ENVIRONMENT

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

➢ **WHY IN NEWS?**

- In the event that measures are not taken to reduce fossil fuel emissions in the generation of green hydrogen, India's shift towards green hydrogen may make pollution worse, according to a recent report by the environmental and energy think tank Climate Risk Horizons (CRH).
- The Ministry of New and Renewable Energy (MNRE) is leading India's National Green Hydrogen Mission, which aims to produce five million tonnes by 2030.

➢ **What Problem Does Green Hydrogen Production Face Right Now?**

- Green hydrogen is defined by the MNRE as hydrogen produced with a carbon dioxide emission rate of no more than two kg per kg of hydrogen. This term is now open to interpretation, which raises questions regarding how it will actually be put into practise.
- **Continuous Electrolysis**: IF Electrolyser which are necessary for producing green hydrogen were to function continuously, they would have to do so at night, when solar power isn't available. This would probably mean using the traditional coal-fired system to get electricity, which could result in higher carbon emissions.
- **Lack of Transparency in Project Power Sources:** According to the report, most projects have not revealed their electricity sources, and it is still unknown if the ones that have made promises are obtaining all of their power from renewable sources.

➢ **What Effects Does the Production of Green Hydrogen Have?**

- The utilisation of biomass, which releases carbon emissions when burned, is permitted under Indian regulations for the creation of green hydrogen. This poses a problem for producing really clean green hydrogen

➢ **Diversion of Renewable Energy Capacity:**

- A substantial quantity of renewable energy (RE) capacity is needed for the production of green hydrogen. If a significant amount of this capacity is instead directed towards producing green hydrogen, consumers might not receive enough clean power.
- This would necessitate the building of 125 GW of renewable energy capacity, or around 13% of India's current electrical generation.
- There is a chance that funding for green hydrogen production could be diverted from initiatives that would aid in the Decarbonisation of the electrical grid.

➢ **Industry Expansion and Investment**:

- A number of significant Indian power companies, like the National Thermal Power Corporation, the Adani Group, and Reliance Industries, have made bold announcements about boosting their production of green hydrogen, despite the possibility that these plans could discourage additional investment.

➢ **What Role Does Green Hydrogen Play?**

  - In order to fulfill its Nationally Determined Contribution (NDC) Targets and guarantee national and regional energy security, access, and availability, India must use green hydrogen energy in order to meet its emission targets.
  - India committed, as part of the Paris Climate Agreement, to reducing its economy's carbon intensity by 33–35% by 2030 compared to 2005 levels. India's shift to sustainable energy and the fight against climate change might be fueled by green hydrogen.

- Energy Storage and Mobility: Green hydrogen has the potential to serve as a storage solution, which will be necessary in the future to meet the intermittent nature of renewable energy.
- In terms of mobility, green hydrogen can be utilized in trains, big ships, and buses for long-distance mobilizations for either urban freight movement within cities and states or for people

➢ **Cutting Down on Import Dependence**

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- It will lessen India's reliance on fossil fuel imports. The establishment of green hydrogen projects and the localization of electrolyser production have the potential to generate thousands of employment and a new green technologies industry in India valued at USD 18–20 billion.

➢ **Nodal Ministry:**

- Ministry of new and renewable energy

➢ **Objective:**

- Decarbonizes energy/industry sector
- Develop indigenous manufacturing capabilities
- Create export oppurtunities for green hydrogen and its derivatives

➢ **Expected outcome by 2030**

- Atleast 5 mmt GH_2 annual production
- Rs 1 lakh crore import saving
- 6 lakhs jobs
- 50 mmt CO_2 annual emissions averted
- Rs 8 lakh crore investment

➢ **The Way Ahead**

- **Establishing a national goal for the capacity of electrolysers and green hydrogen**: To develop a thriving export market for hydrogen goods in India, such as green steel (commercial hydrogen steel plant), a staged manufacturing strategy should be implemented.
- **Use Complementary Approaches to Generate Virtuous Cycles:** Airports, for instance, can be equipped with hydrogen infrastructure for heating, refuelling, and electricity generation.
- **Decentralized Production:** Open access to renewable energy sources for an electrolyser—a device that uses electricity to split water into H2 and O2—is necessary to promote decentralized hydrogen production.
- **Financing:** In order to improve technology for use in India, policymakers must encourage investments in early-stage piloting as well as the necessary research and development.

Conclusion:

The mission will lead to significant Decarbonisation of the economy reduced dependence on fossil fuel imports and enable India to assume technology and market leadership in green hydrogen

POLITY AND GOVERNANCE

CONTEXT: THE 5T INITIATITVE OF ODISHA GOVERNMENT

WHY IN NEWS

The 5T initiative, which stands for Teamwork, Transparency, Technology, Time, and Transformation, is an Odisha-based governance model that was introduced with the intention of enhancing public service delivery and strengthening governance.

- The Odisha government introduced the "Mo Sarkar," or "My Government," initiative in October 2019 in line with the 5T agenda. This initiative is also viewed as a state-level Niti Aayog model.
- The head of the Odisha government added a sixth T (Tour) to the 5T Initiative in 2022 and gave the Ministers a six-point mantra, urging them to "Tour" more and endeavor to further strengthen the grassroots.

The 5T Initiative: What Is It?

➢ **Teamwork:**

- It highlights the necessity of the government's various departments and agencies cooperating as a single, cohesive unit.
- It encourages cooperation and coordination between different government agencies in order to efficiently meet the needs of the populace.

➢ **TRANSPARENCY:**

- A key component of the 5T initiative is transparency. It focuses on increasing public transparency and accountability for government decisions and processes.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- This entails making information easily accessible, cutting back on bureaucratic red tape, and encouraging moral and responsible behavior in government.

➢ **TECHNOLOGY**

- It promotes the use of cutting-edge technology and digital solutions to improve service delivery, expedite government operations, and boost process efficiency.

➢ **TIME**

- The temporal component emphasizes how crucial it is to provide services on time. The 5T model seeks to shorten wait times and guarantee that citizens receive government services on time.

➢ **TRANSFORMATION**

- The ultimate goal of the 5T initiative is to completely change how government departments and agencies operate. Its goals are to increase government responsiveness, citizen focus, and results-drivenness.

➢ **What Have 5T Accomplished?**

- 6,872 high schools had been transformed by March 2023 as a result of the 5T initiative.
- In 2019–20, there were 16,05,000 students enrolled in private schools; however, by 2021–2022, there will only be 14,62,000 students. which suggested that there are now more pupils enrolled in public schools.

➢ **The Mo Sarkar Initiative: What is it?**

- It is a governance program designed to improve public office accountability and transparency while also changing the way government services are provided.
- "Mo Sarkar" translates to "My Government" in the vernacular.
- The real-time feedback mechanism is one of the "Mo Sarkar" initiative's noteworthy features.
- Top officials, including the Chief Minister, have access to the phone numbers of citizens who interact with government offices.
- This feedback system aids in problem identification, evaluation of public servant performance, and, when required, corrective action.
- The "Mo Sarkar" initiative is viewed as a means of returning authority from the bureaucracy to the people and improving the efficiency, equity, and evidence-based nature of governance.

What is the schedule for implementing a body similar to Niti Aayog in each state?

- The goal of becoming a developed nation by 2047 and promoting faster and more inclusive economic growth will be achieved by helping each state establish an equivalent organization in place of their planning boards, thanks to the support of the National Institution for Transforming India (NITI) Aayog.
- Its initial goal is for eight to ten states to establish these bodies, with the goal of reaching all of them by March 2023.
- Assam, Uttar Pradesh, Madhya Pradesh, and Karnataka are the four states that have already started working in this area.
- Gujarat, Maharashtra, Odisha, and Andhra Pradesh are probably going to start working soon.

➢ **NITI Aayog has outlined a strategy to**:

- Assist in the formation of teams to investigate the state planning boards' current organizational structure.
- Within the next four to six months, conceptualize the State Institution for Transformation (SIT).
- Professionals entering SITs laterally will be encouraged to carry out excellent analytical work and policy recommendations.
- In addition to reorganizing state planning boards as SITs, a plan will be developed regarding:
- Assisting states in the creation of policy.
- Observing and assessing government initiatives and policies.
- Recommending improved models or technologies for scheme delivery.

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

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- The engine of growth in the Indian economy is the states. The aggregate growth rates of the states' gross domestic product (GDP), excluding industries like defence, railroads, and highways, is the national GDP growth.
- The state government is largely in charge of health, education, and skill development.
- In order to promote land reforms, infrastructure development, credit flows, and urbanization all of which are essential for long-term economic growth—state governments play a crucial role.
- The majority of states have not made many efforts to revitalize their planning boards or departments, which previously worked with the Planning Commission and created concurrent state five-year plans with the Centre.
- With vast workforces, the majority of state planning departments are virtually nonexistent and unclear about what works they will do

➢ **Which other states have some initiatives that are comparable to these?**

➢ **Kerala State Planning Board:**

- The main responsibilities of the Board include creating annual and five-year plans as well as an economic review every year.
- It carefully supervises the implementation of these Plans, working closely with different Departments on Plan schemes and managing the Decentralization Cell's activities.
- The Board also undertakes studies on commission, provides insightful analysis and recommendations for programs that are sponsored centrally and externally, and puts together policy briefs for the Chairperson.

➢ **Sakala Mission**:

- The Karnataka State Government established Sakala Mission to ensure that residents of the State of Karnataka receive services within the allotted time frame and for matters related and incidental.
- This Act is called the Karnataka Guarantee of Services to Citizens Act, 2011.

Conclusion:

The overall improvement in governance mechanism through the transformative 5T model has made odisha a top destination for new investments and also it ensures citizen centric governance to deliver citizen services at the door steps to the people.

PRELIMS FACTS

1. Scientists discover that haemoglobin is not only used in blood.

Context:

- According to a new study, chondrocytes, or cells that generate cartilage (connective tissue between bones), produce haemoglobin and form haemoglobin bodies, or Hedy.
- Previously, it was understood that haemoglobin was used only by Red Blood Cells (RBCs).

Functions of Chondrocytes

- It secretes chemicals that make cartilage strong while remaining flexible.
- Haemoglobin in Chondrocytes carries oxygen and is necessary for their existence.
- In chondrocytes, haemoglobin stores oxygen and delivers it to the cells when needed.

Haemoglobin is an iron-containing protein found in animal blood that carries oxygen to tissues. It is found in RBCs of vertebrates.

- Except for cold-water ice fish, all vertebrates carry oxygen via haemoglobin.
- With oxygen, haemoglobin forms an unstable reversible connection. It is known as oxyhemoglobin (bright red) in an oxygenated state and deoxyhemoglobin (purple-blue) in a decreased condition.
- Haemoglobin is produced by bone marrow cells that differentiate into RBCs.

RBC (aka erythrocytes) carries oxygen from lungs to every cell in body.

- RBC is covered with a membrane composed of proteins and lipids, lacks a nucleus, and contains haemoglobin.

2. Ejecta halo

- The Chandrayaan-3 mission's Vikram lander produced a lot of dust when it made a soft landing on the moon.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

- This resulted in the formation of a bright area surrounding the spacecraft known as the ejecta halo (a reflectance anomaly).
- About 2.06 tons of lunar epi regolith were ejected and shifted over a 108.4 m2 area near the landing site.
- The ejecta halo phenomena has been observed in practically every lunar landing.

3. Banni Festival

Banni' festival witnessed at Devaragattu in Andhra Pradesh's Kurnool district.
Banni Festival is a traditional stick-fighting festival. Every year, it is celebrated on the night of Vijayadasami.

- It celebrates the victory of Lord Mala Malleswara Swamy and Goddess Parvati over demon Mani and Mallasura, who troubled the people at Devaragattu region.
- It is held on premises of Mala Malleswara Swamy Temple (situated at border of Andhra Pradesh and Karnataka).

4. Shanti Swarup Bhatnagar (SSB) Awards

Context: Only 20 of the 592 Bhatnagar prizes, among India's most prestigious science awards, have gone to women scientists since 1958.

Awards for Shanti Swarup Bhatnagar (SSB)

The award is known as the 'Shanti Swarup Bhatnagar (SSB) Prize for Science and Technology' and is named after the late Dr (Sir) Shanti Swarup Bhatnagar, the pioneer Director of the Council of Scientific and Industrial Research (CSIR) India.

- Every year, the Prize is awarded for outstanding contributions to science and technology.
- **Nature of the Prize:** SSB Prizes, each of the value of Rs 5,00,000 (Rupees five lakh only), are awarded annually for notable and outstanding research, applied or fundamental, in the following disciplines:
  - Biological Sciences,
  - Chemical Sciences,
  - Earth, Atmosphere, Ocean and Planetary Sciences,
  - Engineering Sciences,
  - Mathematical Sciences,
  - Medical Sciences and
  - Physical Sciences.
- The purpose of this award is to recognize exceptional Indian contribution in science and technology.
- **Eligibility:**
  1. Any Indian citizen engaging in research in any field of science and technology up to the age of 45 as of the 31st December of the year before the Prize.
  2. Persons of Indian Origin (PIO) and Overseas Citizens of India (OCI) working in India are also eligible.
  3. The Prize is given based on contributions made predominantly in India during the five years before the year of the Prize. ('Primarily' will indicate 'for the most part' for this purpose.)

5. Reference Fuels

Context: India began producing'reference' petrol and diesel, joining a restricted group of countries that manufacture the highly specialized fuel used in vehicle testing.
The first gasoline and diesel Reference Fuel (RF) in India was introduced by Indian Oil Corporation Limited.
India is currently importing reference fuels.

About:

- Reference fuels are carefully designed and standardized hydrocarbon blends used in automobile and fuels research and testing.
- 'Reference' petrol and diesel rigorously adhere to government-mandated requirements, including cetane number, flash point, viscosity, sulphur and water content, hydrogen purity, and acid number.
- These specialist fuels are critical for performing emission tests on automobiles equipped with spark ignition engines, ensuring accurate and reliable emissions assessment.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

Significance:
It is part of the government's four-pronged energy security strategy, which includes diversifying energy supplies, increasing exploration and production footprint, alternate energy sources, and meeting energy transition through gas-based economy, green hydrogen, and EVs, to make the country 'energy-independent' by 2047.

ANSWER WRITING

Q Describe the various factors responsible for the issue of Stubble burning. How stubble burning is a problem for the Environment, Agriculture and Humans. Also suggest some measures to tackle this issue.
Stubble burning is the process of lighting the remaining straw stubble—such as paddy, wheat, etc.—after grains have been harvested. In regions where crop residue is left behind by the combined harvesting method, it is typically necessary. In order to make way for the sowing of the rabi crop, paddy stubble burning is primarily done in the Indo-Gangetic plains of Punjab, Haryana, and Uttar Pradesh.

Factors responsible for stubble burning:

- **Agricultural mechanization:** Large residues are all that remain after rice grains are extracted by machine. For farmers, manual harvesting is not an option because of the high labor costs and labor-intensive nature of the work.
- **Limited time between two crops:** The primary cause of stubble burning is the limited amount of time between harvesting rice and sowing wheat, as the wheat crop is impacted by the delay in sowing. There is only a two to three week window of time remaining between the paddy crop's harvest and the next crop's sowing.
- **Lack of Awareness**: Farmers burn organic matter and soil-friendly insects without realizing that they are doing so, which results in large losses of potassium, DAP, and nitrogen.
- **The difficulties of environmentally friendly residue management:** Farmers think that if this material isn't burned, it will float in the transplant-ready paddy fields of the seedbed, landing in the vulnerable seedlings and harming the crop during severe windstorms. The devices that control stubble burning, such as rotavators and happy seeders, are costly. Using machinery to manage crop residue is discouraged by growing diesel prices, which exacerbates the situation.
- **Less usage of stubble**: Previously, farmers cooked with and used stubble as hay to keep animals and houses warm. But, sporting this stubble is no longer appropriate. Furthermore, because rice straw contains a lot of silica, it is deemed inappropriate for use as animal feed (this includes non-basmati rice varieties).
- **Policies of the government**: The Punjab Sub-Soil Water Conservation Act of 2009, for example, has unintentionally encouraged stubble burning.

Stubble burning: A problem for the Environment, Agriculture and Humans

- The burning of stubble releases toxic pollutants into the atmosphere, such as volatile organic compounds (VOC), carbon monoxide (CO), methane (CH4), and carcinogenic polycyclic aromatic hydrocarbons. These have a direct impact on the melting of Himalayan glaciers due to environmental pollution.
- Burning paddy straw raises soil temperatures to 33.8 to 42.2 degrees Celsius, with a one-centimeter penetration. This eliminates the populations of bacteria and fungi that are necessary for healthy soil.
- Crop residue burning degrades the soil's organic content and harms other microorganisms that are present in the top layer. Crops are more vulnerable to disease as a result of the loss of "friendly" pests, which has increased the wrath of "enemy" pests.
- A study claims that, aside from organic carbon, burning stubble results in the loss of 5.5 kg of nitrogen, 2.3 kg of phosphorus, 25 kg of potassium, and more than 1 kg of sulfur.Burning stubble can cause anything from skin infections to eye irritation. Additionally, long-term exposure to high levels of air pollution can result in lung conditions like cancer, emphysema, bronchitis, asthma, Chronic Obstructive Pulmonary Disease (COPD), lung capacity loss, and bronchitis.
- According to one study, people in rural Punjab spend Rs 7.6 crore every year on treatment for ailments caused by stubble burning.

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

Measures that can be taken to tackle stubble burning:

- **Adoption of technology**: By using agricultural equipment like Happy Seeder, Rotavator, etc., farmers can also efficiently manage crop residues. However, because these devices are too expensive, state governments ought to step up and offer greater subsidies so that farmers can purchase these devices.
- **Take advice from others:** Punjab's Gurdaspur district came up with a creative solution to reduce crop residue burning. Farmers who refrain from burning their stubble will receive certificates of appreciation and be acknowledged as environmental protectors, or "vatavaran de rakhe." They can skip the line at government offices by presenting it. Such programs can also be put into practice in other districts.
- **Raise Awareness Among Farmers:** Education programs that highlight the savings that machines and in-situ treatment provide in terms of input costs, fertilizers, and water in the short term, as well as the long- to medium-term benefits on soil fertility that lower agrochemical costs, are necessary to raise awareness among farmers.
- **Encourage crop diversification:** It's also critical to boost the purchase of coarse cereals, oilseeds, and pulses on MSP in order to persuade farmers to move away from paddy production. To encourage farmers to adopt crop diversification, a proper agricultural marketing infrastructure for these crops can be helpful.
- **Scale Incorporation of Crop Residue into the Soil:** When plowed into the soil directly or after composting, crop residue is a natural resource that helps with soil fertility, irrigation effectiveness, and erosion control. According to a study, incorporating paddy straw into the soil is more environmentally friendly than managing it in place.
- **Encourage Short-Duration Rice Varieties:** Farmers can harvest the paddy crop, remove stubble, and prepare the fields for the following crop with enough time if they plant early-maturing rice varieties.
- **Strengthen Connections for Ex-situ Management of Crop Residue**: This method has the potential to manage stubble while also providing farmers with a source of income. Crop residue can be used in power plants to grow mushrooms, make handicrafts, fodder, mulch, and biofuels.

Conclusion: Given the negative effects of stubble burning, this problem requires coordinated efforts from the business community and organized government initiatives. A very good place to start is with the Supreme Court's 2019 directive, which offers farmers who are not burning paddy straw financial support of Rs 100 per quintal.

MCQ

1. Koyna Dam, recently seen in the news, lies in which state?
   a) Madhya Pradesh
   b) Maharashtra
   c) Telangana
   d) Tamil Nadu
2. Consider the following statements regarding the Neanderthals:
   1. They never co-existed with modern humans.
   2. Their bodies were shorter and stockier than modern humans.

   Which of the statements given above is/are Incorrect?
   a) 1 only
   b) 2 only
   c) Both 1 and 2
   d) Neither 1 nor 2
3. Consider the following statements regarding Subansiri River:
   1. It is the largest tributary of the Brahmaputra River.
   2. It flows through Assam and Arunachal Pradesh.

   Which of the statements given above is/are correct?
   a) 1 only
   b) 2 only

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com

c) Both 1 and 2
d) Neither 1 nor 2

4. Subsurface Water Ice Mapping (SWIM) project, recently seen in news, is a project of:
   a) European Space Agency (ESA)
   b) Indian Space Research Organisation (ISRO)
   c) Japan Space Agency
   d) National Aeronautics and Space Administration (NASA)
5. Which of the following best describes Ejecta halo, which was recently seen in the news?
   a) It is an irregular bright patch surrounding the Vikram lander module of Chandrayaan-3.
   b) It is an optical phenomenon caused by faint emission of light in the earth's atmosphere.
   c) It is a newly discovered constellation.
   d) It is a malicious program that steals sensitive data from computers.
6. With reference to the Lok Sabha's Ethics Committee, consider the following statements:
   1. The members of the Committee are appointed by the Speaker for a period of one year.
   2. Any person can complain against a Member through another Lok Sabha MP, along with evidence of the alleged misconduct.
   3. There is a provision for a half-hour discussion on the report presented by the committee to the speaker regarding the complaint.
   How many of the statements above are correct?
   a) Only one
   b) Only two
   c) All three
   d) None
7. Consider the following statements about Saras Aajeevika Mela
   1. It aims to bring rural women SHG members under one platform to showcase their skills, sell their products and linkages with potential market players.
   2. It is organised by the Ministry of Women and Child Development and National Institute of Rural Development and Panchayati Raj (NIRDPR).
   Choose the Incorrect statements:
   a) 1 only
   b) 2 only
   c) Both 1 and 2
   d) Neither 1 nor 2
8. Consider the following statements about NISAR
   1. NISAR is a Low Earth Orbit (LEO) observatory jointly developed by NASA and ISRO.
   2. NISAR is the first satellite mission to use two different radar frequencies to measure changes in our planet's surface.
   Choose the correct statements:
   a) 1 only b) 2 only **c) Both 1 and 2** d) Neither 1 nor 2
9. Which of the following are the Indigenous cattle breeds of India?
   1. Harian
   2. Kankrej
   3. Rathi
   4. Jamunapari
   Choose the correct code:
   a) 2 and 3 b) 1 and 2 c) 1, 3 and 4 **d) 1, 2 and 3**
10. Indian Army's first Vertical Wind Tunnel has been constructed in which state/UT?
    a) Sikkim b) Punjab **c) Himachal Pradesh** d) Jammu Kashmi

Plot-1441, Opp. IOCL Petrol Pump, CRP Square, Bhubaneswar-751015
Ph.: 8984111101, 8093083555. Web: www.vanikias.com, E-mail: vaniksias@gmail.com