

## DAILY CURRENT AFFAIRS (DCA)

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## SUPERBUGS AND ANTIMICROBIAL RESISTANCE

### Context

- A silent **pandemic of superbugs** is going on for decades causing more havoc than one can anticipate.

### About

- **Quarter of antibiotics** consumed in the world are in India, and there are annually **300,000 direct deaths** attributable to **Antimicrobial Resistance (AMR)**.
- **Superbugs** are a factor in **10 lakh additional deaths** each year.
- There have **not been any innovative antibiotics** developed since the last few decades.
- More patients with seemingly **minor infections** are going for complicated treatments and surgery.

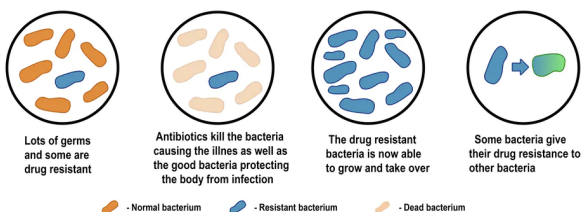
### What are Superbugs and Antibiotics?

- **Superbugs are bacteria** that are resistant to several types of antibiotics; they **can be fungi** as well.
  - ♦ This happens when bacteria **change over time and become resistant to drugs** that are supposed to defeat them and cure the infections they cause.
- Antibiotics **are medications that destroy or slow down the growth of bacteria**. Doctors prescribe them to treat **bacterial infections**. They do this by killing bacteria and preventing them from multiplying.
  - ♦ Alexander Fleming discovered **penicillin, the first natural antibiotic, in 1928**.
  - ♦ Antibiotics cannot fight **viral infections**.

### Antimicrobial Resistance (AMR)

- Antimicrobial Resistance (AMR) occurs when **bacteria, viruses, fungi and parasites** no longer respond to medicines, making people sicker and increasing the risk of disease spread, illness and deaths.

### HOW ANTIBIOTIC RESISTANCE HAPPENS



- Nearly **700,000 people** die of AMR every year. The toll can rise to as many as 10 million by 2050 and eat up **3.8 percent** of annual global gross domestic product (GDP).
- **Antimicrobials:** Antimicrobials are **agents used to prevent, control and treat infectious diseases in humans, animals and plants**.
  - ♦ They include antibiotics, fungicides, antiviral agents and parasiticides. Disinfectants, antiseptics, other pharmaceuticals and natural products may also have antimicrobial properties.

### Causes for Antimicrobial Resistance

- **Overuse and Misuse of Antibiotics:** The excessive and inappropriate use of antibiotics in humans and animals is a major driver of antimicrobial resistance.
  - ♦ This includes using antibiotics without a prescription, not completing the full course of prescribed antibiotics, and using antibiotics for non-bacterial infections.
- **Inadequate Dosage and Duration:** When antibiotics are not taken in the correct dosage and for the recommended duration, it can lead to incomplete eradication of the targeted microorganisms, allowing the surviving bacteria to develop resistance.
- **Self-Medication:** Self-prescription without proper medical guidance contributes to the misuse of antibiotics.
- **Antibiotics Consumption in Food-Animals:** Use of antibiotics as growth promoters in food animals and poultry is a common practice and later it evolves in the food chain.
- **Poor Sanitation:** The large proportion of sewage is disposed of untreated into receiving water bodies, leading to gross contamination of rivers with antibiotic residues, antibiotic-resistant organisms.

### Challenges Posed by AMR

- Antibiotic resistance is emerging as the **threat to successful treatment** of infectious diseases, organ transplantation, cancer chemotherapy and major surgeries.
- There is **more focus on R&D for cancer drugs** compared to antibiotics because as a society we put less value on antibiotics as drugs.
- The issue of AMR causes **out of pocket expenditure on health care**, especially on medicines.

- ♦ The use of high order drugs or second-line expensive antibiotics pushing treatment costs high.

#### Measures Taken against Antimicrobial Resistance in India

- **National Action Plan on Antimicrobial Resistance (NAP-AMR):** It has a focus on the One Health approach & was launched with the aim of involving various stakeholders ministries/ departments.
- **AMR Surveillance Network:** Indian Council of Medical Research (ICMR) established the AMR surveillance and research network (AMRSN) to generate evidence and capture trends and patterns of drug resistant infections in the country.
- **FSSAI has set certain guidelines** limiting the antibiotics in food products such as fish and honey.
- **National Health Policy, 2017:** It terms antimicrobial resistance as one of the key healthcare issues and prioritizes the development of guidelines regarding antibiotic use and check on restricting the growth of antibiotics.
- **National Antibiotic Consumption Network (NAC-NET):** The network sites compile data on antibiotic consumption in their respective health facilities and send it to National Centre for Disease Control (NCDC).

#### Way ahead

- Addressing the challenges posed by AMR requires a coordinated global effort involving healthcare professionals, researchers, policymakers, and the public.
- Further initiatives to promote responsible antimicrobial use, surveillance of resistance patterns, development of new drugs, and international collaboration are crucial to mitigating the impact of AMR on public health.

Source: TH

## INDIA-U.S. SIGN MOU ON CRITICAL MINERALS SUPPLY CHAINS

#### Context

- India and the United States signed a memorandum of understanding (MoU) to expand and diversify the critical minerals supply chain.

#### What are Critical Minerals?

- These are minerals that are **essential for economic development and national security**.
- The lack of availability of these minerals or the concentration of extraction or processing in a few geographical locations could potentially lead to **“supply chain vulnerabilities and even disruption of supplies”**.

#### Applications of Critical Minerals

- **Clean technologies initiatives** such as zero-emission vehicles, wind turbines, solar panels etc.
  - ♦ Critical minerals such as Cadmium, Cobalt, Gallium, Indium, Selenium and Vanadium and have uses in **batteries, semiconductors, solar panels**, etc.
- **Advanced manufacturing inputs and materials** such as defense applications, permanent magnets, ceramics.
  - ♦ Minerals like Beryllium, Titanium, Tungsten, Tantalum, etc. have usage in new technologies, electronics and defense equipment.
- **Platinum Group Metals (PGMs)** are used in medical devices, cancer treatment drugs, and dental materials.

#### List of Critical Minerals

- **Different countries have their own unique lists** of critical minerals based on their specific circumstances and priorities.
- **A total of 30 minerals were found to be most critical for India**, out of which two are critical as fertilizer minerals: Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.

#### Significance of partnership

- India's participation in the network will help in **diversifying and securing its supply of critical minerals** from nations like Argentina, Chile, Australia, and select African countries.
- The partnership marks a critical step forward for India in its quest to **reduce reliance on China** for these minerals and build a robust, self-sustaining supply chain for its green energy initiatives.

### Other steps taken by India

- India has joined the **Minerals Security Partnership**, a US-led plurilateral effort of 14 countries and the European Union.
- **India has joined** the US-led **Minerals Security Finance Network**, an initiative aimed at strengthening global cooperation in securing critical mineral supply chains.
- **Khanij Bidesh India Limited (KABIL)**: It was formed in **2019** as a joint venture of state-run miners **NALCO, HCL and MECL** to source strategic minerals such as lithium and cobalt etc. from abroad.

### Way Ahead

- Critical minerals have become **essential for economic development** and national security in the country.
- Minerals such as Lithium, Cobalt etc. have gained significance in view of India's commitment towards energy transition and achieving **net-zero emission by 2070**.

#### Mineral Security Partnership (MSP)

- **It is a US-led collaboration of 14 countries** that would focus on the supply chains of minerals such as Cobalt, Nickel, Lithium, and also the 17 'rare earth' minerals.
- **Members:** Australia, Canada, Finland, France, Germany, India, Italy, Japan, the Republic of Korea, Norway, Sweden, the UK, U.S., and the EU.
- **Mandate:** To catalyze public and private investment in critical mineral supply chains globally. It directly addresses four major critical minerals challenges:
  - ♦ Diversifying and stabilizing global supply chains;
  - ♦ Investment in those supply chains;
  - ♦ Promoting high environmental, social, and governance standards in the mining, processing, and recycling sectors; and
  - ♦ Increasing recycling of critical minerals.

Source: TH

## NEPAL, INDIA AND BANGLADESH ENERGY COOPERATION

### Context

- Nepal, India and Bangladesh have signed a **tripartite agreement** to facilitate **cross-border electricity trade**.

### About the Agreement

- **Nepal will export** its surplus electricity to **Bangladesh via India** from June 15 to November 15 every year.
  - ♦ In the first phase, **Nepal will export 40 MW of hydroelectricity** to Bangladesh **via Indian territory**.
  - ♦ The rate per unit of electricity has been fixed at 6.4 cents.
  - ♦ Electricity will be exported to Bangladesh via the **Dhalkebar-Muzaffarpur 400 KV transmission line**, with the metering point in **Muzaffarpur**.
- From the export of electricity, Nepal will make an **annual income of around USD 9.2 million**.

### Energy Requirements of India

- India's energy imports **more than doubled to 40 percent** of total energy requirements in 2022 from 18 percent in 2002.
  - ♦ In the same period, the **country diversified its energy partners** from 14 to 32.
- These energy supplies and diversifications are **essential to India's overall economic security**.
  - ♦ As the country will require more and more energy supplies to reinforce its economy, which is growing at an **annual rate of approximately 8 percent**.

### India's Energy Cooperation in Neighbourhood

- India is building **green energy infrastructure** (hydel power plants and solar parks) in **Bangladesh, Bhutan, Nepal and Sri Lanka**.
  - ♦ India is connecting these countries' national energy apparatus to India for **exporting excess energy** generated in these nations.
- **India loaned, invested, or extended Lines of Credit** worth US\$ 7.15 billion between 2005 and 2023 to further collaboration with its neighbours.
  - ♦ Development assistance ranges across cross-border transmission lines, hydel power plants, oil and gas pipelines, and undersea lines for grid integration.
- Resultantly, **electricity trade** among the aforementioned countries has grown from **2 billion units to 8 billion units between 2016 and 2023**.

- **Energy Cooperation with Nepal:** It culminated in the **25-year long-term power purchase partnership agreement** between the two countries, wherein India will annually buy 10,000 MW of hydel energy from Nepal by **2030**.
  - ♦ Nepal, currently, has over a hundred hydel power plants and another one hundred and fifty in the pipeline.
  - ♦ This massive and rapid hydel power capacity development will lead to a **surplus** that energy-needing neighbouring countries—India and Bangladesh—can utilise.
- **India-Bhutan:** In FY22, India imported 1500MW of electricity worth US\$ 83 million from Bhutan. These imports comprised **70 percent of Bhutan's hydel power generation capacity**.
  - ♦ Bhutan is currently also coordinating with multilateral development banks and India, to **increase its installed hydel power capacity** to cater India, Bangladesh and Myanmar.
- **India-Bangladesh:** It involves importing through the **India Bangladesh Friendship Pipeline (IBFP)** and the newly developed electricity transmission network.
  - ♦ India is also endeavouring to link Bhutan and Nepal with Bangladesh through Indian territory for greater energy connectivity across South Asia.

### Significance

- **Connectivity:** India's cross-border collaboration for energy infrastructure development is pivotal for **connecting the geographies of India, Bhutan, Bangladesh and Nepal**.
  - ♦ **Bangladesh and India are energy-deficient countries**, which heavily rely on conventional energy sources in their energy production matrix.
  - ♦ Bhutan and Nepal produce an **energy surplus annually**.
- **Countering Chinese Influence:** India wants to counter China's BRI through increased development aid in the neighbouring countries because of their geopolitical and geostrategic relevance to India's territorial integrity.
  - ♦ Furthering energy cooperation is a step towards regional connectivity and economic integration, something that can act as a hedge against Chinese influence in the region.

### Conclusion

- India's energy cooperation with its South Asian neighbours is a **cornerstone of its foreign policy and energy security**.
- By investing in regional energy infrastructure and **fostering interdependence**, India aims to underpin economic growth, counterbalance China's influence, and enhance its global standing.
- While challenges like geopolitical tensions and competing interests persist, the mutual benefits of energy collaboration are clear.
- As India continues its rise on the world stage, its energy diplomacy is set to play an increasingly pivotal role in shaping the region's future.

Source: IE

## PLANETARY DEFENSE SYSTEM

### Context

- Recently, the news regarding the potential threats of near-Earth objects (NEOs) was widespread due to asteroid **2024 ON**.

### Impact of asteroids on Earth

- Around **100 tons** of space material hits Earth every day in the form of tiny meteoroids. These small fragments burn up in Earth's atmosphere.
- Asteroids about **50 meters** in diameter are estimated to strike Earth once every 10,000 years.
  - ♦ **In 2013**, a 20-meter wide asteroid entered the atmosphere and exploded about 30 km above a Russian town.
- The most dangerous are those larger than **1 kilometer** in diameter, like the **Chicxulub asteroid** that caused the extinction of the dinosaurs 66 million years ago.

### Asteroids

- Asteroids, also known as **minor planets or planetoids**, are small, rocky bodies that orbit the Sun.
- They are **remnants of the solar system's formation**, composed primarily of rock and metal.
- **Location:** The majority of asteroids are found in the **main asteroid belt**, a region between the orbits of Mars and Jupiter.
  - ♦ Some asteroids go in front of and behind Jupiter, which are called **Trojans**.
  - ♦ Asteroids that come close to Earth are called **Near-Earth Objects (NEOs)**.

- Based on their composition, asteroids are **categorized into three types:**
  - ♦ **C-type (carbonaceous):** Rich in carbon, dark, and the most common type.
  - ♦ **S-type (siliceous):** Made mostly of silicate materials and metals.
  - ♦ **M-type (metallic):** Composed mainly of metallic nickel-iron.

#### Near-Earth Objects (NEOs)

- **The United Nations Office for Outer Space Affairs (UNOOSA)** defines NEOs as any asteroid or comet that comes close to Earth's orbit.
- In technical terms, an object is classified as a NEO if its perihelion (the point in its orbit closest to the Sun) is less than **1.3 astronomical units (AU)** from the Sun.
  - ♦ **One astronomical unit** is the average distance between Earth and the Sun, about **149.6 million kilometers.**

#### Planetary Defense Efforts

- **Planetary defense**, the detection of asteroids and comets whose impact with Earth could significantly affect the planet and the prevention or mitigation of any such impacts.
- **In 2022, NASA's Double Asteroid Redirection Test (DART) mission** successfully crashed a spacecraft into an asteroid called Dimorphos. It demonstrated that a collision-based mission could change the direction of a celestial body and defend our planet.
  - ♦ **ESA** is scheduled to launch a reconnaissance mission called **Hera** in 2024 to inspect the aftermath left by DART.
- Several space missions have been sent to study asteroids up close and collect samples, such as
  - ♦ **NASA's OSIRIS-REx mission** to asteroid Benu and
  - ♦ **Japan's Hayabusa2 mission** to asteroid Ryugu.

#### India's initiatives

- Also India is expected to collaborate with global planetary defense initiatives like **International Asteroid Warning Network (IAWN)**, a virtual network of institutions that work to detect, track, and characterize near-Earth objects (NEOs).
- India and the US signed a **Space situational awareness agreement** in 2022.

#### Way Ahead

- Advances in space monitoring have improved the ability to predict and respond to potential threats.
- Scientists estimate that 95% of large, kilometer-sized NEOs have already been discovered, and none are expected to collide with Earth in the foreseeable future.

Source: IE

## PROPOSED ECO-SENSITIVE ZONE (ESZ) AROUND GIR FOREST

#### In News

The Ministry of Environment, Forest and Climate Change (MoEFCC) proposed a 3,328 sq km **Eco-Sensitive Zone (ESZ)** around the Gir forest.

- Later, the area was reduced to 2,061 sq km to accommodate local community needs.

#### Eco-Sensitive Zones

- They are areas identified for their unique environmental resources that require special conservation efforts, as defined by the National Environment Policy (2006).
- The concept was established during the XXI meeting of the Indian Board for Wildlife in January 2002, leading to the Wildlife Conservation Strategy.
- **Legal Framework:** The Environment (Protection) Act, 1986 provides the basis for declaring lands **within 10 km of protected areas as eco-fragile zones.**
  - ♦ National Environment Policy 2006 established guidelines for ESZs to protect areas outside national parks and wildlife sanctuaries.
- State forest departments prepare ESZ proposals, which are submitted to the MoEFCC for scrutiny.
- After a draft notification is issued, public suggestions and objections are invited for 60 days.
- Based on public input and expert recommendations, the MoEFCC issues a final ESZ notification.

Prohibited Activities	Permitted Activities
<ul style="list-style-type: none"> <li>• Commercial mining and stone quarrying.</li> <li>• Major hydroelectric projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Local communities are allowed to continue ongoing practices such as:</li> </ul>

<ul style="list-style-type: none"> <li>• Handling of hazardous substances.</li> <li>• Discharge of untreated effluents.</li> <li>• Setting up brick kilns.</li> <li>• Establishing polluting industries with high environmental risks.</li> </ul>	<ul style="list-style-type: none"> <li>• Agriculture and horticulture.</li> <li>• Dairy farming.</li> <li>• Aquaculture and fisheries.</li> <li>• Poultry and goat farming.</li> <li>• Food-related enterprises.</li> </ul>
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### Objectives

- To protect the environment from degradation caused by human activities.
- To create a buffer for specialized ecosystems (Protected Areas).
- To serve as transition zones between areas of higher and lower protection.
- To maintain ecological balance within permissible limits regarding environmental parameters.
- To notify areas as ESZs while regulating sustainable developmental activities, considering local needs and aspirations.

### Protests

- Previous proposals for Gir's ESZ have faced public protests due to concerns about wildlife protection versus human activities.
- Politicians argue that farmers need the right to protect themselves from wild animals while working.
- Leaders have requested exemptions for certain villages to protect non-agricultural activities and local businesses.

### Conclusion

- The proposed ESZ around the Gir forest has sparked significant debate about the balance between wildlife conservation and local development needs, highlighting the complexities involved in managing protected areas.
  - ♦ Conservation efforts should not hinder local development.
- ESZs serve as crucial zones for protecting biodiversity and maintaining ecological balance while allowing sustainable development that considers the needs of local communities.

### Gir Forest

- Gir Protected Areas include the Gir National Park, Gir Wildlife Sanctuary, Paniya Wildlife Sanctuary, and Mitiyala Wildlife Sanctuary.
- The Gir Forests is the largest compact tract of dry deciduous forests in semi-arid western India and covers an area of 1,153.42 sq. km, with 258.71 sq. km declared as a National Park.
- **Significance:** It is the last natural habitat of the Asiatic lion (*Panthera leo persica*), an endangered species that was saved from extinction through conservation efforts.
  - ♦ The Maldharis, a pastoral community living in Gir, have a historical symbiotic relationship with the lions. Their settlements are known as "nesses."

Source: IE

## NEWS IN SHORT

### BANJARA VIRASAT MUSEUM

#### In News

- Prime Minister Narendra Modi inaugurated the **Banjara Virasat Museum in Pohardevi, Washim, Maharashtra**, highlighting the heritage of the **Banjara community**.

#### About the Banjara community.

- The Banjara are a nomadic community primarily found in Rajasthan, North-West Gujarat, Western Madhya Pradesh, and Eastern Sindh (pre-independence Pakistan).
- They claim descent from the Agnivanshi Rajputs and are known by various names, including Banjari, Pindari, and Lambani.
- Together with the Domba, they are sometimes referred to as the **"Gypsies of India."**
- The Banjara are **divided into three tribes:** Maturia, Labana, and Charan.
- They have migrated to several Indian states, including Andhra Pradesh, Haryana, Karnataka, and Maharashtra, adopting local languages such as Lambadi, Hindi, and Telugu.

Source: Air

### RANI DURGA VATI

#### Context

- Rani Durgavati, the **Queen of the Gond Kingdom of Garha-Katanga**, was commemorated on her 500th Birth Anniversary on October 5.

### About Rani Durgavati

- **Born in 1524** into the **Chandela dynasty** of Mahoba, she was the daughter of Raja Salbahan of Ratha and Mahoba.
- She was married to **Dalpat Shah**, son of Gond King Sangram Shah, who ruled over the powerful Garha-Katanga kingdom, spanning the Narmada Valley and parts of northern Madhya Pradesh.
- After Dalpat Shah's death in 1550, Rani Durgavati became **regent for her young son, Bir Narayan**, and ruled the kingdom with courage.
- According to **Tarikh-i-Firishta** Durgavati **repulsed Baz Bahadur**, the ruler of Malwa, who had attacked her kingdom between 1555 and 1560.
- She fiercely defended her kingdom against the Mughal Subedar Abdul Mazid Khan, dying on the battlefield.
- Later Akbar restored control of the region to **Chandra Shah**, the younger son of Sangram Shah, after he accepted Mughal suzerainty.

Source: PIB

## 100 YEARS OF SURREALISM

### Context

- The year 2024, marks 100 years of Surrealism, an art and literature movement in which unusual or impossible things are shown happening.

### What is Surrealism?

- Surrealism is an influential **20th-century art and literary movement** known for depicting strange or impossible scenarios, often blending the dreamlike with reality.
- It aimed to unlock the power of the subconscious mind, **liberating thought from the confines of reason** and conventional logic.

### Origins of Surrealism

- **The roots of Surrealism** can be traced to the **Dada movement**, an anti-establishment art movement, developed around 1915.
  - ♦ However, there are some fundamental differences between the two.
- **Its formal birth** is traced to the publication of the **surrealist manifesto in October 1924** by French poet and writer Andre Breton.

### Prominent artists and artworks

- One of the most prominent artists of Surrealism were;

- ♦ Spanish artist Salvador Dalí,
- ♦ German painter and sculptor Max Ernst,
- ♦ Belgian artist René Magritte and
- ♦ Spanish Catalan modernist Joan Miró

### The enduring legacy

- Over the years, Surrealism's emphasis on **freeing the creative process from rational thought**, has continued to influence artists, writers, and filmmakers.
- Surrealism also played an essential role in the birth of other art movements such as **Abstract Expressionism and Neo-Surrealism**.

Source: IE

## S-400 AIR DEFENSE MISSILE SYSTEM

### Context

- Indian Air Force Chief Marshal AP Singh said that India will receive the remaining two squadrons of the S-400 air defense missile system by **2025**.

### What is the S-400 system?

- The S-400 Triumf is a **surface-to-air missile system** developed by Russia.
- It is considered **one of the world's most advanced air defense systems** with the key features;
  - ♦ **Simultaneous Target Engagement:** It can track and neutralize a wide range of airborne threats, including aircraft, missiles, and UAVs, across very long ranges and in dense countermeasure scenarios.
  - ♦ **Multi-Layered Defense:** The system is equipped with four types of missiles, offering interception ranges of 40 km, 120 km, 250 km, and 400 km, and it can engage threats up to 30 km altitude, creating a layered defense mechanism.
  - ♦ **Tracking Capability:** Its 3D phased array radar can detect and track up to 300 targets at a distance of up to 600 km.
  - ♦ **Mobility:** The system is fully mobile and includes a command and control center, automatic tracking and targeting systems, launchers, and support vehicles.
- A standard S-400 battalion consists of **eight missile launchers**, each typically loaded with four missiles.

Source: TOI



## VERY SHORT RANGE AIR DEFENCE SYSTEM (VSHORADS)

### In News

- The Defence Research and Development Organisation (DRDO) has successfully conducted three flight tests of the **4th Generation Very Short Range Air Defence System (VSHORADS)** at the Pokhran Field Firing Ranges in Rajasthan.

### About VSHORADS

- It is an indigenously developed **Man-Portable Air Defence System (MANPAD)**.
- VSHORADS is a Man Portable Air Defence System developed by the Research Centre Imarat (RCI) in collaboration with other DRDO laboratories.
- It aimed at high-speed targets, demonstrated critical capabilities in maximum range and altitude interception.

Source: AIR

## TANKS ARMOURING THE LADAKH SECTOR

### In News

The ongoing Ukraine war has highlighted the importance of armored vehicles in modern warfare, demonstrating that tanks remain crucial alongside long-range firepower.

- Other Conflicts like Armenia-Azerbaijan, and Israeli offensives have highlighted threats from drones, long-range projectiles, and loitering munitions.

### Developments in India

- In September 2024, the Indian Army showcased its **armored capabilities near the Line of Actual Control (LAC)** in Eastern Ladakh, deploying T-90 tanks and BMP-2 armored carriers at high altitudes (up to 13,700 feet) while addressing challenges related to extreme weather conditions.
- The T-90, known as Bhishma**, is touted as one of the best tanks globally, featuring advanced capabilities like deep-fording and firing Anti-Tank Guided Missiles (ATGMs).
- Since 2012**, India has significantly improved its military infrastructure and deployments in Ladakh, transitioning from six-month troop rotations to longer tenures to enhance acclimatization and operational readiness.
- Following the May 2020 Galwan clash, there was a **substantial military buildup in response to Chinese troop movements**.

- The Indian Air Force played a vital role in airlifting **troops and equipment, including K9 Vajra self-propelled Howitzers**, which are being procured in greater numbers due to their effectiveness.

### Challenges of High Altitude Warfare

- Oxygen scarcity** at high altitudes affects both personnel and machinery.
- Extreme Temperatures:** Conditions can drop to -40 degrees Celsius, complicating operations.
- Military Hardware Limitations:** Most foreign-made military equipment isn't designed for such harsh conditions.
- High-altitude environments cause **quicker degradation of machinery**, necessitating rapid turnaround for spares.
- Transporting tanks and ensuring operational readiness in remote areas is a significant task.

### Future Outlook

- The Indian Army is focused on adapting its tank and armoured platforms to meet the challenges posed by high-altitude warfare, with an emphasis on modernization and indigenous development to maintain a strategic edge.
- The DRDO is developing the **'Zorawar,'** a 25-tonne light tank, set for user trials by August 2025.
- The Indian Army aims to develop Future Ready Combat Vehicles (FRCVs) and Future Infantry Combat Vehicles (FICVs) to replace ageing systems, with expected advancements by 2030.
- The Army is evaluating new platforms, including U.S. Stryker infantry combat vehicles, to enhance operational capabilities in response to evolving threats.

Source: TH

## BLACK CARBON

### In News

- India's potent black carbon emissions from kerosene lamps make up **10% of total residential emissions**: Study

### About Black Carbon

- Black Carbon (BC) is a **short-lived pollutant** formed through **incomplete combustion** of fossil fuels, biofuels, and biomass.
- Unlike CO, it has a **short atmospheric lifetime** (days to weeks), but its warming potential is much higher.

- It causes respiratory and cardiovascular diseases due to fine particulate matter (PM2.5).
- The **Climate and Clean Air Coalition (CCAC), founded in 2012**, is a voluntary partnership convened within the United Nations Environment Programme (UNEP). Its primary goal is to reduce emissions of short-lived climate pollutants (SLCPs), which are potent contributors to global warming and air pollution.

Source: DTE

## GREENING OF ANTARCTICA

### Context

- Antarctica is undergoing a **significant transformation**, with vegetation cover on the Antarctic Peninsula increasing dramatically.

### About

- Researchers report that this greening has accelerated by **over 30%** in recent years, highlighting a profound environmental shift.
  - ♦ Vegetation cover on the Antarctic Peninsula expanded from **less than one square kilometer in 1986 to nearly 12 square kilometers by 2021**.
- The acceleration in vegetation growth coincides with a **marked decrease in sea-ice extent** in Antarctica between 2016 and 2021.
- The Antarctic Peninsula is **warming faster than the global average**, leading to more frequent extreme heat events.

### Antarctica

- Antarctica, the **world's southernmost and fifth largest continent**. Its landmass is almost wholly covered by a **vast ice sheet**.
- The continental contains about **90 percent** of the world's ice and **80 percent** of its fresh water.

- **An ice shelf** is a huge sheet of ice, connected to land but extending out into the ocean.
  - ♦ Ice shelves develop **mainly from glaciers** flowing slowly downhill toward the ocean.

Source: ET

## WORLD COTTON DAY

### Context

- **October 7** is celebrated each year as World Cotton Day.

### About

- The idea for World Cotton Day originated from the **Cotton Four nations, Burkina Faso, Benin, Chad, and Mali** aiming to promote cotton by-products and their markets.
- The first World Cotton Day (WCD) event was initiated in Geneva and observed on October 7, 2019.

### Cotton Production in India

- India is the **second largest producer** of cotton in the world after China.
- India accounts for **23%** of the total global production.
- The **Central Zone** (which comprises states like **Gujarat, Maharashtra, and Madhya Pradesh**) are the biggest producer of cotton in India.
- Cotton cultivation requires a **hot and sunny climate with an extended frost-free period**. It thrives best in **warm and humid conditions**. The crop can be successfully cultivated in a variety of soil types, such as well-drained deep alluvial soils in the northern regions, black clayey soils of varying depths in the central region

Source: PIB

