



METHANE EMISSIONS - GS II MAINS

Q. Methane is the second most abundant anthropogenic GHG after carbon dioxide (CO₂), accounting for about 20 percent of global emissions. Discuss the efforts taken by the government to reduce the impact of methane in the atmosphere. (15 marks, 250 words)

News: *COP28 turns attention to potent methane emissions*

What's in the news?

- Recently, the 28th Conference of Parties decided to negotiate the curb down of Methane emissions.

About Methane:

- Methane (CH₄) is the simplest hydrocarbon, consisting of one carbon atom and four hydrogen atoms.
- It is a **colourless, odourless, highly flammable gas** and the **main component in natural gas**.
- It is an important greenhouse gas because it is such a potent **heat absorber**. The concentration of methane in the atmosphere has risen by about 150% since 1750, apparently largely due to anthropogenic activities.
- Methane is the **second most abundant anthropogenic GHG after carbon dioxide (CO₂)**, accounting for about 20 percent of global emissions.

About Methane emission:

- **Agriculture** is the largest single source of global anthropogenic methane (CH₄) emissions, with ruminants the dominant contributor.
- Unlike other animals, **ruminants** have specialized digestive systems consisting of stomachs that have four compartments instead of one.
- Plant material is initially taken to rumen, the largest compartment in the stomach that is inhabited by microorganisms such as fungi, bacteria, protozoa and archaea.
- These microorganisms break down the otherwise indigestible cellulose-rich plants to release protein and energy for their host animal in exchange for nutrition and shelter.
- But during this process, which scientists call enteric fermentation, one particular microbe, the archaea, combines CO₂ and hydrogen made by the cellulose-digesting microbes to create methane.

Government efforts to reduce Methane emission:

- **India Greenhouse Gas Program:** Launched in 2012, Led by WRI India, Confederation of Indian Industry (CII) and The Energy and Resources Institute (TERI) is an industry-led voluntary framework to measure and manage greenhouse gas emissions.



- **The National Livestock Mission** since 2014 includes feeding livestock with balanced rations which “can help reduce methane emissions from livestock”.
- **The Galvanising Organic Bio-Agro Resources (Gobar-Dhan) scheme** launched in 2018 and the New National Biogas and Organic Manure Programme, implemented from 2017, provide incentives to farmers for cattle waste recovery, used in the production of bio-energy.
- **Other initiatives:** Several other schemes including **Direct Seeded Rice**, which uses less water during initial paddy cropping that can reduce methane emissions and Waste to Energy plants that will generate biogas from agricultural, urban, industrial and municipal solid waste, etc, will indirectly reduce methane emissions.
- **Seaweed-Based Animal Feed:** The Central Salt & Marine Chemical Research Institute (CSMCRI) developed a seaweed-based animal feed additive formulation that aims to reduce methane emissions from cattle.
- **Anti-methanogenic feed supplement ‘Harit Dhara’ (HD):** Developed by the Indian Council of Agricultural Research (ICAR), can cut down cattle methane emissions by 17-20%.
- **Bharat Stage-VI Norms:** Recently, India has shifted from BS-IV to BS-VI emission norms. Compared to the BS4, BS6 emission standards are stricter.

WAY FORWARD:

- **Changing food products:** Farmers can provide animals with more nutritious feed so that they are larger, healthier and more productive, effectively producing more with less.
- **Alternative feed system:** Scientists are also experimenting with alternative types of feed to reduce the methane produced by cows and looking at ways to manage manure more efficiently by covering it, composting it, or using it to produce biogas.
- When it comes to staple crops like paddy rice, experts recommend alternate wetting and drying approaches that could halve emissions.
- Rather than allowing the continuous flooding of fields, paddies could be irrigated and drained two to three times throughout the growing season, limiting methane production without impacting yield. That process would also require one-third less water, making it more economical.