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## Money Laundering and the Illegal Wildlife Trade

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### Why in News

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Recently, the **Financial Action Task Force (FATF)** has released the **first global report** on the **Illegal Wildlife Trade (IWT)** namely, “**Money Laundering and the Illegal Wildlife Trade**”.

- The report comes amid increasing **international concern** that the crime could lead to more **zoonotic diseases** in the future.
- The report has also described IWT as a “**global threat**”, which also has links with other organised crimes like modern slavery, **drug trafficking** and arms trade.

### Key Points

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- **Transnational Organised Crime:**
  - The parties involved in the IWT are usually engaged in other major transnational organised crime that fuels **corruption, threatens biodiversity**, and can have significant public health impacts.
  - The illegal trade is estimated to generate revenues of **up to \$23 billion a year**.
  - According to the **2016 UN World Wildlife Crime report**, criminals are illegally trading products **derived from over 7,000 species of wild animals and plants** across the world.

- **Origin and Route of IWT:**

- Usually, the **countries that are rich in biodiversity** and/or where there may be **weaker law enforcement oversight** and criminal justice are treated as source countries for IWT.
- Similarly, most parties involved in such crime transit the wildlife through other countries to blur the exact end destination.
- Transit countries typically include **trade and transport hubs or countries with higher levels of corruption**. The laundering of the proceeds occurs across source, transit and destination countries.

- **Methods Used for IWT:**

- It has been observed that the criminals are relying on “**established**” **methods** to launder proceeds from IWT, including **mobile or social media-based payments, third party payments** and the **placement and layering of funds** through the formal financial sector.
- The **accounts of innocent victims** are also used for high-value payments to avoid and **evade detection**.
- IWT also uses **shell and front companies** to conceal payments and launder their money.
  - Shell company is an inactive company used as a vehicle for various financial manoeuvres or kept dormant for future use in some other capacity.
  - A front organization is any entity set up by and controlled by another organization, such as, organized crime groups, banned organizations, religious or political groups, advocacy groups, or corporations.
- Also, **legitimate pet stores and private zoos, farms or parks** are often used to facilitate the illicit pet trade in many countries (such as Asia and the Americas) and are used to justify trading, breeding, or otherwise exploit protected wildlife.
- Additionally, the role of **online marketplaces and mobile, social media-based payments and darknets** have facilitated the fast and movement of illegally traded animals.

- **Link with Zoonotic Diseases:**

- The spread of **zoonotic diseases** underlines the importance of ensuring that wildlife is traded in a **legal, safe and sustainable manner** and that countries remove the profitability of illegal markets.
- The exact connection between the **trading of pangolins and its scales to the Covid-19 outbreak** is yet to be established but it has been noted that the **price of pangolins has increased between 100% to 600% mark-up**. Further, India has also been a source country for illegal **pangolin** trading.

## Challenges with IWT

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- The lack of the **required knowledge, legislative basis and resources** to assess and combat the threat posed by the funds generated through the illegal trade is one of the major issues with IWT. This limited focus on the financial side of IWT has largely prevented jurisdictions from being able to identify and sanction IWT networks.
- IWT makes **other industries more vulnerable to misuse** which includes traditional medicine, décor and jewellery and fashion.

## Recommendations

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- The countries should consider implementing the good practices which include providing all relevant agencies with the **necessary mandate and tools**; and **cooperating** with other countries, international bodies and the private sector.
- The legislative changes are necessary to **increase the applicability of anti-money laundering laws** to the illegal wildlife trade-linked offences.  
India amended the **Prevention of Money Laundering Act** in 2012 removing a value threshold — of ₹30 lakh and above — that was earlier applicable to the wildlife trade predicates.
- It has suggested treating **IWT as money laundering offences** since the proceeds enter the global market through money laundering and also money laundering offences carry more severe penalties in many countries.

## Way Forward

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- The illegal wildlife trade is devastating our wildlife and putting the global ecosystem at risk.
- The world needs to ensure the survival of endangered species and also needs to build strong public-private partnerships to prevent, detect and disrupt IWT, following the money that fuels it and the organised crime gangs, poachers and traffickers behind it.

## Source:IE

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## Electricity (Amendment) Bill 2020

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### Why in News

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Recently, the Central government has introduced the **Electricity (Amendment) Bill 2020** to amend various provisions in the Electricity Act 2003.

### Key Points

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- **Rationale Behind Amendment:**
  - To **address critical issues weakening the commercial and investment activities in the electricity** sector.
    - The current challenges plaguing the Indian power sector is derived from negligence in addressing the structural issues.
    - These include operational and financial inefficiencies of power generation, transmission and distribution utilities, access and quality of power supply, political interference, lack of private investments, inadequate public infrastructure and lack of consumer participation.
  - **Bringing transparency and accountability** to protect the interest of consumers and ensuring healthy growth of the power sector.
- **Key Objectives:**
  - Ensure consumer centricity,
  - Promote Ease of Doing Business,
  - Enhance sustainability of the power sector,
  - Promote green power,
- **Key Amendments:**
  - **National Selection Committee:** Instead of the separate Selection Committee (for appointment of Chairperson and members of State Electricity Regulatory Commissions-SERCs), there is a proposal to set up a National Selection Committee.
    - However, the Central Government is also considering to continue with the existing separate Selection Committees for each state – but make them Standing Selection Committees so that there is no need for constituting them afresh every time a vacancy occurs.
    - The only difference is that it will now be proposed to be presided by the Chief Justice of the High Court of the state.
  - **Introduction of Direct Benefit Transfer:** Direct Benefit Transfer will be beneficial for both the State Governments and as well as Distribution Companies.
    - It will be beneficial for the State Government because it will ensure that the subsidy reaches the people who are actually entitled and the State Government gets clear accounts of the amount given as subsidy.
    - It will benefit the distribution company by making sure that the subsidies due are received as per the number of beneficiaries.

- **National Renewable Energy Policy:** India is a signatory to the Paris Climate Agreement. It is therefore proposed to have a separate policy for the development and promotion of generation of electricity from renewable sources of energy.
  - The policy prescribes a minimum percentage of purchase of electricity from renewable sources of production. It seeks to give special attention to hydro power.
- **Sustainability:**
  - **Cost Reflective Tariff:** There had been the issue of lazy attempts from the commissions in adopting the tariffs determined, causing issues of cost escalation.
    - To address this problem, the Amendment has prescribed a period of 60 days to adopt the determined tariffs. Failing such a timeline of 60 days, the tariff would be deemed to be accepted.
  - **Payment Security:** It is proposed to empower Load Dispatch Centres to oversee the establishment of adequate payment security mechanisms before dispatch of electricity, as per contracts.
    - Late payment of dues of generating and transmission companies have reached unsustainable levels. This impairs the finances of the Gencos and Transcos and also increases the Non Performing Assets of the Banks.
- **Ease of Doing Business:**
  - **Establishment of Electricity Contract Enforcement Authority (ECEA):** It is an Authority headed by a retired Judge of the High Court with powers to execute their orders as decree of a civil court.
    - The Authority will enforce performance of contracts related to purchase or sale or transmission of power between a generating company, distribution licensee or transmission licensee.
    - Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs) do not have powers to execute their orders as decree of a civil court.
  - **Cross Subsidy:** The Bill provides for the SERCs to reduce cross subsidies as per the provisions of the Tariff Policy.

- **Miscellaneous:**
  - **Strengthening of the Appellate Tribunal (APTEL):** It is proposed to increase the strength of APTEL to at least seven to facilitate quick disposal of cases.

To be able to effectively enforce its orders, it is also proposed to give it the powers of the High Court under the provisions of the Contempt of Courts Act.
  - **Penalties:** In order to ensure compliance of the provisions of the Electricity Act and orders of the Commission, section 142 and section 146 of the Electricity Act are proposed to be amended to provide for higher penalties.
  - **Cross Border Trade in Electricity:** Provisions have been added to facilitate and develop trade in electricity with other countries.
  - **Distribution sub-licensees:** To improve quality of supply, an option is proposed to be provided to Discoms to authorise another person as a sub-licensee to supply electricity in any particular part of its area, with the permission of the State Electricity Regulatory Commission.
- **Issues involved:**
  - Cost reflective tariff has been a concern for states like Telangana which provide free electricity to the farming sector.
  - Formation of ECEA has also been criticized as a move towards centralization of power.
  - Recognition of franchisees and sub- licensees might open the sector to private players.

## Way Forward

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The Bill provides the Central government more power to determine tariff and regulations in the power sector. Since electricity is a Concurrent subject, States must not be deprived of their powers, through this Amendment.

### **Source: PIB**

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## Navigating the New Normal: NITI Aayog

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### Why in News

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The **National Institution for Transforming India (NITI) Aayog**, in partnership with several other stakeholders has launched a **behaviour change campaign** called ‘**Navigating the New Normal**’, and **its website**.



## Key Points

- The campaign has two parts:
  - **Covid-safe behavioural norms:** The first is a web portal, containing resources informed by **behavioural science and the use of nudge and social norms theory**, related to Covid-safe behavioural norms during the ongoing Unlock phase, and
  - **Wearing of Masks:** The second is a media campaign focused on the **wearing of masks**.
- The portal focuses on easy implementation of **four key behaviours** in the unlock phase: mask-wearing (essential focus), social distancing, Hand hygiene, and not spitting in public.
- **Citizens Role:** It aims at desired social behaviour in which the **enforcement burden shifts from the Government to the citizens**.
- **Sector Specific:** The website will have sector-specific collaterals and guidelines for health, nutrition, and public transport (in metro cities).
- **International Examples:** Japan and South Korea have made 'mask-wearing' a socially accepted norm.
- **Recent Examples/Initiatives in India:**
  - Recently, **Meghalaya** has issued a new health protocol which also lays emphasis on the **Behaviour Change Model for living with Covid-19**.
  - The **Economic Survey 2019** too lays out an ambitious agenda for behavioural change by applying the principles of behavioural economics to several issues, including gender equality, a healthy and beautiful India, savings, tax compliance and credit quality.

- Behavioural science is a method of analysis that applies psychological insights into human behaviour to explain their decision-making
- In reality, decisions made by people often deviate from the classical principles. Drawing on the psychology of human behaviour, science provides insights to ‘nudge’ people towards desirable behaviour.

## Nudge Theory

- According to Nudge theory, people, rather than being forced, can be **encouraged and influenced** to pursue or desist from certain actions through nudges.
- It does not talk about penalizing people if they do not behave in a particular manner, rather it encourages them to make desirable decisions.
- It believes that **Humans are not-so-rational and often need encouragement or intervention** — a nudge — to get going and do what’s best for the country or society at large.
- American economist **Richard Thaler has won the 2017 Nobel Prize** in economics for his contributions to behavioural economics.

## Limitations of Behavioural Science

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- **Continuous Efforts vs One-time Action** - Give It Up campaign for LPG subsidy was a comparatively easy policy as it requires only a one-time action of affluent households, whereas task is very difficult in case of living with Covid-19, Beti Bachao, Beti Padao and SBM, as **it requires continuous effort** to dislodge mind-sets that prevailed for decades.
- **Specific Targeting is Required:** In order to make this campaign a success, focus must be on special areas of concern such as small factories and poor labourers, who comprise a large part of the vulnerable population. **Example:** Advertising campaigns such as the Beti Bachao Beti Padhao scheme did not target specific states where child sex ratios were already skewed (although it was effective in Haryana, which also has a very poor sex ratio).
- **Case of Confirmation Bias:** The applications of behavioural insights appeared to be a result of **confirmation bias** (to the extent that past policies were viewed with a behavioural lens).

## Way Forward

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As the lockdown is lifted, people will resume their normal activities. This raises a challenge of minimising the spread of Covid-19 without impacting the movement of people. This signals a need for change and creation of a “New Normal” – where we adapt our routine activities to enable consistent compliance to the COVID-19 protective behaviours.



## 70 Years of Korean War

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### Why in News

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Recently North and South Korea separately marked the **70<sup>th</sup> anniversary** of the start of the Korean War.

### Key Points

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- The root of the conflict lies in the **Japanese occupation of Korea between 1910-1945**.
- When Japan was defeated in the **Second World War**, the Allied forces agreed to establish a “**four-power trusteeship over Korea**” at the **Yalta Conference (1945)**.
- However, the USSR invaded Korea and took control of the north while the south remained under the rest of the allies, mainly the USA. The division of the two regions was along the **38<sup>th</sup> parallel north**, which still continues to be the official border dividing the two Koreas.
- In 1948 the Republic of Korea (South Korea) and the Democratic People’s Republic of Korea (North Korea) was established.
- Efforts were made to resolve the conflict and unite the Korean peninsula, but with the advent of the **Cold War** chances of reunification were lost.
- As both tried to enhance their reach, territorially and ideologically, the **Korean Conflict emerged between the two nations**.

### The Korean War

- On 25<sup>th</sup> June 1950, North Korea, backed by the USSR, launched an attack on South Korea and occupied most of the country.
- In response, the United Nations force led by the US retaliated.
- In **1951 the US forces led by Douglas MacArthur crossed the 38<sup>th</sup> parallel** and triggered the **entry of China in support of North Korea**.
- To prevent further escalation peace talks began later in 1951.

- On 27<sup>th</sup> July 1953, the **Korean Armistice Agreement** was signed between the **United Nations Command, the Korean People's Army and the Chinese People's Volunteer Army**.
  - It led to an official ceasefire **without a Peace treaty**. Thus, the war officially never ended.
  - Exchange of Prisoners of war (PoWs).
  - Establishment of **Korean Demilitarised Zone (DMZ)** – a strip of land running across the Korean Peninsula to serve as a buffer zone between North Korea and South Korea.

The Korean DMZ intersects but does not follow the 38<sup>th</sup> parallel north.
  - South Korea did not sign the armistice as it refused to accept it.
  - However, in December 1991, North and South Korea signed a pact agreeing to refrain from aggression.

## Current Dynamics

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- In recent years North Korea has accelerated its nuclear programme by **increasing its nuclear stockpile**, withdrawn from the **Non-Proliferation Treaty (NPT)** and has tested nuclear explosives multiple times.
- USA has deployed **THAAD (Terminal High Altitude Area Defence)** in **South Korea** to counter increasing missile adventurism of North Korea.
- North Korea recently **demolished the Inter-Korean Liaison Office in Kaesong**, which was established in 2018. In the absence of formal diplomatic relations, the building functioned as a de facto embassy and provided a direct communication channel for the two nations.

**Source: TH**

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## Increased Ozone Pollution

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### Why in News

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Recently, the **Centre for Science and Environment (CSE)** has observed an **increase in ozone (a harmful pollutant) levels** in the several cities of the country.

- The analysis is based on **Central Pollution Control Board (CPCB)** data from **22 cities in 15 States**.
- It has also observed that the **particulate matter and nitrous oxide levels fell** during the lockdown to control **Covid-19 outbreak**.

## Key Points

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- **Ozone Gas:**

- The ‘**good**’ ozone present in the earth’s ozone layer **protects human beings** from **harmful Ultraviolet (UV) radiation** whereas the **ground level ozone** is **highly reactive** and can have adverse impacts on human health.
- Even **short-term exposure** of an hour is dangerous for those with **respiratory conditions and asthma**. Thus, an **8-hour average** is considered for **ozone** instead of the 24-hour average for other pollutants.
- Ozone is **not directly emitted** by any source but is formed by **photochemical reactions** between oxides of nitrogen (NO<sub>x</sub>), other volatile organic compounds (VOCs) and gases in the air under the influence of sunlight and heat.

Ozone pollution is thus also a **clear indicator of vehicular pollution**, which results in higher concentration of NO<sub>x</sub>.

- **Concept of Summer Pollution:**

- The ozone is primarily a “**sunny weather problem**” in India as the **presence of sunlight has a direct impact** on formation of ground level ozone.

**Heat acts as a catalyst**, facilitating photochemical reactions. Hence, higher concentrations of ozone are seen during the summer months.

- Additionally, the **intense heat waves** are one of the factors responsible for **increased ozone levels** in the country.
- Usually, the ozone levels tend to spike when winter conditions subside, and its presence is felt most during the day. At night, ozone levels tend to deplete, before spiking again during the afternoon, when sunlight is available.
- Thus, the characteristics of summer pollution include high winds, intermittent rains, thunderstorms, high temperature and heat waves.

- **Particulate Pollution:**

- It has been observed that the particulate pollution has been **dropped dramatically** during the lockdown.
- Also, an average **PM 2.5 levels** during the lockdown for all cities were found to be **lower than the average** for the same period in 2019.
- However, with lockdown relaxed, pollution started to increase. As soon as lockdown 4.0 came in with more relaxation and traffic returned on roads, the average NO<sub>2</sub> levels increased rapidly from the cleanest lockdown phase.

## Way Forward

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- The government needs to take active steps to mitigate primary pollutants, which lead to ground ozone formation.
- These steps involved curbing private vehicle usage, increasing electric mobility, scaling up public transport and pedestrian infrastructure, deploying citywide parking management, and aggressively controlling industrial emissions.

## Increased Funding for Panchayats

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### Why in News

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Recently, in a meeting with the **15<sup>th</sup> Finance Commission**, the **Panchayati Raj Ministry** has pitched for a **fivefold increase in funding** for rural local bodies.

The Ministry asked for Rs 10 lakh crore to be allocated for the 2020-21 to 2025-26 period, in comparison to the Rs 2 lakh crore allocated under the 14<sup>th</sup> Finance Commission.

### Key Points

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- **Allocations had tripled** between the 13<sup>th</sup> and 14<sup>th</sup> Commissions and the **utilisation rate** for FC grants between 2015 and 2019 stands at **78%**.
- The 2.63 lakh panchayats across the country have **29 functions under their ambit**, according to the **11<sup>th</sup> Schedule of the Constitution**.
  - **Road construction, its maintenance and drinking water supply** are the major projects carried out by panchayats using FC grants.
  - **Seventy-Third Amendment Act, 1992:**
    - Granted constitutional status and protection to the **Panchayati Raj** institutions.
    - For this purpose, the Amendment added a new **Part-IX** entitled as 'the panchayats' and a new 11<sup>th</sup> Schedule containing 29 functional items of the panchayats.
- During the **Covid-19**, panchayats gained importance as crucial nodal points as they **ran isolation centres, medical camps and contact tracing**.
  - However, a major challenge during the **pandemic** and **lockdown** was that most panchayats could not provide cooked food at short notice.
  - The Ministry has proposed to set up **community kitchens** in each panchayat, operated by local **self-help groups** (SHGs).
- The role of panchayats also becomes important because now the **Garib Kalyan Rojgar Abhiyan** will also depend on them to generate employment for newly returned migrant workers.

### Finance Commission

- It is a **constitutional body**, that **determines the method and formula for distributing the tax proceeds between the Centre and states and among the states** as per the constitutional arrangement and present requirements.
- Under **Article 280 of the Constitution**, the **President of India** is required to constitute a **Finance Commission** at an interval of **five years or earlier**.
- The **1<sup>st</sup> Finance Commission** was set up in **1951** and there have been fifteen so far.
- The **15<sup>th</sup> Finance Commission** was constituted by the President of India on **27<sup>th</sup> November 2017**, against the backdrop of the **abolition of the Planning Commission** and the **introduction of the Goods and Services Tax (GST)**.  
The 15<sup>th</sup> Finance Commission is **headed by N.K. Singh**.
- In **November 2019**, the Union Cabinet **approved** the 15<sup>th</sup> Finance Commission to **submit its first report for the first fiscal year 2020-21** and to **extend its tenure** to provide for the presentation of the **final report covering Financial Years 2021-22 to 2025-26 by 30<sup>th</sup> October, 2020**.

**Source: TH**

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## Kala- azar Disease

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### Why in News

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Recently, a team of researchers from the National Centre for Cell Science (NCCS), Pune have found **new biomolecules to fight drug resistance in Kala- azar (visceral leishmaniasis)**.

- NCCS is an autonomous organisation under the Department of Biotechnology, Government of India.
- It was established to facilitate cell biology research in the country.

### Leishmaniasis

- It is a **neglected tropical disease** affecting almost 100 countries including India.  
Neglected tropical diseases are a diverse group of communicable diseases that prevail in tropical and subtropical conditions in 149 countries.
- It is **caused by a parasite called Leishmania**, which is transmitted through the bite of sand flies.

- There are **three types of leishmaniasis**:
  - **Visceral leishmaniasis**, which affects multiple organs and is the most serious form of the disease.
  - **Cutaneous leishmaniasis**, which causes skin sores and is the most common form.
  - **Mucocutaneous leishmaniasis**, which causes skin and mucosal lesions.
- Visceral leishmaniasis, which is commonly known as Kala-azar in India, is fatal in over 95% of the cases, if left untreated.

## Key Points

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- **Resistance to Drug:** The only drug available against leishmaniasis, **miltefosine**, is rapidly losing its effectiveness because of **emerging resistance to this drug** due to a decrease in its accumulation inside the parasite.
- **Responsible Proteins:** A protein called 'P4ATPase-CDC50', is responsible for intake of the drug by the parasite, and another protein, called 'P-glycoprotein', is responsible for throwing this drug out from within the parasite's body.
- A decrease in the activity of the former protein, and an increase in the activity of the latter **results in less accumulation of miltefosine inside the parasite's body**, thus causing it to become resistant to the drug.
- While exploring ways to tackle miltefosine resistance, the researchers worked with one of the species of Leishmania that causes infection, called Leishmania major.
- They **tried to manipulate these transporter proteins** in the species in a manner that would result in **increased uptake of the drug and decrease in its being thrown out** of the parasite's body.
- They used computational methods to design small molecules, called **peptides**, that could very specifically interact with the transporter proteins of Leishmania major alone, and not interfere with human proteins in any way.
  - A **peptide** is a short chain of **amino acids**.
  - Amino acids are organic compounds that combine to form proteins.

## Source: PIB

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## Pollinator Week

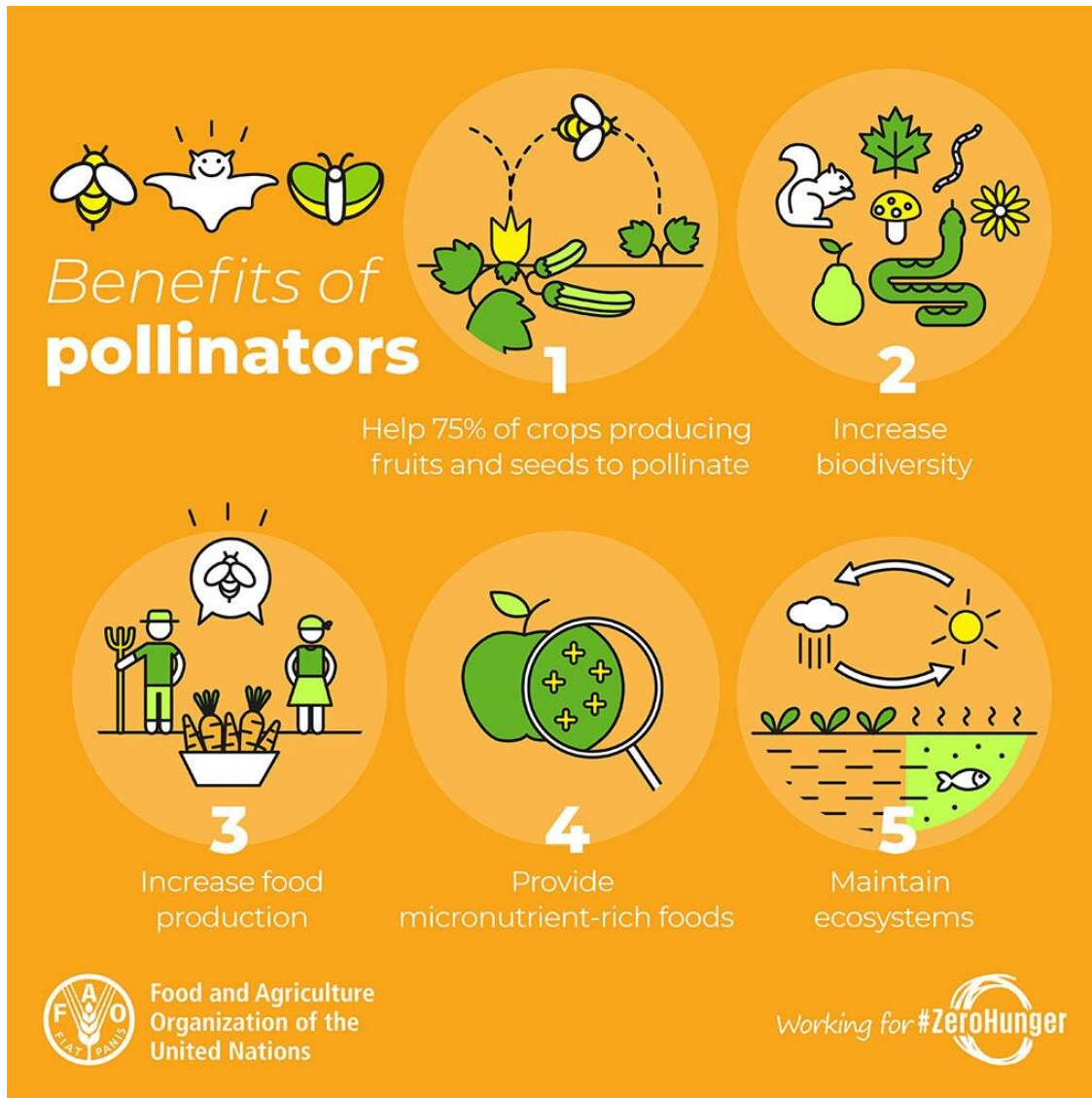
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### Why in News

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**Pollinator Week** is celebrated from **22<sup>nd</sup> June to 28<sup>th</sup> June every year**.

It was initiated by the **non-profit Pollinator Partnership** and the **USA' Senate in 2007**.

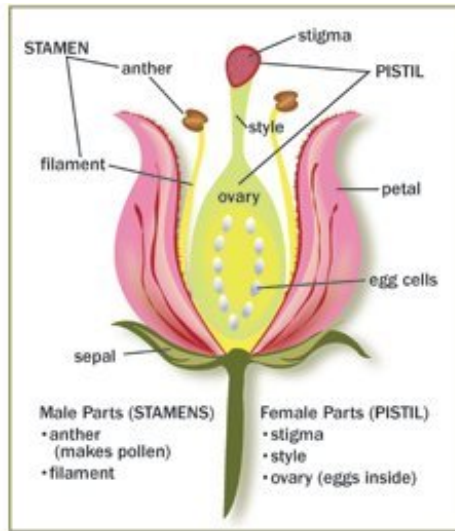


## Key Points

- According to the **Food and Agriculture Organization (FAO)**, **bees being the dominant pollinators**, have around 25,000-30,000 species.
- **More than 180,000 plant species**, including 1,200 crop varieties, across the world, **depend on pollinators** to reproduce.
- **Declining Numbers:**
  - Around **40% of invertebrate pollinator species**, particularly bees and butterflies, **face extinction** across the world.
  - In **India**, wild honeybees of the genus **Apis**, including the **Asian bee** and the **little bee**, have declined steadily for the past 30 years.
  - Around **16.5% of vertebrate pollinators are threatened** with extinction. Of these, 45 species of bats, 36 species of non-flying mammals, 26 species of hummingbirds, seven species of sunbirds and 70 species of passerine birds face extinction.

- **Reasons for the Decline:** Most of them are the **result of an increase in human activities:**
  - Land-use change and fragmentation.
  - Changes in agricultural practices including the use of chemical **pesticides**, fungicides and insecticides.
  - Change in the **cropping pattern** and crops like the cultivation of **Genetically Modified Organisms** (GMOs) and mono-cropping.
  - High environmental **pollution from nitrogen** and heavy metals.
  - Growth of **invasive alien species**.
  - Higher temperatures associated with **climate change**.

## Pollination



- When a **pollen grain** moves from the **anther** (male part) of a flower to the **stigma** (female part), pollination happens and it is the **first step in a process that produces seeds**, fruits, and the next generation of plants.
- This can happen through **self-pollination, wind and water pollination or through pollinators**.

## Pollinators

- **Vectors that move pollen within the flower and from flower to flower** are called pollinators.
- They visit flowers to drink nectar or feed off of pollen and transport pollen grains as they move from spot to spot.
- There are **two categories** of pollinators:
  - **Invertebrate pollinators:** Include bees, moths, flies, wasps, beetles and butterflies.
  - **Vertebrate pollinators:** Include monkeys, rodents, lemurs, tree squirrels and birds.

## Way Forward



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- Pollination contributes to one-third of the world's agricultural crop production and pollinators can increase crop yield by 24% in small diverse farms and its reduction can pose an immediate threat to mankind's food and nutrition.
  - People should leave some areas under natural habitation, promote hedgerows, flower trees and shrub plant diversity, intercropping and try to be less dependent on toxic chemicals and pesticides.
  - Governments should take proactive steps for bee conservation, recognise apiculture (bee-keeping) as a subject for advanced research and promote it among farmer communities as an additional source of livelihood, which will be a win-win situation for both the bees and humans.

**Source: DTE**

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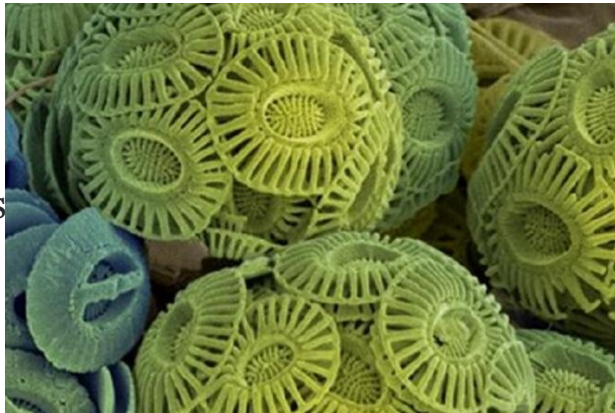
## Coccolithophores

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### Why in News

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Recently, the **National Centre for Polar and Ocean Research** (NCPOR) has carried out the study of ***Coccolithophores*** (microscopic ancient marine algae) and found that there is a **decrease in the concentration of oceanic calcium carbonate ( $\text{CaCO}_3$ )** in the southern Indian ocean.



### Key Points

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- ***Coccolithophores*** are **single-celled algae** living in the **upper layers of the world's oceans**.
  - They **calcify marine phytoplankton** that produce up to 40% of **open ocean calcium carbonate** and are responsible for **20% of the global net marine primary productivity**.
  - They **build exoskeletons from individual  $\text{CaCO}_3$  plates** consisting of chalk and seashells.

- Though **carbon dioxide (CO<sub>2</sub>) is produced** during the formation of these plates, coccolithophores help in removing it from the atmosphere and ocean by **consuming it during photosynthesis**.
- At **equilibrium**, they **absorb more CO<sub>2</sub> than they produce**, which is **beneficial** for the ocean ecosystem.
- **Abundance and diversity enrichment** of coccolithophores in the southern Indian Ocean is **highly dependent on time** and **influenced by** various environmental factors such as **silicate concentrations, calcium carbonate concentration, diatom abundance, light intensity and availability of macro and possibly micronutrient concentrations (marine pollution)**.
  - **Diatoms** are **single-celled algae** which occur after **sea ice breakdown with climate change and ocean acidification**.
  - Diatoms **increase the silicate concentration** in the waters and which in turn **decreases CaCO<sub>3</sub>** and **reduces coccolithophores diversity**.
  - It will affect the growth and skeleton structure of coccolithophores, with potential significance for the world ocean ecosystem.
- The study points to **climate change** as a **major reason for the altered coccolithophore calcification rate** which is important for bringing positive changes in the marine ecosystem and the **global carbon cycle**.

**Source: PIB**

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