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## Increase in Methane Emissions

### Why in Newspapers?

According to a new study, reduced **nitrogen oxide pollution and warming wetlands** are driving global methane emissions to record highs in 2020.

### Quick Issue?

- The study published in the journal Nature states that global methane emissions are expected to reach roughly **15 parts per billion (ppb) in 2020 from 9.9 ppb in 2019.**
- This **growth happened despite the COVID-19 lockdown** which brought the world to a standstill. The study shows that in 2020, methane emissions from human activities are expected to decrease by **1.2 teragrams (Tg) per year.**

### Other Key Facts?

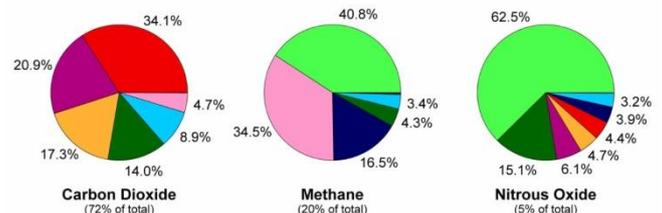
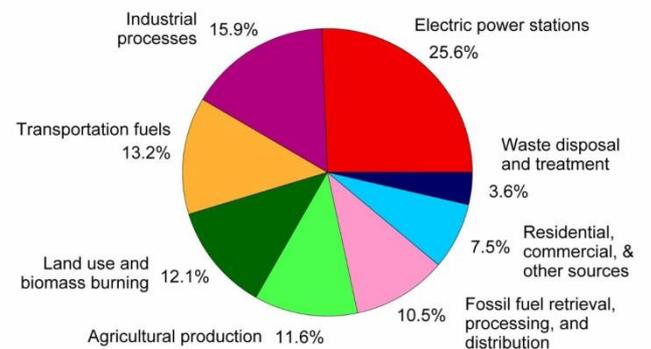
#### Methane:

- Methane is the **simplest hydrocarbon**, consisting of one carbon atom and four hydrogen atoms (CH<sub>4</sub>).
- It is **inflammable** and is used as a **fuel all over the world.**
- Methane is a **potent greenhouse gas.**
- Has been 80 times more potent than carbon dioxide during the past 20 years in increasing global temperatures.
- **Common sources of methane are oil and natural gas systems, agricultural activities, coal mining, and waste.**

### Historical Background?

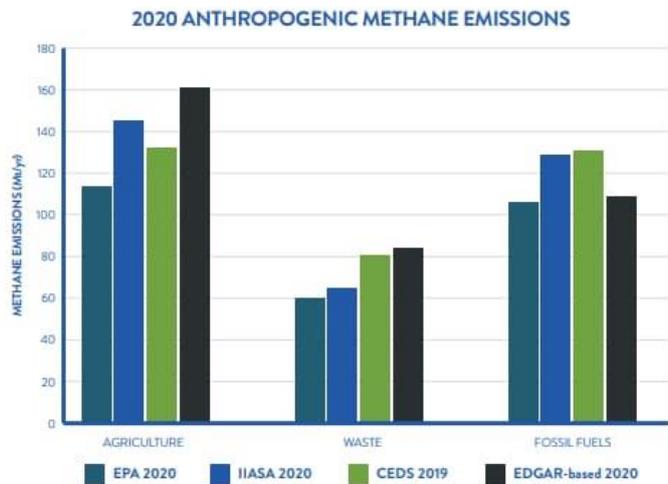
- **Shushi Peng**, assistant professor at **Peking University** and lead author of the study, told **Down To Earth** that it was expected that the **overall atmospheric methane growth rate** would slow. "However, observations from the **US National Oceanic and Atmospheric Administration Global Monitoring Laboratory (NOAA/GML)** and the **Integrated Carbon Observation System (ICOS)** suggest that the growth rate in 2020 is the highest during the 1984-2020 period."
- **Vinayak Sinha**, associate professor at the Indian Institute of Science Education and Research, Mohali, told **Down To Earth**, "This study helps solve the puzzle of how much of the world's greenhouse gas emissions, such as carbon dioxide, will decrease during 2020." **Why did methane levels rise.**" He was not involved in the

Annual Greenhouse Gas Emissions by Sector



study.

- Methane has more than 80 times the warming power of carbon dioxide in the first 20 years of its life in the atmosphere.
- According to the **United States Environmental Protection Agency (EPA)**, common sources of methane are oil and natural gas systems, **agricultural activities, coal mining, and waste**. Nitrogen oxides enter the atmosphere from the exhaust gases of cars and trucks, as well as from electrical power generation plants.
- Nitrogen oxides (NOx) can affect methane levels. In the troposphere -- the upper part of the atmosphere -- NOx combines with ozone to form hydroxyl radicals, Sinha explained.
- **Hydroxyl radicals in the troposphere react with methane to form water and CO2. Less nitrogen oxide pollution means less hydroxyl and more methane**, Ciais tweeted.
- The team collected data on emissions from fires and agricultural activities. They also estimated wetland methane and hydroxyl emissions using the model.
- **What measures have been taken to curb methane emissions?**
- **COP26 Pledges:** At **COP26 in Glasgow**, more than 100 countries signed an agreement to cut methane emissions by **30% by 2030**, as compared to carbon dioxide (which is more deeply embedded in the global economy) Methane may be easier to deal with.
- Prior to this agreement, the US President announced the '**Global Methane Pledge**', an effort led by the **United States and the European Union to cut methane emissions** by a third by the end of the decade. Is.
- **MethaneSAT:** Controlling methane emissions will require further monitoring of its sources. For this, it is planned to launch methane leak tracking satellites, such as **MethaneSat**.
- MethaneSat is a planned **US-New Zealand space mission to be launched in late 2022**.
- It will be an **Earth observation satellite** that will monitor and study global methane emissions to combat climate change.
- **United Nations Initiative:** The '**United Nations Food Systems Summit**' to be held in September 2021 aimed at helping make farming and food production more eco-friendly.
- The **Koronivia Joint Work on Agriculture (KJWA) initiative** of the United Nations is supporting the transformation of agriculture and food systems with a focus on sustaining productivity in the face of a changing climate.
- **India Initiative:** **Central Salt and Marine Chemical Research Institute (CSMCRI)** in collaboration with three premier institutes of the country has developed a seaweed-based





## Mumbai's Kanheri Caves

### Why in Newspapers?

The Mumbai Regional Office of the Ministry of Tourism, through Indian Classical Music in Mumbai. The delegates participating in the meeting of the **Group of 20** also visited the **Kanheri Caves in Mumbai**.

### Quick Issue?

- A conference of representatives of G-20 countries was held in Mumbai from 13 to 16 December. On the last day of the summit, the G-20 delegates visited the famous **Kanheri Caves** in the **Sanjay Gandhi National Park** in Mumbai and learned about the history of these places. The **Kanheri Caves are located in the Sashti forest near Borivali**.
- History of these caves, how the word '**Kanheri**' originated. These caves reflect the art and culture of India during the Buddha period. Officials of the Central Archaeological Department told the G-20 representatives that the area is very peaceful and tourist-attractive, hence a large number of tourists visit here.
- These caves have viharas, halls and rooms for Buddhist monks. The delegates were overwhelmed by the sculptures of Buddha and **Avalokiteshvara**, a water tank on the top of the hill. At the end of the cave there is a vihara, where Buddhists conducted various activities. There are legible inscriptions and epigraphs in three scripts, Brahmi, Devanagari and Pahlavi.

### Other Key Facts?

#### G-20 Group:

- The G20 was formed in the backdrop of the financial crisis of the late 1990s, which particularly affected **East Asia and South-East Asia**.
- It aims to **secure global financial stability by involving middle-income countries**.
- Together the **G20 countries account for 60% of the world's population, 80% of global GDP and 75% of global trade**.
- **Members:** Argentina, Australia, Brazil, Canada, China, European Union, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, Republic of Korea, Turkey, United Kingdom and United States are included.

### Historical Background?

- **Kanheri Caves:**
  - The Kanheri Caves are a group of caves and rock-cut monuments located on the **western outskirts of Mumbai**. These caves are located within the forests of Sanjay Gandhi National Park.



- The name Kanheri is derived from '**Kanhagiri**' in **Prakrit** and is mentioned in the Nasik inscription of the **Satavahana ruler Vashishtaputra Pulumavi**.
- Kanheri is mentioned in the **travelogues of foreign travelers**.
- Kanheri was first described by **Fahien**, who came to India during 399-411 AD, and later by many other travelers.
- **Excavation:**
  - Kanheri Caves includes the **excavation of more than 110 different monoliths** and is **one of the largest single excavations in the country**.
  - The size and extent of the excavations, as well as numerous water cisterns, inscriptions, one of the **oldest dykes**, stupa burial galleries and an excellent rainwater harvesting system attest to its popularity as a monastic and pilgrimage centre.
- **Architecture:**
  - These excavations were carried out mainly during the **Hinayana phase of Buddhism** but also include some prints of the Vajrayana related order along with many examples of Mahayana stylistic architecture.
- **Protection:**
  - It flourished through the patronage of **Kanheri Satavahanas, Trikutakas, Vakatakas and Silharas** as well as donations made by wealthy merchants of the region.
- **Significance:**
  - Kanheri Caves are part of our ancient heritage as they provide evidence of development and our past.
  - The **architecture and engineering of heritage sites like Kanheri Caves and Ajanta Ellora Caves reflect the knowledge of the people of that time in terms of art, engineering, management, construction, patience and perseverance etc.**
  - At that time many such monuments took more than **100 years to build**.
  - Its importance is enhanced by the fact that it is the only center where the continuous progress of Buddhism and architecture from 2nd century AD to 9th century AD is seen as a lasting legacy.
- **Hinayana:**
  - A substantially reduced vehicle, also known as an abandoned vehicle or a defective vehicle. It believes in the **original teachings of the Buddha or the 'Doctrine of the Elders'**.
  - It **does not believe in idol worship** and tries to **achieve personal salvation** through self-discipline and meditation.
  - **Theravada is a part of the Hinayana sect.**



बौद्ध मूर्तियां और राहत नक्काशी

▪ **Mahayana:**

- This sect of Buddhism considers Buddha as a deity and **believes in idol worship.**
- It **originated in northern India** and Kashmir and from there spread to Central Asia, East Asia and some areas of South-East Asia.
- **Mahayana believes in mantras.**
- Its **main principles were based on the possibility of universal freedom** from suffering for all beings. Therefore, **this school is called Mahayana (great vehicle).**
- Its principles are also based on the existence of **Buddha and Bodhisattvas** as 'incarnations of nature'. It talks about **attaining salvation through having faith in the Buddha and devoting oneself to him.**

**Expected Questions for Preliminary Exam**

**Que. In which of the following states are the Kanheri caves located?**

- |                    |                   |
|--------------------|-------------------|
| (a) Bihar          | (b) Uttar Pradesh |
| (c) Madhya Pradesh | (d) Maharashtra   |

**Answer: (d) Maharashtra**

**Que. With reference to the religious history of India, consider the following statements:**

1. The Bodhisattva is the central concept of the Hinayana school of Buddhism.
2. The bodhisattva is compassionate as he progresses on his path to enlightenment.
3. The bodhisattva delays his own attainment of nirvana in order to help all sentient beings on their path to enlightenment.

**Which of the statements given above is/are correct?**

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

**Answer: (b) 2 and 3 only**

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