



## Challenges and Solutions for Managing Solar PV Waste in India

**For Prelims:** PV Waste and its examples, Related initiatives

**For Mains:** Management of Solar Waste in India and other parts of the World, Challenges Posed by Solar Waste, Suggestions, and Related Initiatives.

### Why in News?

Despite the efforts of Indian policymakers to transition to a [circular economy](#), there is currently a lack of clear directives for waste management in the solar photovoltaic (PV) industry.

### What is PV Waste?

- **About:**
  - [Photo-Voltaic waste](#) is the electronic waste generated by discarded solar panels. PV waste may contain hazardous materials, including heavy metals **such as cadmium, copper, lead, antimony, and selenium.**
  - PV waste are sold as scraps in India. It can increase by at least four-five-fold by the next decade. India should focus its attention on drafting comprehensive rules to deal with solar waste.
- **Composition of Solar PV:**
  - India's solar PV installations are dominated by **crystalline silicon (c-Si) technology. A typical PV panel is made of c-Si modules (93%) and cadmium telluride thin-film modules (7%).**
    - A **c-Si module mainly consists of a glass sheet, an aluminum frame, an encapsulant, a back sheet, copper wires, and silicon wafers.** Silver, tin, and lead are used to make c-Si modules. The thin-film module is made of glass, encapsulant, and compound [semiconductors](#).
- **Status of India in PV Waste:**
  - Globally, India has the **world's fourth-highest solar PV deployment.** The installed solar capacity was nearly 62GW in November 2022. This leads to a huge amount of solar PV waste.
  - According to a 2016 report by the [International Renewable Energy Agency](#), **India could generate 50,000-3,25,000 Tonnes of PV waste by 2030 and more than four million Tonnes by 2050.**

### Can this Waste be Recovered or Recycled?

- As **PV panels near expiration, some portions of the frame are extracted** and sold as scrap, and junctions and cables are recycled according to e-waste guidelines.
- The glass laminate is partly recycled, while silicon and silver can be extracted by burning the module in cement furnaces. However, **approximately 50% of the total materials can be recovered**, and only about 20% of the waste is recovered in general, with the rest being treated informally.
- This growing informal handling of PV waste has led to **waste accumulation at landfills,**

**polluting the surroundings.** Incinerating the encapsulant also releases sulphur dioxide, hydrogen fluoride, and hydrogen cyanide into the atmosphere.

## What are the Challenges in Managing PV Waste in India?

- **Informal Handling of PV Waste:**
  - Despite some portions of the PV panels being extracted and recycled, a significant portion of the waste is treated informally, leading to the accumulation of waste in landfills and polluting the surroundings.
- **Limited Market for Reusing Recycled PV Waste:**
  - The market to reuse recycled PV waste is currently extremely small in India due to a lack of suitable incentives and schemes in which businesses can invest.
    - The lack of central insurance or regulatory body to protect against financial losses incurred in waste collection and treatment.
- **Lack of Specific Guidelines for PV Waste Treatment:**
  - Simply clubbing PV waste with other e-waste could lead to confusion, and there is a need for specific provisions to be formulated and implemented within the ambit of the e-waste guidelines.
    - Need for specific provisions for PV waste treatment within e-waste guidelines to avoid confusion.
- **Hazardous Waste Classification:**
  - The waste generated from PV modules and their components is classified as 'hazardous waste' in India.
    - Conducting awareness campaigns and sensitization programs about managing PV waste can help people understand the importance of properly handling hazardous waste. This will encourage more people to participate in proper waste management and disposal practices.
- **Limited Local Solar PV-panel Manufacturing:**
  - India **needs to pay more attention to domestic R&D efforts** as depending on a single module type will dis-uniformly deplete certain natural resources and stunt the local capacity for recycling and recovery of critical materials. The domestic development of PV waste recycling technologies must be promoted through appropriate infrastructure facilities and adequate funding.

## What are India's Initiatives?

- [Draft EPR Notification: Plastic Packaging Waste.](#)
- [Plastic Waste Management Amendment Rules, 2021.](#)
- [E-Waste \(Management\) Rules, 2016.](#)
- [E-waste \(Management\) Amendment Rules, 2018.](#)
- [Central Pollution Control Board.](#)

## What are the Initiatives of the other Countries?

- **European Union:**
  - The **Waste Electrical and Electronic Equipment (WEEE)** Directive of the EU ([European Union](#)) imposes responsibility for the **disposal of waste on the manufacturers or distributors** who introduce or install such equipment for the first time.
    - **PV manufacturers are solely responsible for the collection, handling, and treatment of modules** at the end of their lifecycle, according to the WEEE Directive.
- **UK:**
  - The UK also has an **industry-managed "take-back and recycling scheme"**, where all PV producers will **need to register and submit data related to products** used for the residential solar market (Business-to-Consumer) and non-residential market.
- **USA:**
  - While there are no federal statutes or regulations in the US that talk about recycling, **there are some states who have proactively defined policies to address end-of-life PV**

**module** management.

- Washington and California have come up with **Extended Producer Responsibility (EPR) regulations**. Washington now requires **PV module manufacturers to finance the take-back and reuse or recycling of PV modules** sold within or into the state at no cost to the end user.

▪ **Australia:**

- The federal government in Australia has acknowledged the concern and announced a USD 2 million grant as **part of the National Product Stewardship Investment Fund** to develop and implement an industry-led product stewardship scheme for PV systems.

▪ **Japan and South Korea:**

- Countries such as Japan and South Korea have already indicated their resolve to come up with **dedicated legislation to address the PV waste problem**.

## Why should India Act now?

- India is expected to generate a vast amount of PV waste over the next 20 years, making it one of the **top five leading photovoltaic waste producers worldwide by 2050**.
  - Therefore, India needs to install clear policy directives, well-established recycling strategies, and greater collaboration to prepare for this new challenge. By addressing the gaps in PV waste management, India can achieve its goal of a circular economy and effective waste management while promoting sustainable development.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. With reference to solar power production in India, consider the following statements: (2018)**

1. India is the third largest in the world in the manufacture of silicon wafers used in photovoltaic units.
2. The solar power tariffs are determined by the Solar Energy Corporation of India.

**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: (d)**

- Silicon wafers are thin slices of semiconductor, such as a crystalline Silicon (c-Si), used for the fabrication of integrated circuits and, in photovoltaics, to manufacture solar cells. China is by far the world's largest producer of Silicon, followed by Russia, the United States, and Brazil. India does not figure among the top five producers of Silicon and Silicon wafers. **Hence, statement 1 is not correct.**
- Solar tariffs are determined by the Central Electricity Regulatory Commission and not by Solar Energy Corporation of India. **Hence, statement 2 is not correct. Therefore, option (d) is the correct answer.**

### Mains

**Q. Describe the benefits of deriving electric energy from sunlight in contrast to the conventional energy generation. What are the initiatives offered by our government for this purpose? (2015)**

[Source: TH](#)

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## International Court of Justice and Climate Change

**For Prelims:** UNFCCC, UNGA, Paris Agreement, UNCLOS, NDC, Global Warming, ICJ.

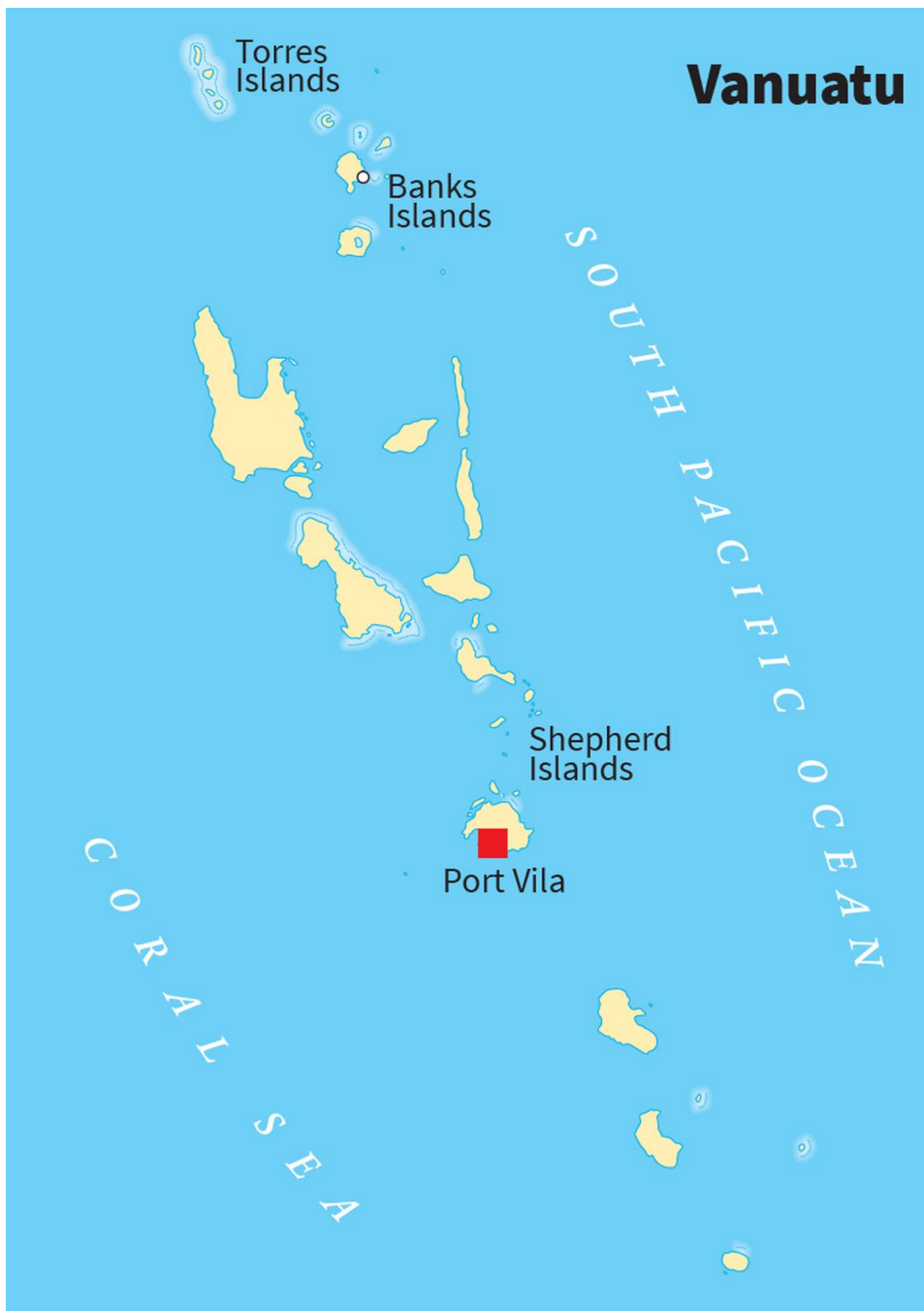
**For mains:** International Court of Justice and Climate Change.

### Why in News?

The [United Nations General Assembly \(UNGA\)](#) has asked the [International Court of Justice \(ICJ\)](#) by passing a **Resolution** to give its opinion on countries' obligations towards Climate Change based on the [U.N. Framework Convention for Climate Change \(UNFCCC\)](#).

- The resolution was pushed through by **one of the smallest countries** in the world, the Pacific Island of Vanuatu, an island that was devastated in **2015 by the effects of Cyclone Pam**, believed to have been spurred by climate change, that wiped out 95% of its crops and affected two-thirds of its population.

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## What does the Resolution Seek?

- The UNGA asked the ICJ to answer two questions,
  - What are the obligations of states under international law to ensure the protection of the climate system for present and future generations?
  - What are the **legal consequences under these obligations** for states where they, by their acts and omissions, have caused significant harm to the climate system, particularly for Small Island Developing States (SIDS) and for people who are harmed.
- The resolution **refers to international agreements** like the [Paris Agreement](#) and the [United Nations Convention on the Law of the Sea \(UNCLOS\)](#).
- The ICJ will take around **18 months to give its opinion**.

## What is India's Position?

- India has not taken a clear stance on the UN resolution, but it **generally supports climate justice** and accountability for [Global Warming](#).

- The Indian government has referred the resolution to legal authorities to assess its implications and international ramifications.
- India has updated its **NDC (Nationally Determined Contributions)** commitments and plans to source half its electricity from renewable sources by 2030, but it did not co-sponsor the draft resolution.
- India is closely watching how major powers like the **U.S. and China respond to the resolution**, as their support is crucial for its implementation.
- India has emphasized that the ICJ process can only address climate change issues broadly and cannot **name or profile any one country**, also stressing that any attempt to impose an opinion in a **"top-down" manner would be resisted**.

### Is the Advisory Opinion of the ICJ Binding?

- The advisory opinion of the ICJ would not be **legally binding as a judgment**, but it would carry **legal weight and moral authority**.
- It could provide important clarification on international environmental laws and **streamline the process for issues related to climate finance**, climate justice, and the loss and damages fund at the COP process.
- Past advisory opinions given by the ICJ, such as those on the Palestinian issue and the dispute between the U.K. and Mauritius over the **Chagos Islands, have been respected**.

### What is the United Nations Framework Convention on Climate Change?

- UNFCCC was signed in 1992 at the United Nations Conference on Environment and Development also known as the Earth Summit, the Rio Summit or the Rio Conference.
  - India is among the select few countries to have hosted the COP of all three Rio conventions on climate change (UNFCCC), biodiversity (CBD) and land (**United Nations Convention to Combat Desertification**).
- The UNFCCC entered into force in 1994 and has been ratified by 197 countries.
- It is the parent treaty of the **2015 Paris Agreement**. **It is also the parent treaty of the 1997 Kyoto Protocol**.
- The UNFCCC secretariat (UN Climate Change) is the United Nations entity tasked with supporting the global response to the threat of climate change. It is located **in Bonn, Germany**.
- Its objective is to achieve **stabilisation of greenhouse gas concentrations in the atmosphere** at a level that would prevent dangerous repercussions within a time frame so as to allow ecosystems to adapt naturally and enable sustainable development.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. "Momentum for Change: Climate Neutral Now" is an initiative launched by (2018)**

- (a) The Intergovernmental Panel on Climate Change
- (b) The UNEP Secretariat
- (c) The UNFCCC Secretariat
- (d) The World Meteorological Organisation

**Ans: (c)**

- "Momentum for Change: Climate Neutral Now", is an initiative launched by the UNFCCC secretariat in 2015.
  - The initiative is a pillar under Momentum for Change which seeks to achieve climate neutrality.

- Climate neutrality is a three step process, which requires individuals, companies and governments to measure their climate footprint; reduce their emissions as much as possible and offset what they cannot reduce with UN certified emission reductions.
- **Therefore, option (c) is the correct answer.**

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## **Mains**

**Q.** Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? **(2021)**

[Source: TH](#)

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## **Open-Source Seeds Movement**

**For Prelims:** IPR, Open-Source Software, WTO, TRIPS, Green Revolution.

**For Mains:** Open-Source Seeds Movement.

### **Why in News?**

With declining public sector breeding and rising dominance of private sector in seed sector, the concept of **Open-Source Seeds becomes increasingly relevant.**

- 'Open-Source seeds' was **first suggested by a Canadian plant-breeder - T.E. Michaels** in 1999 based on the principles of Open-Source Software.
- Farmers have been sharing and innovating on seeds for centuries without claiming exclusive rights or **intellectual property**, similar to how programmers have been sharing and innovating on software.

### **What is Open-Source Software?**

- OSS is software whose **source code is made available to the public** for anyone to view, modify, and distribute under an open source license. This license typically allows **users to access and modify the source code**, as well as to redistribute the software without any restriction on the use or distribution.
  - The concept of OSS originated in the 1980s, but gained wider recognition and popularity in the 1990s, thanks to the efforts of the Free Software Foundation (FSF) and the Open Source Initiative (OSI).
- The benefits of OSS include the ability to **customize the software to meet specific needs**, a reduced cost of ownership, and the potential for greater security due to the increased transparency of the source code. In addition, OSS can foster innovation by allowing developers to build on existing software and improve it.

## What are Plant Breeders' Rights?

- The growth of the commercial seed industry, scientific plant-breeding, and the advent of hybrid seeds led to the establishment of **Plant Breeders' Rights (PBR) in many countries**.
- Under the PBR regime, plant breeders and developers of new varieties have the **exclusive right to demand royalties on seeds** and legally enforce PBRs.
- This limited the rights of farmers to use and reuse seeds and restricted their ability to innovate.
- The establishment of the [World Trade Organization \(WTO\)](#) in **1994** and the [Trade-Related IPR Agreement \(TRIPS\)](#) cast a global IPR regime over plant varieties.
  - TRIPS required countries to provide at **least one form of IP protection for plant varieties**, which raised concerns about the freedom to innovate.
- The [Green Revolution](#) was spearheaded by public-sector breeding institutions and seeds were available as 'open pollinated varieties', or as reasonably priced hybrids with no restrictions on farmers to cultivate, reuse and share.
- But the genetic revolution in agriculture was led by the private sector, with seeds mostly made available as hybrids **and/or protected by strong IPRs**.

## How is IP Protected in Agriculture?

- There are two forms of IPR protection in agriculture: **plant-breeders' rights and patents**.
- Together, **they restrict farmers' rights and the freedom to develop new varieties** using germplasm from IP-protected varieties.
- They have **thus further consolidated the seed sector** and increased the number of plant varieties covered by IPRs.

## What are Open Source Seeds?

- **Need:**
  - The high prices of genetically modified seeds and IP claims triggered many problems, including the **State's intervention on Bt cotton seeds in India**. As public sector breeding declined and the private sector began to dominate the seed sector, the **need for alternatives became keenly felt**.
  - This is when the success of open-source software inspired a solution
- **Open-Source Model:**
  - An open-source model was proposed in 2002 by scientists for seeds and plant varieties, calling it the **"BioLinux model"**, and scholars and civil-society members alike discussed and built on it.
  - In 2012, Jack Kloppenburg launched the **Open Source Seeds Initiative (OSSI)** in Wisconsin.
  - It can be used in farmer-led seed conservation and distribution systems. There are many traditional-variety conservation and sharing initiatives in India, including those involving farmers.
  - It can also be used to **promote farmer-led participatory plant-breeding exercises**.
  - Traditional varieties often lack uniformity and aren't of excellent quality. Open source principles can help overcome these **two challenges by facilitating testing, improvisation, and adoption** – all of which will ultimately be beneficial to India's food security and climate resilience.

## Are there such Initiatives in India?

- In India, the **Hyderabad-based Centre for Sustainable Agriculture (CSA)**, part of the Apna Beej Network, developed a model incorporated into an agreement between CSA and the recipient of the seed/germplasm. It is trying to use this approach through three farmer producer organisations (FPOs).
- Worldwide, the number of seed firms using open-source models and the crop varieties and seeds made available thereunder is small but growing. India is yet to test and adopt it widely.
- Under the [Plant Variety Protection and Farmers' Rights Act \(PPVFR\) 2001](#), farmers can register varieties as 'farmer varieties' if they meet certain conditions, and **have the right to**



**reuse, replant, and exchange seeds.**

- However, they can't breed and trade in varieties protected under the Act for commercial purposes.

## Way Forward

- Using the open-source approach will enable farmers to gain more **rights over germplasm and seeds and facilitate innovation.**
- So there is a need to test this approach with farmers and the three FPOs can take the lead.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Q. Consider the following statements: (2019)

1. According to the Indian Patents Act, a biological process to create a seed can be patented in India.
2. In India, there is no Intellectual Property Appellate Board.
3. Plant varieties are not eligible to be patented in India.

### Which of the statements given above is/are correct?

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

### Ans: (c)

- Section 3(j) of Indian Patent Act, excludes from patentability "plants and animals in whole or in any part thereof other than microorganisms, including seeds, varieties, and species, and essentially biological processes for production or propagation of plants and animals". Hence, statement 1 is not correct.
- The **Intellectual Property Appellate Board (IPAB)** was constituted in 2003 by the Government of India to hear and resolve the appeals against the decisions of the registrar under the Indian Trademarks Act, 1999 and the Geographical Indications of Goods (Registration and Protection) Act, 1999. Hence, statement 2 is not correct.
- Plant variety protection provides legal protection of a plant variety to a breeder in the form of Plant Breeder's Rights (PBRs). In India, **the Protection of Plant Varieties and Farmers' Rights (PPVFR) Act, 2001**, is a sui generis system that aims to provide for the establishment of an effective system for the protection of plant varieties and the rights of plant breeders and farmers. A sui generis system is an alternative to the patent system. **Hence, statement 3 is correct.**
- **Therefore, option (c) is the correct answer.**

[Source: TH](#)

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## China, Japan Set Up Military Hotline

**For Prelims:** Senkaku island, Diaoyu island, East China Sea

**For Mains:** Impact of Territorial Disputes in Geopolitics

## Why in News?

Recently, China and Japan set up military hotlines (a direct phone line set up for a specific purpose) to manage maritime, air incidents over disputed islands (Senkaku Island).

- China and Japan **have a long-festering dispute over uninhabited [East China Sea](#)** islands controlled by Japan but claimed by China.

## Why was the Hotline Established?

- This move was made to strengthen their capability of managing and controlling incidents arising due to their aggressive patrolling of the disputed waters.
- The **hotline will enrich the communication channels** between the defence departments of China and Japan, strengthen the capabilities of the two sides to manage and control maritime and air crises, and help maintain regional peace and stability.
- This move will further **maintain regional peace and stability**.

## What is the Senkaku Island Dispute?

- **About:**
  - The Senkaku Island dispute concerns a territorial dispute over a group of uninhabited islands known as:
    - **Senkaku** Islands in Japan,
    - **Diaoyu** Islands in China, and
    - **Tiaoyutai** Islands in Taiwan.
  - Both Japan and China claim ownership of these islands.
- **Location:**
  - Eight uninhabited islands **lie in the East China Sea**. They have a **total area of about 7 sq km** and lie northeast of Taiwan.



- **Strategic Importance:**
  - Islands are close to strategically **important shipping lanes**, offer **rich fishing grounds** and are thought to contain **oil deposits**.
- **Japan's Claim:**
  - After World War II, Japan renounced claims to a number of territories and islands including

Taiwan in the 1951 [Treaty of San Francisco](#).

- But under the treaty, the Nansei Shoto islands came under USA trusteeship and were then returned to Japan in 1971.
- Japan says that Senkaku islands are part of the Nansei Shoto islands and hence they also belong to Japan.
- Besides, **China raised no objections to the San Francisco deal.**
- **Only since 1970s**, when the issue of oil resources in the area emerged, **Chinese and Taiwanese authorities** began pressing their **claims**.
- **China's Claim:**
  - These Islands have been part of its territory since ancient times, serving as important fishing grounds administered by the province of Taiwan.
  - When Taiwan was returned in the **Treaty of San Francisco**, China said the islands as part of it – should also have been returned.
- **Taiwan Claims:**
  - Taiwan claims the islands **but has forged agreements** with Japan to avoid any conflict as Japan maintains close defence ties with Taipei.
  - Despite the ongoing dispute, Japan maintains close defence ties with Taiwan.

### Other Recent Island Disputes:

- Kuril Island: Located in North Pacific Ocean.
  - Dispute is between Russia and Japan
- The Chagos archipelago: Located in North Indian Ocean.
  - Dispute is between Britain and Mauritius.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. Which one of the following statements best reflects the issue with Senkaku Islands, sometimes mentioned in the news?**

- (a)** It is generally believed that they are artificial islands made by a country around South China Sea.
- (b)** China and Japan engage in maritime disputes over these islands in East China Sea.
- (c)** A permanent American military base has been set up there to help Taiwan to increase its defence capabilities.
- (d)** Though International Court of Justice declared them as no man's land, some South-East Asian countries claim them.

**Ans: (b)**

### **Explanation:**

- Senkaku island is not an artificial island but a natural occurring island. It is a group of Eight uninhabited islands. Hence, statement 1 is not correct.
- The Senkaku Island dispute concerns a territorial dispute over a group of uninhabited islands known between China and Japan. Both Japan and China claim ownership of these islands. Senkaku island lies in the East China Sea. Hence, statement 2 is correct.
- The US did not establish the permanent military bases over the senkaku island but joint military exercises have been conducted between the US and Japan Military forces. Hence, statement 3 is not correct.
- International court of justice has not given any verdict like No man's land regarding Senkaku

Island. Hence statement 4 is not correct.

[Source: IE](#)

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## Megafauna Bias Hampers Carnivore Conservation Efforts

**For Prelims:** carnivores, Project Tiger, tiger reserves, Ken-Betwa River interlinking project, Indian Wildlife Protection Act (1972), Indian leopard, Indian Biological Diversity Act (2002).

**For Mains:** Challenges in wildlife conservation in India, Conservation and management of carnivores in India, Biodiversity conservation in India, Role of ecological data in conservation efforts. Human-animal-animal conflict.

### Why In News?

India's **carnivore research is focusing too much on larger and more popular species**, leading to a lack of understanding of smaller and less well-known carnivores. This gap in knowledge is hindering conservation efforts in the country.

### Why are Carnivores Important for Conservation?

- **Carnivores dominate the food web, playing a crucial role in maintaining ecological balance.** Despite their importance, **carnivores are among the most threatened mammals in the world.**
- Hence, substantial research and conservation resources are invested in studying, protecting, and managing carnivore populations, globally.

### What is India's Carnivore Conservation Status?

- **India is home to 23% of the world's carnivore population, belonging to 60 species.**
- However, a review of studies published since 1947 shows that the impact of the 70 years of research on charismatic species on their conservation status and policies in the country has been far from satisfactory.
- **The wild cat family, particularly the tiger, dominates carnivore literature** in the country. Other top carnivores that have received a substantial research focus include the Indian leopard, golden jackal, [dhole](#), and jungle cat.
  - However, **the quality of studies on smaller and less charismatic carnivores has generally been poor.**

### What is the Impact of Research on Carnivores in India?

- Scientific research on **tigers has led to the establishment of [Project Tiger](#) in 1973 and helped in the establishment of tiger reserves in 50 locations across the country.**
- Research has provided **evidence against the construction or expansion of highways through tiger habitats in litigation, such as through [Bandipur Tiger Reserve](#), [Kanha-Pench tiger corridor](#), and [Bhagwan Mahavir Wildlife Sanctuary](#).**
  - Research data has contested the ambitious [Ken-Betwa river interlinking project](#),

which is likely to submerge a major portion of the core area of the [Panna Tiger Reserve in Madhya Pradesh](#).

- **Research on the Indian leopard has resulted in the formulation of national guidelines on human-leopard conflict mitigation.**
- It is found that the wild cat family, particularly the tiger, dominates carnivore literature in the country. **The Indian leopard, golden jackal, dhole, and jungle cat** are the other top carnivores that have received a substantial research focus.
- But the quality of studies on smaller and less charismatic carnivores has generally been poor.

### Why is Research on Smaller and Less Charismatic Carnivores Important?

- Research on smaller and less charismatic carnivores is **important as it helps in understanding the important link between carnivores and their ecological communities** and ecosystems, which has implications for human sustenance.
- Small cat carnivores execute important ecological **functions like controlling rodent populations, known to be agricultural pests and disease carriers**, dispersing seeds, and maintaining forest ecosystems.
  - **Civets are known to disperse seeds and help in maintaining forest ecosystems.**

### Note

- **Charismatic megafauna** is a term used to **describe large, iconic animal species that are popularly perceived as being charismatic or appealing**, such as elephants, tigers, lions, pandas, and polar bears. These animals often receive a lot of attention and conservation efforts due to their cultural and aesthetic significance.

### What are the Challenges in Carnivore Research and Conservation in India?

- **Wetland conservation remains under-prioritized**, and grassland ecosystems, which give refuge to critically threatened species like the [caracal](#), are also sidelined in research and conservation.
- There is a decline in **natural history studies, the basic steppingstone to understanding species ecology, expedited by a parallel reduction in journals that publish such studies.**
- Policies are often driven by **political influences and misplaced priorities, and scientific recommendations are disregarded.**
- Limited interdisciplinary studies in carnivore literature hinder the development of socio-ecologically sensitive policies.
- Bureaucratic hurdles need to be eliminated to benefit non-government agencies and independent researchers.

### What Steps can be Taken to Improve Carnivore Conservation in India?

- **Increased funding for research on smaller and less charismatic carnivores** to raise their profile and focus attention on their vulnerable and threatened habitats in India's conservation policies.
- **Interdisciplinary research with a collaborative and constructive approach** by roping in communities to encourage socio-ecologically sensitive policies.
- Frameworks like biodiversity heritage sites under the Indian [Biological Diversity Act \(2002\)](#) or community reserves under the Indian [Wildlife Protection Act \(1972\)](#) facilitate the maintenance of socio-ecological systems by fostering local stewardship and ultimately democratising carnivore research.

[Source: DTE](#)

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# Stand-Up India Scheme

## Why in News?

Recently, the Prime Minister of India has acknowledged the role that the [Stand-Up India](#) initiative has **played in empowering the SC/ ST communities and ensuring women empowerment.**

## What are the Key Details of the Stand-Up India Scheme?

### ▪ About:

- Stand up India Scheme was **launched by Ministry of Finance on 5<sup>th</sup> April 2016** to promote entrepreneurship at grassroot level focusing on economic empowerment and job creation.
- This scheme has been extended up to the year 2025.

### ▪ Purpose:

- **Promote entrepreneurship** amongst **women**, [Scheduled Caste \(SC\)](#) and [Scheduled Tribe \(ST\)](#) category.
- Provide loans for **greenfield enterprises** in manufacturing, services or the trading sector and activities allied to agriculture.
- Facilitate bank loans between **Rs.10 lakh and Rs.100 lakh to at least one SC/ST borrower** and at least **one-woman** borrower per bank branch of Scheduled Commercial Banks.

### ▪ Facilitates Bank Loans:

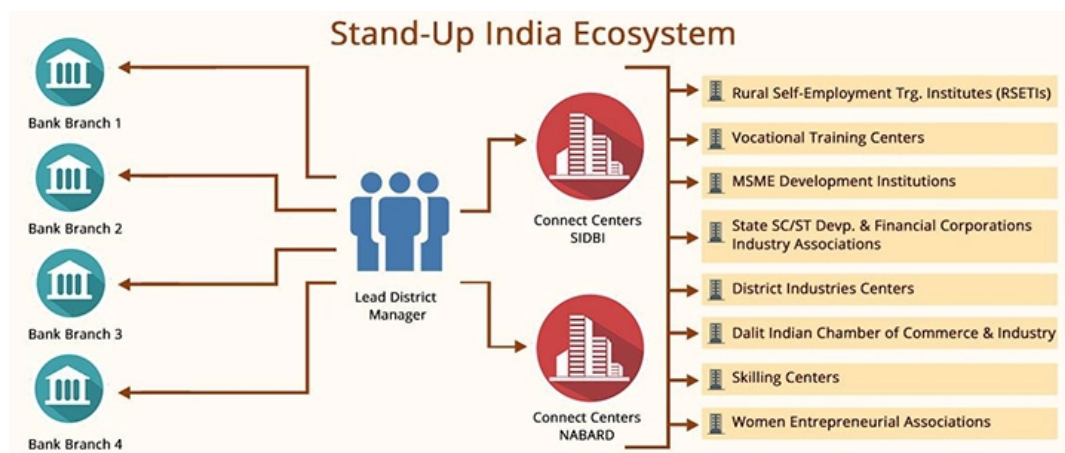
- The scheme aims to encourage all bank branches in extending loans. The desiring applicants can apply under the scheme:
  - Directly at the branch or,
  - Through Stand-Up India Portal ([www.standupmitra.in](http://www.standupmitra.in)) or,
  - Through the Lead District Manager (LDM).

### ▪ Eligibility for a Loan:

- **SC/ST** and/or **women entrepreneurs**, above **18 years** of age.
- Loans under the scheme are available for **only green field projects**. Green field signifies, in this context, the first-time venture of the beneficiary in manufacturing, services or the trading sector and activities allied to agriculture.
- In case of non-individual enterprises, **51% of the shareholding** and controlling stake should be held by either SC/ST and/or Women Entrepreneur.
- Borrowers should **not be in default** to any bank/financial institution.
- The Scheme envisages **'up to 15%' margin money** which can be provided in convergence with eligible Central/State schemes.
  - In any case, the borrower shall be required to bring in a **minimum of 10 %** of the project cost as own contribution.

### ▪ Achievements:

- **Rs.40,710 crore** has been sanctioned under Stand-Up India Scheme to **180,636 accounts** in the last **7 years**.
  - **More than 80% of loans** given under this scheme have been provided to **women**.



[Source: PIB](#)

## Biotech-KISAN Scheme

### Why in News?

The [Biotech-Krishi Innovation Science Application Network \(KISAN\) scheme](#) has been successful in providing benefits to over 1 lakh 60 thousand farmers in the last one year.

### What is Biotech-KISAN Scheme?

- **About:** Biotech-KISAN scheme is a **farmer-centric scheme for farmers**, launched in 2017, developed by and with farmers under the **Department of Biotechnology, Ministry of Science and Technology**.
  - It is a pan-India program, following a **hub-and-spoke model and stimulates entrepreneurship and innovation** in farmers and empowers women farmers.
  - It has a unique feature to identify and promote local farm leadership in both genders.
    - Such leadership helps to develop science-based farming besides facilitating the transfer of knowledge.
  - Biotech-KISAN Hubs have been established **covering all 15 agroclimatic zones and Aspirational Districts in the country**.
- **Aim:** The programme links available **science and technology** to the farm by first understanding the problem of the local farmer and then providing scientific solutions to those problems.
  - The Biotech-KISAN hubs are expected to fulfill the technology required to generate agriculture and bio-resource related jobs and better livelihood ensuring biotechnological benefits to small and marginal farmers.
- **Counseling and Demonstrations:**
  - Under the scheme farmers are provided counseling and demonstrations on improved **seed, planting stock of vegetable**, interventions for use of plant growth-promoting **rhizobacteria** (PGPR's)/bio-fertilizers, **irrigation** & protected cultivation technologies.
  - **Improved livestock** (goat, pig), **poultry and fishery** as well as health management of livestock/poultry are also covered under it.

### What is Biotechnology in Agriculture?

- **Agricultural Biotechnology:**
  - Agricultural biotechnology is a **range of tools**, including traditional breeding techniques, that **alter living organisms, or parts of organisms**, to make or modify products;



improve plants or animals; or develop microorganisms for specific agricultural uses.

- Modern biotechnology today includes the tools of [genetic engineering](#).

▪ **Examples:**

- **Genetically Modified Organisms (GMO):** These are plants, bacteria, fungi and animals whose genes have been altered by manipulation. [GM plants](#) (Bt Cotton) have been useful in many ways.
- **Biopesticide: Bacillus thuringiensis is a naturally occurring soil bacterium** that causes disease on insect pests. It is **accepted in [organic farming](#) and is considered ideal for pest management** due to its low cost, ease of application, high virulence and narrow host specificity.

▪ **Benefits:**

- GMO leads to a number of advantages in the crops which include -there is **less loss after harvest**, the crops **can be modified to have additional nutrients value** for human welfare.
- The use of some of these crops **can simplify work and improve safety for farmers**. This allows farmers to spend less of their time managing their crops and **more time on other profitable activities**.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

**Q. Other than resistance to pests, what are the prospects for which genetically engineered plants have been created? (2012)**

1. To enable them to withstand drought
2. To increase the nutritive value of the produce
3. To enable them to grow and do photosynthesis in spaceships and space stations
4. To increase their shelf life

**Select the correct answer using the codes given below:**

- (a) 1 and 2 only  
(b) 3 and 4 only  
(c) 1, 2 and 4 only  
(d) 1, 2, 3 and 4

**Ans: (c)**

**Exp:**

- Genetically modified crops (GM crops or biotech crops) are plants used in agriculture, the DNA of which has been modified using genetic engineering methods. In most cases, the aim is to introduce a new trait to the plant which does not occur naturally in the species.
  - Examples of traits in food crops include resistance to certain pests, diseases, environmental conditions, reduction of spoilage, resistance to chemical treatments (e.g., resistance to a herbicide), or improving the nutrient profile of the crop.
- Some potential applications of GM crop technology are: Nutritional enhancement -Higher vitamin content; more healthful fatty acid profiles; Hence, 2 is correct.
- Stress Tolerance - Tolerance to high and low temperatures, salinity, and drought; Hence, 1 is correct.
- There is no such prospect that enables GM crops to grow and do photosynthesis in spaceships and space stations. Hence, 3 is not correct.
- Scientists have been able to create certain genetically modified crops which stay fresh for a month longer than usual. Hence, 4 is correct.



- Therefore, option (c) is the correct answer.

[Source: PIB](#)

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## Rapid Fire Current Affairs

### Olive Crown Awards

The **13<sup>th</sup> edition of the Olive Crown Awards** was held in **Mumbai, India**, to commend individuals and corporates that **promoted sustainability or 'green advertising'**. This award is awarded by the **International Advertising Association**. The awards featured **17 categories, including 'Green Agency of the Year' and 'Green Campaign of the Year'**. Notable winners included **P. N. Mohan, who won the coveted 'Green Crusader of the Year'** award for his commitment to **restoring seven lakes near Chennai**. **Kirloskar Limitless** received the **gold award in the 'Corporate Crusader of the Year' category** for their work on **'A Minute for Nature'**. **Famous Innovations** won 10 awards across categories, while **Chirag Rural Development Foundation and People for Animals Wildlife Rescue and Conservation Centre** were awarded the **gold prize in the 'Green NGO of the Year' category**.

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### India achieves 100% Rice Fortification target

As part of the Rice Fortification Program, 269 districts in 27 states in India have achieved a **100% target for Phase II by March 2023** in the distribution of [fortified rice](#) under the **Targeted Public Distribution System (TPDS)**. This program **aims to supply fortified rice in every Social Safety Net Scheme of the Centre throughout the country by 2024 in a phased manner**. During Phase II of the Rice Fortification Programme, 105 Lakh Metric Tonnes of fortified rice was lifted and distributed to 27 states/union territories under the TPDS, while about 29 LMT was lifted by states/UTs under [Integrated Child Development Services](#) and [PM POSHAN](#). In total, about 134 LMT of fortified rice was lifted in 2022-23. The department is now preparing for Phase III to complete the coverage of all remaining districts, except for those that consume wheat, before the targeted date of March 2024.

Fortification is the **process of enhancing the nutritional value of staple foods** like rice, by **adding important vitamins and minerals including iron, iodine, zinc, Vitamin A & D**. Before processing, these nutrients may or may not have been present in the food.

**Read more:** [Public Distribution System \(TPDS\)](#)

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### Konda Reddi Tribe

The Polavaram-Konda Reddi clan is experiencing cultural shock as the [Godavari river](#) does not flow through their new settlements. Pochavaram village is scheduled to undergo rehabilitation as part of the [Polavaram irrigation project's Resettlement and Rehabilitation \(R&R\)](#). **The Konda Reddis, classified as a [Particularly Vulnerable Tribal Group \(PVTG\)](#) in Andhra Pradesh**, They inhabit on both the banks of the Godavari River (East and West Godavari districts), in the hilly forest region of Khammam (Telangana) and Srikakulam (Andhra Pradesh). They live in the **interior forest areas largely cut off from the mainstream**. Traditionally, they were **shifting cultivators** and recently, some of them have adopted **settled agriculture and [horticulture](#)**. Collection of non-timber forest products and basket-making supplement the sources of their livelihood.

**Read more:** [Konda Reddi Tribe](#)

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## Thira Dance

Thirra, also known as **Theyyam thira**, is a ritual dance performed in the groves and temples of the **Malabar region in Kerala, India**. This art form is **performed by the artists of the Malaya community, known as "perumalayans."** It is usually performed during the annual temple festival known as Utsavam. Clan deities such as **Bhagavathi and Shiva are worshipped in these forms. Thira is a sub-division of Theyyam and is similar to the Theyyam dance**, except that in Thira, the **performer is considered to be possessed by the god rather than representing the god**. The **objective of Thira is to bring the gods to life**. Toddy, an alcoholic drink, plays a significant role in the proceedings as an offering to the gods, and almost all the performers dance under its influence, which helps create the feeling of being "possessed." The performers belong to the **Peruvannan caste, who are given prime importance in Thira**. Both upper caste Brahmins and lower caste tribals have an important place in worship in Kerala.

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