Prelim Bits 07-03-2024 | UPSC Daily Current Affairs

INS Jatayu

The existing Naval Detachment Minicoy was upgraded to a naval base and commissioned as INS Jatayu.

- **INS Jatayu Naval Base** – It will have additional infrastructure such as an *airfield, housing, and personnel*.
- It will effectively be the country's *2nd naval base in Lakshadweep*.

Indian Navy's 1st base on Minicoy is INS Dweeprakshak in Kavaratti, was commissioned in 2012. India has had a naval detachment in Minicoy since the 1980s.

- **Objective** – To *incrementally augment security infrastructure* at the strategic Lakshadweep Islands.
- **Significance** – Facilitate *anti-piracy and anti-narcotics operations in the western Arabian Sea*.
- Augment India's capability as the 1st responder in the region.
- *Counter the growing Chinese influence* in the Indian Ocean Region.

Recently, India and Mauritius jointly inaugurated an airstrip and a jetty that India has built on the Mauritian island of Agaléga off the coast of Africa in the western Indian Ocean.

- **Challenges** – The fragile ecology of the island may pose challenges for the construction of a jetty (an extension from land out into water).

The Lakshadweep Islands & its Importance

• **Name** – Lakshadweep means *'a hundred thousand islands'* in Sanskrit and Malayalam.
• **An archipelago** – It consists of *36 islands* located between 220 km and 440 km from Kochi.
• The islands, *only 11 of which are inhabited*, have a total area of only 32 sq km.
• **Chain of coralline islands in the Indian Ocean** – It includes Lakshadweep along with Maldives to the south, and the Chagos archipelago farther beyond, to the south of the equator.
• **Significance** – Given their location in the Indian Ocean, the Lakshadweep are of huge strategic importance to India.
• **Minicoy** - It is the *southernmost atoll of the Lakshadweep* archipelago.
• It straddles *vital Sea Lines of Communications* (SLOCs), the world's main maritime highways including the *8 Degree Channel* (between Minicoy and Maldives) and the *9 Degree Channel* (between Minicoy and the main cluster of Lakshadweep islands).
• **Concerns** – These Islands are also *vulnerable to marine pollution*.

Reference

The Indian Express| Commissioning of INS Jatayu Naval Base

Trisonic Wind Tunnel (TWT)

Recently, 3 major space infrastructure projects of ISRO was inaugurated which includes a Trisonic Wind Tunnel at Vikram Sarabhai Space Centre (VSSC) at Thumba in Kerala.

- **TWT** – A unique *wind tunnel capable of simulating 3 distinct flight* regimes, so the name trisonic
  - **Subsonic** – Below the speed of sound
  - **Transonic** – At the speed of sound
  - **Hypersonic** – Above the speed of sound
- **Aim** – To *test the aerodynamic performance* of scaled-down models of rocket and re-entry spacecrafts under various atmospheric conditions.
- **Features** – It is a ***1.2 metre TWT***, a state-of-the-art facility and the first of its kind in India.
- It is *160 metres in length* with a diameter of 5.4 metres.
- It can simulate flight conditions from 0.2 times the speed of sound (68 m/s) to *4 times the speed of sound* (1360 m/s).
- It also contains different sections for different velocity regimen of wind.
- It produces *controlled uniform airflow* to evaluate aerodynamic characteristics and designs by evaluating forces, moments, load distribution, unsteady pressures, acoustic levels etc.
- **Improves design and efficiency** – It helps in optimizing the design of rockets and spacecraft, leading to *enhanced performance and fuel efficiency*.
- **Reduce Development costs** – It provides a *cost-effective alternative* to expensive, real-world flight testing, allowing ISRO to iterate and refine designs more efficiently.
- **Position India at the forefront** – India is also *one of only 3 countries* to have a wind tunnel that can produce hypersonic speeds after the US and France.
- **Atmanirbhar Bharat** *– Fully conceived by ISRO and executed through Tata Projects*

and is a classic example of Make in India.
- It will provide *self-reliance for the end-to-end design* of various upcoming launch projects.

The TWT at VSSC is India's 3rd hypersonic wind tunnel (HWT) after the DRDO's Hypersonic Wind Tunnel at the APJ Abdul Kalam Missile Complex in Hyderabad, and the 1.2 metre TWT at National Aerospace Laboratories in Bengaluru.

Wind Tunnels
• These *cylindrical wind tunnels* come in various sizes depending on the velocities of wind generated as well as the size of the vehicle. • Air within these tunnels can move from small wafts to mild breezes to multiple times the speed of sound (hypersonic). • **Uses** – To *test airflow properties and aerodynamic forces*, temperature and pressure variation, structural stability of the object being tested, and so on. • To *test vehicles that fly*, like planes and rockets, but *also high-speed vehicles* on roads like cars and trucks. • To *test buildings and bridges* that sway in the wind.

References

1. The Print| Inauguration of Trisonic Wind Tunnel
2. IDRW| Advantages of TWT

Chandrayaan-4

ISRO is gearing up for the next lunar mission 'Chandrayaan-4', to build on the accomplishments of Chandrayaan-3 mission (2023) while attempting more complex objectives.

- **Aim** – To land on the Moon and also ***return rocks and soils*** (lunar regolith) from the lunar surface to India.
- **5 spacecraft modules** – Like Chandrayaan-3 it takes lander, rover and the propulsion module along with 2 additional components to return the samples from the Moon.
- **Propulsion Module** – Similar to Chandrayaan-3, the propulsion module will *guide Chandrayaan-4 in lunar orbit*, before separating.
- **Descender Module** – It will *make the lunar landing*, similar to the Vikram lander on Chandrayaan-3.
- **Ascender Module** – Once the samples are collected and stored, the ascender module will *eject from the lander* and begin returning.
- **Transfer Module** – It will *grab the ascender module* and getting it out of lunar orbit and will journey back to Earth before the capsule with the rock and soil samples detach.
- **Re-entry Module** – This will be the *capsule carrying the lunar regolith that will land on Earth*.

- **2 separate launches** – It is the *1st mission involving 2 launch vehicles* aimed at completing a single mission.
    - **LVM-3** – It will launch with *3 components* (Propulsion Module, the Descender Module and the Ascender Module).
    - **Polar Satellite Launch Vehicle (PSLV)** – It will launch the *Transfer Module and the Re-entry Module*.

LVM-3 is India's heaviest launch vehicle.

If successful, Chandrayaan-4 will make India only the 4th nation to bring back samples from the lunar surface.

Reference

India Today| ISRO is gearing for Chandrayaan-4

Zigzag technology in Brick kilns

A recent survey reported that 90% brick kilns in Alwar in Rajasthan shifted to zig-zag technology, and nearly all brick kilns have started using biomass fuel.

- **Need** – *Traditional brick kilns* with towering chimneys *emits pollutants*, such as particulate matter, sulphur dioxide, and nitrogen oxides which can have detrimental effects on both human health and the environment.
- **Zig zag technology** – A *method of firing bricks in a kiln* that uses a unique design to reduce emissions of pollutants and increase efficiency.
- **Setup** - A typical zigzag kiln typically consists of a *series of chambers*, each section containing a different type of brick.
- The bricks are arranged in a *series of parallel rows* where each row is offset from the one before it, creating a zigzag pattern.

- **Working** – Burn the kiln using fuel in a separate chamber, which *produces the hot flue gases* by the combustion process.
- The hot flue gases are *redirected through the same bricks* which leads to a more efficient burning process as it heats them from all sides.
- Cool and remove the bricks from the kiln once the firing process is complete.
- **Advantages** – It results in *less fuel consumption, lower emissions of pollutants,* and a more consistent and higher-quality product.

Zigzag technology in Brick kilns can reduce black carbon by 60%, particulate matter by 40% and can also reduce the coal needed by 20%.

- **Measures taken by India** – Union Ministry of Environment, Forest and Climate Change's (MoEF&CC) issued a notification in 2022 on brick kilns for the adoption of zig-zag technology.
- The Commission for Air Quality Management's (CAQM) directed the entities for using cleaner fuel in the Delhi-NCR region.

References

1. Down To Earth| 90% of Alwar uses Clean Brick Technology
2. CCACoalition| Zig-zag Technology in Brick Kilns

Global Great Backyard Bird Count (GBBC) 2024

India records 1,036 species for backyard bird count — third highest globally.

GBBC

- The GBBC was *launched in 1998*, in the USA and was initially restricted to the USA only.
- GBBC is a citizen-driven scientific project aimed at counting and reporting the details of birds in the area of their neighborhood.
- It was an initiative of Cornell Lab of Ornithology and the National Audubon Society of USA.
- In 2013, it took the global stage turning into a global bird census.
- GBBC India is the Indian implementation of the global Great Backyard Bird Count, which runs for 4 days every February.
- Indian birders have participated in the GBBC since the event went worldwide in 2013.
- GBBC India is coordinated by the Bird Count India collective, a coming-together of a number of groups and organisations that are interested in birds, nature and conservation.

Indian bird enthusiasts celebrated their 12th consecutive year of participation in the GBBC this time.

e-bird

- eBird is an online database of birds with online real-time data about distribution and abundance.
- Started in 2002 and was initially restricted to western hemisphere only.
- Its geographical extension grew over time and in 2010 it got a global status.

GBBC 2024

- India submitted the second-highest number of checklists and the third-highest species among all participating countries.
- Kerala recorded the highest number of checklists (14,023), followed by Tamil Nadu (13,661) and Maharashtra (5,725).

- West Bengal reported the highest number of species (538), followed by Uttarakhand (426) and Assam (420).

This is the first GBBC where birders from all states and Union territories participated.

- Some restricted-range species spotted by Indian birders this year are:
    1. Andaman Serpent-Eagle,
    2. Andaman Woodpecker,
    3. Nilgiri Laughingthrush,
    4. White-headed Starling,
    5. Nilgiri Sholakili,
    6. White-bellied Blue Flycatcher,
    7. Andaman Treepie,
    8. Forest Owlet,
    9. Bugun Liocichla & White-bellied Sholakili

References

1. Down To Earth – India records 1,036 species for backyard bird count
2. Times of India – Great Backyard Bird Count
3. Telegraph India – Counting the winged guests

Other Important Topics
International Centre of Excellence for Dams (ICED)
*Ministry of Jal Shakti recently signs Agreement with Indian Institute of Science, **Bangalore** for the establishment of ICED.* • **Aim -** To provide solutions to emerging challenges in Dam Safety through Scientific Research. • It will act as a technological arm of Ministry of Jal Shakti and provide specialized technical support for ***Indian & Overseas Dam Owners***. • It is the *2nd International Centre in the area of Dam Safety after IIT Roorkey (2023).*
'NITI for States' Platform
Minister of Communications, Railways, and Electronics & Information Technology to launch NITI Aayog's 'NITI for States' Platform. • It is a cross-sectoral knowledge platform designed to become a ***Digital Public Infrastructure (DPI)*** for Policy & Good Governance. • It will facilitate the digital transformation of governance by *equipping government officials* with robust, contextually relevant, and actionable knowledge and insights. • It is an integrative platform to access the - **SAMARTH** – (Scheme for Capacity Building In Textile Sector) is a flagship skill development scheme approved in continuation to the Integrated Skill Development Scheme. - **National Data and Analytics Platform (NDAP)**
'CSpace' platform

Chief Minister of Kerala will launch the 'CSpace' platform at the Kairali theatre in Thiruvananthapuram, Kerala.

• It is an ***over-the-top (OTT) platform of kerala government*** implemented by Kerala State Film Development Corporation (KSFDC).

• It will be the *first-of-its-kind initiative* by a State government.

• The platform, aimed at ensuring space as well as revenue share for low-budget, independent films.

• It will not have a subscription fee, but will work on a *pay-per-view model.*

Dolutegravir

A recent report by the World Health Organization (WHO) highlighted that the Resistance to the dolutegravir (DTG) drug is increasing among HIV patients.

• Dolutegravir (DTG) is the World Health Organisation's (WHO) recommended antiretroviral drug preferred for first-line and second-line treatment of HIV/AIDS for all populations.

• It is more effective, easier to take, has fewer side effects than alternatives, and has a high genetic barrier to developing drug resistance.

• HIV is the virus that causes ***Acquired Immune Deficiency Syndrome (AIDS).***

Gray Whale (Eschrichtius robustus)

Grey Whale, that vanished from the Atlantic Ocean, spotted again after more than 200 years.

• **Nickname** - "Devil fish".

• Gray whales were found mainly in shallow coastal waters in the ***North Pacific Ocean*** has recently been seen in New England region.

• It can be easily distinguished from other whale species as it usually ***lacks a dorsal fin***, has mottled grey and white skin and a dorsal hump followed by pronounced ridges.

• Gray whales make one of the ***longest annual migrations*** of any mammal.

• **Conservation Status**
  - **IUCN-** Least Concern.
  - **CITES-** APPENDIX I.

*The Pacific and Atlantic Oceans are connected through the **Strait of Magellan, the Drake Passage, Panama Canal and the fabled Northwest Passage**.*

Artifical Glaciers in Tian-Shan mountains

• In the Tian-Shan mountains of ***Kyrgyzstan***, villagers have made an artificial glacier to provide water for their drought-hit farms.

• The water comes through underground piping from a mountain source gushes out and freezes, forming a glacier.

• Apart from providing water when it melts, the glacier also helps lower the ambient temperature and create humidity.

• It helps the surrounding vegetation, which is grazed by cattle from spring to autumn.

*Artificial glaciers were 1st created in the **Indian Himalayas** in **2014** and have gone global.*

Geothermal blanket

Venezuela has embarked a project to preserve its final glacier, La Corona, by deploying a geothermal blanket recently.

• Project - Covering the area with a thermal mesh made of polypropylene plastic warding off the Sun's rays.

• The blankets use the temperature of the earth to moderate the temperature inside the sealed blankets.

• **Disadvantages** - Micro plastics in the blanket will end up in the soil.

• The cover could harm rare species of mosses and lichens and hummingbirds.

Venezuela is the first country in the Andes Mountain to lose all its glaciers.

World Poverty Clock

The latest data of World Poverty Clock showed India has managed to bring down 'extreme poverty' below 3% of its population.

• The World Poverty Clock provides real-time estimates until 2030 for almost every country in the world.

• It monitors progress against Ending Extreme Poverty, which is the UN's first Sustainable Development Goal (SDG). The escape rate calculates the current rate of poverty reduction in the world.

• The World Poverty Clock was developed by ***World Data Lab***, a global data enterprise.

• It was funded by the *International Fund for Agricultural Development (IFAD) and the Federal Ministry for Economic Cooperation and Development of Germany.*

Exercise Samudra Laksamana

The 3rd edition of Exercise Samudra Laksamana is underway recently off Visakhapatnam.

• It is a ***bilateral maritime exercise*** between the ***India and Malaysia***.

• The exercise aims to strengthen bonds and enhance interoperability between the Indian and Royal Malaysian Navy.

e-Kisan Upaj Nidhi

Ministry of Consumer Affairs, Food and Public Distribution has recently launched 'e-Kisan Upaj Nidhi'.

• It is a digital gateway of Warehousing Development and Regulatory Authority (WDRA).

• **Aim** - To encourage more farmers, especially small farmers, to utilise the warehouses and enhance their income.

• The farmers stocking their produce at these warehouses would need to pay ***only 1% security deposit instead of the earlier 3%.***