Today's Prelims Topics

U.S.-India COMPACT Initiative

Context

Recently, the Indian PM & US President launched the U.S.-India COMPACT initiative.

About COMPACT Initiative

- **COMPACT** stands for (Catalysing Opportunities for Military Partnership, Accelerated Commerce, and Technology).
- It is a strategic framework to enhance bilateral cooperation in **defense, trade, technology and security.**

Key Focus Areas of COMPACT

- **Military and Defense Partnership:**
  - **Strengthening India's defense capabilities** through increased **defense trade and technology transfers**.
  - Expansion of joint military exercises, intelligence sharing, and strategic interoperability between Indian and US armed forces.
  - Promoting **co-development and co-production of defense equipment** under **Make in India** initiatives.
  - Facilitating India's procurement of advanced military platforms, such as **F-35 fighter jets.**
- **Trade and Economic Growth:**
  - Boosting **bilateral trade and investments** between India and the US, particularly in **energy and infrastructure**.
  - Focus on reducing **tariff barriers and resolving trade disputes**, with negotiations for a **mini trade deal**.
- **Technology and Innovation Collaboration:**
  - Strengthening **technology sharing agreements** in sectors like:
    - Semiconductors, Artificial intelligence (AI) and quantum computing
    - Space technology (including satellite cooperation)
    - Cybersecurity and digital infrastructure
    - Cooperation in advanced civil nuclear technologies.
  - Launch of **Indus Innovation**, to promote joint research and technology development in emerging fields.
- **Security and Counterterrorism:**
  - Enhanced intelligence sharing and joint operations against terrorist networks.
  - Increased maritime security cooperation in the Indo-Pacific, particularly in countering Chinese influence.

Source:

- Economic Times - COMPACT Initiative

India-US TRUST Initiative

Context

Recently India and United States have launched the TRUST initiative.

About TRUST Initiative

- Transforming Relationship Utilizing Strategic Technology (TRUST) is a bilateral agreement to enhance cooperation in critical minerals, pharmaceuticals, and advanced materials.
- It will strengthen **bilateral collaboration** between **governments, academia and the private sector** in key technological areas such as: Defense, AI, Semiconductors, Quantum Computing, Biotechnology etc.

Key Features of TRUST Initiative

- **Critical Minerals Cooperation:**
  - Focus on recovery and processing of critical minerals like lithium and rare earth elements (REEs).
  - Launch of the **Strategic Mineral Recovery initiative,** a new U.S.-India program to recover and process critical minerals (including lithium, cobalt and rare earths) from heavy industries like aluminum, coal mining and oil and gas.
  - The initiative aims to **reduce dependency on China**, which currently controls **nearly 70% of the global REE market**.
- **Cooperation in Pharmaceutical sector:**
  - Encourage public and private investments to expand Indian manufacturing capacity.
  - India is **the world's second-largest producer of active pharmaceutical ingredients (APIs)**, many of which depend on critical minerals like **lithium, magnesium, zinc, and selenium**.
- TRUST will complement the **Minerals Security Partnership (MSP)**, a **14-nation US-led initiative** that includes **India, Australia, Canada, Japan, Germany and UK** to catalyze investment in critical mineral supply chains.

Source:

- Indian Express - TRUST Initiative

Living Will

Context

Recently The Government Medical College Hospital (GMCH), Kollam (Kerala), established a 'Living Will Information Counter'. It is **the first hospital in India** to set up such a counter to **popularize the concept of a living will**.

What is a Living Will?

- A **living will** is a **legal document** that records an individual's **preferences for medical treatment** in situations where they are unable to communicate their wishes due to a **terminal illness or life-threatening condition**.
- It ensures that personal healthcare choices are respected even when the individual cannot express them.
- Writing a **living will** requires the involvement of:
    - **Two or more healthcare attorneys** (can be family members or friends).
    - **A gazetted officer or a notary** to certify the document.
    - **Two witnesses** must be present during certification.
- The living will **comes into effect when the individual is incapacitated but alive**.

Difference Between a Living Will and Euthanasia

Aspects	Living will	Euthnasia
Legal Status	• Legal in India	• **Active euthanasia is illegal**; only **passive euthanasia** is allowed.
Definition	• A legal document specifying a person's medical treatment preferences if they become **incapacitated**.	• The act of intentionally ending a person's life to relieve suffering.
Effectiveness	• Comes into effect when the person is incapacitated but alive.	• Requires external intervention to cause death.
Outcome	• Does not lead to death but only ensures personal choice in treatment.	• Involves **medically assisted death**, which can be **active (illegal) or passive (legal under strict conditions)**.

Source:

- The Hindu - End-of-life medical care

News in Shorts

Konda Veduru - Green Gold

- Konda Veduru is a species of bamboo found in the Godavari Valley of Andhra Pradesh. It dominates **53% of India's total bamboo area**.
    - It covers **2.25 lakh hectares** in the Godavari Valley and grows naturally in the region.
- It is called **"green gold"** due to its fast growth, high economic value and multiple uses.
- **Uses Among Tribes**: The **Konda Reddi and Koya tribes** use Konda Veduru bamboo for food, livelihood and commercial purposes.
- **Health Precaution**: The tribe ensures bamboo shoots are **boiled before consumption** to remove toxins.

Thiruparankundram Hill

- Madras High Court has directed T.N. government to maintain communal harmony in Thiruparankundram hill.

About Thiruparankundram Hill - Madurai

- **Tirupparankundram Murugan Temple** is located here.
    - It was built here in the 8th century during the reign of Pandyas.
    - It is one among the six temples of Lord Muruga, chief deity of the ancient Tamils of South India, son of the warrior goddess Korravai.
- The **hill is also home to a dargah (mausoleum)** dedicated to **Sikandar Badhusha**, a Muslim saint.
- It also has historical importance for **Jains**, with ancient Jain caves and inscriptions found in the region.

Source:

- The Hindu - Religious hill in T.N.

Sudan Virus

- Recently, the Ugandan Government and the WHO confirmed an outbreak of Sudan virus disease.

About Sudan Virus

- It is a highly infectious pathogen from the **Filoviridae family**, closely related to the **Ebola virus (EBOV)**.
- It causes **Sudan virus disease (SVD)**, a severe hemorrhagic fever with a **high fatality rate**.
- It was first identified in **1976** in **southern Sudan** (now South Sudan).
- **Transmission:**
    - **Animal to Human:** Likely from **fruit bats**, though exact reservoirs are unclear.
    - **Human to Human: Direct contact with bodily fluids** (blood, vomit, saliva, sweat,

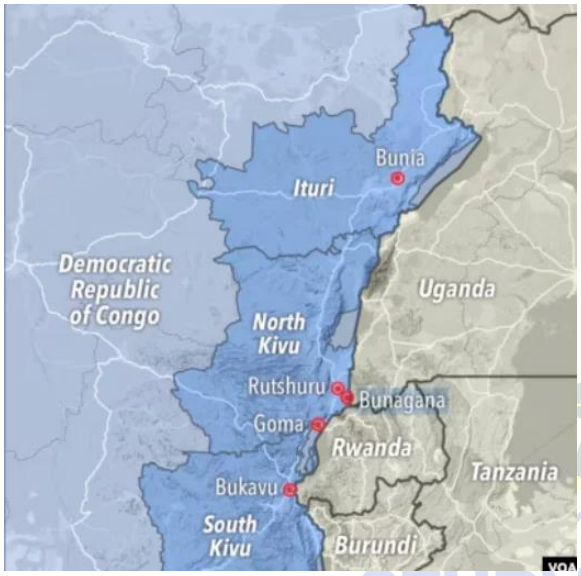
urine, feces)., **contaminated surfaces or objects etc.**

- **Treatment:** Currently, there are no approved vaccines or antiviral treatments for Sudan Virus Disease (SVD).

Source:

- Down to Earth - Sudan Virus

Bukavu



- The **M23 rebels**, backed by **Rwanda**, have advanced in **eastern Congo**, seizing key areas.
- Recently they entered **Bukavu**, the **second-largest city in eastern Congo**, and took control of **Kavumu airport**.
- Earlier they seized **Goma, the largest city in the region**.
- The conflict has **displaced 350,000 people** and worsened the humanitarian crisis.

Source:

- The Hindu - Bukavu

Editorial Summary

Teesta Dam 3 (2.0) And GLOF Concern

Context

An expert committee constituted by the Ministry of Environment, Forests and Climate Change recommended a proposal to rebuild the Teesta-3 dam on the Teesta river in Sikkim.

About Glacial Lakes

- **Formation**: Created by meltwater accumulating in depressions left by retreating glaciers.
- **Types**: ISRO categorised **glacial lakes into four types**: moraine-dammed, ice-dammed, erosion-based, and others.
    - Moraine-dammed lakes are formed by water dammed by debris left by glaciers.
    - Ice-dammed lakes are formed by water dammed by ice.
    - Erosion-based lakes are formed by water trapped in depressions created by erosion.
- **Importance:** Source of freshwater for rivers.
- **Risks of Glacial Lakes:**
    - Glacial lake outburst floods (GLOFs) can have devastating consequences downstream.
    - GLOFs occur when large volumes of meltwater are released due to dam failures.
    - Dam failures can be triggered by avalanches or other factors.

Situation in Uttarakhand

Uttarakhand has 13 glacial lakes that are susceptible to Glacial Lake Outburst Floods (GLOFs).

- **5 of these lakes**, considered highly sensitive, fall into the **'A' category.**
- These include Vasudhara Tal in the Dhauliganga basin and four lakes in Pithoragarh district: Maban Lake in Lassar Yangti Valley, Pyungru Lake in the Darma basin, and two unclassified lakes—one in the Darma basin and another in Kuthi Yangti Valley.

About Glacial lake outburst floods (GLOFs)

- **Definition:** A GLOF is a flood that occurs when water dammed by a Glacial Moraine is released suddenly.
- **Features of GLOF:** Glacier Lake Outburst flood has three main features
    - Involves sudden (and sometimes cyclic) releases of water.
    - These are rapid events, lasting hours to days.
    - These result in large downstream river discharges, which often result in catastrophic flooding or disasters
- **Examples of GLOF-related disasters**:
    - 1926 Jammu and Kashmir deluge
    - 1981 Kinnaur valley floods in Himachal Pradesh
    - 2013 Kedarnath outburst in Uttarakhand
    - 2023 Sikkim GLOF event: A combination of excess rainfall + series of earthquakes in Nepal may have caused the Sikkim GLOF event.

Reasons for Glacial Lake Outburst Floods (GLOFs)

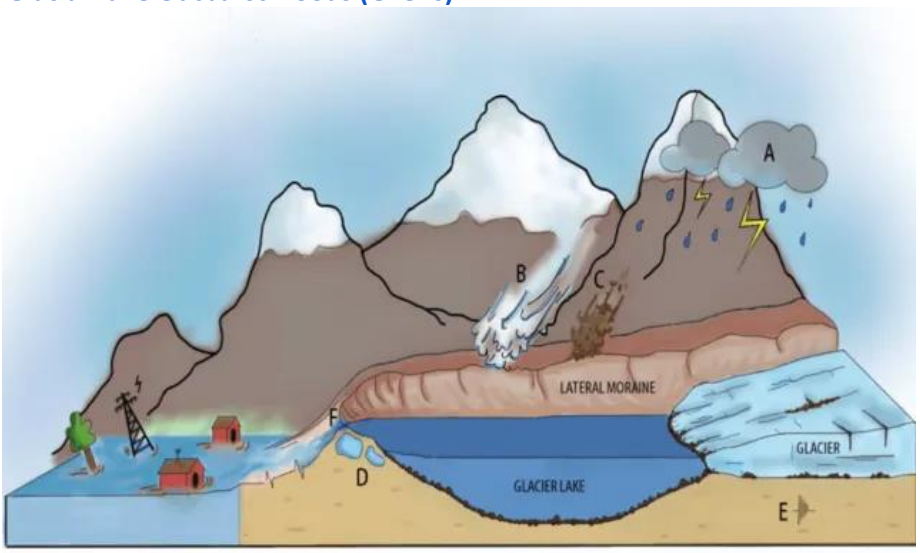


Figure-1: Illustrative graphic showing various reasons for GLOF occurrence
(A) Cloudburst (B) Snow avalanche (C) Landslide (D) Melting of ice in moraine
(E) Earthquake (F) Overflow

- **Melting of Glaciers:** As global temperatures rise, glaciers are melting more quickly, causing glacial lakes to fill with water.
  - The increased water level puts pressure on the lake's natural boundaries, which are often made of unstable ice and debris.
  - When these boundaries break, it can lead to a GLOF.
- **Avalanches and Earthquakes:** Landslides or ice avalanches near glacial lakes can push large amounts of water, causing the natural dams to burst and trigger a GLOF.
  - Earthquakes can also destabilise the area, leading to a similar effect.
- **Extreme Weather Conditions:** Heavy rainfall, severe storms, or sudden changes in temperature can weaken the stability of glacial lakes, increasing the likelihood of a GLOF.
- **Climate Change:** The Himalayan-Hindukush region, which is highly affected by climate change, is seeing accelerated glacier melting.
  - This leads to the formation of more glacial lakes, raising the risk of GLOFs.
  - Climate change is also causing more frequent and intense cloudbursts, further contributing to GLOFs.
- **Volcanic Activity:** In regions near volcanoes, volcanic activity can heat glaciers and cause them to melt faster, increasing the risk of a GLOF.
- **Weak Moraine Embankments:** Moraines, which are piles of debris left by glaciers, often act as natural dams for glacial lakes.
  - However, these moraines can be weak and prone to breaking, leading to GLOFs.
- **Human Activities:** Infrastructure projects like dams and roads in mountainous areas can add stress to the landscape, making GLOFs more likely.
  - **Example**: 2021 Chamoli GLOF, which was linked to multiple hydroelectric projects in the area.

Reason For Vulnerabilities of GLOF in Himalayan Region

- A report by the Central Water Commission of last year found that the number of "glacial lakes and other water bodies" in the Himalayan region had become 10.8% more numerous between 2011 and 2024 and that their combined surface area had increased by 33.7% in the same period.
- The South Lhonak lake itself was formed in the early 1960s and grew to 167 hectares by 2023.

Tragedy at South Lhonak Lake

In October 2023, a **glacial lake outburst flood (GLOF)** from South Lhonak Lake in Sikkim caused the catastrophic destruction of the **Teesta-3 dam** and its hydroelectric facility. The flood, triggered by a **slope failure** in a moraine (glacial debris) on the lake's flank, released nearly **50 billion litres of water** into the valley, leading to landslides and severe downstream damage. The disaster resulted in **over 100 deaths** and affected **more than 80,000 people** across four districts.

Factors Increasing Vulnerability

- **Climate Change & Glacier Melt** – Rising temperatures and black carbon (soot) accelerate Himalayan glacier melting, leading to **larger and more unstable glacial lakes**.
- **Geological Instability** – Glacier retreat weakens surrounding landforms, increasing risks of landslides and **moraine collapses**.
- **Deficiencies in Risk Modelling** – Current GLOF assessment models fail to fully account for **erosion, sediment transport, and riverbank collapses**, making predictions unreliable.
- **Hydropower Infrastructure Risks** – Large dams in **seismically active and landslide-prone regions** add to vulnerabilities, as infrastructure failure can amplify disaster impacts.
- **Inadequate Early-Warning Systems** – The region lacked robust **monitoring and alert mechanisms**, delaying evacuation and disaster response.

Improvements in the New Construction (Teesta-3 2.0)

- **Concrete-only Structure** – Unlike the original **rock-and-concrete** design, the new dam will be built entirely of **reinforced concrete** for better resilience.
- **Larger Spillway** – The spillway capacity has been **tripled** to handle extreme flooding scenarios.
- **Early-Warning System** – A **real-time monitoring and flood alert system** is planned to improve response times.
- **Climate Adaptation Modelling** – The design is based on **"worst-case scenario" rainfall predictions** over the next century.

What Needs to be Done?

- **Holistic Risk Assessment** – Factor in **climate change-driven uncertainties**, including sediment dynamics, moraine stability, and extreme weather patterns.
- **Stronger Environmental Regulations** – Conduct independent **impact assessments** before rebuilding, considering downstream risks.
- **Community Resilience** – Strengthen **disaster preparedness, evacuation plans, and compensation mechanisms** for local populations.
- **Alternative Energy Solutions** – Reduce dependence on large hydro projects in high-risk areas and explore **solar, wind, and smaller hydro alternatives**.
- **Sustainable Development Framework** – Ensure hydropower viability **without externalizing social and environmental costs**, integrating local concerns into decision-making.

Source: The Hindu: The Teesta dam and the long shadow of climate change

Dealing with China's weaponisation of e-supply chains

Context

China has restricted the travel of its engineers and technicians working in Foxconn's facilities in India.

More in News

- Chinese authorities are also recalling those already in India.
- Additionally, China has imposed curbs on the export of critical, specialized manufacturing equipment over which it has a monopoly.
- These measures aim to disrupt India's manufacturing sector, particularly its electronics industry, by limiting knowledge transfer and halting the supply of crucial machinery.

Case Study: Apple-Foxconn in India

- **Expansion in India:** Apple and its contract manufacturers (Foxconn, Pegatron, Tata Electronics) have significantly expanded their presence in India.
    - Foxconn's facility in Tamil Nadu and Tata Electronics' plant in Karnataka are assembling iPhone models.
- **Production Milestones:** In FY 2023-24, Apple assembled iPhones worth $14 billion in India.
    - For the first time, iPhone 16 Pro models were assembled by Foxconn in India in 2024.
- **Government Support:** State governments in South India have prioritized Apple-Foxconn investments.
    - The Indian government conferred the **Padma Bhushan** on Young Liu, Chairman of Foxconn, in 2024, highlighting the company's strategic importance.
- **Challenges:**
    - India remains largely a final assembly hub rather than a full-fledged manufacturing ecosystem.
    - China's restrictions on skilled labor and critical equipment supply pose serious challenges.

India's Steps to Boost Electronics Manufacturing

- **Production-Linked Incentive (PLI) Scheme:** First launched in 2020 for the electronics industry.
    - Increased budget allocation from ₹6,125 crore ($0.70 billion) in 2024 to ₹8,885 crore ($1.02 billion) in 2025.
    - Apple's contract manufacturers in India received ₹6,600 crore ($0.76 billion) over the past three years.
- **Custom Duty Reduction:** Union Budget 2025 removed basic custom duties on mobile phone components like:
    - Printed circuit boards
    - Camera modules
    - Connectors and sensors
    - Machinery for lithium-ion battery manufacturing
- **National Manufacturing Mission:** Announced in the Union Budget to support small, medium, and large industries.
    - Aims to develop industrial clusters and promote technological knowledge-sharing.
- **Skill Development Initiatives:** On-site training programs to ensure tacit knowledge transfer in electronics manufacturing.
    - Plans to integrate industry-specific specialization in skill development programs.

How India Can Counter China's Actions

- **Engaging Apple & Foxconn for Negotiations:** Since both companies have stakes in India and China, they can negotiate with Beijing to ease restrictions.
- **Strengthening Domestic Supply Chains:** Incentivizing local manufacturers to produce specialized machinery and components.
    - Developing a robust domestic contract manufacturing network.
- **Expanding Technological Self-Reliance:** Encouraging private capital to invest in R&D for electronic components.
    - Promoting semiconductor and chip manufacturing under the India Semiconductor Mission.
- **Diversification of Supply Chains:** Strengthening trade partnerships with alternative supplier nations like Taiwan, Japan, South Korea, and the U.S.
- **Reducing Dependence on China:**Encouraging Indian firms to enter high-end electronics manufacturing.
    - Promoting joint ventures with non-Chinese foreign players.
- **Enhancing Infrastructure & Policy Support:** Speeding up the creation of electronics manufacturing clusters.
    - Providing tax incentives and subsidies to attract high-tech investments.

Source: The Hindu: Dealing with China's weaponisation of e-supply chains