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MINISTRY OF SCIENCE AND TECHNOLOGY
सत्यमेव जयते



MK Yadav Sir

Table of Contents

1. Etalin Hydroelectric Project
2. Halal Certification
3. Medical Tourism
4. Ken-Betwa Link Project
5. Road Accidents
6. India and Oman
7. Spot-Bellied Eagle-Owl
8. Yangtze Finless Porpoise
9. Titanosaurs
10. Cold Waves

THE HINDU Page 10

ETALIN HYDROELECTRIC PROJECT

(Syllabus: GS Paper 3 - Economy & Infrastructure)

Central panel asks Arunachal to review hydropower project

The Hindu Bureau
NEW DELHI

The Forest Advisory Committee (FAC) of the Union Environment Ministry has asked the Arunachal Pradesh government to submit a revised request for permission to divert 1,165 hectares of forest land in the State's Dibang valley for the Etalin hydropower project.

The FAC's rationale was that there was widespread local opposition to the project and this ought to be addressed more comprehensively by the State government. The original proposal was sent way back in 2014 and it was "imperative" to review estimates on the number of trees that needed to be felled. There were also "concerns" regarding the biodiversity and protection of wildlife and this needed further assessment and safeguards to be incorporated. In its 2014 estimate, the diversion of forest area would mean the felling of close to 2,80,000 trees.

Moreover, in the earlier approved projects where forest clearance had been accorded, there was a "poor record" of compliance with the conditions stipulated by the FAC. In light of this, the FAC requested the State government to review the status of all approved projects and the extent of their compliance with FAC recommendations and submit a status report to the Environment Ministry at the earliest, the record noted.

List of projects

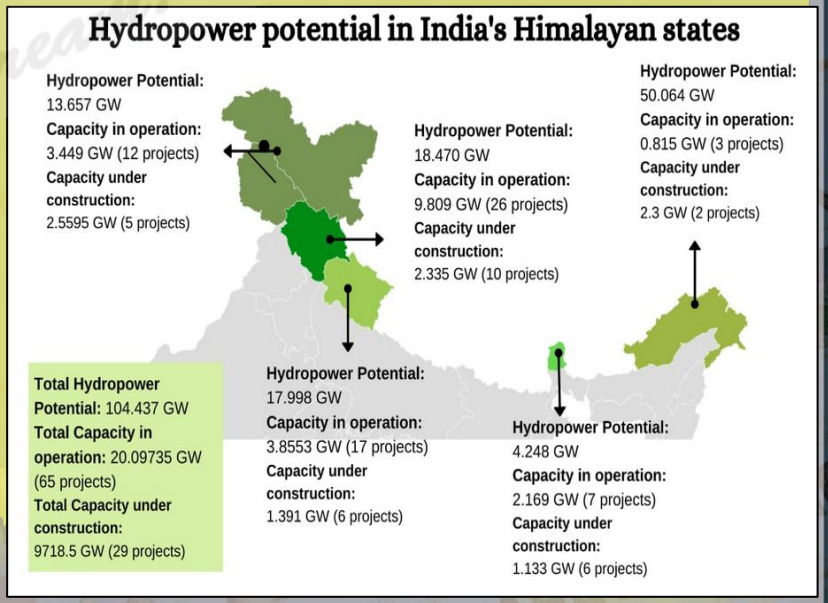
The Etalin hydropower project is a joint-venture between Jindal Power and Hydro Power Development Corporation of Arunachal Pradesh Limited.

The Arunachal Pradesh government has been promoting a slew of hydropower projects with several involving private companies. However, many of them have come unstuck or interminably delayed with cost escalation and local protests. The State government has recently handed over the execution of some stalled projects to Central Public Sector Units.

Context: The Forest Advisory Committee has asked the Arunachal Pradesh government to file a fresh proposal for forest diversion and the construction of the **Etalin hydroelectric project (EHEP)** due to non-compliance to conditions stipulated by the FAC and the overwhelming pushback against the project in the region.

Etalin hydroelectric project (EHEP)

- **About**: Etalin HEP is envisaged as a run of the river scheme on rivers **Dri and Tangon in the Dibang Valley D**istrict of Arunachal Pradesh.
  - It is the **largest of the hydroelectric projects** being currently developed in India.
  - It is the **second hydropower project** proposed in the region, after the already approved Dibang Multipurpose Dam.
  - It envisages construction of two dams over the tributaries of **Dibang: Dir and Tangon.**
- **Location**: The Project is based on the river **Dibang**. It is proposed to be completed in 7 years.
  - Dibang is a **tributary of the Brahmaputra river** which flows through the states of Arunachal Pradesh and Assam.
  - The Project falls under the **"richest bio-geographical province of the Himalayan zone"** and would be located at the junction of the Palaearctic, Indo-Chinese and Indo-Malayan bio-geographic regions.
- **Implementing Agency:** The project is proposed to be developed by **Etalin Hydro Electric Power Company Limited**, a joint venture of Hydro Power Development Corporation of Arunachal Pradesh Limited and Jindal Power Limited.
  - It is one of the components of the master plan of the **Brahmaputra Board for flood moderation** of all rivers contributing to river Brahmaputra.
- **Significance**: The Project is in accordance with the Government's push to establish prior user rights on rivers that originate in China and an effort to fast-track projects in the north-east.



HALAL CERTIFICATION

(Syllabus: GS Paper 3 - Economy & Food Processing)

India Seeks to Streamline Halal Certification; Draft Norms Out

Our Bureau

New Delhi: The commerce and industry ministry has said that all meat and meat products are to be exported as 'halal certified' only if they're produced, processed and packed under a valid certificate issued by a body accredited by a board of the Quality Council of India.

In the draft guidelines on 'Streamlining of Halal Certification Process for Meat and Meat Products', the ministry said that a scheme titled 'India Conformity Assessment Scheme (i-CAS)' has been developed and the procedures laid down under that would need to be followed for halal certification.

It has sought stakeholder views till February 17 to prepare the final guidelines.

"All meat and meat products to be exported as 'halal certified' only if it is produced, processed and packed under a valid certificate issued by a certification body duly accredited by the National Accreditation Board for Certification Bodies (NABCB), Quality Council of India," the ministry said.

The guidelines cover fresh and frozen meat of bovine animals, sheep, goat, poultry and sausages. The accreditation body is required to be responsible for its Halal compliant accreditation decisions, which shall not be subject to approval by any other organisation or person, and develop polices related to Halal conformity assessment practices.

Halal Food Product Certification Schemes would require the implementation of other relevant systems like Food Safety Management Systems, Hazard Analysis Critical Control Points and Good Manufacturing Practices as applicable in manufacture and services for Halal foods, as per the draft.

Context: The commerce and industry ministry has said that all meat and meat products are to be exported as **'halal certified'** only if they're produced, processed and packed under a valid certificate issued by a body accredited by a board of the Quality Council of India.

Halal Certification

- **About**: Halal certification is given by many private companies in India which **marks the food or products permissible for the followers of Islam**. Important halal certification companies in India are:
  - Halal India Private Limited.
  - Halal Certification Services India Private Limited.
  - Jamiat Ulama-E-Maharashtra- A state unit of Jamiat Ulama-E-Hind.
  - Jamiat Ulama-i-Hind Halal Trust.
    - In India, FSSAI (Food Safety and Standards Authority of India) certification can be seen on almost all the processed foods but this authority doesn't give halal certification in India.
- **Halal and Haram:** Halal is an **Arabic term** which means **'permissible or lawful'**. Halal is related to Islam and its dietary laws an is specifically related to meat processed and prepared as per the requirements of the laws.
  - On the other hand, Haram is an Arabic term which means **'prohibited or forbidden'.**
- **Halal law**: Halal practices **mentioned in the Quran** are as follows:
  - Only a **Muslim man can slaughter the animal.** In many texts, it is also mentioned that if Jews and Christians slaughter the animals following the rest of the steps (Halal procedure), the meat is halal as per the Islamic dietary laws.
  - The animal must be **slaughtered with the help of a sharp knife** with a cut to the jugular vein, carotid artery and windpipe.
  - The Quranic verse must be read while slaughtering the animal and is known as **Tasmiya or Shahada.**
  - At the time of slaughter, the **animal must be alive and healthy.** The maximum amount of blood must be drained from the veins of the carcass.
  - Consuming meat of an animal which is a**lready dead or other than the halal process is prohibited in Islam.**
- **Significance**:
  - **Cosmetics and pharmaceuticals need halal certification** as these companies use animal by-products.
  - Companies are getting their products halal certified so that their **products can be exported to Islamic countries.**

LIVEMINT

Page 2

India in G20 pitch for medical tourism

Priyanka Sharma
priyanka.sharma@livemint.com
NEW DELHI

India plans to pitch itself as a medical tourism destination, an official said as a G20 health working group meeting began on Wednesday.

"India will pitch itself as a destination for medical tourism during the event along with other key health priority agendas. Our aim to transform India as a global hub for medical and value-based healthcare for patients from all over the world," said the official who is attending the two-day event.

India is ranked 10th on the Medical Tourism Index (MTI) for 2020-21 out of 46 destinations by the Medical Tourism Association. Thousands of patients visit India from around the world for affordable, advanced and quality treatments, such as cosmetic surgery, bariatric surgery, cardiac surgery, and hip and knee replacement.

MEDICAL TOURISM

(Syllabus: GS Paper 3 - Economy)

Context: India plans to pitch itself as a medical tourism destination, an official said as a G20 health working group meeting began.

Medical Tourism in India

- **About**: Thousands of patients visit India from around the world for affordable, advanced and quality treatments, such as **cosmetic surgery, bariatric surgery, cardiac surgery, and hip and knee replacement.**
- **Status**: India is **ranked 10th on the Medical Tourism Index (MTI) for 2020-21** out of 46 destinations by the Medical Tourism Association.
- **India's Strength**: India has **world-class doctors and hospitals.**
  - The **cost of the treatment** is a fraction of the cost in the source markets.
  - The **increasing popularity of India** as a tourist destination in the west.
  - India offers a range of tourism **opportunities to Medical Value Traveller** to combine the treatment with visit to tourist destinations.
  - **Eastern Healthcare Wisdom** along with the expertise of **Western Medicine.**
    - **Eastern**: Traditional Healthcare Therapies like Yoga, Ayurveda & Naturopathy.
    - **Western**: Allopathy
  - Fast track appointments.
- **Steps taken for the Promotion of Medical and Wellness Tourism**
  - **'Incredible India' brand:** The Ministry of Tourism, releases **global print, electronic and online media campaigns** in important and potential markets overseas, under the 'Incredible India' brand line.
  - **Medical Visa**: It has been introduced, which can be given for **specific purposes to foreign travellers** coming to India for medical treatment.
  - **'E- Medical Visa' and 'E-Medical Attendant Visa'**: These have also been introduced for 156 countries.
  - **Financial Assistance**: The Ministry of Tourism provides **financial Assistance under Market Development Assistance Scheme** to Medical Tourism Service Providers accredited by National Accreditation Board for Hospitals & Healthcare Providers (NABH) for participation in Medical/ Tourism activities.

PIB JAN 19

KEN-BETWA LINK PROJECT

(Syllabus: GS Paper 3 - Economy & Infrastructure)

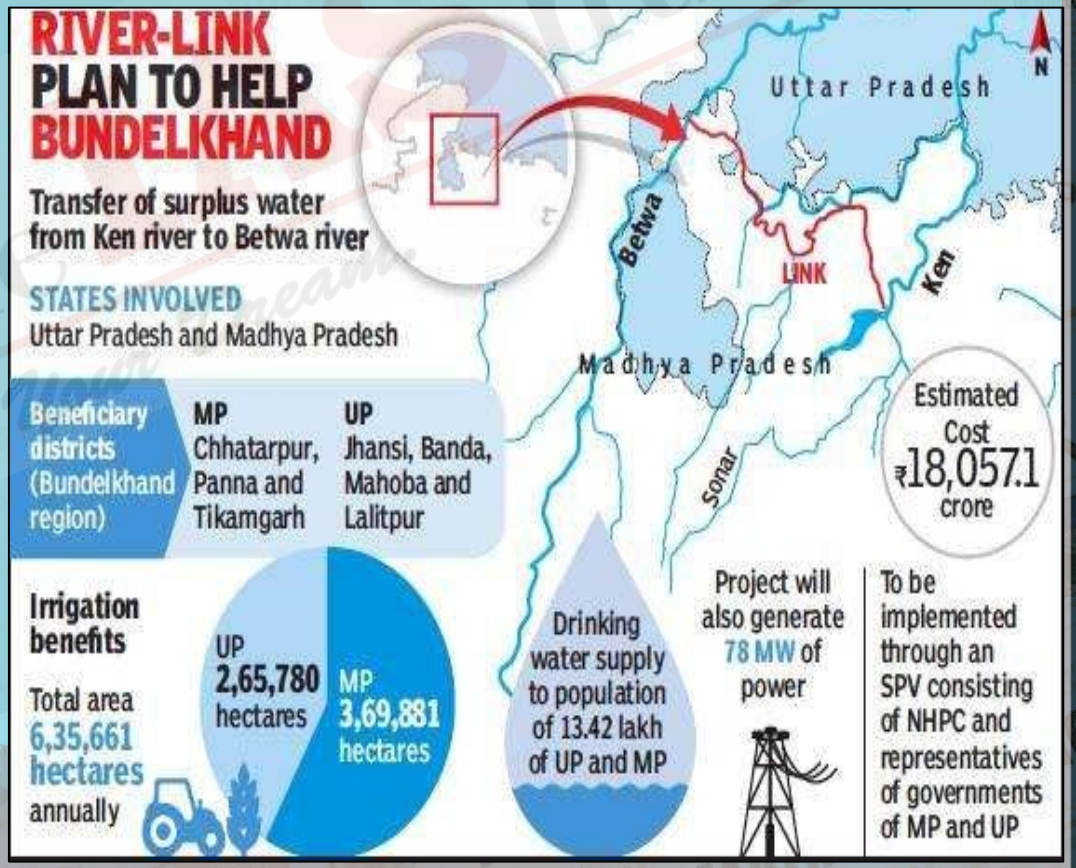
Third Meeting of Steering Committee of Ken-Betwa Link Project

Context: The Third Meeting of **Steering Committee of Ken-Betwa Link Project (SC-KBLP)** was held under the Chairmanship of Secretary, DoWR, RD & GR, Ministry of Jal Shakti.

- Two wildlife sanctuaries namely Nauradehi Wildlife Sanctuary and Rani Durgawati Wildlife Sanctuary of Madhya Pradesh and Ranipur Wildlife Sanctuary of U.P. have been approved by state govt. for bringing them under project Tiger.

Ken-Betwa Link Project

- **About**: It is a project proposed to **transfer excess water from the River Ken to the Betwa basi**n through the use of a concrete canal.
  - It is the first project under the **National Perspective Plan** for interlinking of rivers.
- **Objectives**: The project aims to **provide irrigation to the Bundelkhand region**, which is one of the worst drought-affected areas in India.
- **Beneficiary states**: Madhya Pradesh and Uttar Pradesh.
  - It will meet the irrigation purposes, drinking water, and electricity needs of 6 districts in both states.
  - The proposed concrete canal would be 221 km long. It will pass through **Jhansi, Banda, and Mahoba districts of UP and Chhatarpur, Panna, and Tikamgarh districts of MP.**
- **Tripartite Memorandum of Understanding:** Signed between the Centre and the governments of UP and MP for the project.
- **Implementing Agency**: A Special Purpose Vehicle (SPV) called **Ken-Betwa Link Project Authority (KBLPA)** will be set up to implement the project.
  - The **National Interlinking of Rivers Authority (NIRA)** has the powers to set up SPV for individual link projects.
- **Two phases:**
  - **Phase-I**: It will involve one of the components - **Daudhan Dam** complex and its subsidiary units such as Low Level Tunnel, High Level Tunnel, Ken-Betwa Link Canal and power houses.
  - **Phase-II**: It will involve three components - **Lower Orr Dam, Bina C**omplex Project and Kotha Barrage.



PIB JAN 19

ROAD ACCIDENTS
(Syllabus: GS Paper 2 - Polity & Governance)

Shri Nitin Gadkari calls for efforts by all to reduce road accidents by fifty percent

Context: Union Minister for Road Transport and Highways has said efforts by all are necessary to reduce **road accidents by 50 percent before the end of 2025.**

- **Ministry of Road Transport & Highways (MoRTH) is committed to reduction in road fatalities and injuries and has undertaken multiple initiatives acr**oss all 4Es of Road Safety i.e. Engineering, Enforcement, Education and Emergency Care.
- This year, MoRTH observed the **Road Safety Week (RSW)** from 11th to 17th January 2023, under "Swachhata Pakhwada", to propagate the cause of Safer Roads for All.

Road accidents in India

- **National Crime Records Bureau (NCRB) data, 2021**: Driving under the influence of drugs/alcohol contributed to **1.9% of deaths from accidents.**
  - Over 1.5 lakh people died from road accidents in 2021, and this has been the trend for several years.
  - Further, nearly 90% of deaths on the road were **due to speeding, overtaking, and dangerous driving.**
- **World Bank's data, 2019**: India **ranked first** among the top 20 countries for road accidents.

Initiatives Related to Road Safety

- **Global Initiatives:**
  - **Brasilia Declaration on Road Safety (2015)**: The declaration was signed at the second Global High-Level Conference on Road Safety held in Brazil. **India is a signatory to the Declaration.**
  - **Decade of Action for Road Safety 2021-2030:** The UN General Assembly adopted resolution **"Improving global road safety"** with the ambitious target of preventing at least 50% of road traffic deaths and injuries by 2030.
    - The **Global Plan aligns with the Stockholm Declaration,** by emphasizing the importance of a holistic approach to road safety.
  - **International Road Assessment Programme (IRAP)** : It is a registered charity dedicated to saving lives through safer roads.
- **India's Initiatives:**
  - **National Highways Authority of India Act, 1998:** The Act provides for the constitution of an authority for the **development, maintenance and management of NHs** and for matters connected therewith or incidental thereto.
  - **Control of National Highways (Land and Traffic) Act, 2000**: The Act provides for the **control of land within the National Highways,** right of way and traffic moving on the National Highways and also for removal of unauthorized occupation thereon.
  - **Carriage by Road Act, 2007:** The Act provides for the regulation of common carriers, limiting their liability and declaration of the value of goods delivered to them to determine their **liability for loss of, or damage** to, such goods occasioned by the negligence or criminal acts of themselves, their servants or agents and for matters connected therewith or incidental thereto.
  - **Motor Vehicles Amendment Act, 2019:** It provides for a **Motor Vehicle Accident Fund,** which would provide compulsory insurance cover to all road users in India for certain types of accidents.
    - It also provides for a **National Road Safety Board**, to be created by the Central Government.

India, Oman underline need to fight terrorism collectively

PRESS TRUST OF INDIA
NEW DELHI, JANUARY 19

INDIA AND Oman have underlined the need to work collectively to fight the challenge of terrorism, terrorist propaganda, abuse of cyberspace and misuse of new and emerging technologies. The issues were discussed at the eighth India-Oman strategic dialogue.

While the Indian team was led by Deputy National Security Adviser Vikram Misri, the delegation from Oman was headed by Major General Idris Abdulrahman Al-Kindi, the Secretary General of the National Security Council of the Sultanate of Oman. Al-Kindi is on a visit to India from January 16 to 19. This is his first visit to India after his appointment as the Secretary General, NSC, Oman.

INDIA AND OMAN
(Syllabus: GS Paper 2 - International Relations)

Context: India and its oldest strategic partner in the Gulf Oman condemned in the strongest terms all forms and manifestations of terrorism and underscored the need to work collectively to fight this menace.

Oman's Strategic Significance for India

- Oman is at the **gateway of Strait of Hormuz** through which India imports one-fifth of its oil imports.
- Defence cooperation has emerged as a key pillar for the robust **India-Oman strategic partnership.**
- Defence exchanges are guided by a Framework MOU which was recently renewed in 2021.
- Oman is the only country in the Gulf region with which all three services of the Indian armed forces conduct **regular bilateral exercises** and staff talks, enabling close cooperation and trust at the professional level. Military Exercises:
    - **Army exercise**: Al Najah
    - **Air Force exercise**: Eastern Bridge
    - **Naval Exercise**: Naseem Al Bahr
- Oman also actively participates in the **Indian Ocean Naval Symposium (IONS).**
- In a strategic move to expand its footprint in the Indian Ocean region, India has secured access to the key **Port of Duqm in Oman** for military use and logistical support. This is part of India's maritime strategy to counter Chinese influence and activities in the region.
    - The **Port of Duqm** is situated on the southeastern seaboard of Oman, overlooking the Arabian Sea and the Indian Ocean.
    - It is strategically located, in close proximity to the **Chabahar port** in Iran. With the Assumption Island being developed in Seychelles and Agalega in Mauritius, Duqm fits into India's proactive maritime security roadmap.



THE HINDU Page 5

SPOT-BELLIED EAGLE-OWL
(Syllabus: GS Paper 3 - Env & Eco)

Spot-bellied eagle owl spotted in A.P.'s Seshachalam forest for the first time

The Hindu Bureau
TIRUPATI

A wildlife team recently stumbled upon a spot-bellied eagle owl (*Bubo Nipalensis*) for the first time in the Seshachalam forest, and for the third time in Andhra Pradesh.

The bird's habitat, found on large trees in thick forests, is spread across the Indian subcontinent. But it was sighted only twice in the State earlier, and both the times it was at Nagarjunasagar Srisailam Tiger Reserve (NSTR).

A team, comprising ornithologist K. Karthik Sai, wildlife photographer Gopi Lakkala and Bhakarapeta Forest Range Officer Dattatreya, spotted the bird on January 7 when it ventured into the Talakona forest area. The bold predatory bird, measuring 20-25 inches in length and weighing between 1.5 kg and 2 kg, feeds on small rodents and lizards.



The Mottled wood owl, and, right, the spot-bellied eagle owl sighted in Chamala forest and Seshachalam forest, respectively.

"The bird makes a strange scream similar to humans and it is hence called the 'ghost of the forest' in India and 'devil bird' in Sri Lanka," Mr. Karthik Sai told *The Hindu*.

The team also spotted a 'Mottled wood owl' (*Strix Ocellata*) last weekend in the fields abutting Chamala forest on the Tirupati-Annamayya inter-district border. Though both are labelled as 'least concern' in terms of population stability, the development assumes significance in view of their maiden sighting in the verdant Seshachalam ranges.

Context: A wildlife team recently stumbled upon a **'Spot Bellied Eagle Owl' (Bubo Nipalensis)** for the first time in Seshachalam forest, and for the third time in Andhra Pradesh.

Key Points

- It was sighted only twice in the State earlier, and both the times it was at **Nagarjunasagar Srisailam Tiger Reserve(NSTR)** which spreads over five districts, Kurnool District, Prakasam District, Guntur District, Nalgonda District and Mahabub Nagar district of Andhra Pradesh
- The team also spotted a **'Mottled Wood Owl' (Strix Ocellata)** last weekend in the fields abutting Chamala forest on the Tirupati-Annamayya inter-district border.
- Though both are labelled as **'least concern' in terms of population stability,** the development assumes significance in view of their maiden sighting in the verdant Seshachalam ranges.

Mottled wood owl

- **About**: The mottled wood owl (Strix ocellata) is a **species of large owl found in India.**
- **Habitat**: They are **found in gardens and thin deciduous forests** adjacent to dry thorn forests or farmland.
- **Key Features**: They are easily detected by their distinctive **tremulous eerie calls** at dawn and dusk.
    - The characteristic call is a **duet of the male and female** while other notes include a low hoot and a screech.
    - Their large size, **lack of "ear" tufts** and the concentric barring on the face make them easy to identify.
- **Protection Status:**
    - **IUCN**: Least Concern.
    - **CITES**: Appendix II.

Spot-bellied eagle-owl

- **About**: The spot-bellied eagle-owl (Bubo nipalensis), also known as the **forest eagle-owl** is a large bird of prey with a formidable appearance.
    - This species is considered **part of a superspecies with the barred eagle-owl (Bubo sumatranus),** which looks quite similar but is allopatric in distribution.
- **Habitat**: It is a **forest-inhabiting species** found in the Indian Subcontinent and Southeast Asia.
- **Protection Status:**
    - **IUCN**: Least Concern.
    - **CITES**: Appendix II.

DTE JAN 19

YANGTZE FINLESS PORPOISE

(Syllabus: GS Paper 3 - Env & Eco)



Critically endangered Yangtze finless porpoise return to lost lake stretches after sand mining ban: Report

Sand mining led to loss of habitat & range of the porpoise species but there is hope

NEXT NEWS >

By Preetha Banerjee
Published: Wednesday 18 January 2023

Yangtze finless porpoise (Neophocaena asiaeorientalis)

- **About**: It is a species of **toothed whale** in the family Phocoenidae.
  - It is estimated that **only about 1,000 remain.**
- **Habitat**: It is **endemic to the Yangtze River** in China, making it the country's only known freshwater cetacean following the possible extinction of the baiji (Lipotes vexillifer).
- **Protection Status:**
  - **IUCN**: Critically Endangered.
  - **CITES**: Appendix I.

Context: Checking sand mining can help the population of the **critically endangered Yangtze finless porpoise** to rebound, scientists found.

- Previous reports had shown the cetaceans were pushed out of certain **stretches of their habitat due to sand mining.**
- This divides up the population and increases stress among the individuals, especially during pregnancy, the new research done in the **Dongting lake in China** that joins the Yangtze river found.

Key Points

- The **Yangtze finless porpoise** belongs to the group of animals which also includes **dolphins and whales.**
- It is the **only freshwater porpoise** in the world and **breeds just once in 18 months.**
- **Overfishing**, increased shipping traffic and noise pollution have all been linked with the decline of the porpoise.
- It is the **most critically endangered of its taxonomic group** and the species has an 86 percent chance of becoming extinct in the next century.
- The lake is connected to the main body of the **Yangtze river** by a channel that runs under the **Dongting Lake Bridge.**
- The porpoise population would **swim to and from the river through this channel** but because of sand mining, they were not seen in this channel any longer.

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TITANOSAURS

(Syllabus: GS Paper 3 - Env & Eco)

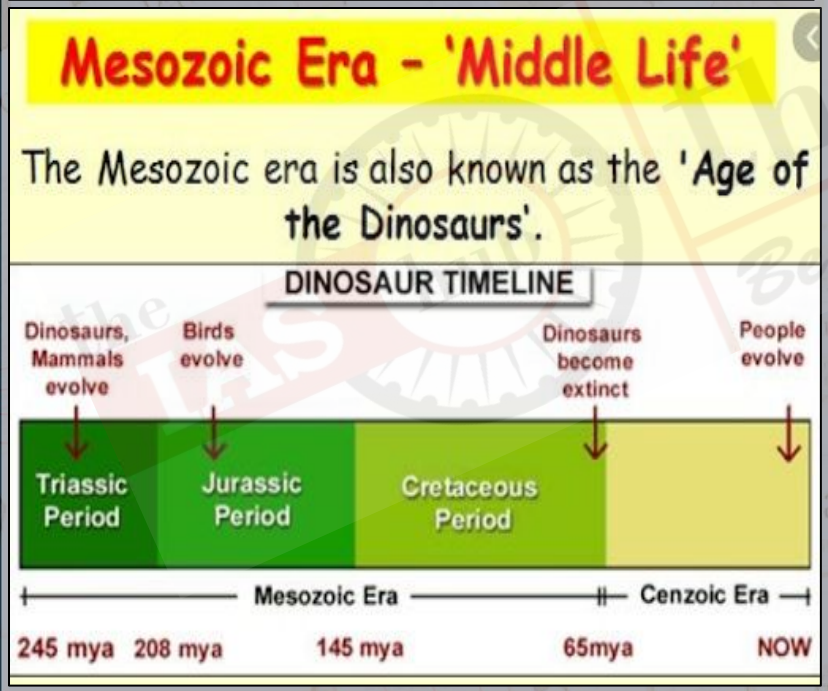


Rare dinosaur eggs found in Narmada Valley show how ancient reptiles shared traits with today's birds: Study

Eggs belong to 6 species, suggesting a higher diversity of these extinct giants in India

NEXT NEWS >

By Rohini Krishnamurthy
Published: Thursday 19 January 2023



Context: A group of Indian researchers found rare cases of **fossilised dinosaur eggs - an egg within an egg** - among 256 newly discovered eggs from the Narmada Valley.

Key Points

- The discovery suggests that **Titanosaurs** displayed a notable reproductive trait unique to modern-day birds.
- Fossilised eggs provide clues on **reproductive biology, nesting behaviour and parental care.**
- This region falls between the **easternmost Lameta exposures at Jabalpur in the upper Narmada Valley (central India)** and Balasinor in the west in the lower Narmada Valley (western central India), according to the document.
- Lameta exposure is a **sedimentary rock formation** known for its dinosaur fossils. These sedimentary rocks are mostly exposed along the Narmada Valley.
- The fossil records here are largely concealed by **Deccan volcanic flows**, which prevents their removal by erosion.

Titanosaur

- Titanosaur belongs to the **sauropod group.**
- It is a humongous **plant-eating lizard** with long neck and tail.
- These animals are said to be the **largest to walk on Earth.**
- A recently discovered 20-meter **Ninjatitan zapatai** may be the oldest titanosaur to be ever discovered.
- It was found in the Neuquen province of southwest **Argentina** in 2014.
- It may have lived approximately 140 million years ago at the initial stages of **Cretaceous period.**

TIMES OF INDIA

Page 14

COLD WAVE

(Syllabus: GS Paper 1 - Geography)

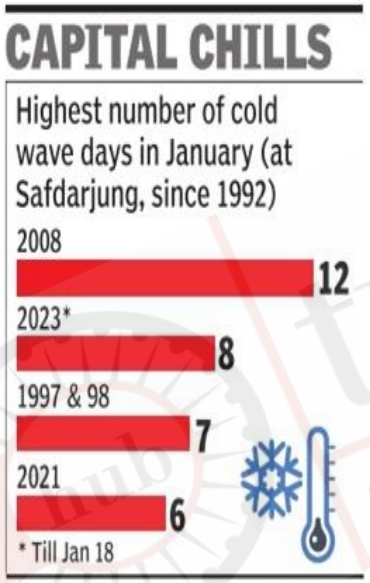
8 cold wave days this Jan, highest in 15 yrs

New Delhi: The city recorded its third consecutive cold wave day on Wednesday and the eighth so far this month, which is the highest during January in 15 years and the second highest in records going back 31 years, according to IMD data, **reports Priyangi Agarwal**. These include two severe cold days this month.

However, the cold wave is likely to abate from Thursday, and the met department has predicted light rain or drizzle.

On Wednesday, the minimum temperature at Delhi's base station Safdarjung was 2.6 degrees Celsius, five notches below normal and 0.2 degrees higher than Tuesday's minimum. The minimum settled at 2.2 degrees Celsius at Lodhi Road, 2.3 degrees Celsius at Ridge and 3.2 degrees Celsius at Aya Nagar — all recording cold wave conditions.

▶Rise in min temp, P 2



Context: Delhi recorded its third consecutive cold wave day and the eighth so far this month, which is the highest during January in 15 years and the second highest in records going back 31 years, according to IMD data.

Cold Wave

- **About**: A Cold Wave is defined as **a sudden fall in temperature** in the same region and date as compared to its normal temperatures for previous years.
  - **"Core Cold Wave Zone"** is a zone which frequently witnesses cold waves from time to time.
- **Indian Meteorological Department (IMD) Criteria:** A cold wave in the plains occurs when the temperature drops **below 10 degrees Celsius and the minimum temperature falls below 4.5 degrees Celsius.**
  - The criterion for hills is that they must be **0 degrees Celsius.**
  - In the plains, a severe cold wave occurs when the temperature falls below **6.4 degrees Celsius or falls below 2 degrees Celsius.**
  - It's "a state of air temperature that becomes lethal to the human body when exposed," according to the IMD.
  - Every five days, the 'normal' temperature is computed by computing the mean temperature for all these days over the previous 30 years.
- **Causes of Cold Waves**
  - **Clouds Absence:** Some of the outbound **infrared radiation is trapped by clouds**, which then radiates it downwards, heating up the ground.
    - In the absence of a thick cloud cover, the radiation escapes the atmosphere thereby reducing the surface temperature of the earth in that region.
  - **Himalayan Snowfall:** Snowfall in the Himalayas' upper reaches brings chilly winds to the region.
  - **Subsidence**: The flow of cold or dry air near the surface is known as subsidence.
  - **La Nina**: Ongoing weake**r La Nina phenomenon** in the Pacific Ocean.
    - La Nina is characterised by unusually cool ocean surface temperatures along the equatorial Pacific Ocean, which is considered to favour cold waves.
    - The intensity of cold circumstances increases during La Nina years.
    - The frequency of chilly waves increases, as does the region affected.
  - **Western Disturbance**: It is an **extra-tropical storm** that originates in the Mediterranean area and provides sudden winter rainfall to India's northern states.
    - These are non-monsoonal in character and westerlies are responsible for their flow to India.
    - The western disturbance usually leads to a sharp fall in temperature due to flowing wind as well as rainfall.

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