

**ENVIRONMENT****Carbon dioxide emissions embodied in international trade****In Context**

- The growing consumption in rich countries has come at a cost for **developing countries such as India.**

**About**

- The **uncertainties in the global economic environment** have all been believed to have created **export opportunities for countries** such as India.
  - Uncertainties , significantly driven by **Russia's invasion of Ukraine** and the resultant sanctions on Russia by the West, along with **Sri Lanka's ongoing struggles** to stay afloat amidst a **deepening crisis.**

**How Carbon dioxide emissions embodied in international trade?**

- As per the environmental **Kuznets curve**, there is an **inverted U-shape relationship** between the **income of a country** and its **environmental degradation.**
- This implies that as **income increases, environmental** quality begins to deteriorate, but improves after some time.
  - However, there is no consensus across studies with respect to this possibility.

**Emissions-embodied exports: Data Analysis**

- **Performance of Developed countries**
  - Most developed countries are the **net importers of polluted goods** produced elsewhere, especially in the developing countries.
  - The largest net importers of carbon emission-intensive goods are the **U.S, Japan and Germany.**
  - The U.S. net carbon **imports increased from 262.3 million tonnes** in 1995 to 834.1 million tonnes in 2018.
  - The OECD member countries which are developed are net importers.
- **Performance of India**
  - The data available from the **Organisation for Economic Co-operation and Development(OECD)** indicates that India is one of the **leading exporters of carbon emissions-embodied products**, and that there is a steady increase in the **total carbon emissions embodied in exports.**
    - China is the **largest exporter of carbon emissions-embodied products**, followed by the U.S, Russia and India.
  - **India's total carbon emission exports** increased from 80.3 million tonnes at the time of it joining the **World Trade Organisation (WTO)** in 1995 to **426.1 million tonnes in 2018.**
    - India's recent export performance has been attributed to **petroleum products, electronics and chemicals.**

**Reasons of relocation of pollution-intensive industries**

- Due to the stringent environmental measures adopted by developed countries, pollution-intensive industries show a tendency to **relocate from developed countries to developing countries** with the lowest environmental standards/weak enforcement of environmental standards in order to cut resource and labour costs — a phenomenon researchers term as the 'pollution haven hypothesis'.
- Thus, developing countries that are **lax in enforcing environmental policies eventually become pollution havens.**
  - The 2009 United Nations Climate Change Conference in Copenhagen witnessed a **vociferous argument from countries** such as India and China that **developed countries who are consuming polluted goods** produced elsewhere also have an **obligation to clean up the mess.**

**Implications of exports of agricultural and food products**

- India is virtually **exporting some of its depleting natural resources** such as water through exports.
  - India is the **leading exporter of rice in the world market.**
- India is **indirectly exporting water** to other countries given that rice is a **water-intensive crop.**

- This virtual water trade will have an adverse **impact on long-term sustainability and food security of the country** although there has been an overall **improvement in water-use efficiency**.
  - The agricultural water withdrawal as a percentage of total available renewable water resources **has increased from 26.7% in 1993 to 36% in 2022**.

### The way forward

- Countries have begun **imposing an environmental tax** to address a broad spectrum of environmental issues.
- In order to ensure long-term sustainability, strict environmental measures need to be explored, such as **revisiting the possibilities** of increasing the **environmental tax**, even though the short-run implications, especially on the trade front, may not be pleasant.
- Similarly, **water-saving policies** that seek to **improve the water use efficiency** are also the need of the hour, in order to **promote sustainable production of rice** and also **safeguard food security in the country**.
- Recent export spike needs to be observed carefully
  - An increased **GDP as a result of expansion** in export revenue can be utilised for improving the environmental quality.

## IMPORTANT FACTS FOR PRELIM

### 1. National Achievement Survey (NAS) 2021 Report

- Recently, the Ministry of Education released the National Achievement Survey (NAS) 2021 report.

#### About National Achievement Survey (NAS) 2021 report

- It is Released by Department of School Education and Literacy, Ministry of Education.
- This nation-wide survey was administered by the CBSE.
- The survey was managed through the technology platform designed and developed by National Informatics Centre (NIC).
- It aimed at assesses the health of the school education system in the country by conducting a comprehensive evaluation survey of children's learning competencies at classes III, V, VIII and X with a cycle period of three years.
- The last NAS was held in 2017.
- It was held at all India level and covered all Government Schools (Central Government and State Government) , Government Aided Schools , Private Unaided Schools.
- Findings:
  - Nearly the same percentage of students (80%) also felt that learning was better in schools because of the help they received from their classmates.
  - As many as 24% students said they had no digital device at home.
  - Though 45% students found the experience "joyful", 38% also said that they had difficulties in learning.
  - Students across various classes performed better in languages but lagged behind in subjects like mathematics and science.
  - It also shows that across various subjects and classes, SC, ST and OBC students performed worse than general category students.

It is significance To evaluate children's progress and learning competencies as an indicator of the efficiency of the education system. And It will help to unravel the gaps in learning

### 2. Green hydrogen: Fuel of the future?

#### What is green hydrogen?

- A colourless, odourless, tasteless, non-toxic and highly combustible gaseous substance, hydrogen is the lightest, simplest and most abundant member of the family of chemical elements in the universe. The prefix 'green' depends on how the electricity is generated to obtain the hydrogen, which does not emit greenhouse gas when burned.
- Green hydrogen is produced through electrolysis using renewable sources of energy such as solar, wind or hydel power. Hydrogen can be 'grey' and 'blue' too.
- Grey hydrogen is generated through fossil fuels such as coal and gas and currently accounts for 95% of the total production in South Asia.
- Blue hydrogen, too, is produced using electricity generated by burning fossil fuels but with technologies to prevent the carbon released in the process from entering the atmosphere.

**Why is India pursuing green hydrogen?**

- Under the Paris Agreement (a legally binding international treaty on climate change with the goal of limiting global warming to below 2°C compared to pre-industrial levels) of 2015, India is committed to reducing its greenhouse gas emissions by 33-35% from the 2005 levels.
- At the 2021 Conference of Parties in Glasgow, India reiterated its commitment to move from a fossil and import-dependent economy to a net-zero economy by 2070.
- India’s average annual energy import bill is more than \$100 billion and the increased consumption of fossil fuel has made the country a high carbon dioxide (CO<sub>2</sub>) emitter, accounting for nearly 7% of the global CO<sub>2</sub> burden.
- In order to become energy independent by 2047, the government stressed the need to introduce green hydrogen as an alternative fuel that can make India the global hub and a major exporter of hydrogen.
- The National Hydrogen Mission was launched on August 15, 2021, with a view to cutting down carbon emissions and increasing the use of renewable sources of energy.

**How much green hydrogen is India producing?**

- India has just begun to generate green hydrogen with the objective of raising non-fossil energy capacity to 500 gigawatts by 2030.
- It was on April 20, 2022 that the public sector OIL, set up India’s first 99.99% pure green hydrogen pilot plant
- The plant was set up at the petroleum exploration major’s Jorhat pump station, in eastern Assam.
- Powered by a 500 KW solar plant, the green hydrogen unit has an installed capacity to produce 10 kg of hydrogen per day and scale it up to 30 kg per day.
- A specialised blender has also been installed for blending green hydrogen produced from the unit with the natural gas supplied by the Assam Gas Corporation Limited and supplying the blended gas to the Jorhat area for domestic and industrial use.

**Advantages of hydrogen as a fuel**

- Green hydrogen can be stored for long periods of time.
- Can be used to produce electricity using fuel cells. In a fuel cell, a device that converts the energy of a chemical into electricity, hydrogen gas reacts with oxygen to produce electricity and water vapour. Hydrogen, thus, can act as an energy storage device and contribute to grid stability.
- The oxygen, produced as a by-product (8 kg of oxygen is produced per 1 kg of hydrogen), can also be monetised by using it for industrial and medical applications or for enriching the environment.

**DAILY ANSWER WRITING PRACTICE**

**Q. How do the melting of Arctic Ice and glaciers of Antarctic differently affect the weather patterns and human activities on Earth ? Explain. (250 Words)**

**Introduction**

Many glaciers around the world have been rapidly melting. Human activities are at the root of this phenomenon. Specifically, since the industrial revolution, carbon dioxide and other greenhouse gas emissions have raised temperatures, even higher in the poles, and as a result, glaciers are rapidly melting, calving off into the sea and retreating on land.

When it comes to sea ice, 95% of the oldest and thickest ice in the Arctic is already gone.

- Scientists project that if emissions continue to rise unchecked, the Arctic could be ice-free in the summer as soon as the year 2040 as ocean and air temperatures continue to rise rapidly.

➤ **Consequences of Melting of Arctic ice**

- **Affects Sea Level and Salinity:**
  - The loss of ice and the warming waters will affect sea levels, salinity levels, and current and precipitation patterns.
- **Danger to Coastal Communities:**
  - The global average sea level has risen by about 7-8 inches since 1900, and it’s getting worse.
  - Rising seas endanger coastal cities and small island nations by exacerbating Coastal Flooding and storm surge.
- **Food Security:**
  - Polar vortexes increase heat waves, and the unpredictability of weather caused by ice loss is already causing significant damage to crops on which global food systems depend.

- **Loss of Methane Store:**
  - Permafrost in the Arctic region (ground that is permanently frozen) stores large amounts of methane, which is a greenhouse gas that contributes to climate change.
  - As more quickly the arctic ice is lost, more rapidly permafrost will melt. This will result in a vicious cycle that may result in a climate catastrophe.
- **Biodiversity Threat:**
  - The melting of the Arctic ice puts the Arctic region's vibrant biodiversity under serious threat especially in the mid-latitude.
- **Consequences of Melting of Antarctic Glaciers**
- **Rising Sea Level:**
  - Antarctic ice sheets are the largest contributors to global sea-level rise.
  - As a result of these rising sea levels, coastal erosion has also increased.
- **Climate change:**
  - The warming of Antarctica Circumpolar Current can aggravate the effects of global warming.
  - As a result of sea-level rise, storm surges become more prevalent, with warm air and ocean temperatures combining to increase the frequency of coastal storms.
- **Loss of Species**
  - Species are also at risk. Many land and sea animals rely on glaciers as their natural habitats and as they disappear so does the rich ecological life they shelter.
- **Disrupting Ocean Currents:**
  - Melting of Antarctic glaciers will lead to slowing of Atlantic Meridional Overturning Circulation, disrupting gulf stream.
  - It would also impact west wind drift.

#### **Conclusion**

The solution to all of this is obvious. It is in humanity's interest to treat the Arctic melting and glaciers as a severe global issue and act accordingly. Climate change mitigation policies need to be implemented stringently. If CO<sub>2</sub> emissions can be reduced over the next ten years then glaciers can still be saved. More targeted measures may also be required.

#### **DAILY QUIZ**

1. "AAROHAN 4.0" is often in news is related to which of the following ?
  - a) **Financial inclusion**
  - b) Promote mountaineering
  - c) Sports
  - d) Research In science and technology
2. Recently the term 'NIRDESHAK' is in news, it is associated which of the following ?
  - a) Drone vigilance in border areas by Indian Air force
  - b) Unmanned remote vehicle for survey in Jammu and Kashmir by Indian Army
  - c) Vigilance boat of coast guard for western coast of India
  - d) **Indian Naval Survey ship**
3. Examine the following statements with reference to measles-rubella (MR) in India
  1. MR elimination target was re-set to 2023.
  2. MR elimination is defined as zero transmission of measles and rubella viruses, evidenced by zero clinical disease, sustained over three years.
  3. The second dose is not necessary as the first dose itself cover the immunity gap
 Choose the correct statement/s using the codes given below
  - a) 1 only
  - b) 2 and 3 only
  - c) **1 and 2 only**
  - d) 1 and 3 only
4. Consider the following statements
  1. Governor is bound by the State government's advice in matters relating to commutation/remission of sentences under Article 161
  2. The decision of governor regarding commutation/remission can be challenged in court of law.
 Choose the correct answer using the code given below
  - a) 1 only

- b) 2 only  
 c) **Both 1 and 2**  
 d) Neither 1 nor 2
5. Match the following culms
- |                   |   |
|-------------------|---|
| A. Green hydrogen | 1. Generated through fossil fuels such as coal and gas  |
| B. Gray hydrogen  | 2. Is produced using electricity generated by burning fossil fuels but with technologies to prevent the carbon released in the process from entering the atmosphere |
| C. Blue hydrogen  | 3. Electricity is generated to obtain the hydrogen, which does not emit greenhouse gas when burned  |
- A    B    C
- a) 1    2    3  
 b) 3    2    1  
 c) **3    1    2**  
 d) 2    1    3
6. Consider the following statements
- Green hydrogen can be stored for long periods of time.
  - Hydrogen can not be used to produce electricity using fuel cells.
  - Hydrogen gas reacts with oxygen to produce electricity and water vapour.
- Choose the incorrect statement using the codes given below
- a) 1 and 3 only  
 b) **2 only**  
 c) 1 and 2 only  
 d) 3 only
7. Which of the following statement is not correct regarding “Bharatnatyam” ?
- K Venkatalakshamma is associated with Bharatnatyam.
  - Most Bharatanatya dances are performed in front of Lord Nataraja statue.
  - The dance form was prevalent in South India.
  - Bharatanatyam is performed only by female artists.**
8. Consider the following statements with reference to Gram Nayalaya
- Gram Nayalaya does not have a statutory backup
  - Gram Nayalaya does not have jurisdiction over criminal cases
  - Both State and Central Government can add or omit any power and function of the Gram Nyayalaya
- Which of the following statement/s is or are not correct
- (a) **1 and 2 only**  
 (b) 2 only  
 (c) 3 only  
 (d) 1,2 and 3
9. Consider the following statements
- The MSP is announced by Commission For Agricultural Costs And Prices
  - There is no legal back up for MSP announcement
- Choose the correct statement using the codes given below
- (a) 1 only  
 (b) **2 only**  
 (c) Both 1 and 2  
 (d) Neither 1 nor 2
10. Which of the following statement is not correct regarding Basel Convention
- Basel convention is on control of Tran boundary Movement of Hazardous Wastes.
  - It does not talk about Hazardous wastes disposal.**
  - It does not address the movement of radioactive wastes.
  - USA has signed the convention but has not ratified it.