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MK Yadav Sir



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DownToEarth
FORTNIGHTLY ON POLITICS OF DEVELOPMENT,
ENVIRONMENT AND HEALTH

**Science
Reporter**



विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY

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U.K. court turns down Nirav Modi's appeal against extradition

The Hindu Bureau
NEW DELHI

The United Kingdom's High Court on Wednesday turned down the appeal of fugitive Nirav Modi against a District Court verdict, based on which the then Secretary of State had, on April 15, 2021, ordered his extradition to India.

The court accepted the Indian government's assurances taking Mr. Modi's mental health concerns into account, noting that its proposed arrangements were more comprehensive than the regime available at his current prison in the U.K. Mr. Modi may explore further legal recourse to challenge the judgment.

Along with his uncle Mehul Choksi, Mr. Modi is wanted by the CBI and the ED for his alleged involvement in the ₹13,758 crore Punjab National Bank fraud, and has been in judicial custody in the U.K. since March 2019.

Mr. Modi had contended that owing to his mental health condition, a risk of suicide and the "vague and sketchy" assurances from the Government of India (GoI) on the medical aid to be made available to him, he should not be extradited. The High Court said: "...the GoI assurances are extensive and specific to meet the successive levels of concern advanced on Mr. Modi's behalf."

Context: The United Kingdom's High Court turned down the appeal of fugitive Nirav Modi against a District Court verdict, based on which the then Secretary of State had, on April 15, 2021, ordered his extradition to India.

Extradition

- **About:** The formal process whereby a State **requests from the requested State the return of a person accused or convicted of a crime** to stand trial or serve a sentence in the requesting State.
- **Definition by Supreme Court:** Extradition is the **delivery on the part of one State to another** of those whom it is desired to deal with for crimes of which they have been accused or convicted and are justifiable in the Courts of the other State.
- **Extraditable persons:** Those charged with a crime but not yet tried, those tried and convicted who have escaped custody, and those convicted in absentia.
- **Legislative Basis for Extradition in India:** The **Extradition Act 1962** provides India's legislative basis for extradition.
 - It consolidated the law relating to the extradition of criminal fugitive from India to foreign states.
 - This is for both extraditing persons to India and from India to foreign countries.
- **Basis of the extradition:** A **treaty** between India and another country.
 - The **Indian Extradition Act 1962** defines an 'Extradition Treaty' as a Treaty, Agreement or Arrangement made by India with a Foreign State, relating to the extradition of fugitive criminals which extends to and is binding on India.
 - Extradition treaties are **traditionally bilateral** in character.
 - At present India has an Extradition treaty with more than 40 countries and Extradition agreement with 11 countries.
- **Nodal authority for Extradition in India:** The **Consular, Passport & Visa (CPV) Division**, Ministry of External Affairs, Government of India is the Central/Nodal Authority that administers the Extradition Act and it processes incoming and outgoing Extradition Requests.

NPCI introduces BHIM app open source licence model

The National Payments Corporation of India (NPCI) on Wednesday introduced the BHIM app open-source license model, under which the source code of the app will be licensed to regulated entities who do not have an UPI app of their own. Currently, a large number of banks do not have a banking app and by licensing of BHIM app to such banks, NPCI wants to bridge this gap by extending all the readily available features of UPI to these entities. **SUBRATA PANDA**

National Payments Corporation of India (NPCI)

- **About:** An umbrella organisation for operating **retail payments and settlement systems in India.**
- **Not for Profit:** It is a “**Not for Profit**” Company under the provisions of Section 25 of Companies Act 1956 (now Section 8 of Companies Act 2013).
- **Nodal Ministry:** The specialised division of Reserve Bank of India which is under the jurisdiction of **Ministry of Finance.**
- **Created by:** **Reserve Bank of India (RBI) and Indian Banks' Association (IBA)** under the provisions of the Payment and Settlement Systems Act, 2007.

BHIM APP

(Syllabus: GS Paper 3 - Economy & Infrastructure)

Context: The National Payments Corporation of India (NPCI) introduced the BHIM app open-source license model, under which the source code of the BHIM App will be licensed to regulated entities that do not have a UPI app of their own.

Bharat Interface for Money (BHIM)

- **About:** A mobile payments application based on NPCI's Unified Payments Interface (UPI).
- **Developed by:** Launched in December 2016 by the National Payments Corporation of India (NPCI).
- **Key features of BHIM:**
 - Using the app on a different handset will require a **separate authentication process.**
 - **Three-point authentication** via mobile number, device ID, and UPI PIN.
 - **Fingerprint-based biometric verification** of transactions via Aadhaar will prevent fraudulent transactions.
 - **UPI PIN is needed** for both opening the app as well as for transactions.
 - Resetting UPI pin requires debit card details and **OTP SMS to authenticate.**
 - Allows to make **direct bank payments to any bank account** on UPI with the help of UPI ID, QR code and PIN.
 - **No need to recharge the wallet** and no commissions/hidden charges are required for using the app.
 - The **upper limit of a single transaction is Rs. 10,000** and one can transfer Rs. 20,000 in 24 hours.
- **BHIM 2.0:** Launched under the Ministry of Electronics and Information Technology.
 - Under BHIM 2.0, the **existing cap of Rs. 20,000 has been increased to Rs. 1,00,000**, from verified merchants.

TO REDUCE CARBON INTENSITY

Green bonds: FinMin clears framework

ENSECONOMIC BUREAU
NEW DELHI, NOVEMBER 9

THE GOVERNMENT on Wednesday gave nod to the final sovereign green bonds framework in line with the Budget announcement. The issuance of green bonds, which are intended to raise funds for public sector projects to help in reducing carbon intensity of the economy, will be for Rs 16,000 crore in the second half of this financial year.

The proceeds from the green bonds, which are a part of the scheduled borrowing plan of the government, would be used to fund renewable energy, energy efficiency, clean transportation, water and waste management, pollution prevention and control and green buildings among others. Nuclear power generation, land-fill projects, alcohol/weapons/tobacco/gaming/palm oil industries and hydropower plants larger than 25 MW have been excluded from the framework.

All eligible 'green expenditures' will include public expenditure by the government in the form of investment, subsidies,

ISSUANCE TO BE FOR ₹16K CR IN H2FY23

THE ISSUANCE of green bonds — intended to raise funds for public sector projects to help in reducing carbon intensity of economy — will be for Rs 16,000 cr in the H2 of FY23

grant-in-aids, or tax foregone or select operational expenditures, R&D expenditures in public sector projects that help in reducing the carbon intensity of the economy. Equity is allowed only in the sole case of metro projects under the 'Clean Transportation' category, the framework said.

The Finance Ministry has constituted a Green Finance Working Committee (GFWC) including members from relevant line ministries and chaired by the Chief Economic Advisor. The GFWC will meet at least twice a year to support the Ministry with selection and evaluation of projects and

other work related to the framework. Initial evaluation of the project will be the responsibility of the concerned Ministry/Department in consultation with experts.

The allocation of the proceeds will be reviewed in a time-bound manner by the GFWC to ensure that the allocation of proceeds is completed within 24 months from the date of issuance. It will also bring out an annual report on the allocation of proceeds to the eligible projects along with details of projects financed, status of implementation, and unallocated proceeds. For every year, GFWC will meet to identify a fresh set of eligible expenditures in line with the framework in consultation with line Ministries. Once the Finance Bill is passed, Ministry of Finance will inform Reserve Bank of India (RBI) regarding the amount of eligible green expenditures for which proceeds from green bonds can be utilised. The proceeds will be deposited to the Consolidated Fund of India (CFI) in line with regular treasury policy, and then funds from CFI will be made available for green projects, the framework said. Full report on www.indianexpress.com

SOVEREIGN GREEN BONDS (Syllabus: GS Paper 3 - Economy)

Context: The government gave nod to the final sovereign green bonds framework in line with the Budget announcement.

Sovereign green bonds

- **Green Bonds:** These are like any other debt instrument except for the fact that the **issuer of the green bond pledges to use its proceeds to finance projects** that will have a positive impact on the climate and environment.
- **Origin:** The first green bond was issued in 2007 by the **European Investment Bank**, the EU's lending arm.
 - This was followed a year later by the World Bank.
- **Different from standard bonds:** Standard bonds proceeds can be used for various purposes as per the choice of the issuer, whereas proceeds of green bonds are **earmarked for green projects or projects** that benefit the environment.
- **Issuer:** Green bonds can be **issued by countries, companies and multilateral organisations** to only fund projects that have positive impacts on the climate and environment and provide investors with fixed income payments.
- **Green Bonds vs Climate Bonds**
 - The term '**labelled**' **green bonds** refers to bonds marketed by the **issuer as 'green'**, where the proceeds are for climate / green assets or projects.
 - '**Climate-themed bonds**' are represented by a broader category of bonds whose proceeds are for climate projects but that are **not labelled as green**. It is much wider than the 'labelled green bonds market'.
- **Budget 2022-23:** The Finance Minister in the Budget 2022 announced that the government proposes to **issue sovereign green bonds** to mobilise resources for green infrastructure.

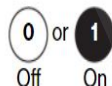
IBM launches its most powerful quantum computer with 433 qubits

International Business Machines Corp on Wednesday said it launched its most powerful quantum computer to date called the Osprey, a 433-qubit machine that has three times the number of qubits than its Eagle machine announced last year. The number of qubits, or quantum bits, are an indication of the power of the quantum computer which uses quantum mechanics. **REUTERS**

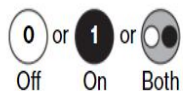
Why Quantum Will Be Quicker

Problems like breaking encryption or mapping a molecule's structure can require sorting through millions of possibilities.

Your PC performs calculations using bits, units of information encoded electrically in either the off (0) or on (1) state.



A qubit, or quantum bit, can exist as 0 or 1 or both simultaneously, a trait known as superposition. Adding more qubits therefore increases the number of states that can be represented exponentially.



A traditional computer tries possible answers one by one until it finds the right one, a process that's far too slow for such complex problems.



Superposition is one of the properties of a quantum computer that enables it to work faster by considering many possibilities at once, sorting through sets of probable outcomes that converge on the correct answer.



Context: International Business Machines Corp launched its most powerful quantum computer to date called the Osprey, a 433-qubit machine that has three times the number of qubits than its Eagle machine announced last year.

Quantum Computing

- **About:** A form of computing which employs technology based on quantum theory.
 - Quantum theory explains the behaviour of energy and material on the atomic and subatomic levels.
- **Based on two features of quantum physics:** Superposition and entanglement.
 - Superposition means the ability of a quantum system to exist in multiple states at the same time.
 - Entanglement is the ability of **two members of a pair (Qubits)** to exist in a single quantum state.
 - Both these features allow quantum computers to handle operations beyond the limits of conventional computers while consuming lesser amounts of energy.
- **Difference between Quantum Computing and Classical Computing:**
 - While classical computers can only process data as either 1 or 0 at different times, **quantum computers can process 1 or 0 at the same time.**
 - Classic computers are good at completing everyday tasks that do not involve complex amounts of data to be processed while **Quantum computers are better for running complex simulations**, chemical or drug trials or any form of tasks which involve processing complex levels of data.

National Mission on Quantum Technologies & Applications (NM-QTA)

- **Origin:** Announced with an outlay of Rs.8000 crore for five years in the Budget 2020-21.
- **Objective:** The mission seeks to develop quantum computing linked technologies amidst the second quantum revolution and make India the world's third-biggest nation in the sector after the US and China.
- **Implementation:** Implemented by the **Department of Science and Technology (DST)** under the Ministry of Science and Technology.
- **Focus areas:** Fundamental science, Translation and Technology development.

BID TO SIMPLIFY RULES; FINAL CALL TO BE TAKEN CLOSER TO BUDGET

Centre Mulling Changes to Capital Gains Tax Regime

Rationalisation of multiple holding periods, tweaks in tax rate on agenda

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New Delhi: The government is examining possible changes to the capital gains tax regime to make it simpler, including rationalisation of the multiple holding periods, officials said.

Parity within asset classes will be a key consideration in the review that may even consider changes in the tax rate.

"The capital gains tax regime is slightly complex. There is a case for simplifying and rationalising

Uncomplicating Gains

Issues
around current framework under examination

Direct tax task force report to serve as a starting point

ISSUES IN FOCUS
Different holding periods
Differential treatment of asset classes

Indexation benefits
Rates



it," said a government official aware of the deliberations.

The direct tax task force report of 2019 is likely to be a starting point for the proposed exercise, the official added. A final call on the rationalisation of the holding period and the rates would be taken at the highest political level closer to the budget, the official said.

Tax experts said there is a case

for rationalising the holding period of assets.

"There is a need to reduce the holding period (for classifying into a long-term capital asset) of financial products like bonds, debts funds, gold ETF to 24 months from 36 months," said Vishwas Panjari, partner, Nangia Andersen LLP.

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Banking MFs Miss Out on PSB Rally >> 9

Govt to Sell Entire 1.55% Stake in Axis

The government will sell its entire 1.55% stake in Axis Bank, held through SUUTI, on November 10-11. The floor price has been set at ₹830.63 per share. >> 10

CAPITAL GAINS TAX

(Syllabus: GS Paper 3 - Economy)

Context: The government is examining possible changes to the capital gains tax regime to make it simpler, including rationalisation of the multiple holding periods.

Capital Gains and Capital Gains Tax

- **About:** Any profit from the **sale of a capital asset** is deemed as 'capital gains'.
 - This gain or profit comes under the **category of 'income'**.
- **Capital asset:** A capital asset is officially defined as **any kind of property held by an assessee**, excluding goods held as stock-in-trade, agricultural land and personal effects.
- **Capital gains tax:** The capital gain tax will be **required to be paid for that amount in the year in which the transfer of the capital asset takes place**.
- **Two Types:** In India, '**Short-term capital gain (STCG)**' and '**Long-term capital gain (LTCG)**' are defined by the **Income Tax Act, 1961**.
 - **STCG:** The tax levied on profits generated from the sale of an asset which is held for a government-defined short period is called short-term capital gains tax.
 - The short term **period differs for various items**; for example, for immovable property such as land, building, and house property, the holding period was reduced in FY 2017-18 from 36 months or less to 24 months or less, to deem it as "short term."
 - **LTCG:** While a holding **period of one year is considered 'long-term'** for equities, the same is two years for real estate.

Budget 2022: Key changes in personal tax



Taxpayers can file updated return **within 2 years**



Taxation on income from transfer of **digital assets at 30%**



Rate of surcharge on long term capital gains capped **at 15%**



Relief to taxpayers for maintenance of **dependent with disability**



Tax exemption for **COVID related expenditure** reimbursed by employer



NPS deduction of up to 14% for state government employees

Withdrawing from key Ukraine city of Kherson, says Russia

Move Serious Blow To Putin's War Effort; Kyiv Is Wary

Russia's defence minister announced on television on Wednesday that he was ordering the retreat of Moscow's forces from the strategically important southern city of Kherson, in a potentially serious blow to President Putin's war effort. The statement, in a televised meeting with the military's top brass, came after General Sergei Surovikin, the commander for Russia's forces in Ukraine, told Sergei Shoigu, Russia's defence minister, that the decision was "difficult" but that a withdrawal would "preserve lives of servicemen and combat readiness of forces."

Ukraine had warned that Russia might try to feign a retreat in hopes of drawing Ukraine into urban combat. The military had been tracking signs of a Russian retreat



A deserted village in Kherson region

through Wednesday but was not convinced the Russian military intended to fully withdraw from Kherson city and the surrounding Russian bridgehead on the western bank of the Dnipro River, according to Roman Kostenko, a colonel in the army and chairman of the defence and intelligence committee in Ukraine's parliament. Ukrainian intelligence agencies were working to assess Russia's movements, he said, and noted that the Russian announcement could be misdirection. A retreat

from the city of Kherson would be a major victory for Ukraine. It is the only regional capital to fall to Russian forces since they invaded in February. The Russian-appointed civilian administration has already fled, and residents have reported widespread looting by Russian forces. Kherson residents have been without power for four days, and communications have been severed.

A Russian retreat from Kherson would have both strategic and symbolic importance. A vital Black Sea port, the city is a gateway to Crimea and provides access to Ukraine's southern coastline for invading Russian forces. The withdrawal would have added resonance because the city is the capital of Kherson region, one of four that Putin illegally annexed in late September. NPT

KHERSON REGION

(Syllabus: GS Paper 1 - Geography)

Context: Russia announced that they were ordering the retreat of Russia's forces from the strategically important southern city of Kherson, in a potentially serious blow to President Putin's war effort.

Kherson Region

- **About:** A port city of Ukraine that serves as the administrative centre of Kherson Oblast.
- **Location:** South of Ukraine.
 - It is strategically located at the mouth of the Dnieper River exit into the Black Sea.
- **Significance:** It is home of a major ship-building industry.
- **Recent developments:** Occupied by Russian forces during their invasion of Ukraine after the Battle of Kherson.



PM expresses enthusiasm for Kashi Tamil Sangam

Context: The Prime Minister has expressed enthusiasm for the Kashi Tamil Sangam which exemplifies the timeless bond that exists between India's Northern and Southern regions.

Kashi-Tamil Sangamam

- **About:** A month-long Kashi-Tamil Sangamam is organizing in Varanasi from November 16 to December 19 by Ministry of Education.
- **Objective:** To rediscover the links between the **two ancient knowledge, culture and heritage centres.**
- **Key Themes:** literature, ancient texts, philosophy, spirituality, music, dance, drama, yoga, Ayurveda, handlooms, handicrafts, and as modern innovations, trade exchanges, edutech and other gen-next technology.
 - It is also a **unique learning experience for students**, scholars, academics, practising professionals, etc., on various facets of Indian Knowledge Systems, education and training practices, arts and culture, language, literature, etc.
- **Ideal Platform to feel "Ek Bharat, Shrestha Bharat":** The Sangamam, which is held in the auspicious Karthigai Tamil month, has been organised under the overall framework and spirit of "Ek Bharat, Shrestha Bharat."
- **Significance of Karthigai Tamil month:** Karthigai masam, Karthikai masam, is the eighth month as per Tamil Calendar.
 - Karthikai masam is the **favorite month for Lord Muruga, Lord Shiva and Lord Vishnu.**
 - Karthikai Deepam and Maha Bharani are the important Karthikai festivals.
 - Karthikai Deepam falls on the **Full Moon or Pournami in Karthikai month.**
 - Karthigai Masam **coincides with Kartik month** in Hindi, Gujarati, Marathi, Telugu, and Kannada calendars.
- **Role of Bharatiya Bhasha Samiti (constituted by the Education Ministry):** A High Powered Committee for Promotion of Indian Languages called Bharatiya Bhasha Samiti (BBS) has come up with a **proposal to rediscover, reaffirm and celebrate** the links between the Tamil culture and Kashi that have existed for centuries.

Ek Bharat Shreshtha Bharat

- **Launch:** It was announced by Prime Minister on 31st October, 2015 **on the occasion of the 140th birth anniversary of Sardar Vallabhbhai Patel.**
- **Nodal Ministry:** Ministry of Education.
- **Features:** All States and UTs will be covered under the programme.
 - There will be **pairing of States/UTs at national level** and these pairings will be in **effect for one year**, or till the next round of pairings.
 - The State/UT level pairings would be utilized for state level activities.
 - District level pairings would be independent of the State level pairings.
- **The broad objectives of the initiative are as follows:**
 - **Celebration:** to **celebrate the unity in diversity of our nation** and to maintain and strengthen the fabric of traditionally existing emotional bonds between the people of our country.
 - **Promotion:** **promote the spirit of national integration** through a deep and structured engagement between all indian states and union territories through a year-long planned engagement between states.
 - **Showcase:** to **showcase the rich heritage and culture, customs and traditions** of either state for enabling people to understand and appreciate the diversity that is india, thus fostering a sense of common identity.
 - **Shared practices:** to create an environment which **promotes learning between states by sharing best practices** and experiences.

42 INTERNATIONAL CONGRESS OF THE INDIAN NATIONAL CARTOGRAPHIC ASSOCIATION (INCA)

Context: The 42 International Congress of the Indian National Cartographic Association (INCA) is being organised by the National Hydrographic Office (NHO), Dehradun from 09 to 11 Nov 22.

42nd INCA Congress

- **Theme:** Digital **Cartography** to Harness Blue Economy.
 - Cartography is the art and science of **graphically representing a geographical area**, usually on a flat surface such as a map or chart.
- **7 sub-themes:** Space Technologies for Mapping, Cartographic Applications for Sustainable Development, Geomatics in Disaster Management, Mapping for Environmental Planning & Management, Hydrography for Resource Management and Land Resource Mapping and Surveying.

Indian National Cartographic Association

- **About:** One of the largest organisations in the field of cartography with more than 3000 life and institutional members.
 - **National Atlas & Thematic Mapping Organisation (NATMO)** is premier cartographic organization of the country under **Ministry of Science and Technology, Government of India**.
- **Origin:** INCA, the **only professional body of the cartographers** and geo-spatial technologists, was founded on **7th August, 1979 at Hyderabad**.
- **Objectives:** To harmonise various aspects of **cartography**.
- **Partners:** Organisations such as the National Hydrographic Office (NHO), Survey of India, Indian Space Research Organisation, National Thematic Map Organisation and Universities are part of this Association.
 - There are **no membership fees** to join the cluster or this platform.

PARIS CLIMATE AGREEMENT 2015

(Syllabus: GS Paper 3 - Env & Eco)

Less than a quarter of emission targets from Paris climate agreement met in 7 years

World is not on track to achieve forest goals of ending and reversing deforestation by 2030


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By Shuchita Jha
Published: Wednesday 09 November 2022



TARGETS FOR PARIS AGREEMENT



INDIA

Emission intensity of GDP
33-35% below 2005 levels by 2030, Power capacity to be 40% non fossil fuel based

Source: uefcc.int



CHINA

Emission intensity of GDP **60-65%** below 2005 levels by 2030. Peak emissions around 2030. Non-fossil fuel to be 20% of primary energy consumption by 2030



USA

Absolute emissions **26-28%** below 2005 levels by 2025



EU (28)

Absolute emissions **40%** below 1990 levels by 2030

Context: The world is not on track to achieve forest goals of ending and reversing deforestation by 2030, which is critical for a credible pathway to the Paris Agreement's goal of limiting warming by 1.5°C, warned a new report.

Key Findings

- Only 24 percent of the **necessary commitments for emissions reductions** have been made so far.
- Only half of these commitments have been realised through emissions **reduction purchase agreements**. Funding for these commitments has not yet been disbursed.
- Forest-based actions** can make an essential contribution to meeting the Paris Agreement's ambition.
 - It can provide nearly 27 per cent of the solution to help avert climate catastrophe.
- High-forest-low-deforestation (HFLD) countries** store 18 percent of tropical forest carbon worldwide. Their access to sufficient climate finance must be rapidly improved.
- Current **forest climate finance mechanisms** are not adequate for rewarding their historical conservation and resisting increasing pressures to deforest.

Paris climate agreement 2015

- About:** a **legally binding** international treaty on climate change.
- Origin:** Adopted by 196 countries at Conference of the Parties **COP 21** in Paris in December 2015.
 - Currently, 195 UNFCCC members have signed it including **India**.
 - US has announced his intention to withdraw from the agreement by November 2020.
- Objective:** To achieve the **long-term temperature goal**, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by mid-century.
- Target:** To limit global warming to well **below 2° Celsius, and preferably limit it to 1.5° Celsius**, compared to pre-industrial levels.
- 20/20/20 target:** The agreement talks about 20/20/20 targets, i.e.
 - Carbon Dioxide emissions** reductions by 20%,
 - Work on increasing the **renewable energy market share** by 20%
 - Target to increase **energy efficiency** by 20%
- Difference between the Kyoto Protocol and the Paris Agreement:**
 - In the Paris agreement, there is **no difference between developing and developed countries**.
 - In the Kyoto Protocol, there was a **differentiation between developed and developing countries** by clubbing them as Annex 1 countries and non-Annex 1 countries.

SOIL CARBON SEQUESTRATION

(Syllabus: GS Paper 3 - Env & Eco)

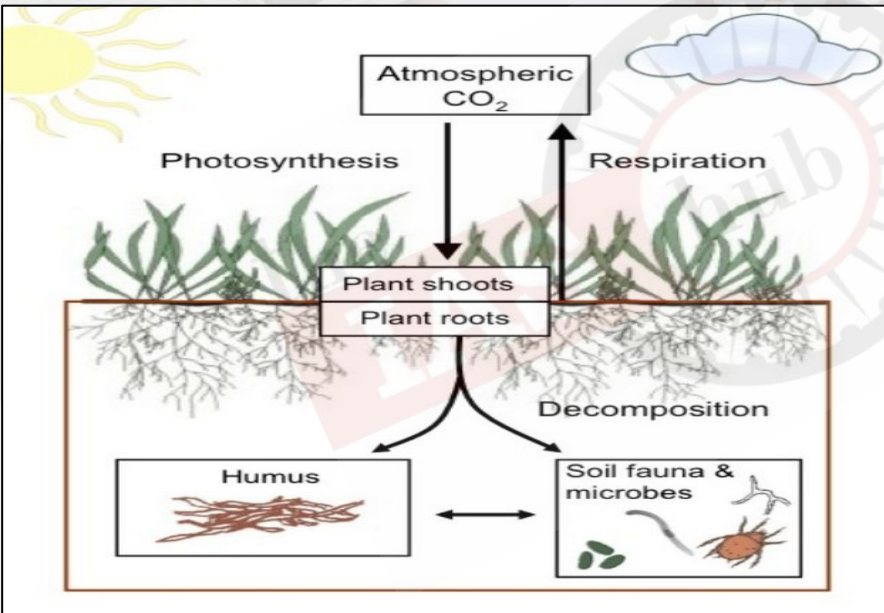
Soil carbon sequestration may help fight climate change

New agriculture modelling study shows atmospheric carbon dioxide can be captured, stored in soil



NEXT NEWS >

By India Science Wire
Published: Wednesday 09 November 2022



Context: New agriculture modelling study shows atmospheric carbon dioxide can be captured, stored in soil.

Key findings of the study

- The study revealed that the **carbon sequestration increased by more than 300 per cent** in combination with fertiliser, biochar, and irrigation.
 - Biochar is a **charcoal-like substance** that burns organic material (biomass) from agricultural and forestry wastes in a controlled process called pyrolysis.
 - Carbon sequestration is the **process of capturing and storing atmospheric carbon dioxide**.
- Biochar increased carbon value in the soil** by 130-300 per cent over 30 years with little difference in yield.
- Optimal use of fertilizers increased the carbon and output by up to 30 per cent.
- Soil carbon is critical for crop yield and climate adaptation or mitigation measures, which are heavily reduced by both intensive agriculture and indiscriminate use of chemicals leading to increased carbon emissions.

Soil carbon sequestration

- About:** Soil carbon sequestration **takes place when plants detain and store, or “sequester,” carbon dioxide (CO2)** from the atmosphere in the soil, multiplying the soil’s carbon content.
 - Decaying plant notes**, along with their constituent carbon, become a component of soil for a phase before microbes break them down, an action that releases the atmospheric carbon.
- Benefits:**
 - Improved soil health:** Soil carbon sequestration helps restore degraded soils, which can **improve agricultural productivity**.
 - Increased climate resilience:** healthier soils make farms more resilient against both droughts and heavy rainfall.
 - Reduced fertilizer use:** healthier soils require less fertilizer, saving farmers money and reducing environmental impacts.
- Limitations:**
 - Saturation:** soils can **only hold a finite amount of carbon**; once they are saturated, it will no longer be able to capture more carbon using soil carbon sequestration.
 - Scientists believe soils could continue to sequester carbon for 20 to 40 years before they become saturated.
 - Reversibility:** the carbon captured via soil carbon sequestration **can be released if the soils are disturbed**; It would need to maintain appropriate soil management practices indefinitely.
 - Difficulty of measurement:** monitoring and verifying carbon removal via soil carbon sequestration is currently difficult and costly.
- Calculation carbon sequestration in plants:** Individuals can determine the weight of CO2 in plants by the proportion of CO2 to C is $44/12 = 3.67$. Hence, to assess the significance of carbon dioxide sequestered in the tree, **multiply the weight of carbon in the tree by 3.67**.

THANK YOU!



t.me/theiashub



[/mkyadav](https://www.youtube.com/channel/UCmkyadav)



www.theiashub.com/daily-quiz



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