



Nutrient Based Subsidy

For Prelims: [Nutrient Based Subsidy](#), [Rabi and Kharif Season](#), [Fertilizers](#), [DAP \(Di-Ammonium Phosphate\)](#), Black Marketing.

For Mains: Significance of Nutrient Based Subsidy and Challenges, Issues related to direct and indirect farm subsidies and minimum support prices.

Source: [PIB](#)

Why in News?

Recently, the union cabinet has approved [Nutrient Based Subsidy \(NBS\)](#) rates for the various nutrients of [Rabi and Kharif Season for 2022-23](#).

- For Rabi Season **2022-23**: NBS approved for various nutrients i.e. **Nitrogen (N), Phosphorus (P), Potash (K) and Sulphur (S)**
- For Kharif Season **2023**: NBS rates approved for Phosphatic and Potassic (P&K) Fertilizers.

What is a Nutrient Based Subsidy (NBS) Regime?

- **About:**
 - Under the NBS regime - fertilizers are provided to the farmers at the subsidized rates based on the **nutrients (N, P, K & S) contained in these fertilizers**.
 - Also, the fertilizers which are fortified with **secondary and micronutrients** such as **molybdenum (Mo) and zinc** are given additional subsidy.
 - The subsidy on P&K fertilizers is announced by the Government on an annual basis for each nutrient on a **per kg basis** - which are determined taking into account the **international and domestic prices of P&K fertilizers**, [Exchange Rate](#), inventory level in the country etc.
 - NBS policy intends to increase the **consumption of P&K fertilizers** so that optimum balance (**N:P:K= 4:2:1**) of NPK fertilization is achieved.
 - This would **improve soil health** and as a result the yield from the crops would increase, resulting in **enhanced income to the farmers**.
 - Also, as the **government expects rational use of fertilizers**, this would also ease off the **burden of fertilizer subsidy**.
 - It is being implemented from **April 2010 by the Department of Fertilizers, Ministry of Chemicals & Fertilizers**.

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Nutrient Based Subsidy Scheme

About:

- A fixed rate of subsidy (in ₹ per Kg) decided on an annual basis
- Being implemented since 2010

Implemented by:

- Department of Fertilisers, Ministry of Chemicals & Fertilizers

Ambit of NBS:

- Given on nutrients - Nitrogen, Phosphate, Potash and Sulphur
- For Phosphatic and Potassic (P&K) fertilisers
- Doesn't include Urea based fertilisers
- NBS is available for imported complex fertilisers except Ammonium Sulphate

Aim:

- Ensure the availability of fertilisers to farmers at an affordable price
- Increase consumption of P&K fertilizers to achieve optimum NPK ratio (4:2:1)

Fertilisers in India:

- 3 basic fertilisers – Urea, Diammonium Phosphate (DAP), and Muriate of Potash (MOP)
- Urea is the most – produced, consumed, imported and physically regulated fertiliser of all
- Urea is subsidised only for agricultural uses

Nutrient	Main Source
Nitrogen (N)	Urea
Phosphorus (P)	DAP
Potassium (K)	MOP



Significance:

- Availability of Subsidized P&K Fertilizers will ensure the availability of **DAP (Di-Ammonium Phosphate)** and other P&K fertilizers to farmers at subsidized, affordable, and reasonable prices during the Kharif season. This is essential to support agricultural productivity and **food security** in India.
- NBS subsidy is crucial for effective resource allocation and ensuring that subsidies are directed toward the **farmers who need them the most**, promoting efficient and

What are the Issues Related to NBS ?

- **Economic and Environmental Costs:**
 - The fertilizer subsidy, including the NBS policy, imposes a **significant financial burden** on the economy. It ranks as the second-largest subsidy after food subsidy, straining fiscal health.
 - Additionally, imbalanced fertilizer usage due to the pricing disparity has adverse **environmental consequences**, such as soil degradation and nutrient runoff, impacting long-term agricultural sustainability.
- **Black Marketing and Diversion:**
 - Subsidized urea is **susceptible to Black Marketing** and diversion. It is sometimes **illegally sold to bulk buyers**, traders, or non-agricultural users like plywood and animal feed manufacturers.
 - Moreover, there are **instances of subsidized urea being smuggled** to neighboring countries like Bangladesh and Nepal, leading to the loss of subsidized fertilizers intended for domestic agricultural use.
- **Leakage and Misuse:**
 - The NBS regime relies **on an efficient distribution system** to ensure that subsidized fertilizers reach the intended beneficiaries, i.e., farmers.
 - However, there may be instances of leakage and misuse, where subsidized fertilizers **do not reach farmers or are used for non-agricultural** purposes. This undermines the effectiveness of the subsidy and denies genuine farmers access to affordable fertilizers.
- **Regional Disparities:**
 - Agricultural practices, soil conditions, and crop nutrient requirements vary across different regions of the country.
 - Implementing a uniform NBS regime may not adequately address the specific needs and regional disparities, potentially leading to suboptimal nutrient application and productivity variations.

Way Forward

- A uniform policy for all fertilizers is necessary, as nitrogen (N), phosphorus (P), and potassium (K) are **crucial for crop yields and quality**.
- In the long term, NBS could be replaced by a flat per-acre cash subsidy that allows farmers to purchase any fertilizer.
- This subsidy should encompass **value-added and customized products** that provide efficient nitrogen delivery and other essential nutrients.
- It is crucial to strike a balance between price control, affordability, and sustainable nutrient management to achieve the desired outcomes of the NBS regime.

What are the Major Cropping Seasons?

Kharif Crops	Rabi Crops
Crops that are sown during the southwest monsoon season are called kharif or monsoon crops.	Those that are sown around the Retreating Monsoon and Northeast monsoon season, which begins by October are called rabi or winter crops.
These crops are sown at the beginning of the season around end May to early June and are harvested post the monsoon rains beginning October.	The harvest for these crops happens typically during April and May, during the summer season.
These crops depend on the rainfall patterns.	These crops depend on the rainfall patterns.
Rice, maize, pulses such as urad, moong dal and millets are among the key kharif crops.	Major Rabi crops are wheat, gram, peas, barley etc.

It requires a lot of water and hot weather to grow.	A warm climate is required for seed germination and cold climate for the growth of crops.
Zaid Crops <ul style="list-style-type: none"> ▪ Sown and harvested: March-July (between Rabi and Kharif) ▪ Important Zaid crops include: Seasonal fruits, vegetables, fodder crops etc 	

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. With reference to the cultivation of Kharif crops in India in the last five years, consider the following statements: (2019)

1. Area under rice cultivation is the highest.
2. Area under the cultivation of jowar is more than that of oilseeds.
3. Area of cotton cultivation is more than that of sugarcane.
4. Area under sugarcane cultivation has steadily decreased.

Which of the statements given above are correct?

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

Ans: (a)

Q. Consider the following crops: (2013)

1. Cotton
2. Groundnut
3. Rice
4. Wheat

Which of these are Kharif crops?

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

Ans: (c)

Rashtriya Gokul Mission

For Prelims: [Rashtriya Gokul Mission](#), Sahiwal, Tharparkar, Red Sindhi, National Dairy Research Institute (NDRI), [Krishi Vigyan Kendra](#), [White Revolution](#), Jersey.

For Mains: Significance of promoting indigenous cattle breeds and their impact on employment generation and economic growth.

Source: DTE

Why in News?

With almost a decade into [Rashtriya Gokul Mission](#), it is found that instead of improving the quality of all the indigenous breeds, as envisioned under the scheme, it has ended up promoting only one indigenous variety, the **Gir cow**, across the country.

What is the Issue With Rashtriya Gokul Mission?

- **Prominence of Gir Cow in Rashtriya Gokul Mission:**
 - **India's Rashtriya Gokul Mission, established in 2014**, initially designed to research and develop high-quality semen for various indigenous bovine varieties, the mission has primarily focused on Gir cows and not much on other breeds.
 - This preference for Gir cows **stems from their milk production and adaptability to different regions.**
- **Impact on Livestock Numbers:**
 - **The 2019 livestock census showed a 70% increase in purebred Gir cows since 2013.** In contrast, other indigenous breeds like Sahiwal and Haryana have not experienced similar growth, with some even witnessing a decline in numbers.
 - This trend raises concerns about the **loss of diversity in indigenous cattle breeds in India.**

What are the Issues with Indigenous Gir Cow Breed?

- **Inconsistent Performance of Graded Gir Cows:**
 - Contrary to the growing obsession with Gir cows, research reveals that graded Gir cows (**a crossbreed between Gir and other nondescript varieties**) **do not consistently outperform indigenous breeds in many states.**
 - For example, **in Haryana, there is no evidence of increased milk production in graded Gir cows.**
 - East Rajasthan has reported lower milk production in graded Gir cows compared to indigenous varieties, leading to farmer complaints about shorter lactation periods and reduced daily milk yields.
 - However, in west Rajasthan, graded Gir cows perform better due to favorable climatic conditions.
- **Factors Beyond Adaptation to Microclimates:**
 - The performance of graded Gir cows is **influenced by factors beyond their adaptability to microclimatic conditions.** For instance, Gir cows thrive in herds, and their milk production decreases when raised in isolation.
 - Without adequate resources and support, **these cows can become a liability for farmers. This was evident in a previous case in Vidarbha.**

What Solutions Can be Adopted ?

- **Emphasis on Genetically Superior Indigenous Cows:**
 - Experts suggest a **shift from the current focus on a few high-yielding bovine varieties to identifying and breeding genetically superior cows from among indigenous breeds.**
 - Maharashtra's animal husbandry department **conducted a successful experiment in 2012-14** by delivering semen from genetically superior indigenous breeds to farms, showcasing the potential of this approach.

- **Long-Term Prospects of Indigenous Bovine Varieties:**
 - India boasts a diverse cow population, each adapted to specific regions. Continuous crossbreeding could lead to the extinction of region-specific traits in graded varieties.
 - For instance, crossbreeding **Badri cows from Himachal Pradesh and Uttarakhand with Gir cows** may increase milk production but could alter their physiology, which need to be avoided.
- **Lessons from the Past and Future Goals:**
 - Experts caution against repeating the mistakes of the [White Revolution](#), which imported exotic breeds like Jersey for crossbreeding with Indian varieties.
 - While this increased milk production, it did not necessarily lead to higher income for livestock rearers, **as crossbred cows were more susceptible to diseases and required more care.**

What is Rashtriya Gokul Mission?

- **About:**
 - It is being implemented for **development and conservation of indigenous bovine breeds since December 2014.**
 - The scheme is also continued under umbrella scheme [Rashtriya Pashudhan Vikas Yojna from 2021 to 2026](#) with a budget outlay of Rs.2400 crore.
- **Nodal Ministry:**
 - Ministry of Fisheries, Animal Husbandry and Dairying
- **Objectives:**
 - To enhance productivity of bovines and increase milk production in a sustainable manner using advanced technologies.
 - To propagate use of high genetic merit bulls for breeding purposes.
 - To enhance Artificial insemination coverage through strengthening breeding network and delivery of Artificial insemination services at farmers doorstep.
 - To promote indigenous cattle & buffalo rearing and conservation in a scientific and holistic manner.

What are the Related Schemes for the Livestock Sector?

- [Animal Husbandry Infrastructure Development Fund \(AHIDF\)](#)
- [National Animal Disease Control Programme](#)
- [Rashtriya Gokul Mission](#)
- [National Artificial Insemination Programme](#)
- [National Livestock Mission](#)
- [National Kamdhenu Breeding Centre](#)
- [Gokul Grams](#)
- [“E-Pashu Haat”- Nakul Prajnan Bazaar](#)

UPSC Civil Services Examination, Previous Years Question (PYQ)

Prelims

Q.1 Consider the following crops of India: (2012)

1. Cowpea
2. Green gram
3. Pigeon pea

Which of the above is/are used as pulse, fodder and green manure?

(a) 1 and 2 only

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

Ans: (a)

Q. 2 Livestock rearing has a big potential for providing non-farm employment and income in rural areas. Discuss suggesting suitable measures to promote this sector in India. (2015)

Atal Bhujal Yojana and Ground Water Management

For Prelims: [Atal Bhujal Yojana](#), Groundwater Management, [World Bank](#), Water Security Plans, [Central Sector Scheme](#), Ministry of Jal Shakti, [Groundwater Depletion](#), Central Ground Water Board (CGWB).

For Mains: Atal Bhujal Yojana and Ground Water Management, Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Source: [PIB](#)

Why in News?

Recently, the 5th meeting of the **National Level Steering Committee (NLSC)** of [Atal Bhujal Yojana \(ATAL JAL\)](#) was held to review the overall progress of the scheme.

- The [World Bank](#) has been involved in the review of the program. The committee encouraged states to integrate **Water Security Plans (WSPs)** into the Gram Panchayat Development Plans which will ensure the sustainability of the scheme's approach even after the program's completion.

What is Atal Bhujal Yojna?

- **About:**
 - ATAL JAL is a **Central Sector Scheme** for facilitating sustainable ground water management with an outlay of Rs. 6000 crore.
 - It is being implemented by the [Ministry of Jal Shakti](#).
 - The scheme is being funded by the **Government of India** and the **World Bank** on a **50:50** basis.
 - The entire World Bank's loan component and central assistance will be passed on to the States as grants.
- **Objectives:**
 - It aims to improve the management of groundwater resources in select water stressed areas in identified states viz. Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.
 - ATAL JAL promotes **panchayat led** groundwater management and **behavioural change** with a primary focus on demand-side management.

What is the Status of Groundwater Depletion in India?

- [Groundwater Depletion](#) in India is a **major concern** because it is the primary source of drinking

water. Some of the main causes of groundwater depletion in India include over-extraction of groundwater for irrigation, [Urbanisation](#), and [Climate Change](#).

- **India is the world's largest user of groundwater**, exceeding the use of the United States and China combined according to [recent UN report](#).
- **According to the [Central Ground Water Board \(CGWB\)](#)** of India, approximately 70% of the total water used in India is from groundwater sources.
 - However, the CGWB also estimates that around 25% of the country's total **groundwater extraction is unsustainable**, meaning that it is being extracted at a faster rate than it can be replenished.
- Overall, groundwater depletion in India is a **serious problem that needs to be addressed through sustainable water management practices**, such as improved irrigation techniques and conservation efforts.

What are the Major Causes of Groundwater Depletion in India?

- **Over-Extraction of Groundwater for Irrigation:**
 - Irrigation accounts for around **80% of total water use in India**, and much of this water is sourced from groundwater.
 - As demand for food continues to grow, more and more groundwater is being extracted for irrigation, leading to depletion.
 - According to the [UN's Interconnected Disaster Risks Report 2023](#), 78% of wells in Punjab are considered overexploited, and the north-western region as a whole is predicted to experience critically low groundwater availability by 2025.
- **Climate Change:**
 - Rising temperatures and [Changing Precipitation Patterns](#) can alter the recharge rates of [Groundwater Aquifers](#), making them more vulnerable to depletion.
 - Droughts, flash floods, and [Disrupted Monsoon Events](#) are recent examples of climate change events that are placing pressure on India's groundwater resources.
- **Poor Water Management:**
 - Inefficient use of water, leaky pipes, and inadequate infrastructure for capturing and storing rainwater can all contribute to groundwater depletion.
- **Decrease in Natural Recharge:**
 - The natural recharge of groundwater aquifers can be decreased by factors such as [Deforestation](#), which can lead to [Soil Erosion](#) and reduce the amount of water that is able to seep into the ground and replenish the aquifers.

What are the Issues Associated with Depleting Ground Water?

- **Water Scarcity:** As groundwater levels drop, there may not be enough water available for domestic, agricultural, and industrial use. This can lead to **water shortages and conflicts** over water resources.
 - A study led by the University of Michigan warns that if **Indian farmers continue to draw groundwater at the current rate**, the rate of groundwater depletion could triple by 2080. This could have severe implications for the **country's food and water security, as well as the livelihoods of over one-third of its population**.
- **Land Subsidence:** When groundwater is extracted, the **soil can become compacted, leading to [Land Subsidence](#)** (the sinking or settling of the land). This can cause damage to infrastructure, such as roads and buildings, and can also increase the risk of flooding.
- **Environmental Degradation:** Depleting groundwater can also have negative impacts on the environment. For example, when groundwater levels drop, it can cause [Saltwater Intrusion](#) in coastal areas, leading to the contamination of freshwater resources.
- **Economic Impacts:** Groundwater depletion can also **have economic impacts**, as it can lead to reduced agricultural production and increased costs for water treatment and pumping.
- **Lack of Depletion Data:** The Indian government regulates **groundwater exploitation by "notifying" highly overexploited blocks** in water-stressed states.
 - However, only about 14% of overexploited blocks are currently notified.
- **Earth's Axis to Tilt:** According to a recent study in *Geophysical Research Letters*, it is claimed that excessive pumping of groundwater has caused the [Earth's axis to tilt nearly 80 centimeters east](#) between 1993 and 2010 alone and contributes to sea level rise.

What are the Government Initiatives Related to Groundwater Conservation?

- [Pradhan Mantri Krishi Sinchayee Yojana](#)
- [Jal Shakti Abhiyan- Catch the Rain Campaign](#)
- [Aquifer Mapping and Management Programme](#)
- [Atal Mission for Rejuvenation and Urban Transformation \(AMRUT\)](#)

Way Forward

- Embrace **comprehensive and sustainable water management strategies** that address both immediate needs and long-term challenges.
- Foster **meaningful engagement with local communities**, incorporating their perspectives and knowledge in water management decisions.
- Prioritize **investments in water infrastructure** and capacity-building programs to build resilience against future water crises.
- Establish **robust monitoring and evaluation frameworks** to assess the effectiveness and impact of water management initiatives.
- Promote responsible **groundwater management and conservation practices** to ensure water availability for future generations.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Mains

Q.1 What are the salient features of the Jal Shakti Abhiyan launched by the Government of India for water conservation and water security? **(2020)**

Q.2 Suggest measures to improve water storage and irrigation system to make its judicious use under the depleting scenario. **(2020)**

The 5T Initiative of Odisha

For Prelims: The 5T Initiative of Odisha, Teamwork, [Niti Aayog Like Model at the State Level](#), [Transparency](#), Technology, Time, and Transformation, Effective Delivery of public services.

For Mains: The 5T Initiative of Odisha, Niti Aayog Like Model at the State Level, Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

[Source: HT](#)

Why in News?

The 5T initiative in Odisha is a governance model that stands for **Teamwork, Transparency, Technology, Time, and Transformation**, launched with the aim of improving governance and ensuring efficient delivery of public services.

- In sync with the 5T agenda, in October 2019, the Odisha government launched the **'Mo Sarkar' or 'My Government' initiative**, which is also seen as a [Niti Aayog Like Model at the State Level](#).
- In 2022, the Odisha Government Chief added another T (Tour) to the 5T Initiative and gave them **6T-Mantra**, asking the Ministers to 'Tour' more and work towards strengthening the grassroots further.

What is the 5T Initiative?

- **Teamwork:**
 - It emphasises the **need for different departments and agencies within the government to work together** as a cohesive team.
 - It promotes collaboration and coordination among various government entities to **address the needs of the people effectively**.
- **Transparency:**
 - Transparency is a **crucial element of the 5T initiative**. It focuses on making government **processes and decisions more open** and accountable to the public.
 - This includes **providing easy access to information**, reducing bureaucratic red tape, and **promoting ethical and accountable conduct** within the government.
- **Technology:**
 - It encourages the **adoption of modern technology and digital solutions** to streamline government operations, enhance service delivery, and make processes more efficient.
- **Time:**
 - The time aspect underscores the **importance of delivering services in a timely manner**. The 5T model aims to reduce delays and ensure that government services are provided to citizens promptly.
- **Transformation:**
 - Ultimately, the 5T initiative seeks to bring about a transformation in the functioning of government agencies and departments. It aims to make the government more responsive, citizen-centric, and results-oriented.

What are the Achievements of 5T?

- By March 2023, **6,872 high schools were transformed under the 5T initiative**.
- Private schools had 16,05,000 students in 2019-20, but the number of students has been reduced to **14,62,000 in 2021-22**. Which implied that **number of students enrolled in government schools have increased**.

What is the Mo Sarkar Initiative?

- It is a governance program **aimed at transforming the way government services are delivered** and improving the accountability and transparency of public offices.
 - "Mo Sarkar" means "My Government" in the local language.
- One of the notable features of the "Mo Sarkar" initiative is the **real-time feedback mechanism**.
 - The government makes the phone numbers of citizens who interact with government offices **available to top officials, including the Chief Minister**.
- This feedback mechanism helps **identify issues, assess the performance of government officers**, and take remedial action when necessary.
- The "Mo Sarkar" initiative is seen as a **way to shift power away from the bureaucracy back to the people** and make governance more evidence-based, efficient, and equitable.

What is the Agenda for the Implementation of Niti Aayog Like Body in States?

[The National Institution for Transforming India \(NITI\) Aayog](#) will assist each state to set up similar bodies, replacing their planning boards for faster and inclusive economic growth along with the vision of becoming a developed nation by 2047.

- Initially, it aims for **8-10 states to set up such bodies**, before reaching out to all by March 2023.

- Four states i.e., **Karnataka, Uttar Pradesh, Madhya Pradesh and Assam have already begun work** in this regard.
- Maharashtra, Odisha, Andhra Pradesh and Gujarat will likely begin work soon.
- A plan has been **chalked out by NITI Aayog to:**
 - Help in the creation of teams that will examine the existing structure of state planning boards.
 - Conceptualise the State Institution for Transformation (SIT) in the next 4-6 months.
 - Lateral entry of professionals will be encouraged in SITs to undertake high-quality analytical work and policy recommendations.
- Besides reorienting state planning boards as **SITs, a blueprint will be made on:**
 - Guiding states in policy formulation.
 - Monitoring and evaluation of government policies and programmes.
 - Suggesting better technology or models for delivery of schemes.

What is the Need for Setting up NITI Aayog-like Bodies in States?

- States are the **Indian economy's growth drivers**. The national **gross domestic product (GDP)** growth is an aggregation of states' rates of growth except for sectors like defence, railways and highways.
 - Health, education and skilling are **primarily with the state government**.
- State governments' role is **critical to improving ease of doing business**, land reforms, infrastructure development, credit flows and urbanisation, all of which are vital for sustained economic growth.
- Most states so far have done little to rejuvenate their planning departments/boards, which earlier dealt with the **Planning Commission** and prepared parallel state five year-plans with the Centre.
 - Most states' planning departments, with huge manpower, are **almost defunct and have no clarity on what work they will do**.

What are Some of the Similar Initiatives in Other States?

- **Kerala State Planning Board:**
 - The primary role of the Board encompasses the **formulation of both Five-Year and Annual Plans**, along with the preparation of an annual Economic Review.
 - It diligently oversees the execution of these Plans, collaborating closely with various Departments on Plan schemes and overseeing the operations of the Decentralisation Cell.
 - Additionally, the Board conducts commissioned studies, offers valuable insights and recommendations regarding externally aided programs and centrally sponsored schemes, while also compiling policy briefs for the Chairperson.
- **Sakala Mission:**
 - Karnataka State Government launched **Sakala Mission** to provide guarantee of **services to citizens** in the State of Karnataka **within the stipulated time limit** and for matters connected therewith and incidental thereto.
 - This Act is called the **Karnataka Guarantee of Services to Citizens Act, 2011**.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Atal Innovation Mission is set up under the (2019)

- (a) Department of Science and Technology
- (b) Ministry of Labour and Employment
- (c) NITI Aayog
- (d) Ministry of Skill Development and Entrepreneurship

Ans: (c)

Mains:

Q. "Effectiveness of the government system at various levels and people's participation in the governance system are inter-dependent". Discuss their relationship in the context of India. **(2016)**

Pitfalls of India's Green Hydrogen Move

For Prelims: Climate Risk Horizons (CRH), [Green Hydrogen](#), [National Green Hydrogen Mission](#), [Renewable Energy](#), [India's Nationally Determined Contribution \(INDCs\)](#), National Thermal Power Corporation.

For Mains: Issues in Green Hydrogen Production which fails to curb the fossil fuels emissions and environmental degradation.

[Source: TH](#)

Why in News?

According to a recent study by environmental and energy think-tank, **Climate Risk Horizons (CRH)**, India's **green hydrogen move** may worsen pollution if steps are not in place to curb fossil fuel emissions in **green hydrogen production**.

- India's [National Green Hydrogen Mission](#), piloted by the Ministry of New and Renewable Energy (MNRE) expects to manufacture five million tonnes by 2030.

What is the Present Issue in Green Hydrogen Production?

- Definition of Green Hydrogen:**
 - The MNRE has defined green hydrogen as hydrogen production that **emits no more than 2 kg of carbon dioxide per kg of hydrogen**.
 - However, this definition is currently subject to interpretation, raising concerns about its practical implementation.
- Continuous Operation of Electrolysers:**
 - If electrolysers (essential for green hydrogen production) run 24/7, they would need to operate at night when there is no solar power available. This would likely require drawing electricity from the conventional coal-fired grid, using which could increase carbon emissions.
- Lack of Transparency in Project Electricity Sources:**
 - The report notes that the majority of projects have not disclosed their electricity sources, and it **remains unclear whether the few projects that have made commitments are meeting 100% of their electricity requirements** from renewable sources.

What are the Implications of Green Hydrogen Production?

- Biomass Use and Green Hydrogen Production:**
 - India's standards for **green hydrogen production permit the use of biomass, which, when burned, also generates carbon emissions**. This introduces a challenge in

achieving truly clean green hydrogen.

- **Diversion of Renewable Energy Capacity:**

- The production of green hydrogen requires a significant amount of renewable energy (RE) capacity. However, **diverting a substantial portion of this capacity to green hydrogen production may result in insufficient clean electricity for consumers.**
 - This would require the installation of renewable energy capacity worth 125 GW, equivalent to about 13% of India's present electricity generation.
 - The risk of diverting finances from projects that would help decarbonize the electricity grid to green hydrogen production is a concern.

- **Industry Expansion and Investment:**

- Several major power utilities in India, such as Reliance Industries, the Adani Group, and the National Thermal Power Corporation, have announced ambitious plans to increase their green hydrogen production **where such concerns could deter further investments.**

What is the Significance of Green Hydrogen?

- **Achieving Emission Target:**

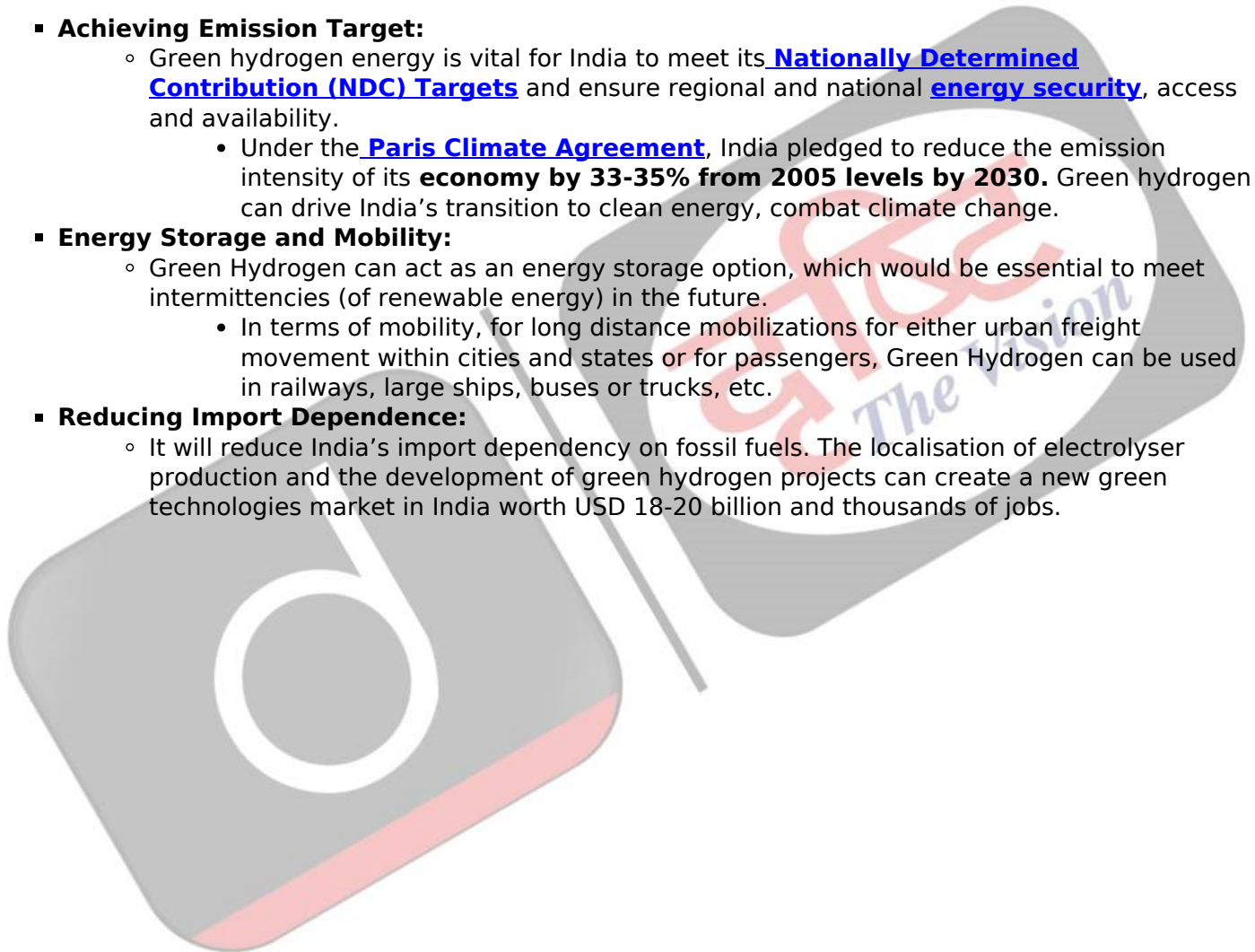
- Green hydrogen energy is vital for India to meet its **Nationally Determined Contribution (NDC) Targets** and ensure regional and national **energy security**, access and availability.
 - Under the **Paris Climate Agreement**, India pledged to reduce the emission intensity of its **economy by 33-35% from 2005 levels by 2030**. Green hydrogen can drive India's transition to clean energy, combat climate change.

- **Energy Storage and Mobility:**

- Green Hydrogen can act as an energy storage option, which would be essential to meet intermittencies (of renewable energy) in the future.
 - In terms of mobility, for long distance mobilizations for either urban freight movement within cities and states or for passengers, Green Hydrogen can be used in railways, large ships, buses or trucks, etc.

- **Reducing Import Dependence:**

- It will reduce India's import dependency on fossil fuels. The localisation of electrolyser production and the development of green hydrogen projects can create a new green technologies market in India worth USD 18-20 billion and thousands of jobs.



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 GH_2 and its derivative

COMPONENTS OF NGHM

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

GH_2 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.

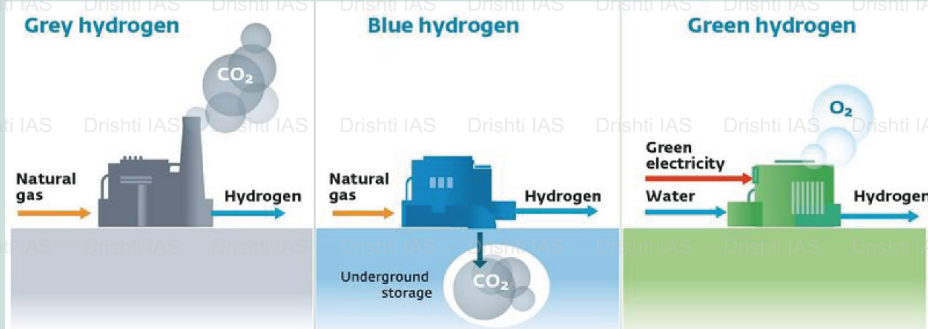
Expected Outcomes by 2030

- ◆ At least 5MMT GH_2 annual production
- ◆ Rs 1 lakh crore fossil fuel import savings
- ◆ 6 lakh jobs
- ◆ 50MMT CO_2 annual emissions averted
- ◆ ₹ 8 lakh crore investment

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 (GH_2) is made by splitting water through an electrical process called electrolysis, using an electrolyser powered by renewable energy (RE).



Way Forward

- **Set a National Target for Green Hydrogen and Electrolyser Capacity:** A phased manufacturing programme should be used to build a vibrant hydrogen products export industry in India such as green steel (commercial hydrogen steel plant).
- **Implement Complementary Solutions that Create Virtuous Cycles:** For example hydrogen infrastructure can be set up for refueling, heating and generating electricity at airports.
- **Decentralized Production:** Decentralized hydrogen production must be promoted through open access of renewable power to an electrolyser (which splits water to form H_2 and O_2 using

electricity).

- **Providing Finance:** Policymakers must facilitate investments in early-stage piloting and the research and development needed to advance the technology for use in India.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Consider the following heavy industries: (2023)

1. Fertilizer plants
2. Oil refineries
3. Steel plants

Green hydrogen is expected to play a significant role in decarbonizing how many of the above industries?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Ans: C

Q. With reference to green hydrogen, consider the following statements : (2023)

1. It can be used directly as a fuel for internal combustion.
2. It can be blended with natural gas and used as fuel for heat or power generation.
3. It can be used in the hydrogen fuel cell to run vehicles.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Ans: (c)

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

- (a) NH_3
- (b) CH_4
- (c) H_2O
- (d) H_2O_2

Ans: (c)

India's Ambitious Bid to Host the 2036 Olympic Games

[Source: TH](#)

Why in News?

Recently, the Indian Prime Minister announced **India's intention to host the Olympic Games, ideally in 2036** during the opening ceremony of the **141st International Olympic Committee session in Mumbai.**

- **China, South Korea, and Japan** are the **only Asian countries** to have hosted the Olympics, with **Japan having hosted the games in both 1964 and 2020.**

What is the Procedure of Selecting a Host City for Olympics?

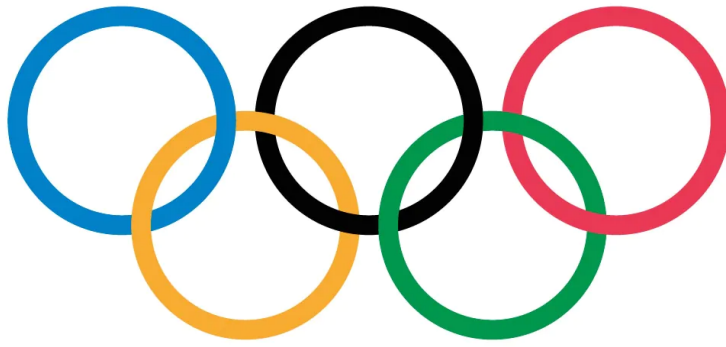
- **Traditional System:**
 - Cities submit a letter of interest to the **International Olympic Committee (IOC)**. It involved a **lengthy multi-year, multi-step evaluation process.**
 - Hosts were selected **seven years in advance.**
 - Often led to excessive **spending, debt, corruption, and scandals.**
- **New Approach: Olympic Agenda 2020:**
 - In 2013, **Thomas Bach became the IOC president** and introduced the **Olympic Agenda 2020**, a blueprint for the Olympic Movement's future.
 - In 2014, the agenda was approved during the IOC session. A key aspect was the '**new norm**' for selecting host cities, which was **officially adopted in 2019** during the IOC session in **Lausanne, Switzerland.**
 - It **replaced the seven-year rule** for selecting hosts with greater flexibility.
 - Emphasized **flexibility, sustainability, and cost-effectiveness** with the motto "**The Games adapt to the region, the region does not adapt to the Games.**"
 - It consists of two stages: **continuous dialogue and targeted dialogue.**
 - Continuous dialogue allows flexible master plans without specific deadlines.
 - Targeted dialogue lasts up to 12 months, involving detailed discussions, guarantees, and an advisory report.

Note

All editions of the **Olympic Games from 2030** onwards must also adhere to the **IOC's climate positive commitment, reducing bid budgets.**

What are the Significant Aspects Associated with the Olympics?

- **About:**
 - The **Olympics are an international sporting event that takes place every four years.**
 - The goals of the Olympics are to **cultivate human beings through sport and contribute to world peace**
 - The Olympics include: **Summer Games, Winter Games, Youth Olympics Games.**
- **History and Origin:**
 - Olympics trace their roots back around **3,000 years to Ancient Greece's Peloponnese region.**
 - While the precise starting date remains uncertain, **776 BC is a commonly mentioned year in historical records.**
 - The first modern Olympics were held in **Athens, Greece in 1896** based on the **plan of Pierre de Coubertin.**
- **Olympic Rings:**
 - The Olympic symbol consists of **five interlocking rings of different colors (blue, yellow, black, green, and red)** on a white background.
 - These rings represent the **five continents of the world** and symbolize the **unity and diversity of nations through sports.**



- **Upcoming Events:**
 - **Summer Olympics 2024:** Paris, France
 - **Winter Olympics 2026:** Milan-Cortina d'Ampezzo, Italy
 - **Summer Olympics 2028:** Los Angeles, USA
 - **Summer Olympics 2032:** Brisbane, Australia

What are the International Multi Sporting Events Hosted by India?

- [Asian Games:](#) 1951 and 1982
- **Commonwealth Games:** 2010
- **South Asian Games:** 1987, 1995, 2016.

Rapid Fire Current Affairs

India Mobile Congress (IMC 7th Edition) 2023 and 100 5G labs Initiative

- The **Prime Minister of India** inaugurated the **7th Edition of the [India Mobile Congress 2023](#) in New Delhi.**
- **India Mobile Congress (IMC)** is the **largest telecom, media, and technology forum in Asia** to be held from **27th to 29th October 2023**.
- Theme of IMC: **'Global Digital Innovation'**.
- The **IMC 2023** aims to strengthen India's position as a developer, **manufacturer**, and exporter of key **cutting-edge technologies**.
- The Prime Minister awarded 100 '5G Use Case Labs' to educational institutions across the country.
- The **'100 5G labs initiative'**, is an endeavor to realize the opportunities associated with [5G technology](#) by encouraging the development of 5G applications.
- The rollout of **5G** has been completed, with plans to extend coverage nationwide by **March 2024**.

Read More: [India Mobile Congress 2023](#)

Dark Patterns Buster Hackathon 2023

- The **Department of Consumer Affairs, Government of India** in collaboration with **IIT (BHU)**, launched **Dark Patterns Buster Hackathon 2023**.

- The **deliverables** of the Hackathon will be to design & prototype innovative apps or software based solutions such as browser extensions, plugins, add-ons, mobile applications.
- It can detect the **use, type** and scale of dark patterns for e-Commerce platforms.
- The winners will be rewarded with a **Certificate of Achievement**.
- The objective of the initiative is to provide protection to consumers from all types of **unfair trade practices**.

Read More: [Dark Pattern](#)

World Polio Day

- **World Polio Day** is celebrated every year on **October 24** to create awareness around the **importance of polio vaccination** to protect children.
 - Polio is a very **infectious illness** that has been around since ancient times, is a life threatening and disabling disease that can spread from person to person and can cause paralysis or may cause **weakness** in arms or legs.
 - Polio virus can live in an infected a person's throat and intestines and can be contracted by food and water in unhygienic conditions.
 - It can spread through a sneeze or feces of an infected person.
 - **Oral polio vaccine (OPV):**
 - It produces antibodies in the blood to protect the individual against polio paralysis by preventing the spread of poliovirus to the nervous system.
 - **Inactivated polio vaccine (IPV):**
 - It is an injectable three dose vaccine and can be either administered alone or along with other vaccines (e.g., diphtheria, tetanus, pertussis, hepatitis B, and haemophilus influenzae).

Read More: [World Polio Day](#)

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