



## Tackling Agri-Emissions

This editorial is based on [“For ‘Climate Smart’ Agriculture”](#) which was published in Indian Express on 14/02/2022. It talks about the greenhouse gas emissions from the agriculture sector and the need for climate smart agricultural practises.

**For Prelims:** General issues on environmental ecology, Climate change, GHG emissions from agriculture, 2070 carbon neutrality target, Climate-Smart Agriculture (CSA), Minimum Support Prices (MSP), Carbon tax, Paddy cultivation.

**For Mains:** GHG emissions from agriculture, paddy cultivation and GHG emissions, Concept of Climate Smart Agriculture (CSA).

In the backdrop of the [2070 carbon neutrality target](#) set by India at the [CoP26 in Glasgow](#), the [Union Budget for 2022-23](#) has listed “climate action” and “energy transition” as one of the **four priorities** for the [Amrit Kaal](#).

However, considering that **agriculture contributes 73% of the country’s methane emissions**, the Budget announcements have been rather limited. Agricultural and allied activities such as **rice cultivation**, rearing of domestic animals and biomass burning account for **22%-46% of the global methane concentration**.

## Agricultural Emissions and Climate Smart Agriculture

### What is the Share of Agricultural Emissions?

- As per the national GHG inventory, the **agriculture sector emits 408 MMT (million metric ton) of CO<sub>2</sub> equivalent**.
- **Rice cultivation is the third highest source** (17.5%) of GHG emissions in Indian agriculture after enteric fermentation (54.6%) and fertiliser use (19%).
- Paddy fields are **anthropogenic sources of atmospheric nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>)**, which have been reckoned as 273 and **80-83 times more powerful than CO<sub>2</sub>** in driving temperature increase in 20 years’ (as per [IPCC AR6, 2021](#)).
  - The amount of CH<sub>4</sub> emitted from paddy fields of India is **3.396 teragram** (1 teragram = 10<sup>9</sup> kilograms) per year or 71.32 MMT CO<sub>2</sub> equivalent.

### Why are the Agricultural Emissions so High?

- The damage is largely a result of the various kinds of **subsidies — on urea, canal irrigation and power for irrigation**.
- The [Minimum Support Prices \(MSP\)](#) and procurement policies concentrated on a few states and largely on two crops, rice, and wheat has led to their **overproduction**.
  - As of 1 January 2022, the **stocks of wheat and rice in the country’s central pool**

- **were four times higher** than the buffer stocking requirement.
- Despite the record distribution of rice in the [Public Distribution System \(PDS\)](#) and exports in 2020-21, the rice stocks with the [Food Corporation of India \(FCI\)](#) are seven times the buffer norms for rice.
- This data not only reflects **inefficient use of scarce capital**, but also the **large amount of greenhouse gases (GHG) embedded in these stocks**.

### What are the Underlying Issues?

- There is scientific evidence that **intermittent flooding reduces water and methane emissions but increases nitrous oxide emissions**.
  - Thus, lowering of methane emissions through controlled irrigation does not necessarily mean net low emissions.
  - Also, India **does not report N<sub>2</sub>O emissions** in its national GHG inventories.
- The **GHG emissions in rice production do not include:**
  - Emissions due to burning rice residues
  - Application of fertilisers
  - Production of fertilisers for rice
  - Energy operations like harvesting
  - Pumps
  - Processing
  - Transportation
- Paddy fields require about 4,000 cubic metres of water per tonne of rice for irrigation. This high amount of water needed, ends up **blocking oxygen** from getting to the soil, which **creates the perfect conditions for bacteria that release methane**.

### What is CSA?

- **Climate-Smart Agriculture (CSA)** is an **integrated approach to managing landscapes** (cropland, livestock, forests and fisheries) that addresses the interlinked challenges of food security and accelerating climate change. CSA aims to simultaneously achieve three outcomes:
  - **Increased Productivity:** Produce **more and better food to improve nutrition security** and boost incomes, especially of 75% of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods.
  - **Enhanced Resilience:** Reduce vulnerability to drought, pests, diseases and other climate-related risks and shocks, and **improve capacity to adapt and grow in the face of longer-term stresses** like shortened seasons and erratic weather patterns.
  - **Reduced Emissions:** Pursue **lower emissions for each calorie or kilo of food produced**, avoid deforestation from agriculture and identify ways to absorb carbon out of the atmosphere.

### What Can Be The Way Forward?

- **Revisiting Policies:** The [Economic Survey 2021-22](#) points out that the country is over-exploiting its ground water resource, particularly in the northwest and some parts of south India which is primarily due to [paddy cultivation](#) on 44 million hectares.
  - Although this has helped India achieve food security, it's **time now to save groundwater and the environment**.
  - This calls for **revisiting policies to subsidise power and fertilisers**, MSP and procurement and **reorient them towards minimising GHG emissions**.
- **Three-Pronged Approach for GHG Emissions:** A study by the [International Maize and Wheat Improvement Centre \(CIMMYT\)](#) pointed out that India has the potential to cut 18% of its annual greenhouse gas emissions from the agriculture and livestock sector.
  - The study estimated that 50% of this reduction could be achieved by implementing these three measures:
    - **Efficient use of fertiliser**
    - **Adoption of zero-tillage**
    - **Management of water used to irrigate paddy**
- **Encouraging Farmers:** Farmer groups and the private sector can be **mobilised to develop**

**carbon markets in agriculture**, both at the national and international levels.

- Moreover, **specific water, fertiliser and soil management practises** can lead to **triple win** - reducing the **climate impacts of rice cultivation** while **increasing productivity** of this culturally important grain and **increasing farmer profits**.
  - Such a move will give India a **“climate smart” agriculture in Amrit Kaal**.
- Also, if we can **protect productivity levels with a low-carbon footprint**, it will help India to access global markets too.
- **Carbon Pricing:** According to the [International Monetary Fund \(IMF\)](#), the **world needs a carbon tax of \$75 per tonne** by 2030 to **reduce emissions to a level consistent with a 2°C** warming target.
  - Many countries have begun to implement carbon pricing; Sweden leads the pack with a carbon price as high as \$137 per tonne of CO<sub>2</sub> equivalent while EU is at \$50/tonne of CO<sub>2</sub> equivalent.
  - It is high time for India to **announce indicative carbon pricing** and create a vibrant carbon market to **incentivise green growth in Amrit Kaal**.
- **Increasing Farmer Awareness:** The right approach is to give the rice-producing-farmers the **right advice and incentives at the right time** so that they add only as much water or fertilisers as the rice plant needs.
  - Rice farming shall be made **more sustainable, without having a negative impact on farmers livelihood**.
  - What is needed going forward is the **flow of sufficient financial resources** to on-the-ground organisations that have the cultural competence and scientific capability to bring the right advice to farmers at the right times.

#### ***Drishti Mains Question***

Discuss the causes of high GHG emissions from the agriculture sector and the steps that can be taken to minimise the emissions.