward FDI Trends

Source: IE

India's **outward foreign direct investment (OFDI)** experienced a notable decline of **39%** to USD 28.64 billion in the fiscal year ending March 2024, reflecting the impact of uncertain global economic conditions.

- The decline is primarily attributed to reduced commitments in both **equity and loan routes**. The decrease in overseas acquisitions by Indian firms also played a role in this decline.
- However, March 2024 witnessed a surge in **outward FDI**, reaching USD 3.92 billion, with equity commitments at USD 2.03 billion, the highest for the year.
 - This rebound indicates potential opportunities emerging amidst the challenging global economic landscape, highlighting the dynamic nature of India's outward FDI trends.
- **Outward direct investment** is a business strategy where a company based in one country (home country) invests in a business entity (foreign affiliate) located in another country (host country).
 - This investment goes beyond simply buying stocks or bonds; **it involves establishing a controlling interest** or significant influence in the foreign company.



FDI and FPI



Foreign Direct Investment (FDI)

About:

- Investment made by foreign entities/individuals in **businesses and assets** located in a different country

FDI Routes:

Automatic Route:

- No prior government approval required
- Up to 100% allowed in non-critical sectors

Government Approval:

- Necessary in certain sectors or for investments above specific thresholds
- Administered by **Department for Promotion of Industry and Internal Trade (DPIIT)** and RBI

Examples of Approval via Auto and Govt Route:

- Banking (Private sector): up to 49% (auto) + above 49% and up to 74% (Govt)
- Defence: up to 74% (auto) + above 74% (Govt)
- Healthcare (Brownfield): up to 74% (auto) + above 74% (Govt)
- Telecom Services: up to 49% (auto) + above 49% (Govt)

Foreign Investment Promotion Board (FIPB):

- Comes under Ministry of Finance
- Responsible for processing FDI proposals – facilitated by **Foreign Investment Facilitation Portal (FIIP)**
- Making recommendations for Government approval

Govt's prior approval is mandatory for FDI from countries sharing land border with India (China, Bangladesh, Pakistan, Bhutan, Nepal, Myanmar and Afghanistan)

India's Top 5 FDI Sources (FY 2022-23):

- Mauritius
- Singapore
- USA
- Netherlands
- Japan

India's Top Sectors Attracting FDI (FY 2022-23):

- Services Sector
- Computer Software & Hardware
- Trading
- Telecommunications
- Automobile Industry



Foreign Portfolio Investment (FPI)

About:

- Investments made by foreign individuals, institutions, or funds in financial assets
- Known as Fly by Night or Hot Money

Imp Features:

- Purchase of financial assets** occur without gaining ownership
- Passive investment approach
- Investors earn returns through **dividends, interest, and capital appreciation**

Example:

- Stocks, Bonds etc.

Regulatory Body:

- Securities and Exchange Board of India (SEBI)

| Difference between FDI and FPI | | |
|--------------------------------|--|---|
| Features | FDI | FPI |
| Nature of Investment | Long-term | Short-term |
| Objective | Long-term presence in a foreign country | Earning quick returns on investments |
| Control | Significant (over the invested entity) | No or limited control |
| Investments in | Tangible assets (e.g., factories, buildings) | Financial assets (e.g., stocks, bonds) |
| Returns | Profits, Dividends, and Capital appreciation | Dividends, Interest, and Capital appreciation |
| Policy Regulations | Govt policies and sector-specific regulations | Flexible regulations and easier entry/exit |
| Impact on Economy | Job creation, technology transfer, and economic growth | Short-term liquidity and impact on stock market performance |



Read more: [India's Outward and Inward Investment Trends](https://www.drishtias.com/current-affairs-news-analysis-editorials/news-analysis/29-04-2024/print)

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