



National Green Hydrogen Mission

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NATIONAL GREEN HYDROGEN MISSION

NODAL MINISTRY

- ▶ Ministry of New and Renewable Energy

OBJECTIVE

- ▶ Decarbonise energy/industrial/mobility sector
- ▶ Develop indigenous manufacturing capacities
- ▶ Create export opportunities for GH₂ and its derivative

COMPONENTS OF NGHM

- ▶ Strategic Interventions for Green Hydrogen Transition Programme (SIGHT)
- ▶ Strategic Hydrogen Innovation Partnership (SHIP) (PPP for R&D)

Expected Outcomes by 2030

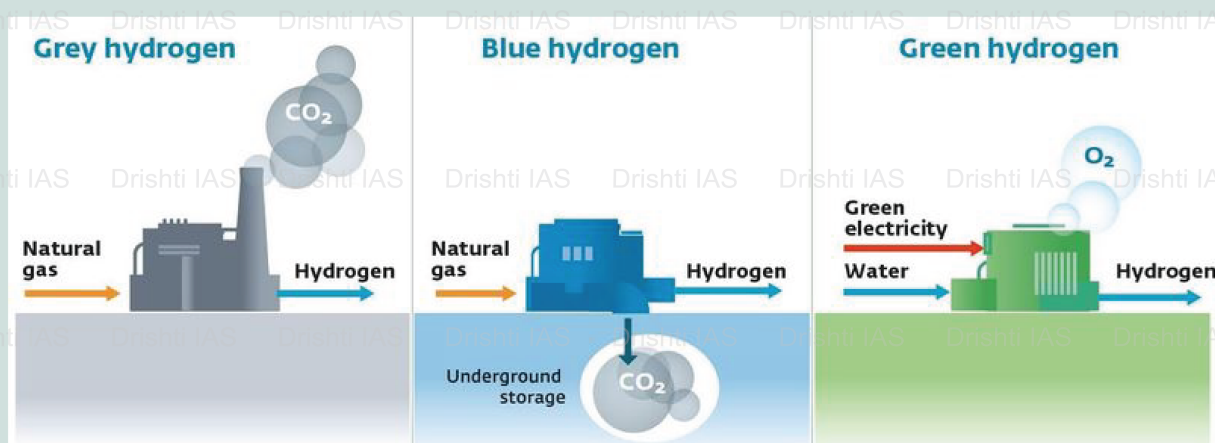
- ◆ At least 5MMT GH₂ annual production
- ◆ Rs 1 lakh crore fossil fuel import savings
- ◆ 6 lakh jobs
- ◆ 50MMT CO₂ annual emissions averted
- ◆ ₹ 8 lakh crore investment

GH₂ is not commercially viable at present; current cost in India is around ₹350-400/kg.
The National Hydrogen Energy Mission aims to bring it down under ₹100/kg.

HYDROGEN AND GREEN HYDROGEN

Hydrogen is the most common element in nature but exists only in combination with other elements. It has to be extracted from naturally occurring compounds (like water).

Green Hydrogen (GH₂) is made by splitting water through an electrical process called electrolysis, using an electrolyser powered by renewable energy (RE).



Heat Dome

For Prelims: Heat Dome, Jet Stream, Climate Change

For Mains: Important Geophysical Phenomena

Why in News?

Several countries in Europe recorded their hottest January weather ever in 2023 with temperatures 10 to 20 degrees Celsius above average.

- These included **Poland, Denmark, the Czech Republic, the Netherlands, Belarus, Lithuania and Latvia.**
- Experts said that the **continent is experiencing an extremely warm spell** because of the **formation of a heat dome over the region.**
- In 2021, a heat dome formed over western Canada and the US, causing deadly [heat waves](#).
- **Another heat dome settled over the US in September 2022** and raised temperatures to a new high.

The 'heat dome'

Occurs when the atmosphere traps hot ocean air like a lid or cap

1 In summer, the **jet stream** (which moves the air) shifts northward

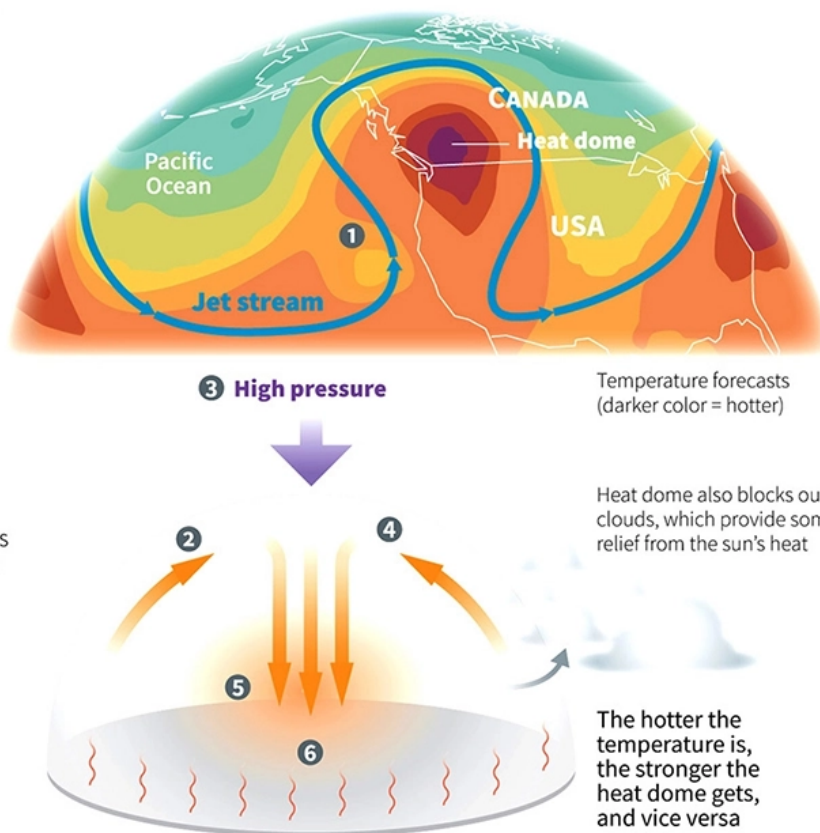
2 **Hot** and stagnant air expands upwards

3 Strong and **high-pressure** atmospheric conditions combine with influences from La Nina act like a dome or cap

4 In a process known as **convection**, hot air attempts to escape but high pressure pushes it back down

5 Under the dome, the air sinks and **compresses**, releasing more heat

6 As winds move the hot air east, the jet stream traps the air where it sinks, resulting in **heat waves**



Temperature forecasts
(darker color = hotter)

Heat dome also blocks out
clouds, which provide some
relief from the sun's heat

The hotter the
temperature is,
the stronger the
heat dome gets,
and vice versa

What is a Heat Dome and Heat Wave?

- **Heat Dome:**
 - A **heat dome occurs when an area of high-pressure traps warm air over a region, just like a lid on a pot**, for an extended period of time.
 - The **longer that air remains trapped, the more the sun works to heat the air**, producing warmer conditions with every passing day.
 - Heat domes **generally stay for a few days but sometimes they can extend up to weeks**, which might cause deadly heat waves.
 - Scientists suggest that **any region of high pressure, whether a heat dome or not, forces air to sink and once it reaches the ground**, it gets compressed and becomes even warmer.
 - Moreover, **when air sinks, it gets drier and further raises the temperature of the area.**
- **Heat Domes and the Jet Stream:**
 - The heat dome's formation is **related to the behaviour of the jet stream.**
 - Jet streams are relatively narrow bands of strong wind in the upper levels of the atmosphere
 - The **jet stream is believed to have a wave-like pattern** that keeps moving from north to south and then north again.
 - **When these waves get bigger and elongated**, they move slowly and sometimes can become stationary.
 - This is **when a high-pressure system gets stuck** and leads to the occurrence of a heat dome.
 - **Although heat domes are likely to have always existed**, researchers say that [climate change](#) may be making them more intense and longer.
 - They suggest with the rising temperatures, it is expected that the jet stream will become more wavy and will have larger deviations, causing more frequent extreme heat events.

What are the Causes of Formation of Heat Dome?

- **Change in Ocean Temperature:** The **phenomenon begins when there is a strong change (or gradient)** in ocean temperatures.
 - In the process known as convection, the **gradient causes more warm air, heated by the ocean surface**, to rise over the ocean surface.
 - As prevailing winds move the hot air east, the northern shifts of the jet stream trap the air and move it toward land, where it sinks, resulting in heat waves.
- **Change in Atmospheric Pressure:** Heat waves **begin when high pressure in the atmosphere moves in and pushes warm air toward the ground.** This effect is fueled by heat rising from the ocean, creating an amplification loop.
 - The high-pressure system pressing down on the ground expands vertically, forcing other weather systems to change course.
 - It even minimizes wind and cloud cover, making the air more stifling.
 - This is also why a heat wave parks itself over an area for several days or longer.
- **Climate Change:** The **rising temperatures lead to hotter weather.** Heat waves have been a regular phenomenon on land.
 - However, **global warming has caused them to be hotter** with a longer duration and an increased frequency.
 - Scientists studying the **climate tend to agree that the heat waves occurring today are more likely to be a result of climate change** for which humans are responsible.

[Source: IE](#)

Why in News?

The [Jain community](#) has been protesting over demands related to two holy sites — **Sammed Shikhar on Parasnath hill in Jharkhand and Shatrunjaya hill in Palitana of Gujarat.**

- In Jharkhand, the issue is about Parasnath hill being declared a tourist spot and an [eco-sensitive zone](#) without consulting the people from the Jain community, while in Gujarat, the row is over the vandalising of a shrine and related security concerns in Shatrunjaya Hill.

What are the Key Facts about Parasnath Hills and Shatrunjaya Hill?

- **Parasnath Hills:**
 - **Parasnath Hills** are a range of hills located in Giridih district of Jharkhand.
 - The **highest peak is 1350 metres**. It is one of the most important pilgrimage centre for Jains. They call it Sammed Sikhar.
 - The hill is named after **Parasnath, the 23rd Tirthankara**.
 - Twenty of Jain Tirthankaras **attained salvation on this hill. For each of them there is a shrine (gumti or tuk)** on the hill.
 - Some of the temples on the hill are believed to be more than 2,000 years old.
 - The Santhals call it **Marang Buru, the hill of the deity**. They celebrate a **hunting festival on the full moon day in Baisakh (mid-April)**.
 - Every year, thousands of Jains from across the world undertake the 27 km long trek of climbing the hills to reach the summit.
- **Palitana and Shatrunjaya Hill:**
 - Shatrunjaya Hill is a sacred site containing hundreds of shrines in Palitana town, Bhavnagar District, Gujarat.
 - The shrines were **sanctified when Rishabha, the first Tirthankara of Jainism**, gave his first sermon in the temple on the hilltop.
 - It is one of the Jainism's holiest pilgrimage sites, the Shatrunjaya hill is an **incredible hill studded with temples, built over 900 years**.
 - It is said that Adinath (also known as Rishabha), the founder of Jainism, **meditated beneath the rayan tree at the summit**.

What is Jainism?

- Jainism came to prominence in the **6th century B.C.**, when **Lord Mahavira** propagated the religion.
- There were **24 great teachers**, the last of whom was **Lord Mahavira**.
- These twenty-four teachers were called **Tirthankaras**-people who had attained all knowledge (Moksha) while living and preached it to the people.
- The first Tirthankara was **Rishabhatha**.
- The word Jaina comes from **the term Jina, meaning conqueror**.
- Tirthankara is a Sanskrit word meaning 'Ford maker', i.e., one who is able to ford the river, to cross beyond the perpetual flow of earthly life.
- Jainism attaches utmost importance to ahimsa or non-violence.
- It preaches **5 mahavratas (the 5 great vows)**:
 - Ahimsa (Non-violence)
 - Satya (Truth)
 - Asteya or Acharya (Non-stealing)
 - Aparigraha (Non-attachment/Non-possession)
 - Brahmacharya (Celibacy/Chastity)
- Among these 5 teachings, **the Brahmacharya (Celibacy/Chastity) was added by Mahavira**.
- The **three jewels or Triratna of Jainism include**:
 - Samyak Darshana (right faith).
 - Samyak Gyana (right knowledge).
 - Samyak Charitra (right conduct).
- Jainism is a religion of **self-help**.
 - There are no gods or spiritual beings that will help human beings.

- It does not condemn the varna system.
- In later times, **it got divided into two sects:**
 - Shvetambaras (white-clad) under Sthalabahu.
 - Digambaras (sky-clad) under the leadership of Bhadrabahu.

What is the Pilgrimage vs Tourism Debate?

▪ Pilgrimage:

- Pilgrimage is the purpose of traveling to the destination, which is **mostly focused on religion**. Pilgrimage shrines are **an important aspect of any religion's materiality** and sacred geography.
- Despite using the term Pilgrimage and Tourism interchangeably, the two cannot be mixed, if a pilgrimage shrine is declared a tourist spot, even people who may not have the distinct sensibilities for the shrine **may enter the sacred place, thus affecting the sanctity and the "purity" of the place**.
- Also, the sacred character of the place helps to protect the **entire landscape from degradation**.
 - Consider the sacred groves spread throughout India, protected by local deities of different communities and connected to people's behaviour in these places, showing us the **traditional example of ecological conservation practiced by local communities**.
- Therefore, declaring the area open for tourism may be doing more harm than good, not only to the community and its faith **but also to nature and its fragile ecosystem**.
 - We have seen what happened in Kedarnath, especially when the cloudburst occurred in June 2013.
 - The lack of planning, clearing of forests, and absence and violation of construction codes in a fragile Himalayan ecosystem **meant that a natural calamity turned into a human-made disaster**.

▪ Tourism:

- Tourism attracts more people in the country and thus creates more employment opportunity, also brings in **focus the importance of sites and need to preserve them**.
- Tourism as a form of soft power, helps in promoting cultural diplomacy, people to people connect and **thereby promotes friendship and cooperation between India and other countries**.
- The growth of domestic tourism largely depends on the Pilgrimage tourism in India and restricting any sort of tourism **may affect the economic growth of the place and of the country**.

Way Forward

Pilgrimage tourism is the type of tourism that entirely or powerfully motivates tourists for the achievement of religious attitude and practices. Thus, pilgrimage and "religious tourism could become an enduring source of employment and income, without sacrificing the important social and religious functions of the sanctuaries and their pilgrimages.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q1. With reference to the religious practices in India, the "Sthanakvasi" sect belongs to (2018)

- (a) Buddhism
- (b) Jainism
- (c) Vaishnavism
- (d) Shaivism

Ans: (b)

Q2. With reference to the religious history of India, consider the following statements: (2017)

1. Sautrantika and Sammitiya were the sects of Jainism.
2. Sarvastivadin held that the constituents of phenomena were not wholly momentary, but existed forever in a latent form.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (b)

Q3. With reference to the history of ancient India, which of the following was/were common to both Buddhism and Jainism? (2012)

1. Avoidance of extremities of penance and enjoyment
2. Indifference to the authority of the Vedas
3. Denial of efficacy of rituals

Select the correct answer using the codes given below:

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

Ans: (b)

Q4. Anekantavada is a core theory and philosophy of which one of the following? (2009)

- (a) Buddhism
- (b) Jainism
- (c) Sikhism
- (d) Vaishnavism

Ans: (b)

[Source: IE](#)

Corporate Tax

For Prelims: Corporate Tax, Gross Domestic Product (GDP), Minimum Alternate Tax (MAT)

For Mains: Significance of Corporate tax, Minimum Alternate Tax (MAT) and its impact on the Indian economy.

Why In News?

Recently, [corporate tax collections](#) exceeded **3% of the GDP** after a gap of two years in **2021-22**.

- It is reflecting overall improvement in profitability of India Inc propelled by an **increase in demand for goods and services**.
- However, the **corporate tax collection** is yet to surpass its five-year high of 3.51% of GDP recorded in 2018-19.

What are the Key Highlights?

- In actual terms, the **net corporate tax collection** in **2021-22** stood at **Rs 7.12 lakh crore**.
- The [Gross Domestic Product \(GDP\)](#) at the current market price was **Rs 236.64 lakh crore**.
- The **percentage of net corporate tax to GDP** worked out to be **3.01%**.
- In 2019-20, government cut corporate tax rates for new manufacturing units by almost **10% points** as it looked to pep up investments.
- The rate of [Minimum Alternate Tax \(MAT\)](#) too had been reduced to **15 %** from **18.5 %** in 2019.
 - The **Minimum Alternate Tax** is a strategy designed to close the **income tax loophole** for all businesses. The **MAT** makes sure that no business, even one with **strong financial standing** and **significant revenue**, may escape paying income tax, even after claiming exemptions.
- The **tax cut** was reflected in the realization of **corporate taxes** in **2019-20**, when collections fell to over **Rs 5.56 lakh crore (2.77% of GDP)**.

What is the Corporate Tax?

- **Corporation tax** is payable by both **public and private companies** registered in India under the [Companies Act 1956](#).
- **Corporation tax** is a **direct tax** placed on a company's net income or profit from its operations.
 - The tax is imposed on the **net profits of the corporation**, which is calculated by subtracting allowable expenses such as the cost of goods sold, operating expenses, and depreciation from the corporation's total revenue.

What is the Significance of Corporate Tax?

- **Corporate tax** is an **important source of revenue** for governments, as it helps to fund **public goods and services** such as **schools, hospitals, roads, and defense**.
- **Corporate tax** also plays a role in **redistributing wealth** and **addressing income inequality**, as it imposes a **higher tax burden** on corporations that are more profitable.
- In addition, **corporate tax** can also have other **economic and social impacts**.
 - **For example, corporate tax** can affect the **competitiveness of businesses**, as a **higher corporate tax rate** may make a country or region less attractive for investment compared to other jurisdictions with **lower tax rates**.
- **Corporate tax** can also influence the **location** and **type of businesses** that operate in a jurisdiction, as businesses may be more or less likely to invest in a particular area depending on the **tax environment**.

Conclusion

Overall, the importance of corporate tax depends on the specific context and goals of the government and the society. Some may view corporate tax as a necessary tool for financing public goods and promoting social justice, while others may view it as a burden on businesses and a deterrent to economic growth.

[Source: IE](#)

108th Indian Science Congress

Why in News?

Recently, the **108th session of the India Science Congress (ISC)** was inaugurated by the Prime Minister.

- The event's theme is **'Science and Technology for Sustainable Development with Women's Empowerment'**.

What are the Highlights of the PM Address?

- **Importance of Women's Participation:**
 - **Increasing participation of women** is a reflection of the progress of society and science.
 - Today, the **country's thinking is not only that women should be empowered through science**, but science should also be empowered with the participation of women.
 - Women's participation in **extramural research has doubled over the last eight years**.
 - India has been **given the opportunity to preside over G20**.
 - Women-led development is one of the high-priority subjects taken up by the chair.
- **India's Achievements:**
 - India is now **one of the top three countries in the world when it comes to the number of PhD research works** and startup ecosystems.
 - The country is now ranked **40th on the Global Innovation Index 2022**, up from the 81st rank in 2015.
 - Scientific developments should ultimately make the country Atmanirbhar.
- **Importance of Science in Today's World:**
 - The efforts of science can **bear fruit only when they go from labs to land**.
 - With 2023 being **declared as the International Year of Millets**, India's millets and their use should be further improved with the use of science.
 - The scientific community should work **towards reducing post-harvest losses with the help of biotechnology**.
- **Energy Innovation:**
 - Endorsed the **need for the scientific community to focus on working on a National Hydrogen Mission** and stressed the need to manufacture critical equipment like electrolyzers in India to make it a success.
 - The National Hydrogen Mission was launched on **India's 75th Independence Day (15th August 2021)**.
- **Other Highlights:**
 - **Stressed on the increasing importance of data gathering and analysis** as well as the importance of traditional knowledge alongside modern knowledge.
 - **Acknowledged the role of low-cost satellite launch vehicles** in the booming space sector in India and pointed to the importance of **quantum computing**.
 - **Stressed the need to focus on futuristic ideas and areas where no work is happening** anywhere as well as the importance of keeping **Artificial intelligence (AI), Augmented Reality (AR)** and **Virtual Reality (VR)** as priorities.

What is the India Science Congress?

- **About:**
 - With a history dating back to 1914, the **Science Congress is a one-of-its-kind event in the country**.
 - It **brings together scientists and researchers not just from the premier institutions** and laboratories but also science teachers and professors from colleges and universities.

- It **offers a platform for their interaction with students** and the general public on matters related to science.
- It is a **celebration of Indian science that has had an illustrious past**, with the who's who of Indian science participating and organizing.
- The first session of the **Indian Science Congress was held in 1914**.
- **Organiser:**
 - Indian Science Congress Association (ISCA).
 - It is an **independent body functioning with the support of the Department of Science and Technology (DST)** in the central government.
- **Decline of Science Congress:**
 - In more recent times, the **event has attracted attention for all the wrong reasons:**
 - Lack of serious discussion, the promotion of pseudoscience, outlandish claims by random speakers, and the absence of useful outcomes.
 - As a result, **several top scientists have advocated the discontinuation of the event**, or at least withdrawal of government support.
 - For organising the Science Congress, the government provides an annual grant.
 - Besides this, the government has no role to play in organising the ISC.

[Source:IE](#)

BIND Scheme

Why in News?

The Cabinet Committee on Economic Affairs approved the proposal of the **Ministry of Information and Broadcasting** regarding the [Central Sector Scheme](#) "Broadcasting Infrastructure and Network Development" (BIND) Scheme with an outlay of Rs.2,539.61 crore up to 2025-26.

What is a BIND Scheme?

- **About:**
 - It is a scheme for providing **financial support to [Prasar Bharati](#)** for expenses related to expansion and upgradation of its broadcasting infrastructure, content development and civil work related to the organization.
 - Prasar Bharati, as the public broadcaster of the country, is the most important vehicle of information, education, entertainment and engagement for the people especially in the remote areas of the country through Doordarshan (DD) and All India Radio (AIR).
 - Prasar Bharati played a stellar role in communicating public health messages and awareness to the public during the [covid pandemic](#).
- **Scope:**
 - It will widen Prasar Bharati's reach, including in the [LWE \(Left Wing Extremism\)](#), border and strategic areas and provide high quality content to the viewers.
 - It will increase coverage of AIR FM (frequency modulation) transmitters in the country **to 66% by geographical area and 80% by population, up from 59% and 68% respectively**. The Scheme also envisages free distribution of over 8 lakh DD Free Dish STBs (Set Top Box) to people living in remote, tribal, LWE and border areas.
- **Significance:**
 - In addition to enhancing the scope of public broadcasting, the Project has the **potential to generate indirect employment by way of manufacturing and services related to supply** and installation of broadcast equipment.
 - Content generation and content innovation for AIR & DD has the potential of indirect

employment of persons with varied experience of different media fields in the content production sector including TV/Radio production, transmission and associated media related services.

[Source: PIB](#)

Rapid Fire Current Affairs

18th National Scout Guide Jamboree

The **Bharat Scouts & Guides** (voluntary organisation) **are hosting the 18th National Jamboree at Rajasthan** from 4th January to 10th January, 2023 with the theme of **“Progress with Peace”**. The **1st National Jamboree was hosted by Andhra Pradesh in 1953-54.**

The **Jamboree is a national level gathering of the Scouts and Guides** conducted **once in 4 years** or to mark special occasions. The Jamboree gives the Scouts and Guides an opportunity to **interact with the youth from different states of India and from abroad.**

About 35000 Scouts, Guides and Adult Leaders of the Organization from different corners of the country and **[South Asian Association for Regional Cooperation \(SAARC\)](#) countries are participating in this Mega Event.**

Japan: The World’s Grayest Society

The Japanese government **plans to increase financial incentives for families who opt to move out of Tokyo** as the government attempts to reverse decades of **[demographic decline](#)**, economic migration and the lure of the world’s biggest metropolis.

The government will extend to families up to **1 million yen per child.** The **figure is more than triple the ¥300,000 on offer under an existing scheme in place since 2019.** Those that take the money **must embrace the provincial life for a minimum of five years** or refund the state. The plan also has some other conditions that would need to be fulfilled strictly in order to avail and keep full benefits.

Read More: [World’s Population](#)

Wildlife Conservation Bond

In 2022, the **[World Bank](#)** has **priced the world’s first wildlife bond, raising USD 150 million that will be partly used for the conservation of black rhinos in [South Africa.](#)**

The **[Wildlife Conservation](#)** Bond is a **first-of-its-kind, outcome-based, financial instrument that channels investments to achieve conservation** outcomes measured in this case by an increase in black rhino populations. The program **could be expanded to protect other wildlife species.**

There **are five rhino species globally** (white and black rhinos in Africa, and the greater one-horned, Javan, and Sumatran), **with most of the animals in South Africa and almost all of them are white rhinos** as the number of black rhinos is decreasing day by day.

Read More: [Rhinos](#)

World Braille Day

Since 2019, World Braille Day **is observed on the 4th January every year**. The aim is to raise **awareness of the importance of Braille as a means of communication** in the full realization of [human rights](#) for blind and partially sighted people.

Braille (named after its inventor in 19th century France, Louis Braille) is a **tactile representation of alphabetic and numerical symbols using six dots** to represent each letter and number, and even musical, mathematical and scientific symbols. Braille is used by blind and partially sighted people **to read the same books and periodicals as those printed in a visual font**.

Braille is essential in the context of education, freedom of expression and opinion, as well as social inclusion, as per the [Convention on the Rights of Persons with Disabilities \(2006\)](#).

Read More: [International Day of Persons with Disabilities](#)

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