

A NASA-led international satellite was launched from Southern California, on a major Earth science project to conduct a comprehensive survey of the world's oceans, lakes and rivers for the first time. Dubbed as SWOT (Surface Water and Ocean Topography), the advanced radar satellite is designed to give an unprecedented view of the life-giving fluid covering 70% of the planet, shedding new light on the mechanics and consequences of climate change. A Falcon 9 rocket, owned and operated by billionaire Elon Musk's commercial launch company SpaceX, was set to lift off from the Vandenberg U.S. Space Force Base.

Researchers at the Indian Institute of Science Education and Research (IISER) Bhopal have carried out whole genome sequencing of banyan (*Ficus benghalensis*) and peepal (*Ficus religiosa*) from leaf tissue samples. They also undertook a comprehensive genome wide phylogenetic analysis with 50 other angiosperm plant species, including four other sequenced *Ficus* species. Genome sizes of these two *Ficus* species were corrected compared to the previously estimated genome sizes. The draft genome assemblies were over 392 Mbp for banyan and nearly 333 Mbp for peepal.

Extinctions of forest dwelling animals have been accumulating since the second industrial revolution — a period of rapid industrialisation that occurred in many developed countries. The findings (Communications Biology) highlight the need for conservation strategies to mitigate the impact of historic deforestation. The extinction rates have increased over time particularly among amphibians, indicating that consistent deforestation over many decades has contributed to increased modern day extinctions.

Trait data from more than 1,000 different vertebrate species suggests that new species often arise not because of pressures from different environments, but because of prolonged geographic separation in ecologically similar environments (Science). It found divergent ecological adaptation is a relatively minor force during allopatric divergence and that most species tend to evolve under similar selective pressures.

The food astronauts eat may have the potential to mitigate some negative health changes during space flight. Astronauts could be given an enhanced diet during space flights that includes a greater variety and quantity of fruits, vegetables, and fish to improve their health and performance compared to standard space flight food (Scientific Reports). Although conducted in a space flight simulation chamber with 16 individuals, they may have implications for astronaut health and decisions about food priorities on space flights.

Nearly 10,000 years ago, humans settling in the Fertile Crescent, the areas of the Middle East surrounding the Tigris and Euphrates rivers, made the first switch from hunter-gatherers to farmers. They developed close bonds with the rodent eating cats that conveniently served as ancient Pest control

FEDERATION OF INDIAN CHAMBERS OF COMMERCE AND INDUSTRY (FICCI) RELEASES 'INDIA'S CENTURY - ACHIEVING SUSTAINABLE, INCLUSIVE GROWTH INITIATIVE'

1. India Century Initiative, released in partnership with McKinsey & Company, outlines a roadmap for India to achieve sustainable and inclusive growth along key metrics by 2047. It is a multi-stakeholder initiative aimed at catalysing actions to achieve country's full economic potential; unlocking benefits of digital transformation, energy transition and modern infrastructure development for sustainable and inclusive growth.
2. It outlines over 50 actions in 10 priority sectors by 2030 (refer image) to achieve sustainable and inclusive growth i.e., Increasing India's per capita income sixfold to ₹10 lakh; Achieving 600 million jobs; Doubling (45-50%) female participation in labour force; 100% population above poverty line; 80-100% cut in carbon emissions; and 100% access to clean water for all, by 2047.
3. **Steps needed from India inc. to turn India's vision into Reality-** Increasing India's innovation quotient through innovation clusters and scaling up innovation quotient. Scaling up India's SMEs to grow 1,000 mid-sized and 10,000 small firms into global challengers. Strengthening the skills of its future workforce; Shaping India into preferred destination for global capital by deepening capital markets.

US' NDDA SEEKS STRONG DEFENCE TIES WITH INDIA, FUNDS BILLIONS TO COUNTER CHINA'S CHALLENGES

1. **US\$ 858 billion National Defence Authorization Act (NDDA)** is passed by Senate and House of Representatives. It focuses on most vital national security priorities for USA, including strategic competition with China and Russia; disruptive technologies etc. To strengthen US engagement in Indo-Pacific region, it stresses on engaging India to expand cooperation on emerging technology, readiness and logistics. This includes areas such as unmanned aerial vehicles, defensive cyber capabilities, cold weather capabilities etc.
2. **India- US Defence Cooperation-**In 2016, US designated India as 'Major Defence Partner,' (status unique to India). India was accorded 'Strategic Trade Authorization Tier 1 status' in 2018 for high-technology product sales particularly in civil space and defence sectors.
3. **India-US Defence Agreements-**General Security of Military Information Agreement (GSOMIA), 2002 on military information exchange. Logistics Exchange Memorandum of Agreement (LEMOA), 2016 to use each other's military base. Communications Compatibility and Security Agreement (COMCASA), 2018 for interoperability between two militaries and sale of high-end technology to India. Basic Exchange and Cooperation Agreement (BECA), 2020 to share high-end military technology, logistics and geospatial maps.

EUROPEAN UNION (EU) ADOPTS GLOBAL MINIMUM 15% TAX ON MULTINATIONALS

1. Agreement on Global Minimum Tax (GMT) was drawn up under Inclusive Framework on Base Erosion and Profit Sharing (BEPS) from Organisation for Economic Cooperation and Development (OECD) and G20. Framework provides two-pillar solution to address tax challenges arising from digitalisation of economy. It is joined by 142 countries, including India to reform international taxation rules and stop governments racing to cut taxes in a bid to attract companies.
2. **Two pillars-** Pillar One: Applied to around 100 biggest and most profitable MNEs (global turnover above 20 billion euros and profitability above 10%), it reallocates part of their profits to places where they sell products or provide services. Pillar Two: Applied to larger MNEs, i.e., companies with over EUR 750 million of annual revenue, it subjects them to global minimum corporate tax of 15% from 2023.
3. **Significance of GMT-**Expected to generate around \$150 billion in new global tax revenues annually. Tax havens would no longer exist since taxes avoided in haven would be collected at home. Provide additional tax revenue to fight pandemic. Boost global economy by levelling the playing field for businesses.

DELHI POLICE USED DNA FINGERPRINTING TO ESTABLISH THE IDENTITY OF BONES RECOVERED FROM MEHRAULI FOREST

in society's first civilisations. A new study (Heredity) found this lifestyle transition for humans was the catalyst that sparked the world's first domestication of cats, and as humans began to travel the world, they brought their new feline friends along with them. The analysis of feline genetics in the study strongly supports the theory that cats were likely first domesticated only in the Fertile Crescent before migrating with humans all over the world, says a release.

Prostate cancer cell dynamics at a single cell resolution across the timespan of the disease — from its beginning to the point of androgen independence, where the tumour no longer responds to hormone, deprivation therapy has now been characterised. The study in mice, published in eLife, reveals an expansion of intermediate cells that occurs in prostate cancer, which correlates with resistance to treatment and poor clinical outcomes in humans. These cells are castration resistant, meaning they continue to grow in the absence of testosterone and could explain how prostate tumours become resistant to hormone related treatments.

The Goods and Services Tax (GST) Council on Saturday clarified tax provisions on items ranging from fryums to sport utility vehicles (SUVs) to reduce disputes. It also approved decriminalisation of some offences but could not find the time to discuss half its agenda including the setting up of a keenly awaited GST Appellate Tribunal. As many as three ministerial groups' reports on critical issues including the taxation regime for tobacco and gutkha businesses, the setting up of a tribunal to settle disputes with taxpayers as envisaged under the GST law of 2017.

The banks are reluctant to lend to electric bus makers for supply to ailing State transport operators over concerns on recovery of dues, hurting India's goal of curbing vehicle emissions, said banking, industry and government sources. Lack of funding is limiting the ability of e-bus makers to participate in Central government tenders to supply to States, the sources told Reuters, threatening to slow the electrification of major public transport now reliant on diesel.

The famous Tal Chhapar blackbuck sanctuary in Churu district of Rajasthan has received a protective cover against a proposed move of the State government to reduce the size of its Eco sensitive zone.

1. DNA fingerprinting is a laboratory technique used to determine the probable identity of a person based on the nucleotide sequences of certain regions of human DNA, called repetitive DNA, that are unique to individuals. These repetitive DNA normally do not code for any proteins, but they form a large portion of human genome.
2. They show a high degree of polymorphism (variation at genetic level that arises due to mutations) that form the basis of DNA fingerprinting. Since DNA from every tissue (such as blood, hair-follicle, skin, bone, saliva, sperm etc.), from an individual shows same degree of polymorphism, they become a very useful identification tool in forensic applications.
3. Further, as polymorphisms are inheritable from parents to children, DNA fingerprinting is the basis of paternity testing, in case of dispute. Lalji Singh, father of DNA fingerprinting in India, developed DNA fingerprinting for crime investigations at Centre for Cellular and Molecular Biology (CCMB) in Hyderabad in 1988.
4. In 1989, DNA fingerprinting was first used in a case by Kerala Police. DNA fingerprinting technique was developed in 1984 by British geneticist Alec Jeffreys.

KERALA'S FIVE AGRICULTURAL PRODUCTS GET GEOGRAPHICAL INDICATIONS (GI) TAG

1. GI is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. They are part of Paris Convention for Protection of Industrial Property. In India, GI registration is administered by Geographical Indications of Goods (Registration and Protection) Act, 1999. Products granted GI includes
2. **Attappady Attukombu-** Avara (Beans) Cultivated in Attappady (Palakkad). It has higher anthocyanin (imparts violet colour) which is helpful against cardiovascular diseases along with its antidiabetic properties. High Calcium, protein, and fibre content.
3. **Attappady Thuvvara (Red gram)-**Seeds are bigger and heavier. Rich in protein, carbohydrate, fibre, calcium and magnesium.
4. **Onattukara Ellu (Sesame)-**Relatively higher antioxidant and unsaturated fat(beneficial for heart patients).
5. **Kanthalloor-Vattavada Veluthulli (Garlic)-**Cultivated in Idukki and contains high amount of sulphides, flavonoids, and proteins. Rich in allicin which is effective against microbial infections, blood sugar, cancer, etc.
6. **Kodungalloor Pottuvellari (Snap melon)-**Cultivated in Kodungalloor and parts of Ernakulam. Harvested in summer. Contains high amount of Vitamin C, calcium, magnesium, fibre and fat content.

MODERN MAMMALS

1. New research showed that Mammals may have evolved 50 million years earlier than thought in Gondwana. Mammals are warm-blooded animals with hair and vertebrates. Modern mammals consist of three sub groups Montremes: Primitive mammals that lay large eggs and have a common opening for urogenital and digestive systems. Include platypus and echidna of Australia.
2. **Marsupials:** Mammals whose young are born incompletely developed. They develop inside a pouch on mother's belly. Mostly found in Australia and New Guinea, e.g.- tree kangaroo, macropods etc. Placentals: They carry fetus until a late stage of development. Comprise majority of mammals including humans.



“Motivation is like a nutrition supplement – you need it more if you are working out seriously.”

DR. KHAN
(KSG)