

My Notes....

NATIONAL

NATIONAL CLIMATE ASSESSMENT REPORT

Eight Indian states -- Jharkhand, Mizoram, Odisha, Chhattisgarh, Assam, Bihar, Arunachal Pradesh and West Bengal -- are **highly vulnerable to climate change**, according to a **national climate vulnerability assessment report**. These states, **mostly in the eastern part of the country**, require prioritisation of adaptation interventions, the report pointed out. Among all states, **Assam, Bihar and Jharkhand have over 60 per cent districts** in the category of highly vulnerable districts.

What

- Lack of forest area per 100 rural populations** was found to be one of the major drivers of vulnerability for **Assam** despite the fact that the **state has a forest cover of 42 per cent**, followed by low road density.
- In case of Bihar**, the report cited **poor health infrastructure** to be the **key vulnerability driver in 36 districts**, followed by a high percentage of marginal and small operational holders in 24 districts.
- The lack of implementation of the rural employment scheme MGNREGA, causing a lack of alternative livelihood opportunities, appeared as a key driver in 14 districts of Bihar, followed by a **lack of women's participation in the workforce in 11 districts**.
- Lack of crop insurance and rainfed agriculture** were key drivers of **vulnerability for Jharkhand**.
- The report, titled '**Climate Vulnerability Assessment for Adaptation Planning in India Using a Common Framework**', which identifies the most vulnerable states and districts in India with respect to current climate risk and key drivers of vulnerability, was released by **Department of Science and Technology (DST)**.
- Himachal Pradesh, Telangana, Sikkim and Punjab** have been categorised as **lower-middle vulnerable states**.
- Uttarakhand, Haryana, Tamil Nadu, Kerala, Nagaland, Goa and Maharashtra** have been categorised as states with low vulnerability.

Flashback

- A **total of 94 representatives from 24 states and two Union Territories** participated in the nationwide exercise **jointly supported by the DST and the Swiss Agency for Development & Cooperation (SDC)**.
- The assessments can further be used for India's reporting on the **Nationally Determined Contributions under the Paris Agreement**. And finally, these assessments will support **India's National Action Plan on Climate Change**.
- The **assessment will help policy-makers in initiating appropriate climate actions**. It will also benefit climate-vulnerable communities across India through development of better-designed climate change adaptation projects.
- In a developing country such as India, **vulnerability assessment is considered as an important exercise** to develop suitable adaptation projects and programmes.

FREE FOODGRAINS TO POOR UNDER PMGKAY

The Centre on 24 April 2021 said it is **gearing up for monthly distribution of additional 5 kg of foodgrains for free to 80 crore PDS beneficiaries** from 1 May 2021, to help the poor tide over the economic hardship in the second wave of the pandemic. **Additional grains will be given for two months** under the **Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY)** via ration shops or Public Distribution System.

What

1. **PMGKAY** is being **reintroduced amid request from some state governments** and after seeing the high level of success last year when sudden lockdown was imposed to contain the **spread of COVID-19**.
2. Food Secretary Sudhanshu Pandey said **80 lakh tonne of foodgrains will be distributed** in the next two months that will cost the exchequer over Rs 26,000 crore.
3. **Pulses are not included under PMGKAY** this time. Last year it was exceptional that pulses were given for free along with grains. **National Food Security Act (NFSA)** scheme is all about cereals.
4. The **earlier lockdown imposed in 2020** was to prepare the country with resources to face the challenges of COVID-19.
5. A study conducted by **Dalbery commissioned** by the Finance Ministry had shown a very high level of "**satisfaction**" among the beneficiaries **with regard to distribution of foodgrains under PMGKAY** during the **COVID-19 crisis**.
6. **Another study by Microsave Consulting** in 88 districts across 18 states showed that average 94 per cent households have received free ration on a monthly basis during the crisis.
7. The government had spent Rs 1.05 lakh crore on distribution of 30 million tonne of grains for free under PMGKAY during April-November 2020.

Finance Minister Smt. Nirmala Sitharaman on 26th March 2020 announced **PM Garib Kalyan Ann Yojna** as a part of PMGKP to especially support poor families so that they do not suffer on account of non-availability of food grains due to disruption in the next three months.

80 crore individuals, i.e, roughly two-thirds of India's population would be covered under this scheme.

Each one of them would be provided double of their current entitlement over next three months.

FIRST LARGE TERRITORY TO GET ORGANIC CERTIFICATION

About 14,491 hectare (ha) area in Andaman and Nicobar has been **certified as organic**, the **first large contiguous territory** to be done under a government scheme, Agriculture Ministry said on 27 April 2021. After **Andaman and Nicobar (A&N) Islands**, Lakshadweep and Ladakh are proactively taking steps for the transformation of their **traditional organic areas to certify organic**.

What

1. There are **traditional areas in Himachal Pradesh, Uttarakhand, north-eastern states and tribal belts of Jharkhand and Chhattisgarh and desert districts of**

- Rajasthan** which can be transformed to certified organic.
2. The **organic certification** has been given under the **Large Area Certification (LAC) Scheme** of the **PGS-India (Participatory Guarantee System) certification programme**.
 3. Under LAC, **each village in the area is considered as one cluster/group**. All farmers with their farmland and livestock need to adhere to the standard requirements and on being verified get certified enmass without the need to go under conversion period.
 4. **Certification is renewed on annual basis** through verification by a process of peer appraisals as per the process of PGS-India.
 5. In a statement, the ministry said it is working to identify traditional organic areas to transform them into certified production hubs.
- Flashback**

 1. Additionally, to bring isolated individual farmers to the certified organic fold, the ministry has also launched an organic certification support scheme under **PKVY (Paramparagat Krishi Vikas Yojana)**.
 2. Under the scheme, **individual farmers can avail financial assistance** for certification under any of the **prevailing certification systems of NPOP** (National programme for organic production) or PGS-India.
 3. **Assistance will be available** as reimbursement of certification cost directly to certification agencies through the states.
 4. The **organic certification will help farmers get direct access** to the emerging organic food market of the country.
 5. India now has more than **30 lakh hectare area registered under organic certification** and slowly more and more farmers are joining the movement.
 6. As per the **international survey report (2021) India ranks at 5th place in terms of area** and is at the **top in terms of total number of producers** (base year 2019), the ministry added.
6. The Government of India has **certified 14,491 ha of such area under Car Nicobar and Nancowry group of islands in A&N Islands**.
 7. An expert committee has verified their organic status and recommended for declaration of the area as **certified organic under the PGS-India certification programme**, adding that this area becomes the first large contiguous territory to be conferred with organic certification.
 8. According to the ministry, **Car Nicobar and Nancowry group of islands** have been **traditionally organic for ages**. The administration has also banned the sale, purchase and usage of any chemical inputs of genetically modified seeds in these islands.

UREA FROM COAL GASIFICATION

The **Union Cabinet** on 20 April 2021 approved an "**exclusive subsidy policy**" for **urea fertiliser** produced through **coal-gasification** by **Talcher Fertilizers Ltd (TFL)**. **Incorporated in 2015, TFL is a joint venture of four PSUs -- GAIL India Ltd, Coal India Ltd, Rashtriya Chemicals and Fertilizers Ltd and Fertilizer Corporation of India Ltd (FCIL)**.

What

1. The estimated cost of this **first of its kind project in India** is about Rs 13,277 crore. **Urea is a widely used fertiliser in India.**
2. **TFL is reviving the erstwhile Talcher plant of FCIL** by setting up a now **greenfield urea plant** in Odisha with the installed capacity of 12.7 lakh tonne per annum.
3. **Coal gasification plants** are **strategically important** as coal prices are non-volatile and **coal is abundantly available in the country.**
4. **India has large coal reserves but not adequate gas.** This effort to **convert coal to gas**, and **then gas to urea** will truly help India become Aatmanirbhar (self-reliant).
5. The gasification process adopted in the Talcher unit is a **Clean Coal Technology** giving negligible **sulphur dioxide, nitrogen dioxide, and free particulate emissions** as compared to directly coal fired processes.
6. **Natural gas and naphtha** are the most commonly used feedstock for manufacturing urea. **Natural gas used for urea production** is sourced either from domestic fields or imported in the form of **liquefied natural gas (LNG).**
7. **Talcher plant** shall also reduce dependence on important natural gas for production of urea leading to reduction in LNG import bill.

Flashback

1. The **Coal Gasification** process involves **pumping oxygen and steam** through a **small borehole** into the **coal seam to produce a small and controlled combustion.**
2. Unlike **coal-bed methane**, therefore, the **actual coal is converted from a solid state into gas.**
3. The **hydrogen, methane, carbon monoxide** and **CO2** are then siphoned off through a second borehole.

NCT OF DELHI ACT 2021 COMES INTO FORCE

The **Government of National Capital Territory of Delhi (Amendment) Act, 2021**, which **gives primacy to the Lieutenant Governor (LG)** over the elected government in the city, has come into force. The **provisions of the Act came into effect from 27 April 2021**, according to a notification issued by the Ministry of Home Affairs (MHA).

According to the legislation

1. The "**government**" in **Delhi means the "Lieutenant Governor"** and the city government will now have to seek the opinion of the LG before taking any executive action.
2. In exercise of the powers conferred by **sub-section (2) of section 1** of the Government of **National Capital Territory of Delhi (Amendment) Act 2021** (15 of 2021), the Central Government hereby appoints the 27th April 2021 as the date on which the provisions of the said Act shall come into force.
3. Parliament had passed the bill last month -- **Lok Sabha on 22 March 2021** and **Rajya Sabha on 24 March 2021.**

WORLD PRESS FREEDOM INDEX 2021

India has not slipped further on the **World Press Freedom Index 2021** published by the **international journalism not-for profit body, Reporters Without Borders (RSF)**, It continues to be counted among the countries classified “**bad**” for journalism and is termed as **one of the most dangerous countries** for journalists trying to do their jobs properly.

What

1. The latest index released on 20 April 2021 **ranks 180 countries**, topped, yet again, by **Norway followed by Finland and Denmark**, while Eritrea is at the bottom. **China is ranked 177**, and is **only above North Korea at 179** and **Turkmenistan at 178**.
2. **India is ranked 142**, same as last year, after it had consistently slid down from 133 in 2016.
3. In the **South Asian neighbourhood, Nepal is at 106, Sri Lanka at 127**, Myanmar (before the coup) at 140, Pakistan at 145 and Bangladesh at 152.
4. The report released on 20 April 2021 stated that **India** shares the “**bad**” classification with **Brazil, Mexico and Russia**.
5. **For India**, the latest report has blamed an environment of intimidation created by BJP supporters for any critical journalist, who, the report said, is marked as “anti-state” or “anti-national”.

INTERNATIONAL

INDIA ELECTED TO THREE BODIES OF UN

India has been elected to three key bodies of the **United Nations' Economic and Social Council** for a **three-year term** beginning 1 January 2022. The **three panels** are **Criminal Justice the Commission on Crime Prevention and Criminal Justice (CCPCJ)**, **Executive Board of UN Women** and **Executive Board of the World Food Programme**.

What

1. The **CCPCJ acts as the principal policy-making body** of the United Nations **in the field of crime prevention and criminal justice**.
2. The **Vienna-based body has 40 member states** that are elected by ECOSOC and is **chaired by a Bureau**, including one member per Regional Group.
3. **India was elected to World Food Program** or WFP's supreme governing body which **comprises 36 Members of the United Nations** or Member Nations of the Food and Agriculture Organization of the United Nations (FAO), the board provides inter-governmental support, **policy direction and supervision of the activities of WFP**.
4. The **UN Women is about gender issues** and the **executive board consists of 41 members, 10 from the African States, 10 from the Asian States, 4 from the Eastern European States**, 6 from Latin American and the Caribbean States, 5 from Western Europe and the Other States, and 6 from top contributing countries.
5. Indian diplomat **Lakshmi Puri** was the Deputy Executive Director of UN Women in the past.

INDIA-US CLIMATE AGENDA 2030

Prime Minister announced the launch of an **India-US climate and clean energy Agenda 2030** partnership to address climate change. Modi made the announcement at the **Leaders' Summit on Climate**, hosted by US President Joe Biden in the run up to global climate meet, **COP 26**, scheduled in Glasgow in November.

What

1. **Several leaders** who attended the summit announced **emission cut plans**.
2. While President Biden said the US emission will be 50% to 52% lower in 2030 than levels in 2005, Chinese President Xi Jinping mentioned his **country's 2060 zero net target** as well as plans to reduce coal consumption starting from 2025.
3. **India's share in per capita carbon footprint** was a fraction of the global average and that the country was taking **'bold steps'** despite huge developmental challenges.
4. **Nationally Defined Contributions (NDCs)** are each country's goals towards achieving the **Paris Agreement target** of limiting rising temperatures to **less than 2 degrees Celsius**.
5. The Prime Minister also emphasised India's encouragement of global initiatives such as the **International Solar Alliance** and the **Coalition for Disaster Resilience Infrastructure**.

MAJOR NAVAL EXERCISE IN ARABIAN SEA

India and France on 25 April 2021 **kicked off their major "Varuna" naval exercise** in the **Arabian Sea**, as a step towards **promoting maritime security in the Indo-Pacific region**. The bilateral exercise, in which France has also deployed its nuclear-powered aircraft carrier **FNS Charles de Gaulle with its Rafale-M naval jets**, comes soon after the two countries joined the **US, Japan and Australia** in the "France-plus-Quad" La Pérousewargames in the Bay of Bengal earlier this month.

What

1. With **China's aggressive and expansionist behavior in the Indo-Pacific**, there is **growing strategic congruence** among like-minded democratic countries to ensure a stable and secure Indo-Pacific as well as a rules-based order in the region.
2. The **three-day Varuna** will see **high tempo-naval operations at sea**, including advanced air defence and anti-submarine exercises, intense fixed and rotary wing flying operations, tactical manoeuvres, surface and anti-air weapon firings, among other maritime security operations.
3. India has deployed **guided missile stealth destroyer INS Kolkata, stealth frigates INS Tarkash and INS Talwar**, fleet support ship **INS Deepak**, with Seaking-42B and Chetak integral helicopters, as well as a **Kalvari-class diesel-electric submarine** and **P-8I long-range maritime patrol aircraft** for the exercise.
4. The **"Varuna" joint exercise is part of** the French carrier **strike group's "CLEMENCEAU 21"** deployment being conducted in the eastern Mediterranean, the Gulf and the Indian Ocean (Arabian Sea) from February to June this year.
5. The goal is to contribute to the **stabilization of these strategic zones** and **strengthening cooperation with the navies of partner countries**, in particular India for the Indian Ocean component.

ECONOMY

NET ZERO BANKING ALLIANCE

A group of 43 international banks including sector heavyweights have joined an UN-convened pact to reach carbon neutrality by 2050, the world body said 21 April 2021. Bringing together household names like Barclays, HSBC, Bank of America, Deutsche Bank and BNP Paribas, the "Net Zero Banking Alliance" members vowed to make greenhouse gas emissions from their lending and investment portfolios "align with pathways to net-zero by 2050 or sooner" with regularly updated intermediate goals.

What

1. All targets will be regularly reviewed to ensure consistency with the latest science, the United Nations' finance for the environment initiative UNEP FI said.
2. The group will also be a founding member of a sector-wide initiative -- the Glasgow Financial Alliance for Net Zero (GFANZ) -- from former Bank of England governor Mark Carney, the UN special envoy for climate action and finance.
3. GFANZ will work to mobilise the trillions of dollars necessary to build a global zero emissions economy and deliver on the goals of the Paris Agreement signed by the world's governments in 2015, UNEP FI said.
4. Carney himself called the alliance "the breakthrough in mainstreaming climate finance the world economy needs" and "the gold standard for net zero commitments".
5. GFANZ's naming for Glasgow refers to the COP26 climate change conference scheduled to be held in Scotland's biggest city in November.
6. As well as banks, UNEP FI said major global insurers and reinsurers were working on a similar project dubbed the Net-Zero Insurance Alliance.

INDIA THIRD HIGHEST MILITARY SPENDER

India was the third largest military spender in the world in 2020 behind only the US and China. According to the latest military expenditure database published on 26 April 2021 by the Stockholm International Peace Research Institute, which tracks military expenditure and arms trade globally, the US accounted for 39 per cent of the money spent on military globally, China accounted for 13 per cent and India accounted for 3.7 per cent of the globe's share.

What

1. The US spent a total of \$778 billion in 2020, China spent \$252 billion and India's military expenditure was \$72.9 billion. All three countries saw their military spending go up compared to 2019, even during a pandemic year.
2. While India's spending since 2019 grew by 2.1 per cent, the increase for China was more moderate, at 1.9 per cent. The US saw a 4.4 per cent growth over its 2019 expenditure.
3. Releasing the latest data, SIPRI said that the total "global military expenditure rose to \$1981 billion last year, an increase of 2.6 per cent in real terms from 2019" and the "five biggest spenders in 2020, which together accounted for 62 per cent of global military expenditure".
4. It mentioned that the "2.6 per cent increase in world military spending came in a year" when the global GDP shrank by 4.4 per cent (October 2020 projection by the

International Monetary Fund), “largely due to the economic impacts of the Covid-19 pandemic”.

5. It added that as a result, “**military spending as a share of GDP**—the military burden—reached a global average of 2.4 per cent in 2020, up from 2.2 per cent in 2019,” which, it said, “was the biggest year-on-year rise in the military burden since the global financial and economic crisis in 2009”.

SCIENCE AND TECHNOLOGY

INDIA'S FIRST 3D PRINTED HOUSE INAUGURATED

India's first 3D printed house built by **IIT-Madras startup Tvasta** was inaugurated on the campus on 27 April 2021. The house, which has a **built-up area of 600 square feet**, has a bedroom, a hall and a kitchen. The entire house was **designed using software and printed using concrete 3D printing technology**. Using this technology, a **new house can be built in five days** against four or five months in conventional mode. Further, the cost of the house is reduced by around 30% and **life of the building can exceed 50 years**.

What

1. **Concrete 3D printing** is an automated manufacturing method for constructing **three dimensional real-life structures** (at all realizable scales).
2. The **technique utilizes a concrete 3D printer** which accepts a **computerized three-dimensional design file** from the user and fabricates a 3D structure in a layer-by-layer manner by extruding a specialized type of concrete specifically designed for the purpose.
3. While inaugurating the **first 3D printed house** virtually on 27 April 2021, finance minister Nirmala Sitharaman said, "**India definitely needs such solutions which do not require much time**."
4. Conventional housing requires timing, material, logistics, transporting of material, and so on. But if this technology can produce houses in different locales at five days per house, it would not be a **big challenge to build 100 million houses by 2022**.
5. The **machine for constructing this house** can be rented, like **borewells rented by farmers**. It provides for large-scale, high quality and also, price assurance for the customers.
6. This technology **can enable deep personalization of construction for the individual**. It also can ensure that affordable, good quality housing is available to all Indians with a technology that is built in India, said, Tvasta.
7. The house was developed in collaboration with **Habitat for Humanity's Terwilliger Centre for Innovation in Shelter**.

FIRST MALARIA VACCINE TO REACH WHO GOAL

The **first malaria vaccine to show more than 75% efficacy**, a **World Health Organization specified goal**, has been developed by scientists at the **University of Oxford**, according to a study published in The Lancet journal. The shot against the **mosquito-borne disease** was trialed in 450 children ages five to 17 months in Burkina Faso and shows a “**favorable safety profile and was well-tolerated**,” according to the team at the university's Jenner Institute.

What

1. Finding **more effective vaccines** has been a critical goal in fighting a disease that kills about 400,000 people a year, largely in **sub-Saharan Africa**, with most being children under the age of five.
2. The candidate, **called R21**, is **77% effective against malaria**, according to the study, which hasn't been peer-reviewed.
3. The **Serum Institute of India**, which is also manufacturing the **Oxford-AstraZeneca Plc shot against Covid-19**, has agreed to make the malaria vaccine once approved.
4. The vaccine will next start broad clinical trials in 4,800 children across four African countries.

DATA RELAY SATELLITE TO TRACK GAGANYAAN

The **Indian Space Research Organisation** will launch a **data relay satellite** that **will help maintain contact with the Gaganyaan mission** throughout after the launch, sources said. The satellite will be launched before the **final leg of the Gaganyaan mission**, which will send astronauts to the **Lower Earth Orbit (LEO)**. The **first leg -- the unmanned mission** -- is to be launched in December.

What

1. **Satellites in orbit cannot pass along their information to the ground stations** on Earth if the satellite does not have a clear view of the ground station. A **data relay satellite serves as a way to pass along the satellite's information**.
2. The NASA, with a robust human space mission programme, also has its own data relay satellite.
3. **Its Tracking and Data Relay Satellite** allows it to have global coverage of all the satellites round the clock without having to build extra ground stations on Earth.
4. The **ISRO uses several ground stations spread across the globe -- Mauritius, Brunei and Biak, Indonesia**.
5. Last month, ISRO Chairperson K Sivan had said the space agency was also in talks with the **Australian counterpart to have a ground station at the Coco islands** for the Gaganyaan mission.
6. However, **there are blind spots**, due to which there is a possibility of not receiving signals, sources added. The **data relay satellite will help address the issues**.
7. Earlier this month, the **ISRO signed an agreement with French space agency CNES** for cooperation for the Gaganyaan, a move that will enable training of Indian flight physicians in French space agency's facilities.
8. Under this agreement, **CNES-developed French equipment**, tested and still operating aboard the International Space Station, will be made available to Indian crews.
9. The CNES will also be supplying **fireproof carry bags made in France** to shield equipment from shocks and radiation.
10. Last month, four prospective astronauts also returned to India after spending nearly a year in Russia.

ONEWEB LAUNCHES OTHER LEO SATELLITES

OneWeb, a **Low Earth Orbit (LEO) satellite communications operator**, co-owned by

DELHI: VIJAY NAGAR 9717380832 & OLD RAJENDER NAGAR 9811293743 | JAIPUR: 8290800441
 BENGALURU: KORMANGALA 7619166663 & CHANDRA LAYOUT 7619136662 | BHOPAL: 7509975361
 PATNA: 7463950774 | INDORE: 7314977441 | RANCHI: 9939982007 | www.ksgindia.com

Bharti Global and the UK government, launched **another batch of 36 satellites** by Arianespace from the Vostochny cosmodrome in Russia. The latest launch takes **OneWeb's total in-orbit constellation to 182 satellites**. These would form part of **OneWeb's 648 LEO satellite fleet** that will deliver high-speed, **low-latency global connectivity**.

What

1. The latest launch of LEO satellites will **enable OneWeb to offer services** across the **UK, Alaska, Northern Europe**, Greenland, Iceland, the Arctic seas and Canada, and will be switched on before the end of the year. **OneWeb intends to make global service available next year**, including in India.
2. Earlier this month, **OneWeb inked a memorandum of understanding (MoU) with the Kazakhstan government** and local partners to drive the Central Asian nation's **ambitions to digitise its economy** boost connectivity and become a pioneer in satellite communications.
3. Last November, Bharti Global MD Shravini Mittal had said that **OneWeb is open to entering India either directly or through a commercial partnership**, involving either the JV route or a bandwidth capacity leasing pact, even as it gears up to launch fast broadband services in the country by June 2022.
4. **Bharti Global is the overseas arm of Bharti Enterprises** -- the holding company of Bharti Airtel, India's second-largest telco.

MAIDEN TRIAL OF PYTHON-5 AAM CONDUCTED

India's indigenous **Light Combat Aircraft, Tejas**, has added the **5th generation Python-5 Air-to-Air Missile (AAM)** in its **air-to-air weapons** capability. The trials conducted on 27 April 2021 were also aimed to validate enhanced capability of the already integrated Derby **Beyond Visual Range (BVR) AAM on Tejas**. The test firing at Goa completed a series of missile trials to validate its performance under extremely challenging scenarios.

What

1. **Derby missile** achieved direct hit on a **high-speed maneuvering aerial target** and the **Python missiles also achieved 100% hits**, thereby validating their complete capability. The trials met all their planned objectives, the ministry of defence said on 28 April 2021.
2. Prior to these trials, **extensive missile carriage flight tests** were conducted at Bengaluru to assess integration of the missile with aircraft systems on board the Tejas, like **Avionics, Fire-control radar, Missile Weapon Delivery System** and the **Flight Control System**.
3. At Goa, after successful separation trials, live launch of the missile on a **Banshee target** was carried out.
4. **Python-5 missile** live firing was conducted to validate target engagement from all aspects as well as **beyond visual ranges**. In all the live firings, missile hit the aerial target.
5. The missiles were fired from **Tejas aircraft** of **Aeronautical Development Agency (ADA)** flown by Indian Air Force (IAF) test pilots belonging to **National Flight Test Centre (NFTC)**.

SPACEX WINS NASA CONTRACT FOR MOON LANDER

NASA has picked Elon Musk's SpaceX to develop the **first commercial lander** and take the **next two US astronauts to the moon**, the US space agency said on 16 April 2021. The **contract is worth \$2.9 billion** and **is part of NASA's Artemis programme**, which **aims to return astronauts to the moon by 2024** as a stepping stone to the first human mission to Mars.

What

1. **SpaceX** had been competing against Amazon founder **Jeff Bezos' private space company Blue Origin** and **defence contractor Dynetics**.
2. The **SpaceX Starship**, which is **designed to land on the moon**, will include a spacious cabin and two airlocks for moonwalks.
3. The goal is to eventually develop a **fully reusable launch and landing system** that can be used for space travel to destinations including the **moon and Mars**.
4. The mission will see four astronauts launched on **NASA's Orion spacecraft into lunar orbit**, where two of them will transfer to the SpaceX human landing system for their final journey to the moon.
5. The two astronauts will explore the lunar surface for around a week before returning to Earth. They will be the **first people to walk on the moon for more than 50 years**.
6. **At least one of the two will be a woman**. NASA also aims to bring the first person of colour to the moon's surface as part of the Artemis programme.
7. The **US brought 12 astronauts to the moon between 1969 and 1972**.

MARS HELICOPTER SUCCESSFUL FLIGHT ON RED PLANET

NASA's miniature robot helicopter Ingenuity performed a **successful takeoff and landing on Mars** early on 19 April 2021, achieving the first powered, controlled flight by an aircraft over the surface of another planet, the U.S. space agency said.

What

1. The **solar-powered whirligig's debut on the Red Planet** marked a **21st-century Wright Brothers moment** for NASA, which said success could **pave the way for new modes of exploration on Mars** and **other destinations in the solar system**, such as **Venus** and **Saturn's moon Titan**.
2. NASA's Jet Propulsion Laboratory (JPL) confirmed that the **4-pound (1.8-kg) twin-rotor helicopter** had performed its **maiden 40-second flight** as planned.
3. The **robot rotorcraft was programmed to ascend 10 feet (3 meters) straight up**, then hover and rotate in place over the Martian surface for half a minute before settling back down on its four legs.
4. A snippet of color video footage captured by a separate camera mounted on the NASA's **Mars rover Perseverance**, parked about 200 feet away, showed the helicopter in flight against the orange-colored landscape surrounding it.

NASA EXTRACTS OXYGEN FROM MARTIAN AIR

NASA has logged another extraterrestrial first on its latest mission to Mars: **converting carbon dioxide from the Martian atmosphere into pure, breathable oxygen**, the U.S. space agency said on 21 April 2021. The **unprecedented extraction of oxygen**, literally out of thin air on Mars, was achieved on 20 April 2021 by an experimental device aboard Perseverance, a **six-wheeled science rover** that landed on the Red Planet 18 Feb. 2021 after a **seven-month journey from Earth**.

What

1. In its first activation, the **toaster-sized instrument dubbed MOXIE**, short for **Mars Oxygen In-Situ Resource Utilization Experiment**, produced **about 5 grams of oxygen**, equivalent to roughly **10 minutes' worth of breathing for an astronaut**.
2. Although the initial output was modest, the feat marked the first experimental extraction of **natural resources from the environment of another planet** for direct use by humans.
3. **MOXIE is the first technology** of its kind to help future missions "**live off the land**" of another planet.
4. The instrument works **through electrolysis**, which **uses extreme heat to separate oxygen atoms from molecules of carbon dioxide**, which accounts for **about 95% of the atmosphere on Mars**.
5. The **remaining 5% of Mars' atmosphere**, which is only about 1% as dense Earth's, consists **primarily of molecular nitrogen and argon**. Oxygen exists on Mars in negligible trace amounts.
6. But an abundant supply is considered critical to eventual human exploration of the Red Planet, both as a **sustainable source of breathable air for astronauts** and as a necessary **ingredient for rocket fuel to fly them home**.
7. The volumes required for launching rockets into space from Mars are particularly daunting.

SPACEX LAUNCHES THIRD CREW

SpaceX launched four astronauts toward orbit 23 April 2021 using a **recycled rocket and capsule**, the **third crew flight in less than a year** for Elon Musk's rapidly expanding company. The **astronauts from the US, Japan and France** should reach the **International Space Station** early 24 April 2021 morning, following a 23-hour ride in the same **Dragon capsule used by SpaceX's debut crew last May**. They'll spend **six months** at the orbiting lab.

What

1. It was the **first time SpaceX reused a capsule and rocket** to launch astronauts for NASA, after years of proving the capability on station supply runs. The **rocket was used last November** on the company's **second astronaut flight**.
2. For this automated flight, **SpaceX replaced some valves and thermal shielding**, and installed new parachutes on the capsule, named **Endeavour** after **NASA's retired space shuttle**. Otherwise, the spacecraft is the same vehicle that flew before.
3. **Out of the four astronauts, two are from NASA and two are from the Japan**

Aerospace Exploration Agency (JAXA) and the European Space Agency (ESA).

4. **In May 2020, NASA's SpaceX Demo-2** test flight lifted off for the ISS carrying astronauts Robert Behnken and Douglas Hurley.
5. The aim of this test flight was to see if **SpaceX capsules** could be used on a regular basis to ferry astronauts to and from the ISS.
6. **Demo-2 was followed by the Crew-1 mission in November**, which was the **first of six crewed missions** between NASA and SpaceX **marking the beginning of a new era for space travel.**

CHINA NAMES MARS ROVER

China's first Mars rover will be named **Zhurong** after a **traditional fire god**, the government announced 24 April 2021. The **rover is aboard the Tianwen-1 probe that arrived in Mars orbit on 24 Feb 2021** and is **due to land in May to look for evidence of life**. It is part of Chinese space plans that include launching a crewed orbital station and **landing a human on the moon.**

What

1. **China in 2019 became the first country to land a space probe** on the **little-explored far side of the moon** and **in December returned lunar rocks to Earth** for the first time since the 1970s.
2. The **rover's title fits with the Chinese name for Mars** _ ``Huo Xing," or fire star, the China National Space Administration said.
3. The name ``**signifies igniting the flame of China's planetary exploration**," a deputy CNSA administrator, Wu Yanhua, was cited by the official Xinhua News Agency as saying.
4. The top candidate for the **landing site is Utopia Planitia**, a rock-strewn plain where the **U.S. lander Viking 2 touched down in 1976.**
5. **Tianwen-1's goals** are including **analyzing and mapping the Martian surface and geology**, looking for water ice and studying the climate and surface environment.
6. **China would become the third country** after the **former Soviet Union and the United States to put a robot rover on Mars.**

MISCELLANEOUS

VACCINE PRODUCTION AT HAFFKINE APPROVED

In a significant development aimed at **ramping up vaccine production**, the **Centre has approved rolling out vaccines** from the Maharashtra government-owned **Haffkine Institute**. Over the last few weeks, Maharashtra Chief Minister Uddhav Thackeray **had requested for production of vaccines in Mumbai** and has requested Prime Minister Narendra Modi during the two back-to-back video conferences with CMs of Covid-19 affected states.

What

1. The **Haffkine Institute located in Parel in Mumbai** will produce the **Bharat**

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- Biotech's Covaxin** under a **technology transfer agreement**.
- Department of Science & Technology** Secretary formally informed Maharashtra Chief Secretary Sitaram Kunte of the approval for a **period of one year**.
 - The Haffkine Institute has the **capacity to produce 22 crore doses annually**.
 - The **Haffkine Institute was established in 1899** and is named after the legendary scientist **Dr Waldemar Mordecai Haffkine** who **invented the plague vaccine**.
 - Since then, Haffkine Institute has emerged as a multi-disciplinary institute engaged in training, research and testing of various aspects of infectious diseases.
 - The **first-ever Phase-I clinical trial in India** was perhaps conducted by the founder of the **Haffkine Institute in 1899**, when he injected himself with the plague vaccine he developed for evaluating its safety and efficacy.
 - In the first half of the twentieth century, the institute extended its scope against various other common infectious diseases.

THE IMPACT RANKING 2021

The **Amrita Vishwa Vidyapeetham** is the **only Indian university to secure a rank amongst the top 100** in the **third edition of Times Higher Education (THE) Impact Ranking**. The **varsity bagged the 81st position** in the university rank list, which consists of **1240 universities from 98 countries and regions**. The rankings are evaluated on the universities' performances of the **United Nation's 17 Sustainable Development Goals**.

What

- Amrita Vishwa Vidyapeetham** has also **scored fifth rank** for '**quality education**' and **eight** for '**gender equality**' globally.
- In '**good health and well-being**', the **varsity got 37th position** and for '**clean water and sanitation**', it is at 52nd. Previously, the **university had its name in the 301-400 set of rankings**.
- Besides, there are **two other Indian universities in the 101-200 bands**, **JSS Academy of Higher Education and Research**, and **Lovely Professional University**.
- The **JSS Academy stands at 49th position for 'zero hunger'**, for '**good health and well-being**' at **52nd**, joint 81st for '**climate action**', joint 70th for '**life on land**' and 97th for '**responsible consumption and production**'.

List of World's Most Impactful Universities

- University of Manchester, UK
- University of Sydney, Australia
- RMIT University, Australia
- La Trobe University, Australia
- Queen's University, Canada
- Aalborg University, Denmark
- University of Woolonngong, Australia
- University College Cork, Ireland
- Arizona State University, US
- University of Auckland, New Zealand

EARTH DAY 2021

22 April 2021 is **Earth Day**, an **international event celebrated around the world to pledge support for environmental protection**. The year 2021 marks the **51st anniversary of the annual celebrations**. This year's **theme for Earth Day** is '**Restore Our**

Earth'. In 2009, the United Nations designated **22 April** as '**International Mother Earth Day**'.

The importance of Earth Day

1. **Earth Day was first observed in 1970**, when 20 million took to the streets to protest against environmental degradation.
2. The **event was triggered by the 1969 Santa Barbara oil spill**, as well as other issues such as smog and polluted rivers.
3. For over the next half century, **Earth Day continued to play an important role** in environmental activism.
4. The **landmark Paris Agreement**, which brings almost 200 countries together in setting a common target to reduce global greenhouse emissions, was signed on **Earth Day 2016**.
5. Earth Day aims to "**build the world's largest environmental movement to drive transformative change for people and the planet.**"
6. The movement's mission is "**to diversify, educate and activate the environmental movement worldwide.**"

SPACEX STARLINK ALLOWED AT LOWER ALTITUDE

Elon Musk's Starlink project to provide broadband from space received authorization on 27 April 2021 to place its satellites lower than previously proposed. The **US Federal Communications Commission (FCC)** said the move will "**serve the public interest,**" and gave SpaceX a **green light** despite protest from competitors such as Amazon.

What

1. **SpaceX**, which asked the US regulator for the permission which will apply to **some 2,800 satellites**, has already launched **hundreds into space** under its project to eventually blanket poorly connected and isolated areas of the globe with **internet connectivity**.
2. Rival Amazon and its space-based internet delivery system, **Project Kuiper**, argued that **Musk's Starlink project sought changes** that could "create a more dangerous environment for collisions in space," and also increase radio interference.
3. The FCC stipulated that SpaceX would have to accept any interference to its network as a result of the modification.

Flashback

1. **In 2018**, SpaceX received FCC approval to launch **4,425 broadband satellites** at orbits of **1,110 km to 1,325 km**.
2. An FCC order in 2019 gave SpaceX permission **to use a lower altitude for over 1,500 of those satellites**.
3. Today's FCC order granting SpaceX's additional license-change request lowers the **altitude for 2,814 of the satellites**, letting them orbit in the **540-570 km range**.
4. Today's FCC order will also let **SpaceX use a lower elevation angle for antennas** on user terminals and gateway Earth stations.
5. **SpaceX has deployed 362 Starlink satellites**, including two prototypes, into 550-kilometer orbits.
6. Its **next 60 satellites** launched aboard a Falcon 9 rocket 22 April 2021 from Cape Canaveral, Florida.

4. The company's satellites would not be allowed to **exceed an altitude of 580 kilometres**, meaning **they will be placed far from Kuiper's satellites** which will orbit at **590 kilometres**.
5. Musk and Amazon founder Jeff Bezos, both of whom have founded space companies, are vying for the title of world's richest man.
6. Bezo's space company **Blue Origin** filed a protest against NASA's choice of **SpaceX to build the module** that **will land the next US astronauts on the Moon**.
7. The **Starlink satellites will fly at an altitude of 540 to 570 kilometres** instead of at the **originally planned altitude of 1,000 to 1,300 kilometres**.

AYUSH-64 DRUG USEFUL IN COVID-19

AYUSH-64, a drug developed for curing malaria in 1980, can be useful for the treatment of asymptomatic, mild and moderate COVID-19 infection cases, the Ministry of AYUSH said on 29 April 2021. The trial at **King George's Medical University (KGMU), Lucknow; Datta Meghe Institute of Medical Sciences (DMIMS), Wardha; and BMC COVID Centre, Mumbai** involved 70 participants in each arm.

What

1. **AYUSH-64** as an adjunct to **standard of care (SoC)** showed significant improvement and thus lesser period of hospitalisation as **compared to SoC alone**.
2. **Several significant beneficial effects of the drug** on general health, fatigue, anxiety, stress, appetite, general happiness and sleep were also observed.
3. The drug's trial study has provided **substantial evidence** that **AYUSH-64** can be effectively and safely used to treat mild to moderate cases of COVID-19 as adjuvant to SoC.
4. **Patients on AYUSH-64 drug** will still require monitoring so as to **identify any worsening of disease** requiring more intensive therapy with oxygen and other treatment measures provided during **hospitalisation**.
5. The **Ayush-CSIR Joint Monitoring Committee** has also recommended the ministry to communicate to state licensing authorities/regulators regarding adding new indication of AYUSH-64 for repurposing in the management of mild to moderate COVID-19.
6. **AYUSH-64** comprises **Alstonia scholaris (aqueous bark extract), Picrorhiza kurroa (aqueous rhizome extract), Swertia chirata (aqueous extract of whole plant) and Caesalpinia crista (fine-powdered seed pulp)**.
7. This medicine is also recommended in the **National Clinical Management Protocol based on Ayurveda and Yoga**, which is vetted by the **National Task Force on COVID-19 Management of ICMR**.