

SUPREME COURT ON ROAD SAFETY - ARTICLE 142 AND HIGHWAY REGULATION

- **Background of the Case**
 - The case originated from two major accidents in November 2025.
 - One incident involved a bus hitting a stationary trailer on the Bharatmala Expressway in Rajasthan, killing 15 people. Another accident in Telangana resulted in 19 deaths when a lorry collided with a bus while avoiding a pothole.
 - These incidents prompted the Supreme Court to take **suo motu cognisance** of road safety issues.
- **Key Directions Issued by the Court**
 - Parking of heavy and commercial vehicles on highways has been prohibited except in designated areas such as lay-bys and wayside amenities.
 - The Court directed the use of **Advanced Traffic Management Systems (ATMS)** to monitor highways and detect violations through GPS-enabled systems.
 - It mandated the deployment of ambulances and recovery vehicles at intervals of 75 km to ensure quick response in emergencies.
 - Authorities have been instructed to identify accident-prone black spots within 45 days and install safety measures such as lighting, cameras, and warning signs.
- **Regulation of Roadside Activities**
 - The Court has prohibited the construction of new dhabas and commercial establishments within the Right of Way (ROW) of highways.
 - It also directed the demolition of unauthorised structures and imposed restrictions on land use within a specified distance from highways.
 - These measures aim to reduce roadside congestion and unsafe practices.
- **Strengthening Enforcement Mechanisms**
 - The Court called for the creation of dedicated highway surveillance teams involving police and transport departments for round-the-clock monitoring.

- Integration of surveillance systems with e-challan mechanisms has been emphasised to ensure effective enforcement.

Road Safety in India: Structural Concerns

- India records a high number of road accidents annually.
- National Highways constitute only about **2% of total road length but account for nearly 30% of road fatalities**, indicating severe safety gaps.
- Key issues include:
 - Poor enforcement,
 - Unsafe parking practices,
 - Lack of surveillance and
 - Inadequate infrastructure, such as lighting and emergency services.

WHEAT CROP



- Wheat is the **second most important staple food crop** in India after rice.
- It is a **temperate crop** that thrives in cool and dry climates.
- It is **primarily grown as a Rabi crop**, meaning it is sown in the winter season and harvested in spring.
- **Required climatic conditions for wheat cultivation**
 - **Temperature:** A cool temperature (10°C to 15°C) during sowing and 21°C to 26°C during ripening ensures optimum growth and grain quality.
 - **Rainfall:** Wheat requires **50-75 cm** of well-distributed rainfall.
 - Excessive rain or humidity during the ripening period can harm the crop, while drizzles brought by Western Disturbances in northwestern India during winter significantly improve yields.

- **Sunlight:** Bright sunshine during ripening improves grain formation and quality.
- **Frost:** Frost or hailstorms during the flowering stage can damage the crop severely.
- **Soil:** It grows well in a clay loam or loam texture soil.
- **Major Wheat Producing Countries:** China, India, Russia and the United States.
- **Major Wheat Producing States:** Uttar Pradesh, Madhya Pradesh, Punjab, and Haryana

INTERNATIONAL WATERS GOVERNANCE: RULES OF THE HIGH SEAS

- At the onset of the conflict on February 28, vessel movement through the Strait of Hormuz **dropped** sharply from around 100 ships daily to only a few.
- Iran introduced a system regulating passage based on geopolitical considerations, reportedly **charging high tolls**, though India maintained it did not pay any fee and exercised its right to free navigation under international law.
- Despite restrictions, several Indian-linked and Iranian vessels were allowed transit, reflecting a selective and strategic control of this critical maritime route.

U.S. Actions in the Strait of Hormuz Conflict: Escalation and Maritime Control

- **Breakdown of Negotiations with Iran** - During talks, Iran sought the right to regulate ship movement and impose tolls in the Strait of Hormuz. After negotiations collapsed on April 12, tensions escalated sharply.
- **Declaration of a Strategic Blockade** - Donald Trump announced a blockade of Iranian ships, not through physical naval barriers but via control measures like radio warnings, aiming to restrict Iran's influence over maritime traffic.
 - These measures are part of a broader U.S. strategy to **disrupt Iran's oil exports and revenue streams**, weaken its control over the strait, and deter its maritime activities.

Legal Framework for Interceptions at Sea: UNCLOS and Key Principles

- Strategic straits have historically been flashpoints in conflicts, leading to treaties governing navigation in regions like Turkey and Egypt.
- These agreements laid the groundwork for a broader global legal framework.
- The **United Nations Convention on the Law of the Sea** established that the oceans are a **shared global commons**.
- Its core principle is the freedom of navigation, especially for merchant ships, with minimal restrictions.
- **High Seas: Freedom with Limited Exceptions**
 - On the high seas, which lie beyond national jurisdiction, ships enjoy unrestricted navigation rights. Interception is allowed only under specific conditions:
 - Hot pursuit of vessels involved in crimes
 - Authorisation by the United Nations Security Council
 - Ships without nationality
 - Consent from the ship's flag state
 - Within a **country's territorial waters**, ships retain the right of "**innocent passage**", meaning transit is allowed as long as it **does not threaten the coastal state's security**.

What Lies Ahead: IMO's Role and Possible Resolution

- The International Maritime Organization is expected to play a key role in de-escalating tensions in the Strait of Hormuz.
- It is working with Iran to facilitate safe passage and evacuation of ships while upholding freedom of navigation.
- The IMO has opposed tolls and permit-based restrictions, and has formally condemned Iran's actions against commercial vessels, though it has not similarly criticised U.S. measures.
- Overall, diplomatic engagement through the IMO may shape the next phase of resolution.

INDIA'S PATH TO 100% ETHANOL BLENDING: CHALLENGES AND PROSPECTS

- 100% blending refers to the use of pure ethanol (**E100**) as fuel.
- Unlike petrol, ethanol has lower energy density, meaning it delivers 45–55% less energy per litre, which can affect vehicle performance and fuel efficiency.
- Most conventional petrol vehicles in India are designed for **E20** (20% ethanol blending) or lower. Higher blends like E85 or E100 require flex-fuel engines, which can operate on varying ethanol-petrol mixtures.
- **Need for Flex-Fuel Vehicles**
 - To support high ethanol blends, vehicles must be specially designed with:
 - Corrosion-resistant fuel systems
 - Advanced sensors and engine control units
 - Optimised tuning for ethanol combustion
 - While countries like Brazil have widely adopted such vehicles, India currently has limited availability, with models from companies like Toyota and prototypes from Maruti Suzuki and Hyundai expected in the coming years.
- **Infrastructure and Supply Chain Requirements**
 - Achieving 100% ethanol blending would require not just new vehicles, but also significant changes in fuel supply chains, storage, and distribution systems, aligned with initiatives like domestic manufacturing.

Ethanol Production in India: Sources, Challenges, and Implications

- India largely produces ethanol from sugarcane, making it the dominant feedstock for blending. However, sugarcane is water-intensive and often grown in water-stressed regions, raising concerns about sustainability and its impact on food supply and prices.
- **Shift to Second-Generation Ethanol**
 - To address these concerns, the government is promoting second-generation (2G) ethanol made from crop residues like rice straw, with support from entities such as Indian Oil Corporation.

- This approach also aims to reduce stubble burning, a major source of air pollution in North India.
- **Cost and Policy Support**
 - Ethanol production remains costlier or comparable to petrol, necessitating government support and administered pricing to ensure viability and encourage adoption.
- **Environmental Trade-offs**
 - While ethanol combustion leads to lower emissions of carbon monoxide and particulate matter, its overall environmental impact depends on:
 - Land use changes
 - Use of fertilisers and pesticides
 - High water consumption, especially for sugarcane

India's Path to Energy Security: Strategies and Challenges

- **Diversifying Energy Sources**
 - India has been working to reduce dependence on imported fossil fuels by exploring alternative oil sources, securing uranium for nuclear energy, and expanding renewable energy deployment.
 - However, efforts are often constrained by geopolitical factors like sanctions.
- **Limits of Domestic Production**
 - Initiatives to boost indigenous oil and gas output under the Hydrocarbon Exploration and Licensing Policy (HELP) have delivered limited results, while domestic manufacturing in key energy technologies remains underdeveloped.
- **Transition to a Hydrogen Economy**
 - India is increasingly focusing on green hydrogen as a long-term solution. Under the National Green Hydrogen Mission, the aim is to:
 - Produce hydrogen at \$1 per kg (globally \$3–6/kg)
 - Compete with conventional fuels like diesel
 - Potentially become an energy exporter

OLIVE RIDLEY TURTLE



- It is one of the smallest and the most abundant of all sea turtles found in the world.
- It gets its name from the olive green colouration of its carapace (shell).
- It is best known for its **unique mass nesting, called Arribada**, where thousands of females come together on the same beach to lay eggs.
- **Distribution:**
 - They are mainly found in the warm waters of the Pacific, Atlantic, and Indian oceans.
 - **Odisha's Gahirmatha Marine Sanctuary** is known as the world's largest rookery (a colony of breeding animals) of sea turtles.
- **Features:**
 - They are **omnivorous**, meaning they feed on both **plants and animals**.
 - They are solitary, preferring the open ocean.
 - These turtles spend **their entire lives in the ocean**, and migrate thousands of kilometers between feeding and mating grounds in the course of a year.
- **Conservation Status:**
 - **IUCN Red List:** Vulnerable
 - **CITES:** Appendix I
 - **Wildlife Protection Act, 1972:** Schedule 1

What is the Sri Lanka Dome?

- It is considered one of the **most productive regions in the Indian Ocean**.
- **Formation:** It is formed by **seasonal upwelling** that brings cool, nutrient-rich waters to the surface, triggering plankton blooms that attract turtles, fish, whales, and seabirds.
- This phenomenon **typically begins in May, peaks in July**, and declines by September, after which the turtles disperse and begin their return migration.

GOND TRIBE



- The Gond or Gondi (Gōndi) or Koitur are a **Dravidian ethnolinguistic group**. The states of **Madhya Pradesh, Chhattisgarh, Maharashtra**, and Odisha are home to the largest Gond populations.
 - Gond tribes also live in the states of Uttar Pradesh, Telangana, Andhra Pradesh, Bihar, Karnataka, Jharkhand, West Bengal, and Gujarat.
- Gonds are **mainly divided into four tribes**, namely Raj Gonds, Madia Gonds, Dhurve Gonds, and Khatulwar Gonds.
- **Language:**
 - The majority of Gond **people speak dialects of Gondi**, an unwritten language of the Dravidian language family. Some Gond have lost their own language and speak Hindi, Marathi, or Telugu, depending on which is dominant in their area.
- **Economy:** The basis of the Gond economy is agriculture, but they also practice animal husbandry. Some Gond also gather wild plants to eat.
- **Belief and Traditions**
 - **Religion:** The religion of the Gond tribes centers on clan and village gods, together with ancestor worship.
 - **Customs and Festivals:** **Keslapur Jathra and Madai** are important festivals of the Gonds.



MALARIA

- Malaria is a life-threatening febrile illness **caused by Plasmodium parasites**.
- **Transmission:** It is transmitted through the **bites of infected female Anopheles mosquitoes**.
- It is **not contagious**, but can be spread through **infected blood or contaminated needles**.

- **Symptoms**
 - Symptoms appear 10–15 days after infection and include fever, chills, and headache. Severe symptoms can include **seizures, difficulty breathing, jaundice, dark urine, and death** if untreated.
- **Prevention and Treatment**
 - Prevention includes vector control, use of mosquito nets, repellents (DEET, IR3535, Icaridin), long-sleeved clothing, and chemoprophylaxis for travellers.
 - **Treatments include:**
 - ACTs (Artemisinin-based Combination Therapies) for *P. falciparum*.
 - **Chloroquine** for *P. vivax*
 - Primaquine to prevent relapses in *P. vivax* and *P. ovale* infections.

KANHA TIGER RESERVE



- **Location:** It is located in the “Maikal” ranges of the Satpuras in the state of **Madhya Pradesh**.
- **Corridor:** It has an active corridor between **Kanha and Pench Tiger Reserves**. Kanha is also connected with the Achanakmar Tiger Reserve of Chhattisgarh State.
- **Terrain:** It is characterized mainly by forested shallow undulations, hills with varying degrees of slopes, plateaus, and valleys.
- **Tribal Communities:** The region is known for some of the ancient tribal communities, like the Gond and Baiga still inhabit the region.
- It is also the first tiger reserve in India to officially introduce a mascot, “Bhoorsingh the Barasingha”.
- **Vegetation:** It primarily consists of a **moist Sal and moist mixed deciduous forest**.
- **Flora:** Bamboo, Tendu, Sal, Jamun, Arjun, and Lendia flourish.
- **Fauna:** The Park has a significant population of Royal Bengal Tigers, leopards, sloth bears, and Indian wild dogs.