

# NEWS TODAY

## NATIONAL HIGHWAYS AUTHORITY OF INDIA (NHAI) RELEASED ITS FIRST 'SUSTAINABILITY REPORT FOR FINANCIAL YEAR 2021-22'

• Report covers **NHAI's governance structure, stakeholders, environment and social responsibility** initiatives.

• **Key findings of report**

➤ **Gradual decrease in GreenHouse Gas emissions intensity** of 9.7 percent in FY 2020-21 and 2 percent in FY 2021-22.

➤ NHAI has continuously been **using recycled materials (Recycled Asphalt and Recycled Aggregates)** for highways construction.

- Recycled asphalt is a **reprocessed pavement material containing asphalt and aggregates.**
- Recycled Aggregates are **crushed cement concrete or asphalt pavement from construction debris.**

• NHAI has **increased utilization of certain materials** in road construction for **ensuring sustainability and reducing environmental footprints.** These include

- **Fly Ash**, by-product of coal combustion;
- **Plastic waste** in hot bituminous mixtures;
- **Steel Slag**, by-product of steel making;
- **Inert materials** (neither chemically nor biologically reactive) from landfills;
- **Geo-synthetics** including coir/jute;
- **Cold Asphalt Mix**, produced by mixing unheated mineral aggregate with either bitumen or foamed bitumen;
- **Copper slag**, byproduct of copper smelting.

• Steel slag is **produced during the separation of molten steel from impurities in steel -making furnaces.**

- **One of the ingredients of asphalt is steel slag**, a by-product of steel and iron production processes.
- It can be used in several activities, such as **construction and paving, agricultural sector due to its ability to correct soil acidity, manufacture of portland slag cement** etc.

**NHAI**

- NHAI, set up through **NHAI Act, 1988**, is responsible for **development, maintenance, and management of National Highways** across India.
- It is a **nodal agency of Ministry of Road Transport and Highways (MoRTH)** and is mandated to implement **National Highways Development Project.**

## 350<sup>th</sup> ANNIVERSARY CELEBRATIONS OF CHHATRAPATI SHIVAJI MAHARAJ'S CORONATION

• Celebrations of **350th anniversary of coronation (Shivrajyaabhishek) of Chhatrapati Shivaji Maharaj** were started at **Raigad fort in Maharashtra.**

➤ He was **coronated on June 6, 1674, at the fort** from where he had **laid the foundation of "Hindavi-Swaraj" or self-rule of Hindu people** and also **took the title Chhatrapati.**

• Raigad fort is a **hill fort** situated about **25 km from Mahad in Raigad district** and Early Europeans called it the **Gibraltar of the East.** Chief architect of fort was **Hiroji Indulka.**

- Fort overlooks an artificial lake known as **'Ganga Sagar Lake'**. Only main pathway to the fort passes through **"Maha Darwaja" (Huge Door).**
- Fort, which was earlier called Rairi, was the **seat of Maratha clan Shirke in 12th century.**

• **Significance of Raigad fort**

- Fort **helped Shivaji to challenge the supremacy of Adilshahi dynasty and opened up the routes towards Konkan for the extension of his power.**
- It had emerged **as the seat of Shivaji's government.**
- Shivaji **passed away in Raigad in 1680** and was **cremated at the fort.**

**OTHER FORTS AND THEIR SIGNIFICANCE**

- **Murud-Janjira fort:** Situated at **Arabian Sea coast.** It is considered **one of the strongest marine forts in India.** Special attractions are **3 gigantic cannons named Kalalbangdi, Chavri and Landa Kasam.**
- **Kolaba fort:** One of the **chief naval stations of Maratha empire.**
- **Pratapgad fort:** Famous for the encounter between **Shivaji and mighty Afzal Khan.**
- **Sindhudurg fort:** Known as **one of the finest sea forts in India.** It was built on an island in **Konkan region during Shivaji's reign.**
- **Shivneri fort:** **Birthplace of Shivaji. He never ruled the fort.**
- **Purandar fort:** **Birthplace of Shivaji's son Samhaji.** It is significant due to its role in **Shivaji's victory over Adil Shahi dynasty and Mughals.**
- **Torna fort:** **First fort captured by Shivaji Maharaj at the age of 16.**



# RARE HIGGS BOSON DECAY OBSERVED IN LARGE HADRON COLLIDER (LHC) EXPERIMENTS

● European Organization for Nuclear Research (CERN), which hosts LHC, found the **first evidence of rare process by which Higgs boson decays into a Z boson and a photon.**

➤ This decay could provide **indirect evidence of existence of particles beyond those predicted by Standard Model of Particle Physics (SMPP).**

● Standard Model is the **theory of particles, fields and the fundamental forces** that govern them. Currently, it is the **most accurate theory covering the foundations of particle physics.**

➤ It contains **12 fundamental matter particles categorized as quarks** (which make up protons and neutrons) and **leptons** (which include electrons).

➤ It explains how **force carrying particles**, which belong to a **broader group of bosons, influence quarks and leptons.**

➤ It contains **three forces that govern the behavior of matter i.e., Electromagnetism, Strong force, and Weak force.**

▪ **Force of gravity is currently not included** in the standard model.

● **Limitations of SMPP:** Unable to explain **how gravity is mediated**; Disproportion between matter and anti-matter; **Composition of dark matter**; and why **mass of sub-atomic particles is greater than sum of its constituents?**

## 50<sup>TH</sup> ANNIVERSARY OF THE WORLD ENVIRONMENT DAY (WED) CELEBRATED ON 5TH JUNE

● WED has been **led by United Nations Environment Programme (UNEP)** since its inception in 1973.

➤ Theme for WED 2023 year is **"Solutions to Plastic Pollution"** and it is being **hosted by Côte D'Ivoire.**

● On this occasion, Ministry of Environment, Forest and Climate Change (MoEF&CC) has launched **Amrit Dharohar and Mangrove Initiative for Shoreline Habitats and Tangible Incomes (MISHTI)** initiatives.

● **Amrit Dharohar** aims at **promoting the unique conservation values of Ramsar Sites.**

➤ It will be implemented over **next three years (2023-26)** to encourage **optimal use of wetlands for enhancing biodiversity, carbon stock, ecotourism opportunities and income generation** for local communities.

● **MISHTI**, announced in Union Budget 2023-24, aims at **mangrove plantation along the coastline and on salt pan lands.**

➤ It will cover approximately 540 sq. km area across **9 coastal States and 4 UTs in five years (2023-2028).**

➤ It will operate through **convergence between MGNREGS, CAMPA Fund and other sources.**

➤ **Significance:** Achieving India's Nationally Determined Contributions to create an **additional carbon sink of 2.5-3 billion tonnes** of carbon dioxide equivalent by 2030.

### MANGROVE

- Mangroves are a group of **trees and shrubs that live in coastal intertidal zone.**
- They are found in **tropical and sub-tropical intertidal regions** characterized by: **High Rainfall** (between 1,000 to 3,000 mm), **temperature range** (26°C- 35°C) and **calm water with sufficient sediments to set down roots.**
- **West Bengal has the highest mangrove cover**, followed by Gujarat and Andaman and Nicobar Islands.
- **Benefits:** Provide livelihood, stabilize shorelines, preventing erosion, acts as carbon sink, improve and maintain local water quality etc.

#### CERN

● Founded in 1954, CERN laboratory is situated at **Franco-Swiss border near Geneva.** It has 23 member states with **India as an Associate Member State.**

#### Large Hadron Collider (LHC)

● It is the **most powerful particle accelerator ever built** that pushes protons or ions to near the speed of light.

● In 2012, it found **Higgs boson** particle which will enabled us **to understand as to why elementary particles have mass.**

## INDIA, US AGREE ON ROADMAP FOR DEFENCE INDUSTRY COOPERATION

● New Roadmap will **fast-track technology cooperation and co-production in areas** such as air combat and land mobility systems; intelligence, surveillance, and reconnaissance; and undersea domain.

#### Key highlights

➤ **India and U.S.** have agreed to initiate negotiations for a **'Security of Supply' (SoS)** arrangement and a **'Reciprocal Defence Procurement' (RDP)** agreement.

▪ **SoS:** Allows to **request priority delivery for contracts, subcontracts, or orders** from companies in either country.

▪ **RDP:** Participants **agree for complementary acquisitions of defense articles** from each other's country.

➤ Both sides agreed to **establish India-U.S. Defence Acceleration Ecosystem (INDUS-X)**, new initiative (to be launched) to advance **cutting-edge technology cooperation.**

➤ Welcomed India's leadership role in **Quad Indo-Pacific Maritime Domain Awareness Initiative (IPMDA).**

● **India has signed four foundational defence agreement of USA i.e.,**

➤ **General Security of Military Information Agreement (GSOMIA), 2002** on military information exchange.

➤ **Logistics Exchange Memorandum of Agreement (LEMOA), 2016** to use each other's military base.

➤ **Communications Compatibility and Security Agreement (COMCASA), 2018** for interoperability between two militaries and sale of high-end technology to India.

➤ **Basic Exchange and Cooperation Agreement (BECA), 2020** to share high-end military technology, logistics and geospatial maps.

#### IPMDA

- In 2022, U.S. announced **IPMDA**, an initiative with **regional partners and allies** to promote a **free and open Pacific.**
- It intends to **connect regional partners and allies with American technologies** to provide greater **maritime situational awareness in real-time.**

# PUBLIC ACCEPTS USE OF BACTERIA-KILLING VIRUSES (PHAGE THERAPY) AS ALTERNATIVE TO ANTIBIOTICS, SAYS STUDY

- Due to **improper use of antibiotics**, there has been an **increase in Antimicrobial Resistance (AMR)**. Therefore, an **increasingly popular alternative to antibiotics is bacteriophages** to control bacterial diseases.

➤ **By 2050**, antibiotic resistance will result in death of **10 million people from drug resistance diseases every year**.

- **Bacteriophages, or phages**, are **viruses that infect and replicate only in bacterial cells**. Phage therapy involves using phages to treat bacterial infections.

➤ Bacteriophages were discovered by **Frederick Willian Twort in 1915 (Great Britain) and Felix d'Herelle in 1917 (France)**.

➤ **Antibiotics, while removing harmful bacteria, simultaneously decimates the microbiota**. Thereby, creating new sets of problems.

➤ However, **each phage targets only a particular bacterial strain or species**.

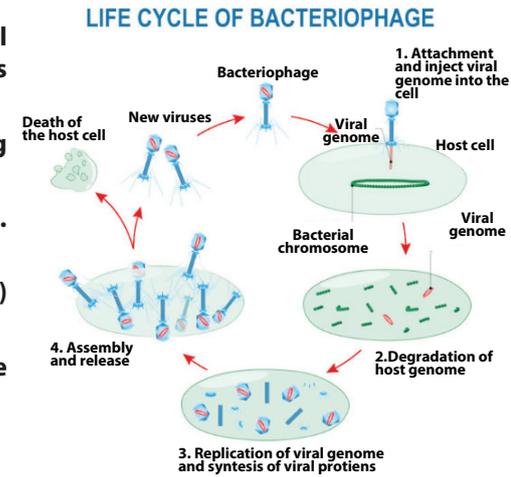
- **Significance of phage therapy**

➤ Phages are **unlikely to damage human cells** due to significant differences in bacterial cells and human cells.

➤ Since they can replicate, **initial dosage can be relatively small**.

➤ **Inherently nontoxic** as they are made up of **nucleic acids and proteins**.

- **Challenges in developing phage therapeutics**: Lack of clinical trials, time consuming process of finding right phages, difficulties in patenting phages as they are natural entities etc.



## ALSO IN NEWS



### Nyaya Vikas

- **Nyaya Vikas Portal** is created by **Ministry of Law and Justice** for **monitoring the implementation of Centrally Sponsored Schemes (CSS)**.
- **About Nyaya Vikas**
  - **Department of Justice** has been implementing CSS for Development of Infrastructure Facilities for Districts and Subordinate Judiciary **since 1993-94**.
  - **Central assistance** is provided to the State Government / UT Administrations for **construction of court halls and residential units for Judicial Officers / Judges of District, etc**.
  - **Funding**: North Eastern and Himalayan States (90:10); Union Territories (100%), remaining states (60:40).



### Adverse possession

- **22nd Law Commission of India (LCI)** in its 280th report has suggested that there is **no need for changing the law relating to adverse possession**.
- Concept of adverse possession stems from the idea that **land must not be left vacant** but instead, be put to judicious use.
  - **Limitations Act 1963** provides that any person in **possession** of private land for over **12 years** or government land for over **30 years can become the owner of that property (Adverse Possession)**.
  - However the possession must be **continuous, uninterrupted, and peaceful**.



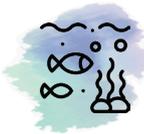
### Flying Geese (FG) model

- FG model, a **theory of industrial development in latecomer economies**, was developed in the 1930s by Japanese economist **Kaname Akamatsu**.
- It intends to explain the **catching-up process of industrialization of latecomer economies**, especially Japan and the East Asian Economies.
- This approach saw the **US (on global scale) and Japan (in Asia) as the lead geese**, followed by Asian emerging economies, resulting in their economic success.
  - The regional development as postulated by the modern FG paradigm presupposes the existence of hierarchy, with a **dominant economy acting as the growth centre and followed by other developing economies**.



### Natural Refrigerant Carbon dioxide

- **Indian Navy in collaboration with IISc (Bengaluru)** has operationalized a **'first of its kind' 100KW capacity AC plant in the country based on the natural refrigerant Carbon dioxide**.
- **About Natural refrigerant Carbon dioxide**: CO<sub>2</sub> has several unique thermo-physical properties such as Very good heat transfer coefficient; Relatively insensitive to pressure losses; and Very low viscosity.
- In practical applications, CO<sub>2</sub> systems deliver very high performance, the main reasons being **better heat exchange, very low pumping power when CO<sub>2</sub> is used as secondary fluid**, and in cold climate the possibility of operating with a very low condensing pressure in the winter.

 <p><b>Ocean Census</b></p>	<ul style="list-style-type: none"> <li>• New initiative called Ocean Census aims to <b>expand marine biodiversity knowledge</b> by finding <b>100,000 new marine species within a decade</b>.                     <ul style="list-style-type: none"> <li>➢ It is jointly established by <b>The Nippon Foundation</b> (a non-profit philanthropic organization in Japan) and <b>Nekton Foundation</b> (marine science and conservation institute in U.K) to <b>discover unknown marine life</b>.</li> <li>➢ It will <b>send scientists on expeditions to marine biodiversity hotspots</b> and using advanced technology like high-resolution imagery, DNA sequencing and machine learning.</li> </ul> </li> <li>• Previously, Census of Marine Life, <b>international project that took place between 2000 and 2010, had recorded the diversity, distribution, and abundance of life in the ocean</b>.                     <ul style="list-style-type: none"> <li>➢ More than 2,700 scientists from 80 nations contributed to the Census.</li> </ul> </li> </ul>
 <p><b>Tiger Reserves (TR)</b></p>	<p><b>Dudhwa TR</b></p> <ul style="list-style-type: none"> <li>• Female Royal Bengal Tiger was found in buffer zone of Dudhwa TR.</li> <li>• Dudhwa TR is a <b>protected area in Lakhimpur-Kheri in Uttar Pradesh</b>, located on India-Nepal border.                     <ul style="list-style-type: none"> <li>➢ It comprises <b>Dudhwa National Park</b>, and two nearby <b>Sanctuaries, viz. Kishanpur and Katerniaghat</b>.</li> <li>➢ In 1958 Dudhwa National park was declared as a wildlife sanctuary. It then became a national park in 1977 and <b>tiger reserve project in 1988</b>.</li> <li>➢ <b>Important Fauna</b> - Tigers, Leopards, Elephants, Sloth Bear.</li> </ul> </li> </ul> <p><b>Kalakad TR or Kalakad Mundanthurai TR (KMTR)</b></p> <ul style="list-style-type: none"> <li>• It is situated in <b>Southern Western Ghats</b> in Tirunelveli and Kanyakumari District of <b>Tamil Nadu (TN)</b>.</li> <li>• Vegetation type gradually changes from <b>dry thorn forest to dry deciduous</b>.</li> <li>• It consists of two adjacent sanctuaries namely <b>Kalakad Wildlife Sanctuary (KWS), Mundanthurai Tiger Sanctuary (MTS)</b> and part of <b>Veerapuli and Kilamalai Reserve Forests</b>.                     <ul style="list-style-type: none"> <li>➢ KWS was established primarily for <b>conservation of Lion Tailed Macaque</b>.</li> <li>➢ KMTR forms <b>part of the interstate (Kerala and TN) Agasthyamalai Biosphere Reserve</b>.</li> <li>➢ <b>River Thamirabarani</b> and 13 other rivers originate from KMTR, popularizing it as <b>River Sanctuary</b>.</li> </ul> </li> <li>• Fauna includes <b>Leopard, Indian Pangolin, Mouse Deer, Great Indian Hornbill etc.</b></li> </ul>
 <p><b>India Rankings 2023</b></p>	<ul style="list-style-type: none"> <li>• <b>Ministry of Education</b> has released 8th edition of <b>India Rankings of Higher Educational Institutions (HEIs) in country</b>.                     <ul style="list-style-type: none"> <li>➢ Ranking is <b>based on National Institutional Ranking Framework (NIRF)</b>.</li> <li>➢ <b>Five broad categories of parameters identified in NIRF includes</b> <ul style="list-style-type: none"> <li>▪ Teaching Learning and Resources; Research and Professional Practice; Graduation Outcome; Inclusivity and Outreach; and Perception.</li> </ul> </li> </ul> </li> <li>• <b>2023 edition of India Rankings</b> <ul style="list-style-type: none"> <li>➢ <b>Introduced a new subject namely Agriculture &amp; Allied Sectors</b></li> <li>➢ <b>Integrated "Innovation" ranking</b> previously executed by Atal Ranking of Institutions on Innovation Achievements (ARIIA) <b>into India Rankings</b>.</li> <li>➢ Expansion of scope of "Architecture" to "Architecture and Planning".</li> </ul> </li> <li>• <b>IIT Madras topped in Overall Category</b> followed by Indian Institute of Sciences.</li> </ul>
 <p><b>Medical Countermeasures (MCMs)</b></p>	<ul style="list-style-type: none"> <li>• "Strengthening Global Collaboration Network on Research and Development in MCMs" side-event was held at 3rd G20 Health Working Group Meeting.</li> <li>• <b>MCMs are used to diagnose, prevent, or treat diseases related to chemical, biological, radiological, or nuclear (CBRN) threats</b>.</li> <li>• It can include                     <ul style="list-style-type: none"> <li>➢ <b>Biologic products</b> – vaccines, blood products, and antibodies.</li> <li>➢ <b>Drugs</b> – antimicrobial or antiviral drugs.</li> <li>➢ <b>Devices</b> – diagnostic tests to identify threat agents and personal protective equipment (PPE).</li> </ul> </li> </ul>
 <p><b>Magnetite</b></p>	<ul style="list-style-type: none"> <li>• <b>Remote sensing &amp; aerial survey</b> will be conducted in <b>southern Bihar</b> to identify magnetite-bearing rocks &amp; ultramafic rocks.</li> <li>• Magnetite-bearing rocks as well as ultramafic rocks which <b>usually host Chromite (Cr), Nickel (Ni), Platinum Group of Elements (PGE) and gold</b>.</li> <li>• <b>Magnetite is a black, opaque, magnetic mineral</b> that leaves a black streak when rubbed across a hard rough surface.                     <ul style="list-style-type: none"> <li>➢ It is <b>one of the most abundant metal oxides</b>, and its <b>crystal structure contains both the ferrous and ferric forms of iron ions</b>.</li> <li>➢ It is <b>often confused with hematite and ilmenite</b> (Titanium).</li> <li>➢ More often, <b>magnetite occurs in its massive form, commonly called 'lodestone'</b>.</li> </ul> </li> </ul>