



2500-year-old Solution to Fight Climate Change

For Prelims: 2500-year-old Solution to Fight Climate Change, [Isotopes](#) and Radiocarbon, [Monsoon Rains](#).

For Mains: 2500-year-old Solution to Fight Climate Change, Environmental pollution and degradation.

[Source: PIB](#)

Why in News?

Recently, the Researchers from the **Birbal Sahni Institute of Palaeosciences** using the 2500-year timeline of human occupation at Vadnagar, showed that **India has a 2500-year-old solution to fight Climate Change**.

- The study used a comprehensive approach by **examining** various types of data, including **archaeological findings, plant remains, and isotopic data**.
- Additionally, they conducted **dating analyses using [Isotopes](#) and Radiocarbon** on grains and charcoal.

What are the Key Highlights of the Report?

- **Climate Adaptation Over Millennia:**
 - In the semi-arid region of Gujarat, the historic site of Vadnagar has unveiled a resilient **agricultural economy that thrived** over a 2500-year period despite the fluctuation of [Monsoon Rains](#) over centuries.
 - Vadnagar experienced **varying levels of monsoon precipitation** during the Historic, **Medieval (800 CE-1300 CE)**, and post-Medieval ([Little Ice Age](#)) periods.
- **Resilient Crop Economy:**
 - Despite fluctuations in monsoon rains, the post-Medieval period (1300-1900 CE) saw a **resilient crop economy based on small-grained cereals**, particularly millets (C4 plants).
 - The use of **C4 plants reflects the community's adaptive response** to a prolonged weakening of the summer monsoon during the Little Ice Age.
 - **C4 plants** are a type of plants that utilize a specific photosynthetic pathway known as the **C4 carbon fixation pathway**. This pathway is an adaptation to hot and arid environments, as well as **conditions where there is a high likelihood of photorespiration**.
- **Diversification of Food Crops:**
 - **Diversification of food crops and socio-economic practices** allowed these ancient societies to **navigate the challenges posed by** fluctuating precipitation and periods of drought.

What is the Significance of this Study?

- It highlights the **importance of understanding historical climate patterns** and human responses to them.
- It suggests that **past famines and societal collapses were not solely the result of climate deterioration** but were also influenced by institutional factors.
- Insights from the **study can inform contemporary climate change adaptation strategies**, emphasizing the importance of understanding historical climate patterns and human responses.

What are India's Climate Change Mitigation Initiatives?

- **National Action Plan on Climate Change (NAPCC):**
 - Launched in 2008 to address climate change challenges in India.
 - Aim to **achieve low-carbon and climate-resilient development** for India.
 - There are **8 national missions forming the core of the NAPCC** which represent multi-pronged, long term and integrated strategies for achieving key goals in climate change. These are-
 - **National Solar Mission**
 - National Mission for Enhanced Energy Efficiency
 - National Mission on Sustainable Habitat
 - **National Water Mission**
 - **National Mission for Sustaining the Himalayan Ecosystem**
 - **National Mission for A Green India**
 - **National Mission for Sustainable Agriculture**
 - **National Mission on Strategic Knowledge for Climate Change**
- **Nationally Determined Contributions (NDC):**
 - India's commitments to **reduce greenhouse gas emissions** and adapt to climate change.
 - Pledged to **reduce the emissions intensity of GDP by 45% by 2030 from 2005 levels** and **generate 50% of electricity from non-fossil fuel sources by 2030**.
 - Pledged to **create additional carbon sink** and achieve **net zero emissions by 2070**.
- **National Adaptation Fund on Climate Change (NAFCC):**
 - Established in **2015 to provide financial assistance to state governments** for implementing adaptation projects in various sectors.
- **State Action Plan on Climate Change (SAPCC):**
 - Encourages **all states and union territories to prepare their own SAPCCs based on their specific needs and priorities**.
 - SAPCCs outline strategies and actions for addressing climate change at the sub-national level.
 - Aligned with the objectives of the NAPCC and the NDC.

Birbal Sahni Institute of Palaeosciences

- **Establishment and Vision:** Founded in 1946 by **Professor Birbal Sahni**, with the vision to **establish palaeobotany as a distinct science**. The institute aimed to address issues related to the **origin and evolution of plant life, geological concerns**, and exploration of fossil fuels.
- **Focus Areas of Research:**
 - Biotic evolution through geological time.
 - Diversification of Precambrian life.
 - Diversity, distribution, origin, and evolution of Gondwana and Cenozoic flora.
 - Phylogenetic framework for understanding plant life.
 - Intra and inter-basinal correlation during Gondwanan and Cenozoic time-slices.
 - Organic petrology to evaluate the quality of Gondwana coals and Cenozoic lignite.

UPSC Civil Services Examination, Previous Year Question:

Prelims

Q.1 In the context of India's preparation for Climate-Smart Agriculture, consider the following statements: (2021)

1. The 'Climate-Smart Village' approach in India is a part of a project led by the Climate Change, Agriculture and Food Security (CCAFS), an international research programme.
2. The project of CCAFS is carried out under Consultative Group on International Agricultural Research (CGIAR) headquartered in France.
3. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India is one of the CGIAR's research centres.

Which of the statements given above are correct?

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

Ans: (d)

Q.2 Which of the following best describes/describe the aim of 'Green India Mission' of the Government of India? (2016)

1. Incorporating environmental benefits and costs into the Union and State Budgets thereby implementing the 'green accounting'.
2. Launching the second green revolution to enhance agricultural output so as to ensure food security to one and all in the future.
3. Restoring and enhancing forest cover and responding to climate change by a combination of adaptation and mitigation measures.

Select the correct answer using the code given below.

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

Ans: (c)

Q.3 With reference to 'Global Climate Change Alliance', which of the following statements is/are correct? (2017)

1. It is an initiative of the European Union.
2. It provides technical and financial support to targeted developing countries to integrate climate change into their development policies and budgets.
3. It is coordinated by World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD).

Select the correct answer using the code given below:

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

Ans: (a)

Mains

Q.1 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)**

Q.2 'Climate Change' is a global problem. How will India be affected by climate change? How Himalayan and coastal states of India will be affected by climate change? **(2017)**

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