DAILY CURRENT AFFAIRS 09-07-2025

GS-2

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GS-3

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Atomic Energy Regulatory Board (AERB)

Syllabus: GS-2: Statutory and non-statutory bodies.

Context:

- The Atomic Energy Regulatory Board (AERB) has granted operational licences for two indigenously developed 700 MWe Pressurised Heavy Water Reactors (PHWRs) at the Kakrapar Atomic Power Station (KAPS), Gujarat.
- This marks a major advancement in India's indigenous nuclear power programme.

About AERB

Aspect	Details
Established	15 November 1983
Constituted by	The President of India under the **Atomic Energy Act, 1962**
Legal Basis	Derived from: • Atomic Energy Act, 1962 • Environment (Protection) Act, 1986
Headquarters	**Mumbai**, Maharashtra
Mission	To ensure that **ionizing radiation and nuclear energy** are used in India **without undue risk** to health and environment
Regulatory Scope	Includes: • Radiation safety • Nuclear safety • Industrial safety under **Factories Act, 1948** for DAE units
Reporting	The Board is responsible to the **Atomic Energy Commission**
Licensing Role	AERB licence is **mandatory** for all activities involving ionizing radiation and nuclear energy

Structure and Members

- **Total Members**: 6

- **2 whole-time members** (including the Chairman)
- **Executive Director** of the Secretariat is a **whole-time ex-officio member**
- **4 part-time members** are experts from relevant disciplines

- **Chairman**: Heads the Board and is responsible for executive functions

AERB Institutions

Name	Function	Location
Regional Regulatory Centres (RRCs)	Surveillance of radiation facilities	Kolkata, Chennai, New Delhi
Safety Research Institute (SRI)	Safety research on nuclear and radiation issues	Kalpakkam, Tamil Nadu

Significance

- Ensures **safe use of nuclear energy** in India.
- Prevents environmental and public health hazards from radiation exposure.
- Supports **self-reliance in nuclear energy** with safety as a priority.

North Eastern Region District SDG Index

Syllabus: GS-2; Governance

Context

- Mizoram, Tripura & Nagaland districts top performers in NITI Aayog's North-East SDG Index 2023-24.

What is it?

- The North Eastern Region District SDG Index is a composite index developed by NITI Aayog, in collaboration with the **Ministry of Development of North Eastern Region (MDoNER) and UNDP** India, to assess the performance of districts in the 8 North Eastern States on the **Sustainable Development Goals (SDGs).**

Objectives

- To track **progress at the district level** across the NE region
- Enable **data-driven governance** and **targeted developmental planning**
- Foster **competitive federalism** and **district-level accountability**
- Help localize global SDG targets through regional insights

Coverage

- Covers 131 districts, which is 92 percent of the total districts across the 8 North Eastern states: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura

Indicators and SDGs

- Uses 84 indicators across 15 SDGs
- SDG 14 (Life Below Water) and SDG 17 (Partnerships) were excluded due to limited district-level applicability
- Key themes include poverty, hunger, health, education, gender equality, clean water and sanitation, clean energy, industry, innovation, economic growth, and sustainable consumption and production

Scoring and Classification

The composite score ranges from 0 to 100

- A score of 100 indicates full achievement on all applicable indicators
- Districts are categorized into four performance groups
    - Achiever: Score equals 100
    - Front Runner: Score between 65 and 99
    - Performer: Score between 50 and 64
    - Aspirant: Score below 50

Top Performing Districts

The top five performing districts in the latest index are:

1. Hnahthial, Mizoram (Score: 81.43)
2. Champhai, Mizoram
3. Gomati, Tripura
4. West Tripura, Tripura

5. Mokokchung, Nagaland

These districts performed well in sectors like health, sanitation, education, and gender equality.

Lowest Performing District

- Longding district in **Arunachal Pradesh** scored the lowest with a score of 58.71

Significance of the NER District SDG Index

- **Localizes Global Goals:** Brings Sustainable Development Goals (SDGs) to the district level, making them actionable in the North East.
- **Promotes Data-Driven Governance:** Assists in evidence-based policy-making and targeted developmental interventions.
- **Identifies Disparities:** Highlights both inter-state and intra-state development gaps for focused action.
- **Encourages Competitive Federalism:** Motivates districts and states to improve through performance-based rankings.
- **Ensures Accountability**: Increases transparency and public participation by making district performance data accessible.
- **Supports Better Planning:** Helps allocate resources more efficiently by identifying priority areas.
- **Drives Inclusive Development:** Focuses on health, education, poverty, sanitation, and gender equality, ensuring holistic regional progress.

International Treaty on Plant Genetic Resources for Food and Agriculture

Syllabus: GS-3: Intellectual Property Rights – IPR laws.

Context:

India has raised concerns over proposed amendments to the **International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty)** during a meeting held in **Peru**.

About the Plant Treaty

- **Full Name:** International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)
- **Adopted by:** FAO in **2001**, entered into force in **2004**
- **India's Role:** A signatory to the treaty
- **Linked to:**
    - Convention on Biological Diversity (CBD)
    - FAO's Global Plan of Action on Plant Genetic Resources

Objectives of the Treaty

- Conservation and **sustainable use** of plant genetic resources
- **Fair and equitable benefit-sharing** arising from their use
- **Ensuring food security** and safeguarding **agrobiodiversity**

Key Features

1. Multilateral System (MLS)

- Covers **64 food and forage crops** listed in **Annex I** (e.g., rice, wheat, maize, pulses)
- Facilitates **international access** to plant genetic material
- Ensures benefit-sharing via:
    - Technology transfer
    - Capacity building
    - Commercial benefit-sharing

2. Standard Material Transfer Agreement (SMTA)

- Legal mechanism for **access and exchange** of plant genetic material
- Defines rights and responsibilities of providers and recipients

3. Farmers' Rights (Article 9)

- Right to **save, use, exchange, and sell farm-saved seeds**
- Recognition of **indigenous knowledge** and **traditional farming practices**
- Involvement of farmers in **policy decision-making**

4. Global Information System (Article 17)

- Promotes **data sharing** and global cooperation on plant genetic resources

Proposed Amendments – Why India Objects

- **What is proposed?**
  - **Expansion of the MLS** to cover **all plant germplasm**
  - Obligatory sharing via **Governing Body-approved SMTA**, bypassing **national laws**
- **India's Concerns:**
  - **Loss of national sovereignty** over native and indigenous plant varieties
  - **Dilution of control** under India's own legal frameworks like **PPV&FR Act**
  - Threatens **traditional seed systems**, especially among **smallholder farmers**
  - May **undermine Farmers' Rights** as guaranteed in Article 9

Significance

- India's stance highlights the tension between **global obligations** and **national interest** in protecting **biodiversity**, **food sovereignty**, and **traditional knowledge**.

Pressurized Heavy Water Reactors

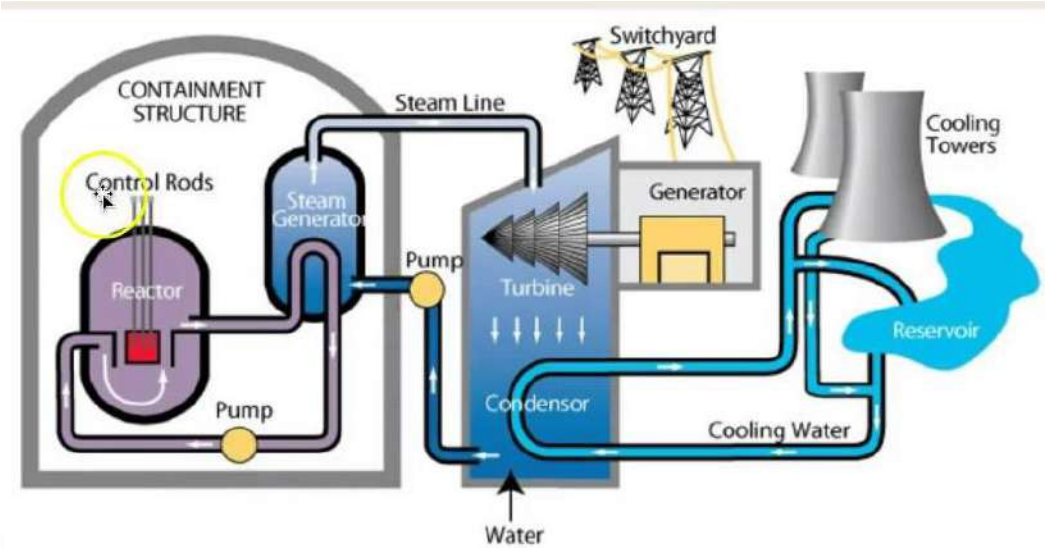
Syllabus: GS-3; Science & Technology

Context

India's nuclear regulator **Atomic Energy Regulatory Board** has granted operation license for two indigenously developed 700 MW Pressurised Heavy Water Reactors at the **Kakrapar Atomic Power Station in Gujarat.**

1. About

- **PHWR (Pressurized Heavy Water Reactor)** is a type of nuclear reactor that uses **heavy water (D_2O)** as a **moderator and coolant**.
- It is commonly used in **India's nuclear power program** due to its ability to use **natural uranium** as fuel (no enrichment required).
- **Developed by Canada** (CANDU reactor), India adopted and indigenized the technology.



2. Key Features of PHWR

- **Fuel:** Natural uranium (U-238 + 0.7% U-235).
- **Moderator:** Heavy water (D_2O) – slows down neutrons to sustain fission.
- **Coolant:** Pressurized heavy water (to transfer heat).
- **Pressure Tube Design:** Unlike Light Water Reactors (LWRs), PHWRs use **pressure tubes** instead of a large pressure vessel.
- **Online Refueling:** Fuel can be replaced without shutting down the reactor.

3. Advantages of PHWR

- **No Uranium Enrichment Needed** – Uses natural uranium, reducing fuel costs.
- **Higher Neutron Economy** – Efficient use of neutrons, allowing use of thorium in future.
- **Online Refueling** – Ensures continuous power generation.
- **Indigenous Development** – India has mastered PHWR technology (e.g., IPHWR-700).

4. Disadvantages of PHWR

- **Heavy Water Cost**: D_2O is expensive to produce.
- **Risk of Heavy Water Leakage:** Requires strict maintenance.
- **Lower Power Density** Compared to LWRs.

5. PHWRs in India

- **First PHWR:** Rajasthan Atomic Power Station (RAPS-1, 1973, with Canadian assistance).
- **Indigenous PHWRs:**
  - IPHWR-220 (220 MWe) – e.g., Madras, Narora, Kakrapar.
  - IPHWR-540 (540 MWe) – e.g., Tarapur.
  - **IPHWR-700 (700 MWe)** – Latest indigenous design (e.g., Kakrapar-3, first 700 MWe PHWR).
- **Future Plans:** More 700 MWe units under construction (e.g., Gorakhpur Haryana Anu Vidyut Pariyojana).

6. PHWR vs. Other Reactors

Feature	PHWR (India)	LWR (US/Russia)	Fast Breeder Reactor (FBR)
Fuel	Natural Uranium	Enriched Uranium	Plutonium/Uranium-233
Moderator	Heavy Water	Light Water	None (Fast Neutrons)
Coolant	Heavy Water	Light Water	Liquid Sodium
Refueling	Online	Shutdown Required	Shutdown Required

7. Importance for India's Nuclear Program

- **Three-Stage Nuclear Program:**
  - **Stage 1:** PHWRs (Natural U → Plutonium).
  - **Stage 2:** Fast Breeder Reactors (Plutonium + Thorium → U-233).
  - **Stage 3:** Thorium-Based Reactors.
- **Self-Reliance:** PHWRs reduce dependency on imported enriched uranium.

National Biobank

Syllabus: GS-3: Science and Technology – Medical Science.

Context:

Recently, National BiobankLaunched byUnion Minister at **CSIR-IGIB**, New Delhi

Developed by:

- Council of Scientific and Industrial Research (CSIR)
- Institute of Genomics and Integrative Biology (IGIB)
- Supported by: Ministry of Science and Technology, Government of India

What is the National Biobank?

- A **centralised genomic and clinical data repository** capturing **India's ethnic, lifestyle, and health diversity**.
- Aims to track **disease patterns** and **gene-environment interactions** over time.
- Integral to **Phenome India**, a **longitudinal cohort study** for deep phenotyping.

Objectives

- Build **India-specific population health and genome database**
- Develop **personalised and predictive healthcare models**
- Enable **AI-powered diagnostics** and **gene-guided therapies**
- Support research on:

- Rare diseases
- Antimicrobial resistance (AMR)
- Cancer
- Diabetes
- Cardiovascular diseases

Key Features

- Collects **genomic, lifestyle, and clinical data** from **10,000+ individuals** across India.
- Modelled on the **UK Biobank**, but adapted for:
  - India's **geographical**, **caste**, **ethnic**, and **socio-economic** diversity.
- Facilitates **long-term tracking** of:
  - Disease susceptibility
  - Treatment response
  - Environmental health effects

Significance

- Positions India as a **global leader in genomics and personalised medicine**
- Promotes **Atmanirbhar Bharat** in health-data infrastructure
- Catalyses:
  - **Preventive and precision healthcare**
  - **Low-cost indigenous CRISPR therapies**
- Boosts India's capacity in **bioinformatics**, **AI-health applications**, and **clinical genomics**