UN World Water Development Report 2025 – Mountains and Glaciers

UNESCO has published the **United Nations World Water Development Report 2025**, focusing on **Mountains and Glaciers: Water Towers**.

Key Insights from the Report

- **Accelerated Glacier Melt**: Glaciers are losing mass at an unprecedented rate.
    - Since 1975, they have shed over **9,000 billion tonnes**, an amount comparable to an ice block the size of Germany.
    - Black carbon from wildfires and dust storms is intensifying glacier melt by increasing heat absorption.
- **Permafrost Thawing**: Rising temperatures are causing permafrost to melt, leading to the release of organic carbon, which worsens climate change.
    - Thawing permafrost also destabilizes slopes, increasing the likelihood of landslides and related hazards.
- **Declining Snow Cover**: Snow cover in mountain regions has significantly reduced, particularly in **spring and summer**.
    - A **7.79% decline** in global snow cover was recorded between 1979 and 2022.

Impacts and Concerns

- The melting of glaciers and permafrost has led to **irregular water flow**, a higher risk of **glacial lake outburst floods (GLOFs)**, and **rising sea levels**.
    - GLOFs have resulted in **over 12,000 deaths** in the last **200 years**.
    - Glacier melt contributes **25-30%** of global sea-level rise, threatening millions worldwide.

Proposed Actions and Future Strategies

- **Mountains play a crucial role in sustaining life**, covering **33 million square kilometers** and providing freshwater for approximately **2 billion people**.
- **Policy changes and awareness campaigns** are necessary to mitigate the impact of rising temperatures on **mountain ecosystems and downstream communities**.
- **Resource mobilization and the development of effective policy frameworks** are essential for addressing these environmental challenges.

Seabed Warfare in the Era of Geotechnological Conflicts

Background

As nations increasingly depend on undersea infrastructure for communication, energy transmission, and resource extraction, the ocean floor has turned into a strategically contested domain.

Understanding Seabed Warfare

Seabed warfare involves military operations conducted on, from, or targeting the ocean floor. It includes the deployment of cutting-edge technologies like **Unmanned Underwater Vehicles (UUVs), Remotely Operated Vehicles (ROVs),** and submersibles to disrupt or protect critical undersea infrastructure, such as:

- **Communication Cables** – Essential for global internet and data exchange.
- **Energy Pipelines** – Crucial for transporting oil and gas.
- **Sensors and Surveillance Systems** – Used for monitoring and security purposes.

Geotechnological Conflicts in the Seabed Domain

Technological advancements are fueling geopolitical rivalries in seabed warfare, including:

- **Cyber & Hybrid Warfare** – AI-driven submarines and deep-sea drones capable of espionage and sabotage without detection.
- **Autonomous Underwater Systems** – Advanced UUVs developed for reconnaissance, surveillance, and offensive capabilities.
- **Seabed Militarization** – Concerns over the potential deployment of mines and offensive UUVs near key undersea infrastructure.

Significance of the Seabed

- **Global Communication** – Over 95% of internet traffic is transmitted via undersea fiber-optic cables, which are vital for finance, military communication, and digital connectivity.
- **Energy & Natural Resources** – The ocean floor is rich in oil, gas, rare earth minerals, and polymetallic nodules. Additionally, underwater energy pipelines are integral to global supply chains.
- **Defense & Surveillance** – Nations are deploying sensor networks, submarines, and UUVs for intelligence gathering, monitoring, and strategic military operations.

Key Players & Global Incidents

- **United States** – Operates advanced seabed warfare systems through its **Seawolf-class** and **Virginia-class submarines**.
- **China** – Has developed deep-sea research submarines, underwater sensor networks, and AI-powered seabed surveillance, including the **Great Underwater Wall** in the South China Sea to detect enemy vessels.
- **Russia** – Uses specialized submarines like **Losharik** and deep-diving vessels such as **Yantar**, which have been implicated in tapping or severing undersea cables.
- **NATO & European Nations** – Heightened focus on protecting undersea infrastructure following incidents like the **Nord Stream pipeline explosions**. Countries like the **UK and France** are investing in seabed security, especially after **cable sabotage in the Baltic Sea (2023–2024)**.

India's Initiatives in Seabed Warfare

Enhancing Submarine Capabilities

- **Project 75 & Project 75I** – Acquisition of **Scorpène-class submarines (INS Kalvari)** and plans for next-generation submarines.
- Development of **nuclear submarines** like **INS Arihant**.

Protecting Undersea Infrastructure

- **Deep Ocean Mission** – Aimed at deep-sea mining and resource security.

Advancing Seabed Surveillance & Unmanned Systems

- Deployment of **Autonomous Underwater Vehicles (AUVs)**.
- **Coastal & Deep-Sea Monitoring** – Led by the **National Institute of Ocean Technology (NIOT)**.

Strategic Collaborations

- **QUAD Partnership** – Strengthening maritime security and safeguarding undersea infrastructure in the Indo-Pacific region.

Future of Seabed Security

- **Enhanced Surveillance** – Nations are leveraging **AI-powered underwater sensors and satellite tracking** to monitor suspicious activities.
- **Legal & Policy Measures** – The **United Nations Convention on the Law of the Sea (UNCLOS)** provides governance guidelines, but stronger international agreements on seabed security are needed.
- **Defense Innovation** – Development of **anti-UUV systems** to counter underwater drones.

Anthurium Flowers

Recent Developments

Mizoram has successfully exported its first batch of Anthurium flowers to Singapore, marking a key milestone in enhancing agro-based exports from the North Eastern Region (NER).

About Anthurium Flowers

- **Scientific Name:** *Anthurium*
- **Geographical Distribution:**
    - Originates from the Americas, spanning from northern Mexico to northern Argentina, including the Caribbean.
    - In India, it is extensively cultivated in Mizoram and other northeastern states due to favorable climatic conditions.
    - It is also grown commercially in Tamil Nadu (21%), Karnataka (16%), Madhya Pradesh (14%), and West Bengal (12%).
- **Botanical & Morphological Characteristics:**

- Anthurium is a herbaceous plant that can grow both epiphytically (on other plants) and terrestrially.
- It features a central spike known as a spadix and a brightly colored spathe (a leaf-like bract) in shades of red, pink, orange, and more.
- The plant contains calcium oxalate crystals, and its sap can cause skin and eye irritation.

Economic & Cultural Importance

- **Exports:** Anthurium contributes to India's floriculture industry, with exports valued at USD 86.62 million in FY 2023-24.
  - **Major Importers:** USA, Netherlands, UAE, UK, and Canada.
- **Tourism & Cultural Promotion:** Mizoram organizes the annual *Anthurium Festival*, which boosts tourism, supports local businesses, and highlights the flower's commercial significance.
- **Livelihood Support:** The cultivation of Anthurium plays a crucial role in generating rural income, especially for women farmers and cooperative societies in the Northeast.