

Carbon Farming: How Soil Could Help Save the Planet

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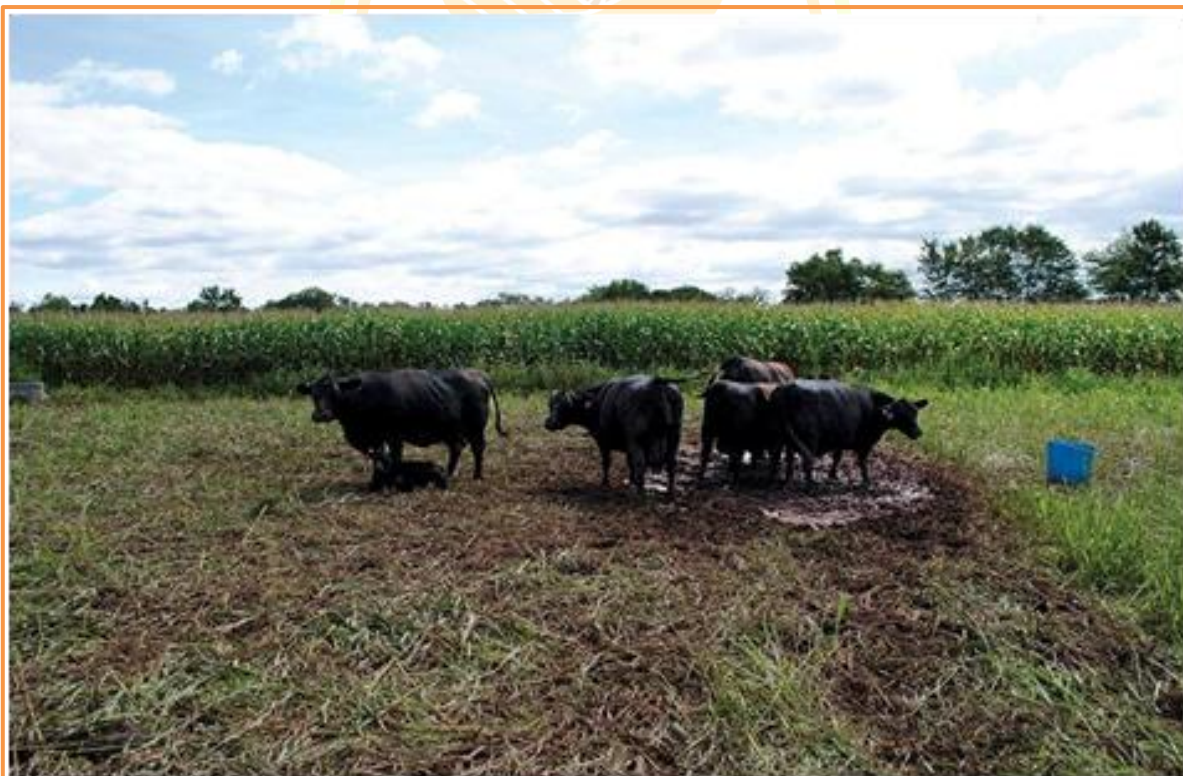
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Carbon farming refers to a set of agricultural methods designed to increase the amount of carbon stored in the soil and vegetation. These techniques capture atmospheric carbon dioxide (CO₂) and trap it in the ground, contributing to climate change mitigation.

Key methods include

- Planting cover crops to prevent soil erosion and enhance biomass
- Reducing or eliminating tillage to maintain soil structure
- Practicing agroforestry by integrating trees with crops or livestock
- Applying compost and organic amendments to enrich soil carbon
- Using rotational grazing to improve pasture health

These practices not only draw down carbon but also enhance soil fertility, increase resilience to drought, and improve overall farm productivity. The FAO estimates that improved soil management worldwide could potentially offset a significant portion of agricultural greenhouse gas emissions (FAO, 2021).



Source: Penn State Extension. (n.d.). *Integrated crop-livestock systems for soil health and carbon*. <https://extension.psu.edu/integrated-crop-livestock-systems>

Why India Needs Carbon Farming

Agriculture accounts for nearly a fifth of India's total greenhouse gas emissions, with methane and nitrous oxide being the primary contributors due to livestock, paddy fields, and excessive fertilizer use (MoEFCC, 2021). Meanwhile, large swathes of India's farmland suffer from declining soil quality, water stress, and reduced yields.

Carbon farming offers a promising approach to reverse these trends. Its potential benefits include:

1. Restoring soil health and productivity
2. Strengthening resilience against climate-induced stresses
3. Unlocking new revenue through emerging carbon markets

India's policy frameworks such as the National Mission on Sustainable Agriculture (NMSA) and Paramparagat Krishi Vikas Yojana (PKVY) provide fertile ground for integrating carbon-focused regenerative practices into mainstream farming.

Voices from the Field

Farmers across different Indian states have started adopting regenerative practices like composting and multi-cropping with the help of local NGOs and climate-tech startups. These changes have led to improved crop health and better soil moisture retention. Platforms like Boomitra are using remote sensing technologies to quantify carbon stored in farmers' fields, enabling them to participate in voluntary carbon credit programs. As farmers transition to such methods, they also gain access to supplementary income streams based on the verified carbon they sequester. Boomitra and similar startups have reportedly helped smallholder farmers globally earn millions of dollars by verifying carbon removal from regenerative agricultural practices (Boomitra Impact Report, 2024).

Opportunities in the Carbon Credit Market

A carbon credit represents one metric ton of CO₂ or its equivalent that has been removed from the atmosphere or avoided. With the growth of voluntary carbon markets, companies are purchasing these credits to offset their emissions. Although still emerging in India, the market for agriculture-based carbon credits is expanding. Prices can vary, with some credits fetching between ₹500 and ₹2,000 per tonne depending on the verification standard and demand (Kumar J. 2025). Startups and cooperatives are now developing user-friendly platforms to track and certify farmers' carbon practices using satellite data and AI models. Agricultural research bodies like ICAR are piloting tools to measure soil carbon more accurately, improving the credibility of carbon credits generated on Indian farms (ICAR, 2023).

Barriers to Large-Scale Adoption

Despite its promise, scaling carbon farming in India faces several obstacles:

- Data Accuracy: Measuring soil carbon changes reliably remains difficult.
- Certification: Verifying carbon credits requires technical expertise.
- Awareness: Many farmers are unaware of carbon farming or its benefits.
- Funding Gaps: Smallholders lack access to upfront capital or digital tools.
- Market Linkages: Selling credits involves intermediaries and market knowledge.

Efforts are underway to simplify verification processes and provide training, but broader government support will be crucial for inclusive growth in this sector.

Future Pathways for India

With over 150 million hectares of arable land, India has the potential to become a global leader in soil-based climate solutions. If even a fraction of this land were transitioned to carbon farming practices, the climate and livelihood impacts could be substantial. Experts suggest that land-based carbon removal strategies could deliver up to one-third of the total emissions reductions needed globally by 2050 (IPCC, 2022).

To achieve this potential, India will need:

- Policy alignment to include carbon farming in schemes like PM-KUSUM and MGNREGA
 - Grassroots-level farmer training via Krishi Vigyan Kendras
 - Technological inclusion to monitor soil carbon and connect farmers to carbon markets
- Empowering farmers to care for their soil is not just an environmental imperative—it is a socio-economic opportunity for sustainable development.

References

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