

# Factly Weekly

**Compilation**

2024

**For UPSC CSE Prelims  
Exam**

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## UPSC Syllabus: Reports and index

### BRICS Reaches Clean Energy Milestone by End of 2024

#### Why in news?

A report from the Global Energy Monitor highlights a significant turning point for the BRICS nations, where clean energy development is accelerating despite continued investments in coal, oil, and gas.

#### Major Energy Transition for BRICS

#### Fossil fuels to lose majority share of total power to cleaner sources in BRICS countries by end of 2024

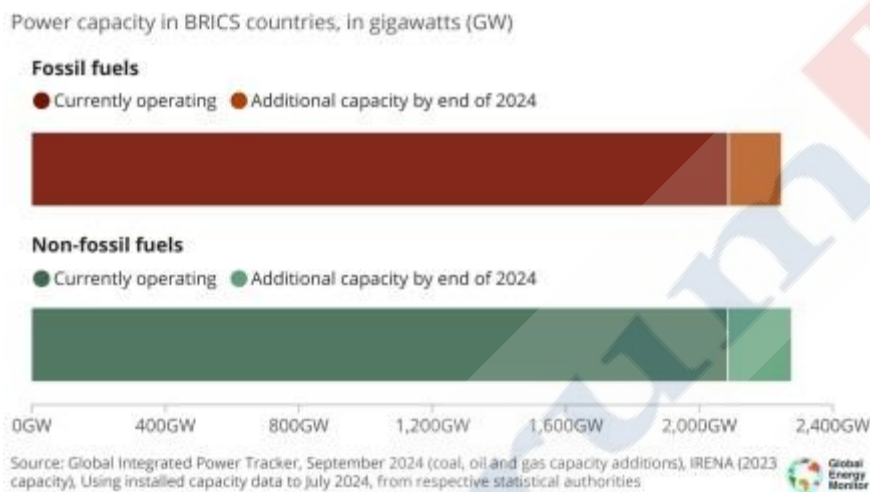


Figure 1. Source: DTE

this milestone, showing a shift toward cleaner energy sources.

**5. Non-Fossil Power Growth in 2024:** In 2024, BRICS countries have added 190 GW of non-fossil power capacity, mostly from wind and solar. In contrast, only 72 GW of fossil fuel power is set to be added this year, showing a significant pivot toward renewables.

**6. Renewable vs. Fossil Capacity:** By the end of the year, BRICS will have approximately 2,289 GW of renewable energy capacity, surpassing the 2,245 GW from fossil fuels. Comparatively, the European Union reached this 50% renewable energy mark in the early 2010s, and the G7 achieved it only last year.

#### BRICS Renewable Capacity Set to Triple by 2030

**Rapid Expansion of Renewable Projects:** BRICS nations are fast-tracking renewable energy projects, with 1,550 GW of wind and utility-scale solar either under construction or planned. Including hydropower, renewable projects outpace fossil fuel projects by nearly three to one.

**Alignment with Global Climate Goals:** BRICS is on track to nearly triple its renewable capacity by 2030, supporting global efforts to limit warming to 1.5°C. If current trends continue, BRICS could see a 2.5-fold increase in total renewable capacity by the end of the decade.

1. The BRICS group includes Brazil, Russia, India, China, South Africa, and recently added members Iran, UAE, Ethiopia, and Egypt. They are collectively responsible for a third of global GDP and carbon emission.

2. BRICS is now rapidly transitioning from coal, oil, and gas to renewable energy.

3. As per the report, BRICS nations will see fossil fuel capacity fall below 50% of their total installed power capacity by the end of 2024.

4. This marks the first time the BRICS group has crossed

## Challenges in the Clean Energy Transition

**Continued Fossil Fuel Investments:** Despite progress, BRICS countries, except for Ethiopia, are still developing new coal, oil, and gas projects. Planned projects could increase coal capacity by 36% and oil and gas capacity by 53%, posing a challenge to the renewable transition.

**Balancing Act for BRICS:** The ongoing investment in fossil fuels creates tension with environmental goals. James Norman from Global Energy Monitor (GEM) emphasizes that while the clean energy transition is real, BRICS' continued coal projects risk undermining their achievements in renewable energy.

## World Bank Report Highlights Poverty and Climate Challenges

### Why in news?

According to the World Bank's latest report, extreme weather will be a significant obstacle to achieving a more equitable world, with 3.53 billion people still living in poverty in 2024.

### Findings of the report

1. Climate shocks, including extreme weather events, devastate livelihoods and trap vulnerable populations in a cycle of poverty.

These shocks are especially difficult to recover from, particularly for those living in low-income countries without access to adequate infrastructure and resources.

2. In 2024, 692 million people are living in extreme poverty, defined as subsisting on less than \$2.15 per day.

When measured against the higher poverty standard of \$6.85 per day, 43.6% of the global population or approximately 3.53 billion people are classified as living in poverty.

3. The slow progress in poverty alleviation reflects a "polycrisis" caused by factors such as the pandemic, slow economic growth, increased conflict, and climate change.

4. In 2024, South Asia is home to 1.48 billion poor people, while Sub-Saharan Africa has 1.11 billion poor people. Together, these regions account for 73% of the global poor.

5. By 2030, 7.3% of the world's population could still be living on less than \$2.15 a day, which is more than double the global goal of reducing extreme poverty to 3%.

**6. Long-Term Poverty Reduction Goals:** It could take over a century to lift individuals above the \$6.85 per day threshold, according to current projections.

**7. Rising Income Disparities:** The World Bank's report warns of growing income inequality, particularly in Sub-Saharan Africa and Latin America, with many countries in these regions showing Gini index scores above 40.

**8. High Inequality in Southern and Central Africa:** Inequality is most pronounced in Southern and Central Africa, exacerbating the challenge of poverty reduction.

### 9. Climate Shocks and Economic Growth

**i) Vulnerability to Extreme Weather:** South Asia, with 88.1% of its population exposed to climate risks, and Sub-Saharan Africa, home to the highest number of people at severe risk, are particularly vulnerable to climate shocks such as floods, heatwaves, and cyclones.

**ii) Need for Inclusive Economic Growth:** The World Bank emphasizes the importance of inclusive economic growth to lift people out of poverty. This growth must be complemented by investments in education, healthcare, infrastructure, and access to markets.

#### 10. Building Resilience to Climate Impacts

**i) Targeted Climate Adaptation Strategies:** Sub-Saharan Africa and South Asia require targeted adaptation strategies to withstand the impacts of extreme weather. The report calls for stronger social protection systems, including healthcare, education, and employment opportunities.

**ii) Progressive Fiscal Policies:** Countries must adopt progressive fiscal policies that increase domestic revenue while reducing inequality, ensuring that vulnerable populations benefit from economic growth.

**iii) Strengthening Insurance Mechanisms:** To protect vulnerable populations from falling deeper into poverty during climate disasters, the report recommends strengthening insurance mechanisms and other safety nets.

### FDA Approval of Cobenfy

#### Why in news?

Recently, the U.S. Food and Drug Administration (FDA) approved Cobenfy, a new antipsychotic drug to treat schizophrenia.

#### About Cobenfy

- 1. About:** Cobenfy is a newly FDA-approved medication for treating schizophrenia in adults. It is a combination of two drugs, xanomeline and trospium chloride.
- 2. How it works:** It offers a unique approach by targeting muscarinic acetylcholine receptors (M1 and M4) instead of the dopamine receptors targeted by traditional antipsychotics.
- 3.** The medication has shown promising results in clinical trials, with significant improvements in schizophrenia symptoms.
- 4. Risks:** It comes with its own set of risks, such as gastrointestinal issues, increased heart rate, and allergic reactions like angioedema.
- 5.** It is not recommended for individuals with certain conditions, including narrow-angle glaucoma and moderate-to-severe liver or kidney impairment.

#### About Schizophrenia

- 1. About:** Schizophrenia is a chronic and severe mental health disorder that affects how a person thinks, feels, and behaves. It is characterized by episodes of psychosis, where an individual experiences distorted perceptions of reality.
- 2. Symptoms:** It typically appear in late adolescence and early adulthood. The disorder results in a 13–15-year reduction in life expectancy due to lifestyle factors and comorbidities, with a 5% suicide rate.

#### Symptoms of Schizophrenia

1. **Positive Symptoms** (reality distortion): Delusions, Hallucinations and Formal thought disorder (disorganized speech)
2. **Negative Symptoms (diminished functions)**: Apathy, Reduced emotional expression, Lack of motivation and decreased pleasure
3. **Disorganization Symptoms**: Disorganized thinking and behavior and Inappropriate emotional responses
4. **Cognitive Impairments**: Impaired attention, memory, and judgment

### Causes of Schizophrenia

1. Genetics play a crucial role with polygenic risk involving hundreds of genetic variants.
2. Environmental factors such as prenatal complications can interact with genetic predispositions to significantly increase the risk.
3. Neurodevelopmental origins also contribute to the disorder's complexity.

### Xanomeline and Trospium: Mechanism of Action

1. Xanomeline is a muscarinic receptor agonist that targets the parasympathetic nervous system showing promise in improving multiple schizophrenia symptoms.
2. Trospium works as an antimuscarinic agent to mitigate xanomeline's adverse effects.
3. Cobenfy's Side Effects and Cost: Common side effects include nausea, indigestion, hypertension, tachycardia and dizziness.

## UPSC Syllabus: Science and technology

### Cloud Chambers

#### Why in news?

With Mission Mausam, India is constructing a cloud chamber with convection properties essential for studying Indian monsoon clouds. Globally, only a few convective cloud chambers exist.

#### About Cloud Chamber

1. **About:** A cloud chamber is a closed cylindrical or tubular drum where water vapor, aerosols, and other elements are injected under controlled humidity and temperature to form clouds.
2. **Purpose:** This facility will enable scientists to study the particles that form cloud droplets or ice particles in a controlled environment.
3. **Objectives of Building the Convective Cloud Chamber:** To study the behavior of clouds during normal and extreme weather, intra-particle interactions, and the formation of rain and ice particles.
4. **Aim:** The aim is to understand moisture interactions and cloud behavior influenced by weather systems like cyclones and low-pressure areas. This knowledge will guide weather modification strategies for the region.

#### 5. Significance of the Convective Cloud Chamber

**i) Limited Global Availability:** Only a few convective cloud chambers exist worldwide, designed to study cloud dynamics with convection properties.

**ii) Relevance to Indian Weather:** The chamber will be tailored to study Indian monsoon clouds and gain insights into cloud physics in conditions specific to India.

#### 6. Application of the Cloud Chamber

**Controlled Experiments:** Scientists will simulate different environmental conditions like temperature, humidity and convection within the chamber to study cloud behavior.

**Advanced Instrumentation:** Over the next 18-24 months, a focus will be on developing complex instrumentation and probes for in-depth study when the chamber is operational.

#### 7. India's Experience with Cloud Seeding

**CAIPEEX Programme:** India's cloud seeding experience includes the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX), conducted over four phases in Maharashtra.

**Results of Cloud Seeding:** The experiments demonstrated that cloud seeding could enhance rainfall by up to 46% in specific areas under suitable conditions.

**8. Limitations:** Despite its potential, cloud seeding is not seen as a universal solution to address rainfall deficits across all regions.

### C. elegans worm

#### Why in news?

Sydney Brenner who is a pioneer of C. elegans research, won the first Nobel Prize involving the worm.

#### Nobel Prize Contributions

C. elegans research has led to four Nobel Prizes across various fields:

**1. 2002 Nobel Prize in Physiology or Medicine:** Research using C. elegans helped scientists understand the process of programmed cell death, or apoptosis, which is critical in diseases like AIDS, strokes, and neurodegenerative disorders.

**2. 2006 Nobel Prize in Physiology or Medicine:** Studies on C. elegans led to the discovery of gene silencing through RNA interference, a breakthrough that paved the way for new therapeutic strategies.

**3. 2008 Nobel Prize in Chemistry:** Scientists used the worm in the development of "cellular lanterns" that enabled researchers to visualize cellular processes in real-time, advancing molecular biology techniques.

**4. 2024 Nobel Prize in Physiology or Medicine:** Molecular biologist Gary Ruvkun, while accepting the award, acknowledged C. elegans for its role in his groundbreaking work on microRNAs, which regulate gene expression.

#### About Caenorhabditis elegans





Source: IE

1. *Caenorhabditis elegans* is a tiny 1-millimeter-long nematode that has played a significant role in scientific discovery, contributing to four Nobel Prize-winning studies.
2. It is a free-living, transparent nematode (roundworm) widely used as a model organism in molecular biology and developmental biology research.
3. Key characteristics of *C. elegans* include:
  - i) **Genome:** Its genome is fully sequenced, with about 20,000 genes, many of which have homologs in humans.
  - ii) **Rapid Life Cycle:** It has a short life cycle of about 3 days from egg to adult, making it ideal for genetic studies.
  - iii) **Hermaphroditism:** It can reproduce both through self-fertilization (as a hermaphrodite) and through sexual reproduction (with males).
  - iv) *C. elegans* was key in discovering the mechanism of programmed cell death (apoptosis), a vital process in development and disease.
  - v) *C. elegans* is highly regarded for its contributions to our understanding of neurobiology, development, aging, and genetics.

#### **Experimental Advantages of *C. elegans***

*C. elegans* offers several advantages that make it an ideal experimental organism:

- i) **Simplicity:** The worm consists of just 959 cells, each of which scientists have meticulously mapped from fertilization to death.

ii) **Transparency:** Its translucent body allows researchers to observe developmental stages under a microscope in as little as three days.

iii) **Genome Sequencing:** *C. elegans* was the first animal to have its genome fully sequenced in 1998, a milestone achieved before other model organisms like flies and mice.

iv) **Self-Sufficiency:** Female *C. elegans* are hermaphroditic, possessing both eggs and sperm, which allows them to self-fertilize and reproduce efficiently.

## Smart insulin to control blood sugar level

### Why in news?

Recently, an international team of scientists from Denmark, the UK, Czechia, and the University of Bristol has engineered a “smart” insulin called NNC2215 that responds automatically to blood sugar changes.

### How It Works:

i) NNC2215 consists of a ring-shaped structure and a glucoside molecule. The glucoside binds to the ring when low blood glucose, keeping the insulin inactive.

ii) As glucose levels rise, glucose replaces the glucoside, activating the insulin to lower blood sugar.

### Potential Benefits

**Easier Management:** This smart insulin could simplify blood sugar management, reducing the need for constant monitoring and improving the quality of life for millions of people dependent on insulin therapy.

**Effectiveness in Studies:** NNC2215 has shown to be as effective as human insulin in controlling blood glucose in animal tests (rats and pigs), and human trials are expected soon.

### Challenges in Insulin Management

**Constant Monitoring:** Patients with diabetes need to continuously monitor their blood sugar levels and adjust insulin doses, as blood glucose levels fluctuate throughout the day.

**Risk of Overdosing:** Overdosing on insulin can cause blood glucose levels to drop dangerously low, which can be life-threatening.

### Current Limitations and Future Improvements

**Abrupt Activation:** One limitation of NNC2215 is that it activates only after a significant spike in glucose, leading to a sudden insulin release.

**Ongoing Refinement:** Scientists are working to improve the insulin molecule so that it activates more gradually, allowing insulin levels to rise slowly for better glucose control.

### Current Insulin Therapies

**Traditional Methods:** Insulin therapies involve administering synthetic insulin, but keeping blood sugar levels stable remains a challenge.

**Glucose-Sensitive Insulin:** Some advanced therapies rely on insulin being stored in the body and released based on glucose levels detected by sensors.

## Nobel Prize for microRNA Discovery

### Why in the News?

Recently, the discovery of microRNA earned the Nobel Prize in Physiology and Medicine. This is the fifth Nobel Prize awarded for RNA research, emphasizing RNA's fundamental role in cell biology. Previous awards have recognized discoveries like mRNA (1965), RNA as enzymes (1989), RNA interference (2006), and mRNA vaccines (2023).

### About Cellular Biology

Each cell contains a DNA blueprint to build and maintain the organism. Proteins, made based on DNA instructions, perform various functions like oxygen transport by haemoglobin. Only specific genes are expressed in different cell types, allowing specialized protein production in each type.

### About MicroRNAs (miRNAs)

1. They are small, non-coding RNA molecules that play a crucial role in regulating gene expression.
2. They are typically about 20-24 nucleotides long and function by binding to messenger RNA (mRNA) molecules, leading to mRNA degradation or inhibition of translation.

### How microRNA Regulates Protein Production

1. mRNA is a transient copy of DNA used to create proteins through transcription.
2. miRNAs bind to mRNA, halting protein synthesis by either marking mRNA for degradation or preventing it from producing proteins.
3. miRNA and mRNA share the same four chemical bases but differ in length, with miRNA being only about 22 bases long.

### Importance of microRNA in Cellular Processes

1. miRNAs regulate approximately 60% of human genes and are crucial in processes like cell development, differentiation, cell division, and response to stress and disease.
2. They play a significant role in controlling abnormal protein production, making them potential targets for cancer and other therapies.
3. miRNA trials, like those for miRNA-34a, began in 2013 but faced challenges due to early delivery technology limitations, leading to immune reactions and halted trials.
4. Improved packaging and delivery methods have enabled trials against diseases such as hepatitis C and cardiovascular conditions.
5. Current Status: As of the recent Nobel announcement, 581 miRNA-related clinical trials had been registered in the U.S., with mixed outcomes.

## New statue of Lady Justice

### Why in news?

Recently, the Supreme Court has unveiled a new statue of “Lady Justice”.

### Lady Justice in India



Figure 2. Source: IE

**1. British Influence:** The image of Lady Justice came to India with the British legal system during colonial rule. It became a common feature in courthouses across the country.

2. Notably, at the Calcutta High Court, constructed in 1872, Lady Justice appears in carvings, sometimes blindfolded, sometimes not. Similarly, the Bombay High

Court also features a statue of Lady Justice without a

blindfold.

**3. Modern Depiction in India:** In 2024, the Supreme Court of India unveiled a new statue of Lady Justice. This six-foot-tall statue differs from the classical depiction.

The statue was created by artist Vinod Goswami, shows Lady Justice in a saree, without a blindfold, holding scales in one hand and a copy of the Constitution of India in the other, instead of a sword.

**4. Significance of the New Depiction:** The absence of the blindfold symbolizes that “law is not blind” and sees everyone equally. This new representation aligns with recent legal reforms and efforts to “decolonize” India’s legal framework.

### Origins of Lady Justice

**1. Greek Mythology:** The concept of Lady Justice traces back to ancient Greek mythology. Themis, one of the 12 Titans born to Gaea and Uranus, was the goddess of justice, wisdom, and good counsel. She is often depicted holding scales in one hand and a sword in the other, symbolizing fairness and enforcement of justice.

**2. Roman Influence:** In Roman mythology, the first emperor Augustus introduced Justitia, the goddess of justice. Like Themis, Justitia held scales and a sword, but she did not wear a blindfold.

**3. Origins of the Blindfold:** The earliest depiction of a blindfolded Lady Justice comes from a 1494 woodcut titled “The Fool Blindfolding Justice,” part of Ship of Fools, a satirical collection by German lawyer Sebastian Brant. This image was not meant to celebrate impartiality but was a critique, symbolizing injustice. It was attributed to German Renaissance artist Albrecht Dürer.

**Change in Meaning:** By the 17th century, the blindfold lost its satirical meaning and came to represent the impartiality of justice, signifying that justice should be delivered without prejudice or favoritism.

## UPSC Syllabus: Polity and nation

### Advance Reservation Period (ARP)

#### Why in news?

Recently, Indian Railways has taken the significant step of shortening the Advance Reservation Period (ARP), reducing the window for booking tickets from four months (120 days) to two months (60 days). This change is set to take effect from November 1, 2024 reversing a policy that had been in place since May 1, 2008.

#### About Advance Reservation Period (ARP) by Indian Railways

1. The Advance Reservation Period (ARP) refers to the number of days in advance that a passenger can book a ticket before the date of departure for trains, flights, or other transportation services.
2. The purpose of ARP is to allow travellers to plan their journeys and secure seats or accommodation ahead of time.

#### Reasons for the Change

Railway officials cite several reasons for the decision to shorten the ARP:

- i) High Cancellation Rates:** One of the primary motivations behind this policy change is the high rate of ticket cancellations, which currently stands at around 21%. The long booking window allowed passengers to reserve tickets months in advance, often leading to a change in plans and subsequent cancellations. This practice disrupts the allocation of seats, causing inefficiency in seat utilization.
- ii) No-Show Passengers:** Another concern is that a percentage of passengers (about 4% to 5%) do not show up for their journeys, creating “no-show” situations, where the reserved seats remain vacant.
- iii) Passenger Booking Trends:** According to data, 88% to 90% of reservations happen within the 60-day period before travel. This observation helped justify reducing the ARP to 60 days as it aligns with actual passenger booking behaviour.

#### How Longer ARPs Give Rise to Frauds

A longer ARP not only encourages cancellations but also creates opportunities for fraudulent activities, such as:

**Impersonation and Seat Reselling:** Fraudsters impersonate passengers or take advantage of empty berths when passengers don't show up for their journeys. In some cases, railway officials may be involved in illegally reselling vacant seats for money.

**Touting:** Touts often block tickets in bulk during the long reservation window, leaving genuine passengers with fewer booking options. The shortening of the ARP is aimed at discouraging touts, as a shorter window reduces the chance of large-scale ticket blocking.

#### Impact on Foreign Tourists and Other Exemptions

The reduction of the ARP does not apply to foreign tourists, who have access to a special quota allowing them to plan their journeys across India well in advance.

Some trains, such as the Taj Express and Gomti Express, are also exempt from ARP rules.

Additionally, General Class tickets, which are typically purchased immediately before travel, remain unaffected by the ARP changes.

## Supreme Court Declares Secularism as a Core Part of the Constitution

### Why in news?

Recently, SC gave judgement with regard to secularism. This observation was made during the hearing of petitions, including one by former Rajya Sabha member Subramanian Swamy, challenging the inclusion of the words “socialist” and “secular” in the Preamble.

### Judgment on Secularism and the Constitution

A bench emphasized that secularism is evident in the Constitution’s commitment to equality and fraternity.

The bench referred to previous rulings where secularism had been upheld as a core feature of the Constitution.

The Supreme Court reaffirmed that secularism is a fundamental and indelible part of the Basic Structure of the Indian Constitution.

### Challenge to the 42nd Amendment

**The 42nd Amendment Secularism is a core part of the Constitution:** SC made during Indira Gandhi’s government, introduced the words “socialist” and “secular” to the Preamble, alongside changing “unity of the nation” to “unity and integrity of the nation.”

**Historical Context of the Amendment:** The original Preamble described India as a “sovereign, democratic republic.” The inclusion of “socialist” and “secular” was enacted through the 42nd Constitution Amendment, which occurred during the Emergency period.

**Kesavananda Bharati Case and the Preamble:** The landmark Kesavananda Bharati case in 1973, adjudicated by a 13-judge bench, had declared the Preamble as an integral part of the Constitution. It also ruled that while the Preamble could be amended, such amendments could not alter the Basic Structure of the Constitution.

## UPSC Syllabus: Polity and nation

### Indo-Oman Naval Exercise (Naseem Al Bahr)

### Why in news?

The Indian Navy’s INS Trikanth and Dornier Maritime Patrol Aircraft participated in the Indo-Oman bilateral naval exercise Naseem-Al-Bahr with the Royal Navy of Oman’s vessel Al Seeb off the coast of Goa from October 13 to 18, 2024.

### About Indo-Oman Naval Exercise (Naseem Al Bahr)



Figure 3. Source: PIB

**1. About:** The exercise was held off the coast of Goa from 13 to 18 October 2024.

**2. Exercise Participants:** Indian Navy: INS Trikand and Dornier Maritime Patrol Aircraft and Royal Navy of Oman (RNOV): Vessel Al Seeb.

**3. Phases of the Exercise:**

**i) Harbour Phase (13-15 October 2024):** It involves professional interactions between the navies, including Subject Matter Expert Exchanges and planning conferences. Also involves sporting events and social engagements for relationship building.

**ii) Sea Phase (16-18 October**

**2024):** Joint maritime operations included gun firings at inflatable surface targets and close-range anti-aircraft firings.

Ships performed complex naval manoeuvres and Replenishment at Sea Approaches (RASAPS). Helicopter from INS Trikand conducted cross-deck landings and Vertical Replenishment (VERTREP) with RNOV Al Seeb.

Indian Navy's Dornier aircraft provided Over-the-Horizon Targeting (OTHT) data. Indian Navy Sea Riders embarked on RNOV Al Seeb for a day to enhance interoperability.

### Key Outcomes

**1. Enhanced Interoperability:** The exercise promoted mutual understanding and shared best practices between both navies.

**2. Strengthened Collaboration:** Fosters India's commitment to cooperation with friendly nations in the Indian Ocean Region.

**3. Successful Engagement:** The exercise was a success in achieving its objectives of building stronger naval ties and operational cohesion between the Indian Navy and the Royal Navy of Oman.

## UPSC Syllabus: Defence exercises

### Multi-Purpose Vessel 'Samarthak'

#### Why in news?

Recently, Larsen & Toubro (L&T) launched the first of two multi-purpose vessels (MPVs) for the Indian Navy.

#### About Multi-Purpose Vessel 'Samarthak'

**1. About:** The first of two multi-purpose vessels (MPVs) for the Indian Navy was launched by Larsen & Toubro (L&T).

**2. Location:** The launch took place at Kattupalli Shipyard, located near Ennore, around 45 km north of Chennai.

3. This marks a significant achievement in L&T's commitment to indigenous defense manufacturing under the 'Make in India' and 'Atmanirbhar Bharat' initiatives.

**4. Key Features of INS 'Samarthak':** The vessel is named INS 'Samarthak' and is 107 meters in length with a width of 18.6 meters. It has a displacement of over 3,750 tonnes. It is designed and constructed entirely in-house by L&T, it showcases the company's advanced design and construction capabilities.

**5. Multi-Role Capabilities:** INS 'Samarthak' is equipped to serve multiple roles including:

i) Conducting maritime surveillance and patrol operations.

ii) Launching and recovering surface and aerial targets.

iii) Providing humanitarian aid during crises.

iv) Facilitating trials for the development of next-generation weapons and sensors for the Indian Navy.

**6. Significance of the Launch:** The successful launch, despite global geopolitical disruptions affecting supply chains, demonstrates L&T's efficiency in defense manufacturing. This achievement underscores L&T's commitment to national security and its strong in-house warship design and execution capabilities.

## UPSC Syllabus: Science and technology (Defence)

### Yars Intercontinental Ballistic Missile (ICBM)

#### Why in news?

Recently, Russia's Defence Ministry announced that it is testing the combat readiness of a unit armed with Yars intercontinental ballistic missiles in a region northwest of Moscow.

#### About Yars Intercontinental Ballistic Missile (ICBM)



Figure 4. Source: TH

1. The RS-24 Yars also known as Topol-MR is a Russian intercontinental ballistic missile (ICBM) designed to bolster the country's nuclear deterrence capabilities. It was introduced in 2007.

2. The Yars is an advanced version of the Topol-M missile, featuring improvements in range, mobility, and warhead capacity.

3. It plays a crucial role in Russia's strategic nuclear forces, forming a

backbone of its long-range strike capability.



### Key Features of the Yars Missile:

1) The Yars missile can be deployed in two primary configurations:

i) **Silo-based:** Launched from hardened, underground silos, providing greater protection against enemy attacks.

ii) **Mobile launchers:** Mounted on large transporter-erector-launchers (TELs), giving the missile mobility and making it harder for adversaries to detect and destroy.

2. **Range:** The Yars missile has a range of up to 11,000 km (approximately 6,835 miles), enabling it to strike targets far beyond Russia's borders, including most of Europe, the United States, and other strategic locations.

3. **Warhead:** The Yars is equipped with multiple independently targetable reentry vehicles (MIRVs), meaning it can carry multiple nuclear warheads, each capable of striking different targets. This increases the missile's lethality and makes it more challenging to intercept by missile defense systems.

4. **Accuracy and Guidance:** The Yars missile benefits from advanced guidance systems, making it highly accurate. Its MIRVs can deliver warheads with precision, ensuring a more effective strike against strategic enemy targets.

### Strategic Importance

i) The Yars missile is a critical component of Russia's nuclear triad which consists of land-based ICBMs, submarine-launched ballistic missiles (SLBMs), and strategic bombers.

ii) This triad provides Russia with a diversified and resilient nuclear deterrent, ensuring that it can retaliate in the event of an attack.

## UPSC Syllabus: Defence

### India-China Agreement on LAC Tensions

#### Why in news?

India and China recently reached an agreement on patrolling arrangements at the Line of Actual Control (LAC). The agreement includes resolving remaining military stand-off points at Demchok and Depsang.

#### Key Points of the agreements

**Run-up to resolution**

The Indian and Chinese militaries have been locked in the stand-off along the Line of Actual Control since May 2020. India announced that it has reached agreements on patrolling and other issues

- June-July 2024:** Minister Jaishankar meets Chinese Foreign Minister Wang Yi in Almaty, Vientiane
- July-August:** Working mechanism of diplomats, military holds meetings in Delhi, Beijing
- September:** National Security Adviser Ajit Doval meets Wang Yi in St. Petersburg
- October:** Military commanders, diplomats meet at LAC points

**Major headway:** Foreign Secretary Vikram Misri made the announcement on the breakthrough during a press briefing on PM Narendra Modi's visit to Russia on Tuesday. PTI

**1. Restoration of 2020 LAC Status:** India and China have agreed to restore the LAC to its pre-May 2020 status, resuming patrolling by both sides. This marks a significant diplomatic breakthrough in resolving the border

Figure 5. Source: TH

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standoff that had escalated since 2020.

**2. Diplomatic Achievement:** External Affairs Minister S. Jaishankar announced the agreement on October 21, 2024, crediting it to “patient and persevering diplomacy.” This move reflects the culmination of efforts by both nations to de-escalate tensions.

**3. Patrolling Resumed:** As per the agreement, Indian and Chinese soldiers will now patrol the LAC in a manner consistent with pre-2020 arrangements, resolving the standstill that had blocked patrols in key areas for over four years.

**4. Unresolved Areas:** Although many friction points have been addressed, two key areas: Depsang Plains and Demchok remain unresolved. These strategic transgressions are yet to be fully resolved despite ongoing talks.

**5. Military Mobilization:** During the standoff, both countries stationed over 50,000 troops along the LAC, along with significant firepower and military resources. The agreement aims to reduce tensions in this heavily militarized zone.

**6. Future Considerations:** The agreement leaves some questions unanswered, particularly whether patrolling rights have been restored along the entire LAC or just in specific areas. Additionally, the future of buffer zones, created in transgression areas, remains unclear.

**7. Strategic Implications:** The timing of the agreement, ahead of Prime Minister Narendra Modi’s visit to the BRICS summit in Russia, could strengthen India’s position on the global stage. However, concerns remain over China’s long-term intentions, especially in relation to Taiwan.

## UPSC Syllabus: Internal security

### eShram – One Stop Solution

#### Why in news?

Recently, Union Minister of Labour & Employment and Youth Affairs & Sports launched the “eShram – One Stop Solution” in New Delhi.

#### About eShram – One Stop Solution

1. The One Stop Solution involves consolidating and integrating data from various Central Ministries and Departments into a unified repository, in line with the recent Budget announcement and the Ministry of Labour and Employment’s 100-day agenda.

**2. Objective of eShram – One Stop Solution:** The new platform aims to simplify and provide seamless access to various social security schemes for unorganised workers registered on the eShram portal.

It serves as a bridge between workers and government welfare schemes, making registration and access easier and more transparent.

#### 3. Key Features of the Platform:

i) It consolidates and integrates data from various Central Ministries and Departments into a single repository.

ii) Major welfare schemes, such as One Nation One Ration Card, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), National Social Assistance Programme, National Career Service, and Pradhan Mantri Shram Yogi Maandhan, have already been integrated.

iii) The integration of additional schemes is ongoing.

**4. Government Collaboration:** The initiative reflects a “whole of government” approach, as demonstrated by the numerous meetings held with concerned ministries to integrate their social security and welfare schemes with eShram during the first 100 days of the new government.

**5. Platform Reach:** Since its initial launch on August 26, 2021, the eShram portal has registered more than 30 crore unorganised workers over the last three years.

## UPSC Syllabus: Schemes and programmes

### Sakura Programme 2024

#### Why in news?

The Department of School Education & Literacy, Ministry of Education (DoSEL), is sending a delegation of 20 school students and 2 supervisors to Japan to participate in the Sakura Programme 2024. They will join representatives from five other countries for the event, which will take place from 20 to 26 October 2024.

#### About Sakura Programme 2024

1. The “Japan-Asia Youth Exchange Program in Science,” known as the Sakura Science Programme has been implemented by Japan’s Science and Technology Agency (JST) since 2014.
2. India has been a participant since 2015, with students invited for short-term visits to Japan to experience its cutting-edge science, technology, and culture.
4. It is aligned with India’s National Education Policy (NEP) 2020, which promotes holistic and experiential learning, this program supports the NEP’s emphasis on integrated and enjoyable education.
5. Educational trips, like the Sakura Programme, are vital for exposing students to historical, cultural, social, and technological developments.
6. Under the programme, Japan offers an enriching environment for students’ intellectual growth and exploration of innovative practices.
5. Past Participation: India first joined the program in April 2016, and to date, 553 students and 85 supervisors from India have visited Japan through the initiative. The most recent batch participated in June 2024.

## UPSC Syllabus: Governance

### Karmayogi Saptah' – National Learning Week (NLW)

#### Why in news?

Recently, the Prime Minister inaugurated the 'Karmayogi Saptah' – National Learning Week (NLW) at the Dr. Ambedkar International Centre, New Delhi.

#### About Mission Karmayogi

1. Mission Karmayogi was launched in September 2020.
2. It aims to create a future-ready civil service rooted in Indian values with a global perspective. It has made substantial progress since its inception.

#### About National Learning Week (NLW)

1. **About:** The largest event of its kind, dedicated to individual and organisational capacity building for civil servants.
2. **Aim:** It aims to foster a renewed commitment to lifelong learning and align civil servants with national goals.
3. **Objective:** It is to promote the message of "One Government" to ensure cohesion across Ministries, Departments, and Organisations.
4. **Targeted Learning:** Each participant, referred to as a Karmayogi will be required to complete at least 4 hours of competency-linked learning during the week.

**Learning can be achieved through:** Role-based modules on the iGOT platform and Webinars, including public lectures and policy masterclasses by eminent speakers.

5. **Workshops and Seminars:** Ministries, Departments, and Organisations will organise workshops and seminars to enhance domain-specific competencies. Eminent speakers will deliver talks aimed at improving \*\*citizen-centric service delivery.

### Amazon Future Engineer (AFE) program

#### Why in news?

Recently, the National Education Society for Tribal Students (NESTS) launched the third phase of the 'Amazon Future Engineer Program' in 50 Eklavya Model Residential Schools (EMRS).

#### About Amazon Future Engineer (AFE) program

The Amazon Future Engineer (AFE) program is an educational initiative designed to inspire, educate, and support students from underrepresented and underserved communities to pursue careers in computer science (CS) and engineering.

It was launched by Amazon and is part of the company's broader commitment to bridge the technology skills gap and foster diversity in STEM fields.

### Key Components:

- 1. K-12 Support:** AFE provides resources and funding for elementary, middle, and high schools to introduce students to coding and CS. This includes teacher training, online curriculum access, and activities like Hour of Code. Schools in underserved areas receive priority support.
- 2. Scholarships and Internships:** One of the flagship aspects of the AFE program is its scholarship initiative which awards \$40,000 college scholarships to high school seniors planning to major in CS. In addition to financial aid, recipients are offered paid internships at Amazon to gain real-world experience.
- 3. University and Career Readiness:** AFE partners with universities and organizations to provide mentorship, career guidance, and hands-on learning opportunities for students as they navigate higher education and career paths. The internships at Amazon help students gain practical skills, network with professionals, and build a career foundation.
- 4. Focus on Diversity:** Amazon has placed a significant emphasis on expanding access to CS education for students from underrepresented groups, including minorities, women, and those from low-income families. The goal is to create a more inclusive tech workforce.
- 5. Partnerships with Nonprofits:** AFE collaborates with various nonprofit organizations, such as Code.org, Girls Who Code and The Boys & Girls Club of America to expand its reach and bring high-quality STEM education to even more communities.
- 6. Real-World Applications and Projects:** Students involved in the AFE program are encouraged to work on real-world projects, such as building apps, creating AI models, or contributing to sustainability and humanitarian efforts through technology. This hands-on approach helps them see the impact of computer science in everyday life.

## Pradhan Mantri Divyasha Kendra (PMDK)

### Why in news?

Recently, Department of Empowerment of Persons with Disabilities (DEPwD) inaugurated a new 'Pradhan Mantri Divyasha Kendra (PMDK)' of the Artificial Limbs Manufacturing Corporation of India (ALIMCO), at the National Institute for the Empowerment of Persons with Visual Disabilities (NIEPVD), Dehradun.

### About Pradhan Mantri Divyasha Kendra (PMDK)

1. The Pradhan Mantri Divyasha Kendra (PMDK) is a dedicated initiative aimed at empowering persons with disabilities, particularly those with visual impairments.
2. It is located at the National Institute for the Empowerment of Persons with Visual Disabilities (NIEPVD) in Dehradun.
3. This centre serves as a crucial resource for enhancing the quality of life and opportunities for Divyangjans.

### Objectives and Services

- 1. Empowerment Through Rehabilitation:** MDK focuses on providing comprehensive rehabilitation services to visually impaired individuals, enabling them to gain independence and self-sufficiency.

**2. Assistive Technologies:** The center is equipped with advanced technologies, including prosthetics, orthotics, and Braille appliances, to assist individuals in their daily lives and enhance their mobility.

**3. Skill Development:** The PMDK emphasizes skill development through various training programs, ensuring that beneficiaries acquire vocational skills that can lead to employment and self-employment.

**4. Community Engagement:** By fostering community involvement, the PMDK aims to raise awareness about the capabilities of persons with disabilities and promote inclusivity.

#### **Facilities and Infrastructure**

**1. Prosthetics and Orthotics Lab:** A specialized lab that provides tailored assistive devices to enhance mobility and functionality for users.

**2. Audiology Room:** Facilities for auditory assessments and interventions to support individuals with combined visual and hearing disabilities.

**3. Braille Workshop:** It is a dedicated space for the manufacture of Braille materials and assistive devices, promoting literacy and education among visually impaired individuals.

### **Karakoram Wildlife Sanctuary**

#### **Why in news?**

The standing committee of the National Board for Wildlife (NBWL) recently approved five significant road stretches, including four that traverse the Karakoram Wildlife Sanctuary along the Line of Actual Control (LAC).

#### **About Karakoram Wildlife Sanctuary**



Source: Peakvisor

## Factly Compilation [Third Week] October 2024

Aspects	Description
About	<ol style="list-style-type: none"> <li>1. Karakoram Wildlife Sanctuary is located in the easternmost reaches of the Karakoram Range in Leh District, Ladakh.</li> <li>2. It is situated at high altitudes. The sanctuary is important as one of the few places in India where the Chiru or Tibetan Antelope migrates.</li> <li>3. The sanctuary is bounded by the Nubra and Shayok Rivers and shares international borders with China and Pakistan.</li> <li>4. It is named after the Karakoram Ranges, which line the north of the sanctuary.</li> </ol>
Climatic Conditions	In certain elevations within this Wildlife Sanctuary, the average temperature during the warmest month is below 0 degrees Celsius, while in other areas, it stays under 10 degrees Celsius.
Major Peaks	Significant peaks within the sanctuary include Saltoro Kangri, Saser Kangri I, and K12.
Rivers	The Shyok and Nubra Rivers serve as the primary water sources for the sanctuary.
Vegetation	<p>The riverine vegetation is divided into:</p> <p><b>Natural Riverine Vegetation:</b> Includes broad-leaved shrubs like <i>Rosia webbiana</i>, <i>Ephedra</i>, <i>Caragiana</i> and other bushes, primarily found along main riverbeds.</p> <p><b>Artificial Vegetation:</b> Consists of species such as <i>Salix</i> spp., <i>Populus euphratica</i>, <i>Juglans regia</i> (walnut), and <i>Prunus armanica</i> (wild apricot).</p>
Flora	The flora comprises broad-leaved shrubs such as <i>Rosia webbiana</i> , <i>Ephedra</i> , <i>Caragana</i> and several other bushes.
Fauna	<ol style="list-style-type: none"> <li>1. The sanctuary is home to 14 mammal species, including 10 rare and endangered ones like the Ibex, Ladakhi Urial, Argali, Chiru (Tibetan Antelope), Tibetan Gazelle, Shapo, Bharal (Blue Sheep), Wild Yak, Snow Leopard, Lynx, and Wolf. Bactrian camels are also found in nearby region.</li> <li>2. Notable birds include eagles (Short-toed, Booted, Golden), Lemmargeir, Himalayan Griffon, Gadwall, Tufted Duck, Goosander, Himalayan Snow Cock, Grey Plover, Lapwing, Little Gull, Hill and Blue Rock Pigeons, and larks (Haepee, Small Skylark).</li> </ol>
Ecological Significance	<ol style="list-style-type: none"> <li>1. The sanctuary serves as a breeding centre and habitat for a wide range of rare and endangered wild animals and plant species.</li> <li>2. The area's diverse vegetation is categorized based on dominant species, altitude, and habitat, adding to the region's ecological richness.</li> <li>3. With its stunning landscapes and unique biodiversity, the Karakoram Wildlife Sanctuary is an important ecological reserve in India.</li> </ol>

## UPSC Syllabus: Environment

### Rantha Twilight Zone in the ocean

#### Why in news?

Recent evidence suggests that there are more animals in Twilight Zone of the ocean by weight than in all of the world's fisheries combined.

#### About Twilight Zone in the ocean

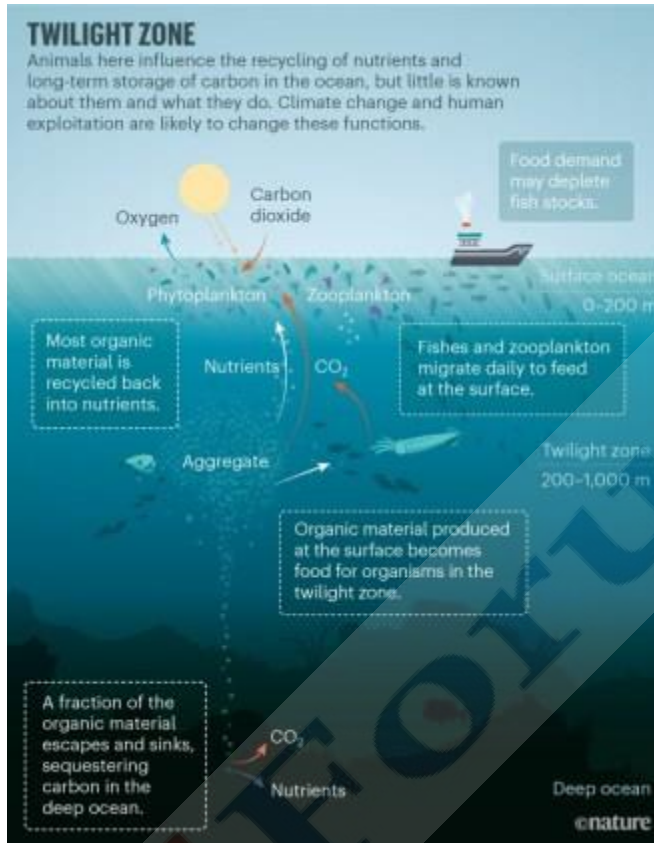


Figure 6. Source: nature

1. The Twilight Zone in the ocean is a fascinating layer of the marine environment that lies between the Epipelagic Zone (sunlit surface waters) and the Bathypelagic Zone (deeper, darker waters). It is also known as **Mesopelagic Zone**.

2. It extends from approximately 200 meters to 1,000 meters below the ocean's surface. In this zone, sunlight is minimal and insufficient for photosynthesis, creating a dimly lit, shadowy realm, hence the name "twilight."

#### Characteristics of the Twilight Zone

**1. Light Penetration:** Very little sunlight reaches the Twilight Zone, which gradually diminishes as depth increases. While it is not completely dark, the low light levels make it impossible for photosynthetic organisms to survive.

**2. Temperature and Pressure:** Temperatures in the Twilight Zone are significantly cooler than at the surface, often ranging from 4°C to 20°C. Pressure increases drastically with depth, which plays a role in the adaptation of organisms living here.

**3. Oxygen Levels:** The oxygen concentration in this zone is relatively low, especially at deeper levels, creating a challenge for marine life that must adapt to low-oxygen environments.

**4. Marine Life:** Despite the low light and harsh conditions, the Twilight Zone is home to a wide array of organisms.

Many species, including lanternfish, bristle mouths, squids, jellyfish, and zooplankton have evolved to survive in this environment.

Some animals are bioluminescent, producing light through chemical reactions in their bodies. This ability is crucial for communication, predation, and camouflage in the dim light of the Twilight Zone.



**5. Diel Vertical Migration:** One of the most remarkable phenomena in the Twilight Zone is the diel vertical migration, where vast numbers of creatures travel from the depths to the surface at night to feed, returning to the Twilight Zone by day to avoid predators.

**6. Role in the Carbon Cycle:** The Twilight Zone plays a crucial role in the global carbon cycle. Marine organisms, particularly zooplankton and small fish, feed on phytoplankton from the surface waters and transport carbon to deeper layers of the ocean when they excrete waste or die and sink.

#### Importance and Research:

1. The Twilight Zone is increasingly recognized for its importance in marine ecosystems and climate regulation.
2. Scientists are keen to understand how it functions as a carbon sink, helping mitigate the effects of climate change.

However, it is also under pressure from deep-sea fishing and climate change, making its preservation a growing concern for marine biologists.

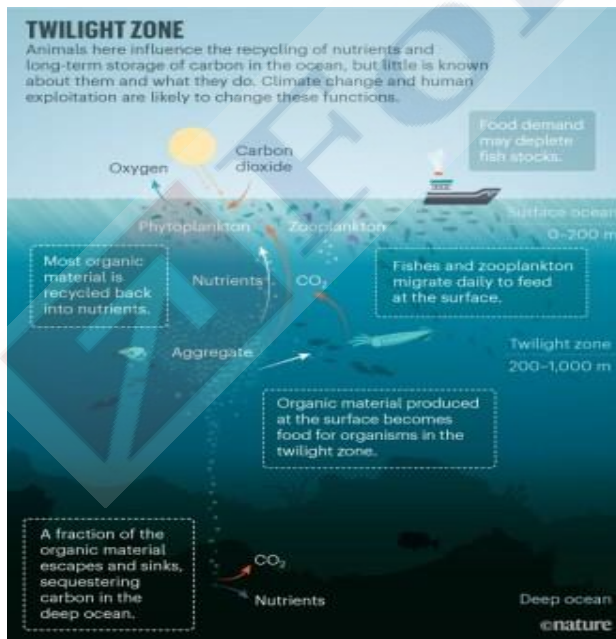
## UPSC Syllabus: Geography in news, Environment

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## **Ranthambore Tiger Reserve**

### **Why in news?**

Recently, Rajasthan Forest Department has halted the construction of a large complex, consisting of over a dozen rooms, within the buffer zone of the crucial tiger habitat in the Ranthambore Tiger Reserve (RTR) in Sawai Madhopur district.

### **About Ranthambore Tiger Reserve**



Source:blogspot

- 1. Location:** Ranthambore Tiger Reserve is located in the Sawai Madhopur district of Rajasthan.
- 2. Establishment:** It was established as the Sawai Madhopur Game Sanctuary in 1955 by the Government of India.
3. It was declared one of the Project Tiger reserves in 1973 and became a national park in 1980. It is now a part of the larger Ranthambore Tiger Reserve, which includes the nearby Kailadevi Sanctuary and Sawai Mansingh Sanctuary.
4. Ranthambore spans an area of around 1,334 square kilometers, with the core zone comprising about 392 square kilometers.
5. The park is situated at the junction of the Aravalli and Vindhya hill ranges. The park landscape is combination of rugged hills and plateaus, with open grasslands, dense forests, lakes, and rivers.
6. Its rich topography, including the famous Ranthambore Fort (a UNESCO World Heritage Site) enhances its appeal to visitors.
- 7. Flora:** The park is known for its diverse ecosystem, which includes dry deciduous forests, grasslands, and scrublands. Some of the dominant tree species in Ranthambore include the dhok (*Anogeissus pendula*), banyan, pipal, and various species of acacia.
- 8. Fauna:** Bengal tiger is the primary attractio. Ranthambore is home to a variety of other wildlife including Mammals such as Leopards, sloth bears, striped hyenas, sambar deer, chital, nilgai, wild boar, and Indian foxes.

## UPSC Syllabus: Environment

### Battle of Walong

#### Why in news?

The Indian Army is organizing a series of month-long events to commemorate the 62nd anniversary of the Battle of Walong, which occurred during the 1962 war with China.

#### About Battle of Walong

1. The Battle of Walong, fought between 14 and 16 November 1962, was the only counterattack launched by India during the India-China war of 1962.
2. The battle took place in Arunachal Pradesh's Walong, the easternmost town near the Tibet region.
3. The Indian Army's 6 Kumaon Battalion launched the counterattack with limited resources, ammunition, and manpower. Despite being heavily outnumbered, Indian troops managed to hold back the Chinese forces for over 20 days.
4. Initially, China had reserved a full division for attacks on Tawang and Sela sectors and assigned just one regiment for Walong. However, due to stiff Indian resistance, the Chinese had to divert their division meant for Tawang to Walong.
4. **Notable Incidents:** On 23 October, a company led by Lt Bikram Singh removed planks from a wooden bridge, causing the first Chinese soldier crossing the bridge to fall into a river, alerting Indian troops and allowing them to repel the Chinese assault, inflicting heavy casualties.
6. **Counterattack at Tri Junction:** On 12 November, Indian troops planned to disrupt Chinese operations by attacking from a feature called Tri Junction. The counterattack launched by two companies under Captain B.N. Singh on 14 November was met with fierce Chinese resistance.
7. **Final Day of Battle:** On 16 November, Chinese troops launched a massive attack on Walong. Despite valiant resistance from the few remaining Indian troops, they were surrounded and ordered to withdraw due to lack of reinforcements and mounting casualties.
8. **Post-War Scenario:** After the war, the Chinese vacated most of the territory they had captured, including Walong, but India learned hard lessons regarding preparedness, infrastructure, and the importance of proper military equipment.
9. **Legacy and Recognition:** The bravery and determination of Indian soldiers were recognized, with Time magazine in January 1963 stating, "At Walong, Indian troops lacked everything. The only thing they did not lack was guts."