



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 CO₂ 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 (N₂O) and methane (CH₄)**, which have been reckoned as 273 and **80-83 times more powerful than CO₂** in driving temperature increase in 20 years’ (as per [IPCC AR6, 2021](#)).
 - The amount of CH₄ emitted from paddy fields of India is **3.396 teragram** (1 teragram = 10⁹ kilograms) per year or 71.32 MMT CO₂ 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 N₂O emissions** in its national GHG inventories.
- The present scope of **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 CO₂ equivalent while EU is at \$50/tonne of CO₂ 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.