



Daily PIB Summary

16 July, 2026

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1. INDIA'S FIRST HYDROGEN-POWERED TRAIN: ADVANCING GREEN RAIL MOBILITY



- The hydrogen-powered train will operate using **hydrogen fuel cell technology**, generating electricity through the electrochemical reaction of hydrogen and oxygen.
- The only by-products of the process are **water and heat**, making it a zero tailpipe emission technology.
- The project is initially planned for operation on selected heritage and non-electrified railway routes.
- Hydrogen-powered trains offer a cleaner alternative to diesel locomotives, especially where railway electrification is not economically feasible.
- The initiative is expected to reduce greenhouse gas emissions, improve energy efficiency, and promote the adoption of green hydrogen in the transport sector.
- The project also encourages indigenous development of hydrogen technologies under the **Atmanirbhar Bharat** initiative.
- It strengthens India's transition towards sustainable and low-carbon transportation.
- The initiative complements broader efforts to develop a domestic **green hydrogen ecosystem**.

BACKGROUND / CONTEXT

Hydrogen Fuel Cell Train

- A hydrogen fuel cell train uses **fuel cells** to convert hydrogen into electricity through an electrochemical process.
- The electricity powers electric traction motors.
- **By-products:** Water vapour and heat.
- Unlike diesel engines, fuel cells produce **no direct carbon dioxide emissions**.

National Green Hydrogen Mission

- **Launched:** 2023.
- **Nodal Ministry:** Ministry of New and Renewable Energy (MNRE).
- **Objective:** Make India a global hub for the production, utilization, and export of **green hydrogen** and its derivatives.

Indian Railways and Decarbonization

- I. Indian Railways aims to become a **Net Zero Carbon Emitter by 2030**.
- II. Key initiatives include:
 - A. 100% railway electrification.
 - B. Renewable energy adoption.
 - C. Energy-efficient technologies.
 - D. Hydrogen-powered trains.
 - E. Biofuel and alternative fuel initiatives.

KEY HIGHLIGHTS

- **Project:** India's first hydrogen-powered train.
- **Implementing Agency:** Indian Railways.
- **Technology:** Hydrogen fuel cell propulsion.
- **Primary Objective:** Promote zero-emission rail transport and green mobility.
- **Environmental Significance:** Reduces greenhouse gas emissions and air pollution.
- **Energy Significance:** Supports clean energy transition and hydrogen economy.
- **Economic Significance:** Promotes indigenous hydrogen technology and reduces fossil fuel dependence.



- **Challenges:** High production cost of green hydrogen, storage infrastructure, fuel cell costs, and scaling up hydrogen supply chains.
- **Way Forward:** Expand green hydrogen production, develop refuelling infrastructure, encourage domestic manufacturing of fuel cells, and integrate hydrogen technology into public transport systems.

PRELIMS BOOSTER BOX

- **Hydrogen Fuel Cell:** Converts hydrogen and oxygen into electricity through an electrochemical reaction, producing **water and heat** as by-products.
- **Green Hydrogen:** Hydrogen produced using renewable electricity through the **electrolysis of water**, with negligible carbon emissions.
- **Grey Hydrogen:** Produced from natural gas or coal without carbon capture; associated with significant CO₂ emissions.
- **Blue Hydrogen:** Produced from fossil fuels with **Carbon Capture, Utilisation and Storage (CCUS)** technologies.
- **National Green Hydrogen Mission:** Launched in **2023** under the **Ministry of New and Renewable Energy (MNRE)**.
- **Electrolysis:** Process of splitting water into hydrogen and oxygen using electricity.
- **Fuel Cell:** An electrochemical device that continuously converts chemical energy into electrical energy without combustion.
- **Net Zero Emissions:** Achieving a balance between greenhouse gas emissions produced and those removed from the atmosphere.
- **Indian Railways' Net Zero Target: 2030.**
- **Hydrogen Economy:** An economic system where hydrogen serves as a major clean energy carrier for transport, industry, and power generation.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. A **hydrogen fuel cell** generates electricity through an electrochemical reaction between hydrogen and oxygen.
2. **Green hydrogen** is produced by electrolysis of water using renewable energy.
3. The **National Green Hydrogen Mission** is implemented by the **Ministry of New and Renewable Energy (MNRE)**.

Which of the statements given above is/are correct?

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

Answer: (d)

2. INDIAN NAVY SET TO COMMISSION THE LATEST ANTI-SUBMARINE WARFARE SHALLOW WATER CRAFT (ASW-SWC) 'MALVAN'



- I. **INS Malvan** is part of the **Anti-Submarine Warfare Shallow Water Craft (ASW-SWC)** programme of the Indian Navy.
- II. The vessel is designed for **detecting, tracking, and neutralising enemy submarines** operating in shallow coastal waters.
- III. Besides anti-submarine operations, the ship can undertake:
 - A. Coastal surveillance.
 - B. Search and rescue (SAR).



- C. Low-intensity maritime operations.
- D. Mine-laying (where required).
- IV. It is equipped with advanced **sonars, underwater sensors, lightweight torpedoes, and anti-submarine rockets**.
- V. The induction enhances India's maritime security and complements the Navy's coastal defence architecture.
- VI. The project promotes indigenous shipbuilding and defence manufacturing under **Aatmanirbhar Bharat** and **Make in India**.
- VII. The vessel strengthens India's preparedness against emerging underwater threats in the **Indian Ocean Region (IOR)**.
- VIII. It reflects India's focus on modernizing naval capabilities and safeguarding maritime interests.

BACKGROUND / CONTEXT

ASW Shallow Water Craft (ASW-SWC)

- I. A class of indigenously built warships designed specifically for **anti-submarine warfare in shallow coastal waters**.
- II. Built for:
 - A. Detection and destruction of submarines.
 - B. Coastal patrol.
 - C. Maritime surveillance.
 - D. Search and Rescue (SAR).
 - E. Protection of ports and offshore installations.

Key Features

- Advanced hull-mounted sonar.
- Lightweight torpedoes.
- Anti-submarine rocket systems.
- Modern electronic warfare and communication systems.
- High manoeuvrability for shallow-water operations.

Importance of Anti-Submarine Warfare (ASW)

- Detects and neutralizes hostile submarines.
- Protects sea lines of communication (SLOCs).
- Secures ports, harbours, and offshore infrastructure.
- Enhances maritime domain awareness.
- Strengthens deterrence in the Indian Ocean Region.

KEY HIGHLIGHTS

- **Vessel:** INS Malvan.
- **Type:** Anti-Submarine Warfare Shallow Water Craft (ASW-SWC).
- **Operator:** Indian Navy.
- **Primary Role:** Anti-submarine warfare in shallow coastal waters.
- **Strategic Significance:** Enhances coastal security, underwater surveillance, and maritime deterrence.
- **Defence Significance:** Strengthens indigenous naval capability and force modernization.
- **Economic Significance:** Promotes domestic shipbuilding and defence manufacturing.
- **Challenges:** Rapidly evolving underwater warfare technologies, maintenance of advanced sensors, and expanding submarine activity in the Indian Ocean.
- **Way Forward:** Accelerate induction of indigenous naval platforms, integrate AI-enabled underwater surveillance, strengthen maritime domain awareness, and expand indigenous defence production.

PRELIMS BOOSTER BOX

- **ASW: Anti-Submarine Warfare**—operations to detect, track, and neutralize enemy submarines.
- **ASW-SWC: Anti-Submarine Warfare Shallow Water Craft**, designed for operations in littoral and coastal waters.



- **Indian Ocean Region (IOR):** A strategically important maritime region connecting major global trade routes.
- **Sea Lines of Communication (SLOCs):** Primary maritime routes essential for international trade, energy supplies, and naval movement.
- **Sonar (Sound Navigation and Ranging):** Uses sound waves to detect and locate underwater objects such as submarines.
- **Lightweight Torpedo:** A guided underwater weapon primarily used against submarines.
- **Maritime Domain Awareness (MDA):** Effective understanding of activities in the maritime domain that could impact security, safety, economy, or the environment.
- **Aatmanirbhar Bharat in Defence:** Government initiative to promote indigenous design, development, and manufacturing of defence equipment.
- **Make in India (Defence):** Initiative to enhance domestic defence production and reduce import dependence.
- **Search and Rescue (SAR):** Operations to locate and assist persons in distress at sea.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. **Anti-Submarine Warfare (ASW)** involves operations to detect and neutralize hostile submarines.
2. **Sonar** uses sound waves to detect underwater objects.
3. **Sea Lines of Communication (SLOCs)** are important maritime routes critical for global trade and strategic movement.

Which of the statements given above is/are correct?

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

Answer: (d)

3. INDIA ACHIEVES MAJOR MILESTONE AT CODEX COMMISSION WITH ADOPTION OF THREE GLOBAL STANDARDS FOR SPICES



- The **Codex Alimentarius Commission** adopted three international standards for spices, with India playing a key role in their development.
- The standards aim to ensure **quality, safety, authenticity, and fair trade practices** in the global spice market.
- Harmonized standards reduce technical barriers to trade and improve market access for exporters.
- The adoption is expected to enhance the global competitiveness of Indian spices by promoting uniform quality benchmarks.
- The initiative supports consumer protection by ensuring safe and high-quality spice products.
- India, being the world's largest producer, consumer, and exporter of several spices, stands to benefit significantly from these internationally recognized standards.
- The achievement reflects India's growing influence in global food standard-setting processes.
- It also aligns with the objective of increasing agricultural exports and strengthening India's food processing sector.

BACKGROUND / CONTEXT

Codex Alimentarius Commission (CAC)

- **Established:** 1963.
- **Created by:** Food and Agriculture Organization (FAO) and World Health Organization (WHO).
- Develops **international food standards, guidelines, and codes of practice** to protect consumer health and ensure fair practices in food trade.
- The collection of standards is known as the **Codex Alimentarius** ("Food Code").

Codex Committee on Spices and Culinary Herbs (CCSCH)

- **Host Country:** India.
- Established in **2013** under the Codex Alimentarius Commission.
- Develops international standards for spices and culinary herbs to facilitate safe and fair global trade.

Spices Board India

- **Established:** 1987 under the **Spices Board Act, 1986**.
- **Administrative Ministry:** Ministry of Commerce and Industry.
- Responsible for the promotion, development, quality improvement, and export of Indian spices.

KEY HIGHLIGHTS

- **Organisation:** Codex Alimentarius Commission (CAC).
- **Achievement:** Adoption of three global standards for spices.
- **India's Role:** Active contributor and host of the Codex Committee on Spices and Culinary Herbs (CCSCH).
- **Economic Significance:** Enhances spice exports, improves market access, and strengthens India's global leadership in the spice trade.

- **Consumer Significance:** Ensures food safety, quality assurance, and consumer protection.
- **Trade Significance:** Reduces technical barriers to international trade through harmonized standards.
- **Challenges:** Ensuring compliance by small producers, traceability, quality certification, and meeting stringent export requirements.
- **Way Forward:** Strengthen quality testing infrastructure, improve farmer awareness, promote Good Agricultural Practices (GAP), enhance traceability, and expand value-added spice exports.

PRELIMS BOOSTER BOX

- **Codex Alimentarius Commission (CAC):** Established in **1963** by the **FAO** and **WHO** to develop international food standards.
- **Codex Alimentarius:** Collection of internationally recognized food standards, guidelines, and codes of practice.
- **FAO: Food and Agriculture Organization** of the United Nations, established in **1945**.
- **WHO: World Health Organization**, established in **1948**.
- **Codex Committee on Spices and Culinary Herbs (CCSCH):** Established in **2013**; **India** is the host country.
- **Spices Board India:** Constituted under the **Spices Board Act, 1986** and established in **1987** under the **Ministry of Commerce and Industry**.
- **Good Agricultural Practices (GAP):** Sustainable farming practices that ensure food safety, quality, environmental protection, and worker welfare.
- **Technical Barriers to Trade (TBT):** Non-tariff measures such as standards, testing, certification, and labeling requirements that may affect international trade.
- **Traceability:** Ability to track a food product through all stages of production, processing, and distribution.



- **India's Position:** India is among the **world's largest producer, consumer, and exporter of spices**, exporting over **200 varieties of spices and spice products**.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The **Codex Alimentarius Commission (CAC)** was established jointly by the **FAO** and the **WHO**.
2. **India** hosts the **Codex Committee on Spices and Culinary Herbs (CCSCH)**.
3. The **Spices Board India** functions under the **Ministry of Commerce and Industry**.

Which of the statements given above is/are correct?

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

Answer: (d)

4. ICMR STUDY FINDS DRONE-ENABLED TB SAMPLE TRANSPORT CAN REDUCE DIAGNOSIS TIME AND PATIENT EXPENSES IN REMOTE TELANGANA



- The study evaluated the use of drones to transport **TB sputum samples** from remote health facilities to diagnostic laboratories.

- Under the drone model, **diagnosis time was reduced from around 15 days to about 5 days**, enabling earlier treatment initiation.
- Patient **out-of-pocket expenditure** fell sharply as repeated travel to distant diagnostic centres was avoided.
- The project was implemented under **ICMR's i-DRONE initiative**, demonstrating the role of drone technology in strengthening healthcare delivery in difficult-to-reach regions.
- Drone logistics can improve access to timely diagnosis for populations in geographically isolated and underserved areas.
- The findings support the integration of drone technology into the **National TB Elimination Programme (NTEP)**, particularly in hilly, tribal, and remote regions.
- The initiative aligns with India's efforts to leverage digital and emerging technologies for achieving **Universal Health Coverage (UHC)**.
- It also contributes to India's goal of eliminating tuberculosis through faster diagnosis and treatment.

BACKGROUND / CONTEXT

i-DRONE Initiative

- A flagship initiative of the **Indian Council of Medical Research (ICMR)**.
- Demonstrates the use of **drone technology** for transporting medical supplies, diagnostic samples, vaccines, and medicines.
- Aims to improve healthcare accessibility in remote and inaccessible regions.

National TB Elimination Programme (NTEP)

- Formerly known as the **Revised National Tuberculosis Control Programme (RNTCP)**.
- **Nodal Ministry:** Ministry of Health and Family Welfare.
- Objective: Eliminate tuberculosis in India through early diagnosis, universal access to quality treatment, and patient support.

Tuberculosis (TB)

- Caused by the bacterium ***Mycobacterium tuberculosis***.
- Primarily affects the lungs (**pulmonary TB**) but can involve other organs.
- Spreads through **airborne droplets** when an infected person coughs, sneezes, or speaks.
- TB is **preventable and curable** with timely diagnosis and appropriate treatment.

KEY HIGHLIGHTS

- **Study:** Drone-enabled transport of TB sputum samples.
- **Lead Agency:** Indian Council of Medical Research (ICMR).
- **Location:** Yadadri-Bhuvanagiri district, Telangana.
- **Partners:** AIIMS Bibinagar and District TB Office under NTEP.
- **Primary Outcome:** Reduced diagnosis time and patient expenditure.
- **Healthcare Significance:** Enables earlier diagnosis, timely treatment, and improved access in remote areas.
- **Technological Significance:** Demonstrates the potential of drones in strengthening public health logistics.
- **Challenges:** Regulatory approvals, drone infrastructure, weather constraints, payload limitations, and scalability.
- **Way Forward:** Integrate drone logistics into national health programmes, expand operations to other difficult terrains, strengthen digital health infrastructure, and establish standard operating procedures for medical drone operations.

PRELIMS BOOSTER BOX

- **ICMR (Indian Council of Medical Research):** Apex body for biomedical research in India under the **Department of Health Research, Ministry of Health and Family Welfare**.

- **i-DRONE Initiative:** Uses drones to transport vaccines, medicines, blood products, and diagnostic samples to improve healthcare delivery.
- **NTEP (National TB Elimination Programme):** India's flagship programme for tuberculosis elimination.
- **RNTCP:** Revised National Tuberculosis Control Programme; renamed as **NTEP** in 2020.
- **Tuberculosis (TB):** Infectious disease caused by ***Mycobacterium tuberculosis***.
- **Sputum Sample:** Mucus coughed up from the lungs, commonly used for TB diagnosis.
- **NAAT (Nucleic Acid Amplification Test):** Molecular diagnostic technique used for rapid detection of TB and drug resistance.
- **Universal Health Coverage (UHC):** Ensures access to quality health services without financial hardship.
- **Drone Rules, 2021:** Simplified regulatory framework for drone operations in India.
- **SDG 3:** Ensure healthy lives and promote well-being for all at all ages, including ending the TB epidemic.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. The **i-DRONE initiative** is led by the **Indian Council of Medical Research (ICMR)** to improve healthcare delivery using drone technology.
2. **Tuberculosis** is caused by the bacterium ***Mycobacterium tuberculosis***.
3. The **National TB Elimination Programme (NTEP)** was formerly known as the **Revised National Tuberculosis Control Programme (RNTCP)**.

Which of the statements given above is/are correct?

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

Answer: (d)

5. STRENGTHENING RURAL CREDIT FOR INCLUSIVE GROWTH IN INDIA



- Rural credit plays a crucial role in providing farmers, rural entrepreneurs, Self-Help Groups (SHGs), and small businesses with access to affordable finance.
- The Government has expanded institutional credit through commercial banks, Regional Rural Banks (RRBs), cooperative banks, and Small Finance Banks.
- Major initiatives such as the **Kisan Credit Card (KCC)** scheme have improved farmers' access to short-term crop loans and working capital.
- Financial inclusion programmes, including the **Pradhan Mantri Jan Dhan Yojana (PMJDY)** and digital payment infrastructure, have strengthened rural banking access.
- Rural credit supports agricultural modernization, mechanization, allied activities, MSMEs, and rural infrastructure development.
- Priority Sector Lending (PSL) norms ensure adequate credit flow to agriculture and other underserved sectors.
- Strengthening rural credit contributes to poverty reduction, employment generation, and inclusive economic growth.

- The initiative aligns with the vision of **Viksit Bharat, Atmanirbhar Bharat**, and sustainable rural transformation.

BACKGROUND / CONTEXT

Rural Credit

- I. Refers to institutional and non-institutional loans provided to:
 - A. Farmers.
 - B. Agricultural labourers.
 - C. Rural artisans.
 - D. Rural entrepreneurs.
 - E. Self-Help Groups (SHGs).
 - F. Rural MSMEs.

Sources of Institutional Rural Credit

- Commercial Banks.
- Regional Rural Banks (RRBs).
- Cooperative Banks.
- Small Finance Banks.
- NABARD-supported financial institutions.

National Bank for Agriculture and Rural Development (NABARD)

- **Established: 1982.**
- Apex development financial institution for agriculture and rural development.
- Promotes sustainable rural prosperity through credit planning, refinancing, and institutional development.

MAJOR GOVERNMENT INITIATIVES

Kisan Credit Card (KCC)

- Provides timely and affordable short-term credit to farmers.
- Covers crop cultivation, allied activities, and working capital needs.

Priority Sector Lending (PSL)

- I. Mandated by the **Reserve Bank of India (RBI)**.
- II. Requires banks to lend a specified proportion of credit to priority sectors such as:
 - A. Agriculture.



- B. MSMEs.
- C. Education.
- D. Housing.
- E. Renewable energy.

Pradhan Mantri Jan Dhan Yojana (PMJDY)

- **Launched: 2014.**
- Expands access to banking, savings, credit, insurance, and pension services.

Self-Help Group (SHG)–Bank Linkage

Programme

- Implemented by **NABARD**.
- Promotes financial inclusion and women's empowerment through group-based lending.

KEY HIGHLIGHTS

- **Focus:** Expanding rural institutional credit.
- **Primary Objective:** Promote inclusive growth and financial inclusion.
- **Economic Significance:** Increases agricultural investment, productivity, and rural entrepreneurship.
- **Social Significance:** Reduces dependence on informal moneylenders and empowers vulnerable communities.
- **Financial Significance:** Strengthens formal banking penetration and digital financial inclusion.
- **Challenges:** Limited credit access for tenant farmers, regional disparities, rising NPAs, low financial literacy, and climate-related credit risks.
- **Way Forward:** Expand digital lending, strengthen farmer credit assessment, improve financial literacy, enhance SHG financing, promote climate-resilient agricultural credit, and leverage fintech for last-mile banking services.

PRELIMS BOOSTER BOX

- **NABARD: National Bank for Agriculture and Rural Development**, established in **1982**; apex

development financial institution for agriculture and rural development.

- **Kisan Credit Card (KCC):** Introduced in **1998** to provide timely and affordable credit to farmers.
- **Regional Rural Banks (RRBs):** Established under the **Regional Rural Banks Act, 1976** to provide banking services in rural areas.
- **Priority Sector Lending (PSL):** RBI policy requiring banks to lend a prescribed share of credit to priority sectors.
- **Pradhan Mantri Jan Dhan Yojana (PMJDY):** Launched in **2014** to promote universal financial inclusion.
- **SHG–Bank Linkage Programme:** Launched by **NABARD** in **1992** to connect Self-Help Groups with formal banking institutions.
- **Self-Help Group (SHG):** A voluntary group, usually comprising 10–20 members (primarily women), that promotes savings and access to credit.
- **Financial Inclusion:** Ensuring affordable access to financial services such as banking, credit, insurance, and pensions.
- **Agriculture Infrastructure Fund (AIF):** Central Sector Scheme launched in **2020** to provide medium- to long-term financing for post-harvest agricultural infrastructure.
- **Inclusive Growth:** Economic growth that creates opportunities for all sections of society and ensures equitable distribution of its benefits.

PadhAI-GENERATED UPSC MCQ

Consider the following statements:

1. **NABARD** was established in **1982** as the apex development financial institution for agriculture and rural development.
2. The **Kisan Credit Card (KCC)** scheme was introduced to provide timely institutional credit to farmers.



3. The **SHG–Bank Linkage Programme** is implemented by **NABARD** to promote financial inclusion through Self-Help Groups.

Which of the statements given above is/are correct?

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

Answer: (d)