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MK Yadav Sir



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**Science
Reporter**



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MINISTRY OF
SCIENCE AND
TECHNOLOGY

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Radio telescope floating in Karnataka waters throws light on nature of early stars and galaxies

Hemanth C.S.
BENGALURU

SARAS 3, a radio telescope designed and built at the Raman Research Institute (RRI) here, has provided clues to the nature of the universe's first stars and galaxies.

Using data from the telescope which has been deployed over the Dandiganahalli Lake and Sharavati backwaters since 2020, astronomers and researchers have been able to determine properties of radio luminous galaxies formed just 200 million years post the Big Bang, a period known as the Cosmic Dawn.

Researchers Saurabh



Window to beyond: SARAS 3, built by the Raman Research Institute in Bengaluru, deployed on the Sharavati river. SPECIAL ARRANGEMENT

Singh from the RRI and Ravi Subrahmanyan from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia, along with col-

laborators at the University of Cambridge and University of Tel Aviv, have used data from SARAS 3 to throw light on the energy output, luminosity, and masses of

Deeper insight

"The results from the SARAS 3 telescope are the first time that radio observations of the averaged 21-centimetre line have been able to provide an insight into the properties of the earliest radio loud galaxies that are usually powered by supermassive black holes," said Subrahmanyan, former Director of the RRI and currently with CSIRO. Explaining the findings, Professor Singh said SARAS 3 had improved the understanding of astrophysics of Cosmic Dawn by telling astronomers that

the first generation of galaxies that are bright in radio wavelengths. less than 3% of the gaseous matter within early galaxies was converted into stars, and that the earliest galaxies that were bright in radio emission were also strong in X-rays, which heated the cosmic gas in and around the early galaxies.

The results of the findings have been published in the journal *Nature Astronomy*.

In March, the SARAS 3 team used the same data to reject claims of the detection of an anomalous 21-cm signal from Cosmic Dawn made by the EDGES radio telescope developed by researchers from Arizona State University and MIT, the U.S.

SARAS 3 TELESCOPE (Syllabus: GS Paper 3 - Sci & Tech)

Context: SARAS 3, a **radio telescope** designed and built at the Raman Research Institute (RRI) Bangalore, India, has provided clues to the nature of the Universe's first stars and galaxies.

SARAS 3 telescope

- **About:** An **indigenously invented** and built radio telescope that can detect extremely faint radio wave signals from the depths of time.
 - It is the first telescope worldwide to reach the required sensitivity and cross-verify the claim of the signal detection
- **Invented and built by:** The **astronomers at RRI (Raman Research Institute)**, an institute for scientific research located in Bangalore, India.
- **Key features:** SARAS is a **correlation spectrometer designed for precision measurements** of the cosmic radio background and faint features in the sky spectrum at long wavelengths and operates in the octave band 87.5–175 MHz.
 - It **can detect faint cosmological signals**, especially radiation emitted by hydrogen atoms at the 21-cm wavelength (1.4 GHz) arising from the depths of the cosmos.
 - It was built to **deploy in India a precision radio telescope to detect extremely faint radio wave signals** from the depths of time, from our "Cosmic Dawn" when the first stars and galaxies formed in the early Universe.
 - **Cosmic Dawn** is the time in the infancy of our Universe when the first stars and galaxies came into existence.

'RoDTEP credit doesn't lapse after one year from scroll generation'



CHATROOM

T N C RAJAGOPALAN

We had made some exports under the RoDTEP scheme more than one year back. We received the duty credit in the electronic credit ledger but did not generate the e-scrip. Now, our ledger shows the credit but does not allow us to make the e-scrip. So, we are unable to use the duty credit. Is there any provision that says that the duty credit will lapse if we do not generate the e-scrip within one year?

No. Regulation 4(1) of the Electronic Duty Credit Ledger Regulations, 2021, says that the exporter will have the option to combine the duty credits under a particular scheme, allowed to him in one or more shipping bills or bills of export, and to carry forward the duty credits to create an e-scrip for that scheme in the ledger, customs station-wise according to the customs station of export, within a period of one year from the date of generation of the scroll in the customs automated system.

Provided that if the exporter does not exercise the option of creating the e-scrip within a period of one year, duty credit in each scroll will be combined customs station-wise for each scheme and will be automatically created by the customs automated system as a single e-scrip for duty credit for that scheme, for

each customs station, in the ledger of the exporter. Regulation 6(2) of the regulations says that the e-scrip will be valid for a period of one year from the date of its creation in the ledger and any duty credit in the e-scrip that remains unutilised at the end of this period will lapse.

Regulation 6(3) of the regulations says that such duty credit in the e-scrip that has lapsed will not be re-generated. So, the Customs automated system should have automatically created the scrip, if you did not create the e-scrip within one year from the date of generation of the scroll. The duty credits do not lapse or expire within one year of generation of the scroll. The unutilised portion of the duty credits in the e-scrip expires only after one year of creation of the e-scrip. What you observe appears to be a case of malfunction of the customs automated systems software. You can take it up with the appropriate authorities.

We are an Export House and have received a high-value order from a company based in Ghana, under a UNIDO project. On behalf of the importer, the financing bank (ANA, Germany) will issue an "irrevocable confirmation payment order" (ICPO) in the exporter's favour, covering 75 per cent of the purchase value in lieu of the LC. This document would also serve as Exhibit B in the contract. Is it workable in India? If not, should we opt for a particular transaction-specific ECGC policy? We want full payment security.

In my opinion, the ICPO referred to by you does not give you full payment security, as, say, a bank guarantee or irrevocable LC would give.

RoDTEP SCHEME

(Syllabus: GS Paper 3 - Economy)

Context: On behalf of the importer, the financing bank (ANA, Germany) will issue an "irrevocable confirmation payment order" (ICPO) in the exporter's favour, covering 75 per cent of the purchase value in lieu of the Electronic Duty Credit Ledger Regulations under The Remission of Duties and Taxes on Exported Products (RoDTEP) Scheme

RoDTEP scheme

- **About:** The RoDTEP Scheme allows exporters to receive refunds on taxes and duties that are not exempted or refunded under any other scheme.
 - The scheme basically replaces the Merchandise Export from India Scheme (MEIS).
 - The RoDTEP scheme can be said to be a combination of the Merchandise Export from India Scheme (MEIS) and the Rebate of State and Central Taxes and Levies (RoSCTL).
- **Origin:** It was announced in 2019 by the Government of India and it became effective on 1 January 2021.
 - In October 2019, WTO ruled that Merchandise Export from India Scheme (MEIS), Export Oriented Units (EOU), Electronics Hardware Technology Parks (EHTP), Special Economic Zone (SEZ), Export Promotion Capital Goods (EPCG) schemes are inconsistent with the WTO agreements for providing prohibited export subsidies.
 - The WTO panel recommended to the Indian government that these schemes should be withdrawn.
 - In response, the Indian government came up with the RoDTEP scheme which is WTO-compliant.
- **Objectives:** The chief aim of the scheme is to boost the export of goods that were poor in volume.
- **Features of RoDTEP Scheme:**
 - **Remission of taxes/duties/levies:** It covers duties and taxes levied at the central, state and local levels that are not reimbursed under any other mechanism. Items that were under the MEIS and the RoSCTL are shifted to the RoDTEP.
 - **Automated refund system:** Refunds will be issued to exporters as transferable duty credit/electronic scrips and maintained in an electronic ledger.
 - Under this scheme, refund would be claimed as a percentage of the Freight On Board (FOB) value of exports.
 - This can be used to pay basic customs duty on imported goods.
 - The credits can also be transferred to other importers.
 - **Speedy clearance through digitalisation:** Faster clearance through a digital platform will be facilitated through a monitoring & audit mechanism, with an IT-based risk management system that would physically verify the exporters' records.
 - **Scheme for all sectors:** The scheme is applicable across all sectors.

Red Planet Day: Remembering a pioneering space mission to Mars

EXPRESS NEWS SERVICE

NEW DELHI, NOVEMBER 28

ON NOVEMBER 28, Red Planet Day is marked, to commemorate one of the most significant space missions launched to Mars. On that day in 1964, the United States launched the space probe Mariner 4 on a course towards Mars. This was the first time that a spacecraft undertook a flyby of the red planet.

The Mariner flew past Mars in July 1965, becoming the first-ever spacecraft to take close-up photographs of another planet.

After an eight-month voyage, the pictures Mariner 4 brought back helped humans see lunar-type impact craters on Mars, some of them touched with frost. A television camera onboard took 22 pictures, covering about 1% of the planet.

These photos were transmitted to Earth in four days.

"Although originally not expected to survive much past the Mars flyby encounter, Mariner 4 lasted about three years in solar orbit, continuing long-term studies of the solar wind environment and making coordinated measurements with Mariner 5," according to NASA's website.

The photographs also revealed a cratered surface resembling the Moon, although because of their limited range, they failed to cover the more geologically diverse features we know about now. "These findings dashed many scientists' expectations of Mars as a place hospitable to life," NASA said.

Since then, massive interest has been sparked in the planet, and to date, a number of probes have been launched towards it by countries such as India, China and the UAE, among others.

Context: Commemorating the day one of the most significant space missions to Mars was launched, November 28 is marked as Red Planet Day.

Red Planet Day

- **About:** On **November 28, Red Planet Day** is observed in remembrance of the 1964 NASA launch of Mariner 4, the first spacecraft to land on Mars.
 - The spacecraft finally made a fly-by of the red planet on July 14, 1965, after traveling there for nearly eight months.
- **Mariner 4 spacecraft:** The Mariner 4 spacecraft was built to **collect data during fly-bys**, enabling planetary exploration and up-close scientific observations of Mars, and to relay that data back to people on Earth.
- **Key Facts:**
 - The **first person** to view Mars through a telescope was **Galileo Galilei**.
 - The **planet's name**, which is connected to its red appearance, derives from the Roman deity.
 - It's red because of **rusty iron in the ground**.
 - It is the fourth planet from the Sun and is a cold desert world. It is half the size of Earth.
 - Due to its **greater distance from the Sun than Earth**, Mars experiences weather that is made up of extreme temperatures.
 - The temperature can go from -191 to +81 degrees Fahrenheit.
 - The **gravitational pull** of the Red Planet is roughly **one-third that of Earth**.
 - As a result of the different pull of gravity, a person who weighed 100 pounds on Earth would only weigh about 38 pounds in space.
 - **Mars' orbit is much slower** to complete because of how far away it is from the Sun.
 - Approximately 687 days would pass in a "year" on Mars, which is nearly twice as long as a year on Earth.
 - It is also a **dynamic planet** with seasons, polar ice caps, canyons, extinct volcanoes, and evidence that it was even more active in the past.
 - It has a **very thin atmosphere** made of carbon dioxide, nitrogen, and argon.
 - Around Mars, there are **no rings**.
 - **Phobos and Deimos** are the names of Mars' two moons.
- **Mars Missions:**
 - **USSR:** Mars Orbiter.
 - **NASA:** Marine series, Viking series, Pathfinder, Rovers: Spirit, Opportunity (2003), Phoenix (2007), Curiosity (2011), Maven (2013-14), Perseverance (2021)
 - **European Space Agency (EU):** Mars Express (2001)
 - **ISRO:** Mangalyaan (MOM) (2014)
 - **UAE:** Amal (Hope Mission) (2021)
 - **China:** Tianwen 1 (2021)

India gets its first private launchpad and control centre

Shouvik Das
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NEW DELHI

The Indian Space Research Organization (ISRO) on Monday unveiled the first privately designed and operated rocket launchpad and mission control centre in India.

The facility, unveiled by S. Somanath, chairman of ISRO and secretary Department of Space (DoS), is designed and will be fully operated by homegrown space startup Agnikul Cosmos. ISRO confirmed in a statement.

The launchpad and mission control centre, located in ISRO's Satish Dhawan Space Centre (SDSC) in Sriharikota, Andhra Pradesh, is expected to host its first rocket launch in the coming weeks by Agnikul itself.

"The first exclusive launch pad for a private launch vehicle has come up at Satish Dhawan Space Centre (SDSC). So now India can travel to space from one more space platform. Thanks to Agnikul," Somanath said.

Srinath Ravichandran, chief executive of Agnikul, told *Mint* that while the launch facility will be presently used by Agnikul only, the company will be "open to other companies using the launchpad in future".

A senior industry official with knowledge of the matter said that any private space firm would be allowed to set up their launch facilities in ISRO premises—by making requisite payments towards the use of the latter.



Agnikul Cosmos will operate the launchpad.

government's nodal space organization, Indian National Space Promotion and Authorization Centre (In-Space). Once the final version of the national space policy is unveiled, a transfer of technology clause under this policy will enable private firms to access or share ISRO infrastructure.

Agnikul Cosmos is expected to launch its first rocket called Agnibaan. In a statement, the company confirmed that the first launch would include a smaller version of the rocket,

which will carry a payload of up to 100kg to a low-earth orbit of up to 700km. Ravichandran said that the company plans to execute the launch "before the end of this year".

The payload aboard a rocket is typically satellites deployed in orbits as required by companies. Agnikul Cosmos did not respond to an email seeking confirmation on the matter till press time.

India's first private rocket launch occurred on 18 November, when private space firm Skyroot Aerospace launched

Context: The Indian Space Research Organization (ISRO) unveiled the **first privately designed and operated rocket launchpad** and mission control centre in India.

India's first-ever Private launchpad

- About:** Chennai headquartered space-tech startup **Agnikul**, has set up India's first-ever launchpad that will be operated by a private player, at Sriharikota.
 - Founded in 2017, **Agnikul** is an IIT Madras incubated startup.
 - It became the **first Indian company** to sign an agreement with ISRO in December 2020.
- Agreement signed under the IN-SPACE:** The agreement signed under the IN-SPACE initiative sanctioned Agnikul access to the Indian space agency's expertise and facilities to build Agnibaan and its launchpads.
 - IN-SPACE was conceived in June 2020** following the Central government's decision to open up the space sector and enable the participation of Indian private sector in the gamut of space activities.
 - It acts as a **single-window, independent, nodal agency** which functions as an autonomous agency in Department of Space.
- Space Center:** The first exclusive launch pad for a private launch vehicle has come up at the Satish Dhawan Space Center (SDSC).
- Design and execution:** The facility was **designed by Agnikul and executed in support with ISRO and IN-SPACE** (Indian National Space Promotion and Authorization Center).
- Two sections:** The **Agnikul launchpad (ALP)** and the **Agnikul mission control center (AMCC)**.
 - All critical systems connecting these two sections, which are 4 km away from each other, are redundant to ensure 100% operationality during countdown.
 - The launchpad is specifically built keeping in mind the **necessity to support liquid stage controlled launches**, while also addressing the need for ISRO's range operations team to monitor key flight safety parameters during launches.
 - Additionally, it has the ability to, as necessary, share data and other critical information with ISRO's Mission Control Center.
- Controlled and guided mission:** Agnikul's first launch, which will be a **controlled and guided mission, a vertical launch**, using its patented engine will happen from this launchpad.
 - The mission will be a **technology demonstrator** that will mirror Agnikul's orbital launch but at a reduced scale.
 - Agnibaan and Agnilet** will be used in the Agnikul's first launch.
 - Agnibaan:** It is Agnikul's highly customizable, **two-stage launch vehicle**, capable of taking up to 100 kg payload to orbits around 700 km high (low Earth orbits) and enables plug-and-play configuration.
 - Agnilet:** It is the **world's first single-piece 3-D printed engine fully designed and manufactured in India** and was successfully test-fired in early 2021, making Agnikul the first company in the country to test its engines at ISRO.

Gati Shakti Status to be Tracked Monthly

Our Bureau

New Delhi: A month-wise action plan will be created for connectivity projects yet to be awarded, with a focus on maximising awards by the end of December 2022 and March 2023. This was decided at a meeting held earlier this month to review the progress of the PM Gati Shakti National Master Plan, according to an order from the Road Transport and Highways Ministry.

The National Highways Authority of India, National Highways & Infrastructure Development Corp and the Border Roads Organisation are responsible for implementing these projects, numbering 235, against demands raised by the ministries of steel, fertilizers, ports, shipping & waterways and defence.

The status of these road projects would be tracked on a monthly basis.

As many as 168 roads are identified for building for the defence ministry. The Ports, shipping and waterways ministry comes next with 61 projects, while steel has five and fertiliser has one. It has also been decided that geo-tagged data of automated testing stations and registered vehicle scrapping facilities will be uploaded on the PM Gati Shakti NMP Portal. Mapping of potential sites for these facilities will also be added to it.

A slowdown in the pace of road construction this year has prompted the Centre to undertake a review to identify the shortcomings and hasten implementation of national highway projects. According to data, 4,060 km of highways were constructed in the current financial year till October. This is 10.7% lower than the 4,550 km built during the same months of FY22.



GATI SHAKTI MASTER PLAN

Roadways capacity to be increased



Around 200 new airports, heliports and water aerodromes envisioned

Railways transport cargo capacity to be increased to 1,600 tonnes by FY25



Transmission network to be increased to 4,54,200 circuit km

Renewable capacity to be increased to 225 GW by FY25



4G connectivity for villages by FY22. Around 20 new mega food parks



Context: A month-wise action plan will be created for connectivity projects yet to be awarded, with a focus on maximising awards by the end of December 2022 and March 2023.

PM Gati Shakti National Master Plan

- **About:** It is a **digital platform** that will bring 16 ministries and departments of the Government of India together and that includes the Railways and the Roadways also.
- **Origin:** It was **announced by the Prime minister** of India in August 2021 and was launched in October 2021.
 - The program has been launched as an umbrella integrator of ₹111-lakh crore worth of projects under the National Infrastructure Pipeline (NIP) for 2020-25.
- **Objectives:** It involves the **creation of a common umbrella platform** through which infrastructure projects can be planned and implemented in an efficacious manner by way of coordination between various ministries/departments on a real-time basis.
- **Coverage:** It is a **Rs.100 lakh-crore project** for developing 'holistic infrastructure'.
 - It **incorporates the infrastructure schemes** of various Ministries and State Governments like Bharatmala, Sagarmala, inland waterways, dry/land ports, UDAN etc.
 - **Economic Zones** like textile clusters, pharmaceutical clusters, defence corridors, electronic parks, industrial corridors, fishing clusters, agri zones will be covered to improve connectivity & make Indian businesses more competitive.
 - It will also **leverage technology extensively** including spatial planning tools with ISRO imagery developed by BISAG-N.

6 Pillars of Gati Shakti Scheme



Comprehensiveness: One centralized portal to comprehensively cover all departments



Prioritization: Interaction between departments to prioritize projects



Optimization: Identifying critical gaps and optimization of resources



Synchronization: coordination to achieve common objectives



Analytical: Data centered governance and use of GIS based spatial planning



Dynamic: Periodic updation of on-ground progress on the portal

BB's nasal Covid vax can be used as booster: Regulator

Swati Bharadwaj | TNN

Hyderabad: Bharat Biotech on Monday announced it will work on variant-specific versions of the world's first intranasal Covid-19 vaccine iNCOVACC, which has received emergency use authorisation as a primary dose and heterologous booster for people above 18 years.

"Despite the lack of demand for Covid vaccines, we continued product development in intranasal vaccines to ensure we are well-prepared with platform technologies for future infectious diseases," Bharat Biotech chairman and MD Krishna Ella said.

Bharat Biotech said the intranasal vaccine platform



The vaccine has been developed to be cost-effective in low- and middle-income countries

offers the double benefit of enabling faster development of variant-specific vaccines and easy nasal delivery to enable mass immunisation to protect from emerging variants. It has been specifically formulated to allow intranasal delivery through nasal drops and has been designed and developed to be cost-effective in low- and middle-income countries.

fective in low- and middle-income countries. It can be stored at 2°C to 8°C.

Bharat Biotech said approval by the Indian drug regulator means the launch dates, pricing and availability of vaccine can be announced in due course of time. The regulator granted emergency use authorisation to iNCOVACC as a primary two-dose vaccine in September, while Central Drugs Standard Control Organisation authorised it on Friday for use as a booster.

"The product development data will be made available in public domain," said Bharat Biotech, which developed the vaccine in partnership with Washington University, St Louis.

How some of the different Covid-19 vaccines compare



Technology / company	Suitable for people with weak immune systems	Number of doses	Storage	Other vaccines using this technology
RNA Pfizer-BioNTech Moderna	✓	2	Pfizer-BioNTech: -70C and 2-8C for up to 5 days Moderna: -20C for 6 months and 2-8C for 30 days	No other licensed vaccines
Viral vector Oxford-AstraZeneca CanSino Biologics Gamaleya Research Institute Johnson & Johnson	✓ (Depending on viral vector used)	2 to 3	2-8C	Ebola
'Whole' virus Sinovac (inactivated) Bharat Biotech (inactivated) Sinopharm (inactivated) Medicago Inc. (virus-like particle)	✓	2	2-8C	Whooping cough (inactivated) Rabies (inactivated) Hepatitis A (inactivated) HPV/cervical cancer (virus-like particle)
Protein subunit Novavax Chinese Academy of Sciences	✓	2	2-8C	Hepatitis B

As of 6 January 2021. Source: Company data/Wellcome

INCOVACC (BBV154) VACCINE

(Syllabus: GS Paper 3 - Sci & Tech)

Context: Bharat Biotech announced it will work on variant-specific versions of the **world's first intranasal Covid-19 vaccine iNCOVACC**, which has received emergency use authorisation as a primary dose and heterologous booster for people above 18 years.

iNCOVACC (BBV154) Vaccine

- **About:** A novel adenovirus vectored, **intranasal vaccine** for COVID-19.
- **Intranasal vaccine:** An **intranasal vaccine stimulates a broad immune response** – neutralizing IgG, mucosal IgA, and T cell responses.
 - Immune responses at the site of **infection (in the nasal mucosa)** – essential for blocking both infection and transmission of COVID-19.
 - The nasal route has excellent **potential for vaccination due to the organized immune systems** of the nasal mucosa.
- **Key Features of the vaccine**
 - Non-invasive, **Needle-free**.
 - **Ease of administration** – does not require trained health care workers.
 - Elimination of **needle-associated risks** (injuries and infections).
 - **High compliance** (Ideally suits for children's and adults).
 - **Scalable manufacturing** – able to meet global demand.

Different types of Covid-19 vaccines

- **mRNA Vaccines:** Pfizer and Moderna vaccines developed in the US are mRNA vaccines.
 - In this type, vaccines will carry the **molecular instructions** to make the protein in the body through a synthetic RNA of the virus.
- **Viral Vector Vaccines:** Johnson & Johnson, **Sputnik V** and **AstraZeneca-Oxford University** vaccine is a kind of viral vector vaccine.
 - In this type, a **modified version of other viruses** (for example, adenovirus) is used.
- **Inactivated Vaccines:** Bharat Biotech's **Covaxin** and **Sinovac-CoronaVac** is categorised as an inactivated vaccine. In this type, an inactivated live virus is used to create an immune response against the disease.
- **Spike Protein Vaccines:** **Corbevax** is a recombinant protein subunit vaccine.
 - The vaccine is being **indigenously produced by Biological E**, Hyderabad-based Pharmaceutical company.
 - The Corbevax vaccine is made up of a specific part of SARS-CoV-2 — the spike protein on the virus's surface.

INDIA - MALAYSIA JOINT MILITARY EXERCISE HARIMAU SHAKTI - 2022 COMMENCES AT PULAI, KLUANG, MALAYSIA

Context: India - Malaysia joint military Exercise “Harimau Shakti -2022” commenced at Pulai, Kluang, Malaysia on 28th November and will culminate on 12th December 22.

Exercise Harimau Shakti - 2022

- **About:** It is an annual training event between the **Indian and Malaysian Army** which is being conducted since 2012.
- **Participations:** Combat-experienced troops of the **GARHWAL RIFLES Regiment** of Indian Army and the Royal Malay Regiment of the Malaysian Army are participating in the exercise this year to share experiences gained during operations in order to enhance interoperability in planning & execution of various operations in jungle terrain.
- **Scope:** The scope of this exercise involves a **Command Planning Exercise (CPX)** at the Battalion level and Company level Field Training Exercise (FTX) on sub-conventional operations in jungle terrain.
- **Significance:** It will **enhance the level of defence co-operation between Indian Army and the Malaysian Army**, which in turn will further foster the bilateral relations between the two nations.

Udarashakti: India-Malaysia Air force exercise

- **About:** It is a bilateral exercise between **Indian Air Force (IAF)** and **Royal Malaysian Air Force (RMAF)**.
 - From 2008 to 2010, the Indian Air Force Training Team was deployed in Malaysia to give **training to Malaysian pilots** on the SU-30SKM aircraft.
- **Origin:** The first bilateral Air Force exercise that staged frontline **Sukhoi-30 combat aircraft** was conducted in 2018.
- **Participations:** In Udarashakti 2022, **Indian Air Force** has taken part in air exercise with **Su-30 MKI and C-17 aircraft**.
 - On the other hand, Malaysian Air Force has taken part with **Su 30 MKM aircraft**.
- **Activities:** During the four days, various aerial combat drills will be conducted between two Air Forces.
- **Significance of the exercise:** Exercise will secure the long-standing bond of friendship and **enhance the line of defence cooperation between both the armies**.



KVIC Chairman inaugurates the ambitious Re-Hab Project in Nainital

Context: KVIC Chairman inaugurated the ambitious **Re-Hab Project (Reducing Human Attacks using Honey Bees)** by Khadi and Village Industries Commission (Ministry of Micro, Small and Medium Enterprises, Government of India) at village Chausla, in Forest Range Fatehpur, Haldwani, District Nainital, where he also distributed 330 Bee-boxes, bee-colonies and toolkits along with the honey extractors to the rural beneficiaries in Chausla village, free of cost.

Re-Hab Project

- KVIC is **running this project called Re-Hab in 7 states** of the country, namely in Karnataka, Maharashtra, West Bengal, Assam and Orissa, where attacks of the elephants is more common.
- Under this project, **fencing of bee boxes is installed** in such areas from where elephants move towards the human settlements and farmers' agriculture.
- Fencing of Bee-boxes on the routes of **movement of elephants blocks** the path of wild elephants.
- In this way, through honey-bees, **elephants can be prevented from attacking humans** and destroying farmers' crops.
- As a new initiative, the Re-Hab project will be **run by KVIC** at selected locations for a period of one year.

Khadi and Village Industries Commission (KVIC)

- **About:** It is a **statutory body** of the Indian Constitution.
 - It was established by **Khadi and Village Industries Act, 1956**.
- **Nodal Ministry:** Ministry of **Micro, Small and Medium Enterprises**.
- **Objectives:** To cater to the **self-reliance doctrine of the country** by empowering underprivileged and rural sections of the society.
- **Functions of KVIC:** It plans, promotes, organizes, and implements programmes for the development of Khadi and Village Industries (KVI).
 - It **maintains a reserve of raw materials** that can be further promoted in the supply-chain.
 - It helps in **providing financial assistance** to the individuals and institutions related to the khadi and village industries.
 - It **enforces guidelines** to comply with the product standards to eliminate the production of ingenuine products.
 - It is **empowered to bring projects, programmes, schemes** in relation to khadi and village industries' development.
 - It has brought **KVIC e-portal** for Khadi institutions that help artisans promote and sell their KVI products across India.
 - KVIC is the **nodal agency** to develop clusters for Khadi production under **Scheme of Fund for Regeneration of Traditional Industries (SFURTI)**.
 - SFURTI was launched in 2005 to **promote cluster development** of traditional industries and artisans.
 - KVIC is also the **nodal agency** for the implementation of the **Prime Minister Employment Generation Programme (PMEGP)**.
 - PMEGP is a **credit-linked subsidy scheme** which aims at generating employment by setting up micro-enterprise in the non-farm sector both in rural and urban areas.
 - Under Honey mission scheme, KVIC is **providing beekeeping training and 10 bee boxes** with live colonies to beneficiaries including farmers, beekeepers and unemployed youth with an aim to generate livelihood for the beneficiaries and also increase honey production in the country.
 - The Honey mission scheme is aimed at the **overall development and promotion of scientific beekeeping in India** to achieve the objectives of the Sweet Revolution.
 - The scheme is under the **Ministry of Agriculture and Farmers' Welfare, GOI**.
 - It is a **central sector scheme** (100% central government funding).

SUKHATAL LAKE

(Syllabus: GS Paper 1 - Env & Eco)

No construction on Sukhatal lakebed near Naini lake, orders Uttarakhand High Court

All encroachments to be immediately removed; Administration would have done it by now if squatters were from poorer sections of the society, HC notes



NEXT NEWS >

By Zumbish

Published: Monday 28 November 2022



Context: The High Court Of Uttarakhand recently directed the state government to **stop all construction activities on the bed of Sukhatal lake in Nainital.**

Background

- The **PIL was initiated** by the court March 2, 2022 on the basis of a letter written by a retired professor from Kumaun University along with the support of 104 other people last year.
- The petitioners pleaded with the HC to take suo motu cognisance, claiming **“ongoing destruction on Sukhatal in the name of development”**.
- Due to **unbridled construction activities** in the recharge zones of Naini Lake in Nainital, its natural feeder (Sukhatal) springs around the lake have been damaged.
- The **main recharge zone** of the Naini lake is Sukhatal, a seasonal lake situated 50 metres above it.
- The Sukhatal lake **covers an area of two hectares** and absorbs water during the monsoons, which recharges the Naini lake during the dry seasons.
- About 53 per cent of lakes in Nainital are **recharged by Sukhatal water.**

Sukhatal lake

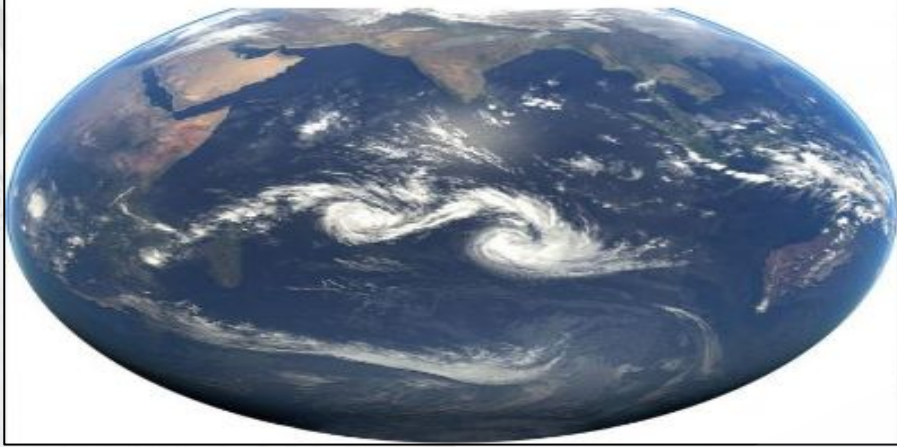
- **About:** It is a **freshwater** lake located in Nainital.
 - It was earlier known as **Khudariya Tal** and was renamed as Sukha Tal because the entire water from this lake was drained in the extreme region of the Nainital Lake.
- **Location:** It is **dry lake** located half a km from lake of Nainital.
 - Sukhatal is fringed with **dense Oak and Pine Forests** and often home to migratory birds from across the globe.
- **Seasonal:** Sukhatal is a seasonal lake that falls **under the category of a wetland**, as per the established guidelines of the Ministry of Environment, Forest and Climate Change.
 - Sukhatal is **well underwater for approximately 4 months** during a normal monsoon year.
- **Significance:** It is believed that **Sukhatal is a feeder lake for Naini Lake**, as it acts as upstream storage for Naini Lake during monsoon by holding the runoff from catchment of water that would have otherwise flown out, thereby increasing erosion and silt deposition in Naini Lake.
 - Since 2000, **Naini Lake has reached zero level** - minimum water level to be maintained - on at least 10 occasions.

FUJIWHARA EFFECT

(Syllabus: GS Paper 1 - Geography)

Perfect storm: What is the Fujiwhara Effect?

The world is seeing a rise in cyclonic formations and in cases of cyclones merging to form megacyclones, courtesy warming oceans



Five different ways of Fujiwhara Effect

Elastic Interaction (EI): Interaction of vortices (storms) of same or different sizes, resulting in changes only in the direction of motion. This is the most commonly seen interaction

Partial Straining-Out (PSO): Interaction of vortices of unequal sizes. Part of the smaller vortex lost to the atmosphere.

Complete Straining-Out (CSO): Interaction of vortices of unequal sizes. The smaller vortex completely lost to the atmosphere

Partial Merger (PM): Interaction of vortices of unequal sizes. Part of the smaller vortex merged to the bigger vortex

Complete Merger (CM): Interaction of vortices of same or different sizes, resulting in complete merger of both the storms

Context: In recent years, several storms have come close to undergoing the **Fujiwhara Effect**.

Key Points

- On September 1, 2022, **super typhoon Hinnamnor**, the strongest tropical cyclone of the year, was hurtling towards Taiwan from the western Pacific Ocean.
- Another tropical storm called **Gardo** was moving towards Hinnamnor from its southeast.
- As the two approached each other, they started a dance around the central line between them, showcasing a textbook example of what is known as the **Fujiwhara Effect**.
- When two ocean storms form in the same region, their **wind circulations start meeting each other** at the mid and higher levels.
- This meeting of winds makes a **bond between the two storms** like a connecting limb through which they start influencing each other.
- The occurrence of the Fujiwhara Effect **makes cyclones more unpredictable** due to their rapid intensification, carrying of more rain and newer ways of moving over warming oceans.
 - This is because each of the interactions between the two storm systems is unique and very difficult to capture with current climate models.
- There is **no worldwide accepted technique or recording agency** dedicated to recognise and collect the cases of the Fujiwhara Effect as these are rare events and tough to assess.

Fujiwhara effect

- About:** The Fujiwhara Effect is **any interaction between tropical storms formed around the same time** in the same ocean region with their centres or eyes at a distance of less than 1,400 km, with intensity that could vary between a depression (wind speed under 63 km per hour) and a super typhoon (wind speed over 209 km per hour).
 - The Fujiwhara effect can **turn two cyclones into one mega cyclone**
 - The interaction could **lead to changes in the track and intensity** of either or both storms systems. In rare cases, the two systems could merge, especially when they are of similar size and intensity, to form a bigger storm.
- Origin:** Fujiwhara effect was **identified by Sakuhei Fujiwhara**, a Japanese meteorologist whose first paper recognising the Fujiwhara cases was published in 1921.
 - The first known instance of the effect was in 1964 in the **western Pacific Ocean** when **typhoons Marie and Kathy** merged.
- Five different ways in which Fujiwhara Effect can take place:** Elastic interaction, Partial straining out, Complete Straining out, Partial merger and Complete merge.
 - During a merger interaction between two tropical cyclones the wind circulations come together and form a sort of **whirlpool of winds in the atmosphere**.

THANK YOU!



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