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SUMMARY OF
DOWN TO EARTH

[16–30 September, 2024]

Trade on Emissions

Context:

The global push for a low-carbon economy is accelerating, but concerns are emerging about economic rivalry and trade protectionism disguised as climate action. The EU's Carbon Border Adjustment Mechanism (CBAM) illustrates how developed nations may be using climate policies to shield domestic industries while shifting environmental burdens onto others.

CBAM and the Global Push for a Low-Carbon Economy

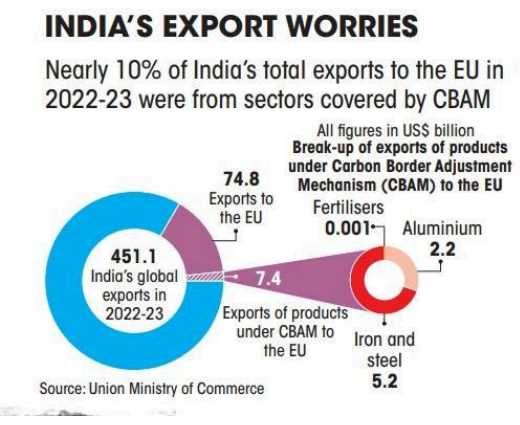
- The international effort to reduce greenhouse gas (GHG) emissions is intensifying, with a focus on transitioning to a low-carbon economy. However, this movement has sparked concerns over trade protectionism, as developed nations allegedly use climate policies to shield domestic industries while shifting the environmental burden to developing countries.
- The European Union's (EU) Carbon Border Adjustment Mechanism (CBAM), introduced in October 2023 as part of the "Fit for 55" initiative, aims to reduce GHG emissions by at least 55% by 2030. CBAM imposes a carbon tariff on energy-intensive imports, including iron, steel, cement, electricity, hydrogen, fertilizers, and aluminum, based on production-related emissions.

Concerns and Criticism

- **Developing Countries Challenge CBAM's Alignment with the Paris Agreement:** Developing nations, led by India, South Africa, Brazil, and China, have voiced concerns that the Carbon Border Adjustment Mechanism (CBAM) contradicts the Paris Agreement's principle of "Common but Differentiated Responsibilities." They argue that the policy unfairly imposes climate obligations on less developed economies.
- **Concerns Over Shifting Financial Burden to the Global South:** Critics contend that CBAM transfers the financial cost of climate action from the Global North to the Global South, placing an economic burden on developing countries. This shift could exacerbate challenges for these economies in addressing climate change.
- **Global Forums Criticize CBAM as Coercive and Trade-Distorting:** At platforms like the 2024 Ministerial Declaration for the High-Level Political Forum and COP28, various nations condemned CBAM, describing it as a coercive measure that distorts trade under the guise of climate protection. They stressed the need for fairer approaches to climate policy.
- **Potential Impact on Export Competitiveness in Developing Economies:** There is growing concern that CBAM could weaken the competitiveness of export-oriented industries in developing countries, particularly in the short to medium term. This could lead to economic disruptions as industries adapt to the new carbon-related trade requirements.

Economic Impact and Trade Implications

- Studies indicate that CBAM could disrupt global trade more than it reduces emissions. The Asian Development Bank (ADB) estimates that a €100 per tonne carbon tariff would only reduce emissions by 0.2% while potentially leading to a 1.1% decline in Asia's exports to the EU.
- The Centre for Science and Environment (CSE) reported that CBAM could raise the costs of India's exports to the EU by 25%.
    - Nearly 10% of India's exports to the EU in 2022-23 came from sectors covered under CBAM, making its economy particularly vulnerable to these tariffs.



- Small and medium enterprises (SMEs) in developing countries, which often lack the resources to comply with CBAM's complex reporting and verification requirements, face significant challenges in maintaining their market positions.

The EU's Justification vs. Counterarguments

- The EU claims that CBAM is necessary to uphold its Emissions Trading System (ETS), launched in 2005, by preventing "carbon leakage"—the relocation of industries to regions with lower environmental standards.
- The ETS requires companies in high-emission sectors to purchase allowances for their emissions, and CBAM aims to level the playing field by imposing similar requirements on imports.
- Critics argue that there is no substantial evidence that carbon leakage is a significant concern, as companies typically relocate based on factors like labor costs, market access, and production expenses rather than carbon regulations.
- The historical context shows that Europe outsourced a considerable portion of its manufacturing in the 1990s, yet continued to consume imported goods with embedded emissions.

Compatibility with WTO Rules and Trade Equity

- The WTO's **"most-favored nation" rule** and other principles mandate equal treatment for similar products, irrespective of their origin. CBAM's method of tying carbon tariffs to production emissions raises questions about its alignment with these trade rules, as it disproportionately affects developing nations that have higher emission intensities.
- This approach potentially places an unfair financial burden on countries with fewer resources for advanced technologies, creating barriers that could be considered discriminatory under international trade agreements.

Addressing CBAM's Challenges for Developing Nations

- **Administrative and Financial Barriers**: Developing countries may struggle with CBAM's requirements due to limited resources and experience in measuring carbon content. SMEs, which make up a significant portion of exports from countries like India, face steep administrative costs and complex compliance processes.
- **Higher Tariffs for Developing Nations**: The calculation of tariffs based on emissions intensity means higher costs for goods from countries like India, where emission standards may not be as stringent as in developed countries.
    - For instance, steel produced in India has higher emissions compared to that produced in the U.S., resulting in a larger tariff under CBAM.
- **Potential Trade Disruptions**: The financial impact of CBAM could discourage trade, as tariffs would make products from developing countries less competitive in the EU market. Analysts predict a potential trade downturn, which could undermine poverty alleviation efforts and economic growth in these regions.

Strategic Recommendations for Mitigation

- **Implement Domestic Carbon Pricing**: Developing nations could consider imposing a carbon tax on exports to offset CBAM tariffs. The revenue generated could be directed towards decarbonizing industries and supporting sustainable growth.
- **Promote Greener Production for Export**: Industries could adopt low-carbon production methods for goods destined for the EU, while maintaining traditional techniques for other markets. This approach would help reduce CBAM-related costs without compromising overall production.
- **Demand Fair Revenue Allocation**: Developing countries should advocate for the EU to allocate CBAM revenues towards a global decarbonization fund, aimed at supporting clean energy projects in exporting nations,

similar to the EU's Modernisation Fund. Developing nations should push for climate finance equity, urging wealthier countries to increase their contributions and support measures that align with UN Framework Convention on Climate Change (UNFCCC) mandates for assistance to developing nations.

Conclusion

- With the EU expecting significant revenue from CBAM, other regions, such as the UK and the U.S., are also considering similar measures. This could risk sparking a global trade conflict if not managed through coordinated international efforts. To prevent CBAM from becoming a new barrier to trade, a more comprehensive approach is needed, balancing climate action with fair economic development across regions.

Indian Carbon Market

Context:

As global efforts to combat climate change intensify, India is preparing to launch its own carbon market, the Carbon Credit Trading Scheme (CCTS). With the aim of regulating greenhouse gas emissions, this initiative is a significant step toward meeting the country's ambitious climate targets.

India's Carbon Market: Moving Towards Emission Reduction

- India is set to roll out the CCTS, a market-based approach aimed at reducing emissions by setting industry-specific targets.
- Companies that exceed their targets can sell surplus emission credits, while those failing to meet targets must purchase credits to comply.
- The CCTS supports India's climate commitments, including reducing emissions intensity by 45% by 2030 and achieving net-zero status by 2070.

Implementation and Scope of CCTS

- The CCTS follows a **baseline-and-credit system**, which determines credits based on emissions intensity rather than setting a total emissions cap.
- Initially, the scheme will cover four industrial sectors: iron and steel, cement, pulp and paper, and petrochemicals, with plans to expand to nine sectors.
- The estimated coverage of emissions remains under 20% of the country's total, even with the inclusion of additional sectors.

Global Trends Influencing the CCTS

- India's decision to introduce the CCTS is partly driven by the need to adapt to international climate initiatives such as the EU's CBAM, which could affect exports.
- Other developing countries, like China and Indonesia, have also established carbon markets, further motivating India to keep pace with global carbon trading trends.
- The CCTS aims to help India achieve its Nationally Determined Contributions (NDCs) under the Paris Agreement and address the economic impacts of climate change.

Challenges in Implementing the CCTS

- **Low Carbon Credit Prices and Market Liquidity:** Initial carbon markets in regions like Korea and China faced low prices and limited market activity, challenges that India may also encounter.The Perform Achieve and Trade (PAT) scheme experienced similar issues, with low pricing and oversupply of certificates.
- **Dependence on the PAT Scheme:** As India transitions to the CCTS, ongoing reliance on the PAT scheme may limit coverage and exclude the biggest emitters from early compliance.
- **Unambitious Target Setting:** Previous targets under PAT were considered too lenient, resulting in oversupply and lower market prices. CCTS must establish more challenging goals to ensure significant emission reductions.
- **Data Quality and Transparency Concerns:** Data integrity issues in other markets, like China's, highlight the need for accurate emissions reporting and strict monitoring to ensure compliance under the CCTS.
- **Exclusion of the Power Sector:** The thermal power sector, contributing about 40% of India's

emissions, is not included in the initial phase, leaving a substantial portion of emissions unregulated.

Comparison of the world's leading carbon emissions trading systems (ETSs)

Case studies	EU ETS	Korea ETS	China ETS	Surat ETS in India
Type of system	Cap-and-trade	Cap-and-trade	Partly baseline-and–credit	Cap-and-trade
Year of commencement	2005	2015	2021	2019
Allocation of emissions allowed (measured in carbon credits)	Initially allocated freely, the share of free allocations reduced and auctioning increased	Mix of free allocation and auctioning	All free allocations	Auctioning at floor price of ₹5/kg of particulate matter (PM) emissions
Coverage	37% of the EU's greenhouse gas (GHG) emissions	89% of GHG emissions of the country	40% of country's GHG emissions	342 textile industries from Surat
Offset limits*	No offset emissions allowed after 2020	5% of the verified emissions	5% of the verified emissions	No offsetting
Emission reduction achieved	ETS emissions in 2023 were 47% below 2005 levels (as per a 2024 report by European Commission)	Data not available	Data not available	It has claimed to have reduced PM emissions by 24% between 2019 and now. No study in public domain to back these claims
Price of purchasing one carbon credit in the ETS*	US $90 (average auction price 2023)	$6.4 (as of July 2024)	$11.74 (as of March 2024)	₹5/kg (PM emission permit price, not carbon credit, as of 2023)

Recommendations for Strengthening the CCTS

- **Adopt a Unified National Scheme for Carbon-Intensive Sectors:** Phasing out the PAT scheme and integrating these sectors into the CCTS will create a more comprehensive regulatory framework.
- **Set Ambitious Targets and Ensure Market Stability:** Higher reduction targets and mechanisms to stabilize the market will help maintain a fair and effective carbon pricing system.
- **Introduce Revenue Generation Mechanisms:** Carbon credit auctions can generate revenue to support small businesses and fund decarbonization initiatives.
- **Enhance Data Quality and Monitoring:** Rigorous monitoring processes and public data transparency are essential to prevent fraud and manipulation in emissions reporting.
- **Include the Power Sector in the CCTS:** Adding the thermal power sector would significantly increase emission coverage, making it easier to meet India's climate targets.

Conclusion:

The success of India's Carbon Credit Trading Scheme hinges on overcoming implementation challenges, establishing ambitious goals, and ensuring market stability. By addressing these issues, CCTS can become a critical tool in India's journey toward a low-carbon future, aligning with both global trends and domestic climate commitments.

OZONE LAYER

Context:

Efforts to restore the ozone layer have shown promising results, but evolving challenges like climate change and increased space activity could jeopardize progress. These factors may introduce new risks that threaten the stability of the ozone layer, highlighting the need for continued global action.

Signs of Recovery Amid Global Efforts

- **Decline in Ozone-Depleting Chemicals**
  - In June 2024, a study published in *Nature Climate Change* reported a decrease in hydrochlorofluorocarbons (HCFCs) levels,

marking the first time since the 1970s that these chemicals have significantly declined.

- This progress was achieved five years ahead of the projected peak year of 2026, indicating a positive trend in ozone recovery due to the successful implementation of the Montreal Protocol.

- **Role of the Montreal Protocol**
  - The Protocol, a landmark international agreement, has phased out 99% of ozone-depleting substances, such as CFCs and HCFCs, which were primarily used in refrigeration and air conditioning.
  - With these substances nearly eliminated, the Antarctic ozone hole, which appears annually, is expected to gradually close by the 2060s.

Climate Change Complicates Ozone Recovery

- **High Global Warming Potential of HFCs**
  - While HCFCs have been replaced with hydrofluorocarbons (HFCs), which do not contain chlorine and are safe for the ozone, they have a high global warming potential.
  - The Kigali Amendment to the Montreal Protocol aims to phase out HFCs to reduce global warming by up to 0.5°C by 2100, aligning climate action with ozone protection efforts.
- **Unusual Ozone Hole Activity Linked to Climate Change**
  - In recent years, the Antarctic ozone hole has exhibited abnormal behavior, including forming earlier than usual in 2023 and persisting longer.
  - Events like the 2022 volcanic eruption in Tonga, which released significant water vapor into the stratosphere, have been linked to these anomalies. The water vapor can interact with chlorine molecules, enhancing ozone depletion.
  - NASA points out that greenhouse gas emissions can cool the upper stratosphere, increasing the efficiency of chlorine-based ozone depletion, potentially disrupting the recovery process.

Space Activity Poses New Risks

- **Satellite Reentry and Ozone Depletion**
  - A 2024 study from the University of Southern California highlighted that satellites burning up during reentry release aluminum oxides, which act as catalysts for ozone-destroying chemical reactions.
  - A projected "mega-constellation" of satellites could emit 360 tonnes of aluminum oxides annually, significantly impacting the ozone layer.
- **Monitoring the Impact of Growing Space Industry**
  - With the space industry expected to expand to $3.7 trillion by 2040, increased satellite launches could exacerbate ozone depletion.
  - Experts like David Fahey of NOAA have called for the Montreal Protocol to consider these risks in future assessments, with plans to address the issue in the 2026 evaluation.

Increased UV Exposure Due to Ozone Changes

- **Risks to Polar Ecosystems**
  - A thinner ozone layer increases exposure to UV radiation, especially in polar regions where the protective layer is already fragile.
  - An April 2024 study warned that climate change-induced shifts in wind patterns and the loss of sea ice in Antarctica could heighten organisms' exposure to UV radiation, disrupting ecosystems and threatening biodiversity.
- **Potential Health Impacts on Humans**
  - Increased UV radiation can lead to higher rates of skin cancer, cataracts, and other health problems, underscoring the need to continue protecting the ozone layer.

Recommendations for Protecting the Ozone

Layer

- **Strengthen Global Efforts Under the Kigali Amendment:** Full implementation of the Kigali Amendment is essential to phase out HFCs and limit global temperature rise, supporting both ozone recovery and climate mitigation.
- **Regulate Space Activities to Minimize Impact:** International agreements should establish guidelines to limit the emissions of harmful substances from satellite reentries and other space-related activities.
- **Integrate Climate and Ozone Protection Strategies:** Policies should simultaneously target climate change and ozone depletion, creating synergy to tackle both issues more effectively.
- **Enhance Monitoring and Research:** Continuous scientific monitoring and research are crucial to detect new threats and ensure that progress in ozone restoration is maintained.Increasing transparency in data collection can help prevent manipulation and improve global compliance.
- **Include the Space Industry in Environmental Assessments:** Given the projected growth of the space sector, its environmental impact, including effects on the ozone layer, should be evaluated in global assessments like the Montreal Protocol.

Conclusion:

While global efforts have made significant strides in protecting the ozone layer, emerging risks from climate change and space activities present new challenges. Addressing these evolving threats is essential to maintain progress, safeguard human health, and protect ecosystems from harmful UV radiation. Continued vigilance and proactive policies are required to ensure that the recovery of the ozone layer remains on track.

Vaccine Inequity Amid Mpox Outbreak: Africa's Struggle for Access

Context:

The mpox (formerly monkeypox) outbreak in Africa, particularly in the Democratic Republic of Congo (DRC), has exposed the harsh reality of vaccine inequity. Delayed vaccine shipments, limited supplies, and bureaucratic obstacles continue to hamper efforts to contain the epidemic, leaving millions vulnerable.

Reasons Behind Vaccine Inequity

- **Delayed Arrival and Limited Supplies**
  - On September 5, 2024, a small shipment of 100,000 vaccine doses from the EU reached Kinshasa, DRC. An additional 200,000 doses arrived two days later, but this is far from sufficient, as DRC needs 3.5 million doses to control the outbreak, and the continent requires 10 million.
  - With over 18,000 cases and 629 deaths reported in DRC this year, the delayed arrival of vaccines mirrors the struggles seen during the COVID-19 pandemic, when Africa faced similar shortages.
- **Limited Vaccine Production:**
  - Currently, only two companies produce mpox vaccines: **Denmark's Bavarian Nordic (Jynneos) and Japan's KM Biologics (LC16)**. LC16, which can be administered to children, is not yet commercialized.
    - The high cost, with Jynneos priced at around $110 per dose, adds to the challenges, making it difficult for African nations to secure enough vaccines.
- **Disparities in Vaccine Stockpiling**
  - The U.S. has a substantial stockpile of over 100 million doses of the older ACAM2000 smallpox vaccine, reserved for emergencies. When mpox reemerged, the U.S. and Europe had enough supplies due to these reserves.
  - Despite this, the U.S. has donated only 50,000 doses to Africa, most of which went to Nigeria, while Japan has pledged

2-3 million doses of LC16 but has not set a timeline.

- **Slow WHO Response**
  - **Delayed Emergency Declaration for Africa:** While WHO declared a **Public Health Emergency of International Concern (PHEIC)** for mpox in developed countries within months of the outbreak in 2022, it took over a year to do the same for Africa, even after a spike in cases.
  - The delay came despite warnings from public health advocates and only after the Africa CDC declared an emergency in August 2024, one year after DRC's health emergency declaration.
- **Bureaucratic Delays:** Securing vaccines depends on countries' ability to arrange financing, meet regulatory requirements, and confirm demand. WHO has not yet completed its review of the vaccines for Emergency Use Listing, further slowing distribution.

Africa Takes Charge

- **Africa CDC Leads the Response**
  - Learning from past experiences, Africa is stepping up its role, with the Africa CDC and WHO launching a six-month response plan to tackle the mpox outbreak. The plan, running from September 2024 to February 2025, has a budget of $600 million and aims to strengthen health systems in 29 African countries.
  - This marks a shift towards greater regional control, as Africa Centers for Disease Control and Prevention (CDC) plays a more prominent role in health crisis management.

Addressing Vaccine Inequity

- **Urgent Need for More Support:** African countries still lack the 13.5 million doses needed to contain the outbreak. More timely and substantial donations from high-income nations are essential to closing this gap.
- **Rethinking Global Health Governance:** The mpox crisis highlights the need for more equitable global health policies, including timely emergency declarations and fair access to vaccines.

Conclusion:

The ongoing mpox outbreak in Africa underscores the persistent vaccine inequity and the challenges of securing adequate resources during health emergencies. As the continent takes a more active role in addressing the crisis, global support remains critical to ensure that vulnerable populations receive the protection they need. The proactive stance of the Africa CDC offers hope, but swift and coordinated international efforts are essential for effective containment.

Many Myths of Chipko: Unraveling the Misconceptions

Context:

The Chipko movement, often depicted through images of Garhwali women hugging trees to protect them from being felled, has become an iconic symbol of environmental activism. However, many popular perceptions of the movement, such as its ecological and feminist undertones, overshadow its true objectives.

Origins of Chipko: A Fight for Forest Rights

- **Grassroots Beginnings**
  - The Chipko movement started in 1973 in Uttarakhand, then a part of Uttar Pradesh, as a response to commercial logging practices that degraded forests and contributed to natural disasters.
  - The initial demands focused on ending the contract system of tree-felling and granting local communities control over forest management. This approach aimed to foster local economies through small-scale, forest-based industries while ensuring sustainable forest use.
- **Shift to Environmental Advocacy**
  - Historian Shekhar Pathak notes in *The Chipko Movement: A People's History* that the movement's shift toward ecological

concerns emerged between 1977 and 1979. During this period, environmentalist Sunderlal Bahuguna advocated for a total ban on tree-felling based on his deep ecology views.

- This shift diverted attention from the movement's original goals of local empowerment and economic development.

The Feminist Narrative: A Misconception

- **Myth of the "Gender Conflict"**
  - The portrayal of Chipko as a feminist struggle against male exploitation originated from a single incident highlighted by social activist Vandana Shiva in her 1988 book, *Staying Alive: Women, Ecology and Development*.
  - Shiva described an event where Bachni Devi allegedly protested against her husband, identified as contractor Sunderlal Saklani. However, historical records show that Bachni Devi's husband was actually Bakhtawar Singh, a village head, and not involved in tree-felling.
- **Gender Collaboration, Not Conflict**
  - Prominent Chipko activist Gaura Devi from Reni, often associated with the movement's feminist image, stated, "We have no quarrel with anybody." She attributed the significant participation of women to the migration of men seeking jobs, rather than a gender conflict.
  - Interviews with other female activists like Sudesha Behn, Vimla Bahuguna, and Dulari Devi confirm that Chipko was not an "ecofeminist" movement. The struggle was for life and livelihood, with men and women collaborating as equals.

Misattributions and Myths

- **The Origin of the Slogan**
  - The widely recognized slogan, "What do forests bear? Soil, water, and pure air," was not coined by Bachni Devi, as stated in some literature. It was actually composed by journalist and social activist Kunwar Prasun, confirmed through interviews with Chipko leaders and Prasun's family.
- **The Reenactment of Iconic Photos**
  - Many of the famous images showing women hugging trees lack context, including dates, names, or locations. These photos were staged reenactments organized during demonstrations to satisfy visitors from outside Uttarakhand, as admitted by activist Sudesha Behn.
  - Veteran activist Chandi Prasad Bhatt noted in a 1993 interview that women never had to hug trees to protect them; the mere threat of doing so was often enough to deter loggers.
- **The Real Meaning Behind "Chipko"**
  - **The Word's Origin:** Contrary to popular belief, "Chipko" did not arise from media images of tree-hugging women. It was first used in a poem by Ghanshyam Raturi, a poet associated with the movement, and later popularized by Chandi Prasad Bhatt, as explained in Pathak's research.

Impacts of Misconceptions

- **A Shift Away from the Original Goals**
  - In 1981, the Uttar Pradesh government banned tree-felling, responding to the ecological narrative that overshadowed the movement's original demand for local control over forest resources. This policy shift disregarded the call for community-based forest management, which would have empowered local economies and increased women's participation.
  - The emphasis on Chipko as a conservation movement led some to blame its

"internationalization" for stalling Uttarakhand's development.

Changing Dynamics in Uttarakhand

- **Socioeconomic Shifts Over the Decades**
  - Mechanized transportation, telecommunications, and market penetration have transformed mountain villages over the last 50 years. Enhanced education and diverse job opportunities have led younger generations to aspire to urban lifestyles.
  - The availability of liquefied petroleum gas (LPG) cylinders, water connections, and formal education reduced the reliance on forests for daily needs, weakening the traditional bond with nature.

Conclusion:

The Chipko movement, in its true form, was a struggle for local rights and sustainable development, rather than merely a conservation effort or feminist crusade. The misconceptions surrounding the movement have obscured its real objectives and contributed to policy decisions that overlooked the importance of community-based forest management. With changing socioeconomic conditions and evolving aspirations in Uttarakhand, a revival of the original Chipko demand for localized development and forest-based economies seems improbable today.

India sees unusual monsoon patterns

States in western and southern India, including Gujarat, Maharashtra, and Tamil Nadu, experienced surplus rainfall. In contrast, northern and north-eastern states like Nagaland, Manipur, and Punjab reported significant rainfall deficits.

Reasons Behind

- **Shifting Monsoon Trough Patterns:** The monsoon trough, a critical rain-bearing system, displayed irregular movement this season. A southward deviation of the trough resulted in heavy rainfall over southern India, while northern and eastern regions experienced dry spells.
  - When the trough shifted north, the monsoon entered a "break" phase, directing rains toward the Himalayan and northeastern regions.
- Unprecedented Extreme Weather Events: Cyclone Asna, a rare August cyclone over the Arabian Sea, brought unseasonal heavy rainfall to western India.
  - The monsoon season has been marked by extreme weather patterns, with alternating bouts of intense rainfall and prolonged dry spells.
- **Anticipated Impact of La Niña**
  - The India Meteorological Department (IMD) forecasts warmer-than-normal temperatures for the rest of September, with some regions likely to face extreme rainfall. The development of La Niña, expected towards the end of the 2024 monsoon season, could further influence weather patterns.
  - Similar to 1999, a strong El Niño followed by La Niña could lead to more frequent cyclonic events and erratic weather conditions.

Implications of unusual Monsoon Pattern

- Increased Flood Risk in Southern India: The southward shift of the monsoon trough has led to excessive rainfall, heightening the chances of floods and urban waterlogging in southern regions.
- Agricultural Stress in Northern and Eastern India: Dry spells due to irregular monsoon patterns could severely affect crop yields, potentially threatening food security in these regions.
- Rise in Extreme Weather Events: Unseasonal Cyclone Asna and erratic rainfall patterns signal an increased frequency of extreme weather events, necessitating improved disaster preparedness.
- Potential Surge in Cyclonic Activity with La Niña: The expected onset of La Niña could lead to more frequent and severe cyclones, especially over the Arabian Sea, posing greater risks to coastal communities.
- Warmer Temperatures and Heatwave Threats:IMD predicts higher-than-normal temperatures in September, increasing the

likelihood of heatwaves and their impact on public health and energy demand.

- Disruption to Monsoon-Dependent Livelihoods: The erratic behavior of the monsoon threatens the stability of agriculture and water-reliant industries, affecting millions of livelihoods across India.
- Strain on Water Resources: Irregular rainfall and prolonged dry periods could exacerbate water shortages, leading to potential conflicts over water access and over-reliance on groundwater resources.

Way Forward

- **Building Climate-Resilient Infrastructure:** The unpredictable behavior of the 2024 monsoon season emphasizes the need for adaptive infrastructure that can cope with both excessive rainfall and extended droughts.
- **Enhancing Water Management Practices:** Improved water management strategies are critical to mitigating the effects of irregular monsoon patterns, ensuring sustainable water supply during droughts while preventing floods.
- **Adopting Climate-Resilient Agricultural Systems:** Implementing climate-resilient agricultural techniques is essential to protect crops and maintain food security in the face of increasingly erratic monsoon behavior.
- **Investing in Climate Adaptation:** Governments must invest in climate adaptation measures to safeguard vulnerable communities from both extreme weather events and changing monsoon dynamics.

Conclusion:

Governments and global institutions must collaborate to tackle the growing challenges posed by climate change, as these disruptions threaten food security and the livelihoods of millions. By investing in sustainable practices and innovative solutions, we can safeguard vulnerable populations and promote sustainable development. Proactive measures taken today will be essential in securing a more resilient future for all.

TROPICAL STORM SHANSHAN HITS JAPAN

In late August, Japan experienced severe weather conditions due to Tropical Storm Shanshan, which intensified into a typhoon upon making landfall on August 29. The storm unleashed heavy rainfall and strong winds across the southern regions, leading to devastating consequences.

About

- Typhoons are a form of tropical cyclone, known by various names such as hurricanes or cyclones based on their geographical location. These cyclones are characterized by swift inward airflow around a low-pressure zone.
- In the Northern Hemisphere, this air movement occurs in an anticlockwise direction, while in the Southern Hemisphere, it moves in a clockwise direction. Typhoons typically bring severe storms and adverse weather conditions.

About Tropical Cyclones

- Tropical cyclones are major weather phenomena that originate over warm ocean waters near the equator.
- The formation process begins when warm, moist air rises from the ocean surface, creating a low-pressure area.
- As higher-pressure air from the surrounding regions moves toward this low-pressure zone, the air warms and rises further.
- When the rising air cools, it leads to cloud formation.
- This system of rotating clouds and winds gains strength from the ocean's heat, and as wind speeds increase, an eye develops at the center of the cyclone.

Characteristics of Tropical Cyclones

- **Calm Center**: The center of a cyclone is typically tranquil and clear, marked by very low air pressure.
- **Wind Speed**: The average wind speed within a tropical cyclone is approximately 120 km/h.
- **Closed Isobars**: These cyclones are characterized by closed isobars, which indicate higher wind velocities. Isobars are imaginary lines on weather maps that connect areas of equal atmospheric pressure.

- **Formation Location**: Tropical cyclones exclusively form over oceans and seas.
- **Movement**: They generally move from east to west, are influenced by trade winds, and occur seasonally.

Cyclone Type	Location
Typhoon	China Sea and Pacific Ocean
Hurricane	West Indian Islands, Caribbean Sea, Atlantic Ocean
Tornado	Guinea Lands of West Africa, Southern USA
Willy-Willies	North-Western Australia
Tropical Cyclone	Indian Ocean Region

BNT116 VACCINE

Trials of the world's first mRNA vaccine for lung cancer have begun in seven countries. About 130 people in the UK, US, Germany, Hungary, Poland, Spain and Türkiye will be inoculated by the BNT116 vaccine made by BioNTech.

About

- Lung cancer is the leading cause of cancer death globally, accounting for about 1.8 million deaths annually.
- It utilizes mRNA (messenger ribonucleic acid) technology, viewed as a breakthrough in cancer treatment.

mRNA Vaccine Technology

- **Introduction of mRNA**: The vaccine introduces a piece of mRNA that encodes a protein associated with cancer cells.
- **Function of mRNA**: mRNA serves as a genetic molecule containing instructions for cells to produce proteins.
- **Immune Response**: The delivered mRNA prompts cells to create specific proteins, triggering the immune system to produce antibodies and enhance its defensive response.

Benefits of mRNA Vaccines

- **Safety**: Safer than traditional vaccines as they do not contain live or weakened viruses, minimizing the risk of causing the disease.
- **Rapid Development**: Can be developed quickly compared to traditional vaccines, which often require extensive time for cultivation of weakened viruses.
- **Precision Targeting**: mRNA vaccines can be designed to target specific proteins associated with diseases, potentially increasing their effectiveness against particular cancers or infections.
- **Strong Immune Response**: They can elicit a robust immune response by prompting the body to produce a wide range of antibodies, enhancing the overall immune defense.
- **Adaptability**: The technology allows for rapid modifications in response to emerging variants of viruses or cancer mutations, facilitating timely updates to vaccines.
- **Non-infectious**: Since mRNA vaccines do not use live pathogens, they cannot cause infections, making them suitable for immunocompromised individuals.

LAKE KARIBA

Zambia halted operations at its primary hydropower plant on September 14, following a dramatic decline in water levels at its source, Lake Kariba.

About Lake Kariba

- **World's Largest Reservoir**: Lake Kariba holds the title of the largest man-made lake and reservoir by volume globally.
- **Geographical Location**: Situated approximately 1,300 kilometers upstream from the Indian Ocean, it spans the border between Zambia and Zimbabwe.
- **Kariba Dam**: The lake is fed by the Kariba Dam, a double-curvature concrete arch dam located in the Kariba Gorge within the Zambezi River basin, straddling both Zambia and Zimbabwe.
- **Boundary Formation**: The dam acts as a natural divider between Zambia and Zimbabwe, spanning the Kariba Gorge.
- **Energy Production**: The dam plays a crucial role in generating significant amounts of electricity for both countries while also supporting a thriving commercial fishing industry.

- **Biodiversity**: Lake Kariba and its surrounding areas are home to a rich variety of bird species, including fish eagles and cormorants, which are often spotted hunting along the shoreline.
- **Wildlife Attraction**: The lake attracts elephants and other large game animals that come to drink, creating stunning scenes of wildlife at the water's edge and enjoying the shallows.

HOOLLONGAPAR GIBBON WILDLIFE SANCTUARY

Assam government has approved and forwarded to the Centre a proposal for an oil exploration project by the Vedanta group near Hoollongapar Gibbon Wildlife Sanctuary.

- **Location and Status**: Hoollongapar Gibbon Wildlife Sanctuary is an isolated area of evergreen forest situated in the Jorhat district of Assam, India. It was designated as a wildlife sanctuary in 1997 by the Assam Government.
- **Unique Name**: This sanctuary is notable for being the only one in India named after a gibbon, recognized for hosting the densest populations of gibbons in Assam.
- **Topography**: The sanctuary lies at an altitude of 100 to 120 meters (330 to 390 feet), with a gentle slope descending from the southeast to the northwest.
- **Water Bodies**: The Bhogdoi River forms a waterlogged area along the sanctuary's border, characterized by semi-hydrophytic vegetation.
- **Flora**: The forest's upper canopy is predominantly made up of the Hollong tree, while the middle canopy is mainly composed of the Nahar tree. The lower canopy features a variety of evergreen shrubs and herbs.
- **Fauna**: The sanctuary is home to **India's only gibbons, the hoolock gibbons,** as well as the **Bengal slow loris,** the **only nocturnal primate** found in Northeast India. Other wildlife includes Indian elephants, tigers, leopards, jungle cats, wild boar, three species of civet, four types of squirrels, stump-tailed macaques, and northern pig-tailed macaques.

About

SUBJECTIVE QUESTIONS

1. The European Union's Carbon Border Adjustment Mechanism (CBAM) has drawn significant criticism from developing nations for potentially violating the Paris Agreement's principle of "Common but Differentiated Responsibilities." Discuss the challenges posed by CBAM to developing economies and suggest measures that could be adopted to mitigate its economic impact.
2. India is launching the Carbon Credit Trading Scheme (CCTS) to regulate greenhouse gas emissions and meet its climate targets. Critically analyze the challenges in implementing the CCTS and suggest measures to strengthen the carbon market, ensuring its effectiveness in achieving India's climate goals.
3. The Chipko movement is often celebrated as an environmental and feminist struggle, but historical accounts suggest that its original objectives were different. Critically analyze the misconceptions surrounding the Chipko movement and discuss how these have impacted both the movement's legacy and local forest management policies.

OBJECTIVE QUESTIONS

Q.1 Which of the following statements about the European Union's Carbon Border Adjustment Mechanism (CBAM) are correct?

1. The CBAM was introduced as part of the EU's "Fit for 55" initiative and imposes tariffs on energy-intensive imports based on production-related emissions.
2. CBAM primarily focuses on creating a level playing field by preventing "carbon leakage," where industries relocate to regions with laxer environmental regulations.
3. CBAM has been universally accepted by both developed and developing nations as an equitable tool for reducing global emissions.
4. CBAM could lead to trade distortions, unfairly shifting the financial burden of climate action onto developing nations.

Select the correct answer using the code below:

(a) 1 and 4 only

(b) 1, 2, and 4 only

(c) 2 and 3 only

(d) 1, 3, and 4 only

Q.2 With reference to mpox (formerly known as monkeypox), consider the following statements:

1. Mpox is caused by a virus that belongs to the same family as the smallpox virus.
2. Mpox primarily spreads through respiratory droplets and close contact with infected animals or humans.
3. The Jynneos vaccine, developed by Denmark's Bavarian Nordic, is the only approved vaccine for mpox.
4. The World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC) for mpox in Africa in early 2022.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 2 and 4 only

(c) 1, 2, and 3 only

(d) 1, 3, and 4 only

Q.3 With reference to the global efforts to protect the ozone layer and the emerging challenges, consider the following statements:

1. The Montreal Protocol has successfully phased out 99% of ozone-depleting substances, including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs).
2. Hydrofluorocarbons (HFCs), which replaced HCFCs, have no impact on global warming.
3. Satellite reentry emissions, particularly aluminum oxides, have been identified as a new threat to ozone depletion.

Which of the above statements is/are correct?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 1 and 2 only

(d) 1, 2 and 3 only

Q.4 What was the original objective of the Chipko movement when it began in 1973?

(a) To promote women's rights and feminism

(b) To end the contract system of tree-felling and empower local communities

(c) To protest against urban development

(d) To promote international conservation efforts

Q5. Which of the following statements is true regarding Lake Kariba?

(a) It is located exclusively in Zimbabwe and does not border Zambia.

(b) It is the largest natural lake in Africa by volume.

(c) The Kariba Dam acts as a boundary between Zambia and Zimbabwe.

(d) Lake Kariba has no significant role in electricity generation for the region.

Q6. Which of the following statements accurately describes the Hoollongapar Gibbon Wildlife Sanctuary?

(a) It is located in the state of West Bengal, India.

(b) It is the only sanctuary in India named after a monkey species.

(c) It is home to the hoolock gibbons, the only gibbons found in India.

(d) The sanctuary was designated as a national park in 1995.

Answer key

1. (b) 2. (a) 3. (a) 4. (a) 5. (c) 6. (c)