

## Prelim Bits 11-12-2023 | UPSC Daily Current Affairs

### Climate Change Performance Index (CCPI)

CCPI 2024 was released at the COP 28 event in United Arab Emirates.

- It is an **annual report**, 1<sup>st</sup> presented at the COP 11 in **2005**.
- **Compiled by** - 3 environmental NGO's
  - **German watch**, New Climate Institute and the Climate Action Network.
- **Aim** - To enable transparency in international climate politics and comparability of countries' efforts and progress.
- **Coverage** - It covers major emitters, **63 countries and the EU**, which together account for over 90% of global GHG emissions.
- Nigeria, Pakistan, UAE and Uzbekistan were added in CCPI 2024.
- **Assessment** - It uses **14 indicators under 4 categories**
  - GHG Emissions (40% weightage),
  - Renewable Energy (20% weightage)
  - Energy Use (20% weightage)
  - Climate Policy (20% weightage)

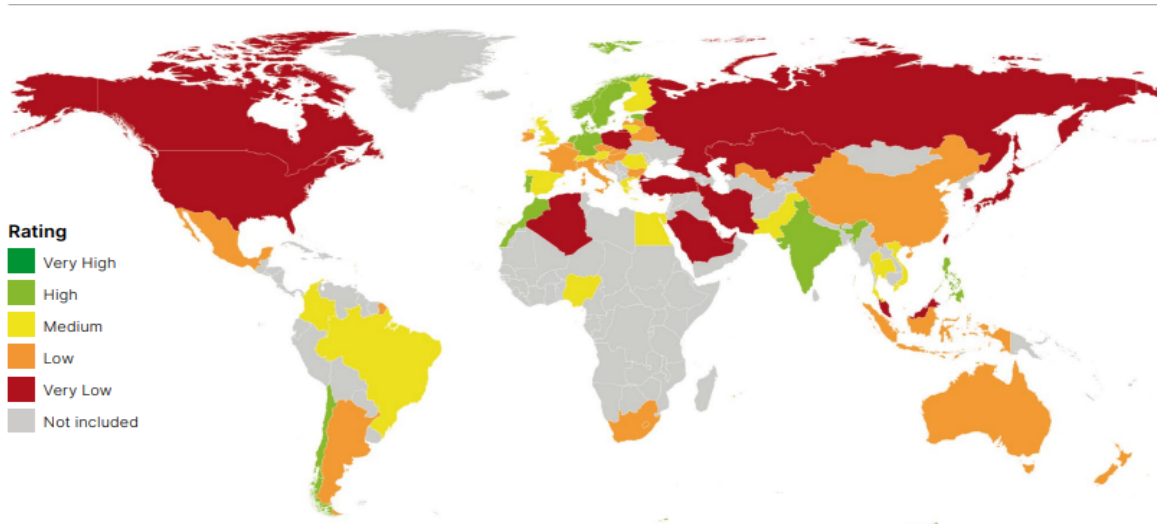
**Climate Policy section** evaluates countries policy working towards in achieving the Paris Agreement goals. CCPI uses per capita GHG emissions in its analysis.

### CCPI 2024

- **No one has occupied the 1<sup>st</sup> 3 ranks** in the 'very high' performance category.
- **Denmark retained the 4<sup>th</sup>** with a score of 75.59% followed by Estonia and the Philippines taking 5<sup>th</sup> and 6<sup>th</sup> position respectively.
- **India** - It **ranked 7<sup>th</sup> (8<sup>th</sup> in CCPI 2023)**, high ranking in the GHG emissions and Energy Use categories, but a medium in Climate Policy and Renewable Energy, as in the previous year.

*While India is the world's most populous country, it has relatively low per capita emissions as per CCPI 2024.*

- **G20 nations** - 15 G20 countries receive an overall low or very low rating with Canada, Russia, the Republic of Korea, and Saudi Arabia being the G20's worst-performing countries.
- **EU** - Overall, it rises 3 spots to 16<sup>th</sup>, where 14 EU countries are among the high and medium performers.



## References

1. [Down To Earth| Climate Change Performance Index](#)
2. [CCPI| Results of CCPI 2024](#)

## Cosmic Expansion

*Euclid telescope observed that galaxies belonging to the Perseus Cluster and others move further away showing the expansion of universe.*

***Euclid telescope**, designed and built by European Space Agency (ESA) to explore [dark matter and dark energy](#) which are thought to make up 95% of the universe.*

- **Cosmic expansion** - The universe was born with the Big Bang as an unimaginably hot, dense point and at ***10-34 of a second of big bang***, it had an incredible burst of expansion known as ***inflation*** which expanded faster than the speed of light.
- **Expansion rate** - After inflation, it ***continued at a slower rate*** as the matter in the universe pulled on itself via gravity.
- About 5 or 6 billion years after the Big Bang, ***dark energy began speeding up the expansion again*** that continues even today.

## Measuring the rate of expansion

- It is calculated using 2 models such as Lambda-cold dark matter (ACDM) and Modified Newtonian Dynamics (MOND).
- **Lambda-cold dark matter (ACDM)** - It is based on observation of the light left over from the Big Bang called as [cosmic microwave background \(CMB\)](#).
- **Hubble's constant** - A value *to predict how fast an astronomical object (star or galaxy) is moving away* from us.
- It is about 43 miles (70 km) per second per Megaparsec meaning, a *galaxy gains about 50,000 miles per hour* for every million light years it is away from us.

- **Hubble tension** - It refers to the ***discrepancies in the expansion rate*** when measured using nearby galaxies and supernovas (exploding stars).
- It is 10% larger than when we predict it based on the CMB.
- **Modified Newtonian Dynamics (MOND)** - It suggests that ***Newton's law of gravity breaks down when the gravitational pull is very weak*** and the structure (such as galaxy clusters) would grow faster.
- **Bulk flow** - It is the ***average velocity of matter in a given sphere***, which varies with the radius of the sphere.

*The universe's expansion makes galaxies move away from each other. The further away they are from us, the more quickly they move.*

## References

[The Hindu| Measuring Cosmic Expansion](#)

## Otolith Rings

*A new study published in 'Nature', tried to predict the effects of climate change on the physiological performance and distribution of organisms by studying the Otoliths.*

- **Otolith** - They are ***small, white bio-mineralized ear stones*** in the head.
- Small ***calcium carbonate crystals*** are accumulated every day as very thin layers over a tiny core, and this forms an otolith.
- They are found in ***all fishes other than sharks, rays and lampreys*** but their shape and morphology is unique to each fish species.
- It contributes to both hearing and vestibular function in fish.
- **Significance** - When the fish dies the otoliths are ***preserved***, separated from the decomposed fish body, and buried in the sediments of the sea floor unaffected for thousands of years.
- It records the ***age and growth of a fish*** from the date of hatch to the time of death and also reveals about fish's health.
  - **Oxygen isotopes** - It indicate the ***temperature*** the fish experienced when it was alive.
  - **Carbon isotopes** - It reveal ***how quickly food was converted*** into energy.
- **Otoliths relevance in climate change** - Animals' energy needs shift with temperature and studying the otoliths can help us predict which animals are most at risk from rising temperatures.
  - ***Atlantic bluefin tuna in warmer waters had lower metabolic rates***, showing that their bodies were unable to keep up with the energy costs of living in temperatures over 28°C.

## References

[The Hindu| Relevance of Otoliths in Climate Change](#)

## 75<sup>th</sup> Year of Universal Declaration of Human Rights (UDHR)

*Human Rights 75 is an initiative to mark the 75<sup>th</sup> anniversary of Universal Declaration of Human Rights.*

***Human Rights 75**, an initiative whose 3 main goals focus on universality, progress and engagement under the leadership of UN Human Rights, together with its partners.*

- **UDHR** - A global document that establishes the **human rights and civil liberty** of every person in the world.
- It consists of a **preamble and 30 articles** setting out fundamental rights and freedoms.
- **Basis** - Vienna Declaration and Program of Action of 1993.
- **Proclaimed by** - The United Nations General Assembly in Paris on **10 December 1948 (UNGA resolution 217 A)**.

*UDHR sets out, for the 1<sup>st</sup> time, fundamental human rights to be universally protected and it has been translated into over 500 languages. **Human Rights Day** is celebrated annually around the world on 10 December every year to honour the UN Assembly adoption of UDHR.*

- **Legality** - It **isn't a treaty and isn't legally binding** in itself, but it is viewed as the **basis for international human rights law**.
- **Achievements** - It have inspired and paved the way for **more than 70 human rights treaties** at global and regional levels.
- It inspired the decolonization movement, anti-apartheid movement and on gender issues and even on LGBTIQ+ issues.
- **India is a signatory** to this declaration.

### References

1. [The Indian Express| 75<sup>th</sup> Year of UDHR](#)
2. [UN.ORG| Universal Declaration of Human Rights](#)

### Red Sprite

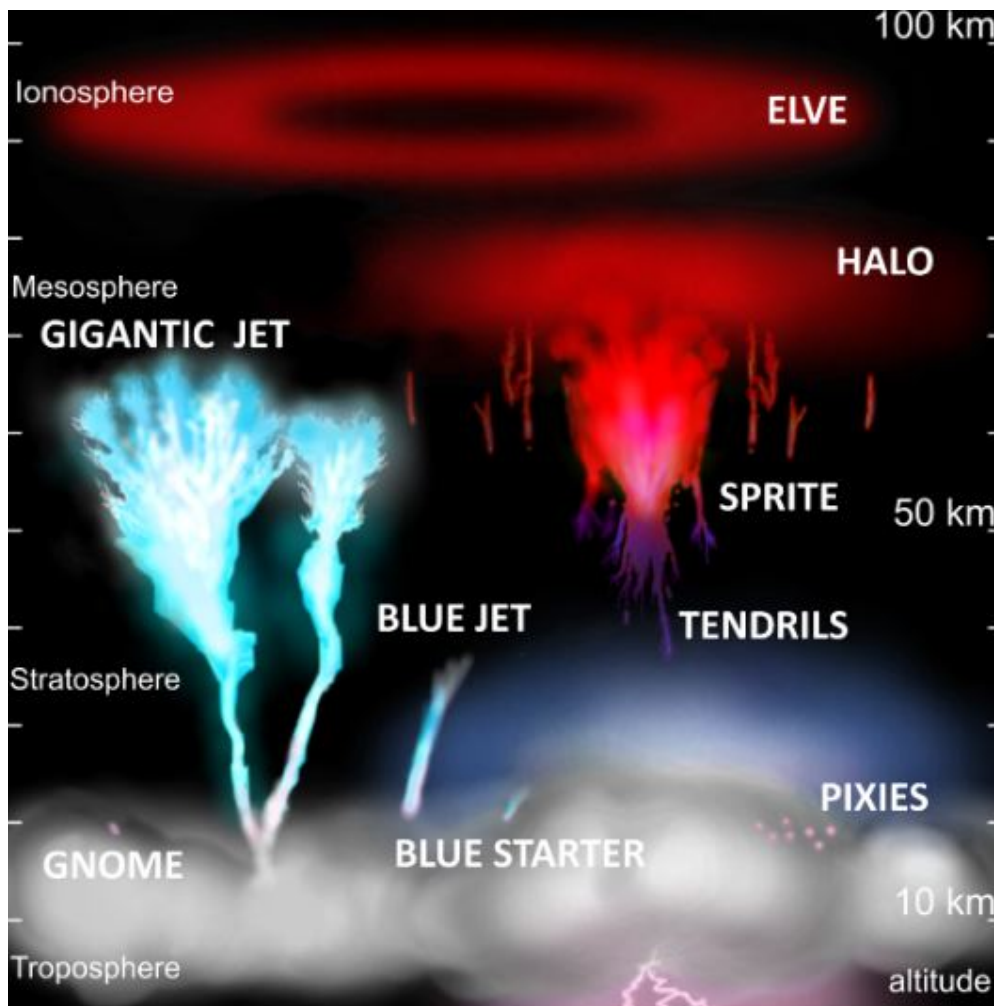
*The European Space Agency (ESA) astronaut captures images of red sprite from ISS Cupola observatory.*

- It is dubbed as **red lightning** which lasts merely a millisecond.
- It is a part of **transient luminous event (TLE)**, a rare electrical discharge that can

appear over thunder clouds.

*Unlike typical lightning bolts that descend from the clouds to the ground, a sprite behaves inversely, ascending into the atmosphere, resembling a form of reverse lightning.*

- **Location** - It forms ***between 40 and 80 kilometers above Earth*** and is rarely visible from Earth.
- **Thor-Davis ISS experiment** - It aims to ***investigate upper atmospheric lightning and its implications*** on greenhouse gas levels, thereby influencing global warming.
- It will photograph storms from the vantage point of the International Space Station's (ISS) observatory.
- **Davis Camera** - It ***works like the retina in our eyes*** that is sensitive to changes in light, allowing it to take up to the equivalent of 100,000 pictures per second.



## Reference

[NDTV| Red Sprite](#)

### Youth for Unnati and Vikas with AI (YUVAi)

- YUVAi is a national program that aims to teach AI skills to students in **grades 8-12**.
- The program is a collaboration between the National e-Governance Division (NeGD), Ministry of Electronics and Information Technology (MeitY), and Intel.

### Zhuque-2 rocket

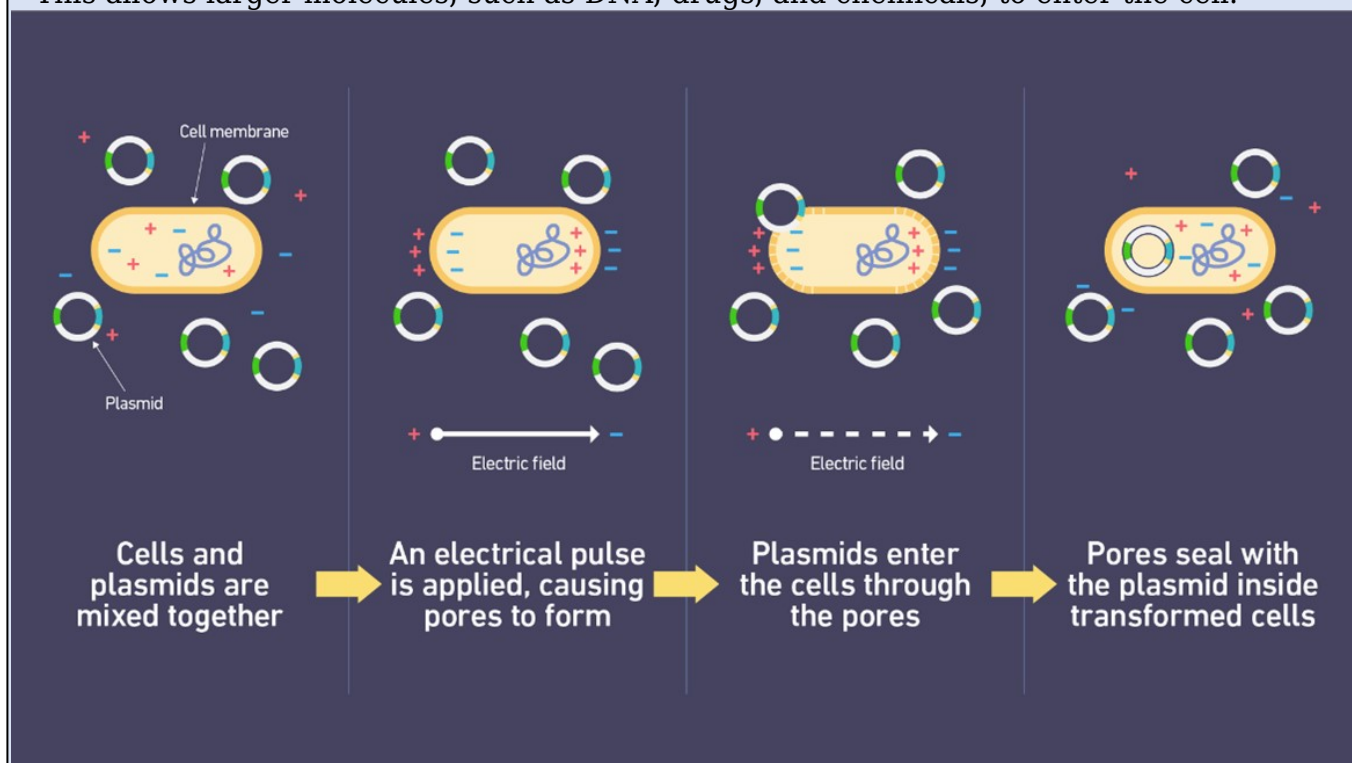
- The Zhuque-2 (ZQ-2) is a Chinese medium-sized, **1<sup>st</sup> methane-fueled** rocket to reach orbit.
- The rocket can carry a payload of up to 1.5 metric tons into a 500-kilometre-orbit.
- The rocket is powered by **liquid oxygen and liquid methane**.
- It was launched by China-based private space technology firm LandSpace.

### “Operation Storm Makers II”

- Operation Storm Makers II was a **global operation by Interpol** that targeted **human trafficking and migrant smuggling**.
- The operation targeted criminal networks that exploit migrants for cyber fraud.
- The operation involved law enforcement agencies in 27 countries across Asia and other regions.

### Electroporation

- A recent study found that *electric eels* can release enough electricity to genetically modify small fish larvae, which is known as electroporation, a gene delivery technique.
- Electroporation is a technique that uses an electrical field to increase the permeability of cell membranes.
- This allows larger molecules, such as DNA, drugs, and chemicals, to enter the cell.



### Poshan Innovation Platform (PIP)

- **Aim** - To improve the nutritional status of mothers and children under five years of age, at the last mile.
- **Launched by** - India Nutrition Collaborative in partnership with the office of the Principal Scientific Adviser to the Government of India.
- India ranked **111** of the 125 in the Global Hunger Index 2023.

### **Green turtle (*Chelonia mydas*)**

- The green sea turtle (*Chelonia mydas*) is the ***largest hard-shelled*** sea turtle.
- Green sea turtles are found in temperate and tropical waters around the world. In India, they can be found on the west and east coasts, Andaman & Nicobar Islands and Lakshadweep.
- Green sea turtles are ***mainly herbivorous*** and eat sea grass.
- **Conservation Status**
  - IUCN - Endangered
  - Schedule I of the Indian Wildlife (Protection) Act.

### **China's Belt & Road Initiative**

- ***Italy*** withdraws from China's Belt and Road project recently.
- China's Belt and Road Initiative (BRI) is a connectivity project that aims to revive the ancient Silk Road.
- The BRI was announced by Chinese President Xi Jinping in 2013.
- It aims to connect China with Europe by land and rail, and to Asia and Africa by sea.

### **Palamu Tiger Reserve (PTR)**

- 4 soft release centres being set up in Palamu Tiger Reserve (PTR) will be guarded by solar fencing recently.
- The Palamau Tiger Reserve (PTR) is located in Jharkhand, established in 1973 as part of Project Tiger.
- It is one of the first 9 tiger reserves created in the country at inception of 'Project Tiger'.
- It is the only tiger reserve in Jharkhand. It forms part of Betla National Park and Palamau Wildlife Sanctuary.

### **Eastern Ghats Nature Interpretation Centre**

- A first-of-its-kind Eastern Ghats Nature Interpretation Centre in Visakhapatnam, Andhra Pradesh has been inaugurated recently.
- It is a project within the development of the ***Kambalakonda Wildlife Sanctuary***.
- A nature interpretation centre is a museum that aims to educate visitors about the importance of nature conservation.

### **Gangetic Dolphin**

- Uttar Pradesh has made the Gangetic Dolphin as the ***state's aquatic animal*** recently.
- The dolphin has already recognized as the ***national aquatic animal***.
- These dolphins are found in rivers like Ganga, Yamuna, Chambal, Ghaghra, Rapti, and Gerua.
- **Conservation Status**
  - IUCN - Endangered species.
  - Schedule -I of the Wild Life (Protection) Act, 1972.
- **Project Dolphin** - Launched in 2016 by the National Mission for Clean Ganga (NMCG).