Indian Farming 76 (07): 08-11; July 2026

Turning farmland into carbon assets: Monetisation of climate friendly practices

Maina Kumari[1]*, Usha Das[2], Rajarshi Roy Burman[3] and Rajbir Singh[3]

[1]*ICAR-National Dairy Research Institute, Karnal, Haryana 132 001*
[2]*ICAR-Indian Institute of Wheat and Barley Research, Karnal, Haryana 132 001*
[3]*Indian Council of Agricultural Research, New Delhi 110 012*

Carbon credit trading in agriculture highlights how climate-friendly farming practices can transform farmland into valuable economic assets. India's Carbon Credit Trading Scheme enables farmers to earn additional income by reducing greenhouse gas emissions through sustainable methods. Various carbon farming practices and the process of generating and trading carbon credits are outlined in this article. The approach offers dual benefits of improving farmer livelihoods and promoting environmental sustainability. Some challenges such as verification, market development, and equitable access may affect the successful implementation of scheme.

Keywords: Agriculture, Carbon credit, Climate change, Farmer, Sustainability

THE world today stands at a decisive moment in its fight against climate change. Rising global temperatures, erratic rainfall patterns, prolonged droughts, devastating floods, and extreme heatwaves are no longer distant predictions, they are living realities. According to Intergovernmental Panel on Climate Change (IPCC), global warming has already crossed 1.1°C above pre-industrial levels, and without urgent emission reductions, the world risks breaching the critical 1.5°C threshold in the coming decades. Crossing this limit could trigger irreversible environmental damage, threatening food security, water availability, biodiversity, and human health. India is home to nearly 1.4 billion people and heavily dependent on agriculture. But it contributes to greenhouse gas emissions through methane from rice paddies and livestock, nitrous oxide from fertilisers, and carbon dioxide from soil degradation and stubble burning. This dual role being both a victim and a contributor to climate change places agriculture at the centre of climate solutions.

Globally, countries are responding by building carbon markets and incentivising low-carbon transitions under the framework of the Paris Agreement. India has pledged to achieve net-zero emissions by 2070 and significantly reduce the emissions intensity of its economy. Achieving these targets requires transformation not just in industry and energy but also in land use and farming systems. Recognising this urgency, the Government of India introduced a landmark, Carbon Credit Trading Scheme (CCTS), in the Union Budget 2026-27 under the amended Energy Conservation Act, 2001. The scheme brings farmers into the formal carbon market ecosystem, enabling them to earn tradable carbon credits by adopting climate-friendly agricultural practices such as agroforestry, regenerative farming, improved soil management, and methane reduction techniques. Among the key initiatives introduced was a Carbon Credit Programme, part of a broader Carbon Capture, Utilisation and Storage (CCUS) strategy that formalises and expands India's carbon market, making it accessible to agricultural producers as well as industries. This move aims not only to reduce greenhouse gas emissions and help India meet its climate goals, but also to supplement farmers' incomes by enabling them to generate and sell carbon credits through the adoption of sustainable and regenerative agricultural practices. The scheme transforms traditional farmland from a source of emissions into a 'carbon asset', creating economic opportunities while promoting environmental stewardship.

Concept and significance of carbon credit

Carbon credits are tradable certificates that represent the reduction, avoidance, or removal of 1,000 kg of carbon dioxide or equivalent greenhouse gas (GHG) from the atmosphere. Industries that cannot completely reduce their pollution can buy carbon credits. These credits help them balance the extra pollution they produce. In Indian context, the carbon market framework was launched as CCTS.

Solar irrigation system at farm women field

Methods of carbon farming

Carbon farming refers to a range of agricultural and land management practices designed to capture and store carbon from the atmosphere while lowering GHG emissions. These approaches not only help mitigate climate change but also improve soil health, boost farm productivity, and support long-term environmental sustainability.

***Forest management*:** Improved forest management practices include selective harvesting, thinning, regeneration, and the prevention of illegal logging. These practices aim to maintain healthy and diverse ecosystems that continue to sequester CO_2.

***Grasslands conservation*:** Conservation of grasslands involves preventing overgrazing, conversion of grasslands to agricultural land, and restoring degraded grassland areas.

***Renewable energy production*:** Transitioning from fossil fuel-based energy to renewable sources such as wind, solar, and biomass is a crucial strategy for reducing GHG emissions in agriculture and across the broader economy.

***Fertiliser management*:** Reduce the use of chemical fertilisers and adopt organic farming practices such as mulching, crop rotation, composting, and the application of organic manure to improve soil fertility while minimising GHG emissions.

***Reduced tillage*:** Reduced tillage, or no-till farming, involves minimising soil disturbance to help conserve soil organic carbon and maintain soil health.

ICAR-CIFT Solar dryer

***Improved residue management*:** Avoid burning crop residues; instead, incorporate them into the soil through practices such as conservation tillage or convert them into biochar to enhance soil fertility and reduce emissions.

***Greening fallow land*:** Grow nitrogen-fixing cover crops such as clover or legumes, during fallow periods to improve soil fertility and enhance soil health.

***Cover crops and companion cropping*:** Cover crops such as legumes, grasses, and brassicas are especially effective in improving soil structure, reducing nutrient leaching, and enhancing water retention.

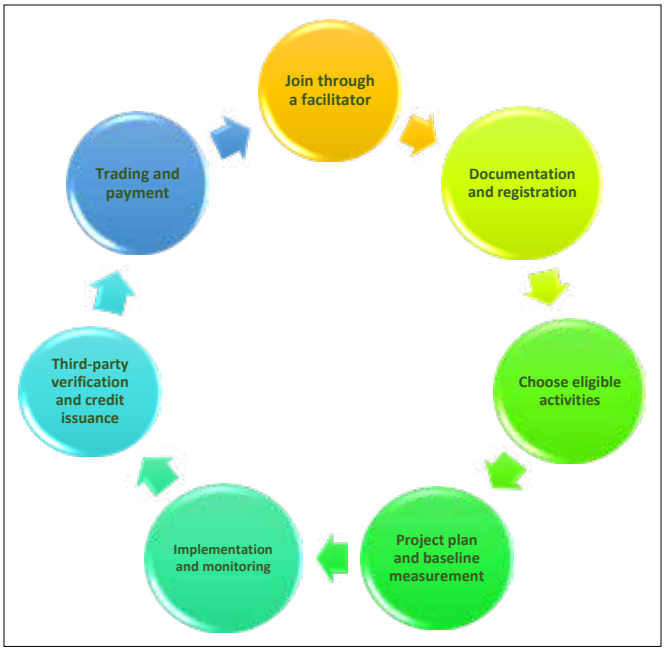
***Agroforestry*:** Suitable species for agroforestry include nitrogen-fixing trees such as neem and *Acacia*; timber species like teak and eucalyptus; and fruit trees such as apples, pears, and bamboo. These agroforestry systems enhance carbon sequestration while improving soil fertility and promoting biodiversity.

Dual benefits for agriculture and climate

India's farm sector accounts for a significant share of rural livelihoods and national GDP (15–18%). Yet, farmers often face income volatility due to weather, price fluctuations, and rising input costs. Introducing carbon credits into agriculture serves various critical purposes:

***Diversify farmer's income*:** Beyond traditional crop sales, carbon credits offer an additional revenue stream. Farmers participating in approved carbon sequestration or emission reduction activities can earn credits that are tradable on regulated platforms. When sold, these credits provide direct payments or shared revenue via aggregators or FPOs. This bottom-line incentive can strengthen rural economies and build resilience against crop-related uncertainties.

***Encourage sustainable farming practices*:** The carbon credit framework rewards practices such as regenerative soil health management, water



Process of carbon credit generation

Solar dryer

Forest style

management, conservation of grassland, fertiliser management, etc. These practices not only sequester carbon, but also enhance biodiversity, soil fertility, and water efficiency, aligning economic incentives with environmental outcomes.

***Supporting national climate commitments*:** India has pledged to achieve carbon neutrality by 2070, and expanding the carbon credit market to agriculture strengthens its domestic mitigation portfolio. Increasing carbon sequestration through soil and biomass supports GHG reduction, thus, contributing to global climate action while building sustainable rural systems.

Step-by-step process of carbon credit generation for farmers

***Step I*:** Rather than acting alone, farmers typically join projects led by FPOs, cooperatives, or accredited aggregators. These organisations handle complex technical, documentation, and compliance aspects, enabling farmers to focus on field implementation.

***Step II*:** Farmers provide basic identification and land documentation, such as Aadhaar, land ownership proof, cultivation records, bank details, and contact information. This data is crucial for registration and future payments.

***Step III*:** Within registered projects, farmers adopt climate-positive practices that are measurable. These might include regenerative cultivation, tree planting, improved water management, or other methods that demonstrably increase carbon capture.

***Step IV*:** Aggregators prepare a project plan outlining participating farmers, activity design, monitoring approaches, and benefit-sharing arrangements. A baseline assessment (current soil carbon, land use, crop practices) is documented to measure future improvement.

***Step V*:** Farmers apply the selected sustainable practices. Monitoring evidence like geotagged photos, input records, and satellite data is crucial to verify outcomes. Remote sensing and on-field checks help maintain credibility.

***Step VI*:** Accredited carbon verification agencies audit the documented outcomes. Once verified, carbon credits are issued and recorded in the domestic registry.

***Step VII*:** Issued credits can be sold on regulated trading platforms to compliance or voluntary buyers. Payments flow back to farmers directly or through their aggregator partners, according to agreed terms. By institutionalising this market mechanism, the government aims to ensure transparency, trust, and scalability for thousands of farmers across states.

Opportunity and potential impact

While India's carbon market is still emerging, the inclusion of farmers signals a major shift in climate

Self-propelled track type vehicle for small farms for tillage

Soybean crop with conservation tillage

Multilayer cropping system with conservation practices

Verification complexity Accurate measurement of soil carbon changes and emissions reductions requires rigorous, scientific monitoring standards, which can be costly and technically demanding.	**Market maturity** India's domestic carbon market is still developing clear benchmarks and price signals. While international markets offer higher prices, domestic trading platforms and regulations are in early stages.
Equity and access Ensuring equity to smallholder farmers who often lack digital access or land titles will require tailored outreach, capacity building, and incentives.	**Risk of greenwashing** Without strict safeguards, poorly designed projects could generate credits that overstate climate benefits or fail to deliver genuine additionality.

Key challenges in agricultural carbon credit system

Liquid fertiliser applicator

finance and agricultural economics. Some early soil carbon projects such as those supported by private initiatives have already highlighted how farms can generate credits valued in international markets, with typical prices ranging from USD 40 to USD 60 per tonne for high-integrity carbon credits. For farmers, this can mean tangible earnings over time in addition to crop income. Estimates from voluntary programmes indicate that individual farmers could receive credits worth ₹15,000–50,000 (or more) over multi-year periods, depending on acreage, practices, and market prices.

SUMMARY

Central government budget 2026's carbon initiative is a cornerstone in aligning agricultural livelihoods with India's climate vision. By integrating farmers into the carbon market, the government aims to unlock new income streams, encourage sustainable land-use practices, and build climate resilience. As the carbon market matures and domestic trading platforms become operational later in 2026, more farmers are expected to engage in certified carbon credit projects across regions and ecosystems. The true success of this initiative will depend on effective implementation, credible verification systems, equitable access for smallholders, and robust market infrastructure. If these come together, India's carbon credit scheme could become a model for how developing economies can harness agriculture for shared economic and environmental gains transforming farms into engines of sustainability for generations to come.

*Corresponding author email: maina.kumari@icar.org.in