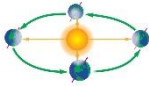


WHAT IS SUMMER SOLSTICE?

The summer solstice heralds the start of astronomical summer in the Northern Hemisphere and marks the day with the most daylight for the year.



- In Latin, "Solstice" means "**sun stands still**".
- It is an annual astronomical phenomenon that brings the **longest day of the year**.
- On the summer solstice, the **Northern Hemisphere** is tilted toward the sun, receiving the full glare of the sun's rays.
- During the solstice, **the Earth's axis** — around which the planet spins, is tilted in a way that the **North Pole is tipped towards the Sun** and the South Pole is away from it.
- Typically, this imaginary axis passes right through the middle of the Earth from top to bottom and is always tilted at 23.5 degrees with respect to the Sun.

What happens during the solstice?

- This day sees the Earth receiving a **greater amount of energy** from the Sun.
- Each year, the summer solstice in the Northern Hemisphere falls **on one of two days: June 20 or June 21**. In the Southern Hemisphere, the summer solstice happens on Dec. 21 or Dec. 22.
- The date varies because the **Gregorian calendar** has 365 days, with an extra leap day added in February every four years.
- The amount of light received by a specific area in the Northern Hemisphere during the summer solstice depends on the latitudinal location of the place.
- The further north one moves from the equator, the more light one receives during the summer solstice. At the **Arctic Circle**, the sun does not set during the solstice.

WHEAT PROCUREMENT FOR CENTRAL POOL (LAKH TONNES)					
	2019-20	2020-21	2021-22	2022-23	2023-24
Punjab	127.14	132.22	96.45	121.17	122.31
Haryana	74.00	84.93	41.86	63.17	70.32
MP	129.42	128.16	46.04	70.97	45.66
UP	35.77	56.41	3.36	2.20	8.47
Rajasthan	22.25	23.40	0.10	4.38	8.35
TOTAL*	389.93	433.44	187.92	262.02	255.24

HOW PUNJAB AND HARYANA ARE KEY TO NATIONAL FOOD SECURITY?

- Till the mid-2000s, Punjab and Haryana used to contribute 90% of the wheat in the public distribution system (PDS) and other government programmes.
- In the current marketing season, the two states account for 75.5% of the total wheat procured for the Central foodgrains storage.
- Government agencies have so far bought 25.5 million tonnes (mt) of the 2023-24 winter-sown crop harvested from late-March.
- Of that, 12.2 mt has come from Punjab and over 7 mt from Haryana.

Impact of Climate Change on Production of Cereal:

- **Unseasonal heat in March 2022 and heavy rain in March 2023** hit the crop in its final grain-formation and filling stage.
- An **unusually warm November-December 2023** has impact wheat yields this year, **particularly in Central India.**
- The delayed arrival of winter due to **El Nino** resulted in premature initiation of flowering, and the crop's vegetative growth phase was cut short.
- The effect was felt most in Madhya Pradesh, Gujarat, Maharashtra, and parts of Rajasthan, where sowing happens early.

Impact on Wheat Producing States:

- Wheat procurement from **Madhya Pradesh** has crashed from 12.8 mt in 2019-20 and 2020-21 to hardly 4.6 mt this season.
- **Uttar Pradesh** and **Rajasthan** too, have posted steep drops from their 2020-21 highs.
- On the other hand, **Punjab** and **Haryana** have weathered the climate shocks better, because winters are longer there, and sowing begins in early to mid-November.
- Punjab and Haryana have been the savior at a time when wheat stocks in government godowns, at 7.5 mt on April 1, were the lowest since 2008.
- The stocks were barely above the minimum operational-cum-strategic reserve of 7.46 mt necessary at the start of the marketing season.

Impact on Rice Producing States:

- Earlier, government procurement of rice was traditionally concentrated in Punjab and Haryana, and the Godavari-Krishna and Kaveri deltas of Andhra Pradesh and Tamil Nadu.
- But with new states – Telangana, Chhattisgarh, Odisha and UP – becoming major contributors, the combined share of Punjab and Haryana in total procurement has fallen.
 - In early 2000s it was 43-44% but now it has come down to an average of 28.8% in the four years ended 2022-23.
- However, the current crop year has seen that ratio rise to almost 33%.
- One of the key reasons for the growth is the assured access to irrigation which has helped in mitigated the impact of last year's patchy monsoon.

Implication of Welfare Schemes:

- Under the National Food Security Act, 2013, **more than 80 crore people are entitled to 5 kg of wheat or rice per month at highly subsidized rates.**
- However, since January 2023, this grain is being provided for free to all NFSA beneficiaries.
- The NFSA, along with other welfare schemes and open market sale operations, require 60-65 mt of grain to be procured annually by state agencies.
- In most years, this requirement is comfortably covered.

Conclusion:

- The **national average of per-hectare wheat and paddy production is 3.5 tonnes and 4.1 tonnes, respectively.**
- On the other hand, the **average of Punjab and Haryana is higher at 4.8 tonnes and 6.5 tonnes for wheat and paddy production, respectively.**
- Hence, the two agrarian states will continue to matter for national food security even with some desirable acreage shifts to other crops.

WHAT IS PROJECT ASTRA?



Recently, Google at the company's annual developer conference, presented an early version of Project Astra.

Project Astra is a new **multimodal AI agent** developed by Google.

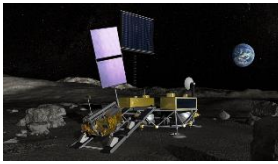
- It is capable of answering **real-time questions** fed to it through text, video, images and speech by pulling up the relevant information.
- It can see the world, remember where one has left a thing and even answer if a computer code is correct by looking at it through the phone's camera.
- It is more straight-forward, there is no range of emotional diversity in its voice.
- It is **not limited to smartphones**. Google also showed it being used with a pair of smart glasses.
- Project Astra can learn about the world, making it as close as possible to a human-assistant-like experience.

What is multimodal model AI?

- A multimodal model is a ML (machine learning) model that is **capable of processing information from different modalities**, including images, videos and text.
 - For example, Google's multimodal model, Gemini, can receive a photo of a plate of cookies and generate a written recipe as a response and vice versa.
 - This model expands on generative capabilities, processing information from multiple modalities, including images, videos, and text. Multimodality can be thought of as giving AI the ability to process and understand **different sensory modes**.
-

WHAT IS LUNAR POLAR EXPLORATION MISSION (LUPEX)?

The India-Japan partnership for their joint moon mission, Lunar Polar Exploration Mission (LUPEX), is likely to take flight in a few years, the Japan Aerospace Exploration Agency (JAXA) said in an interview recently.



Lunar Polar Exploration Mission (LUPEX) is a collaborative endeavor between Indian Space Research Organization (ISRO) and Japan Aerospace Exploration Agency (JAXA).

- The mission is scheduled to **launch in 2025**.
- This mission will take off aboard Japan's H3 rocket.
- **Primary Goal:** To explore the moon's southern polar region, investigating the presence of water and other elements, potentially in the form of surface ice.
- It aims to showcase innovative surface exploration technologies. The special focus is on vehicular transport and lunar night survival.
- It features both a lander and a rover. **JAXA** is responsible for developing and operating the **rover**, and **ISRO** for **developing** and operating the **lander** that will carry the rover.
 - The rover will drive on its own to search for areas where water is likely to be present and sample the soil by digging into the ground with a drill.
 - The plan is to acquire data by **analyzing the collected samples in detail** with observation equipment mounted on the rover.
 - The rover will be equipped with instruments for measuring the water content of regolith (lunar sand), drilling, and sampling, as well as with other world-first and world-leading technologies for the driving system and batteries.
 - The **rover will carry** not only the **instruments** of ISRO and JAXA but also **those of the US space agency NASA and the European Space Agency (ESA)**.

THE EVOLUTION AND ESSENTIALS OF INDIA'S CLIMATE POLICY

Why in News? India is faced with the challenges of sustaining rapid economic growth while dealing with the global threat of climate change. In this context, the article tries to analyse the evolution and essentials of India's Climate Policy.

Evolution of India's Climate Policy:

- **Over-exploitation by the developed world:**

- Climate change has been brought to a crisis stage by the **excessive, unsustainable production and consumption patterns** of the developed countries.
- Only 16% of the world's population lives in high-income nations (like the US, EU), however they **account for 74% of the excess resource use** (between 1970-2017) that exceeds fair share.
- **China** has also overshoot its sustainability limit by 15% of resource overuse.
- Therefore, the high-income countries **must reduce resource use by ~70%** from existing levels to reach the sustainability range.
- **Resource use by the developing world:** Over the same period, 58 countries representing 3.6 billion people - including India, Indonesia, Pakistan, Nigeria, and Bangladesh - **stayed within their sustainability limits.**
- **Evolution of India's Climate Policy:**
 - **India and the world saw significant change in the 1990s**, which prompted the creation of new regulations in a number of fields, including the environment.
 - **The Rio Summit of 1992** saw the emergence of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) and Forest Principles.
 - **The divisions of biodiversity and climate change** in India's former Ministry of Environment and Forests gradually emerged following Rio.
 - Since then, India's climate policy has always been **clear, consistent, and coordinated.**

Key Determinants of India's Climate Policy:

- **Disturbance in the seasonal cycle:**
 - India's civilization and economy have developed in harmony with the seasonal cycle.
 - In recent decades, **climate change has disrupted this harmony** by blurring the distinction between seasons, which has led to increased unpredictability and negative consequences for nature and society.

- **Limited land resources:**
 - In India, the **human to land ratio is very low at 0.0021 sq km**, and is continuing to recede.
 - Therefore, we must learn to survive with this serious limitation, which **requires understanding and an integrated management of land and water.**
- **Extreme weather events:**
 - The Germanwatch's Global Climate Risk Index 2020 puts India as the **fifth most affected country in terms of experiencing extreme weather events**, a sharp rise from its 14th position in 2017.
 - By 2050, rising temperatures and shifting patterns of monsoon rainfall might cost India 2.8% of its GDP and lower living conditions of about half of the nation's population. (WB)
- **India's resolution:**
 - The logo of the Ministry of Environment, Forest and Climate Change (MoEFCC) - **Nature Protects if She is Protected** - shows India's reverence, respect for nature, and its focus towards conserving it.
 - Despite having historical cumulative emissions of less than 4% (1850-2019) and 1.9 tonnes CO₂ per capita emissions, India has not dissuaded itself from taking resolute domestic and international actions that benefit the planet.

UNITED KINGDOM'S GRADUATE ROUTE VISA (GRV) SCHEME

Why in news?

British Prime Minister Rishi Sunak is considering changes to the **Graduate Route visa (GRV)** scheme. He wants to limit visas to only the best and the brightest students. This change aims to reduce the number of international students coming to the UK. The proposal will particularly target education recruitment agents who provide misleading information to UK colleges and authorities.

Popularity of the UK as a Study Destination Among Indians

- Indians form the largest community of international students in the UK. Recently, there has been a significant increase in student visas granted to Indians.
- According to the UK Home Office, between June 2022 and June 2023, student visas issued to Indians increased by 54%.
- Since June 2019, the number of visas granted to Indian nationals has risen seven-fold.

Graduate Route visa (GRV) scheme

- Introduced by the UK government in July 2021, it is a visa scheme for international students.
- It allows graduates who have completed a degree at a UK higher education provider to stay in the UK to work or look for work for **up to two years** after completing their studies.
 - For those who have completed a PhD, the stay can be up to three years.
- This visa does not require a job offer and provides an opportunity for graduates to gain work experience in the UK.
- **Eligibility:** This visa is available to international students:
 - who have successfully completed a degree at undergraduate level or above at a Higher Education Provider with a track record of compliance; and
 - who have a valid Tier 4 or Student visa at the time of application.
 - Tier 4 visa in UK is a type of student visa. It is designed for international students who wish to study in UK at a school, college, or university.

Why do Indians seek GRVs?

- GRV extends an individual's stay in the UK after education. It allows them to seek employment opportunities and earn well.
- While on a GRV, individuals can also try to get other visas, such as a work visa, by finding a good sponsor or employer.
- Many students from India, especially from Punjab, want to settle in UK. A GRV gives them a gateway to do so.

- It is popular because it allows families to accompany the GRV holder if certain criteria are met.

Impact of restricting the GRV scheme

- **On number of international students seeking to study in the UK**
 - Experts believe the proposal of restricting GRVs could significantly reduce the number of international students seeking to study in the UK.
 - It would do so by creating uncertainty regarding post-graduation prospects, and opportunity for a more long-term stay in the country.
- **Prospects of average student seeking to study in UK will be hindered**
- **Financial losses to the universities of UK**
 - Recently, an independent Migration Advisory Committee (MAC), in its study, said that the GRV scheme should continue as it helps UK universities make up for financial losses on the domestic front.
- **UK - a less attractive destination for overseas students**
 - This proposal came at a time when other countries such as Canada and Australia have also introduced (or will soon introduce) caps on international students.
 - Due to this, the UK was emerging as a top alternative but Sunak's move has brought in an air of uncertainty.
- **Impact on Indian students**
 - Currently, Indians constitute roughly 42% of GRV holders, again, the highest among all nationalities.
 - Indians accounted for 89,200 visas between 2021 and 2023 or 42 per cent of the overall grants,
 - Thus, whatever the specific changes may be in the UK's GRV scheme, Indians will be significantly impacted.