

● POLITY

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ECOLOGY

ARUNACHAL HYDEL PROJECTS

CONTEXT: 12 unprofitable Arunachal Pradesh hydropower projects transferred to CPSUs due to private sector disinterest.

BACKGROUND: Arunachal Pradesh's Power Commissioner signed CPSU agreements for hydropower, linking it to net-zero emissions by 2070 and India's 500 GW non-fossil energy target by 2030. The 2008 Hydro Power Policy, under Dorjee Khandu's leadership, aimed to incentivize projects via upfront payments per MW. The State government's push for hydropower aligns with sustainable energy goals, employment, and environmental commitments. 233 MoUs with 159 firms were signed for projects totaling 47,000 MW capacity.

HIGHLIGHTS: Private companies abandoned unviable 11,523 MW hydropower projects in Arunachal Pradesh. CPSUs, including Satluj Jal Vidyut Nigam and North Eastern Electric Power Corporation Ltd., took over. Total investment needed is ₹1,

42, 000 crore. Private sector disinterest due to economic inviability led to transfer.

Net Zero Emission and India

Net zero emission refers to the balance between greenhouse gas emissions produced and those removed from the atmosphere. Achieved by reducing emissions and implementing carbon removal techniques, it helps mitigate climate change's impact while fostering environmental sustainability.

- **Commitment:** India aims to achieve net-zero emissions by 2070, displaying a strong commitment to combat climate change and transition towards cleaner energy sources.
- **Renewable Expansion:** Accelerating renewable energy capacity is central, with plans to achieve 50% energy from renewables by 2030, driving down carbon emissions significantly.
- **Economic Transformation:** The net-zero goal drives green innovation, fostering job creation in sectors like solar, wind, and electric mobility, propelling sustainable economic growth.
- **Challenges and Adaptation:** India faces challenges due to its energy demands. Adaptation involves technology adoption, forest restoration, and enhancing climate resilience for vulnerable communities.
- **International Cooperation:** India actively engages in global climate dialogues, seeking technology transfer and financial assistance to realize net-zero targets while ensuring equitable development.

Excerpts from – "The Hindu - 'Unviable Arunachal hydel projects given to Central PSUs'



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SCIENCE AND TECHNOLOGY

METAGENOME SEQUENCING TECHNOLOGY

CONTEXT: Global mpox virus outbreak in 2022 linked to super-spreader event, genome sequencing aided understanding and surveillance.

BACKGROUND: Metagenome sequencing transformed pathogen identification during the COVID-19 pandemic, allowing rapid and unbiased virus identification directly from patient samples, changing the course of pathogen surveillance and identification methods. SARS-CoV-2 became one of the most sequenced organisms due to this approach's scalability and effectiveness.

SAMPLE CASE STUDY: Nigerian scientists utilized metagenomic sequencing to survey 593 febrile patients, identifying 13 viruses, including Lassa and yellow fever viruses. The approach also identified pegivirus C's role in Lassa fever co-infections and ruled out viral causes in some cases, showcasing the method's power in pathogen detection, diagnosis, and outbreak response.

TRACKING AVIAN INFLUENZA

- **MPOX Virus Outbreak:** 2022's global mpox virus outbreak, related to a super-spreader event, was controlled due to genome sequencing from COVID-19 technology.
- **Avian Influenza Surveillance:** Avian influenza viruses trigger deadly outbreaks among migratory hosts, posing threats to birds, animals, humans, and biosecurity.
- **Human Spread:** Avian influenza rapidly spread to humans in the last decade, necessitating genomic surveillance to monitor evolving strains.
- **Genomic Surveillance Need:** Despite available detection kits

and vaccines, organized genomic surveillance is vital to track circulating strains and vaccine impact.

- **COVID-19 Legacy:** Utilizing COVID-19's large-scale genome sequencing infrastructure, avian influenza genomic surveillance, exemplified by Cambodian success, offers timely insights for response.

Metagenome Sequencing

- **Metagenome sequencing** analyzes genetic material from diverse organisms in an environment, revealing their collective genomic information and interactions.
- **Diversity Insight:** It unveils the genetic diversity of complex ecosystems, allowing us to understand microbial communities' roles in various environments, like soil or the human gut.
- **Functional Potential:** Metagenome data identifies functional genes and pathways, helping decipher microbial contributions to nutrient cycling, disease resistance, and other ecosystem processes.
- **Uncharted Microbes:** This technique enables discovery of previously unknown microorganisms, expanding our knowledge of the microbial world and its potential applications.
- **Biotechnological Applications:** Insights gained from metagenome sequencing have practical uses, such as developing enzymes for biofuels, discovering novel antibiotics, and enhancing agricultural practices.

Excerpts from – "The Hindu - Metagenome sequencing technology is transforming pathogen surveillance"

INTERNAL SECURITY

INDIA'S DEFENCE MINISTRY ADOPTING MAYA OS

CONTEXT: The National Informatics Centre (NIC) has developed the Ubuntu-based Maya operating system to prevent malware attacks by cybercriminals, who are increasingly targeting critical infrastructure and government agencies.

India's Defence Ministry has decided to replace the Microsoft Operating System (OS) in all its computers that can connect to the Internet with Maya, an Ubuntu-based OS built locally. The new OS will be backed by a protection system called Chakravayuh. This end point system is also being deployed in the computers that have Maya installed.

India's switch to the Ubuntu-based Maya OS comes at a time when cyberspace is increasingly becoming vulnerable to malware and ransomware attacks. According to findings from a survey by the Center for Strategic and International Studies (CSIS), a total of 669 open-source policy initiatives were taken by governments around the world between 1999 and 2022. After a spike in using FOSS in 2003, interest in such software continues to be constant overall.

"An investment in knowledge pays the best interest." – Benjamin Franklin

INTERNAL SECURITY

'IAF HAD AIRLIFTED 68,000 PERSONNEL TO LADAKH'

CONTEXT: The IAF operates transport aircraft such as. After a stand-off unfolded in eastern Ladakh in May 2020, with the Indian military.

The Indian Air Force (IAF) pressed its entire transport fleet - AN-32, IL-76, IL-78, C-130J, and C-17 Globemaster into service to carry over 68,000 troops, 330 infantry vehicles and more than 90 tanks, in addition to artillery guns mobilising to counter the Chinese build-up of forces and their invasion of Indian territory. The priority was quick deployment of Army and air assets to build credible force to tackle the adversary. In all, over 9,000 tonnes were airlifted in the initial phase of the stand-off," including the airlift of IAF assets, such as radars and surface-to-air guided weapon systems.

The build-up of fighter aircraft included the forward deployment of Rafales, Su-30 MKIs and MiG-29s. The IAF has airfields at Leh and Thoise in Ladakh, while work has just commenced to extend the runway at the advanced landing ground in Nyoma to handle fighter jets.

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INTERNAL SECURITY**INDIA, CHINA TO HOLD MILITARY TALKS TODAY**

CONTEXT: India and China are set to hold the 19th round of Corps Commander talks at Chushul as part of the ongoing efforts to resolve the stand-off in eastern Ladakh. Lt. Gen. Rashim Bali, the Leh-based 14 Corps Commander would lead the Indian delegation.

India has consistently called for restoration of status quo ante as on April 2020, including restoration of patrolling rights till the traditional patrolling points. India maintains that they are the two additional friction points that still remain, while China has refused to accept it, terming them legacy issues predating the 2020 stand-off.

India and China have so far undertaken disengagement from five friction points — from Galwan after the violent clash in June 2020, from the north and south banks of Pangong Tso in February 2021, from Patrolling Point (PP) 17 in the Gogra-Hot Springs area in August 2022, and from PP15 in September 2022. There are fundamental disagreements between the two countries on the Depsang Plains and Demchok.

External Affairs Minister S. Jaishankar described ties as “abnormal”. Army chief General Manoj Pande termed the situation along the Line of Actual Control as “stable but unpredictable”, while stating that five out of the seven friction points had been resolved and the focus was now on the remaining two points. India has maintained that ties cannot go back to normal till the stand-off is resolved. Chinese officials have sought to assert that ties were returning to the normal track and have called India to keep the border in an “appropriate” position.



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