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सत्यमेव जयते



MK Yadav Sir

Table of Contents

1. Bharat 6G Project
2. QS World University Rankings
3. DAPSC
4. Wetlands Methane Emissions
5. Biomass Shrinking
6. Non-Lapsable Defence Fund
7. Armed Forces Tribunal
8. Sam No Varunah Rally
9. Liquid Mirror Telescope
10. Padma Awards

BUSINESS STANDARD

Page 4

BHARAT 6G PROJECT

(Syllabus: GS Paper 3 - Infrastructure)

Bharat 6G: Modi launches prep for next-gen telecom

Also inaugurates International Telecommunication Union Area Office

SUBHAYAN CHAKRABORTY
New Delhi, 22 March

Prime Minister Narendra Modi on Wednesday unveiled India's 6G mission, which visualises a focused initiative for the next-generation tech in India, and the official 6G testbed project to allow research on new network technologies.

The government has launched the Bharat 6G project, and appointed an apex council to oversee it. India is the second-largest telecom market globally with 1.2 billion digital subscribers.

Modi said the past nine years witnessed an unprecedented digital leap, whereby India's digital economy grew 2.5 times faster than the national economy. Modi also launched the 'Call Before You Dig (CBuD)' app to facilitate coordination between excavation agencies and underground utility owners to prevent damage to utilities due to digging.

"Over this period, the number of broadband users rose to 800 million, from 60 million, and the number of internet connections rose to 850 million from 250 million. The government and private sector together have laid over 2.5 million km of optical fibre," he said. Modi stressed India is the most connected democracy in the world, where 70 million e-authentications are done every day, and 8 billion UPI transactions are made every month. "India has sent upwards of ₹28 lakh crore directly to its citizens through direct benefit transfers," he said.

6G supply chains

In November 2021, the government formed a 22-member innovation group headed by Telecom Secretary K Rajaraman to create a vision for the 6G road map in India.

Opening up 6G airwaves is part of India's efforts to attain a key toehold in the global supply chain for emerging technology, such as satellite and terrestrial communication gear and components.

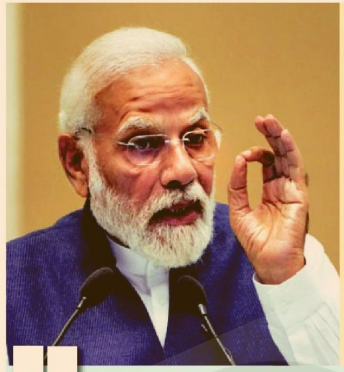
The new 6G testbed is being co-developed by a consortium of Indian Institutes of Technology (IITs), including Guwahati and Madras.

The project will provide an R&D platform to start-ups, researchers, industry and other broadband wireless applications in India like e-Governance, smart cities, rural Broadband or other Digital India initiatives under Atmanirbhar Bharat.

New ITU office

The prime minister also inaugurated the first Area Office & Innovation Centre of the International Telecommunications Union (ITU) in India. ITU is the United Nations' specialised agency for information and communication technologies (ICT). The ITU's next World Telecommunication Standardisation Assembly will also be held in India next year.

The new office will help ITU coordinate with India and other countries in the region, said ITU's secretary-general Doreen Bogdan-Martin.



6G: VISION & MISSION

- Mission to run in two phases till 2030
- To make India 6G R&D, manufacturing hub
- At 1Tbps, 6G to be 100 times faster than 5G
- Network to be built upon 5G infrastructure; be more reliable and affordable
- Suitable spectrum to be be identified
- Hyper personalised networks, drone communications, and holographical on cards

"WITHIN SIX MONTHS OF THE 5G ROLLOUT, TODAY WE ARE TALKING ABOUT 6G. THIS SHOWS THE CONFIDENCE OF INDIA. TODAY WE HAVE BROUGHT THE VISION DOCUMENT TO THE FORE. THIS WILL BECOME A BIG BASE FOR THE ROLL OUT OF 6G"

India has 127 global patents for 6G now, says Vaishnaw

India now has over 127 global patents for 6G technology, Union Minister for Communications Ashwini Vaishnaw said on Wednesday. He reiterated Prime Minister Narendra Modi's remark that India has the power of trust and scale, which is leading to the demand for indigenous telecom gears overseas. "I must also share with you that 127 patents have been obtained by Indians," Vaishnaw said on the sidelines of the 17th India Telecom event. PTI

Context: Prime Minister unveiled **India´s 6G mission (Bharat 6G Project)**, which visualises a focused initiative for the next generation tech in India, and the official 6G testbed project to allow research on new network technologies.

- The Prime Minister also unveiled the **Bharat 6G Vision Document** and launch the 6G R&D Test Bed.
- The Prime Minister also launched the **'Call Before You Dig (CBuD)' App.**

Bharat 6G Vision Document

- **About**: It is a document prepared by the **Technology Innovation Group on 6G** (TIG 6G) that was formed in November 2021 to develop a roadmap and action plans for 6G in India.
- **Objectives**: 6G Test Bed will provide a p**latform for startups, MSMEs,** etc. to test and validate the evolving ICT.

Call Before You Dig (CBuD)' App

- **About**: It is a tool developed for **preventing damage to underlying assets l**ike optical fibre cables.
  - Uncoordinated digging and excavation results in a loss of about Rs 3000 cr every year to the country.
- **Objectives**: This app will **connect excavators and asset owners** and illustrates the 'Whole of Government Approach' in the governance of the country.

Parameter	5G	6G
Spectrum (Major Frequency Bands)	24 GHz to 100 GHz	95 GHz to 3 THz (Terahertz) (Can operate on higher frequency than 5G)
Latency (End to End Delay)	5 milliseconds	1 millisecond
Peak Data Rates	Up to 20 Gbps	Up to 1,000 Gbps
Significance	Accelerate adoption of cloud gaming, AR/VR technology, Internet of Things etc.	Support high-performance computing, edge computing, Technology Convergence etc.

INDIAN EXPRESS

Page 17

QS WORLD UNIVERSITY RANKINGS

(Syllabus: GS Paper 2 - Education)

44 Indian courses among top 100 in QS University Rankings

EXPRESS NEWS SERVICE
NEW DELHI, MARCH 22

IIT BOMBAY'S Mathematics programme at 92nd place and JNU's Sociology at 68th place are some of the courses that featured in the QS World University Rankings 2023 by subject. Apart from these 10 entries from BITS Pilani and two from OP Jindal University also made it to top 100.

Led by its Institutes of Eminence (IoE), India has improved its position in the Quacquarelli Symonds (QS) World University Rankings by Subject, with 44 courses, in their respective subject categories, offered in the country's higher educational institutes, ranked among the global top 100.

The rankings, released on Wednesday, show that the 11 declared Institutes IoEs account for 44 per cent of the 355 programmes offered by Indian universities which made it to the overall rankings. In the previous round, there were 299 entries, including 35 among the top 100.

While the rankings cover 54 academic disciplines, the Indian universities perform well in the fields of Computer Science, Chemistry, Biological Sciences, Business Studies and Physics.

Among the IOEs, barring Delhi Universities, the other institutes saw more courses offered by them gaining places compared to ones that slipped. However, in the case of DU, of the 27 programmes featured in the QS list, seven improved ranks, while 12 declined.

For the second consecutive year, the dentistry programme offered by the Saveetha Institute of Medical and Technical Sciences posted the best performance among Indian institutes obtaining the 13th rank globally. Last year, it was ranked 18th.

"It is the only Indian university to achieve a perfect score (100/100) in both Citations per Paper and H Index. The next two highest ranked universities in these tables are the IIT Madras placed 21st in Petroleum Engineering (up 9 places) and the ISM University, Dhanbad, placed 25th," the QS said in a statement.

The QS noted that, globally, India, which saw its research output grow by 54% between 2017 and 2022, produces the world's fourth most research (1.3 million academic papers between 2017 and 2022), behind world leader China (4.5 million), the United States (4.4 million) and the United Kingdom (1.4 million).

But in citation count, India lags far behind. "From 2017 to 2021, India saw 15% of its publications cited in top journals. Meanwhile, its closest competitors in terms of research output volume, the United Kingdom and Germany boast top journal citation percentages more than double that, 38% and 33% respectively," the QS pointed out.

The highlights of the 2023 rankings include the entry of IIT Bombay's Mathematics programme in the global top 100 categories, getting the 92nd spot. IIT Delhi's Electrical engineering programme broke into the top 50 categories globally, placed 49th, while the same programme offered by IIT Kanpur has been placed 87th, featuring in the top 100 categories for the first time.

Jawaharlal Nehru University breaks into the world's top 100 in Sociology, taking 68th place, showing a rise of 33 places. The University of Delhi ranked 91.

The organisation's Research Director Ben Sowter said among countries having over 10 universities featured in the rankings, "India is the second-most improved in Asia with its overall performance improving by 17.2% year on year, after Mainland China which improved by 21.9%."

Context: IIT Bombay's Mathematics programme at 92nd place, JNU's sociology at 68th place are some of the courses that featured in the **QS World University Rankings 2023** by subject.

- Apart from these 10 entries from BITS Pilani and two from OP Jindal university also made it to top 100.

Key Points

- **India has improved its position** in the **Quacquarelli Symonds (QS)** World University Rankings by Subject, with 44 courses, in their respective subject categories, offered in the country's higher educational institutes ranked among the global top 100.
- The QS noted that, globally, India, which saw its **research output grow by 54%** between 2017 and 2022, produces the world's fourth most research (1.3 million academic papers between 2017 and 2022), behind world leader China (4.5 million), the United States (4.4 million) and the United Kingdom (1.4 million).
- From 2017 to 2021, **India saw 15% of its publications cited in top journals.**
- Meanwhile, its closest competitors in terms of research output volume, the United Kingdom and Germany boast top journal citation percentages more than double that, 38% and 33% respectively.

QS World University Rankings

- **About**: It is an **annual publication of university rankings** which comprises the global overall and subject rankings which name the world's top universities for the study of 51 different subjects .
  - It is the most-widely read university rankings in the world.
  - It currently **leads the higher education industry** with consistent innovation and growth, progressively affecting the way students and institutions engage.
- **Functions**: The QS rankings provide **methodical evaluations** of key areas of higher education institutions, ultimately offering potential students expert advice proven to align students with their chosen path.
- **Parameters**:
  - Academic Reputation (AR),
  - Employer Reputation (ER),
  - Faculty-Student Ratio (FSR),
  - Citations Per Faculty (CPF),
  - International Faculty Ratio
  - International Students Ratio.

PIB MARCH 23

DEVELOPMENT ACTION PLAN FOR SCHEDULED CASTES

(Syllabus: GS Paper 2 - Social Justice)

BUDGETARY ALLOCATIONS UNDER DAPSC

Context: 15.74 % of funds allocated towards **Development Action Plan For Scheduled Castes (DAPSC)** out of total budgetary allocation in 2022-23.

Key Points

- The **Budgetary Allocation of funds under DAPSC** is done by NITI Aayog for the welfare schemes implemented by the participating Ministries/Departments for **improving the socio-economic and educational conditions** of the SCs and STs.
- It is the prerogative of the Ministries/Departments to further r**e-allocate the funds allocated by NITI Aayog** under their respective Schemes.
- The percentage of allocation under DAPSC **remains proportional** with the total percentage of the SC population.
- As per the guidelines of NITI Ayog, percentage of earmarking **should not be less than 50% of the population proportion** or at least in the proportion of SCs/STs population of the country, whichever is higher.

Implementation of Development Action Plan for Scheduled Castes

- The **Ministry of Social Justice and empowerment** has been monitoring the expenditure of the funds allocated for the Development Action Plan for Scheduled Castes (DAPSC) every quarter.
    - A portal has been created which shows the progress in utilisation of these funds on **real-time basis.**
- DAPSC is actually a **conglomeration of various schemes** being run by different Ministries for the welfare of Scheduled Castes.
- Usually, the schemes of the **Ministries undergo evaluation study normally every five years,** if the scheme is to be continued beyond five years.
- The onus of the study of the scheme solely **rests on the implementing Ministries.**
- DAPSC is a gamut of schemes which are **run and implemented by various Ministries.**
- DAPSC is not a standalone scheme. The schemes included under DAPSC are those which **provides for direct benefits to the Scheduled Castes population.**
- Since it is **obligatory** on the participating Ministries to allocate funds for the welfare of Scheduled Castes in their schemes under DAPSC, the issue of giving legal framework to DAPSC has not arisen.

DTE

MARCH 23

METHANE EMISSIONS FROM WETLANDS

(Syllabus: GS Paper 3 - Env & Eco)

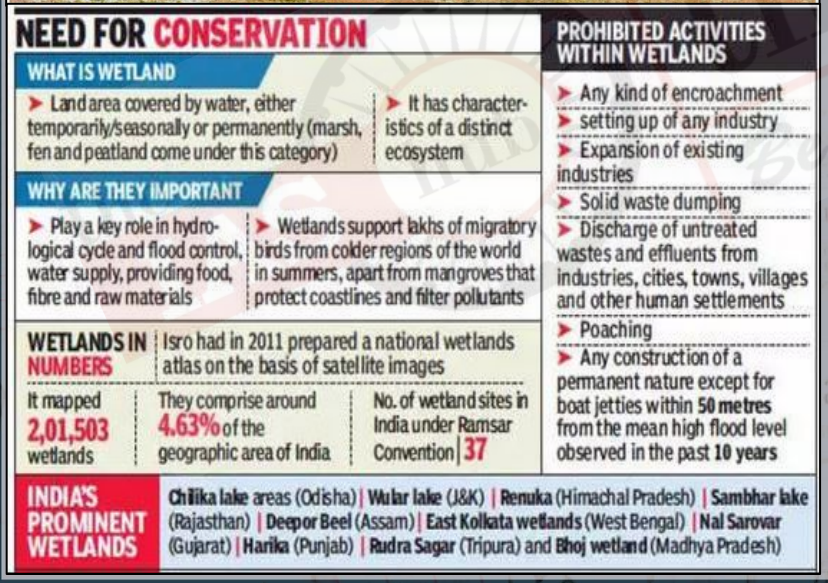
Methane emissions from wetlands rose 5-6% since 2000-2006: Study

Methane is responsible for roughly 30 per cent of the rise in temperature since the pre-industrial period

NEXT NEWS >

By Rohini Krishnamurthy
Published: Wednesday 22 March 2023





Context: Warming temperature and increased precipitation appears to be driving **methane emissions from wetlands** - land areas where water covers the soil either seasonally or permanently, according to a new study.

- **Methane emissions from wetlands** rose at a rate of 1.3-1.4 teragrams (1 Tg equals 1,000,000 tonnes) per year from 2000 to 2021.

Key Points

- Methane is responsible for roughly **30 percent of the rise** in temperature since the pre-industrial period.
  - It is also 84 times more potent on a 20-year timescale.
- Wetlands like **swamps, marshes, permafrost** (permanently frozen ground), bog and fens are responsible for a third of total methane emissions.
  - **Fens are wetlands fed by groundwater,** while bogs are depressions filled by rainwater.
- Wetlands store more than a **third of the world's terrestrial carbon.**
  - However, they can **also act as a source**, releasing roughly 127-155 Tg of carbon annually.
  - This is largely **attributed to microbes** inhabiting wetlands.
- Methane emissions cause a **positive climate feedback,** which means it amplifies warming.
  - **Increased rain** due to global warming, for instance, creates more wetlands, which increase methane emissions.
  - This, in turn, causes more global warming and rain, creating a **feedback loop.**
  - Despite this, most climate models such as **Earth System Models and Integrated Assessment Models** that were a part of the last Assessment Report of the Intergovernmental Panel on Climate Change do not consider this process.
  - The models **focus on the long-term increase in atmospheric methane concentrations** due to human activities such as industry and agriculture.

DTE

MARCH 23

BIOMASS SHRINKING

(Syllabus: GS Paper 3 - Env & Eco)

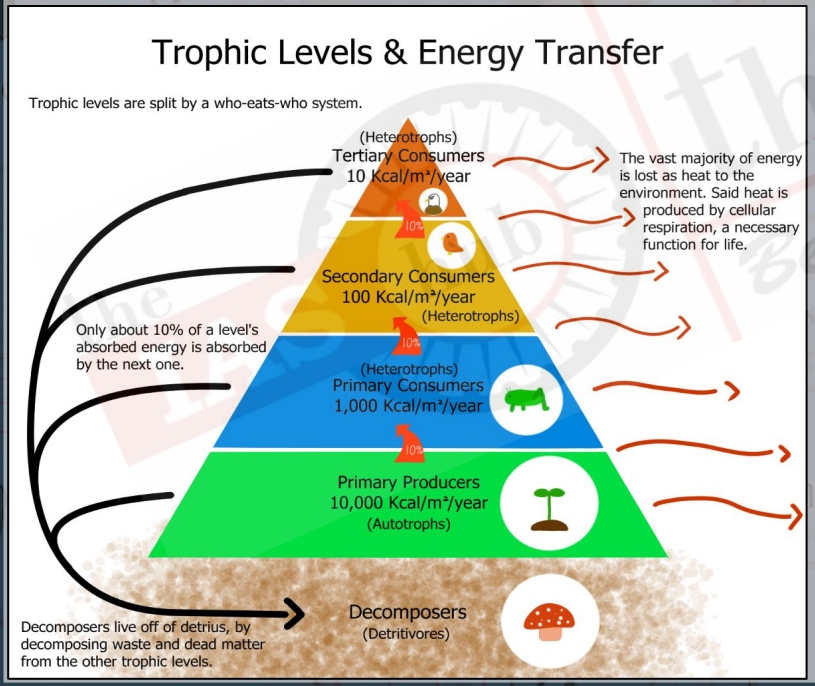


Total weight of humans is 10 times that of all wild mammals put together

The weight distribution is also skewed: 40% global biomass of wild land mammals is concentrated in only 10 species

NEXT NEWS >

By Preetha Banerjee
Published: Tuesday 21 March 2023



Context: The **population of wild mammals is shrinking** despite conservation efforts and the extent of this crisis is visible in a new report that compares the biomass of wild and domesticated mammals and human beings.

- Total **mass of humans is 10 times that of all the world's wild mammals** combined, the report published in Proceedings of the National Academy of Sciences journal showed.

Key Points

- **Wild mammals** comprise some of the heaviest animals of the planet — the elephants, bears, bisons and whales.
- The **total weight of wild land mammals and marine mammals** is around 22 million tonnes and 40 million tonnes respectively.
- The **distribution of biomass** across wild land mammal orders and species reveals that about 40 per cent of the global biomass of wild land mammals is concentrated in only 10 species.
- The total biomass of the three elephant species in the world, for instance, is similar to that of all the 1,200 bat species combined.

Biomass

- **About**: In ecological terms, biomass refers to the **various types of living organisms** in a particular environment or ecosystem.
  - Biomass can also be known as **species biomass,** which is the mass of one or more species.
  - Biomass can also be called **community species,** which is the mass for all species in the community.
  - Biomass includes **microorganisms, plants and animals.**
  - At a given time, living plants and animal tissues get **accumulated in a specific environment** and biomass is referred to as the total accumulated material in a particular time period.
- **Producers**: Plants that transform sunlight into chemical energy via photosynthesis are called producers.
- **Consumers**: The living organisms that consume producers are known as **primary consumers.**
  - The organisms that feed on primary consumers are called **secondary consumers.**
  - All these describe the **biomass productivity** in an ecosystem, where each consumer eats the other consumers.

ECONOMIC TIMES

MARCH 23

NON-LAPSABLE DEFENCE FUND

(Syllabus: GS Paper 3 - Defence Sector)

Non-lapsable Fund Not Needed, Grant Process Changed: Defence Secy

Manu.Pubby
@timesgroup.com

New Delhi: The creation of a non-lapsable fund for defence modernisation is no longer required as a new consultative process has been put in place that will allocate capital budgets based on realistic assessment of the armed forces, a top defence ministry bureaucrat has said.

The non-lapsable fund, which has long been under discussion with even the government accepting in 2021 a Finance Commission recommendation for its creation, was aimed at providing a dedicated pool of money for capital-intensive purchases like fighter jets and warships.

Among reasons behind the demand for such a fund was the uncertain nature of defence purchases and the gap every year between projected expenses of the armed forces and the actual allocation granted by the government. For example, in FY23 the armed forces projected capital expenses of Rs 1.99 lakh cr but were allocated only Rs 1.36 lakh crore.

Explaining the change in stand over creation of the fund, defence secretary Giridhar Aramane has informed the parliamentary standing committee on defence that a new mechanism has been put in place that will ensure that the entire expenses projected by the armed forces will be met by the finance ministry.

"When it was recommended, the concept was right... Now, the process has been changed in the finance ministry. All our requirements have been met. So, there is no need for non-lapsable fund. If in a particular year, we require this much to pay for the equipment we have ordered, we will get that," the defence secretary informed the panel.

He added that "the concept of non-lapsable budget may not be possible in view of the parliamentary approval required every year for the budget process. We have a rolling budget". The panel was also informed that unlike in the past, the entire projected capital expense of Rs 1.48 lakh crore has been granted to the armed forces this year.

Secretary informs House panel of new 'consultative process', Fund creation mentioned earlier by FM

Explaining the new process, an army representative told the panel that a better system for estimating expenses has been put in place. "Earlier, when we were not automated and when we did not have a full idea of how much the committed liabilities would be, we tended to ask for a little more and it was generally accepted that we got a little lesser than that," the representative said, adding that allocations for FY 24 are "exactly equal to what we have asked for".

Context: The creation of a **non-lapsable fund for defence modernisation** is no longer required as a new consultative process has been put in place that will allocate capital budgets based on realistic assessment of the armed forces, a top defence ministry bureaucrat has said.

- The non-lapsable fund, which has long been under discussion with even the government accepting in 2021 a **Finance Commission recommendation** for its creation, was aimed at providing a dedicated pool of money for capital-intensive purchases like fighter jets and warships.

Non-Lapsable Defence Modernisation Fund

- **About**: The **Ministry of Defence** is reportedly considering the creation of a Non-Lapsable **Defence Modernisation Fund (DMF)** to modernize the defence forces.
- **Objectives**: The fund is expected to supplement the regular yearly budgetary allocations and eliminate any uncertainty in provisioning **adequate funds for various defence capability** development and infrastructure projects.
- **Significance**: The DMF, once operationalised, will ensure that the **unspent budgetary allocation to the three services** can be retained even after the end of the fiscal year.
  - In India, the defence budget is allocated on a **yearly basis.** At the end of each fiscal year, any **unspent funds are returned to the government's consolidated fund.**
- **Benefits of Non-Lapsable Funds:**
  - **Adequate funds:** It **eliminates** the need for the Ministry of Defence to **constantly approach the Ministry of Finance** for additional funds.
  - **Used for any unforeseen requirements:** This ensures that the defence services are **better equipped to deal with any challenges** that may arise.
  - **Long-term planning**: The defence services can **plan their modernisation projects over a longer time frame,** without the fear of losing out on unutilised funds at the end of the fiscal year.

TIMES OF INDIA

Page 1

ARMED FORCES TRIBUNAL

(Syllabus: GS Paper 3 - Armed Forces)

HCs can hear appeals against AFT verdicts: SC

Ajay.Sura@timesgroup.com

The Supreme Court has fully restored the jurisdiction of high courts to hear appeals challenging the judgments of the Armed Forces Tribunal (AFT), something that had been barred by a 2015 order of the top court.

A larger SC bench of Justices Sanjay Kishan Kaul, Abhay S Oka and B V Nagarathna also remanded back the appeals that were earlier dismissed by various HCs over lack of jurisdiction. The SC has also sent back to the high court a direct appeal filed in the top court by the government in a service matter.

Most litigants aggrieved by orders of the AFT used to challenge these in the high courts of their respective states. However, in 2015, the SC held that in view of a specific clause of appeal to the SC provided in the AFT Act, the HCs, though empowered under the Constitution, should not hear challenges to orders.

▶'Without remedy', P 22

Context: The Supreme Court has fully restored the jurisdiction of high courts to hear appeals challenging the judgments of the **Armed Forces Tribunal (AFT)**, something that had been barred by a 2015 order of the top court.

- In 2015, the SC held that in view of a specific clause of appeal to the SC provided in the AFT Act, the HCs, though empowered under the Constitution, should not hear challenges to orders.

Armed Forces Tribunal (AFT)

- **About:** Armed Forces Tribunal is a **military tribunal** of India.
  - It was established on 8th August 2009 and is a statutory body set up under the **Armed Forces Tribunal Act 2007.**
  - **Paramilitary forces are not considered** to be a part of the Armed Forces Tribunal jurisdiction.
- **Principal bench**: Located in **New Delhi.**
- **Procedure**: The tribunal follows the procedure as is practised in the High Court of India; and for that **Armed Forces Tribunal (Procedure) rules, 2008** are followed by it.
- **Composition**:
  - **Chairman: Only a retired SC judge or a retired Chief Justice of High Court** can become the chairperson.
  - **Judicial Members**: They are the **retired high court judges.**
  - **Administrative Members**: They are **either retired members of the Armed Forces or a Judge Advocate General.** The qualifications to be appointed as the administrative members of the Armed Forces Tribunal are:
    - **For retirees from Armed Forces** – Holder of a rank of Major General or an equivalent post or above for a period of three years or more.
    - **For Judge Advocate General –** Experience in the post for at least one year.
- **Dress code:** There is a dress code for the members of the Armed Forces Tribunal:
  - **White shirt**
  - **Collar band, and**
  - **Black coat/ jacket**
- **Appellant**: An aggrieved person by the court martial order, decision or finding can **appeal before the Armed Forces Tribunal.**
  - The tribunal can also **dismiss the appeal** if the court martial findings are found to be justified.
  - The tribunal can allow an **appeal against conviction.**
  - Any appeal by a person against a decision given by the tribunal **can be taken up in the Supreme Court and High courts.**

- **Jurisdictions:**
  - It is empowered to adjudicate appeals against any order, decision, finding or sentence passed by a court-martial or any matter connected therewith or incidental thereto.
  - The tribunal is empowered to grant bail to an accused who is in military custody. The bail so provided can be with or without conditions as the tribunal may decide.
  - The Armed Forces Tribunal acts as a criminal court for the purposes of relevant sections of the Indian Penal Code and Chapter XXVI of the Code of Criminal Procedure, 1973. (Know in detail about Criminal Courts in India in the linked article.)

PIB MARCH 23

SAM NO VARUNAH RALLY

(Syllabus: GS Paper 3 - Various Armed Forces)

INDIAN NAVY TO CONDUCT THE 'SAM NO VARUNAH' COASTAL CAR RALLY

Context: To awaken the maritime nation and encourage Sea Consciousness, the Indian Navy in association with **Navy Welfare and Wellness Association (NWWA)** is undertaking a maritime awareness coastal motor car expedition, "**SAM NO VARUNAH**" covering the entire Indian coastline in March 2023.

- The expedition planned over 25 days covering approx 7500 Kms **passing through all coastal states** is partnered with by M/s Mahindra who are providing a fleet of 12 vehicles along with Mastercard India and Indian Oil Corporation Ltd (as fuel partner).

Objectives of the expedition

- Celebrate **Azadi ka Amrit Mahotsav.**
- **Conduct awareness** drives along the route about various career opportunities that the Navy offers including the Agnipath Scheme.
- Showcase **'Naari Shakti'** by participation of serving women officers and naval wives.
- Instill a **sense of adventure and motivate young generation** to join the Indian Navy.
- Interact with **Naval Veterans/ Veer Naaris** enroute.
- Spread awareness about the **rich maritime heritage** and revival of maritime history by covering various Ports, Forts, Lighthouses, Heritage Villages, Beaches etc.

Key Facts

- Indian Navy's motto is **"Sham no Varunah",** which means "may the god of water, Varuna is protecting us".
- The **Indian Navy Day** is celebrated on December 4 every year to remember Operation Trident.
- **Operation Trident** was an offensive operation carried out by the Indian Navy on 4–5 December 1971 against the Pakistani port city of Karachi.
    - **Operation Trident** inflicted devastating losses on Pakistani shipping and its success is celebrated every year in India as Navy Day.

DST

MARCH 23

LIQUID MIRROR TELESCOPE

(Syllabus: GS Paper 3 - Sci & Tech)

Union Minister Dr Jitendra Singh inaugurates Asia's largest 4-metre International Liquid Mirror Telescope at Devasthal in Uttarakhand in the presence of the Governor of Uttarakhand Lt. Gen (Retd.) Gurmeet Singh

Context: Union Minister of State (Independent Charge) Science & Technology inaugurated **Asia's largest 4-metre International Liquid Mirror Telescope** at Devasthal in Uttarakhand.

- **Aryabhatta Research Institute of Observational Sciences (ARIES)** announced that the world-class 4-metre International Liquid Mirror Telescope (ILMT) is now ready to explore the deep celestial sky.
- The telescope is **located at an altitude of 2450 metre at the Devasthal Observatory campus of ARIES,** an autonomous institute under the Department of Science and Technology (DST), Govt. of India in Nainital district, Uttarakhand.

Liquid mirror telescope

- **About**: Liquid-mirror telescopes are telescopes with mirrors made with a r**eflective liquid.**
- **Liquid used:** The most common liquid used is **mercury**, but other liquids will work as well (for example, low-melting alloys of gallium).
- **Mechanism**: The liquid and its container are rotated at a constant speed around a **vertical axis,** which causes the surface of the liquid to assume a paraboloidal shape.
  - This **parabolic reflector** can serve as the primary mirror of a reflecting telescope.
  - The **rotating liquid** assumes the same surface shape regardless of the container's shape; to reduce the amount of liquid metal needed, and thus weight, a rotating mercury mirror uses a container that is as close to the necessary parabolic shape as possible.
- **Affordable**: Liquid mirrors can be a **low-cost alternative** to conventional large telescopes.
  - Compared to a solid glass mirror that must be cast, ground, and polished, a rotating liquid-metal mirror is much less expensive to manufacture.
- **Types**:
  - **Conventional land-based liquid-mirror telescopes:** These are made of **liquid stored in a cylindrical container** made of a composite material, such as Kevlar.
    - The liquid gradually forms a **paraboloid**, the shape of a conventional telescopic mirror..
  - **Moon-based liquid-mirror telescopes**: Low-temperature ionic liquids (below 130 kelvins) have been proposed as the fluid base for an extremely **large-diameter spinning liquid-mirror telescope** to be based on the Moon.
    - **Low temperature is advantageous** in imaging long-wave infrared light, which is the form of light (extremely red-shifted) that arrives from the most distant parts of the visible universe.
  - **Space-based ring liquid-mirror telescopes**: It will **only work in space;** but in orbit, gravity will not distort the mirror's shape into a paraboloid. The design features a liquid stored in a flat-bottomed ring-shaped container with raised interior edges.
    - The central focal area would be **rectangular**, but a secondary rectangular-parabolic mirror would gather the light to a focal point. Otherwise the optics are similar to other optical telescopes.

THE HINDU Page 13

PADMA AWARDS

(Syllabus: GS Paper 1 - Sports & Awards)

President confers Padma awards on S.M. Krishna, Kumar Mangalam Birla

The Hindu Bureau
NEW DELHI



Time for laurels: President Droupadi Murmu presents the Padma Vibhushan to S.M. Krishna in New Delhi on Wednesday. PTI

Former Karnataka Chief Minister S.M. Krishna, industrialist Kumar Mangalam Birla and playback singer Suman Kalyanpur were among those who were honoured with the Padma awards by President Droupadi Murmu at an investiture ceremony at the Rashtrapati Bhavan on Wednesday.

Mr. Krishna, a former External Affairs Minister, who is "known for his statesman-like vision and administrative acumen during a career spanning more than six decades", was given the Padma Vibhushan, the second highest civilian award. Noted architect Balkrishna Doshi, known for his minimalistic, simple and eco-friendly approach to architecture, was also given the Padma Vibhushan posthumously, the Rashtrapati Bhavan tweeted. Stock market investor Rakesh Jhunjhunwala, who had passed away last year, was given the Padma Shri posthumously.

Mr. Birla, chairman of the Aditya Birla Group (ABG), was given the Padma Bhushan. In a tweet, the Rashtrapati Bhavan noted that the ABG was one of the first Indian groups to venture abroad and acquire widespread global presence.

Delhi-based professor Kapil Kapoor, spiritual leader Kamlesh D. Patel and Ms. Kalyanpur were also among those who were honoured with the Padma Bhushan, the country's third highest civilian award. Jodhaiya Bai Baiga, a prominent artist of Baiga painting; Usha Barle, performer of Pandwani and Panthi art forms of Chhattisgarh, and Raman Cheruvayal, a tribal farmer from Kerala who is known for his contribution to sustainable agriculture and preservation of biodiversity, were given the Padma Shri.

The ceremony was attended by Vice-President Jagdeep Dhankhar, Prime Minister Narendra Modi and Lok Sabha Speaker Om Birla as well as Home Minister Amit Shah.

The President had approved 106 Padma awards on the eve of Republic Day and over 54 people were given on Wednesday. Two awardees including music legend Zakir Hussain, who has been honoured with Padma Vibhushan, were not present at the ceremony. The rest of the awardees would be conferred the honour in another ceremony later.

Context: Former Karnataka Chief Minister S.M. Krishna, industrialist Kumar Mangalam Birla and playback singer Suman Kalyanpur were among those who were honoured with the **Padma awards by President**.

Padma Award

- **About**: The Padma Awards, which were **instituted in the year 1954**, are one of the highest civilian honours of India, announced annually on the eve of Republic Day.
- **3 categories:** :
  - **'Padma Vibhushan'** is awarded for exceptional and distinguished service.
  - **'Padma Bhushan'** for distinguished service of a high order.
  - **'Padma Shri'** for distinguished service in any field.
- **Disciplines/ fields:** The Awards are given in **various disciplines/ fields of activities;** art, social work, public affairs, science and engineering, trade and industry, medicine, literature and education, sports, civil service, etc.
  - The Padma Awards are conferred on the recommendations made by the **Padma Awards Committee,** which is constituted by the Prime Minister every year.
  - The nomination process is open to the public. Even **self-nomination can be made.**
- **Eligibility**: **All persons** without distinction of race, occupation, position or sex are eligible for these awards.
  - However, Government servants including those **working with PSUs, except doctors and scientists, are not eligible for these Awards.**
- **Awards**: The awardees are presented a **Sanad (certificate) signed by the President and a medallion.**
  - The recipients are also given a small replica of the medallion, which they can wear during any ceremonial/State functions etc. if the awardees so desire.
  - The award **does not amount to a title** and cannot be used as a suffix or prefix to the awardees' name.
  - The total number of awards to be given in a year (excluding posthumous awards and to NRI/foreigners/OCIs) **should not be more than 120.**

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