



Carbon Farming: Our Way Out of Climate Change

(*Sohan Lal Kajla¹ and Neha²)

¹Rajasthan Agricultural Research Institute, Durgapura, Jaipur- 302018

²Chaudhary Charan Singh Haryana Agriculture University, Hisar, Haryana

*Corresponding Author's email: kajlasikar@gmail.com

Carbon farming (also known as carbon sequestration) is a method of agricultural management that allows the land to store more carbon while emitting fewer greenhouse gases into the atmosphere. Agriculture and livestock contribute 18% of total country emissions. Agriculture accounts for more than 80% of total nitrous oxide emissions, owing to the use of synthetic nitrogen and manure fertilisers in soils and pastures. It also accounts for roughly 45 percent of the total methane emissions. Livestock methane emissions, including enteric fermentation and manure management, account for roughly 80% of agricultural methane emissions. Rice cultivation is the second largest source of agricultural methane emissions, with the rest coming from savanna fires and crop residues for agricultural use. (World Economic Forum) While agriculture contributes to climate change through greenhouse gas (GHG) emissions, shifting weather patterns also have a negative impact. Climate change threatens India's agricultural prosperity by causing frequent dry spells, heat waves, and variable rainfall. With a growing population and the need to increase food production, it will be difficult to strike a balance between meeting rising food demand and managing and lowering GHG emissions from agriculture.

India has pledged to achieve zero carbon emissions by 2070. This refers to the amount of emissions produced versus the amount of emissions removed from the atmosphere. The agriculture sector can help India achieve this goal by using a "Climate Smart" systems approach. Farmers can maintain and restore vegetation on their grazing pastures, including tree cover along waterways, by managing their grazing fields. This method helps the land store carbon and removes greenhouse gas emissions from the environment. If soil carbon levels increased, individuals, businesses, and non-governmental organizations concerned about climate change would compensate farmers. It will help farmers earn more money while also storing carbon in their land.

When carbon benefits from better land management or conservation efforts surpass carbon losses, carbon farming is fruitful.

Carbon Farming Method

Appropriate interventions for promoting low-carbon agriculture are:

Forest management: Forest management is an appropriate intervention for promoting low-carbon agriculture. Healthy forests absorb and store CO₂ emissions from other sources, making them an important source of GHG sequestration. Carbon offsets can be obtained in a variety of ways, including:

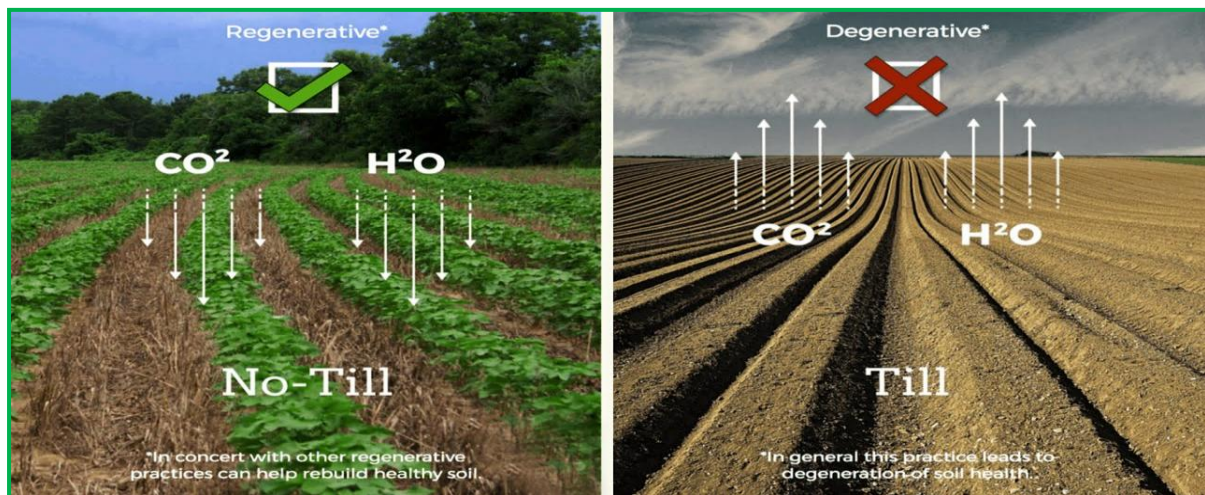
- Avoided deforestation,
- Permanent land conservation,
- Reforestation and replanting initiatives
- Improved forest management.

Sustainability of Grasslands: Native grasses and other vegetation, such as forestry, act as a natural source of GHG absorption and sequestration. Rather than converting grassland for commercial development or intensive agriculture, this type of carbon offset focuses on preserving native plant life through long-term land conservation.

Cover Cropping: Instead of being harvested, these crops are grown to cover the soil. They are produced after the main crop has been harvested. They return more carbon to the soil and support soil microbes, which play critical roles in carbon storage.

Mixed Farming: They were raising cattle and crops together in a climate-friendly way. Rotating cows around pastures replenishes soil carbon by allowing grasses to recover from grazing and allowing animal dung and the impact of their grazing to regenerate.

Soil Tillage Reduction: Tillage is typically used to loosen and aerate the soil as well as to remove the first weeds. Tillage, on the other hand, increases carbon mineralization, resulting in carbon dioxide emissions from the soil. Reducing soil disturbance is an important tool for preserving soil organic matter. Introduction of superior livestock breeds to reduce livestock numbers (especially unproductive cattle) and increase yield; use of livestock wastes to produce energy for cooking and heating via biogas technology can reduce methane emissions and save households money on electricity.



Advantages of Promoting Low-Carbon Technologies

Cost savings in irrigation water, labour, and energy; reduced GHG emissions; increased water and fertilizer usage efficiency; moisture and heat stress tolerance; improved soil health; increased income; and improved other planetary boundaries in jeopardy such as freshwater, biodiversity, land use, and nitrogen use are among the key benefits.

Challenges in Promoting Low-Carbon Technologies

Significant constraints include the need for broader participation (including sound policies), increased difficulty for farmers in hot and dry areas, high initial costs, infrastructure for installation and maintenance, knowledge intensiveness and technical soundness, high production costs, risks in rainfed regions, weed problems, yield loss, insufficient market facilities, a lack of awareness, and limited post-harvest facilities. Establishing baselines and measuring carbon storage in agriculture may be difficult. Creating an accredited carbon budget (carbon emissions and farming) for each farm is a difficult task. Some programmes (for example, agroforestry) have a long gestation period and are fraught with uncertainty. Besides that, getting to the point of carbon trading comes at a high transaction cost. To make it cost-effective, a significant amount of C mitigation must be created, which necessitates widespread adoption of these technologies. Because the average farmer's landholding in India is so small, many farmers would need to adopt these technologies in order to benefit from C trade.

Actions required promoting low-carbon technologies

The actions required to overcome the constraints include the development of irrigation facilities, the provision of incentives for water conservation, carbon credits for mitigation, subsidies and other incentives for the installation of resource conserving infrastructure, training for skill development, public awareness generation, the development of low-cost, environmentally friendly herbicides, accurate weather forecasting, the development of post-harvest facilities, and the development of post-harvest facilities. To overcome the problem of small farm size, cooperatives, self-help groups (SHGs), and even large commercial enterprises could collaborate.

The introduction of "carbon credits," also known as "carbon allowances," which serve as emission permits. When a corporation purchases a carbon credit from the government, it is granted permission to emit one tonne of CO₂. Carbon income flows vertically from firms to regulators via carbon credit, while companies with excess credit can sell it to other companies and conduct research on local carbon markets in order to successfully implement low-carbon technology.