

WHAT ARE SECONDARY POLLUTANTS?



- Secondary pollutants are pollutants which form in the atmosphere.
- These pollutants are **not emitted directly from a source** (like vehicles or power plants).
 - Pollutants that are **emitted** into the environment **from a source** are called **primary pollutants**.
- **Secondary pollutants** form as a **result of the pollutants emitted from these sources reacting with molecules in the atmosphere to form a new pollutant**.
- **Examples** of secondary pollutants are **ozone and secondary organic aerosol (haze)**.
- Secondary pollutants are **harder to control** because they have **different ways of synthesizing**, and the formation is not well understood.
- They form naturally in the environment and cause **problems like photochemical smog**.
 - The phenomenon of photochemical smog is a result of the **interactions of primary pollutants with other molecules** in the air, **such as molecular oxygen, water, and hydrocarbons**.
 - These **combine to form yellow clouds** that are harmful to humans.

Understanding Secondary PM_{2.5} Pollution in India

- Particulate matter smaller than 2.5 microns (PM_{2.5}) is **one of the most hazardous components of air pollution**, responsible for serious respiratory and cardiovascular diseases.
- Traditionally, primary pollutants such as soot and dust from burning fossil fuels have been considered the chief contributors to PM_{2.5} levels.
- However, new research highlights the rising significance of secondary pollutants, especially ammonium sulphate, as key components of India's air pollution challenge.

Key Findings of the CREA Study

- According to a study by the **Centre for Research on Energy and Clean Air (CREA)**, secondary pollutants, especially ammonium sulphate, constitute up to 34% of India's PM_{2.5} mass.
- **Coal Plants as a Major Source:**
 - Over 60% of India's sulphur dioxide (SO₂) emissions, the precursor to ammonium sulphate, are linked to coal-fired thermal power plants. These facilities become the primary driver of secondary PM_{2.5} formation.
- **Higher Concentration near Coal Plants:**
 - Within 10 km of coal power plants, ammonium sulphate concentrations were 2.5 times higher (15 µg/m³) compared to areas beyond that range (6 µg/m³).
 - Near these plants, it accounts for 36% of PM_{2.5} pollution, whereas even distant areas reported a significant 23% contribution.

Strategies for Mitigation

To address the growing burden of secondary pollutants, a multipronged strategy is required.

- **Strict Implementation of Emission Norms:**
 - Enforcement of FGD installation in coal power plants must be non-negotiable. Regulatory rollback would be counterproductive to public health goals.
- **Agricultural and Industrial Reforms:**
 - Efficient fertiliser management can reduce ammonia emissions, which are a key reactant in forming secondary particles.
- **Source-Specific Action:**
 - Pollution mitigation efforts must target both direct emission sources and precursor gases like SO₂ and NH₃.
- **Real-Time Monitoring and Research:**
 - Investments in air quality monitoring infrastructure and continuous data-driven research are needed to identify evolving patterns in pollution dynamics.

SPREE SCHEME



• The Scheme to Promote Registration of Employers/Employees (SPREE) was originally introduced in 2016.

- **Objective:** The objective of **expanding ESI coverage** across the country.
- The scheme successfully facilitated the registration of over 88,000 employers and 1.02 crore employees.
- The renewed SPREE will be open from **1st July to 31st December 2025**, offering a **one-time opportunity for unregistered employers** and left-out workers—including contractual and temporary staff—to enroll under the ESI Act.
- Under the scheme, employers registering **during this period will be treated as covered from the date of registration** or as declared by them, while newly registered employees will be covered from their respective dates of registration.
- By focusing on voluntary compliance rather than penalization, the scheme will seek to ease the litigation burden, encourage formal registration, and foster improved engagement and goodwill among stakeholders.

JOSTLING FOR PRIMACY: INDIA'S CHINA CHALLENGE IN THE INDIAN OCEAN

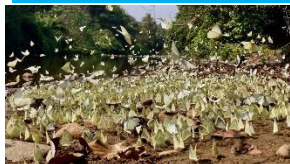
- Since the early 2000s, the **Indian Ocean's significance has resurged**, becoming a **critical zone in global security and economic dynamics**.
- **Rise of Regional Economies and Trade Networks**
 - The emergence of new economies, especially India and China, has increased the Indian Ocean's role in global trade and connectivity, turning it into a central hub of commerce.
- **Maritime Security and Piracy Threats**

- The rise of piracy off the Somali coast highlighted vulnerabilities in Sea Lines of Communication (SLOCs), prompting enhanced maritime security efforts across the region.
- **Indo-Pacific as the New Geostrategic Construct**
 - The Indo-Pacific framework, which links the Indian and Pacific Oceans, has elevated the Indian Ocean's strategic value, positioning it as a central axis in the evolving global order.

Chinese Advances in the Indian Ocean

- Unlike its overt assertiveness in the South China Sea, China has adopted a long-term, calculated approach in the Indian Ocean, gradually enhancing its footprint through economic, political, and maritime initiatives.
- **Strategic Port Infrastructure and Political Engagement**
 - China is expanding its influence in the IOR by:
 - Strengthening political and economic ties with littoral states like Sri Lanka, Maldives, and Bangladesh.
 - Investing in dual-use port infrastructure across the region.
- **Surveillance via Research Vessels**
 - China has been deploying research and survey vessels in the Indian Ocean, docking them in countries like Sri Lanka and Maldives.
 - These vessels are believed to support underwater surveillance and data gathering, posing a potential security threat to India's maritime interests.
- **Launch of the China-Indian Ocean Forum**
 - In 2022, China initiated the China-Indian Ocean Forum, aiming to take the lead in regional governance and multilateral cooperation.
 - India's notable absence from the forum highlights a growing geopolitical divergence in the region.

ARALAM BUTTERFLY SANCTUARY



The Kerala State Wildlife Board recently renamed the Aralam Wildlife Sanctuary in Kannur as the Aralam Butterfly Sanctuary, thereby becoming India's first protected forest dedicated entirely to butterflies.

- It is located in the Kannur District of **Kerala**.
- It is spread over 55 sq. km. area of forests on the **Western Ghats**.
- The **Cheenkannipuzha River** forms the main drainage system of Aralam.
- **Vegetation:** Tropical and semi-evergreen forests.
- It is home to over 266 species of butterflies, accounting for more than 80 percent of all butterflies in Kerala. Some of these are unique to this region, while others are endangered.
- Between October and February, the sanctuary transforms into a living rainbow when butterflies migrate here from the lower slopes of the Western Ghats.
- An amazing scene is created during this season, also known as the time for the Common albatross butterfly, when hundreds of butterflies fill the air and fly amid tall trees, orchids, and wildflowers.
- Every January or February, the sanctuary holds a **Butterfly Migration Study**, which celebrates this seasonal movement and deepens our understanding of these pollinators.
- In addition to butterflies, Aralam is home to several animals, including elephants, giant squirrels, leopards, and a variety of birds.

WHAT IS THAAD MISSILE SYSTEM?

The United States used up a total of 15 to 20 percent of the country's THAAD missile system to bolster the defence against Iran's aerial strikes during the 12-day conflict in which Israel and the US struck nuclear facilities.

- The THAAD (Terminal High Altitude Area Defense) is an advanced missile defence system developed by the United States to intercept and destroy short-, medium-, and intermediate-range ballistic missiles during their terminal phase (the last phase of their flight).



- It was developed by the U.S. after their experience of Iraq's Scud missile attacks during the Persian Gulf War in 1991.
- It is a key element of U.S. ballistic missile defense (BMD).
- It is the only US system capable of intercepting targets within (endoatmospheric) and outside (exoatmospheric) the atmosphere.
- Features:
 - Each THAAD battery is made up of five parts: 48 interceptor missiles, six truck-mounted launchers, a radar, a command-and-control platform, and 95 soldiers.
 - The THAAD missile is 6.17 m in length and is equipped with a single-stage solid-fuel rocket motor with thrust vectoring.
 - There is no warhead on the missile, which destroys its targets by the force of its impact.
 - The launch weight is 900 kg.
 - The THAAD Radar is an X-band radar, the world's largest ground/air-transportable X-band radar. The radar has the capability to acquire missile threats at ranges up to 1,000 km.
 - The target object data and the predicted intercept point are downloaded to the missile prior to launch. The updated target and intercept data are also transmitted to the missile in flight.
 - The THAAD missile can destroy aerial targets at ranges from 150 to 200 km and can reach a maximum altitude of 150 km.
 - It is interoperable with other Ballistic Missile Defense (BMD) systems.

KOLHAPURI CHAPPALS



Italian luxury fashion brand Prada recently acknowledged being inspired by ‘traditional Indian handcrafted footwear, with a centuries-old heritage’, for its sandals featured in the recent Men’s Spring/Summer 2026 collection, after being slammed for failing to acknowledge the resemblance to India’s GI-tagged Kolhapuri chappals

- Kolhapuri Chappals are named after the city of **Kolhapur in Maharashtra**, where they originated.
- They are **handmade leather sandals** with a **Geographical Indication (GI)** tag.
- They are renowned for their **intricate, handcrafted designs**.
- They have been **produced** in the Kolhapur region of India **since the 13th century**.
- Handcrafted with leather, Kolhapuri usually have **open-toed, T-strap designs**.
- The **original Kolhapuri** is **made from 100% leather**. This leather can be **from cow, buffalo, or even goat**.
- These handmade leather footwear are then **tanned using vegetable dyes**, giving them a **soft feel free of any allergens**.
- The traditional Kolhapuris **do not have many different color options** and can be seen only in **shades of tan and deep brown**. Similarly, they had **three finishes: oil, natural, or polish**.
- Traditional artisans can take up to **six weeks to make a pair** of chappals.
- Their robust construction makes them **suitable for various terrains and weather conditions**.
- The **leather** used in Kolhapuri chappals **molds to the shape of your feet over time, providing a custom fit** that enhances comfort.
- With proper care, they can **serve you for many years**, making them a sustainable and cost-effective choice in the long run.

KEY FACTS ABOUT LITCHI



- It is a **delicious juicy fruit** of excellent quality. Botanically it belongs to the Sapindaceae
- The translucent, flavoured aril or edible flesh of the litchi is popular as a table fruit in India.
- Litchis are believed to have arrived in India from China over 300 years ago.
- **Required climatic condition**
 - Litchi is a **sub-tropical fruit** and thrives best under **moist sub-tropical climate**.
 - It usually prefers low elevation and can be **grown up to an altitude of 800 m**.
 - **Soil:** Deep, well drained loamy soil, rich in organic matter and having pH in the range of 5.0 to 7.0 is ideal for the crop.
 - **Temperature:** The temperature should not go beyond 40.5 °C in summer and below freezing **point in winter**.
 - **Rain:** Prolonged rain may be harmful especially at the time of flowering, when it interferes with pollination.
 - The young trees **require protection against frost and hot winds** for several years till they are firmly established, even though some variation in temperature is necessary for proper fruiting of trees.
 - Frost during winter and dry heat in summer are limiting factors for its successful cultivation.
- **Distribution:** In India, commercial cultivation was traditionally restricted to the north in the **foothills of Himalayas from Tripura to Jammu & Kashmir** and plains of Uttar Pradesh and **Madhya Pradesh**.
- India is the second largest producer of litchi in the World after China. Other major producing countries are **Thailand, Australia, South Africa, Madagascar** and Florida in the US.

ASIATIC WILD DOG



According to a new study by scientists from the Wildlife Institute of India (WII), the Dhole, or Asiatic wild dog (*Cuon alpinus*), believed to have been locally exterminated, has made a confirmed return to Assam's Kaziranga-Karbi Anglong Landscape (KKAL).

It is a **wild canid carnivorous species**.

- **Other Names:** Indian wild dog, whistling dog, red wolf, red dog and mountain wolf.
- **Habitat:** Dholes are animals that inhabit **dense jungles, steppes, mountains, scrub forests**, and pine forests.
- **Distribution:**

They are found throughout **Central, Eastern Asia and Southeastern Asia**.

In India, they are found in three clusters across India, namely the **Western and Eastern Ghats**, the central Indian landscape and **North East India**. The Western and Eastern Ghats is a stronghold region for dholes.

- **Conservation status:**
- **IUCN Red List:** Endangered
- **CITES:** Appendix II
- **Wildlife Protection Act 1972:** Schedule II
- **Threats:** Habitat degradation, prey depletion, and retaliatory killings.

Key facts about Kaziranga-Karbi Anglong Landscape

It is a critical part of the **Indo-Burma Biodiversity Hotspot**.

This area has been known as the North Bank Landscape which covers the south of the **Brahmaputra river in Assam**.

It is home to about half of Assam's elephant population, more than 70 per cent of Assam's tigers and close to 90 per cent of the rhino population of India.