Winter Storms in the US

For Prelims: Winter Storms in the US, Hypothermia, Snowstorms, Blizzards, Polar Vortex, Arctic.

For Mains: Winter Storms in the US, Atmosphere structure and composition, temperature, wind systems, clouds, and rainfall types.

Source: TH

Why in News?

Winter storms in the U.S. have led to a range of challenges, affecting various states with sub-freezing temperatures, snow, and ice.

- The situation has resulted in at least 72 deaths nationwide in January 2024, primarily due to **Hypothermia or Road Accidents.**

What are the Factors Causing Severe Winter Storms in the US?

- **Polar Vortex:**
  - The **Polar Vortex** is a large area of low pressure and cold air surrounding both of the Earth's poles.
  - The term **"vortex" refers to the counterclockwise flow of air that helps keep the colder air near the Poles**. It always exists near the poles but **weakens in summer and strengthens in winter.**
    - Occasionally, **disruptions in the polar vortex can lead to outbreaks of cold air moving southward into the United States,** bringing frigid temperatures.
    - **Climate change**, in the Arctic, leads to a phenomenon called **Arctic amplification**. This is the faster warming of the Arctic compared to the rest of the globe. The amplified warming in the **Arctic weakens the polar vortex, making it more susceptible to disruptions.**
      - The weakening can result in the polar vortex stretching or splitting, allowing **cold Arctic air to spill southward.**

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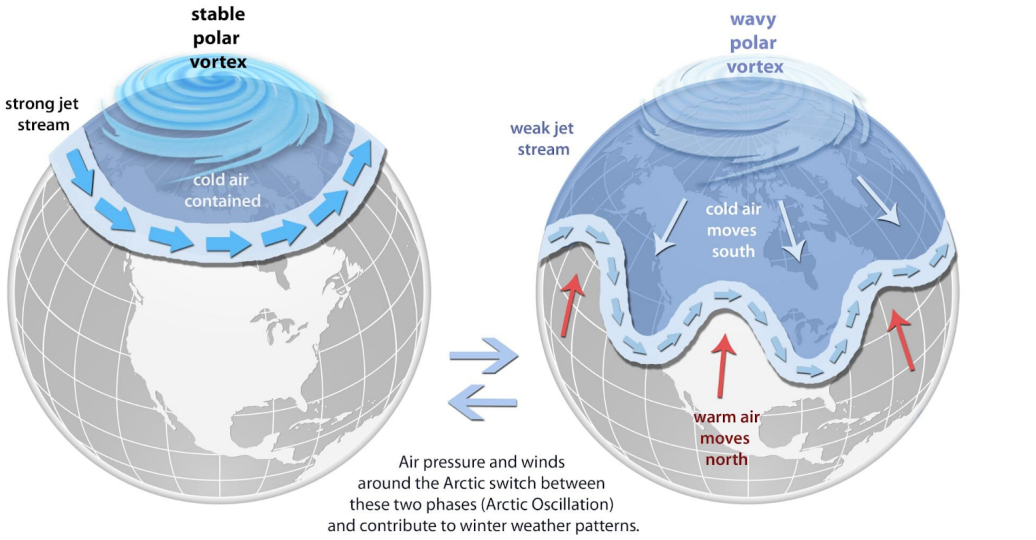
The Science Behind the Polar Vortex

The polar vortex is a large area of low pressure and cold air surrounding the Earth's North and South poles. The term vortex refers to the counterclockwise flow of air that helps keep the colder air close to the poles (left globe). Often during winter in the Northern Hemisphere, the polar vortex will become less stable and expand, sending cold Arctic air southward over the United States with the jet stream (right globe). The polar vortex is nothing new — in fact, it's thought that the term first appeared in an 1853 issue of E. Littell's *Living Age*.



- **Arctic Air Masses:**
  - The intrusion of Arctic **air masses** into the US can cause a rapid drop in temperatures. These air masses originate in the **Arctic region and can extend southward,** bringing bitterly cold conditions to areas that are not accustomed to such extremes.
- **Jet Stream Patterns:**
  - The jet stream, a fast-flowing ribbon of air high in the atmosphere, plays a role in steering weather systems.
  - Changes in the **jet stream pattern can allow cold air from the Arctic** to plunge southward, affecting large portions of the country.

What are Winter Storms?

- **About:**
  - Winter storms are **weather events characterized by extreme cold temperatures,** precipitation in the form of snow, sleet, or freezing rain, and often accompanied by **strong winds.**
  - These storms can disrupt normal daily activities, impact transportation, and pose various hazards to communities.
- **Winter Storm Formation:**
  - **Moist Air Rising:** Winter storms **begin with moist air rising** into the atmosphere. This can occur at a cold front where warm air is lifted above cold air or as air moves up a large hill or mountain.
  - **Source of Moisture:** A source of moisture is necessary for cloud formation and precipitation. This can be provided by **air blowing across large bodies of water,** such as lakes or oceans, picking up water vapour.
  - **Cold Air:** The key factor that differentiates winter storms is the presence of cold air. When temperatures **both near the ground and throughout the atmospheric layers** are below freezing, precipitation occurs in the form of snow or ice.
- **Types of Winter Storms:**
  - **Snowstorms:** These are **storms where precipitation falls mainly as snow.** Snowflakes form as water vapor condenses into water droplets and freezes. The air temperature determines whether the precipitation falls as snow, rain, or freezing rain.
  - **Blizzards:** Defined by strong winds rather than the amount of snow, blizzards have wind **speeds at or above 35 MPH (MIles Per Hour).** Blizzards create blowing snow

conditions, reducing visibility and **causing the accumulation of snowdrifts.**
    - **Lake Effect Storms:** These storms form **due to the abundance of moisture from the Great Lakes (USA).** Cold, dry air passing over the lakes picks up water vapour, leading to heavy snowstorms in areas south and east of the lakes.
    - **Ice Storms**: Winter storms with an accumulation of at least 0.25 inches of ice on outdoor surfaces. Ice storms create **slick layers on the ground, making travel and walking** hazardous. They can also lead to the **snapping of branches and powerlines.**

What is Hypothermia?

- **About:**
    - Hypothermia is a medical emergency that occurs when the body loses heat faster than it can produce it, resulting in a **dangerously low body temperature.**
    - The normal body temperature is around 98.6 degrees Fahrenheit (37 degrees Celsius), and **hypothermia typically sets in when the body temperature drops below 95 degrees Fahrenheit** (35 degrees Celsius).
    - Cold exposure can lead to hypothermia through a **combination of factors that disrupt the body's ability** to maintain its core temperature.
    - The Body's natural response to cold conditions is to generate heat and conserve warmth, **primarily regulated by the hypothalamus in the brain.**
- **Symptoms:**
    - Shivering, which may stop as hypothermia progresses. (Shivering is actually a good sign that your heat regulation systems are still active.)
    - Slow, shallow breathing
    - Confusion and memory loss
    - Drowsiness or exhaustion.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. The formation of ozone hole in the Antarctic region has been a cause of concern. What could be the reason for the formation of this hole? (2011)

(a) Presence of prominent tropospheric turbulence; and inflow of chlorofluorocarbons

(b) Presence of prominent polar front and stratospheric clouds; and inflow of chlorofluorocarbons

(c) Absence of polar front and stratospheric clouds; and inflow of methane and chlorofluorocarbons

(d) Increased temperature at polar region due to global warming

Ans: (b)

- The severe depletion of stratospheric ozone in the Antarctic in late winter and early spring is known as the ‘ozone hole’.
- The air temperature in the Antarctic regions is extremely low in the lower stratosphere in the winter season. Polar stratospheric clouds (PSCs) are formed in the polar ozone layer when in winter, minimum temperatures fall below about −78°C. This occurs on average for around 5 to 6 months over Antarctica.
- Besides, the nitric acid in PSCs reacts with CFCs to form chlorine, which catalyzes the photochemical destruction of ozone.
- Halogen gases enter the stratosphere primarily from the tropical upper troposphere and these are transported towards the poles through the stratospheric air motions.
- Besides, stratospheric air in the Antarctic region is relatively isolated for long periods in the winter

months as the strong winds encircle the Antarctic, forming a polar vortex which prevents substantial motion of air into or out of the polar stratosphere.
- Therefore, option (b) is the correct answer.

Mains:

Q.1 How does the cryosphere affect global climate? **(2017)**

Q.2 How do the melting of the Arctic ice and glaciers of the Antarctic differently affect the weather patterns and human activities on the Earth? Explain. **(2021)**

Q.3 Why is India taking keen interest in resources of Arctic region? **(2018)**

Recruitment of Skilled Workers for Israel

For Prelims: National Skill Development Corporation, Israel, Emigration, International Labour Organisation, Trade unions

For Mains: International Practices for Protection of Migrant Workers, Concerns Related to Indian Working in War-torn Areas.

Source: TH

Why in News?

The governments of **Uttar Pradesh and Haryana, in collaboration with the** National Skill Development Corporation (NSDC), have initiated a large-scale recruitment drive to send approximately **10,000 workers to** Israel, mainly for construction activities.

- While this endeavour is hailed as a "**passport to dreams abroad**" by the NSDC, it has faced significant opposition, primarily from **trade unions, citing concerns about the violation of** emigration rules.

What are the Employment Opportunities in Israel and Related Concerns?

- **Lucrative Opportunities in Israel:** There are **openings** in Israel: plastering workers, ceramic tile workers, iron bending and frame workers.
  - Selected candidates from India are promised monthly salaries of around **₹1.37 lakh (6,100 Israeli shekels).**
  - As of **February 2023**, there were about **18,000 Indian citizens in Israel,** engaged in various professions such as caregiving, diamond trading, IT, and education.
- **Concerns Raised by Trade Unions:** Trade unions are challenging the employment drive, **citing violations of the Emigration Act.**
  - The Emigration Rules require workers going to conflict zones to register with the **Ministry of External Affairs' 'e-migrate' portal.** However, Israel is not on this list.
  - Current Situation in Israel, particularly due to **conflicts with Hamas,** have raised concerns about the safety of migrant workers.
    - They argue that the **move goes against the ethos of bringing back citizens from conflict zones** and accuse the government of using unemployment for

political gains.

Note

Workers going to conflict zones or places without sufficient labour protections are required to **register with the Ministry of External Affairs' 'e-migrate' portal.**

- Passports issued under the **ECR (Emigration Check Required) scheme cover workers travelling to 18 countries,** including Afghanistan, Bahrain, Indonesia, Iraq, Jordan, the Kingdom of Saudi Arabia, Kuwait, Lebanon, Libya, Malaysia, Oman, Qatar, South Sudan, Sudan, Syria, Thailand, the UAE, and Yemen. **Israel is not on this list.**

- **International Practices for Protection of Migrant Workers:**
  - The International practises for protection of migrant workers are governed by two conventions of the **International Labour Organisation (ILO)**: the **Migration for Employment Convention (Revised), 1949** and **Migrant Workers (Supplementary Provisions) Convention, 1975.**
    - While **India has not ratified both conventions**, Israel had ratified the **1949 convention in 1953.**
    - The 1949 convention emphasised measures against misleading propaganda related to **emigration and immigration.**
- **Additional Considerations: ILO** predicts a global increase in **unemployment** in 2024. The report urges countries to **design sensible migration policies and skilling initiatives to address the growing** unemployment concerns.
  - In 2019, a parliamentary committee recommended the drafting of a migration policy, emphasising the need for **enhanced institutional arrangements for the welfare of Indian emigrants.**

Note

An unofficial method to work in foreign countries floated in the news recently, the **Donkey Flight.** It is an illegal immigration method used to enter countries like the **United States, Canada, and the United Kingdom.**

- It involves multiple stops and border crossings through various countries, **often relying on** human traffickers **and agents.**

Way Forward

- **Address Trade Union Concerns:** Engage in a constructive dialogue with **trade unions** to address their concerns and **ensure transparency in the recruitment process.**
- **Enhance Safety Measures:** Prioritise the **safety and well-being of recruited workers** by establishing robust safety protocols and contingency plans, especially considering the geopolitical challenges in Israel.
- **Develop Comprehensive Migration Policy:** Work towards drafting and implementing a **comprehensive** migration **policy,** taking into account the recommendations of the parliamentary committee, to ensure the welfare and protection of Indian emigrants in the long run.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q 1. Which one of the following countries of South-West Asia does not open out to the

Mediterranean Sea? (2015)

(a) Syria
(b) Jordan
(c) Lebanon
(d) Israel

Ans: (b)

Mains

Q . "India's relations with Israel have, of late, acquired a depth and diversity, which cannot be rolled back." Discuss. **(2018)**

National Monetisation Pipeline

For Prelims: Index of Industrial Production (IIP), National Monetization Pipeline (NMP), Infrastructure Investment Trust (InvIT), Global Warming, Pandemics, Endemic Poverty.

For Mains: National Monetisation Pipeline, Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Source: FE

Why in News?

Recently, the Centre has decided to conduct an **Asset Recycling Drive** under the **National Monetization Pipeline (NMP),** aiming to generate resources for new investments in infrastructure.

- The Centre's asset recycling drive is expected to **generate around Rs 1.5 trillion in the fiscal year 2024-25.**
- Transactions with monetisation values of around Rs 0.97 trillion were completed in 2021-22, and Rs 1.32 trillion in 2022-23.

What is the National Monetisation Pipeline (NMP)?

- **About:**
  - The NMP envisages **an aggregate monetisation potential of Rs 6-lakh crore through the leasing of core assets of the Central government** in sectors such as roads, railways, power, oil and gas pipelines, telecom, civil aviation etc, over a **four-year period (FY 2022-25).**
  - The **Monetization through NMP only includes core assets,** excluding monetization through **disinvestment of non-core assets.** Currently, only assets of **central government line ministries and CPSEs** in infrastructure sectors have been **included.**
  - The government is currently in the process of coordinating and collating asset pipelines from states to expand the scope of the NMP, **incorporating assets at both the central and state levels in due course.**
    - To streamline the process, the **monetization of non-core assets,** including land, real estate, and infrastructure, **is being transferred from the** Department of

Investment and Public Asset Management (DIPAM) **to the Department of Public Enterprises (DPE) within the Ministry of Finance.**
    - This pipeline is intended **to support investments under the** National Infrastructure Pipeline (NIP) worth **Rs 111 trillion in six years through FY25**.
        - The **timeline for the NMP** has been strategically set to be **co-terminus with** the remaining period under the **National Infrastructure Pipeline (NIP).**
- **Need for NMP:**
    - **Cost Overruns:** In some cases, **project completion time is exceeded**, leading to elevated project cost so much so that the project itself becomes unviable at the time of its launching.
    - **Overcapitalisation:** The optimum **input-output ratio is seldom observed** in a majority of government infrastructure projects leading to their overcapitalisation.
    - **Resource Optimization:** Inefficiencies in resource allocation and utilization contribute to project delays and cost escalations.
        - The NMP aims to optimize resources by introducing private sector efficiency and market-driven approaches, ensuring better alignment of inputs and outputs.
    - **Coordination Challenges:** Lack of inter-ministerial and inter-departmental coordination can lead to **inefficiencies and delays in project execution.**
        - The NMP encourages collaboration between the public and private sectors, fostering a more coordinated and streamlined approach to infrastructure development.
    - **Labour Reforms and Decision-Making**: Reluctance to implement labour reforms, poor decision-making, and ineffective governance contribute to the failure of public infrastructure assets.
- **Significance of NMP:**
    - **Boost Economy:** It is the first-of-its-kind initiative that will boost the economy, generate better employment opportunities and drive the competitiveness of the Indian economy.
        - NMP is linked with the **PM Gati Shakti,** which is a **holistic and integrated approach** to infrastructure development in India. Gati Shakti focuses on building a comprehensive and well-connected infrastructure network, while the NMP aims to monetize existing infrastructure assets to fund new projects.
        - The success of one initiative can complement and reinforce the goals of the other, contributing to India's overall economic growth and development.
    - **Utilising Underutilised Public Assets:** The NMP advocates **unlocking idle capital from non-strategic underperforming** government owned assets.
        - It also **envisages reinvesting the funds**, thus received, into new infrastructure projects and **augmentation of assets such as greenfield infrastructure creation.**
- **Achievements and Expectations:**
    - **Mining Sector:** The monetization of assets in 2023-24 has been led by the mining sector, particularly coal blocks and other mines.
        - The achievement in this sector is expected to be around Rs 55,000-60,000 crore in FY 2024-25, **surpassing the original target of Rs 8,726 crore.**
        - FY23 segment target increased to Rs 37,500 crore from Rs 6,060 crore, achieved around Rs 68,000 crore.
        - FY22 mining sector surpassed target, generating Rs 68,000 crore against Rs 3,394 crore.
    - **National Highways Authority of India (NHAI):** NHAI, as the second biggest contributor to **brownfield asset recycling,** is likely to achieve around Rs 45,000 crore in the fiscal year 2024-25.
        - This achievement is through a mix of **Toll Operate Transfer (ToT)**, securitization, and **Infrastructure Investment Trust (InvIT)** models.
    - **Expectations for Other Sectors in FY24:**
        - The power generation and transmission sectors, which met their combined **target of Rs 15,300 crore** in FY23, are likely to do well in FY24 with an achievement of around Rs 20,000 crore as against the initial target of Rs 26,700 crore.
        - **Railways,** whose target was reduced to Rs 20,000 crore for FY24 from Rs 44,907 crore, is seen achieving around Rs 8,000-10,000 crore compared with Rs 8,000 crore in FY23.
            - While railways has not progressed much in the monetisation of key assets

such as stations, it would **complete some transactions in railway colony redevelopment,** Gati Shakti freight terminals and rolling stock.
- The **Oil and Gas sector** has achieved around Rs **4,000 crore and could reach Rs 8,000 crore by March 2024.**

What are the Challenges Associated with NMP?

- **Issue of Taxpayers' Money:** Taxpayers have expressed **concerns about potential double charges on public assets**. After funding the creation of these assets, they now **face an additional cost for utilizing them through payments to private entities** following their monetization.
    - The challenge lies in navigating this **perceived duplication of charges and ensuring a fair balance between public investment and private involvement** in the management and utilization of these assets.
- **Cycle of Creating and Monetising Assets:** The NMP is quite likely to create a vicious **cycle of creating new assets and then monetising the same** when they become liabilities for the Government at a later stage.
- **Asset-specific Challenges:** Low Level of capacity utilization in gas and petroleum pipeline networks, regulated tariffs in power sector assets, low interest among investors in national highways below four lanes and multiple stakeholders which own stake in the entity.
- **Monopolisation:** A major critique of the NMP is the **potential for monopolization resulting** from the transfer of assets, which could lead to increased prices.
    - The consolidation of ownership may lead to monopolies, **particularly in the case of highways and railway lines.** This concern centres around the possibility of reduced competition and market dynamics, potentially resulting in higher costs for end-users.

Way Forward

- There is a need to **enhance transparency in the asset monetization process** to build trust among stakeholders, including investors, government agencies, and the public.
- Communicate the benefits of asset monetization in terms of economic growth, job creation, and improved infrastructure.
- It is imperative to continuously refine and update the policy framework to address emerging challenges and opportunities.
- Ensure a supportive regulatory environment that encourages private sector participation and investments.
- Establish a robust monitoring and evaluation system to track the performance of asset monetization projects.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Mains:

Q.1 Account for the failure of manufacturing sector in achieving the goal of labour-intensive exports. Suggest measures for more labour-intensive rather than capital-intensive exports. **(2017)**

Q.2 The nature of economic growth in India in recent times is often described as a jobless growth. Do you agree with this view? Give arguments in favour of your answer. **(2015)**

Wild Life Licensing Rules 2024

For Prelims: Wild Life (Protection) Licensing (Additional Matters for Consideration) Rules, 2024, **Wildlife Protection Act, 1972**, **CITES**

For Mains: Wildlife Conservation, success and challenges involved in Wildlife Protection Act 1972, Wild Life Licensing Rules

Source: DTE

Why in News?

The central government recently introduced **Wild Life (Protection) Licensing (Additional Matters for Consideration) Rules, 2024**, amending the **wildlife trade rules, 1983** resulting in significant changes in the **licensing process and exclusions of certain species.**

- The amendments became operational on 16th January, 2024, marking the first revision since 1983.

What are Wild Life Licensing Rules 2024?

- **Schedule I:**
  - The rules published in 1983 state that **no such licence shall be granted to trade in a wild animal** specified in **Schedule I or Part II of Schedule II to the** Wildlife Protection Act, 1972, except with the previous consultation of the central government.
    - This condition has been changed in the new guidelines, which say **no such licence shall be granted** if it relates to any wild animal **specified in Schedule I to the Act,** except with the previous consultation of the Central Government.
  - This means that the restrictions on Schedule I species, which include animals requiring utmost protection, such as tigers**,** elephants**,** rhinos, etc., are still in place, with a provision for consultation.
- **Schedule II:**
  - The significant change in the new guidelines is the **removal of licensing restrictions** for species listed in **Schedule II of the Wildlife Protection Act, 1972.**
  - This implies that the licences for trading in **Schedule II species can be granted** without any consultation or approval from the central government, which was required earlier.
- **Factors Considered in Licensing:**
  - The new rules also specify the factors that the authorised officers must consider while granting licences, such as the **capacity of the applicant, the source and manner of obtaining supplies,** the number of **existing licences in the area,** and the **implications on hunting or trade** of the concerned wild animals.

What are the Concerns Regarding the New Rules?

- **Exclusion of Schedule II Species**:
  - The notification does not provide clarity on why **licensing restrictions for Schedule II species have been removed.**
    - Schedule II encompasses important species, such as **endangered mammals, birds, turtles, geckos, and snakes,** and their exclusion from licensing restrictions raises concerns about the level of protection they will receive.
  - The lack of clarity necessitates further scrutiny to ensure that the revised **rules adequately address conservation needs** and do not inadvertently compromise the protection of vulnerable wildlife.
- **Rationalization of Schedules in 2022:**
  - The schedules of the Wildlife Protection Act 1972 were rationalized in The **Wild Life (Protection) Amendment Act, 2022**, leading to changes in the categorization of species.
  - Before the 2022 amendment, **schedules were based on the level of endangerment of species.** The recent rationalization may have altered the criteria for categorizing

species.
    - Experts question whether the exclusion of **certain species in Schedule II aligns with the rationalization process** and whether those species have indeed increased in numbers, justifying a lower level of protection.

Status of Wildlife Trade

- India is a bio-diverse country, with nearly **6.5% of the world's known wildlife species.** Approximately, **7.6% of the world's mammals and 12.6% of the world's birds are found in India.**
    - The illicit demand, globally, for wildlife and its products has seen the rise of wildlife crime across the subcontinent.
- In India, wildlife trade includes diverse products including **mongoose hair;** snake skins; **Rhino horn; Tiger and** Leopard **claws,** bones, skins, whiskers; **Elephant tusks;** deer antlers; turtle shells; medicinal plants; timber and caged birds such as parakeets, mynas, munias etc.
    - A large part of this t**rade is meant for the international market** and has no direct demand in India.
- India is one of the top 20 countries for **wildlife trafficking** and one of the **top 10 for wildlife trafficking by air.**
- The **World Wildlife Report 2020 by** United Nations Office on Drugs and Crime found that between 1999 and 2018, **6,000 different species of flora and fauna were seized globally.**

What is the Wildlife (Protection) Act, 1972?

- **About:**
    - The Wild Life (Protection) Act, of 1972 provides a legal framework for the **protection of various species of wild animals and plants,** management of their habitats, regulation, and control of trade in wild animals, plants, and products made from them.
    - The act also **lists schedules of plants and animals** that are afforded varying degrees of protection and monitoring by the government.
    - After the enactment of **Jammu & Kashmir Reorganization Act, 2019** Wildlife Protection Act, 1972 became applicable to the **Union Territory of Jammu & Kashmir and Ladakh.**
- **Latest Amendment:**
    - **Wildlife (Protection) Amendment Act, 2022**:
        - The **number of schedules has been reduced to four from earlier six.**
            - **Schedule I** contains animal species enjoying the highest level of protection.
            - **Schedule II** for animal species subject to a lesser degree of protection.
            - **Schedule III** for **protected plant species**, and
            - **Schedule IV** for scheduled specimens under **CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora).**

Way Forward

- Establishing a **robust and transparent mechanism** for the consultation and approval **process for Schedule I species,** and ensuring the participation and representation of the relevant stakeholders.
- Providing a **clear and rational explanation** for the exclusion of Schedule II species from the consultation and approval process, and the criteria for selecting the species.
- Strengthening the **enforcement and compliance of the wildlife trade law**s and regulations, and enhancing the penalties and incentives for the violators and the abiders.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. If a particular plant species is placed under Schedule VI of the Wildlife Protection Act, 1972, what is the implication? (2020)

(a) A licence is required to cultivate that plant.
(b) Such a plant cannot be cultivated under any circumstances.
(c) It is a Genetically Modified crop plant.
(d) Such a plant is invasive and harmful to the ecosystem.

Ans: (a)

Mains

Q. How does biodiversity vary in India? How is the Biological Diversity Act, 2002 helpful in the conservation of flora and fauna? **(2018)**

World's Largest Deep Sea Coral Reef

Source: DH

Why in News?

Scientists have mapped the largest known **deep-sea coral reef**, located off the **Atlantic coast** of the **United States.**

- The reef's existence has been acknowledged by scientists since the 1960s, but only recently has the advent of **underwater mapping technology** enabled the creation of **clear** 3D images depicting its dimensions.

What are the Features of the Newly Found Reef?

- **About:**
  - The reef spans approximately **500 km** in length, stretching from **Florida to South Carolina**. At certain points, its width reaches up to 110 km.
    - The reef's area is almost three times larger than **Yellowstone National Park.**
    - Discovered at depths ranging from 200 to 1,000 meters, **the reef exists in areas beyond the reach of sunlight.**
      - Unlike the recently found coral reef which is the largest in deep water, the **Great Barrier Reef is the largest coral reef system in Shallow water.**
  - A scientist mentioned the potential discovery of larger deep-sea reefs in the future, pointing out that only approximately **25% of the** world's ocean floor has been thoroughly mapped in high resolution.

What is the Difference Between Deep and Shallow Water Coral Reef?

Specifications	Shallow Water Coral	Deep Water Coral
Appearance	Brown & Green	White
Diversity	High	Low
Food	Rely on Photosynthetic algae	Feed on small plankton or available

		organic material
Habitats	Provides to sponges, crabs, etc	Provides to Sharks, Swordfish, Octopus etc
Type of Structure	Rock Like	Groves in the form of feathers, trees, etc
Growth Process	Require sunlight	Don’t require Sunlight
Distribution	Less coverage of ocean floor	Larger Coverage of ocean floor
Challenges	Climate Change, Disturbance from Oil and Gas Drilling	Climate Change, Disturbance from Oil and Gas Drilling

Coral Reefs

(Rainforests of the seas)

Drishti IAS

About

- **Large underwater structures** – made of skeletons of **colonial marine invertebrates 'coral'** – individually called **polyp**
- **Symbiotic** Relationship with **algae 'zooxanthellae'** (responsible for beautiful colours of corals)
- Support over 25% of marine biodiversity

Hard Corals vs Soft Corals

- **Hard Corals** - Rigid skeleton **made of $CaCO_3$ - reef-building** corals
- **Soft Corals** - Non reef-building

Great Barrier Reef (Australia)

- Largest Coral Reef in the World
- World Heritage Site (1981)
- Endures Mass Coral Bleaching

Corals in India

- Present in the areas of Gulf of Kutch, Gulf of Mannar, Andaman & Nicobar, Lakshadweep Islands and Malvan

Significance

- Coral reefs **protect coastlines from storms/erosion**, provide jobs, offer opportunities for recreation
- Source of **food/medicines**

Threats

- **Natural:** Temperature, Sediment Deposition, Salinity, pH, etc.
- **Anthropogenic:** Mining, Bottom Fishing, Tourism, pollution, etc.

Coral Bleaching

- Corals under stress - expel algae – thus turning white (bleached)
- Bleached corals - not dead – but, more risk of starvation/disease

Initiatives to Protect Corals

Technology

- Cyromesh: Storage of the coral larvae at (-196°C) - Can be later reintroduced to the wild
- Biorock: Creating artificial reefs on which coral can grow rapidly

Global

- International Coral Reef Initiative
- The Global Coral Reef R&D Accelerator Platform

Indian

National Coastal Mission Programme

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Prelims

Consider the following statements: (2018)

1. Most of the world's coral reefs are in tropical waters.
2. More than one-third of the world's coral reefs are located in the territories of Australia, Indonesia and Philippines.
3. Coral reefs host far more number of animal phyla than those hosted by tropical rainforests.

Which of the statements given above is/are correct?

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

Ans: (d)

Mains:

Q. Assess the impact of global warming on the coral life system with examples. **(2019)**

MoE Guidelines for Coaching Centres

Source: TH

Why in News?

Recently, the **Ministry of Education (MoE)** has introduced **comprehensive guidelines to regulate coaching centers** and manage the unregulated growth of private coaching centres.

What are the Major Guidelines for the Coaching Centres?

- **Age Restrictions:** Coaching centers are prohibited from **enrolling students below 16 years of age.** Student enrolment is allowed only after completing the **secondary school examination.**
- **Tutor Qualification:** Tutors must have at least a **graduation qualification**, and the hiring of individuals convicted of moral turpitude is prohibited. Moral turpitude means an act done contrary to honesty and good morals of the society.
- **Avoiding False Promises and Assurance:** Coaching institutes **cannot make misleading promises, guarantee ranks, or assure good marks.**
    - Misleading advertisements about coaching quality, facilities, or results are strictly prohibited.
- **Updated Website:** Coaching centers are required to have a website with updated information on tutor qualifications, courses, duration, hostel facilities, and fees.
- **Mental Well-being:** In response to rising student suicides, the guidelines emphasize the need for coaching centres to prioritize mental well-being.
    - This includes establishing a counseling system, **providing information about**

psychologists and counsellors, and training tutors in mental health issues.

- **Fee Regulations**: Tuition fees must be **fair and reasonable,** and refunds should be provided on a **pro-rata basis** if a student leaves a course prematurely.
- **Inclusive Policies:** Coaching institutes must refrain from discriminating based on religion, race, caste, sex, place of birth, or descent.
    - Special efforts can be taken to increase the representation of female students, those with disabilities, and marginalized groups.
- **Infrastructure Standards:** A minimum of one square metre per student during a class.
    - Coaching center buildings must comply with **fire safety codes, building safety codes, and other relevant standards.**
    - Buildings and surroundings must also be **Divyang-friendly,** following the provisions of the **Rights of Persons with Disabilities Act, 2016.**
- **Government Oversight:** The government proposes the registration of new and existing coaching centers within three months of the guidelines taking effect.
    - **State governments are tasked with monitoring coaching centre activities** and ensuring compliance with registration eligibility.
- **Penalties:** In case of violation of any of the terms and conditions of registration or general conditions, the coaching centre shall be liable for penalties as follows:
    - Rs 25,000/- for first offense
    - Rs. 1,00,000/- for the second offense
    - Revocation of registration for subsequent offense.

Note

According to the **Ministry of Education**, coaching means tuition, instructions or guidance in any branch of learning imparted to more than **50 students** but does not include **counseling, sports, dance, theatre and other** creative activities.

Light Emitting Diodes (LED)

Source: TH

Why in News?

The **Royal Swedish Academy of Sciences** made a statement declaring that while incandescent light bulbs illuminated the 20th century, the 21st century would be illuminated by LED lamps.

What are Diodes?

- A diode is an electronic component about **5 mm wide.** It has two points of contact, or terminals, called its **anode** and **cathode**.
- A diode's primary purpose is to allow current to flow in only **one direction**. It achieves this using a **P-N Junction Diode.**
- The P-N junction occurs at the interface of **p-type** and **n-type** semiconductors.
    - The **positive side** of the **semiconductor,** known as the **p-side, possesses an abundance of holes.**
    - The **negative side** of the **semiconductor,** referred to as the **n-side**, contains an **excess of electrons.**
        - **Electrons are 'places' inside atoms that carry negative charge.**

Note

- **Electrons:** An **electron is a subatomic particle with a negative charge** that can exist either bound to an atom or in a free state.
- **Hole:** In a **PN junction, "holes"** refer to the **absence of an electron** in the **valence band** of a **semiconductor material.**
    - When an electron from the **valence band** moves to a **higher energy level (conduction band)**, it leaves behind a **vacancy** in the valence band, known as a hole.
- **Band Gap:** The **band gap** is the energy difference between the **highest occupied** and the **lowest unoccupied** electronic states in a material.

What are Light Emitting Diodes (LED)?

- LEDs are semiconductors that can emit light when an electric current passes through them.
    - Inside the diode's p-n junction, the electrons have more energy than the holes. When an electron meets and occupies a hole, it releases energy into its surroundings.
- The **Nobel Prize in Physics** for **2014** was granted to **Isamu Akasaki, Hiroshi Amano** and **Shuji Nakamura.**
    - Their achievement was recognized for the invention of efficient **blue light-emitting diodes,** a breakthrough that paved the way for the creation of **bright and energy-efficient white light sources.**
    - **Red** and **green diodes** existed for a while, but the **lack of blue light** prevented the creation of **white lamps.**

What are the Difference Between Light Emitting Diodes (LED) and Liquid Crystal Display (LCD)?

LCD	LED
▪ LCDs primarily use fluorescent lights.	▪ LEDs use light-emitting diodes.
▪ Fluorescent Lights are usually placed behind the screen in LCD	▪ Light Emitting Diodes are positioned either behind the screen or along the edges.
▪ LCDs tend to be thicker and exhibit lower energy efficiency in comparison to LEDs.	▪ LEDs are thin and use less energy.
▪ LCD has a narrower viewing angle than LED.	▪ LEDs have a wider viewing angle than LCD.
▪ LCD uses mercury and is harmful to the environment.	▪ LED uses no mercury and is environmentally friendly.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q1. With reference to street lighting, how do sodium lamps differ from LED lamps? (2021)

1. Sodium lamps produce light in 360 degrees but it is not so in the case of LED lamps.
2. As street lights, sodium lamps have a longer lifespan than LED lamps.
3. The spectrum of visible light from sodium lamps is almost monochromatic while LED lamps offer significant colour advantages in street lighting.

Select the correct answer using the code given below.

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

Ans: (c)

Mains

Q. The Nobel Prize in Physics of 2014 was jointly awarded to Akasaki, Amano and Nakamura for the invention of Blue LEDs in the 1990s. How has this invention impacted the everyday life of human beings? **(2021)**

Rohan Bopanna: Oldest World No. 1 in Men's Doubles

Rohan Bopanna is set to become the oldest tennis player (at the age of 43) to achieve the world No. 1 ranking in men's doubles. He reached the semifinals of the **Australian Open** with **his partner Matthew Ebden.**

- Bopanna and Ebden **defeated the sixth-seeded Argentinian duo** of Máximo González and Andrés Molteni in the quarterfinals.
- **Bopanna** is set to **break the record established by USA's Rajeev Ram, becoming the oldest player to achieve the World No. 1 ranking.**
- **Bopanna is the fourth Indian**, following in the footsteps of Leander Paes**, Mahesh Bhupathi, and Sania Mirza, to attain the top spot** in the world doubles rankings.
    - He is **also the oldest player to claim a men's doubles title at a Masters 1000 event**, achieving this feat **at the age of 43 with Ebden at the Indian Wells tournament.**

Read more: Australian Open

Homi J Bhabha Death Anniversary

Homi Jehangir Bhabha (born **30th October 1909,** Mumbai, India) and died on **24th January, 1966** was a pioneering Indian physicist.

- He is regarded as the **father of** India's nuclear programme. He saw the importance of **nuclear power as a military deterrent** and source of energy, and laid the foundation of India's nuclear establishment.
- He founded and directed two of the institutions that would bring India into the nuclear age: the **Tata Institute of Fundamental Research (TIFR)** and the **Atomic Energy Establishment, Trombay**, later renamed the **Bhabha Atomic Research Centre (BARC) in his honour.**
- **India's three-stage nuclear power programme** was formulated by **Homi Bhabha** in the 1950s.
- Bhabha was the **first Indian to receive the Adams Prize in 1942**, the highest honour given by the **University of Cambridge.** Bhabha received the award for his **"theory of the elementary particles and their interactions".** He was also awarded the **Padma Bhushan.**

Read more: India’s Prospects as a Nuclear Power

Lake Victoria Restoration

Lake Victoria confronts a multitude of environmental challenges, necessitating united endeavours for its **restoration and conservation.**

- India-based think tank **Centre for Science and Environment (CSE)** and **National Environment Management Council (NEMC),** Tanzania conducted a multinational stakeholder consultation in **Dar es Salaam,Tanzania** recently to decide on strategies to restore the lake.

- **Lake Victoria** is the largest lake in Africa and the **world's second-largest freshwater lake.** Its shoreline is shared by **Kenya (6%), Uganda (43%), and Tanzania (51%).**

- The **Kagera, Katonga, Sio, Yala, Nyando, Sondu Miriu, and Mara** rivers feed the lake and the River **Nile** carries water out of the lake.

National Girl Child Day

National Girl Child Day (NGCD) is observed on **24th January every year** to shed light on the **challenges faced by girls in Indian society.**

- The day focuses on creating **awareness about the inequalities girls encounter** and advocates for equal opportunities in education, healthcare, and nutrition.
- NGCD was established by the **Ministry of Women and Child Development in 2008.**
  - The initiative acknowledges the unique challenges faced by girls, including child marriage**, and** gender-based violence.
- NGCD commemorates the inaugural anniversary of Beti Bachao, **Beti Padhao Scheme (Save the Girl Child, Educate the Girl Child)** launched on January 22, 2015.

Read more: National Girl Child Day
