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The Road Map to Mussoorie...

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NUCLEAR POWER IN INDIA

Context: The Union Government is readying multiple amendments to the overarching legislations governing the country's atomic energy sector.



Nuclear Power in India:

- It's the **6th largest source** of electricity in India, contributing about **2% of India's total electricity generation**. India currently has 22 nuclear reactors in 7 power plants, which together produce **6.78 GW of power**.
- Of these reactors, **18 are Pressurized Heavy Water Reactors (PHWRs) and 4 are Light Water Reactors (LWRs)**.
- In January 2021, the Kakrapar Atomic Power Project (KAPP-3), India's first 700 MWe unit and the biggest indigenously

developed variant of the PHWR, was connected to the grid.

- Union govt has allowed joint ventures between **Nuclear Power Corp. of India Ltd. (NPCIL) and PSUs**. NPCIL has joint ventures with National Thermal Power Corp. (NTPC) and Indian Oil Corp. Ltd. (IOCL).
- Govt is **aiding expansion of nuclear installations to new parts** of the country. For example, an upcoming plant in Gorakhpur (Haryana).
- India is also working on an entirely **indigenous thorium-based nuclear plant, "Bhavni,"** which will be the first of its kind using Uranium-233.
- **Experimental thorium plant 'Kamini'** already exists in Kalpakkam.
- **The upcoming nuclear power plant in Jaitapur (Maharashtra) would be world's most powerful** nuclear power plant with 6 state-of-the-art Evolutionary Power Reactors (EPRs).
- India aims to increase nuclear power capacity from to **22.4 GW by 2031**.
- Functioning of all nuclear power related facilities in India is governed by the **Atomic Energy Act of 1961**.

Bharat Small Reactors:

- In the 2024 Union Budget, the govt. announced that it will **partner with the private sector to develop Bharat Small Reactors (BSRs)**.

- BSRs are a **type of Small Modular Reactor (SMR)** designed for India's energy needs. These reactors are compact, factory-built reactors with a **power capacity of up to 300 MW**.
- They aim to provide a safe, cost-effective, and low-carbon energy source, particularly suitable for locations that cannot accommodate larger nuclear plants.
- Development of BSRs involves collaboration of Union Govt and the private sector. This marks a historic shift in India's nuclear policy, as **Atomic Energy Act, 1962 previously barred private sector participation**.
- BSRs, aligned with global trends in SMRs, are based on India's existing PHWR technology.

About Nuclear Energy:

- ✓ Nuclear energy is the energy released from the nucleus, or core, of atoms.
- ✓ It has high energy density, meaning that a small amount of nuclear fuel can produce a large amount of energy.
- ✓ There are two primary methods of harnessing nuclear energy:
 - **Nuclear Fission:** This is the process of splitting the nucleus of an atom into two smaller nuclei, releasing a large amount of energy in the process.
 - **Nuclear Fusion:** This is the process of combining the nuclei of two light atoms to form a heavier nucleus. This process powers the sun and other stars.



Nuclear power, along with hydrogen energy, were identified as key to India's Long Term Low Carbon Development Strategy (LT-LCDS) which was presented at COP 27 in Egypt (2022).

Source: Two key amendments to open up N-power sector likely in Winter Session, nuclear collaborations driven more by the need for capital than technology: Official (The Indian Express)

BIODIVERSITY BEYOND NATIONAL JURISDICTION (BBNJ) AGREEMENT

Context: An article in today's edition of The Hindu analyzes the challenges faced in proper implementation of the BBNJ Agreement.



About Biodiversity Beyond National Jurisdiction (BBNJ) Agreement:

- The BBNJ Agreement, also known as the "**High Seas Treaty**", falls under the United Nations Convention on the Law of the Sea (**UNCLOS**).
- It addresses the **protection of marine biodiversity in the high seas** through international cooperation and sustainable practices.


- The agreement **prohibits sovereign rights over high seas resources and promotes the fair sharing of benefits**, an inclusive ecosystem-centric approach, and the use of traditional and scientific knowledge.
 - It will help achieve the **30x30 target** set at UN Convention on Biological Diversity (CBD) COP15 Agreement (called the **Kunming Montreal Global Biodiversity Framework**), under which countries agreed to **protect 30% of global oceans by 2030**.
 - It aims to minimize environmental impacts and support the achievement of **SDG 14 (Life Below Water)**.
 - BBNJ Agreement will become the **3rd implementation agreement under UNCLOS**, alongside the agreements on mineral resources and fish stocks.
 - **India signed the BBNJ Treaty in Sept 2024, but has yet to ratify it.**
- Identifying, prevention, and management of potential adverse effects.
 - **Consent from Indigenous Community:**
 - Marine resources in high seas held by indigenous people and local communities accessed only with their informed consent and involvement.
 - No State has rights over marine bio-resources in such areas.
 - **Clearing-House Mechanism (CHM):**
 - Members to provide CHM - with details like research objective, geographical area of collection, names of sponsors, etc.
 - **Funding:**
 - A special fund will be established which will be fixed by the COP of UNCBD.

Significance of the High Seas:

Salient Features of the BBNJ Treaty

- **Access and Benefit-sharing Committee:**
 - Will set up an access- and benefit-sharing committee to frame guidelines.
 - Activities concerning marine genetic resources in the interests of all States and for benefit of humanity.
 - They have to be carried out only for peaceful purposes.
 - **Environmental Impact Assessments (EIA):**
 - Signatories to conduct EIAs before exploitation of marine resources.
- Accounts for **>65% of world's ocean area and 50% of Earth's surface** – the biggest hub of marine life.
 - It is home to around **2.7 lakh known species** – and many more are yet to be discovered, according to scientists.
 - **Regulates the climate** by playing a fundamental role in carbon cycle.
 - Helps in **mitigating effects of climate change** through absorption of carbon, storing solar radiation, distributing heat around the globe.
 - Serves as a **wealth of resources and services** - seafood and raw materials, medicinal resources, aesthetic, scientific & cultural services.

- These areas are currently poorly regulated and **only 1% of them are protected.**

 Under UNCLOS, areas within 12 nautical miles off the coastline are called “territorial waters”. From 12 to 24 nautical miles lies the “contiguous zone”. The Exclusive Economic Zone (EEZ) extends till 200 nautical miles off the coast. The ocean areas beyond the EEZ are called “high seas” and are not subject to any nation’s jurisdiction.

Source: *What are the challenges with the High Seas Treaty? (The Hindu)*

PM’S DEVELOPMENT INITIATIVE FOR NORTH EAST REGION (PM-DEVINE)

Context: Ministry of Development of North Eastern Region (MoDoNER) laid the foundation stone for the Integrated Sohra Tourism Circuit in Meghalaya under the PM-DevINE scheme.



About PM-DevINE Scheme:

- It was announced as a **Central Sector scheme**, with 100% Central funding in the Union Budget 2022-23., with a total financial

outlay of Rs 6600 crore for the **period from 2022-23 to 2025-26.**

- This is co-terminus with the period of the **15th Finance Commission.**
- It will lead to creation of infrastructure, support industries, social development projects and create livelihood activities for youth and women, thus leading to employment generation.
- It funds key infra and social projects, supports youth and women livelihoods, and bridges development gaps in line with the **PM GatiShakti vision.**
- As of February 2025, a total of **36 projects worth Rs 4,927 crore** have been sanctioned under PM-DevINE scheme.
- It prioritises funding for projects that tackle critical **social issues** and improve the **quality of life** for residents in NER.
- It emphasizes creating **sustainable livelihood** opportunities specifically for **youth and women**, fostering greater participation in the region’s growth.
- It focuses on **bridging developmental disparities** in sectors not covered by other schemes, enhancing regional balance.
- **Ineligible Projects:**
 - Excludes projects involving Direct Benefit Transfers (**DBT**) or those providing **long-term individual benefits.**
 - Projects related to **administrative buildings, government offices**, or sectors already addressed by existing MDoNER schemes or listed in a **Negative List.**

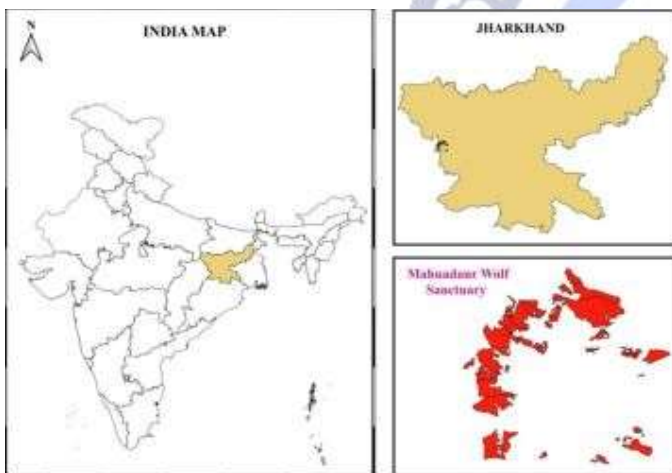
Achievements under PM-DevINE:

- 35 projects worth Rs 4857.11 crore include initiatives such as cancer care facilities, university infrastructure upgrades, and radiation oncology centers.
- Road connectivity projects have developed new roads, connecting remote villages, reducing travel time, and boosting local economies.
- Smart water supply projects providing integrated drinking water systems have directly benefited over 1 lakh residents.

Source: Jyotiraditya Scindia lays foundation stone for Integrated Sohra Tourism Circuit under PM-DevINE (PIB)

PLACES IN NEWS

Mahuadanr Wolf Sanctuary



- It is India's **first and only sanctuary dedicated solely to the Indian grey wolf**
- It is located in **Mahuadanr valley in Jharkhand**. It lies within the Chhota Nagpur plateau, bordering the **Palamau Tiger Reserve**.
- It is characterized by rocky hills, **dry deciduous forests**, scrublands, and streams. The major river which drains the Mahuadanr valley is **Burha River**.

- Indian grey wolf (**Canis lupus pallipes**) is a subspecies of the grey wolf, found across Southwest Asia and the Indian subcontinent.
 - It lives in **smaller packs** and is less vocal compared to other wolf species. It is primarily **nocturnal**, hunting from dusk to dawn.
 - It is well-adapted to warmer climates and typically inhabits **scrublands, grasslands, and semi-arid agroecosystems**.
 - Conservation Status:
 - IUCN Red List: **Endangered**
 - CITES: Appendix I
 - Wildlife (Protection) Act, 1972: Schedule I

Bhavani Island



- Bhavani Island is situated in the midst of the **Krishna River**, at Vijayawada, Andhra Pradesh.
- It is located at the upstream of **Prakasam Barrage**. It is considered as one of the **largest river islands in India**, with an area of 133 acre.
- It is named after the **Goddess Bhavani or Kanaka Durga** whose temple is on the Indrakeeladri hill close to the island.
- The island's landscape is **relatively flat**, with gentle slopes leading down to the water's edge.
- It is surrounded by **mangrove forests** and is home to several birds: the kingfisher heron,

the egret, and the black-capped kingfisher bird.

- Bhavani Island is a premier destination for **water sports and recreation**.

Rowmari- Donduwa Wetland Complex



- Environmentalists in Assam have **proposed the Rowmari-Donduwa Wetland Complex for designation as a Ramsar Site**, citing its exceptional biodiversity and ecological services.
- Rowmari-Donduwa Wetland Complex is situated within the **Laokhowa-Burhachapori Wildlife Sanctuary**, Nagaon district, Assam, forming part of the **Kaziranga-Orang landscape**.
- It is an interconnected **floodplain-marsh system** acting as an ecological corridor between Kaziranga and Orang National Parks, supporting wildlife movement and genetic diversity.
- The 6th Kaziranga Wetland Bird Census (2025) recorded **47,000+ birds of 120 species** at this location, exceeding counts from Deepor Beel & Loktak Lake.
- Hosts globally threatened birds such as Knob-billed Duck, Lesser Adjutant Stork, Black-necked Stork, Ferruginous Pochard, and Common Pochard.

- It also provides ecosystem services such as flood control, groundwater recharge, carbon storage, and supports fisheries and ecotourism-based livelihoods.
- It **fulfils 8 of 9 Ramsar criteria**, qualifying as a Wetland of International Importance.

Bahrain



- Bahrain's Foreign Minister is currently in India as part of an official visit, and has been holding talks with Indian officials over expanding trade and defence ties.
- Bahrain, officially the Kingdom of Bahrain, is an **island country in West Asia**. Situated on the **Persian Gulf**, it comprises a small archipelago of 50 natural islands and an additional 33 artificial islands.
- Bahrain is situated between **Qatar** and the northeastern coast of **Saudi Arabia**.
- The population is **1,501,635** as of 2023, of whom 712,362 (47% of the population) are Bahraini nationals. is the **third-smallest nation in Asia** after Maldives and Singapore.
- Its capital and largest city is **Manama**.
- In the late 19th century, following successive treaties with the British, Bahrain became a **protectorate of the United Kingdom**. In **1971, it declared independence**. Formerly

an emirate, Bahrain was declared a **semi-constitutional monarchy in 2002**.

- The ruling **Sunni Muslim Al Khalifa royal family** has been criticised for violating the human rights of groups including dissidents, political opposition figures, and its Shia Muslim population.
- Bahrain is known as **one of the first post-oil economies in the Persian Gulf**, the result of decades of investing in the banking and tourism sectors.
- Many of the world's largest financial institutions have a presence in Manama. But despite this, oil revenues still constitute a significant part of its government budget.
- It is recognised by the World Bank as a **high-income economy**.

PRACTICE QUESTIONS

Q1. Consider the following statements regarding the use of nuclear power in India:

1. Most of India's nuclear reactors are Light Water Reactors (LWRs).
2. Nuclear power was identified as key to India's Long Term Low Carbon Development Strategy (LT-LCDS) presented at COP 27 in 2022.
3. Bharat Small Reactors, proposed in the 2024 Budget, seek to attract private finance to enhance deployment of nuclear energy.

How many of the above statements are correct ?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q2. This wetland was recently proposed for designation as a Ramsar Site. It is a floodplain-marsh ecosystem that forms part of the Kaziranga-Orang landscape and acts as an ecological corridor. It hosts one of the highest wetland bird populations in India.

Identify the wetland described above:

- (a) Rowmari-Donduwa
- (b) Deepor Beel
- (c) Umiam Lake
- (d) Lake Tsomgo

Q3. Consider the following islands located in India:

1. Bhavani Island
2. St. Mary's Island
3. Sagar Island
4. Menchal Island

Arrange these islands in a north-to-south orientation:

- (a) 3-4-2-1
- (b) 2-3-1-4
- (c) 3-1-4-2
- (d) 3-1-2-4

Q4. Consider the following statements regarding the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement:

1. It has been created under the aegis of the UN Convention on Biological Diversity (UNCBD).
2. It will help achieve the 30x30 target set at the UNCBD COP15 Agreement (Kunming-Montreal Global Biodiversity Framework).
3. The agreement applies to areas that lie beyond the Exclusive Economic Zone (EEZ) of countries.

4. The agreement prohibits exclusive sovereign rights over high seas' resources and promotes the fair sharing of benefits.

Which of the afore mentioned statements are correct ?

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

Q5. Consider the following nations located in West Asia:

- 1. Iraq
- 2. Jordan
- 3. Bahrain
- 4. Oman
- 5. UAE
- 6. Kuwait
- 7. Yemen

Which of these nations share a coastline with the Persian Gulf ?

- (a) 2, 3, 4, 6 and 7
- (b) 1, 3, 4, 5 and 7
- (c) 1, 3, 4, 5 and 6
- (d) 1, 2, 4, 5 and 6



Answers:

- 1. B
- 2. A
- 3. D
- 4. C
- 5. C