POLITY AND GOVERNANCE

NO LOCAL BODY MEMBERS IN J&K FROM TOMORROW

CONTEXT: The term of 30,000 local representatives, including Panches (panchayat members) and Sarpanches (village headmen) is set to expire on January 9, 2024. There will be no electoral representation at any level as Jammu & Kashmir has not had Assembly elections since 2018. The Union government has decided to conduct a delimitation exercise before holding new elections. This process involves redrawing the boundaries of municipal wards and panch constituencies to ensure equal numbers of electors.

Jammu & Kashmir (J&K) has been under central rule since 2018 and is currently a Union Territory without a Legislative Assembly. The Centre revoked Article 370 of the Constitution granting J&K special status in 2019, leading to its bifurcation. The 73rd amendment aimed to empower panchayats, and J&K partially adopted its recommendations in 1993. In 2020, the Union Cabinet approved adaptations to the J&K Panchayati Raj Act, allowing for the creation of directly elected District Development Councils.

Consequences of Absence:

The absence of electoral representation at any level will halt the disbursement of ₹25-lakh funds allocated to each panchayat. It will also create a significant gap in local representation, with only a handful of Members of Parliament and District Development Councils remaining. This raises concerns about governance at the grassroots level, particularly in remote areas.

Statehood and Elections:

Union Home Minister Amit Shah has linked the restoration of J&K's statehood to holding Assembly elections. The Supreme Court has directed the Election Commission to hold Assembly elections by September 30, 2024.

Panchayat Funds and Population:

Panchayat Conference chairman Anil Sharma urges the administration to consider population figures while disbursing funds during the delimitation process. He emphasizes that panchayats with larger populations should not be disadvantaged due to redrawing boundaries.

ECONOMICS AND DEVELOPMENT

GST REVENUES REVEAL A DISSONANCE IN CONSUMPTION GROWTH ACROSS STATES

CONTEXT: The National Statistical Office estimated private final consumption expenditure (PFCE) to grow just 4.4 % this year, the slowest since 2002-03, barring the pandemic-affected year of 2020-21. After recovering to 6 % in the April to June 2023 quarter from below 3 % in the second half of 2022-23, the PFCE growth had slipped to 3.1 % in the July-September quarter.

FIGURE: Column chart representation of GST growth rates of Major States. (Source: Bank of Baroda's analysis of the Finance Ministry data)

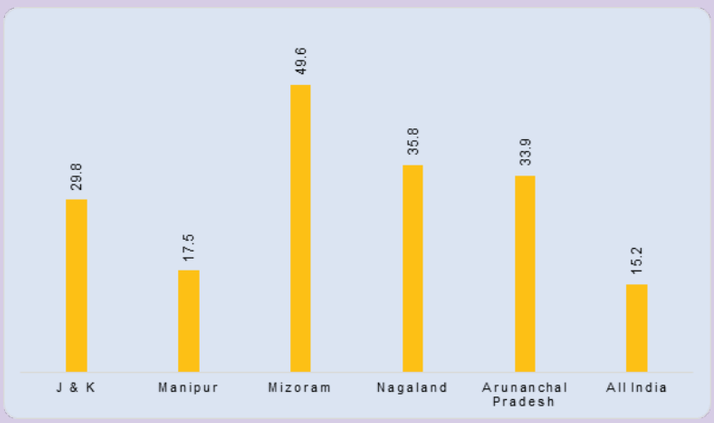


FIGURE: Column chart representation of GST growth rates of Smaller States and Union Territories. (Source: Bank of Baroda's analysis of the Finance Ministry data)

Goods and Services Tax (GST) revenues for April – December (2023-24) grew at 11.7%, State GST collections have grown at a sharper pace of 15.2 %. GST, a consumption-based tax can broadly signal the consumption trends in the economy. Gujarat, West Bengal, Delhi and Odisha are among the top 10 GST contributors where growth was slower, while eight States have driven the overall collections with growth higher than the national average. This is indicative of consumption being uneven across geographies.

Gujarat, West Bengal, and Andhra Pradesh are among the states with weaker consumption growth, despite robust overall GST revenue collection. States like Madhya Pradesh, Maharashtra, Karnataka, and Uttar Pradesh are seeing high consumption growth. This uneven growth is attributed to factors like tepid rural demand, lack of significant wage growth, and income inequality. Smaller states and Union Territories are generally showing higher growth in State GST collections than the national average.

Rural distress

In States like Odisha, Rajasthan and Chhattisgarh, where GST revenues have grown less than 11 % so far this year, tepid rural demand due to weaker farm sector outcomes could have played a factor, they reckoned.

Lack of wage growth

The wage growth, which turned marginally negative for lower income households while rising 6.4 % for their upper income counterparts in the second quarter of this year has been cited as a major reason for consumption growth. Ongoing consumption demand continues to be an area of worry as it is skewed in favour of goods and services consumed largely by households belonging to the upper income bracket. For sustained PFCE growth, recovery in consumption demand has to be more broad-based where by a significant contribution comes from goods and services consumed by households in the lower income bracket as well.

INTERNAL SECURITY

IN A FIRST, IAF C-130 WITH GARUD COMMANDOS MAKES NIGHT LANDING AT KARGIL

CONTEXT: An Indian Air Force C-130J Super Hercules aircraft, accompanied by Garud special forces, successfully completed the first-ever night landing at the Advanced Landing Ground (ALG) in Kargil, near the Line of Control (LoC) with Pakistan. This operation showcases the IAF's enhanced capability to conduct specialized missions around the clock in this strategic region.

Previously, landings at the Kargil ALG were only possible during the day due to its challenging conditions:

1. High altitude (around 10,000 feet)
2. Restricted airstrip with a single approach direction
3. Surrounding rough terrain
4. Lack of night-landing facilities

This successful landing demonstrates the IAF's adaptability and expertise in operating under demanding circumstances. The Kargil ALG is strategically crucial as the only airstrip in the area, making it vital for rapid response in case of emergency. This operation aligns with the broader trend of the Indian military reactivating and upgrading ALGs near both the LoC and the Line of Actual Control (LAC) with China.

Overall significance:

This successful night landing by the IAF C-130J at the Kargil ALG signifies a significant advancement in India's military capabilities, particularly in terms of rapid deployment and logistics support in sensitive border regions. It also highlights the continued focus on improving India's air power infrastructure and operational preparedness.

DISASTER MANAGEMENT

IIT-DELHI TEAM MAKES FIRST HI-RES LANDSLIDE RISK MAP FOR INDIA

CONTEXT: Dr. Manabendra Saharia Manabendra Saharia, an assistant professor in the civil engineering department and head of the HydroSense Lab at IIT Delhi and his team at IIT Delhi developed the first-ever national landslide susceptibility map for India.

Landslides are a unique and deadly problem in India. Unlike floods, they're less widespread and harder to track and study with satellites. Landslides happen in very localised areas and affect only about 1 % - 2 % of the country.

National Landslide Susceptibility Map:

The two researchers used GeoSadak, an online system that has data on the national road network in India gathered information from across the country to gather data on 16 such factors, which they called landslide conditioning factors. The map identifies areas most vulnerable to landslides based on 16 factors, including soil type, vegetation cover, and proximity to roads and mountains. The fewer trees there are in a place, the closer it is to road-building activity, and the steeper the local slope, the more unstable the place will be and thus more prone to landslides.

It covers the entire country at a high resolution of 100 meters, making it a valuable tool for disaster management. Ensemble machine learning techniques were used to analyze data from over 150,000 known landslides and 16 conditioning factors. Ensemble machine learning is when multiple machine learning models are used together to average out an oversize impact from any one model.

The map acknowledged some well-known regions of high landslide susceptibility, like parts of the foothills of the Himalaya, the Assam-Meghalaya region, and the Western Ghats. It also revealed some previously unknown places with high risk, such as some areas of the Eastern Ghats, just north of Andhra Pradesh and Odisha.

Significance:

This map can help plan mitigation strategies, allocate resources effectively, and improve preparedness for future landslides. It can also be used to develop a landslide early warning system for India. The map is publicly available online and accessible to anyone.

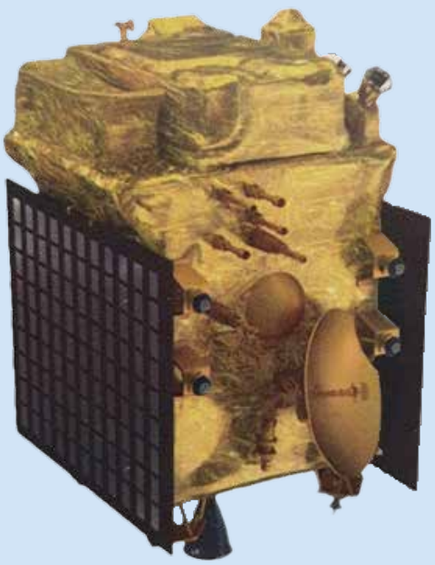
SCIENCE AND TECHNOLOGY

A NEW HIGH

CONTEXT: On January 6 evening, a stream of commands transmitted by scientists and engineers of the Indian Space Research Organisation (ISRO) were translated by a computer onboard the Aditya-L1 spacecraft into manoeuvres that guided it into orbit around an imaginary point in space. Thus, Aditya-L1 reached its destination, around the L1 Lagrange point, from where it will have an unfettered view of the sun for its expected lifetime of five years.

Aditya-L1 supplements India's storied history of observing the sun — dating back to the Kodaikanal Solar Observatory, which commenced operations in 1901 — by lofting it into space. It also follows the XPoSat mission, launched on January 1 to become only the world's second X-ray polarimetry satellite, and eight years after AstroSat, which reached several highs of its own. Aditya-L1 is an observatory-class solar mission that will study the sun with seven instruments: The main objectives of Aditya-L1 are:

1. Observe the dynamics of the Sun's chromosphere and corona:
2. Study chromospheric and coronal heating, the physics of partially ionised plasma, of coronal mass ejections (CMEs) and their origins, of the coronal magnetic field and heat transfer mechanisms, and flare exchanges.
3. Observe the physical particle environment around its position.
4. Determine the sequence of processes in multiple layers below the corona that lead to solar eruptions.
5. Study space weather, and the origin, composition and dynamics of solar wind.



Visible Emission Line Coronagraph (VELC): Developed by Indian Institute of Astrophysics, Bangalore, VELC employs internal occultation coronagraphs, blocking the Sun's direct light within the instrument itself, minimizing scattered light and allowing for clearer observations of the faint corona. VELC can capture incredibly detailed images of coronal structures with a resolution of 1.25-2.5 arcseconds, providing valuable insights into their dynamics and evolution. The ability to

image, spectroscopically analyze, and measure the polarization of the corona in three different modes (multi-mode observations) provides a comprehensive understanding of the physical processes at play. Utilizing artificial intelligence algorithms, VELC can automatically detect and track Coronal Mass Ejections (CMEs), potentially improving our ability to forecast space weather events that can impact Earth.

The corona, the Sun's outermost layer, is crucial for understanding solar activity and space weather. VELC will provide unprecedented data to study coronal heating, mass ejections, and their impact on Earth's magnetosphere. Accurate and timely CME detection is vital for space weather forecasting, allowing us to better prepare for potential disruptions to satellites, power grids, and communication systems.

Solar Ultraviolet Imaging Telescope (SUIT): Developed by Inter University Centre for Astronomy & Astrophysics, Pune, in collaboration with ISRO, SUIT will observe features of the Sun focusing on the 200-400 nm range of the ultraviolet spectrum (Ultraviolet Imaging) invisible to the naked eye that play a crucial role in solar activity and its impact on Earth. The Spectral Filters use of both narrowband and broadband filters allows SUIT to isolate specific wavelengths and study their variations with high precision, providing detailed information about different elements and processes in the Sun's atmosphere. SUIT provide a Near-simultaneous Coverage, capturing images of the solar atmosphere from the lower photosphere (surface layer) to the upper chromosphere (outer layer) almost simultaneously, offering a comprehensive view of its dynamics and interactions.

Studying the Sun's ultraviolet emissions and their influence on Earth's atmosphere is crucial for understanding Solar-Atmospheric Coupling to get deep insights to climate change, space weather, and even ozone depletion. Precise measurements of solar ultraviolet radiation will help refine atmospheric models and improve our understanding of Earth's energy balance and future climate changes.

Solar Low Energy X-ray Spectrometer (SoLEXS): Developed by U R Rao Satellite Centre, Bangalore, SoLEXS provides uninterrupted observations of the Sun's soft X-ray flux in the 1-22 keV range, unlike many X-ray telescopes that focus on individual events like flares. This allows for studying long-term trends and subtle variations in the corona's temperature and structure. SoLEXS will provide crucial data on the X-ray emissions of different coronal structures, aiding scientists in unraveling the mystery of scorching temperature of the corona, millions of degrees hotter than the Sun's surface. Combining SoLEXS's X-ray data with VELC's visible and ultraviolet observations will create a holistic view of the corona's dynamics and thermal processes. This can lead to a deeper understanding of solar activity and its impact on space weather.

Existing X-ray telescopes often focus on short-term bursts or specific events, leaving gaps in our understanding of the corona's overall behaviour. SoLEXS's continuous monitoring will fill these gaps and provide a more comprehensive picture. Understanding the corona's temperature and activity is crucial for accurate space weather forecasting. SoLEXS will provide valuable data for predicting solar flares and CMEs, protecting satellites and communication systems from their harmful effects.

High Energy L-1 Orbiting X-ray Spectrometer (HEL1OS): Developed by the Space Astronomy Group, URSC, HEL1OS specifically focuses on X-rays emitted during solar flares across a broad spectrum with its range of 10-150 keV, offering a more comprehensive picture of the energy involved in solar flares, providing valuable insights into these powerful events. HEL1OS can provide crucial information about how electrons are accelerated and move within the solar corona during flares. The Twin-detector Technology combining CdTe and CZT detectors allows HEL1OS to achieve both high energy resolution for studying low-energy emissions and high sensitivity for capturing high-energy X-rays. Understanding the boundary between thermal and non-thermal solar emissions is essential for studying the overall energy distribution in the corona and the mechanisms behind flare heating.

HEL1OS will provide significantly more detailed data on solar flares than previously available, helping scientists better understand their triggering mechanisms, evolution, and impact on space weather. The precise measurements of X-ray spectra can be used to test and refine existing theoretical models of solar flares, leading to more accurate predictions and mitigation strategies.

Aditya Solar Wind Particle Experiment (ASPEX): Developed by Physical Research Laboratory, Ahmedabad, ASPEX combines Solar Wind Ion Spectrometer (SWIS) for low-energy particles and STEPS for high-energy particles, providing a comprehensive picture of the solar wind across a wide energy range. The two analysers in SWIS and the two parts of Supra Thermal Energetic Particle Spectrometer (STEPS) allow ASPEX to study particles entering from different directions, offering a more complete understanding of the spatial distribution of the solar wind. is specifically designed to distinguish between protons and alpha particles, the two most abundant types of particles in the solar wind, enabling detailed study of their individual behaviours and contributions to the overall flow. ASPEX can measure the total number of particles (integrated flux) within its energy range, providing valuable data on the overall intensity and variability of the solar wind.

Studying the solar wind is crucial for understanding space weather, as these charged particles can interact with Earth's magnetic field and disrupt satellites, communication systems, and power grids. ASPEX will provide accurate and detailed data on the composition, speed, and direction of the solar wind, aiding in space weather forecasting and mitigation strategies. ASPEX data can be used to study how the solar wind interacts with Earth's magnetosphere and ionosphere, providing insights into the complex processes that influence Earth's environment and communication infrastructure.

Plasma Analyser Package for Aditya (PAPA): Developed by the Space Physics Laboratory of the Vikram Sarabhai Space Centre, Thiruvananthapuram, PAPA combines Solar Wind Electron Energy Probe (SWEEP) and for analysing electron energy levels and Solar Wind Ion Composition Analyser (SWICAR) for studying ion composition

and energy, providing a comprehensive picture of the solar wind's makeup and behaviour. PAPA can determine the temperature and velocity of the solar wind at different points in its flow by analysing the energy distribution of both electrons and ions. SWICAR specifically identifies and characterizes different ion species within the solar wind, such as protons, alpha particles, and heavier elements. This helps understand the sources and acceleration mechanisms of the solar wind. PAPA can measure the solar wind properties with high spatial resolution, allowing us to study variations in temperature, velocity, and composition across different regions of the solar wind flow.

Accurate data on the solar wind's temperature, velocity, and composition is vital for predicting solar storms and other space weather events that can disrupt satellites, power grids, and communication systems. PAPA will contribute to developing more accurate and timely space weather forecasts. PAPA's data on temperature and velocity will help scientists refine theories about coronal heating and the mechanisms behind the acceleration of the solar wind. The solar wind interacts with Earth's magnetosphere, influencing auroras, geomagnetic storms, and other phenomena. Studying the variations in the solar wind with PAPA can improve our understanding of solar-terrestrial coupling and its impact on Earth's environment.

Digital Magnetometers: Onboard the Aditya-L1 spacecraft are a pair of magnetic sensors on a deployable boom, one positioned in the middle and the other at the tip. The purpose of these sensors is to gather information about the magnitude and direction of the Interplanetary Magnetic Fields (IMF), as well as to study other events such as Coronal Mass Ejections (CME). Data from the magnetic sensors will be used to supplement that of the PAPA and ASPEX sensors.

ISRO picked the L1 Lagrange point — 1.5 million km from the earth in the earth-sun direction and one of five Lagrange points in the earth-sun system — because the gravitational influences of the two bodies interact such that a smaller body here will not experience a net tug towards either. So, Aditya-L1 can stay at L1 while expending little fuel. Its scientific mission will begin in a month or so, once its thrusters' emissions drift away.

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