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MANUAL SCAVENGING IN INDIA

SOURCE: ECONOMIC TIMES

WHY IN NEWS?

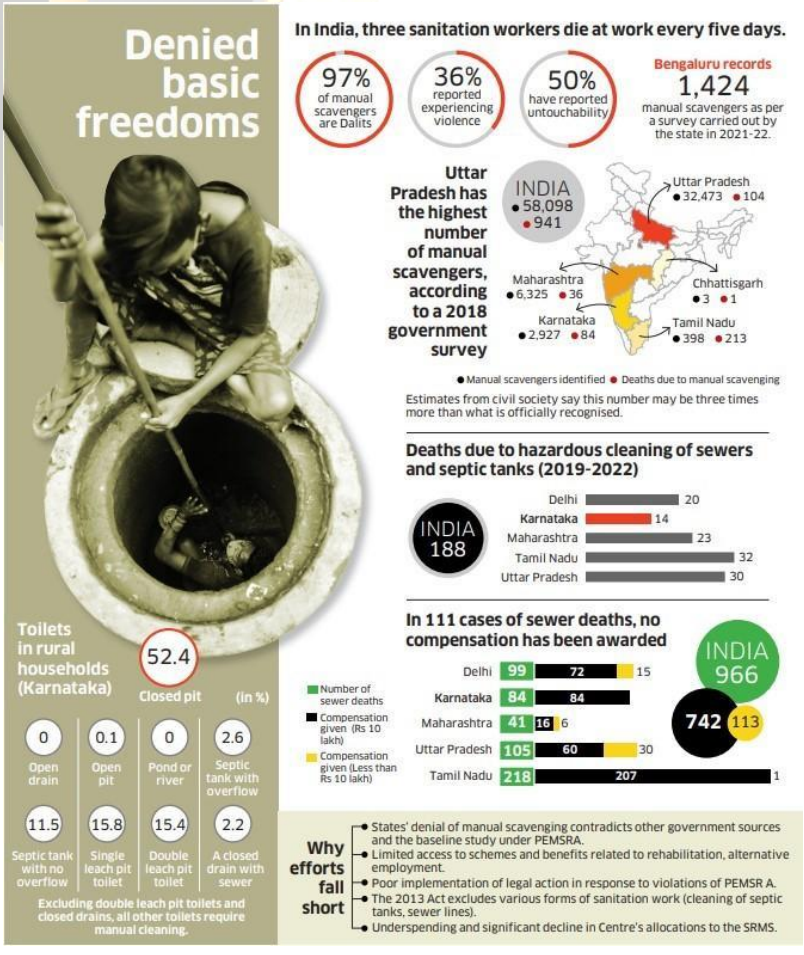
The Supreme Court of India has directed the **Centre and states to take measures to eradicate manual sewer cleaning** and improve the conditions of manual scavengers.

SUPREME COURT DIRECTIVES:

- The Supreme Court of India has issued directives for the effective implementation of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.
- The court has instructed the Centre and state governments to provide compensation of Rs 30 lakh to the families of those who lose their lives in sewer cleaning.
- Additionally, they are to increase compensation for sewer-related deaths and injuries. Those with permanent disabilities will receive a minimum compensation of Rs 20 lakh, and up to Rs 10 lakh can be provided for other injuries.
- Furthermore, the governments are required to offer rehabilitation measures, including scholarships and skill programs, for the victims and their families.

ABOUT MANUAL SCAVENGING:

As per International Labor Organisation (ILO), manual scavenging includes mainly the disposal of human excreta from dry latrines, public streets and the maintenance and sweeping of septic tanks, sewers and gutters.
It has been **officially banned since 1993.**
India has prohibited manual scavenging under the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 (PEMSR).



REASONS FOR THE PERSISTENCE OF MANUAL SCAVENGING:

- **Caste System:** Deep-rooted caste-based discrimination forces many individuals into this profession. For example, a significant number of manual scavengers belong to Scheduled Castes.
- **Limited Alternatives:** Restricted access to education and job opportunities keeps people engaged in manual scavenging.
- **Weak Law Enforcement:** Ineffective implementation of laws against manual scavenging contributes to its persistence.

- **Inadequate Sanitary Infrastructure:** The absence of modern sanitation systems necessitates manual cleaning.
- **Economic Factors:** The low cost of manual labour makes manual scavenging financially appealing.

CONSTITUTIONAL SAFEGUARDS:

- Article 14: Ensures equality before the law and equal protection under the laws.
- Article 17: Abolishes untouchability and forbids its practice in any form.
- Article 21: Guarantees the protection of life and personal liberty.
- Article 23: Prohibits human trafficking and forced labour.

LEGAL PROVISIONS:

- The primary legal framework for addressing manual scavenging in India is the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.
- This law aims to prevent and eradicate manual scavenging by forbidding the employment or engagement of individuals in such work and also prohibiting the construction and maintenance of unsanitary latrines.

EFFECTS OF MANUAL SCAVENGING:

1. Health Hazards:

a) Manual scavengers face significant health risks due to direct exposure to human waste and hazardous substances.
b) They are highly vulnerable to diseases like cholera, typhoid, hepatitis, and various respiratory infections.
c) The absence of protective gear and poor sanitation conditions further exacerbates the health hazards, resulting in increased illnesses and premature deaths among manual scavengers.

2. Dignity and Human Rights Violations:

a) Manual scavenging clearly violates the dignity and human rights of those involved.
b) Workers endure degrading and inhumane conditions, handling human waste with their bare hands and lacking access to basic sanitation facilities.
c) This occupation perpetuates social stigma, discrimination, and marginalization of affected communities, reinforcing caste-based oppression.

3. Psychological and Emotional Trauma:

a) Constant exposure to filth, the indignity of the work, and the discrimination they face take a toll on their mental well-being.
b) Manual scavengers often experience feelings of shame, low self-esteem, and depression, leading to long-term psychological trauma.

GOVERNMENT INITIATIVES:

1. Supreme Court Directions:

- In 2014, a Supreme Court order mandated the government to identify all those who died in sewage work since 1993 and provide Rs. 10 lakh each as compensation to their families.

2. Rehabilitation Effort:

- Payout and Subsidies: Around 58,000 manual scavengers have been identified and given a one-time cash payout of ₹40,000 each.
- Skills Training: Approximately 22,000 manual scavengers have been connected to skills training programs.
- Business Support: Subsidies and loans are available to support those interested in starting their own businesses, with the aim of eliminating manual scavenging deaths.

3. Merger with NAMASTE Scheme:

- The rehabilitation scheme for manual scavengers has been merged with the NAMASTE scheme for 100% mechanization of sewer work.

- While the FY 2023-24 Union Budget lacks a specific allocation for the rehabilitation scheme, it allocates ₹100 crore to the NAMASTE scheme.
- The NAMASTE scheme involves identifying and profiling all septic tank/sewer workers, providing occupational training and safety equipment, and enrolling them in health insurance under the Ayushman Bharat scheme.

4. Other Related Initiatives:

- Safaimitra Suraksha Challenge
- Swachhta Abhiyan App
- Rashtriya Garima Abhiyan
- National Commission for Safai Karamchari

WAY FORWARD:

1. Technology-Driven Solutions:

- Embrace technology for innovative tools and machinery to replace manual scavenging tasks.
- Deploy automated sewer cleaning robots for safer cleaning of sewer lines and septic tanks, reducing human exposure to hazardous environments.

2. Promote Entrepreneurship and Skill Development:

- Encourage training and skill development for affected individuals to empower them to explore alternative livelihoods.
- Provide vocational training in areas like plumbing, electrical work, computer literacy, and entrepreneurship to facilitate the transition to safer and more dignified professions.

3. Sanitation Infrastructure Upgrades:

- Invest in the development and enhancement of sanitation infrastructure, including modern toilets, sewage treatment plants, and efficient waste management systems.
- These upgrades will decrease the reliance on manual scavenging and offer safer waste disposal alternatives.

NATIONAL COMMISSION FOR SAFAI KARAMCHARIS:

- **NCSK Establishment and Role:**
  - NCSK was established as an institution to investigate the conditions of Safai Karamcharis (waste collectors) in India and provide recommendations to the Government.
  - Currently, it functions as a non-statutory body under the Ministry of Social Justice and Empowerment.
- **Background of NCSK:**
  - NCSK was initially established in 1993 under the NCSK Act 1993, with an initial validity period until 31.3.1997.
  - The Act's validity was subsequently extended up to 2004.
  - The NCSK Act ceased to have effect from 29.2.2004.
  - Since then, the NCSK's tenure has been extended as a non-statutory body through resolutions.
- **Functions of NCSK:**
  - NCSK provides recommendations to the Government for specific programs to improve the welfare of Safai Karamcharis.
  - It evaluates existing welfare programs for Safai Karamcharis and investigates specific grievances.
  - NCSK monitors the implementation of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.
  - It is the sole authority responsible for tracking sewer-related fatalities throughout the country.

GREEN HYDOGEN

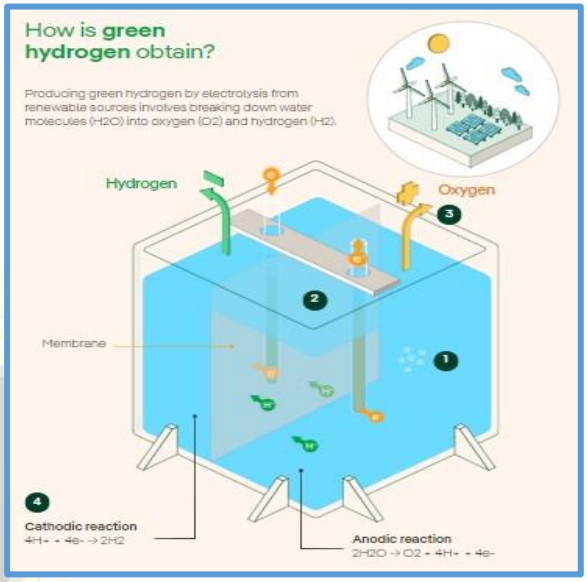
SOURCE: THE HINDU

WHY IN NEWS?

India's green hydrogen move may worsen pollution if steps are not in place, says study. India's ambitious plans for green hydrogen production have garnered attention due to their potential environmental impact.

WHAT IS GREEN HYDROGEN?

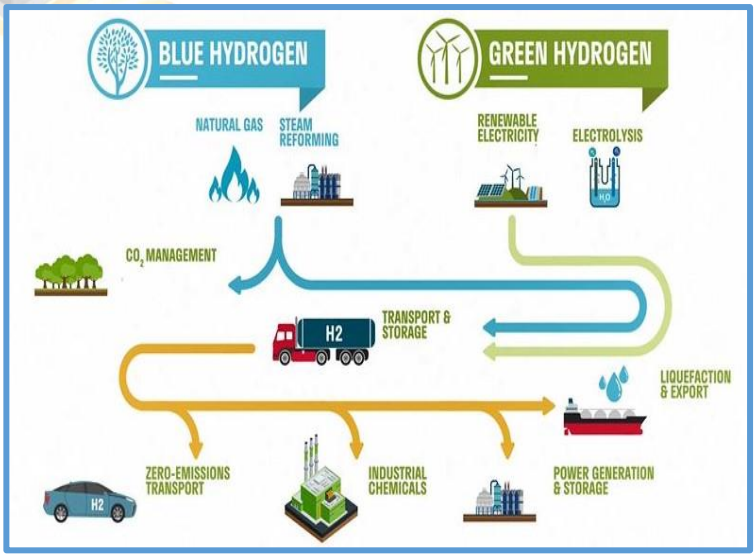
- Green Hydrogen / Green Ammonia shall be defined as Hydrogen / Ammonia produced by way of electrolysis of water using Renewable Energy; including Renewable Energy which has been banked and the Hydrogen/Ammonia produced from biomass.
- **Process to obtained green hydrogen:**
  - ✓ Green hydrogen is produced through electrolysis, a chemical process that uses an electrical current to separate hydrogen from water, eliminating carbon dioxide emissions when powered by renewables.
  - ✓ This method can save 830 million tonnes of annual CO2 emissions compared to fossil fuel-based hydrogen production.
  - ✓ Transition to green hydrogen relies on decarbonization and decreasing the cost of renewable energy.



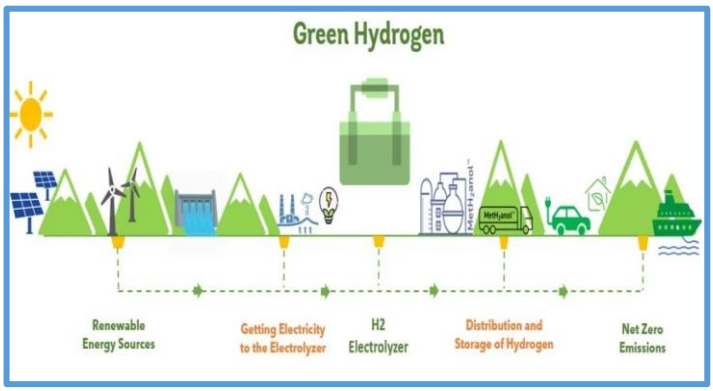
- **Applications:**
  - ✓ **Chemical industry:** For manufacturing ammonia and fertilizers.
  - ✓ **Petrochemical industry:** In the production of petroleum products.
  - ✓ Emerging use in **the steel industry** to address **pollution concerns**, particularly in Europe.

IMPORTANCE OF GREEN HYDROGEN

- **Emerging Importance of Hydrogen:**
  - ✓ Hydrogen is **gaining economic value** in selected **use cases, shaping a growing market**.
  - ✓ It finds **applications** in industrial processes (**steel, refineries**), **transportation (vehicles, buses, trucks, trains, ships, and aircraft), power sector (storage, grid balancing),** and as a **chemical feedstock (ammonia, methane, methanol).**



- ✓ Hydrogen plays a critical role in **decarbonizing hard-to-abate sectors** like iron, steel, refining, methanol, and maritime shipping.
- ✓ It supports **renewable electricity generation and energy storage**, with decreasing production costs.
- ✓ Hydrogen helps **reduce oil imports, create jobs,** and align with the global energy transition.



- ➢ **Achieving Emission Targets:**
  - ✓ Green hydrogen is vital for India **to meet its emission reduction goals and ensure energy security**.
  - ✓ It aligns with **India's pledge under the Paris Climate Agreement** to reduce emission intensity.
- ➢ **Energy Storage and Mobility:**
  - ✓ Green hydrogen serves as **energy storage for intermittent renewable energy**.
  - ✓ It can be used in **various forms of long-distance mobility**, such as railways, ships, buses, and trucks.
- ➢ **Reducing Import Dependence:**
  - ✓ Green hydrogen **reduces India's reliance on fossil fuel imports**.
  - ✓ Local production and green hydrogen projects can **create a significant market and job opportunities** in India.

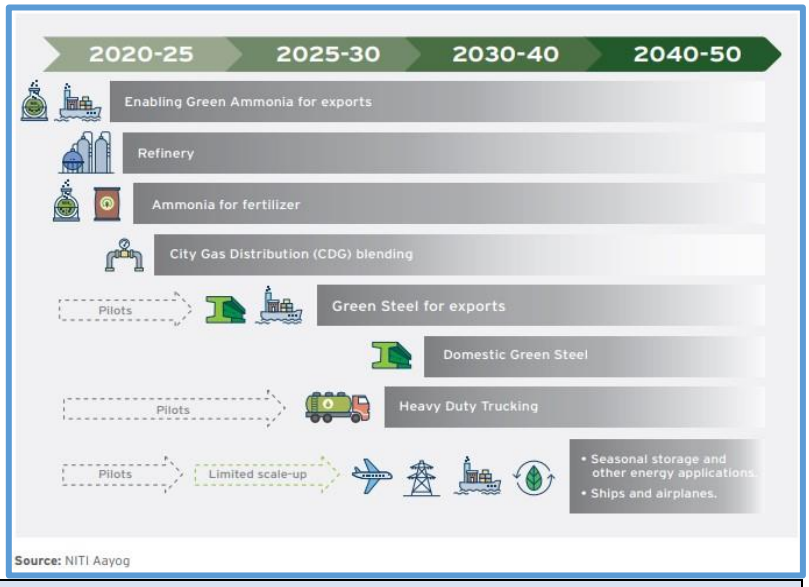
ADVANTAGES AND DISADVANTAGES OF GREEN HYDROGEN

- ➢ **Advantages of Green Hydrogen:**
  - ✓ ***100% Sustainable:*** Green hydrogen is **environmentally friendly,** emitting **no polluting gases during production or combustion.**
  - ✓ ***Storable:*** Hydrogen is **easily storable for use at a later time** or different applications.
  - ✓ ***Versatile:*** It can be **converted into electricity or synthetic gas**, serving various commercial, industrial, and mobility purposes.
- ➢ **Disadvantages of Green Hydrogen:**
  - ✓ ***High Cost:*** The use of **renewable energy sources for hydrogen production is costlier**, resulting in a higher overall cost for green hydrogen.
  - ✓ ***High Energy Consumption:*** Hydrogen production, **especially green hydrogen**, demands more energy than other fuel production methods.
  - ✓ ***Safety Concerns:*** **Hydrogen is highly volatile and flammable**, necessitating rigorous safety measures to prevent leaks and explosions.

INDIA'S GREEN HYDROGEN PLANS

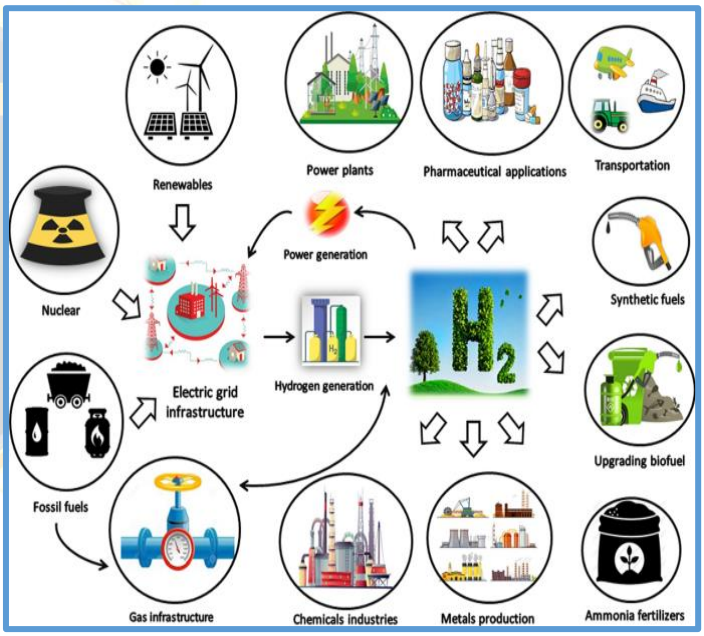
- ➢ India aims to produce 'green hydrogen' without fossil fuel emissions under the **National Green Hydrogen Mission.**
- ➢ The **Ministry of New and Renewable Energy (MNRE)** is leading the **mission with a target of five million tonnes by 2030.**
- ➢ Achieving this **target requires 125 GW of renewable energy capacity and 250,000 gigawatt-hour units** of power, **equivalent to 13% of India's current electricity generation**.

- As of August 2023, **India had 131 GW of renewable energy capacity**, meaning an additional capacity equivalent to this **must be added by 2030.**
- The challenge is substantial, as India's **commitment under the Paris Agreement** already **requires 500 GW** of renewable energy capacity **by 2030**, and **the country installed only 15 GW in 2023.**
- The MNRE defines green hydrogen as **emitting no more than two kg of carbon dioxide per kg of hydrogen.**



CONCERNS ABOUT THE GREEN HYDROGEN PLAN

- **key concern:**
  - ✓ The **source of electricity for electrolysers**, especially during **nighttime when solar power is unavailable.**
  - ✓ If electricity comes from **India's coal-powered grid,** which constitutes **about 70% of the grid's electricity,** it will **increase carbon emissions**, particularly during **non-daylight hours when solar generation is minimal.**
  - ✓ Many projects have **not disclosed their electricity sources**, and it's unclear **whether** those **committing to meet 100% of their requirements** will use clean sources.

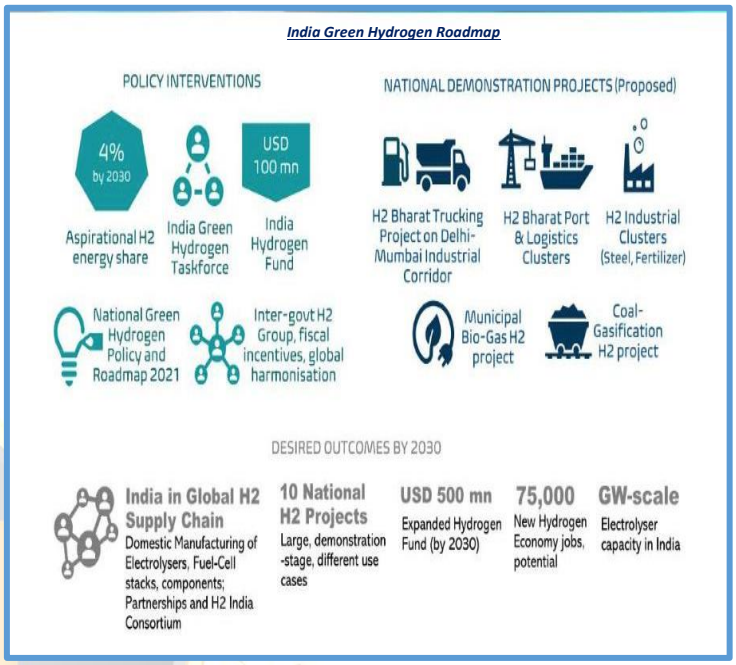


- **High Production Costs:**
  - ✓ Currently, green hydrogen production **is costlier compared to fossil fuel-based hydrogen** due to the **electricity-intensive electrolysis process**.
  - ✓ Renewable electricity costs **remain high in India**, contributing to **increased production expenses**.
- **Infrastructure Deficiency:**
  - ✓ Inadequate infrastructure in **India hinders the production, storage, and distribution** of green hydrogen.
  - ✓ **Shortage of hydrogen refuelling stations** and **pipelines for hydrogen transportation** is evident.
- **Limited Adoption:**
  - ✓ Despite the potential advantages, **India faces limited adoption of green hydrogen technology**.
  - ✓ **Lack of public awareness, limited understanding of green hydrogen**, and insufficient incentives for businesses impede its growth.
- **Economic Sustainability:**
  - ✓ Ensuring **economic sustainability poses a significant challenge** for the commercial use of green hydrogen.

- ✓ **To compete with conventional fuels and technologies in terms of cost-effectiveness**, hydrogen must be price-competitive on a per-mile basis for transportation fuel cells.

WAY FORWARD

- **Green Hydrogen Production in India:**
  - ✓ ***Competitiveness Factors:*** Green hydrogen prices **depend on electrolyser and electricity costs**, operating expenses, transmission and distribution costs, and local **duties like the GST in India.**
  - ✓ ***Current Cost:*** Hydrogen from **electrolysis costs around $7/kg to $4.10/kg**, making **it less competitive against grey or brown hydrogen.**
  - ✓ ***Renewable Advantage:*** India boasts **competitive solar and wind LCOE** while being a **net natural gas importer**, positioning it well for green hydrogen production.
  - ✓ ***Reducing Soft Costs:*** By targeting duty waivers, **GST reduction, and T&D charge reductions**, the levelized cost of hydrogen (LCOH) **can be reduced to around $3.2/kg,** approaching grey hydrogen costs.
  - ✓ ***Expected Price Trajectory:*** Green hydrogen cost could **fall to approximately $1.60/kg by 2030 and $0.70/kg by 2050**, potentially becoming cost-competitive with grey hydrogen.



- **Hydrogen Storage and Transportation Considerations:**
  - ✓ ***Storage Necessity:*** As renewable **sources are variable**, and consistent **demand is expected**, storage becomes necessary for hydrogen.
  - ✓ ***Cost Impact:*** **Storage costs can affect the economics of hydrogen production** based on standalone renewables and RTC renewables.
  - ✓ ***Transportation:*** Transportation costs **can impact economics**; **pipelines become cost-effective** when demand exceeds tens of tonnes per day.
  - ✓ ***Infrastructure Assessment:*** Government and **private sector collaboration** is needed for infrastructure assessment and cost-reduction pathways.
- **Demand Prospect for Hydrogen in India:**
  - ✓ ***Current Consumption:*** India consumes **almost 6 million tonnes of grey hydrogen** primarily in refining, ammonia production, and a **small share in methanol and steel production**.
  - ✓ **Emerging Demand: Potential demand emerges in heavy-duty,** long-haul freight transportation and the power sector.
  - ✓ ***Scenario Assumptions:*** **High uptake of green hydrogen, fuel cell trucks, decreasing electrolyser** and renewable costs, and policy implementation.
  - ✓ ***Policy Scenario:*** **Favorable policies scenario (FPS) with incentives**, waivers, and mandates to understand market **creation until 2030.**

Prelims Specific

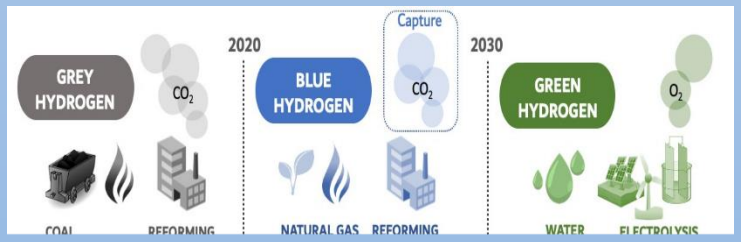
Types of Hydrogen Production

Black/Brown/Grey Hydrogen

- ✓ Produced from **coal or lignite gasification (black or brown)** or steam methane reformation (grey).
- ✓ Generally, **carbon-intensive processes.**

Blue Hydrogen

- ✓ Produced from **natural gas or coal gasification with carbon capture storage (CCS)** or carbon capture use (CCU) technologies.
- ✓ Aims to **reduce carbon emissions.**



Green Hydrogen

- ✓ Produced through **electrolysis of water using electricity generated from renewable sources**.
- ✓ Carbon intensity depends on the **carbon neutrality of the electricity source; more renewable energy means "greener" hydrogen.**

UNMASKING THE INDIAN OSTEOPOROSIS CARE CRISIS

SOURCE: THE HINDU

WHY IN NEWS?

Only a small percentage of people in India receive care for their osteoporosis -a condition characterized by weakening of bones.

ABOUT OSTEOPOROSIS

- Osteoporosis is classified as **a metabolic bone disorder.**
- Osteoporosis occurs **when the creation of new bone** doesn't keep up with the **removal of old bone.**
- Osteoporosis causes bones to **become weak and brittle** — so brittle that a fall or even mild stresses such as bending over or coughing can cause a fracture.
- Common **among the elderly and postmenopausal women**.
- Leads to **bone pain, changes in posture, fractures, and nerve injuries**.

OSTEOPOROSIS IN INDIA

- **Prevalence in India:**
  - ✓ Lack of large-scale studies, but an estimated 46 million Indian women have post-menopausal osteoporosis.
  - ✓ Higher numbers when including other risk groups.
  - ✓ India tops global statistics for osteoporosis-related deaths/disabilities.
- **Lack of Awareness:**
  - ✓ Many doctors, especially general practitioners and orthopedics, have limited knowledge of osteoporosis.
  - ✓ Few doctors consider osteoporosis for patients with vague bone pain.

World Osteoporosis Day

Annual Observation: World Osteoporosis Day is marked every year on **October 20.**

Objective: The day aims to raise **global awareness about osteoporosis, its prevention, diagnosis, and treatment**.

Origins: World Osteoporosis Day was established on October 20, 1996, with support from the UK's National Osteoporosis Society and the European Commission.

WHO Support: The World Health Organization (WHO) became a co-sponsor of **World Osteoporosis Day in 1998**, further endorsing this global initiative.

***"Step Up for Bone Health-Build Better Bones,"* is the theme of World Osteoporosis Day 2023.**

CLASSIFICATION OF OSTEOPOROSIS

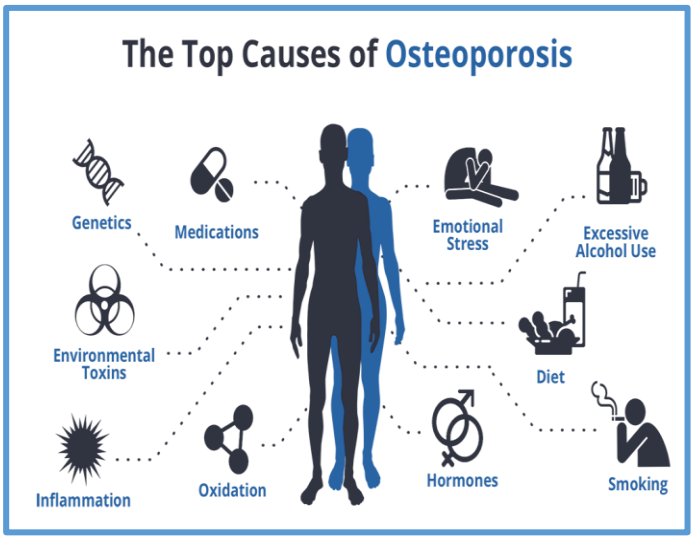
Osteoporosis may be classified into two types:

- **Primary osteoporosis:**
  - ✓ Primary osteoporosis **occurs in women after menopause and in men later in life**, but it is **not merely a consequence of aging** but of **failure to develop optimal peak bone mass** during childhood, adolescence, and young adulthood.
- **Secondary osteoporosis**:
  - ✓ Secondary osteoporosis is the **result of medications or other conditions and diseases** that affect bone metabolism.

CAUSES OF OSTEOPOROSIS

- **Genetics:**
  - ✓ **Greatest risk for small-framed**, nonobese Caucasian women.

- ✓ **Asian women of slight build are at risk for low peak bone** mineral density.
- ✓ African American women have **lower susceptibility to osteoporosis**.



- ➢ **Age:**
  - ✓ **Men experience osteoporosis at a lower rate** and older age.
  - ✓ Increasing age raises the risk **due to hormonal influences** (testosterone and estrogen).
- ➢ **Nutrition:**
  - ✓ Low calcium intake.
  - ✓ Low vitamin D intake.
  - ✓ High phosphate intake.
  - ✓ Inadequate calorie consumption reduces essential nutrients for bone remodelling.
- ➢ **Physical Exercise:**
  - ✓ **Sedentary lifestyle.**
  - ✓ **Lack of weight-bearing** exercise.
  - ✓ **Low weight and body mass index** increase the risk because bones require stress for maintenance.
- ➢ **Lifestyle Choices:**
  - ✓ **Excessive consumption of caffeine and alcohol**.
  - ✓ Smoking.
  - ✓ Insufficient exposure to sunlight, reducing bone remodeling.
- ➢ **Medications:**
  - ✓ **Use of corticosteroids, anti-seizure medications**, heparin, and thyroid hormone impacts calcium absorption and metabolism.

PREVENTION

To prevent primary and secondary osteoporosis, measures such as the following must be implemented:

- ➢ **Identification:**
  - ✓ **Early identification of at-risk teenagers and young adults** could prevent osteoporosis.
- ➢ **Diet:**
  - ✓ A **diet with increased calcium intake strengthens** the bones and avoids fractures.
- ➢ **Activities**:
  - ✓ Participation in **regular weight-bearing exercises** results in excellent bone maintenance.
- ➢ **Lifestyle:**
  - ✓ **Modifications in lifestyle such as reduced use of caffeine, cigarettes**, **carbonated softdrinks**, and **alcohol** could improve osteogenesis for bone remodeling.

Prelims Specific

Sickle Cell Anemia:

An Overview

- ***Definition:*** Sickle cell anemia is an inherited blood disorder.
- **Impact on Hemoglobin:** It affects hemoglobin, the molecule in red blood cells responsible for oxygen delivery to the body's cells.
- **Altered Hemoglobin Molecules:** Individuals with this condition possess abnormal hemoglobin molecules known as hemoglobin S, leading to a distortion of red blood cells into a sickle or crescent shape.
- **Rigid and Sticky Cells:** These sickle-shaped cells become rigid and sticky, potentially obstructing or slowing blood flow.

Causes:

- ***Genetic Basis:*** Sickle cell disease is caused by a defective gene referred to as a sickle cell gene.
- ***Inherited from Both Parents:*** To develop sickle cell disease, an individual must inherit two of these genes—one from the mother and one from the father.