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Chandrayaan and its Payloads

Context: Recently, ISRO successfully launched India's third lunar mission, Chandrayaan-3, using the GSLV Mark 3 heavy-lift launch vehicle, also known as the 'Bahubali' rocket.

Chandrayaan-3 Mission:

- **Launch Date and Time:** July 14, 2023 at 2:35 pm IST
- **Launching Agency:** Indian Space Research Organisation (ISRO)
- **Purpose:** Chandrayaan-3 is India's third lunar exploration mission, aimed at demonstrating the capability of safe landing and rover mobility on the lunar surface.
- **Modules:** The mission consists of three major modules - the Propulsion module, Lander module (Vikram) and Rover (Pragyan).
- **Orbiter:** Unlike Chandrayaan-2, Chandrayaan-3 will not have an orbiter. The propulsion module will function as a communications relay satellite.

Payloads:

- **RAMBHA (Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere):** Measures near-surface plasma density and its variations over time.
- **ILSA (Instrument for Lunar Seismic Activity):** Monitors seismicity near the landing site and investigates the structure of the lunar crust and mantle.
- **LIBS (Laser-Induced Breakdown Spectroscopy):** Determines the elemental composition of lunar soil and rocks in the landing area.
- **APXS (Alpha Particle X-Ray Spectrometer):** Derives the chemical and mineralogical composition of the lunar surface.
- **SHAPE (Spectro-polarimetry of Habitable Planet Earth):** Studies spectro-polarimetric signatures of Earth in the near-infrared range, relevant for exo-planet life search.
- **Imaging System:** The lunar lander Vikram will capture images of the rover Pragyan during its exploration activities.
- **Lunar Melting Experiment:** Vikram will use lasers to melt a portion of the lunar surface (regolith) and study the gases emitted during the process.

About Chandrayaan-2:

- **Launch Date:** July 22, 2019
- **Launching Agency:** Indian Space Research Organisation (ISRO)
- **Objective:** Chandrayaan-2 aimed to further explore the Moon, particularly the lunar south pole and conduct in-depth studies on lunar topography, mineralogy, and the presence of water ice.

Payloads:

- **Orbiter:** Continues lunar orbit for data and imagery.
- **Vikram Lander:** Designed for soft landing near the south pole.
- **Pragyan Rover:** Explores lunar surface and conducts experiments.
- **XSM (Solar X-ray Monitor):** Analyzes key elements on the lunar surface.
- **CLASS (Large Area Soft X-ray Spectrometer):** Studies lunar exosphere elements.
- **DFSAR (Dual Frequency Synthetic Aperture Radar):** Examines Moon's water ice deposits.
- **DFRS (Dual Frequency Radio Science Experiment):** Measures electron density in Moon's ionosphere.

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- **DPR (Dual Frequency Precipitation Radar):** Assesses water-ice distribution and molecules.
- **SFRSE (Single Frequency Radio Science Experiment):** Investigates Moon's ionosphere electron density.

About Chandrayaan-1:

- **Launch Date:** October 22, 2008
- **Launching Agency:** Indian Space Research Organisation (ISRO)
- **Objective:** Chandrayaan-1 was India's first lunar probe and aimed to explore the Moon's surface, study its mineralogy, and search for the presence of water molecules.

Payloads:

- **TMC (Terrain Mapping Camera):** Captured high-resolution images of the lunar surface for mapping and analysis.
- **HySI (Hyper Spectral Imager):** Used to identify minerals and resources on the Moon's surface.
- **LLRI (Lunar Laser Ranging Instrument):** Measured the distance between the Earth and the Moon by reflecting laser beams off the lunar surface.
- **MIP (Moon Impact Probe):** Released a probe that impacted the Moon's surface, providing valuable data on surface characteristics and composition.

India-Indonesia Economic and Financial Dialogue

Context: Recently, the India-Indonesia Economic and Financial Dialogue was officially announced during the third meeting of G20 Finance Ministers and Central Bank Governors (FMCBG) held in Gandhinagar, Gujarat.

The India-Indonesia Economic and Financial Dialogue:

It is a bilateral platform established between India and Indonesia to enhance cooperation and strengthen economic and financial ties between the two countries. It aims to facilitate mutual growth, address common challenges and contribute to regional and global economic stability.

- **Purpose:** The India-Indonesia Economic and Financial Dialogue was recently launched to strengthen economic ties and collaboration between the two countries.
- **Participants:** The dialogue involves representatives from India and Indonesia, with a focus on fostering better cooperation in various areas.
- **Focus Areas:** The dialogue aims to enhance bilateral trade and investment between India and Indonesia, promote financial services, and facilitate infrastructure development projects.
- **Global Agenda:** Finance Minister Nirmala Sitharaman emphasized that the dialogue will also contribute to advancing the global agenda, particularly from the perspective of emerging market and developing economies.
- **Regional Cooperation:** The dialogue's significance extends beyond the bilateral relationship, as it aims to foster better cooperation between India and Southeast Asia.
- **Global Stability:** One of the primary objectives of the dialogue is to contribute to global economic and financial stability by strengthening economic linkages between India and Indonesia.
- **Potential Outcomes:** Through the dialogue, both countries seek to explore new opportunities for economic growth, increased investment flows and expanded cooperation in various sectors.
- **Potential on Trade and Development:** Both countries see substantial potential for cooperation in trade and development, especially concerning issues of climate change, global public health and investment cooperation.
- **Focus on Digital Technology and Payment Systems:** Discussions in the dialogue will explore cooperation in digital technology, payment systems under central banks, and the use of local currencies.
- **Support on Financial Action Task Force:** India extends strong support to Indonesia's agenda regarding its membership in the Financial Action Task Force.

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The Mekong-Ganga Cooperation

Recently, External Affairs Minister S. Jaishankar highlights Mekong's importance to India at 11th Mekong-Ganga Cooperation meeting with six countries.

What is the Mekong-Ganga Cooperation?

The Mekong-Ganga Cooperation (MGC) is an initiative that brings together six countries - India and five ASEAN nations, namely Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. Established on November 10, 2000, during the First MGC Ministerial Meeting in Vientiane, Laos, the MGC draws its name from the two prominent rivers in the region, the Ganga (Ganges) and the Mekong. This cooperation seeks to foster closer ties, greater understanding and enhanced collaboration among the people living in the vast basins of these two ancient and civilization-rich rivers.

Objectives and Pillars of Cooperation:

The primary objectives of the Mekong-Ganga Cooperation are to enhance friendship, solidarity and cooperation among the member countries. To achieve this, the MGC is structured around four key pillars of cooperation:

1. Culture:

The MGC endeavors to promote cultural exchanges and preserve the shared heritage of the member countries. It encourages joint research in various artistic fields such as music, dance and theatre. Efforts are made to protect and conserve heritage sites and artifacts, while universities in the region are connected through networking and twinning arrangements.

2. Education:

Capacity building and educational cooperation play a crucial role in the MGC's agenda. Under the Initiative for ASEAN Integration (IAI), Centers for English Language Training (CELTs) have been established in Cambodia, Laos, Myanmar and Vietnam. India also offers annual scholarships to MGC countries and proposes specialized scholarships in museology and conservation techniques. This educational exchange aims to strengthen human resource development and foster a deeper appreciation of each other's educational systems.

3. Transport and Communication:

The MGC focuses on improving transport networks and communication links to enhance connectivity between member countries. Projects such as the "East-West Corridor" and the "Trans-Asian Highway" aim to facilitate smooth movement of goods and people, contributing to regional development and integration. Efforts are made to develop air services, IT infrastructure and networks, promoting easier travel and enhancing regional cooperation.

4. Tourism:

Tourism is a significant aspect of MGC cooperation, and strategic studies are conducted for joint marketing to attract more tourists from the region. The MGC also works towards facilitating travel, expanding multimodal communication, and promoting cultural-religious package tours to increase tourism opportunities. These initiatives aim to boost economic growth, generate employment, and foster cultural understanding through shared experiences.

Working Mechanism and India's Sector-wise Approach:

The MGC's working mechanism includes Annual Ministerial Meetings, Senior Officials Meetings (SOM) and five working groups focusing on Education, Tourism, Culture, Plans of Action, and Communication. India's approach within the MGC covers various sectors, including tourism, capacity building, education, connectivity, culture, public health, water resource management, science and technology and Micro, Small and Medium-sized Enterprises (MSMEs).

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NEWS IN BETWEEN THE LINES

Hoolock Gibbon



The recent event in China has highlighted concerns over India's only ape, the hoolock gibbon, as one of the 20 species of apes at a high risk of extinction.

What is Hoolock Gibbon?

Hoolock Gibbon, scientifically known as Hoolock, is a species of ape native to the tropical and subtropical forests in Southeast Asia,

Global Concern: The conservation status of hoolock gibbons, India's only ape species, is a matter of concern at a global event on gibbons held in China.

Hoolock Gibbons in India: The hoolock gibbon is unique to India's Northeast region and is one of the 20 species of gibbons on Earth

Declining Population: The estimated population of hoolock gibbons is 12,000, and all 20 species of gibbons are at a high risk of extinction.

Genetic Analysis: Recent research by the Centre for Cellular and Molecular Biology (CCMB) in 2021 confirmed that there is only one species of ape in India, debunking earlier beliefs about two species.

IUCN Status:

Eastern hoolock: Vulnerable

Western hoolock: Endangered

Threatened by deforestation and hunting in Northeast India.

Cicada



Recently, a 'foreign' cicada commonly found in several parts of South India has been given an Indian identity.

What is Cicada?

Cicada is an insect with a distinct singing call, mainly by males to attract females. It has transparent wings, large eyes and is often found in trees. It periodically emerges in large numbers, known as "cicada swarms" or "broods" and is commonly found worldwide.

New Name: Purana cheeveeda (after its Malayalam name "Cheeveedu")

Mistaken Identity: Previously misidentified as Purana tigrina, a species described in Malaysia in 1850.

Basis of Correction: Differences in male genitalia and operculum.

Cicadas are important for:

- Nutrient cycling in soil
- Serving as food for predators
- Indirectly aiding in pollination
- Indicating ecosystem health
- Cultural significance

The United Naga Council



Recently, there have been disturbing incidents of violence in the foothills of Manipur.

What is the United Naga Council?

The United Naga Council (UNC) is a Naga tribal organization based in the state of Manipur, India. It is a representative body that works to safeguard the rights and interests of the Naga community residing in Manipur.

Formation: It was formed in 1994 with the aim of representing and safeguarding the interests of the Naga community in Manipur.

Objectives: The UNC advocates for the protection of the social, cultural, and political rights of the Naga people in the region.

Role in Conflict: The UNC's activities have been closely linked to the long-standing Naga insurgency issue in the Northeast.

Legal Recognition: It is not a government-recognized organization and its status has been a subject of legal and political debate.

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Indian Council of Agricultural Research



Recently, during the 95th foundation day of ICAR, Union Agriculture Minister (Narendra Singh Tomar) emphasized research in animal husbandry and fisheries.

Indian Council of Agricultural Research:

Indian Council of Agricultural Research is an autonomous organization under the Department of Agricultural Research and Education, Ministry of Agriculture and Farmers Welfare, Government of India.

Established: ICAR was founded on August 16, 1929.

Function: It is an autonomous organization under the Department of Agricultural Research and Education, Ministry of Agriculture and Farmers Welfare, Government of India.

Research and Development: ICAR is responsible for coordinating and promoting agricultural research, education and extension activities across the country.

Crop Production: It plays a crucial role in advancing agricultural technologies and practices, contributing to India's position as a leading producer of various crops globally.

Animal Husbandry and Fisheries: ICAR focuses on research in areas of animal husbandry and fisheries to boost production and development in these sectors.

Agricultural Universities: ICAR governs and supports various agricultural universities and institutes in India, fostering agricultural education and training.

Vision: ICAR's vision is to enhance agricultural productivity, sustainability, and overall rural development through scientific research and technological advancements.

Nautica



Recently, a UN-owned ship, Nautica, has arrived off war-torn Yemen for a risky operation operation to prevent a catastrophic oil spill.

The UN-Owned Ship Nautica:

The Nautica is a vessel owned by the United Nations, specifically deployed for a critical operation off the coast of war-torn Yemen.

Risky Operation: The Nautica's mission involves a risky operation to pump more than a million barrels of oil from the decaying tanker, FSO Safer

FSO Safer: The FSO Safer is a rusting super-tanker that has been stranded off the coast of Yemen in the Red Sea. Maintenance operations on the vessel were suspended in 2015 due to Yemen's ongoing conflict, leading to concerns about its potential to "explode at any time."

Environmental Disaster Prevention: The primary objective of the Nautica's mission is to prevent a catastrophic oil spill that could cause an ecological disaster in the region.

Operation Objective: The UN-owned ship will transfer 1.14 million barrels of oil from the deteriorating tanker FSO Safer, anchored in the Red Sea.

Environmental Protection: The mission seeks to safeguard Yemen's environment, fishing communities and vital ports from a potential oil spill.

Regional Impact: The spill could affect Saudi Arabia, Eritrea, Djibouti, and Somalia, with potential cleanup costs exceeding \$20 billion.

Coral Bleaching



What is Coral?

Coral refers to the colonies of tiny marine animals called polyps that secrete calcium carbonate to form a hard exoskeleton. These colonies create large, diverse ecosystems known as coral reefs.

Coral Bleaching: Coral bleaching is a phenomenon that occurs when corals lose their vibrant colors and turn white due to stress or changes in environmental conditions, such as increased water temperatures, high acidity, or pollution.

Symbiotic Relationship: Most corals have a symbiotic relationship with zooxanthellae, a type of algae. The algae provide nutrients to the corals and in return, receive minerals and carbon dioxide.

Causes of Bleaching: Bleaching occurs when the ocean environment changes, such as rising temperatures, increased acidity, excessive brightness, low tides, water pollution and climate crisis-induced ecosystem changes.

Survival Potential: While bleaching is a sign of stress and can lead to coral death, some colonies have shown resilience and survived bleaching events. Notable examples include a coral near Japan's Iriomote Island that recovered after a 2016 bleaching event.

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Place in News

Sand Point

Recently, on July 15, 2023, a powerful magnitude 7.2 earthquake hit the offshore Alaska Peninsula region, particularly near Sand Point.

Geographical Location: Sand Point is a small city located in the Aleutians East Borough of Alaska, USA. It is situated at approximately 55.3447° N latitude and 160.4914° W longitude. It is located on Popof Island, which is part of the Shumagin Islands.

Economy: The economy of Sand Point is primarily based on commercial fishing, especially for salmon, halibut and crab.

Natural Hazards: The area is susceptible to earthquakes and tsunamis due to its location along the seismically active Pacific Ring of Fire.

Indigenous Heritage: The region has a rich cultural heritage, with a history of Aleut and Alutiiq Native communities living in the area for thousands of years.



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