

METHODS AND CHALLENGES IN GETTING CARBON CREDITS IN PADDY FARMING

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SUMMARY OF THE CONTENTS COVERED IN THE REPORT

- What are the challenges for paddy farmers to adapt sustainable farming practices in the current scenario?
- What are carbon credits, how to avail them, What is the Indian government's take on sustainable farming practices?
- Overview of the challenges in conducting a pilot.

TERMINOLOGY:

Methodology	The specific procedures and rules for quantifying and verifying carbon credits to ensure consistency and accuracy
Standards	Established criteria for a project to be eligible for carbon credits E.g. : CDM - Clean Development Mechanism VCS - Verified Carbon Standard GS - Gold Standard
Baseline Emission Assessment (BEA)	Assessment of amount of carbon removed from atmosphere
Project Design Document (PDD)	Document that explains results of BEA, methodology selected, details of execution and monitoring of project
VCM	Voluntary Carbon Market

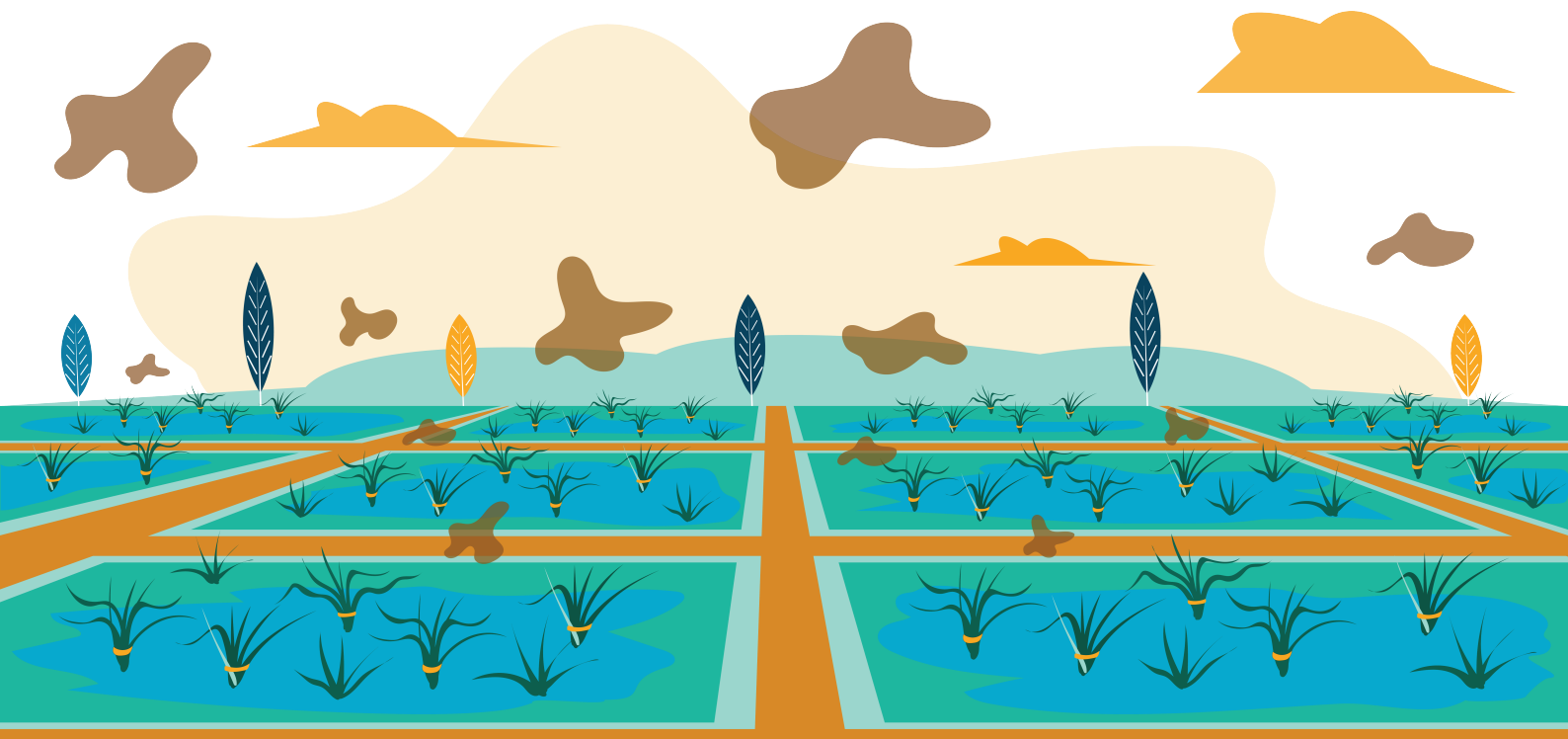
PROJECT REPORT:

METHANE - 86 TIMES BIGGER THREAT THAN CO₂, OVER 20 YEARS

Methane has an alarming warming effect, 86 times higher than that of CO₂ per unit mass over 20 years and 28 times higher over 100 years.[1]. Its lifetime is 12 years, unlike CO₂, which remains in the atmosphere and shows its effects for 300 to 1,000 years. after it enters the atmosphere. Hence methane mitigation has a bigger and faster impact on current global climatic conditions.

METHANE FROM PADDY FIELDS?

India is one of the largest consumers of rice, with over 50% population, vis-a-vis more than 80 crore people, depending on rice as a staple food. A great number of rural Indian households' main source of income is paddy cultivation. This makes rice cultivation an important part of the Indian economy. Paddy occupies about 43% [2] of the area under agriculture in India. As stated by the world bank [3], "India is a global agricultural powerhouse", with the largest 'area under rice' in the world, responsible for more than 20% of global rice production. This in turn causes large amounts of methane emissions from paddy cultivation, leading to major environmental issues.



MOST UNUSUAL YET MOST COMMON REASON FOR METHANE EMISSIONS - PADDY FIELDS

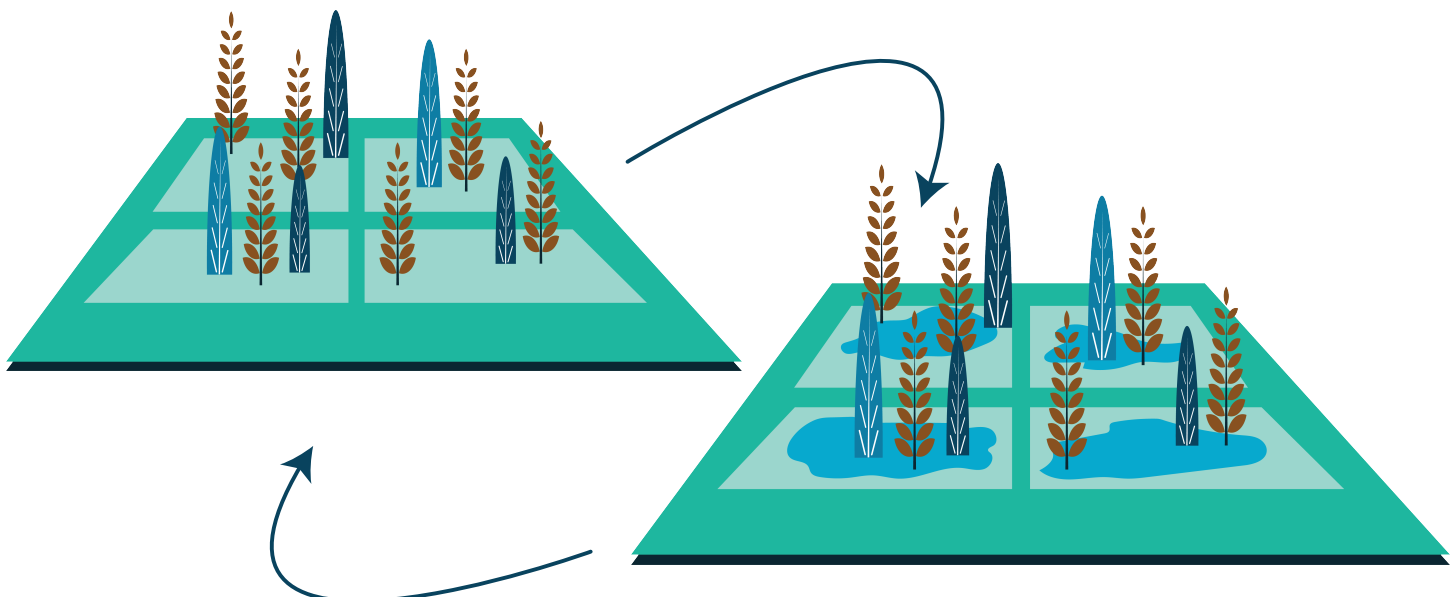
Methane emissions are caused by flooding paddy fields with water for longer periods, originally done to kill weeds by reducing oxygen availability for their growth. On the other hand, certain kinds of bacteria called methanogens thrive in oxygen scarce environments. Methanogens break down organic matter (like plants & other natural materials in the soil). This leads to anaerobic decomposition of organic matter, resulting in emission of large amounts of Methane (CH₄) [4]. Paddy cultivation accounts for the 2nd largest methane emissions in India, after livestock. India, in turn, is the 3rd largest global methane emitter.

4 WAYS TO REDUCE METHANE EMISSIONS FROM PADDY CULTIVATION

There are many effective ways to reduce methane emissions from paddy fields, including:

AWD METHOD

- Field is allowed to dry before reflooding.
- Minimizes anaerobic conditions.
- PVC pipes, usually with level sensors, used to monitor water level for it to be always less than certain level.



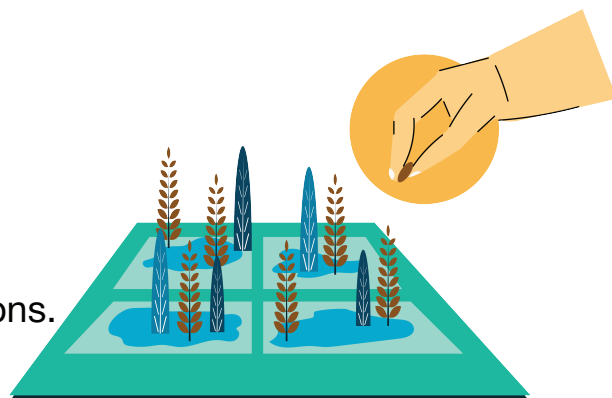
SRI METHOD

- Fewer seedlings, consistent soil moisture and organic fertilizers.
- Increased yields, reduced water usage.
- Transplanting 8-12 days old seedlings, instead of transplanting them after they grow bigger.



DIRECT SEEDING METHOD

- Sowing seeds directly into the soil instead of transplanting seedlings.
- Reduces duration of waterlogged conditions.
- Dry or moist soil, but not flooded.



INTEGRATED CROP LIVESTOCK SYSTEMS

- Combining rice cultivation with other livestock like fish, where fish waste is used as manure.
- Enhanced nutrient cycling and improved organic matter management.
- It has been Implemented in many areas in Southeast Asia.

Large amounts of emissions can be reduced worldwide by making a few lifestyle changes. But why would farmers alter farming practices passed down through generations? Nevertheless, can emissions that can be reduced by bringing changes in farming practices be ignored? These questions directed us to an established innovative solution to global warming, **Carbon credits**. Though the concept of carbon trading is considered ground-breaking, it was not very much welcomed by farmers, not to mention researchers and professors finding the implementation lacking. Various nations have diverse takes on mitigation of agricultural emissions. Considering all these factors, we, at **SIC**, have decided to explore this issue in depth.

BREAKING DOWN CARBON TRADING



Carbon trading is a key and innovative mechanism providing a market-based approach for reduction of greenhouse gas emissions. Financial instruments used in Carbon trading are called Carbon credits[5]. **A single carbon credit represents an avoidance, reduction or removal of one metric tonne of carbon dioxide or equivalent amount of a different greenhouse gas.** Even though the concept of carbon trading was proposed in the **Kyoto Protocol, 1997**, the rise in its importance in climate talks is after its special mention in the **Paris agreement, 2015** as an effective means for reducing GHG emissions globally. With numerous countries pledging to restrict the rise of global temperature to 1.5 oC in this century, implementation of carbon trading is considered necessary as an effective step towards mitigation of GHG emissions.

STEPS TO REGISTER FOR CARBON CREDITS [6]



IDEATE

- Conceptualise a project aimed at GHG mitigation, conduct Base Emission Assessment (BEA), and prepare a Product Design Document(PDD).

PROJECT REGISTRATION

- After an independent 3rd party auditor validates the project eligibility in the report, submit the report to a standards program and the governing body registers project as an eligible one to generate carbon credit



CERTIFICATION

- After the project implementation, with monitoring and periodic verification by third party auditor throughout the process carbon credits are issued and recorded in registry by carbon credit



TRADE

- Sell the carbon credit and notify the standard, for the body to retire the credit, i.e , as buyer claims the credit, it will be noted to be out of circulation



PILOT EXECUTION TIME - AROUND 2 YEARS

The pilot was not executed after the initial study due to the time required for execution.



MARKETS AND PRICING FOR CARBON CREDITS



Carbon trading markets are places for carbon trading between buyers and sellers, where buyers include corporations, organisations, countries, states, individuals and sellers being project developers, governments, brokers and traders.

There are two kinds of carbon markets:

Compliance markets : Regulated by government policies.

Voluntary markets : Companies and individuals participate in carbon trading, for the sake of corporate social responsibility or personal environmental commitments.

Pricing is dependent on various factors such as Geographical Region or Country, Credit Methodology or technology, Credit standard, Volume of credits generated per year, Project credit issuance costs, Sustainable Development Goals (SDGs) met, Market dynamics etc.

HOW DO CARBON TRADING MARKETS WORK IN INDIA?



In recent COP27, India emphasised the principles of equity and common but differentiated responsibilities (CBDR-RC), arguing that all countries should have fair access to the global carbon budget to meet the Paris Agreement's temperature goals. India urged developed nations to achieve net-zero emissions sooner, as they have historically consumed more than their fair share of the carbon budget. The country also highlighted the importance of climate finance and technology transfer for developing nations to accelerate climate action.

During a discussion on emissions from agriculture at COP27, India had criticised rich nations for "searching for cheaper solutions abroad" instead of reducing their emissions through lifestyle changes. It emphasised that agriculture emissions are "survival emissions" and not "luxury emissions" — Sourced from[7].

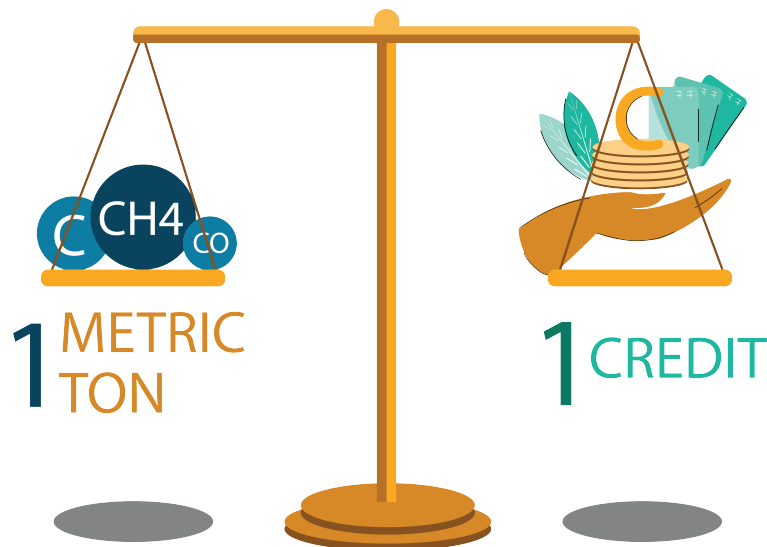
India called for specific actions and funding to support adaptation and mitigate loss and damage due to climate change. It stressed the need for global collaboration in developing technologies for renewable energy, low carbon emissions, and other key areas. Additionally, India reiterated its commitment to climate justice and sustainable lifestyles through initiatives like the LIFE Mission. The minister also mentioned that India has submitted multiple reports to the UNFCCC, detailing its climate actions, achievements, and needs[8].

Currently India participates in Clean Development Mechanism (CDM) which is a global trading standard, owing to the Paris Agreement.

India is notified of the domestic market in the Carbon Credit Trade Scheme (CCTS)[9], a national carbon market which is expected to be functional from the financial year 2025-26. This market is being developed and structured under the framework of India Energy Efficiency Services Limited (IEESL) and other governmental bodies. These initiatives aim to provide a robust infrastructure for carbon trading nationwide, encouraging industries to adopt greener technologies and practices.

The Department of Agriculture and Farmers Welfare, under the Ministry of Agriculture and Farmers Welfare, proposed a Framework for Voluntary Carbon Market (VCM) in the Agricultural Sector[10] in January, 2024. If implemented accurately, transparently and sincerely, developments are hopeful and are expected to support sustainable farming practices greatly.

ONE ACTION FOR TWO GOALS - CARBON TRADING :



Carbon trading can largely help reduce carbon footprints, not to mention the economic benefits. It drives sustainability as well as provides financial support. In agriculture, various methods used to reduce GHG emissions contribute greatly to enhancing the quality of the land, water and biodiversity which results in increased water holding capacity, enhanced water penetration, reduced soil density, higher soil fertility, better water and biodiversity management, all of which ultimately lead to temperature regulation, lesser vulnerability and better climate conditions. In India, it is valuable in contributing to the net-zero targets set by the governments and organisations. Carbon trading in Agriculture is rather more significant due to their high quality, large availability (nearly 60% of land in India is under Agriculture).

As of August 2024, the price of each credit is Rs. 40 due to high volatility in carbon markets[11]. But according to the Framework for VCM for agricultural sector by Department of Agriculture and Farmers benefits, a farmer is expected to earn from Rs. 700 to Rs 1000 per credit, along with the fact that an average farmer can sequester 2-6 credits per hectare. This can help in increasing the farmers' income[12].

BUT

Small and medium farmers getting benefits from carbon trading using their meagre lands is not very practical in current situations[13].

“For a low value crop like paddy, farmers are not ready to invest more in machinery needed for sustainable farming practices like direct seeding method, etc”.

- Farmer in Sangareddy

Efforts needed for implementation of the new methods are high and shortage of labour makes it even more expensive, given the meagre profits.

“For methods like SRI, returns are high but the efforts to put in are also high.”

- Farmer in Sangareddy.

“An average Indian farmer, who owns about 2 - 2.5 acres of land, gets a revenue of Rs. 50,000 - Rs. 60,000 per season after removing all expenses, which make nearly Rs.10,000 per month.”

- Farmer in Sangareddy.

Ensuring that the emission reductions claimed by carbon credits are real, additional, and permanent requires rigorous verification and monitoring.

The price of carbon credits can be volatile, influenced by regulatory changes, market demand, and other factors.

There is a risk that emission reductions could be counted more than once, undermining the integrity of carbon credits.



CONCLUSION



Carbon trading/carbon credits is one of the most impressive solutions till date in the process of striking a balance between environmental and economic benefits.

Nevertheless, its implementation in the real world is a mission yet to be accomplished (mission impossible ☺). For the right people to reap the benefits of carbon trading in India, policies have to be formalised, especially to be accessible to all sections of farmers irrespective of the social barriers. Taking the efforts India put into sustainable development, especially concerning agriculture in recent times, things are expected to look up with support from farmers as well as the rest of the citizens, businesses, NGO's and various other organisations.

A project concerning carbon trading in paddy cultivation to mitigate methane emissions is a large-scale, time consuming one. It requires 100s of villages coming together for a minimum time of 5 years. Next Bharat's SIC originally intended to conduct a pilot with the farmers, however due to the high demand of time and investment for the pilot, the idea was withdrawn.

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