



Marriage Can't be Grounds to Sack Women from the Military

For Prelims: Marriage can't be Ground to Sack Women from Military, [Supreme Court \(SC\)](#), [United Nations Peacekeeping Missions](#).

For Mains: Marriage can't be Ground to Sack Women from Military, Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

[Source: IE](#)

Why in News?

Recently, the [Supreme Court \(SC\)](#) has directed the Ministry of Defence to pay Rs 60 lakh in compensation to a former permanent commissioned officer in the **Military Nursing Service (MNS)**.

- It is ruled that the officer was “wrongly” released from **service in 1988 on grounds of her marriage**.

Note

As of Aug 2023, over 7,000 women personnel are serving in the Indian Army followed by 809 in the Indian Air Force and 1306 in the Navy.

What are the Key Facts of the Case?

- **Background:**
 - **Former permanent commissioned officer of the MNS**, was released from employment in **1988 on grounds of her marriage**, as stipulated by **Army Instruction No. 61 of 1977 titled “Terms and Conditions of Service for the Grant of Permanent Commissions in the Military Nursing Service.”** It was later withdrawn by a letter dated 9th August, 1995.
 - It governed the **terms and conditions of MNS**.
 - Clause 11 dealt with the termination of an appointment on certain grounds. These included **“being pronounced by a medical board to be unfit for further service in the Armed Forces”; getting married; misconduct; breach of contract, or if services are found unsatisfactory.”**
 - In 2016, she sought recourse through the **Armed Forces Tribunal (AFT)**, established under the Armed Forces Tribunal Act of 2007 to adjudicate disputes related to commission, appointments, enrollment, and conditions of service. The **AFT deemed her termination “illegal” and directed her reinstatement with back wages.**
 - However, the **Central government contested this ruling by moving the Supreme Court** in the case titled **‘Union of India & Others vs. Ex. Lt. Selina John’**.

▪ **SC's Observations:**

- The SC stated that her release from the service was **“wrong and illegal”**.
- The court also rejected the Centre's argument, based on a **rule in force at the time**.
 - Such **rule was ex facie manifestly arbitrary**, as terminating employment because the **woman has got married** is a coarse case of gender discrimination and inequality.

Policy Framework to Recruit Women Military Officers

- Women officers were initially inducted into the Indian Army under the **Women Special Entry Scheme (WSES) in 1992**.
 - Under WSES, they served **for five-year periods in certain streams**, like the Army Education Corps and the Corps of Engineers.
- However, they faced restrictions on certain roles, such as infantry and armored corps.
- In **2006, WSES was replaced by the Short Service Commission scheme**, which allowed women officers the option to switch from WSES to SSC.
 - Men under SSC were commissioned for ten years, extendable up to fourteen years. Men in SSC have an option to **opt for a PC**.

How has the SC Acted in Favour of Women Officers in the Armed Forces?

- **Union of India v. Lt Cdr Annie Nagaraja Case, 2015:**
 - In 2015, seventeen **women officers who had joined the Indian Navy** as Short Service Commissioned (SSC) officers in various cadres (such as Logistics, Law, and Education) filed writ petitions **before the Delhi High Court**.
 - These officers had **completed fourteen years of service as SSC** officers but were not considered for the grant of **Permanent Commissions (PCs)** and were subsequently discharged from service.
 - In 2020, the SC held that serving women Short Service Commission Officers in the Indian Navy were entitled to Permanent Commission at par with their male counterparts.
- **Secretary, Ministry of Defence vs. Babita Puniya Case, 2020:**
 - In February 2020, SC upheld the demands of women in the SSC, stating that seeking a **Permanent Commission (PC) or a full-length career was “justified”**.
 - Before the ruling, only male officers on Short Service Commission (SSC) could opt for PC after 10 years of service, leaving women unable to qualify for a government pension.
 - The court's decision brought women officers in **10 streams of the Army at par with men**.
- **Government's Arguments:**
 - The Centre argued that the issue was a matter of policy, adding that **Article 33** of the Constitution allows **fundamental rights to be restricted** when it comes to the armed forces.
 - It also argued that there were “dangers involved in serving in the army” and adverse service conditions including **“absence of privacy** in field and insurgency areas, maternity issues and child care”.
 - The case was first filed in the Delhi HC by **women officers in 2003** and the **HC awarded Permanent Commissions to women officers** in all branches where they were serving in 2010.
- **Following the 2020 Ruling:**
 - Following the 2020 ruling, the Army constituted the **Number 5 Selection Board**, directing the Army to induct all eligible female officers as Permanent Commission (PC) officers.
 - The **special board came into effect in September 2020**, led by a senior general officer. It also includes a woman officer of the rank of brigadier.
 - Here, women officers qualifying for the screening process will be granted PC status, subject to being in the acceptable medical category.
- **Permanent Commission for Women In Indian Coast Guard:**

- In ***Priyanka Tyagi v. Union of India Case, 2024***, SC underscored the necessity for the Central government to ensure **that eligible women officers receive permanent commission in the Indian Coast Guard**.
- The Attorney General presented arguments citing operational challenges in granting permanent commissions to women officers.
 - However, the Court dismissed these arguments, emphasising that in the year 2024, such justifications hold no merit.
- The SC further urged the Centre to develop a **gender-neutral policy on this matter**, calling for a departure from patriarchal norms.
 - This instance underscores the ongoing struggle for gender equality and the necessity for proactive measures to ensure women's inclusion and empowerment in all spheres of society, including the armed forces.

What is the Significance of Increasing the Representation of Women in the Armed Forces?

- **Gender is not a Hindrance:** As long as an **applicant is qualified for a position**, one's gender is arbitrary. In the modern high technology battlefield, technical expertise and decision-making skills are increasingly more valuable than simple brute strength.
- **Military Readiness:** Allowing a **mixed gender force keeps the military strong**. The armed forces are severely troubled by falling retention and recruitment rates. This can be addressed by allowing women in the combat role.
- **Effectiveness:** The blanket restriction for women limits the **ability of commanders in theatre to pick the most capable person for the job**.
- **Tradition:** Training will be required to facilitate the **integration of women into combat units**. Cultures change over time and the masculine subculture can evolve too.
- **Global Scenario:** When women officially became eligible for combat positions in the **American military in 2013**, it was widely hailed as another step towards the equality of sexes. In **2018, the UK military lifted a ban on women serving in close combat ground** roles, clearing the way for them to serve in elite special forces.

What is MNS?

- MNS is the **only all women corps of the Armed Forces**. The MNS, an integral part of the **Armed Forces Medical Services (AFMS)**, encompasses the Army Medical Corps (AMC) and Army Dental Corps (ADC).
- The mission of Military Nursing Service is **'Excellence in patient care'** both in peace and war.
 - Officers of Military Nursing Service have always been resilient in meeting the ever changing and expanding demands of AFMS clientele in health care services and became the front line warriors in the healthcare system.
- Personnel of the AFMS serve in India's medical establishments and have actively participated in **United Nations Peacekeeping Missions** abroad.
- **Military nurses marched in the 2024 Republic Day parade for the first time**, they were still denied the status of ex-servicemen.
 - In February 2024, the Punjab and Haryana HC ruled that MNS officers cannot be denied ex-serviceman status under the **Punjab Recruitment of Ex-Servicemen Rules, 1982**.
 - Under this, officers who were released from service on completion of their term with a gratuity (as SSC officers do), are categorised as ex-servicemen.

Way Forward

- Implement comprehensive policy reforms to eliminate discriminatory practices and ensure equal opportunities for women officers, including granting them equal access to permanent commissions across all branches and ranks.
- Conduct regular awareness programs and sensitivity training for military personnel to promote a

culture of gender equality, respect, and inclusion within the armed forces.

- Establish support systems and facilities tailored to the needs of women officers, including provisions for maternity leave, childcare assistance, and adequate medical facilities.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Which of the following gives 'Global Gender Gap Index' ranking to the countries of the world? (2017)

- (a) World Economic Forum
- (b) UN Human Rights Council
- (c) UN Women
- (d) World Health Organization

Ans: (a)

Mains

Q. What are the continued challenges for Women in India against time and space? (2019)

Q. Discuss the desirability of greater representation to women in the higher judiciary to ensure diversity, equity and inclusiveness. (2021)

India's first Indigenous Hydrogen Fuel Cell Ferry

For Prelims: [Hydrogen Fuel Cell](#), [Harit Nauka Initiative](#), [Cochin Shipyard](#), [Clean Energy Solutions](#), [Green Hydrogen](#), [Zero-Emission Fuels](#), [National Hydrogen Energy Mission \(NHM\)](#), [Jawaharlal Nehru National Solar Mission \(JNNSM\)](#), [International Solar Alliance](#), [PM- KUSUM](#), [National Wind-Solar Hybrid Policy](#), [Rooftop Solar Scheme](#)

For Mains: Reservation and Its Implication Over Social Equality.

Source: [TH](#)

Why in News?

Recently, Prime Minister of India flagged off India's first indigenously built [hydrogen fuel cell ferry boat](#) in virtual.

- The hydrogen cell-powered inland waterway vessel launched under the **Harit Nauka initiative**.

What are the Other Key Highlights About the Ferry?

- **About:**
 - The vessel's flagging off was a key component of a major program that involved the foundation stone laid for a **₹17,300-crore project**, including the outer harbor at the **V.O.**

Chidambaranar Port.

- The vessel has been built at the [Cochin Shipyard](#).
- **Importance:**
 - It will make urban mobility smooth and easy through [inland waterways](#). The vessel underscores the pioneering step for embracing [clean energy solutions](#) and aligning with the nation's **net-zero commitments**.

Note

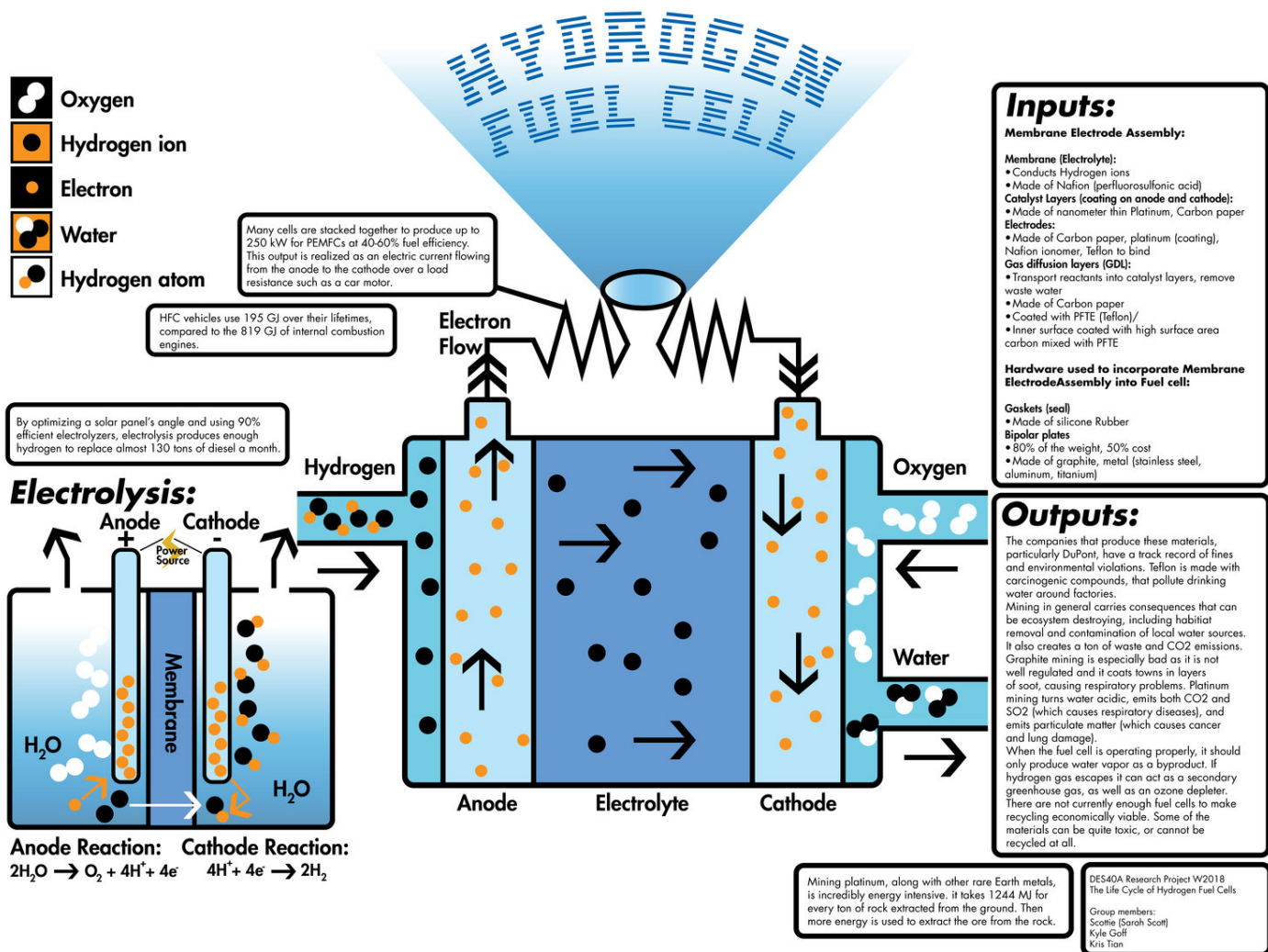
The V.O. Chidambaranar Port is the **first [Green Hydrogen Hub Port](#)** of the country and the projects include a **desalination plant, hydrogen production and bunkering facility**.

What is the Harit Nauka initiative?

- **About:**
 - The **Ministry of Ports, Shipping and Waterways** unveiled the **Harit Nauka guidelines** for inland vessels in January 2024.
- **Guidelines:**
 - As per the guidelines, all states have to make efforts to use **green fuels** for **50% of inland waterways-based passenger fleets** in the **next one decade**, and **100% by 2045**.
 - This is to reduce [greenhouse gas emissions](#) as per the **Maritime Amrit Kaal Vision 2047**.
- Globally, the shipping industry is increasingly transitioning to green fuels due to **environmental regulations, sustainability goals, and advancements** in green fuel technologies.
- Hydrogen and its derivatives are gaining attention for promising [zero-emission fuels](#) for the industry.

What is a Hydrogen Fuel Cell?

- **About:**
 - Hydrogen fuel cells are a **clean, reliable, quiet**, and efficient source of **high-quality electric power**.
 - They use hydrogen as a fuel to drive an **electrochemical process** that produces electricity, with **water** and **heat** as the only by-products.
 - Hydrogen is one of the most abundant elements on earth for a cleaner alternative fuel option.
- **Significance:**
 - **Zero Emission Solutions:** It is one of the best **Zero Emission solutions**. It is completely environment friendly with no **tailpipe emissions** other than water.
 - **Tailpipe emissions:** Emission of something such as gas or radiation into the atmosphere.
 - **Quiet Operation:** The fact that the fuel cells make little noise means that they can be used in challenging contexts, such as in hospital buildings.
- **Initiatives Taken:** The **Union Budget** for **2021-22** has announced a [National Hydrogen Energy Mission \(NHM\)](#) that will draw up a road map for using hydrogen as an energy source.
- **Other Initiatives for Renewable Energy:**
 - [Jawaharlal Nehru National Solar Mission \(JNNSM\)](#)
 - [International Solar Alliance](#)
 - [PM- KUSUM](#)
 - [National Wind-Solar Hybrid Policy](#)
 - [Rooftop Solar Scheme](#)



Net-Zero Target

- It is referred to as **carbon neutrality**, which does not mean that a country would bring down its emissions to zero. Rather, it is a state in which a country's emissions are compensated by the absorption and removal of **greenhouse gasses** from the atmosphere.
 - Further, absorption of the emissions can be increased by creating more carbon sinks such as forests.
 - While the removal of gasses from the atmosphere requires futuristic technologies such as **carbon capture** and **storage**.
- More than 70 countries have promised to become **Net Zero** by the middle of the century i.e., by **2050**.
- India has promised to cut its emissions to **net zero** by **2070** at the [Conference of Parties \(COP\)-26 Summit of UNFCCC](#).

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims:

Q. Hydrogen fuel cell vehicles produce one of the following as "exhaust" (2010)

- (a) NH₃
- (b) CH₄
- (c) H₂O
- (d) H₂O₂

Ans: (c)

Exp:

- A fuel cell is a device that converts chemical energy (energy stored in molecular bonds) into electrical energy.
- It uses Hydrogen gas (H₂) and Oxygen gas (O₂) as fuel and the products of the reaction in the cell are water (H₂O), electricity, and heat.
- This is a big improvement over internal combustion engines, coal-burning power plants, and nuclear power plants, all of which produce harmful byproducts. Therefore, option (c) is the correct answer.

Mains:

Q. Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? **(2021)**

NITI Aayog GROW Report and Portal

For Prelims: GROW Portal, Geographic Information System(GIS), Agroforestry Suitability Index, Agroforestry, [Sub-Mission on agroforestry](#) , National Agroforestry Policy (NAP) 2014, [Bhuvan platform](#)

For Mains: Agroforestry - Significance and Challenges, Government Policies & Interventions

Source: PIB

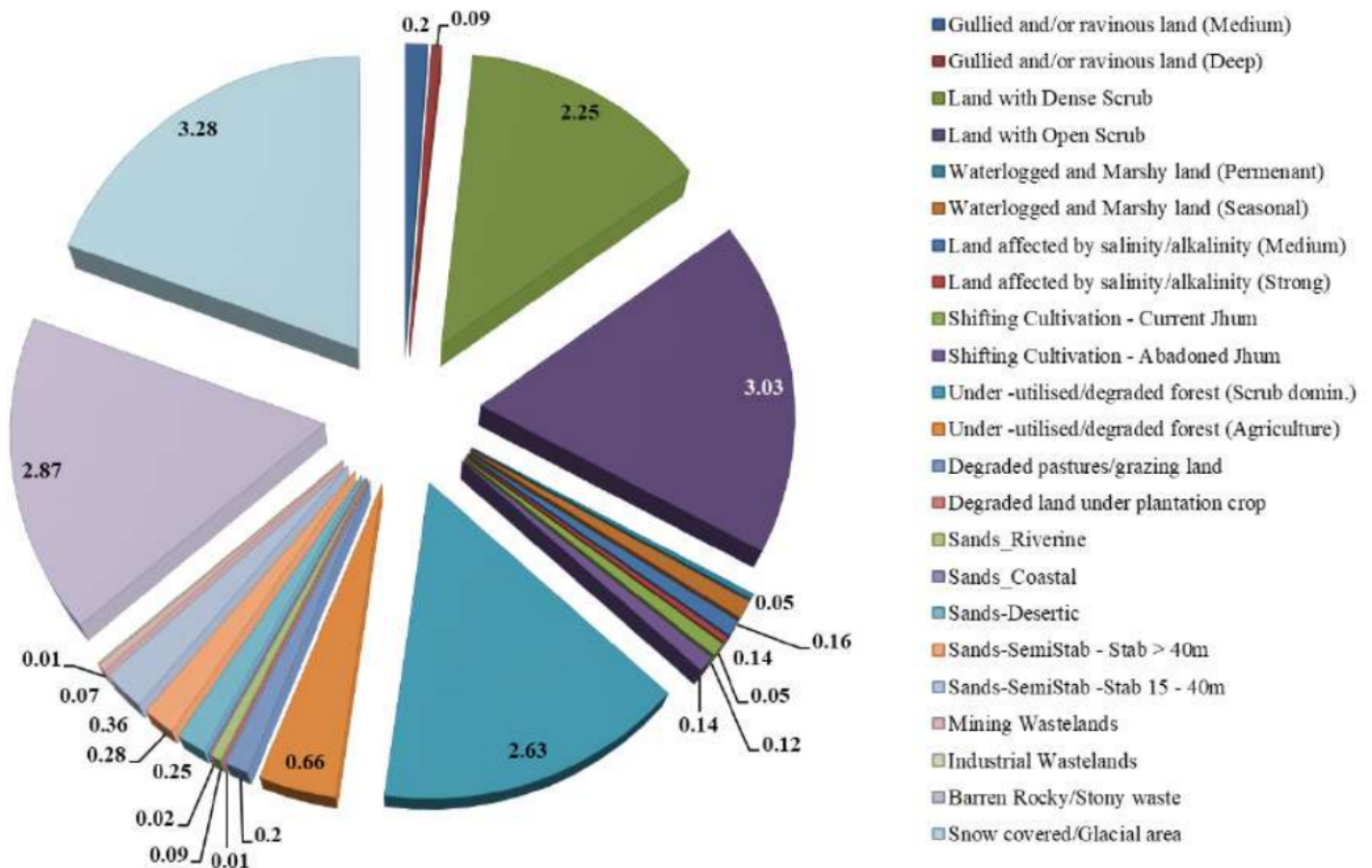
Why in News?

Recently, the **Greening and Restoration of Wasteland with Agroforestry (GROW) report and portal** was launched by [NITI Aayog \(National Institution for Transforming India\)](#).

What are the Key Highlights of the GROW Report?

- **GROW Report Objective:**
 - The GROW report aims to **facilitate restoration projects for achieving national commitments of Land Degradation Neutrality and restoring 26 million hectares of degraded land by 2030**, as well as creating an additional carbon sink of 2.5 to 3 billion tonnes of carbon dioxide equivalent.
- **Extent of Wastelands in India:**
 - The report highlights that **India possesses approximately 55.76 million hectares of wastelands**, comprising 16.96% of the total geographical area (TGA) of the country.
 - These degraded lands have suffered from reduced productivity and biodiversity due to

various natural and human-induced factors. However, the report suggests greening **and restoring these wastelands** through **agroforestry**.



Percentage of area under 23 classes of wastelands

▪ Agroforestry as a Solution:

- The report also underscores the **potential benefits of converting underutilised areas, especially wastelands, for agroforestry**.
 - Currently, agroforestry covers 8.65% of India's total geographical area, totalling about 28.42 million hectares and about 6.18% and 4.91% of India's land are highly and moderately suitable for agroforestry, respectively.
 - As per [Indian Space Research Organisation \(ISRO\)](#) **Rajasthan, Madhya Pradesh, and Telangana** are the top large-sized states for agroforestry suitability, while **Jammu and Kashmir, Manipur, and Nagaland** ranked highest among the medium-sized states.
- The report identifies the **policy and institutional support required for scaling up agroforestry interventions** in wastelands.

▪ Policy Framework:

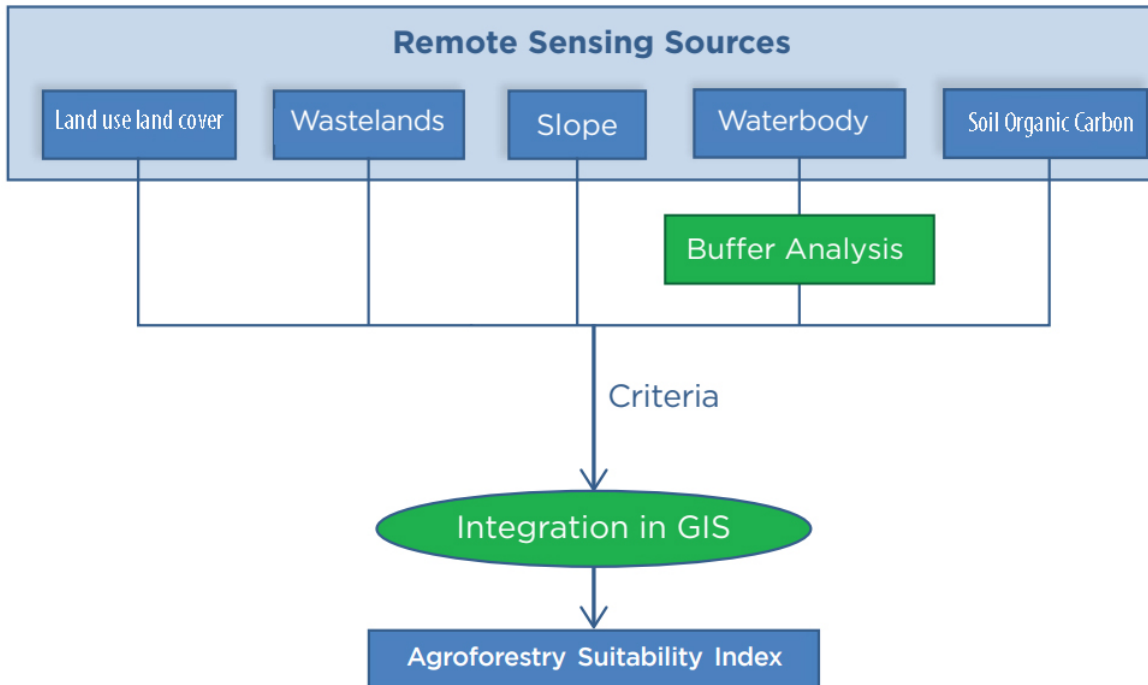
- The report emphasises India's National Agroforestry Policy of 2014, which aims to enhance productivity, profitability, and sustainability through this agro ecological land use system.
 - This aligns with global commitments like the [Paris Agreement](#), [Bonn Challenge](#), [UN Sustainable Development Goals](#), [United Nations Convention on Combating Desertification \(UNCCD\)](#), [Green India Mission](#) and more.

What is the GROW Portal?

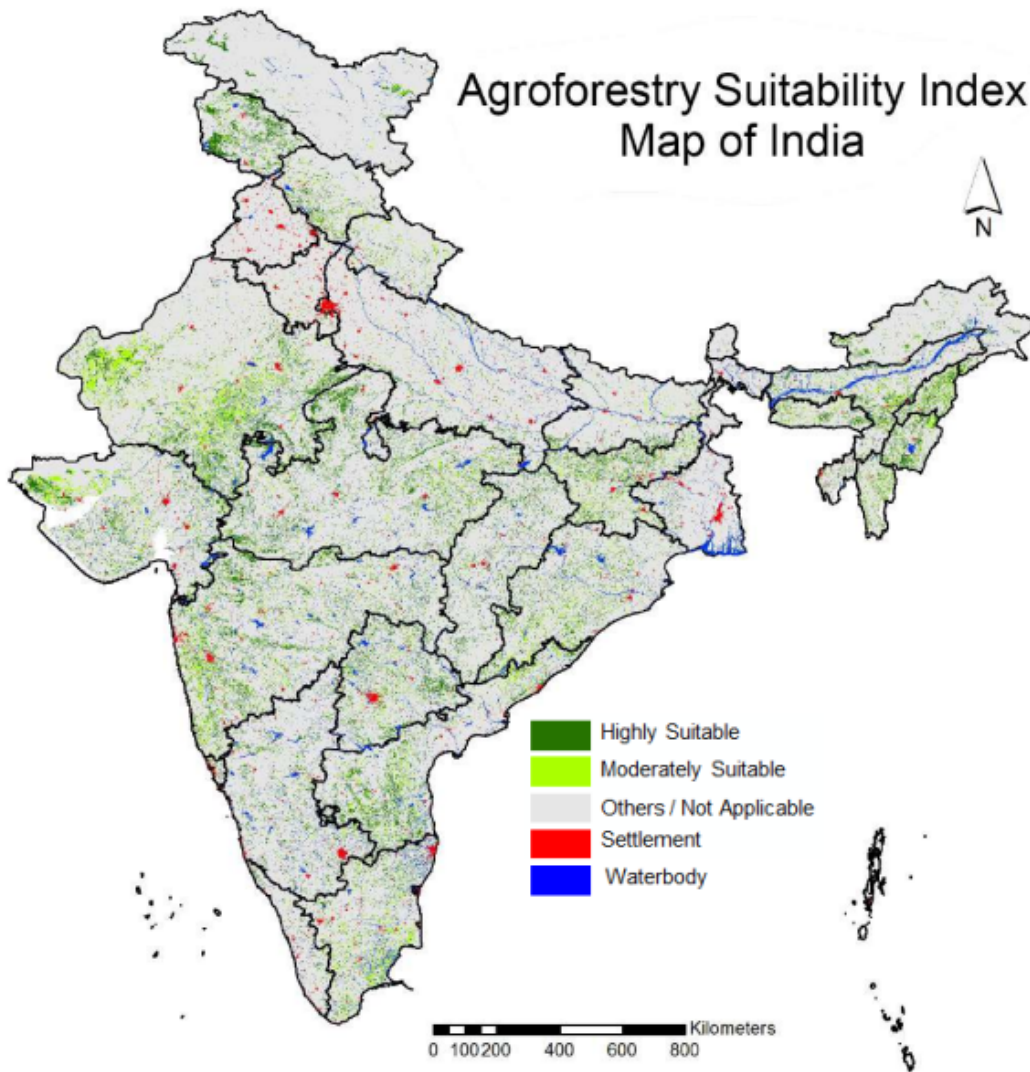
- The GROW portal is hosted on the [Bhuvan platform](#), ensuring universal access to state and district-level data related to [agroforestry](#) suitability.
 - Through the portal, users can access detailed maps and assessments of agroforestry

suitability across different regions of India.

- The portal utilises thematic datasets derived from **remote sensing** and **Geographic Information System (GIS)** technology, offering comprehensive information on factors influencing agroforestry suitability.
- One of the key features of the portal is the **Agroforestry Suitability Index (ASI)**, which provides a standardised index for prioritising agroforestry interventions at the national level.
- The portal offers insights into the current extent of agroforestry in India, highlighting its geographical spread and total coverage.



Work flow for calculating the Agroforestry Suitability Index



Note : Data for Andaman and Nicobar Islands and Laksadweep Islands are not available

Map with sites suitable for greening with Agroforestry

What is Agroforestry?

▪ About:

- Agroforestry is a **land use management system that combines trees and shrubs with crops** and livestock. It combines agricultural and forestry technologies to create more sustainable land-use systems.
- Agroforestry has been an integral part of Indian agriculture, fulfilling diverse needs such as **wood demand, fuelwood, fodder, and subsistence requirements.**
- Agroforestry is practised by both small and marginal farmers in rainfed conditions and large farmers under irrigated conditions, albeit with variations in adoption rates.

▪ Evolution of Agroforestry Policies and Initiatives:

- The initiation of **All India Coordinated Research Project (AICRP)** on Agroforestry in 1983 marked the formal integration of agroforestry into agricultural and forestry research agendas.
- Major policy initiatives in India, such as the **National Forest Policy 1988**, the **National Agriculture Policy 2000**, **National Bamboo Mission 2002**, **National Policy on Farmers 2007**, and **Green India Mission 2010**, have consistently highlighted the importance of agroforestry.
- Agroforestry gained momentum after India adopted the **National Agroforestry Policy**

(NAP) 2014.

- The NAP is a policy framework that aims to improve agricultural livelihoods by integrating trees, crops, and livestock into the same plot of land. The policy was launched in February 2014 during the **World Congress on Agroforestry, held in Delhi.**
- India became the **first country in the world to adopt a comprehensive agroforestry policy in 2014.**
- As a follow-up to the policy, the **Sub-Mission on agroforestry (SMAF)** under **National Mission for Sustainable Agriculture (NMSA)** was launched in 2016-17 to encourage and **expand tree plantation on farmland**, with the motto of **“Har Medh Par Ped”**, along with crops/ cropping system.
- **Impacts of Agroforestry:**
 - **Economic Impact:**
 - Agroforestry systems demonstrate positive yield growth for fruits, timber, and crops, contributing to **enhanced agricultural productivity.**
 - Agroforestry proves **economically viable, offering additional income streams** from diversified livelihood sources, including timber, fuelwood, and fodder.
 - **Social Impact:**
 - Agroforestry systems, particularly those emphasizing fruit crops, contribute to **improved nutrition and health status** among communities.
 - While women's participation in agroforestry is significant, there's a need for further research to understand the **impact of agroforestry on gender dynamics and women's empowerment.**
 - **Environmental Impact:**
 - Agroforestry enhances **soil fertility, nutrient cycling, and soil organic carbon**, contributing to sustainable land management practices.
 - Agroforestry systems improve **water-use efficiency, mitigate soil erosion**, and contribute to watershed management and conservation efforts.
 - Agroforestry serves as a **significant source of biomass energy** while also sequestering carbon, aiding in climate change mitigation efforts.
 - Agroforestry promotes biodiversity conservation by providing habitat, supporting species movement, and reducing deforestation rates.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. How is permaculture farming different from conventional chemical farming?

1. Permaculture farming discourages monocultural practices but in conventional chemical farming, monoculture practices are predominant.
2. Conventional chemical farming can cause an increase in soil salinity but the occurrence of such phenomenon is not observed in permaculture farming.
3. Conventional chemical farming is easily possible in semi-arid regions but permaculture farming is not so easily possible in such regions.
4. Practice of mulching is very important in permaculture farming but not necessarily so in conventional chemical farming.

Select the correct answer using the code given below:

- (a)** 1 and 3
- (b)** 1, 2 and 4
- (c)** 4 only
- (d)** 2 and 3

Ans: (b)

Q.2 Which of the following is the chief characteristic of 'mixed farming'? (2012)

- (a) Cultivation of both cash crops and food crops
- (b) Cultivation of two or more crops in the same field
- (c) Rearing of animals and cultivation of crops together
- (d) None of the above

Ans: (c)

Q. The Government of India has established NITI Aayog to replace the (2015)

- (a) Human Rights Commission
- (b) Finance Commission
- (c) Law Commission
- (d) Planning Commission

Ans: (d)

Mains

Q.1 What are the present challenges before crop diversification? How do emerging technologies provide an opportunity for crop diversification? **(2021)**

Himalayas More Prone to Extreme Weather Events

For Prelims: [Himalayan Region](#), [Global Warming](#), [Indo-Gangetic plain](#), [Greenhouse Gas \(GHG\)](#).

For Mains: Impact of Global Warming on the Himalayas, Ecological Challenges to Himalayan region due to rampant urbanisation.

Source: [DTE](#)

Why in News?

The [Himalayan Region](#), prone to cloudbursts and extreme weather events, is experiencing accelerated impacts of [Global Warming](#).

How are the Shifts in Weather Patterns Increasing the Frequency of Extreme Events?

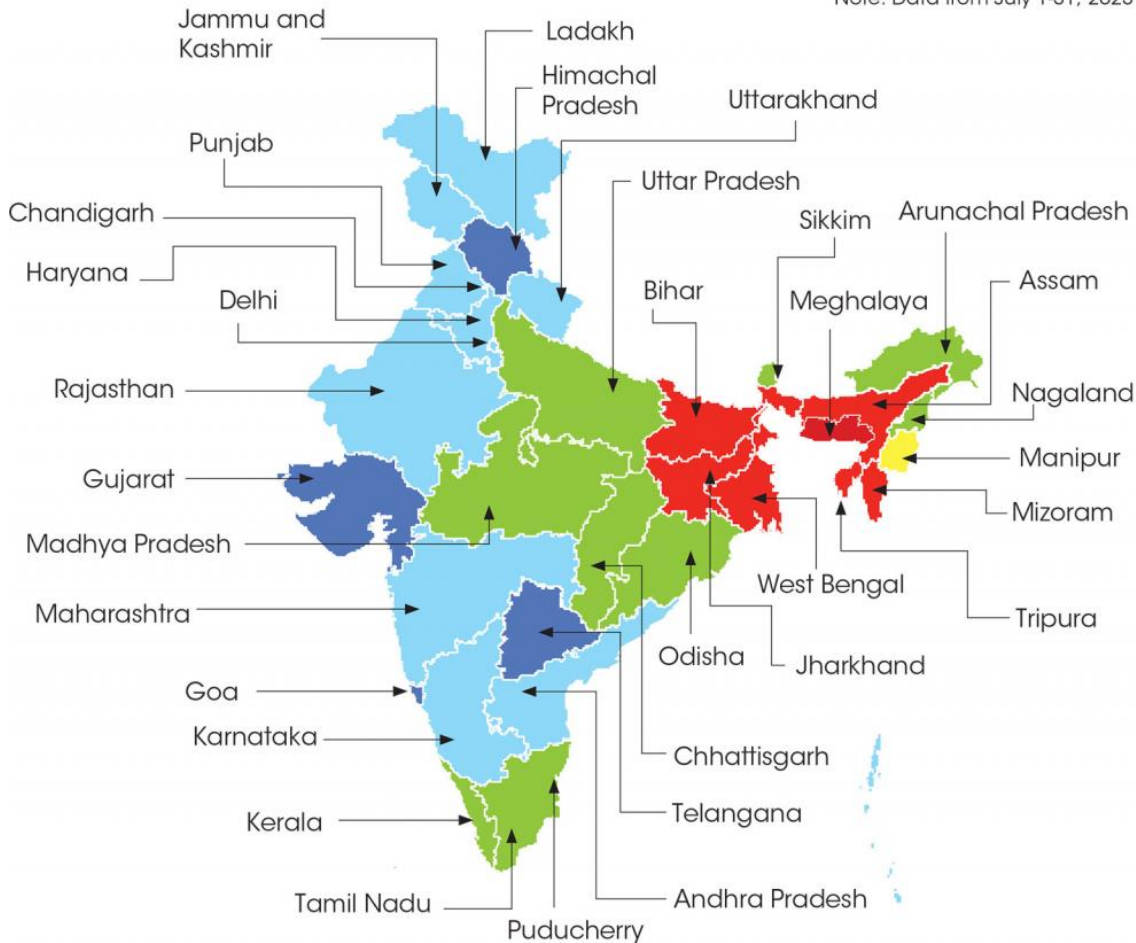
▪ **Shift in Monsoon Patterns:**

- There is evidence suggesting a **shift in southwest monsoon patterns**, with deviations occurring more frequently in the [Indo-Gangetic plain](#) rather than the **southern half of the sub-continent**.
- This **includes excessive rainfall** in the arid and **semi-arid western half of India** and deficient rainfall in the eastern half and coastal areas, indicating a reversal of historical precipitation patterns.

In July 2023, when southwest monsoon was at its peak, rainfall was excessive in arid and semi-arid western half of the country, but heavily deficient in the eastern half of Indo-Gangetic plain, northeast and coastal areas

■ Large Deficient (-99 to -60%)
 ■ Deficient (-59 to -20%)
 ■ Normal (-19 to 19%)
 ■ Excess (20 to 59%)
 ■ Large Excess (60%)

Note: Data from July 1-31, 2023



▪ **Temperature Rise in the Arabian Sea:**

- The uppermost layer of the Arabian Sea has experienced abnormal warming, leading to **increased evaporation and potentially** altering the behaviour of the southwest monsoon.
- This warming trend has also contributed to **more Cyclonic storms in the Arabian Sea**, including some making landfall on the west coast of India.
 - Between 2001 and 2019, there has been a **50% increase in the frequency of cyclones in the Arabian Sea**. About half of these dissipate before they land.

▪ **Extreme Rainfall and Cloudbursts:**

- Cloudbursts are not just intense rain showers, but a **genetically different form of rain**. Even in heavy showers, the raindrops are usually about 2 mm in diameter.
- Their size grows to between 4-6 mm during severe thunderstorms and cloudbursts. Being heavier, these raindrops fall faster, thus they trigger **landslides with their tremendous pounding power**.
 - Number of thunderstorms, cloudbursts and hailstorms has increased from between two and 4 per annum during the four decades between **1970-2010, to 53 in Himachal Pradesh alone in 2023**.

SHARP RISE

Himachal Pradesh now records more cloudbursts, more often

Year	Number of cloudbursts (per annum)
1972-2012	3 to 4
2018	21
2019	16
2020	NA
2021	30
2022	39
2023	53



▪ **Glacial Melting and Glacier Lake Outbursts:**

- Rising temperatures in the Himalayas have caused glaciers to melt rapidly, **leading to the formation of [glacial lakes](#)**.
- The **increasing frequency and ferocity of [cloudbursts](#)** are causing these lakes to overflow or burst their banks, resulting in floods and loss of lives and property downstream.

- The number of such lakes in Uttarakhand and east of Himachal Pradesh, has increased from 127 in 2005 to 365 in 2015.

- **Loss of Glacial Ice:**

- The Himalayas have **already lost more than 40% of their ice**, and this trend is expected to continue, with projections indicating a **potential loss of up to 75% by the end of the century**.
 - This loss of ice is affecting the vegetation line, agricultural practices, and water resources in the region.

What can be the Adaptation Measures to Tackle the Impact of Climate Change?

- There is a growing need for improved **monitoring of glaciers and glacial lakes**, as well as **better forecasting and early warning systems for [landslides](#)** and glacial lake outbursts.
 - However, these measures alone may not be sufficient to address the long-term impacts of climate change in the Himalayas.
- Reducing **[Greenhouse Gas \(GHG\)](#)** emissions and transitioning to **renewable energy sources** are seen as essential steps to mitigate the effects of global warming and safeguard the **[Himalayan region](#)** and its inhabitants.
- There should be **Sustainable Construction Activities** in the Himalayas region, which can withstand any calamitous event if it occurs. **Some of the steps are-**
 - **Understanding Terrain Characteristics:** Recognising the **impact of slope, drainage, and vegetation cover** on the stress that an area can endure is fundamental. By delineating zones based on these factors, authorities can better manage construction activities and mitigate risks associated with unstable terrain.
 - **Assessing Climate Vulnerability:** Given the increasing frequency of extreme weather events like floods and landslides, it's essential to project future climate scenarios and identify vulnerable areas. **Projections and simulations can help in devising strategies to adapt** to and mitigate the impacts of climate change.
 - **Managing Development Impacts:** Development projects, particularly **hydropower ventures**, often have significant **ecological consequences in hilly regions**. Regulations should incorporate risk assessments and consider cumulative impacts to safeguard against forest degradation, changes in river courses, and loss of biodiversity.
 - **Enhancing Adaptive Capacity:** As hill town populations grow, **their ability to cope with climate change diminishes** due to various challenges such as water scarcity, inadequate infrastructure, and limited livelihood options.
 - Improving adaptive capacity involves bolstering services and infrastructure while prioritising sustainable solutions with community involvement.

What are the Government Initiatives Related to the Himalaya?

- **[National Mission on Sustaining Himalayan Ecosystem \(2010\):](#)**
 - **Covers 11 states** (Himachal Pradesh, Uttarakhand, Sikkim, all northeast states, and West Bengal) **and 2 UTs** (Jammu & Kashmir and Ladakh).
 - Part of the **[National Action Plan on Climate Change \(NAPCC\)](#)**, comprising eight missions.
- **Indian Himalayas Climate Adaptation Programme (IHCAP):**
 - It aims to enhance the **resilience of vulnerable communities in the Indian Himalayas** by strengthening the capacities of Indian institutions in climate science, with a specific focus on glaciology and related areas
- **SECURE Himalaya Project:**
 - Integral to the "**Global Partnership on Wildlife Conservation and Crime Prevention for Sustainable Development**" (Global Wildlife Program), funded by the **[Global Environment Facility \(GEF\)](#)**.
 - Focuses on promoting sustainable management of alpine pastures and forests in the high-range Himalayan ecosystems.
- **[Mishra Committee Report 1976:](#)**
 - Named after MC Mishra, the then **Garhwal commissioner in erstwhile Uttar Pradesh**. It provided findings **on land subsidence in Joshimath**.
 - Recommendations included **imposing restrictions on heavy construction work**,

blasting, excavation for road repairs and other construction activities, and **tree felling in the region.**

Conclusion

- The recent shifts in monsoon patterns and extreme weather events underscore the urgent need for proactive measures to address the impacts of climate change in the Indian subcontinent.
- It is imperative for governments and stakeholders to prioritise adaptation and mitigation strategies to minimise the socio-economic and environmental risks posed by these changing climatic conditions.
- Only through concerted efforts in sustainable development, renewable energy adoption, and disaster preparedness can we mitigate the adverse effects of climate change and ensure the resilience of communities across the subcontinent.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. Consider the following pairs: (2020)

	Peak	Mountains
1.	Namcha Barwa	Garhwal Himalaya
2.	Nanda Devi	Kumaon Himalaya
3.	Nokrek	Sikkim Himalaya

Which of the pairs given above is/are correctly matched?

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

Ans: (b)

Q. If you travel through the Himalayas, you are likely to see which of the following plants naturally growing there? (2014)

1. Oak
2. Rhododendron
3. Sandalwood

Select the correct answer using the code given below:

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

Ans: (a)

Q. When you travel in the Himalayas, you will see the following: (2012)

1. Deep gorges
2. U-turn river courses
3. Parallel mountain ranges
4. Steep gradients causing landsliding

Which of the above can be said to be the evidence for Himalayas being young fold mountains?

- (a) 1 and 2 only
- (b) 1, 2, and 4 only
- (c) 3 and 4 only
- (d) 1, 2, 3 and 4

Ans: (d)

Mains:

Q. Differentiate the causes of landslides in the Himalayan region and Western Ghats. **(2021)**

Q. How will the melting of Himalayan glaciers have a far-reaching impact on the water resources of India? **(2020)**

Q. "The Himalayas are highly prone to landslides." Discuss the causes and suggest suitable measures of mitigation. **(2016)**

Laser Cooling of Positronium

For Prelims: AEgIS, [Positronium](#), [European Organization for Nuclear Research \(CERN\)](#), [Gamma-ray laser](#), Laser Cooling, [Quantum Electrodynamics \(QED\)](#), Atomic Nucleus

For Mains: Significance of AEgIS in formation of AntiHydrogen and measurement of earth's gravitational acceleration on AntiHydrogen.

Source: [IE](#)

Why in News?

The **AEgIS collaboration** has achieved a significant breakthrough by demonstrating the **laser cooling of Positronium**.

- The experiment was performed at the [European Organisation for Nuclear Research](#), more popularly known as CERN, in Geneva.

What are the Key Highlights of the Study?

- **About AEgIS:**
 - Anti-hydrogen Experiment: Gravity, Interferometry, Spectroscopy (AEgIS) is a collaboration of physicists from a number of countries in Europe and from India.
 - In 2018, AEgIS became the **first in the world to demonstrate the pulsed production of antihydrogen atoms**.
- **Aim:**
 - This is an important precursor experiment to the formation of antiHydrogen and the measurement of Earth's gravitational acceleration on antihydrogen in the AEgIS experiment.
 - This scientific feat could open prospects to produce a [gamma-ray laser](#) that would eventually allow researchers to look inside the atomic nucleus and have applications beyond physics.

▪ Positronium:

- Positronium, comprising a bound [electron \(e⁻\) \(matter\)](#) and [positron \(e⁺\) \(matter\)](#), is a fundamental atomic system.
 - Electrons and positrons are leptons. They interact through electromagnetic and weak forces.
- Since Positronium is only made up of electrons and positrons, and no usual nuclear matter, it has the unique **distinction of being a purely leptonic atom**.
 - Due to its very short life, it annihilates with a half life of **142 nano-seconds**. Its mass is **twice the electron mass**.

▪ Cause of Choosing Laser Cooling as the Method:

- Positronium is the **lightest known particle system**, and it's extremely unstable. When produced in the clouds for experimental studies, positronium zips around at a huge range of velocities, making it really difficult to pin down.
- One way to resolve this would be to **cool down the positronium** which would **slow its particles** so more accurate measurements of its properties could be taken.

▪ Laser Cooling:

- It is a method of **temperature reduction** based on particles absorbing and emitting photons. If **laser light** is directed along the path of incoming particles, those particles will **absorb the photon, and re-emit** it in a random direction that changes its momentum and slows it down.
 - Scientists **first proposed** the method of laser cooling for positronium decades ago **in 1988**.
- Experimentalists achieved laser cooling of **Positronium atoms**, reducing their temperature from **~380 Kelvin to ~170 Kelvin** using an alexandrite-based laser system.

▪ Significance and Future Prospects:

- Laser cooling of Positronium opens avenues for spectroscopic comparisons necessary for [Quantum Electrodynamics \(QED\)](#) studies.
- **High-precision measurements** of the properties and **gravitational behaviour of antimatter** could reveal new physics and provide insights into the matter-antimatter asymmetry.
- The creation of a [Bose-Einstein condensate](#) of antimatter, proposed as a means to produce coherent **gamma-ray light**, holds promise for **fundamental and applied research**, including peering into the **atomic nucleus**.
 - In a **Bose-Einstein condensate, matter (or antimatter)** is in a coherent state analogous to photons in a laser beam, and individual atoms lose their independent identity. This allows many atoms to be stored in a small volume.

Conclusion

The AEGIS experiment's success in laser cooling Positronium marks a significant advancement in antimatter research at CERN. This achievement not only contributes to our understanding of fundamental physics but also holds potential for groundbreaking discoveries and applications in the future.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. The efforts to detect the existence of Higgs boson particle have become frequent news in the recent past. What is/are the importance of discovering this particle?

1. It will enable us to understand as to why elementary particles have mass.
2. It will enable us in the near future to develop the technology of transferring matter from one point to another without traversing the physical space between them.
3. It will enable us to create better fuels for nuclear fission.

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: (a)

Belgium Recognises Ecocide as a Crime

[Source: DTE](#)

Why in News?

The Federal Parliament of [Belgium](#) has made history by becoming the **first country in the European Continent** to recognise '[ecocide](#)' as a national as well as an international crime.

- The law targets individuals in positions of decision-making power and corporations, aiming to prevent and punish severe environmental degradation such as extensive oil spills.

Note

- **Belgium is a federal and constitutional monarchy** divided into two main linguistic and cultural regions: **Flemish (Dutch)-speaking** Flanders and **French-speaking** Wallonia.
- Belgium is called the '**Cockpit of Europe**' because it is where the largest number of European battles have taken place in history.
- Its capital, Brussels, is also the seat of the European Union (EU).





What is Ecocide?

- Ecocide is defined as "**unlawful or wanton acts committed with knowledge** that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts."
 - The definition was provided by the **Independent Expert Panel for the Legal Definition of Ecocide**, formed by the Stop Ecocide Foundation.
- Ecocide is considered a form of **environmental crime** and is often associated with significant **negative impacts on biodiversity, ecosystems, and human well-being**.
 - Recognizing ecocide as a crime aims to hold individuals and corporations accountable for their actions and to prevent further environmental degradation.
- Ecocide is a crime in 12 countries, with nations mulling laws around criminalising environmental damage that is wilfully caused and harms humans, animals and plant species.

What is India's Stance on Criminalising Ecocide?

- **Ecocide as Law:** Some **Indian court judgments have referenced the term 'ecocide,' the concept has not been formally incorporated into Indian law**.
 - **Chandra CFS and Terminal Operators Pvt. Ltd. v. The Commissioner of Customs (2015):** The court noted that certain sections of people have been continuing ecocide by removing valuable timbers.

- **T.N. Godavarman Thirumulpad vs Union Of India & Ors (1997):** [Supreme Court](#) called attention to an “anthropogenic bias” and argued that “environmental justice could be achieved only if we drift away from the principle of anthropocentric to **ecocentric.**”
- However, India has yet to take concrete steps towards enacting legislation specifically targeting ecocide.
- **Existing Legal Framework:** India's environmental legal framework includes statutes like the [Environmental \(Protection\) Act of 1986](#), [The Wild Life \(Protection\) Amendment Act, 2022](#), and the [Compensatory Afforestation Fund Act, 2016 \(CAMPA\)](#).
 - Despite these laws, there remains a **gap in addressing ecocidal activities directly**, necessitating the incorporation of ecocide as a distinct criminal offence.

Read more: [Global Push to Criminalise Ecocide](#)

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Consider the following statements: (2019)

The Environment Protection Act, 1986 empowers the Government of India to

1. state the requirement of public participation in the process of environmental protection, and the procedure and manner in which it is sought
2. lay down the standards for emission or discharge of environmental pollutants from various sources

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)

Women Exporters in the Digital Economy (WEIDE) Fund

Source: WTO

- The [World Trade Organization \(WTO\)](#) and the [International Trade Centre \(ITC\)](#) launched a **USD 50 million Women Exporters in the Digital Economy (WEIDE) Fund** to assist women in accessing opportunities in **international trade and the digital economy**, coinciding with the [13th Ministerial Conference in Abu Dhabi, UAE](#).
 - The Women Exporters in the Digital Economy (WEIDE) Fund aims to **assist women-led businesses** and entrepreneurs in developing and least-developed countries to adopt **digital technologies** and enhance their online presence.
 - The United Arab Emirates (UAE) has allocated **USD 5 million as the first donor to the fund.**
- The **WTO-ITC SheTrades Summit** convened over 250 women entrepreneurs from 60+ countries, along with business leaders and development partners, to **discuss solutions** and access new markets in a **green and digital trading system**, featuring masterclasses by experts.

Shri Morarji Desai Birth Anniversary

Source: [PIB](#)

The Prime Minister paid tributes to [Shri Morarji Desai](#) on his birth anniversary.

- Born on **29th February 1896** in Bhadeli village, Gujarat. Graduated from Wilson Civil Service in Bombay and served as a **Deputy Collector for twelve years**.
- Morarji Desai was an Indian politician and activist who served as the **fourth Prime Minister of India from 1977 to 1979**.
 - The **Forty-fourth Amendment of the Constitution** of India was enacted during his tenure as Prime Minister.
- Morarji Desai joined Congress during the [Civil Disobedience Movement](#). Imprisoned thrice and actively participated in **individual Satyagraha** and [Quit India Movement](#).
 - He became **Chief Minister of Bombay in 1952** and also served as Minister for Commerce and Industry, then Finance Minister. **Resigned under the Kamraj Plan** and led the **Administrative Reforms Commission**. Became Prime Minister in 1977.
- Desai emphasised the importance of **improving the living standards of the poor and underprivileged**, enacted progressive legislation to help peasants and tenants, believed in the [rule of law for all](#), and upheld truth as an article of faith.



Read more: [Morarji Desai](#)

Alliance for Global Good - Gender Equity and Equality

Source: [PIB](#)

Recently, the Ministry of Women & Child Development, Government of India launched the logo and the website for the [Alliance for Global Good - Gender Equity and Equality](#).

- It marks a significant milestone in the global pursuit of gender equality. Launched in **Davos 2024 (54th annual World Economic Forum)**, it is a testament to India's unwavering commitment to the **cause of women-led development**.
 - The alliance aims to consolidate global best practices, foster knowledge exchange, and attract investments in women's health, education, and entrepreneurship, in line with various [Sustainable Development Goals \(SDGs\)](#).
- It is being supported by influential partners like the **Bill & Melinda Gates Foundation** and anchored by institutions such as the **CII Centre for Women Leadership**

Read more: [Alliance for Global Good - Gender Equity and Equality](#)

Advancing Pregnancy Care with India-Specific AI Model

Source: [TH](#)

Researchers at the **Indian Institute of Technology Madras** and the **Translational Health Science and Technology Institute, Faridabad**, have collaborated to develop an India-specific artificial intelligence model named **Garbhini-GA2**, tailored for accurately determining the [gestational age \(GA\) of foetus](#) in the second and third trimesters of pregnancy.

- GARBH-Ini GA-2 is based on **genetic algorithms**. A genetic algorithm is an optimisation technique inspired by evolution and natural selection principles.
 - In addition to aiding neonatal care, Garbhini-GA2 also contributes to precise epidemiological estimates.
 - It minimises the **margin of error** in accurately determining the **age of a foetus** within the Indian population by nearly threefold.
- This initiative is a part of the [GARBH-Ini programme](#), addressing the critical need for precision in prenatal care.
 - The **GARBH-Ini** is a flagship programme of the Department of Biotechnology (DBT), Govt of India.
 - It advocates for the health of both mothers and children while also creating predictive tools for identifying [preterm birth](#) risks.
- Published in the **Lancet Regional Health Southeast Asia**, this research marks a significant stride towards improving pregnancy care in India.

Read more: [Medical Termination of Pregnancy \(MTP\) Amendment Act, 2021](#)
