



Black Carbon Emissions and PMUY

For Prelims: [Black Carbon](#), [Carbon Neutrality](#), [Renewable Energy](#), [Biomass](#), [Climate Change](#), [Air Pollution](#), [Global Warming](#), [Fossil Fuel](#), [Air Pollutant](#), [Pradhan Mantri Ujjwala Yojana \(PMUY\)](#), [Liquefied Petroleum Gas \(LPG\)](#), [Ujjwala 2.0](#), [BS-VI norms](#), [Ethanol Blending](#), [Sustainable Alternative Towards Affordable Transportation \(SATAT\)](#), [Compressed Bio-Gas \(CBG\)](#), [National Clean Air Programme](#), [FAME Scheme](#).

For Mains: Contribution of Pradhan Mantri Ujjwala Yojana (PMUY) in India's effort to achieve net zero emission.

Source: [TH](#)

Why in News?

During the **UNFCCC COP26 climate talks** in **Glasgow** in **November 2021**, India committed to attaining **net-zero emissions by 2070**, positioning itself as a leading contender in the pursuit of **carbon neutrality**.

- As per the **Ministry of New and Renewable Energy**, India has established a renewable energy capacity surpassing **180 GW by 2023** and is on track to achieve its goal of reaching **500 GW by 2030**.
- **Pradhan Mantri Ujjwala Yojana (PMUY)**, a scheme of the government of India can contribute to **net zero emission** significantly by mitigating the black carbon emission.

What is Black Carbon (BC)?

- **About:**
 - **Black carbon (BC)** is the **dark, sooty material** emitted alongside other pollutants when **biomass** and **fossil fuels** are not fully combusted.
 - BC is a short-lived pollutant that is the second-largest contributor to warming the planet behind **carbon dioxide (CO₂)**.
 - Unlike other **greenhouse gas emissions**, BC is quickly washed out and can be eliminated from the atmosphere if emissions stop.
 - Unlike historical carbon emissions it is also a localised source with greater local impact.
 - Black carbon is a kind of an aerosol.
- **Impacts:**
 - Among aerosols (such as brown carbon, sulphates), Black Carbon has been recognized as the second most important anthropogenic agent for **climate change** and the primary marker to understand the adverse effects caused by **air pollution**.
 - Black carbon absorbs solar energy, it warms the atmosphere. When it falls to earth with precipitation, it darkens the surface of snow and ice, reducing their albedo (the reflecting power of a surface), warming the snow, and hastening melting.
 - It contributes to **global warming** and poses severe risks. Studies have found a direct link between exposure to **black carbon** and a higher risk of **heart disease, birth complications, and premature death**.
- **Source:**

- Most **black carbon emissions** in India arise from **burning biomass**, such as **cow dung** or **straw**, in traditional **cookstoves**.
- It gets emitted from **gas** and **diesel engines**, **coal-fired power plants**, and other sources that burn **fossil fuel**. It comprises a significant portion of **particulate matter (PM)**.
- According to a 2016 study, the **residential sector** contributes **47%** of India's total black carbon emissions.
- Industries contribute a further **22%**, **diesel vehicles 17%**, **open burning 12%**, and other sources **2%**.

What is Pradhan Mantri Ujjwala Yojana (PMUY)?

▪ About:

- The Ministry of Petroleum and Natural Gas (MoPNG), introduced the '**Pradhan Mantri Ujjwala Yojana**' (**PMUY**) in 2016 as a flagship scheme with the objective of making clean cooking fuel such as LPG available to the rural and deprived households which were otherwise using traditional cooking fuels such as firewood, coal, cow-dung cakes etc.
 - Usage of traditional cooking fuels had detrimental impacts on the health of rural women as well as on the environment due to huge emission of particulate matter and black carbon.

▪ Objectives:

- Reducing the number of deaths in India due to unclean cooking fuel which emits more black carbon.
- Preventing young children from a significant number of acute respiratory illnesses caused due to indoor air pollution by burning fossil fuel and black carbon emission.
- To make clean cooking fuel available to rural and poor households and reduce their dependence on traditional cooking fuels.
- To set up infrastructure to accompany LPG connections, which includes providing complimentary gas stoves, deposits for LPG cylinders, and establishing a distribution network.

▪ Features:

- The scheme provides a financial support of **Rs 1600 for each LPG connection** to the BPL households.
- Along with a deposit-free LPG connection, **Ujjwala 2.0** provides the first refill and a hotplate free of cost to the beneficiaries.

▪ Challenges of the Scheme in BC Emission Mitigation:

- **Energy Needs and Traditional Fuels:** Up to half of the energy needs of households benefiting from the PMUY are still met by traditional fuels, emitting high levels of black carbon.
 - In 2022-23, **25%** of all **PMUY beneficiaries** availed either **zero LPG refill** or only **one LPG refill**, according to **RTI data**, meaning they still relied entirely on **traditional biomass** for cooking which aggravates the emission of black carbon.
- **Impact on Health and Well-being:** A shortage of LPG and increased reliance on traditional fuels disproportionately affects women and children, leading to elevated indoor air pollution due to black carbon and other pollutants, health concerns, and premature deaths.
- **LPG Subsidy and Affordability:** In October 2023, the government increased the LPG subsidy to ₹300 from ₹200. However, despite this adjustment, the cost of a 14.2-kg LPG cylinder remains around ₹600, posing affordability challenges for many PMUY beneficiaries compared to free alternatives like cow dung and firewood.
 - Cow dung and firewood are more affordable to PMUY beneficiaries so its use is more prevalent, intensifying the problem of black carbon.
- **Last-Mile Connectivity Hindrance:** The lack of last-mile connectivity in the LPG distribution network poses a significant challenge to the success of PMUY in reducing the black carbon emission, especially impacting remote rural areas heavily reliant on biomass burning which is a significant source of black carbon.

Other Measures Taken to Mitigate Black Carbon Emission

- **Introducing Cleaner Fuels:** Introduction of cleaner / alternate fuels like gaseous fuel (CNG, LPG etc.), [ethanol blending](#).
- **SATAT Scheme:** A new initiative [Sustainable Alternative Towards Affordable Transportation \(SATAT\)](#), has been launched to set up 5000 [Compressed Bio-Gas \(CBG\)](#) production plants and make CBG available in the market for use.
- **Managing Crop Residue:** Agricultural machines and equipment for in-situ crop residue management in Punjab, Haryana, Uttar Pradesh and NCT of Delhi are promoted under the Central Sector Scheme on Promoting Agricultural Mechanization for in-situ Crop Residue Management with 50% subsidy to individual farmers and 80% subsidy to the establishment of Custom Hiring Centers.
- **National Clean Air Programme:** Under the [National Clean Air Programme](#), the government has set a new target: a **40%** reduction in particulate matter concentration in covered cities by **2026**, surpassing the previous goal of **20 to 30%** reduction by **2024**.
- **City specific Clean Air Action Plans:** The [CPCB](#) has identified 131 cities based on ambient air quality levels exceeding national ambient air quality standards, and cities with a million plus population.
 - These plans define time bound targets to control city specific air polluting sources (soil & road dust, vehicles, domestic fuel, municipal solid waste burning, construction material and industries, etc.).
- **FAME Scheme:** [Faster Adoption and Manufacturing of Electric Vehicles \(FAME\)](#) phase-2 scheme has been rolled out.

Way Forward

- **Coal-Bed Methane:** One potential solution to this issue is the local production of coal-bed methane (CBM) gas by composting biomass. CBM is a much cleaner fuel with lower black-carbon emissions and investment.
 - Panchayats can take the initiative to produce CBM gas locally at the village level, ensuring every rural household can access clean cooking fuel.
- **Promoting LPG Adoption:** Increase awareness campaigns to promote the benefits of LPG over traditional fuels, emphasising its positive impact on health and the environment.
- **Improving Supply Chain Efficiency:** Invest in infrastructure development to enhance **last-mile connectivity** in the **LPG distribution network**, ensuring reliable access to **clean cooking fuel**, particularly in **remote rural areas**.
- **Diversifying Clean Energy Sources:** Explore alternative clean energy sources such as biogas or solar energy for cooking purposes, particularly in areas where **LPG accessibility is limited**.
- **Community Engagement:** Engage local communities, especially women and youth, in decision-making processes related to clean energy adoption, ensuring their needs and preferences are adequately addressed.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Prelims

Q. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels? (2020)

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds
4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

- (a) 1, 2, 5 and 6 only
- (b) 1, 3, 4 and 6 only
- (c) 2, 3, 4 and 5 only
- (d) 1, 2, 3, 4, 5 and 6

Ans: (a)

Mains

Q. Access to affordable, reliable, sustainable and modern energy is the sine qua non to achieve Sustainable Development Goals (SDGs)." Comment on the progress made in India in this regard. **(2018)**

Environmental Protection Charge

Source: IE

Why in News?

According to a [CPCB \(Central Pollution Control Board\)](#) report submitted to the [National Green Tribunal](#), a significant portion of the **Environment Protection Charge (EPC)** and Environmental Compensation (EC) collected by the CPCB remains unspent.

- As much as 80% of the EPC and EC collected by the Central Pollution Control Board remains unspent.

What is the Environment Protection Charge?

- The EPC is a fund used by the **Central Board of Pollution Control (CPCB)** to provide scientific inputs for improving air quality in **Delhi NCR**. The CPCB works with other institutions like IIT and NEERI under the EPC fund.
- The EPC is received as per an order of the [Supreme Court \(M.C. Mehta Vs Union of India Case, 1985\)](#), and for air quality improvement and related work in Delhi-NCR such as research and development activities and vehicular pollution control health impact studies and specific projects to control pollution in Delhi-NCR and Punjab.
- The CPCB also receives 25% of the environmental compensation collected by state pollution control boards. It also collects environmental penalties directly from polluters/defaulters in various matters.
 - In 2016, the **SC (Supreme Court)** imposed an **EPC of 1% on the sale of 2000cc** and above diesel cars in Delhi and NCR.

What is Environmental Compensation?

- The EC is a tool **aimed at protecting the environment and mitigating the damage** caused by pollution. It operates on the [principle of "polluter pays,"](#) which means that those who are responsible for polluting the environment should bear the cost of its restoration or compensation for the damage caused.
- In simple terms, environmental compensation involves **imposing monetary penalties on individuals, companies,** or entities that pollute the environment or adversely affect human health.
- These penalties are intended to recover the costs associated with the environmental damage and to deter future violations.

What is CPCB?

- The **Central Pollution Control Board (CPCB)**, is a statutory organisation, was constituted in 1974 under the **[Water \(Prevention and Control of Pollution\) Act, 1974](#)**.
- CPCB was also entrusted with the powers and functions under the **[Air \(Prevention and Control of Pollution\) Act, 1981](#)**.
- It serves as a field formation and also provides technical services to the Ministry of Environment and Forests and Climate change of the provisions of the **[Environment \(Protection\) Act, 1986](#)**.

What is the National Green Tribunal?

- **Foundation:** The NGT was established in October, 2010, under the **[National Green Tribunal Act 2010](#)**.
 - Its primary focus is to facilitate the swift and efficient resolution of cases related to environmental protection, conservation of forests, and preservation of natural resources.
 - Currently, **New Delhi serves as the principal place of sitting of NGT**, with Bhopal, Pune, Kolkata, and Chennai designated as the other four places of sitting for the Tribunal.
- **Structure:**
 - The Tribunal is headed by the Chairperson who sits in the Principal Bench and has at least 10 but not more than 20 judicial members and expert members.
 - The Chairperson is appointed by the Central Government in consultation **with the [Chief Justice of India \(CJI\)](#)**.
 - A Selection Committee shall be formed by the central government to appoint the Judicial Members and Expert Members.
- **Legal Mandate:** The Tribunal's jurisdiction extends to **enforcing environmental rights, granting relief and compensation** for damages to individuals and property, and addressing matters associated with environmental protection and conservation.
 - It operates independently of the **procedural rules laid down in the [Code of Civil Procedure, 1908](#), guided instead by principles of natural justice**.
 - Any person seeking relief and compensation for environmental damage involving subjects in the legislations mentioned in **Schedule I of the National Green Tribunal Act, 2010**, may approach the Tribunal. The statutes in **Schedule I** are:
 - **[The Water \(Prevention and Control of Pollution\) Act, 1974](#)**
 - **The Water (Prevention and Control of Pollution) Cess Act, 1977**
 - **[The Forest \(Conservation\) Act, 1980](#)**
 - **[The Air \(Prevention and Control of Pollution\) Act, 1981](#)**
 - **[The Environment \(Protection\) Act, 1986](#)**
 - **[The Public Liability Insurance Act, 1991](#)**
 - **[The Biological Diversity Act, 2002](#)**.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims:

Q.1 In the cities of our country, which among the following atmospheric gases are normally considered in calculating the value of Air Quality Index? (2016)

1. Carbon dioxide
2. Carbon monoxide
3. Nitrogen dioxide
4. Sulphur dioxide
5. Methane

Select the correct answer using the code given below:

- (a) 1, 2 and 3 only
- (b) 2, 3 and 4 only
- (c) 1, 4 and 5 only
- (d) 1, 2, 3, 4 and 5

Ans: (b)

Mains:

Q.1 Describe the key points of the revised Global Air Quality Guidelines (AQGs) recently released by the World Health Organisation (WHO). How are these different from its last update in 2005? What changes in India's National Clean Air Programme are required to achieve revised standards? **(2021)**

India Joins Sri Lanka in Seabed Mining Race

For Prelims: [Indian Ocean Seabed](#), Cobalt-Rich Afanasy Nikitin Seamount (AN Seamount), [International Seabed Authority \(ISBA\)](#), [United Nations Convention on the Law of the Sea \(UNCLOS\)](#), [Internal Waters](#), [Territorial Sea](#), [Contiguous Zone](#), [Exclusive Economic Zone \(EEZ\)](#), [Continental Shelf](#), [Bay of Bengal](#)

For Mains: Economic and diplomatic significance of the right to explore the Indian Ocean sea bed

Source: [TH](#)

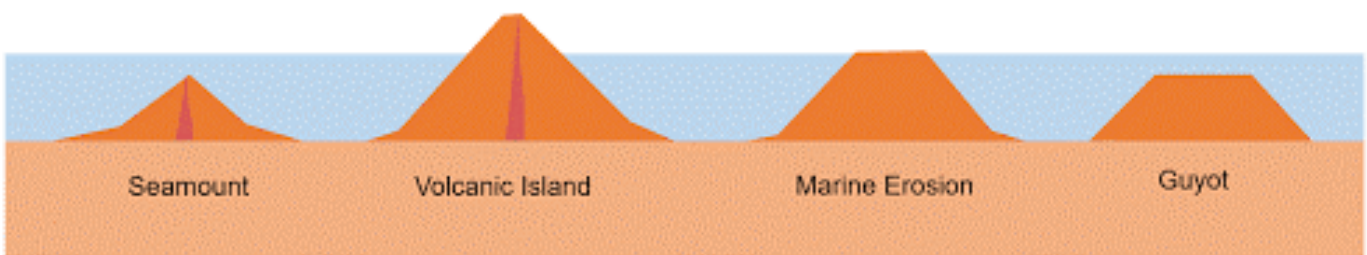
Why in News?

Recently, India applied for Rights to Explore the Indian Ocean Seabed Beyond its Jurisdiction, Including **Cobalt-Rich Afanasy Nikitin Seamount (AN Seamount)**. India's interest is fueled by concerns over Chinese vessels conducting reconnaissance there.

- Rights to the region have already been claimed by **Sri Lanka** under a separate set of laws.

What is Afanasy Nikitin Seamount (AN Seamount)?

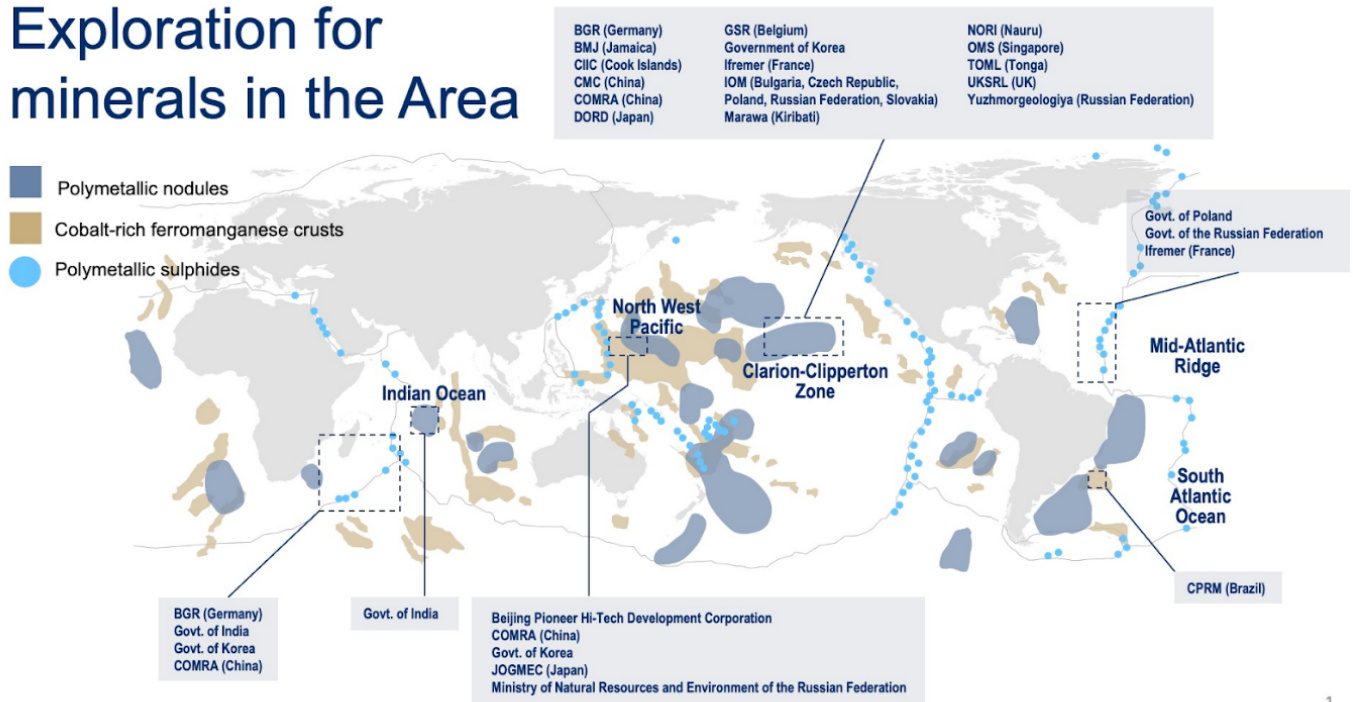
- The **AN Seamount** is a structural feature (400 km long and 150 km wide) in the Central Indian Basin, located about 3,000 km away from India's coast.
- From an oceanic depth of about 4,800 m, it rises to about 1,200 meters and it is rich in deposits of **cobalt, nickel, manganese and copper**.
- To proceed with extraction, interested parties/countries must first apply for an exploration license to the [International Seabed Authority \(ISBA\)](#). This organisation operates autonomously under the [United Nations Convention on the Law of the Sea \(UNCLOS\)](#).
- These rights are specific to areas that are part of the open ocean. **Around 60% of the world's seas are open ocean** and though believed to be rich in a variety of mineral wealth, the costs and challenges of extraction are prohibitive.



Which Countries have been Provided with Exploration Licences?

- Both state-owned and government-sponsored companies from **India, France, Russia, Germany, China, Singapore** and the **UK** had sought permission for minerals prospecting in the high seas.
- **Licence Granted:**
 - Four licences have been granted for the **Pacific Ocean**, the **Clarion Clipperton Zone** between **Hawaii** and **Mexico** and the **Magellan Seamount** in the **northwest Pacific**.
 - Two licences are for the **Indian Ocean Ridge**, while one for **Rio Grande Rise** in the **southern Atlantic**.
- **India's Exploration Applications:** Along with the application for AN Seamount, India has also applied for permission to explore another region, spanning **3,00,000 square km**, called the **Carlsberg Ridge** in the **Central Indian Ocean** to investigate for **polymetallic sulphides**, which are **large smoking mounds** near **hydrothermal vents** that are reportedly rich in **copper, zinc, gold and silver**.
- **Previous Exploration Efforts:** India has previously secured exploration rights to two other large basins in the **Central Indian Ocean** and has undertaken surveys in these regions, demonstrating its commitment to marine exploration and resource assessment.
 - India has been studying the seabed and carrying out test mining for about two decades through institutes like **National Institute of Oceanography (NIO)** and **National Institute of Ocean Technology (NIOT)**.

Exploration for minerals in the Area



1

What is Deep Sea Bed Mining?

- **Deep-sea mining** involves extracting valuable mineral deposits from the ocean floor at depths ranging from **200 to 6,500 meters** below the surface.
 - These mineral deposits include materials such as **copper, cobalt, nickel, zinc, silver, gold, and rare earth elements.**
 - **NIO** has tested deep-sea mining systems up to **512 meters depth** and is working on systems for up to **6,000 meters.**
- Establishing **deep-sea mines** was earlier considered more expensive than **land-based mining.**
- Innovations in **underwater robotics** from the **petroleum industry** have improved prospects for **deep-sea mining.**

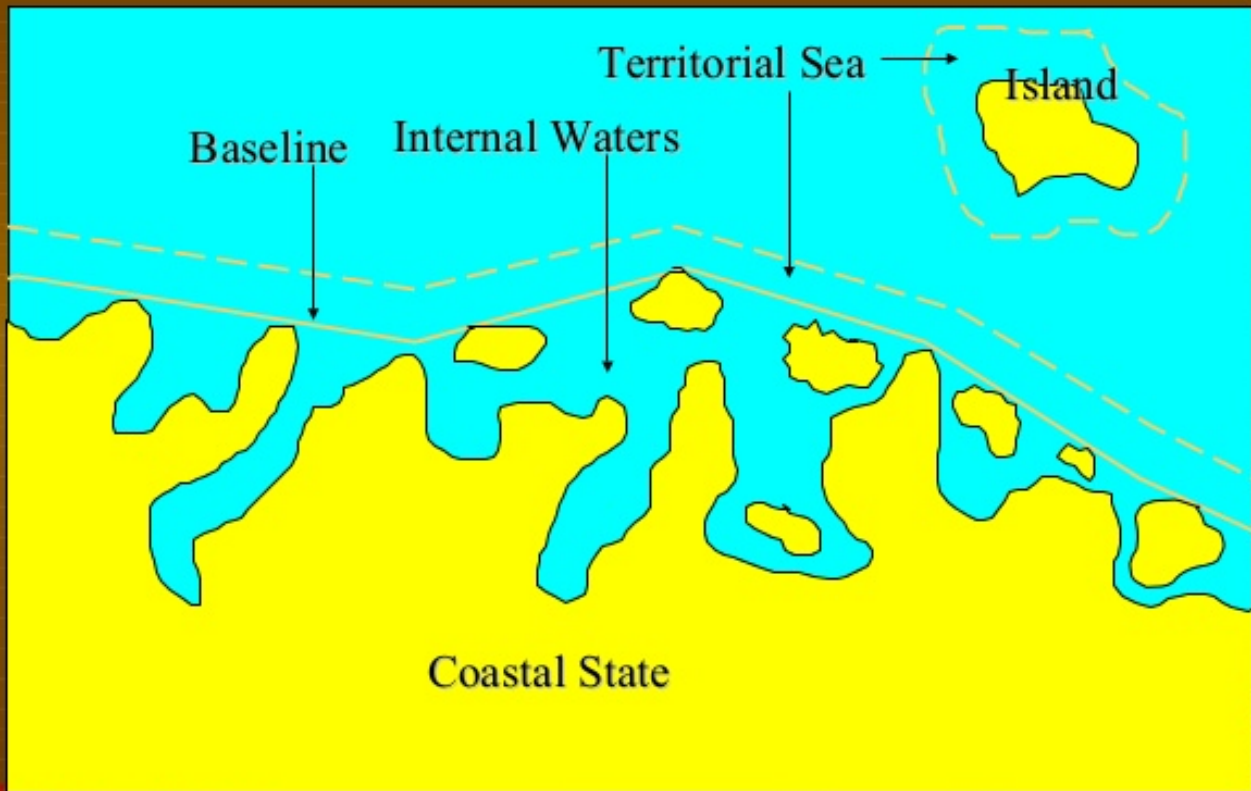
What are the Different Maritime Zones?

- **Baseline:**
 - A **baseline refers** to a line, **often along the coastline**, serving as a reference point for measuring the outer boundaries of a state's territorial sea and other maritime zones, such as its exclusive economic zone.
 - Typically, this baseline mirrors the low-water mark of the coastal state. In cases where the **coastline is deeply indented, contains islands close to the shore**, or exhibits significant instability, straight baselines may be established instead.
- **Internal Waters:**
 - Internal waters are **waters on the landward side of the baseline** from which the breadth of the territorial sea is measured.
 - **Each coastal state has full sovereignty over its internal waters** as like its land territory. **Examples** of internal waters include bays, ports, inlets, rivers and even lakes that are connected to the sea.
 - There is **no right to innocent passage** through internal waters.
 - **The innocent passage refers** to the passing through the waters which are not prejudicial to peace and security. However, the nations have the right to suspend the same.

▪ Territorial Sea:

- The territorial sea **extends seaward up to 12 nautical miles (nm) from its baselines.**
 - The coastal states have **sovereignty and jurisdiction over the territorial sea.** These rights extend not only to the surface but also to the seabed, subsoil, and even airspace.
- However, the coastal states' rights are **limited by the innocent passage** through the territorial sea.

Straight Baselines (Example)



▪ Contiguous Zone:

- The **contiguous zone** adjacent to and beyond its **territorial sea** that extends seaward up to **24 nm** from its baselines.
- It is **an intermediary zone between the territorial sea and the high seas.**
- The coastal state has the right to both prevent and punish infringement of fiscal, immigration, sanitary, and customs laws within its territory and territorial sea.
- Unlike the territorial sea, the contiguous zone **only gives jurisdiction to a state on the ocean's surface and floor.** It does not provide air and space rights.

▪ Exclusive Economic Zone (EEZ):

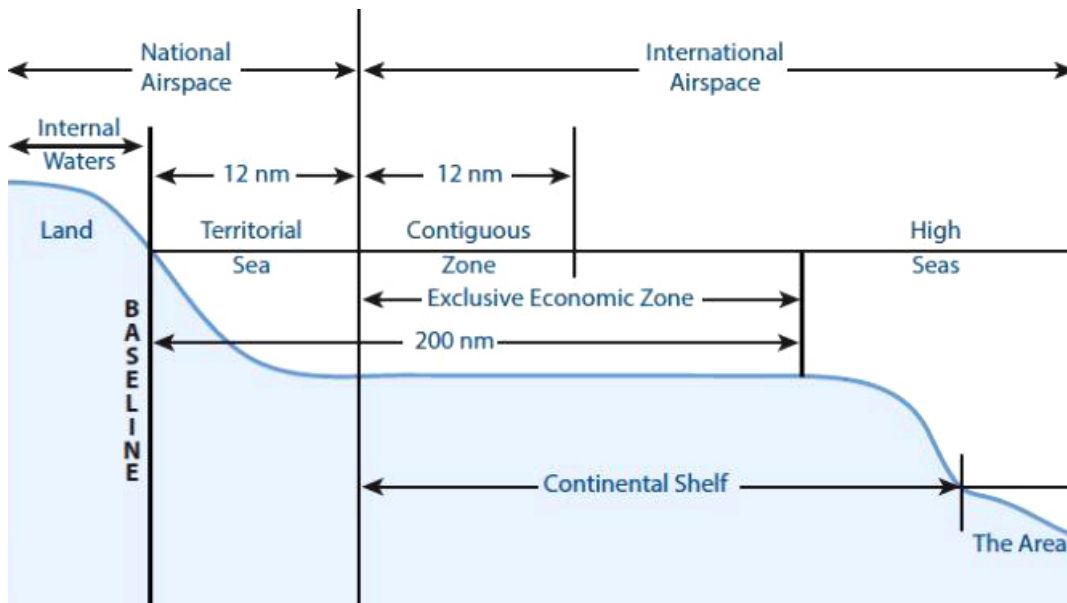
- Each coastal State may claim an EEZ beyond and adjacent to its territorial sea that extends seaward **up to 200 nm from its baselines.**
- Within its EEZ, **a coastal state has:**
 - Sovereign **rights to explore, exploit, conserve and manage natural resources**, whether living or nonliving, of the seabed and subsoil.
 - Rights to carry out activities like the production of energy from the water, currents and wind.
- Unlike the territorial sea and the contiguous zone, the EEZ only allows for the above-mentioned resource rights. It **does not give a coastal state the right to prohibit or limit freedom of navigation or overflight**, subject to very limited exceptions.

▪ Continental Shelf:

- A continental shelf is the **edge of a continent that lies under the ocean**. A continental shelf extends from the coastline of a continent to a **drop-off point** called the **shelf break**.
 - From the break, the shelf descends toward the **deep ocean floor** in what is called the **continental slope**.

▪ High Seas:

- The ocean surface and the water column beyond the EEZ are referred to as the high seas.
- It is **considered as “the common heritage of all mankind”** and is beyond any national jurisdiction.
- States can conduct activities in these areas as long as they are for peaceful purposes, such as transit, marine science, and undersea exploration.



What are the Continental Shelf Claims and Exploration Rights?

- **Exclusive Rights to Continental Shelf:** Countries possess exclusive rights up to 200 nautical miles from their borders, including the underlying seabed. This jurisdiction extends to the exploration and potential exploitation of resources within this zone.
- **Continental Shelf Extension:** Some ocean-bound states may have a natural land formation connecting their border to the edge of the deep ocean, extending beyond the 200-nautical-mile limit. This extension is known as the continental shelf.
- **Special Provisions:** There is a provision allowing countries along the **Bay of Bengal** to apply a different set of criteria for making claims on the extent of their continental shelf.
 - **Example:** Utilising a special provision, Sri Lanka has asserted a claim for an extension of its continental shelf up to **500 nautical miles**, exceeding the usual limit of **350 nautical miles**.
- **Rational Support to Claim:** To claim exclusive rights to the continental shelf beyond 200 nautical miles, a country must **provide a detailed scientific rationale supported by underwater maps and surveys**. This information is submitted to a scientific commission appointed by the **International Seabed Authority (ISBA)**.
 - If the claim is approved by the commission, the country gains primacy to explore and potentially exploit both living and non-living resources within the extended continental shelf.

What is the Significance of Deep Sea Mining?

- **Resource Accessibility:** Deep sea mining provides access to valuable resources that are becoming increasingly scarce on land. These resources include **polymetallic nodules**,

polymetallic sulphides, and cobalt-rich ferromanganese crusts, which contain high concentrations of minerals such as **copper, nickel, cobalt, and rare earth elements**.

- As terrestrial deposits become depleted, deep-sea mining offers an alternative source of these critical materials.
- **Technological Advancements:** Developing technologies for deep-sea mining presents opportunities for innovation and technological advancement. This includes the design of specialised equipment capable of operating in **extreme oceanic conditions**, such as high **pressure, darkness, and low temperatures**.
 - Advancements in **robotics, remotely operated vehicles (ROVs), and autonomous underwater vehicles (AUVs)** are essential for efficient and safe mining operations.
- **Economic Potential:** Deep sea mining has the potential to generate significant economic benefits for participating countries and companies.
 - The extraction of valuable minerals from the ocean floor can stimulate **economic growth, create employment opportunities**, and contribute to national revenue through taxes, royalties, and resource-sharing agreements.

What are the Concerns Related to Deep Sea Mining?

- **Damage to Marine Ecosystem:** Deep Sea Mining can damage the **Marine Ecosystem and ecosystems**. Damage from mining can include noise, vibration and light **pollution**, as well as possible **leaks and spills of fuels** and other chemicals used in the **mining process**.
 - It could severely harm marine biodiversity and ecosystems,
- **Sediment Plumes Formation:** It will stir up **fine sediments** on the **seafloor**, creating **plumes of suspended particles**. Once valuable materials are extracted, slurry sediment plumes are sometimes pumped back into the sea.
 - That can harm **filter-feeding species** like **corals and sponges** and could smother or otherwise interfere with some creatures.
- **Wider Impact on Marine Population:** Deep-sea mining would go beyond harming the seabed and have a wider impact on **fish populations, marine mammals** and the essential function of the **deep-sea ecosystems** in regulating the climate.
- **Digging & Gauging:** The **digging and gauging** of the ocean floor by machines can alter or destroy **deep-sea habitats** and can harm yet unknown species of greater depth at sea.

United Nations Convention on the Law of the Sea 1982

- **About:**
 - The UNCLOS is an **international treaty** that provides a **regulatory framework for the use of the world's seas and oceans**.
 - It lays down a **comprehensive regime of law and order** in the world's oceans and seas establishing rules governing all uses of the oceans and their resources.
 - It enshrines the notion that **all problems of ocean space are closely** interrelated and need to be addressed as a whole.
- **Ratification:**
 - The Convention was **opened for signature in December 1982** in Montego Bay, Jamaica.
 - The convention has been **ratified by 168 parties**, which includes 167 states (164 **United Nations** (UN) member states plus the UN Observer state Palestine, as well as the Cook Islands and Niue) and the **European Union**. An additional 14 UN member states have signed, but not ratified the convention.
 - While **India ratified UN Law of the Seas in 1995, the US has failed to do it so far**.
- **Indian Law:**
 - As per India's **Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976:**
 - All foreign ships (other than warships including submarines and other underwater vehicles) shall enjoy the **right of innocent passage** through the territorial waters.
 - **Innocent passage:** It is the passage that is not prejudicial to the peace, good order or security of India.

What are other Blue Economy Initiatives?

- [India-Norway Task Force on Blue Economy for Sustainable Development:](#)
- [Sagarmala project](#)
- [O-SMART](#)
- [Integrated Coastal Zone Management](#)
- [National Fisheries policy](#)

Way Forward

- **Regulatory Framework Enhancement:** Strengthening regulations and international agreements to ensure responsible and sustainable deep-sea mining practices are essential. This includes setting stringent guidelines for **noise, vibration, and light pollution**, as well as strict protocols for the handling and disposal of mining by-products and chemicals.
- **Environmental Impact Assessments:** Conducting thorough environmental impact assessments before granting mining licenses is crucial. These assessments should evaluate **potential damage to marine ecosystems, biodiversity, and habitats**, as well as the long-term effects on **fish populations and marine mammals**.
- **Mitigation Measures:** Implementing effective mitigation measures to **minimize the impact of deep-sea mining** activities is vital. This could involve using advanced technologies to reduce noise and light pollution, employing sediment control measures to prevent the spread of suspended particles, and developing innovative methods for waste management and disposal.
- **Monitoring and Enforcement:** Establishing robust monitoring mechanisms to track the environmental impact of deep-sea mining operations is necessary. Regular inspections and enforcement of regulations can ensure compliance with environmental standards and prompt intervention in case of any violations.

Read more: [Deep Sea Mining](#), [Deep Sea Mining and its Threats](#), [India's Deep Ocean Mission](#)

UPSC Civil Services Examination Previous Year Question (PYQ) nation

Prelims

Q1. With reference to 'Indian Ocean Rim Association for Regional Cooperation (IOR-ARC)', consider the following statements: (2015)

1. It was established very recently in response to incidents of piracy and accidents of oil spills.
2. It is an alliance meant for maritime security only.

Which of the statements given above is/ are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (d)

Exp:

- Indian Ocean Rim Association for Regional Cooperation (IOR-ARC) is a regional cooperation initiative of the Indian Ocean Rim countries which was established in Mauritius in March 1997 with the aim of promoting economic and technical cooperation among its members. Hence, statement 1 is not correct.
- IOR-ARC is the only pan-Indian ocean grouping. It has 23 Member States and 9 Dialogue Partners.
- It aims to create a platform for trade, and socio-economic and cultural cooperation in the Indian Ocean Rim area, which constitutes a population of about two billion people. Hence, statement 2 is

not correct.

- The Indian Ocean Rim is rich in strategic and precious minerals, metals and other natural resources, marine resources, and energy, all of which can be sourced from Exclusive Economic Zones (EEZ), continental shelves, and the deep seabed. Therefore, option (d) is the correct answer.

Q2. Consider the following statements: (2021)

1. The Global Ocean Commission grants licences for seabed exploration and mining in international waters.
2. India has received licences for seabed mineral exploration in international waters
3. 'Rare earth minerals' are present on the seafloor in international waters.

Which of the statements given above are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (b)

Mains

Q. Critically evaluate the various resources of the oceans which can be harnessed to meet the resource crisis in the world. (2014)

H5N1 Bird Flu

[Source: IE](#)

Why in News?

[H5N1 bird flu](#), a highly pathogenic virus, has been spreading globally, posing a significant threat to birds and wildlife.

What is H5B1 Bird Flu?

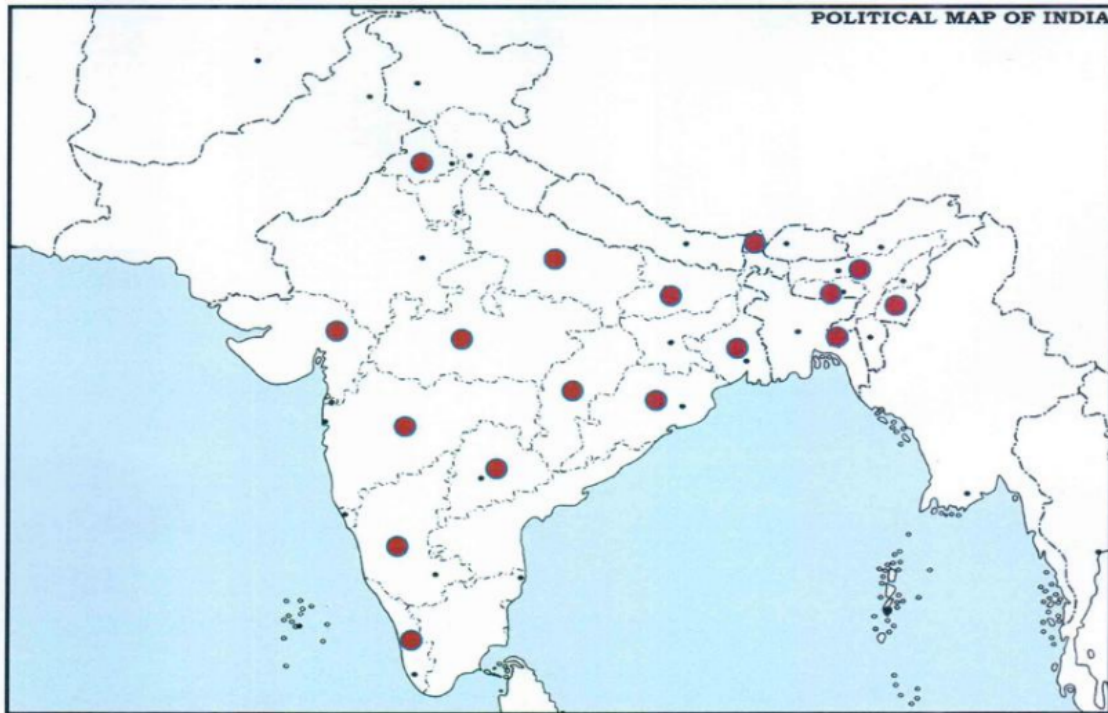
▪ Background:

- **Avian influenza A(H5N1) or H5B1 Bird Flu** is a highly pathogenic virus that primarily circulates among birds but can infect mammals.
- H5N1 originated from a virus outbreak in China in 1996 and rapidly evolved into a highly pathogenic strain.
- Since 2020, it has spread across **Europe, Africa, Asia, North America, South America, and even mainland Antarctica.**
- India experienced the first H5N1 outbreak in the State of Maharashtra and Gujarat in 2015.

▪ Impact on Animals:

- Wild birds, including endangered species like **California condors**, have been severely affected by H5N1.
- The main species affected used to be chicken.
- Marine mammals, such as **sea lions and dolphins**, have suffered mass deaths in regions like Chile and Peru.
- Mammals like **foxes, pumas, bears in North America**, and farmed minks in Spain and

Finland, have also been infected.



The map highlights the States where highly pathogenic avian influenza H5N1 outbreaks in poultry were reported (Feb 2006-April 2015).

▪ **Human Risk and Spread Factors:**

- While rare, humans can contract bird flu, primarily through contact with infected birds.
- Climate change may exacerbate the spread of the virus, altering bird behaviour and increasing interactions between bird species.

▪ **World Health Organization (WHO) Risk Assessment:**

- While the virus does not easily infect humans, sporadic cases continue to occur, mainly linked to poultry exposure.
- **Human-to-human transmission remains rare**, but the potential for further cases exists, particularly in regions where the **virus is endemic in poultry**.
- WHO assesses the overall risk to the general population as low but emphasises the importance of surveillance and risk management.

▪ **Preventive Measures and Recommendations:**

- WHO advises the public to avoid high-risk environments like live animal markets and practise good hand hygiene.
- Prompt reporting of sick animals and avoiding consumption of sick poultry are recommended.
- Individuals exposed to infected birds or environments should seek medical care promptly.

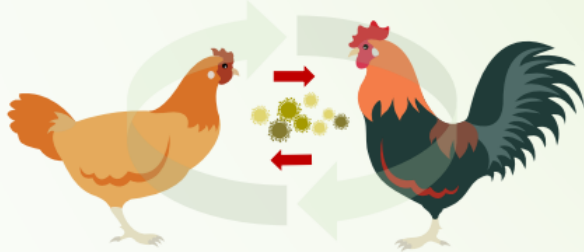
About Bird Flu



WHAT IS BIRD FLU?

Bird flu is an infectious disease in birds caused by avian influenza type A viruses. It may cause mild to severe illness or sudden death in birds. Domestic poultry like chickens are particularly vulnerable.

Avian influenza viruses do not usually infect humans but may sometimes be transmitted to humans who have contact with infected poultry and their secretions and faeces, or contact with contaminated surfaces.



HOW DOES BIRD FLU SPREAD BETWEEN BIRDS?

- Direct contact with nasal and respiratory secretions from infected birds
- Direct contact with infected bird faeces
- Contamination of feed and water
- Contact with contaminated equipment and humans

KEEPING PET BIRDS SAFE

- Keep your pet birds away from wild birds and their droppings.
- Use a bird-proof cage or enclosure with fine wire mesh netting preferably with a roof over the aviary.
- Separate all new birds from existing ones for at least 21 days to monitor for signs of illness.
- Adopt hygiene practices such as washing hands thoroughly with soap after handling birds and their cage(s).
- Do not bring birds back to Singapore without a valid import permit from NParks/Animal & Veterinary Service.

WHAT IF MY PET BIRD FALLS SICK OR DIES?

- Immediately bring your sick bird to see a vet.
- Keep it away from healthy birds.
- Wash and disinfect the cage regularly while wearing a mask and gloves.
- Wear a mask and gloves when disposing of dead birds. Place the bodies in a plastic bag tightly sealed with a rubber band or cable tie.
- Adopt hygiene practices such as washing hands thoroughly with soap and water after handling the bird and its cage.

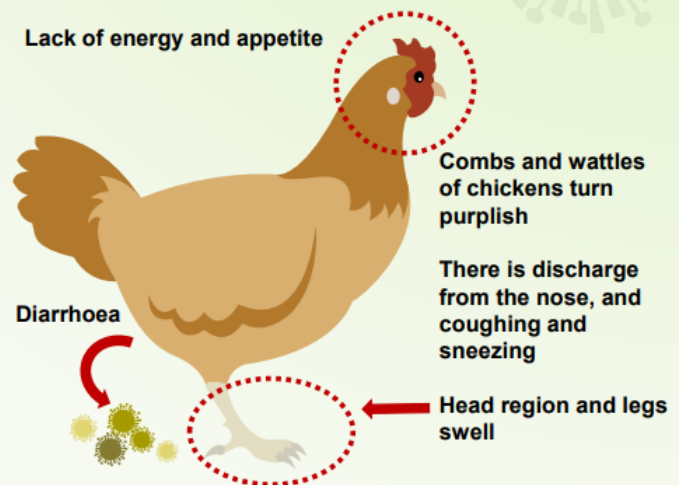


IS IT SAFE FOR ME TO COME INTO CONTACT WITH FREE-ROAMING CHICKENS IN SINGAPORE?

- As a precaution, please avoid touching or feeding free-roaming chickens.
- If you come into contact with free-roaming chickens, you should practise good hygiene habits and wash your hands thoroughly with soap and water.

SIGNS IN INFECTED BIRDS

Lack of energy and appetite



Combs and wattles of chickens turn purplish

There is discharge from the nose, and coughing and sneezing

Head region and legs swell

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. H1N1 virus is sometimes mentioned in the news with reference to which one of the following diseases? (2015)

- (a) AIDS
- (b) Bird flu
- (c) Dengue
- (d) Swine flu

Ans: (d)

Q. Which of the following statements is/are correct? Viruses can infect (2016)

1. bacteria
2. fungi
3. plants

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

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