

21 February 2023

Flooding From Glacial Lakes

❖ Context

- According to research India and Pakistan make up one-third of the total number of people globally exposed to glacial lake outburst floods or GLOFs.



❖ Key Highlights:

- As per the study '**Glacial lake outburst floods threaten millions globally**'- Around 15 million people across the world face the risk of sudden and deadly flooding from glacial lakes. More than half of those who could be impacted live in four countries: India, Pakistan, Peru & China.
- GLOFs can prove to be catastrophic as they mostly arrive with little warning & result in large-scale destruction.

❖ What are Glacial Lake Outburst Floods or GLOFs?

- **Glacial lakes are large bodies** of water that sit in front of, on top of, or beneath a melting glacier. As they grow larger in size, they become more dangerous because glacial lakes are mostly dammed by unstable ice or sediment composed of loose rock and debris.
- In case the boundary around them breaks, huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas. **This is called glacial lake outburst floods or GLOFs.**
- GLOFs **can be triggered by** several reasons, including earthquakes and ice avalanches. These lakes are also often **found in steep, mountainous regions**, which means landslides or ice avalanches can sometimes fall directly into the lakes and displace the water, causing it to over-top the natural dam and flood downstream.
- In 2013, one such **event took place in Uttarakhand's Kedarnath** when the region witnessed flash floods along with a GLOFs caused by the Chorabari Tal glacial lake, killing thousands of people.

❖ What Are The Findings Of The New Study?

- In order to identify the areas and communities the researchers used existing **satellite-derived data** on different locations and sizes of glacial lakes.
- It is estimated that anyone living within **50 km of a glacial lake** and one km of a river that originates from one could be affected, directly or indirectly, if one or more lakes upstream failed.
- It added that populations in High Mountains Asia (HMA), a region stretching from the Hindu Kush all the way to the eastern Himalayas are the most exposed.
- Glacial flood risks depend on more than just the size and number of glacial lakes in an area, including factors such as the **population size, proximity to the danger zone**, and social vulnerability levels.
- The most surprising bit for the scientists was to find **Peru ranked third globally in danger levels.**
- They also pointed out that in the past two decades, due to climate change, glacial lakes across the Andes have **increased by 93 percent** in comparison to 37 per cent in high-mountain Asia.

❖ How Can GLOFs Be Prevented?

- Reducing the risk of GLOFs is complex and no single solution would work however **limiting climate change and keeping warming under 1.5 degree Celsius** is a big one as this will help slow the growth of glacial lakes.
- But unfortunately a certain amount of ice loss is already locked in and if we stopped all emissions today GLOF hazard will continue to increase for several decades.

NITI (National Institution for Transforming India) Aayog

❖ Context

- Recently, Former IAS officer BVR Subrahmanyam was appointed the **Chief Executive Officer (CEO)** of NITI Aayog by the government.



❖ About NITI Aayog:

- It was **formed on January 1, 2015.**
- NITI (National Institution for Transforming India) Aayog **replaced the Planning Commission.**
- The first meeting of NITI Aayog was chaired by Prime Minister Modi on February 8, 2015.
- **Objectives :**
 - Fostering **COOPERATIVE FEDERALISM**, active involvement of states.
 - Formulation of plans at **VILLAGE LEVEL**, aggregation at higher levels.
 - **SPECIAL ATTENTION** to sections at risk of not benefitting adequately from economic progress.
 - Economic policy that incorporates **NATIONAL & SECURITY INTERESTS.**
 - Feedback for constant **INNOVATIVE IMPROVEMENTS.**

- Partnerships with national and international **THINK TANKS.**
- Creating a **KNOWLEDGE, INNOVATION & ENTREPRENEURIAL** support system.
- Platform for **RESOLUTION** of inter-sectoral & inter-departmental issues.
- State-of-the-art resource center for **RESEARCH on good governance.**
- Focus on **TECHNOLOGY** upgradation and **CAPACITY BUILDING.**
- **Composition :**
 - Prime Minister of India serving as the **Chairperson.**
 - **Vice-Chairperson-** To be appointed by Prime-Minister.
 - **A Governing Council** comprised Chief Ministers of all states and Lt. Governors of Union Territories in India.

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- **Regional Council-** To address specific regional issues, Comprising Chief Ministers and Lt. Governors Chaired by Prime Minister or his nominee
- **Adhoc Membership-** 2 member in ex-officio capacity from leading Research institutions on rotational basis.
- **Ex-Officio membership-** Maximum four from Union council of ministers to be nominated by Prime minister.
- **Chief Executive Officer-** Appointed by Prime-minister for a fixed tenure, in rank of Secretary to Government of India.

- **Special Invitees-** Experts, Specialists with domain knowledge nominated by Prime-minister.
- **Initiatives taken by NITI Aayog :**
 - Atal Innovation Mission.
 - School Education Quality Index.
 - SDG India Index.
 - Composite Water Management Index.
 - India Innovation Index.
 - Good Governance Index.
 - 'Methanol Economy' programme

Chandrayaan-3

❖ Context

- Recently, Chandrayaan-3's lander has **successfully undergone the EMI/EMC (Electro-Magnetic Interference/Electro-Magnetic Compatibility) test.**



❖ Key Highlights:

- The EMI-EMC test is conducted prior to satellite missions.
 - It ensures the functionality of the satellite subsystems in space.
- This test is a **major milestone** in the realization of the satellites.
- The **final launch date of the mission is yet to be announced** but is said to be towards the second or third quarter of this year.

❖ About Chandrayaan-3:

- Chandrayaan 3 configuration will be **similar to that of its predecessor** (Chandrayaan 2) with a lander, rover and a propulsion module.
- It **won't require an orbiter.**
- ISRO is planning to land the Chandrayaan 3 lander at the same location as the Chandrayaan 2 – the lunar south pole, which is a singularly promising part of the moon's surface.
- It will be launched by GSLV MkIII from the Satish Dhawan Space Centre in Sriharikota.
- If successful, it will make **India the fourth country** to soft-land a spacecraft on the Moon after the **United States, USSR and China.**

❖ Lunar South pole:

- It is interesting because the lunar surface area that remains in shadow is much larger than that at the North Pole.

- There could be a **possibility of presence of water in permanently shadowed areas** around it.
- In addition, the **South Pole region has craters that are cold traps** and contain a fossil record of the early Solar System.

❖ Information Gathered till Now:

- Presence of **water molecules & minor elements** (Chromium, manganese and Sodium) on the moon.
- Information about **solar flares.**

❖ About Chandrayaan-2:

- It was launched by a **GSLV Mk III on 22 July 2019**, months after China's successful soft-landing attempt.
- The mission had three components : An orbiter, a lander (**Vikram**) & a rover (**Pragyan**).
 - It was designed to expand lunar scientific knowledge through the detailed study of the Moon's surface and atmosphere.
- The orbiter was successfully injected into the moon's orbit.
- However, the lander, which was initially descending as planned, lost communication nearly two kilometers from the surface on 6 September 2019.
 - It was later revealed that **the Vikram lander had hard-landed on the moon** because of a problem with the lander's braking thrusters.

News in Between the Lines

EXERCISE 'DUSTLIK'



❖ Context

- The 4th edition of joint military **Exercise 'DUSTLIK'** between the Indian Army and Uzbekistan Army commenced recently, in Foreign Training Node, Pithoragarh (Uttarakhand).

❖ About Exercise 'DUSTLIK':

- The 14 days long joint exercise would focus on **joint counter-terrorist operations in mountainous and semi-urban scenarios under UN mandate** and will include field training exercises, combat discussions, lectures, demonstrations and culminate with a validation exercise.
- Both sides will **jointly train, plan and execute a series of tactical drills** for neutralisation of likely threats, while learning to exploit new generation equipment and technology for conducting joint operations.
- The first edition of the exercise was held in Uzbekistan in November 2019.

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India's First Hybrid Rocket



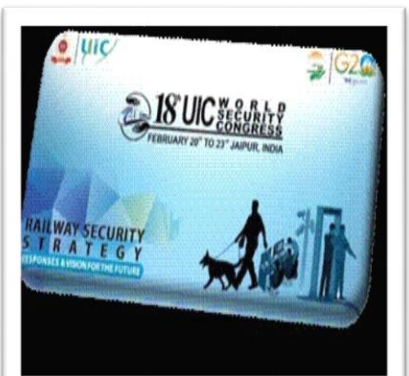
❖ Context

- India's **first hybrid sounding rocket** by private players was successfully launched from Pattipulam village in the Chengalpattu district of Tamil Nadu.

❖ Key Highlights:

- Martin Foundation, in association with Dr. APJ Abdul Kalam International Foundation & Space Zone India, launched the **Dr. APJ Abdul Kalam Satellite Launch Vehicle Mission- 2023**.
- The selected students designed & constructed a student satellite launch vehicle (rocket) & **150 PICO satellite research** experiment cubes that contained different payloads.
- The reusable rocket was made by the selected top 100 students, while the rest made the satellites. The rocket can be used for research in weather, atmospheric conditions and radiation.
- **As per ISRO sounding rockets** are one or two stage solid propellant rockets used for probing the upper atmospheric regions and for space research.
- They also serve as **easily affordable platforms** to test or prove prototypes of new components or subsystems intended for use in launch vehicles and satellites.

World Security Congress



❖ Context

- **The International Union of Railways and The Railway Protection Force** have come together to organize the 18th World Security Congress.

❖ Key Highlights:

- The International Union of Railways (**UIC**) **represents** the railway sector and promotes rail transport worldwide.
- The Railway Protection Force (**RPF**) is a **prime security** and Law Enforcement Agency in the field of Railway Security in India.
- India will be **hosting the 18th World Security Congress** for the International Union of Railways in the Pink City Jaipur.
- Having **assumed the chair of UIC Security platform**, DG RPF has taken up measures to enhance the involvement of member organizations operating in Asia, Africa and several other developing countries with similar demographic patterns.
- The 18th edition of the Congress, centered on the theme of "**Railway Security Strategy: Responses and Vision for Future**".

High Altitude Balloons



❖ Context

- **The United States and China** are currently involved in an extraordinary standoff over allegations of espionage through high-altitude balloons.

❖ About High-Altitude Balloons:

- **Balloons have** been in frequent use for several decades now, though the first uses go back at least 200 years. They are used mainly for **scientific purposes** but increasingly for tourism and **joy rides, surveillance, and disaster relief and rescue**.
- Balloons can stay in flight from anywhere between a **few hours to a couple of months**. Those that are meant to remain in air for long and go higher up in the atmosphere are made of more advanced materials for increased sturdiness.
- Balloons typically have a basket attached to them, **called gondolas**, that carry instruments or human beings. The most **common use of balloons is in scientific research**. In a way, balloons equipped with instruments were able to perform the functions of a satellite before the space age dawned.
- Weather agencies routinely use balloons to make measurements – **of air temperature, pressure, wind speed and direction, aerosol concentrations**.

Pluto

❖ Context

- 92 years ago on 18 february Pluto was discovered by astronomer Clyde W Tombaugh.

❖ Key Highlights:

- Today, according to the International Astronomical Union (IAU), our solar system officially has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus & Neptune.
- But between 1930 to 2006, it had nine.
- Scientists **took away the planetary status from Pluto**.
- Today it has been relegated to the status of a **dwarf planet**.

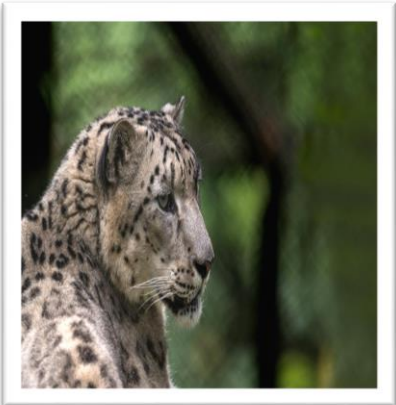
Face to Face Centres



❖ Pluto

- It is most **distant planet from the sun**.
- It is **located in the Kuiper Belt**.
 - It is a zone beyond the orbit of Neptune brimming with hundreds of thousands of rocky, icy bodies each larger than 62 miles (100 kilometers) across as well as 1 trillion or more comets.
- NASA's New Horizons space probe made a close flyby of Pluto.
- New Horizons showed that **Pluto has a diameter of 1,473 miles (2,370 km)**, less than one-fifth the diameter of Earth, and only about two-thirds as wide as Earth's moon.
- **Definition of a “planet”** : A planet must meet in order to be so classified:
 - The object must be in orbit around the sun.
 - The object must be big enough to be rounded by its own gravity.
 - The object must have cleared the neighbourhood around its orbit.
- Pluto failed to meet the third criterion.
- Pluto is not gravitationally dominant – **its mass is substantially less** than the combined mass of the other objects in its orbit.

Snow Leopard



❖ Context

- Recently, a snow leopard has been sighted for the first time at a height of about 11,120 feet in the Darma valley in Uttarakhand's Pithoragarh district.

❖ Key Highlights:

- **Snow leopards are usually found at a height of more than 12,000 feet**, while Dar village is located at nearly 11,120 feet.
- Snow leopards were earlier spotted in the **Nanda Devi range** of the Garhwal Himalayas, parts of Himachal Pradesh and the Ladakh region.

❖ Snow Leopard

- It is **native to the mountain ranges** of Central and South Asia.
- **Scientific Name**- Panthera uncia.
- **Distribution** : The snow leopard's habitat range extends across the mountainous regions of 12 countries across Asia: Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.
 - In India, they are found in J&K, Ladakh, HP, Uttarakhand, Sikkim and Arunachal Pradesh.
- **Food** : Carnivore
 - Snow leopards prey upon the blue sheep (bharal) of Tibet and the Himalayas, as well as the mountain ibex found over most of the rest of their range.
- **Threats to survival** : Expansion of human settlement, livestock grazing, poaching, Vanishing habitat and the decline of the cats' large mammal prey.
- **Conservation : IUCN Red List** – Vulnerable.
 - **CITES**- Appendix I
 - **WPA 1972** - Schedule I.

Tsetse Flies



❖ Context

- Recently, Yale researchers found a **volatile pheromone** generated by the tsetse fly.

❖ Key Highlights:

- **Tsetse fly is a blood-sucking bug** that spreads diseases in both humans and animals across much of Sub-Saharan Africa.
- Tsetse flies are **known to carry parasites** called African trypanosomes.
- When the insects bite humans or animals, they transmit these parasites, spreading diseases such as African sleeping sickness, which can be fatal to humans, and nagana, a disease that affects livestock and other animals.
- The **study sheds fresh light on how flies communicate with one another** and could lead to new techniques for regulating their populations and the dangerous diseases they carry.
- Researchers found that a chemical called **methyl palmitoleate (MPO)** attracted male tsetse flies, caused them to stop and remain where they were for some time, and acted as an aphrodisiac.

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