

Carbon Farming

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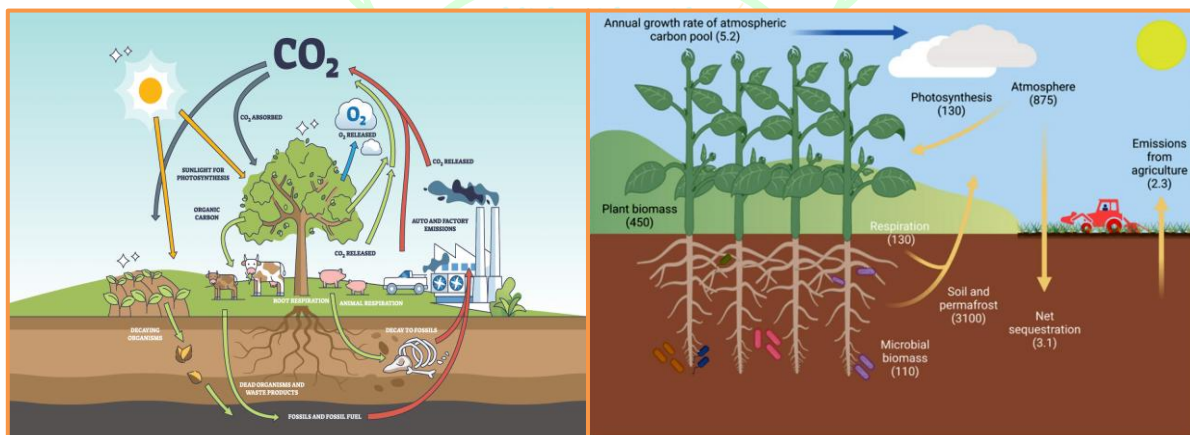
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Agriculture is the backbone of India's economy, supporting millions of livelihoods. However, in recent years, farming has been facing serious challenges due to climate change. Rising temperatures, erratic rainfall, prolonged droughts, and declining soil fertility are affecting crop productivity and farmer income. One of the major causes of climate change is the increased concentration of greenhouse gases, especially carbon dioxide (CO_2), in the atmosphere. At the same time, agriculture itself has the potential to become part of the solution. By adopting certain sustainable practices, farmers can capture and store atmospheric carbon in the soil. This concept is known as carbon farming. It not only helps in reducing climate change impacts but also improves soil health and farm productivity. In addition to environmental benefits, carbon farming opens up a new economic opportunity for farmers through carbon credits. Farmers can earn income by adopting practices that reduce carbon emissions or increase carbon storage. Thus, carbon farming represents a win-win approach—benefiting both farmers and the environment.

Carbon Credits

Carbon credits are a market-based mechanism designed to reduce greenhouse gas emissions. One carbon credit represents the reduction or removal of one tonne of carbon dioxide (or its equivalent) from the atmosphere. Industries, companies, and organizations that emit large amounts of greenhouse gases are required or encouraged to offset their emissions. They do this by purchasing carbon credits from those who reduce or capture carbon. Farmers can play an important role in this system. By adopting sustainable agricultural practices that increase soil organic carbon, they can generate carbon credits. These credits can then be sold in carbon markets, either through government-supported systems or private platforms.



There are two main types of carbon markets:

- **Compliance markets**, regulated by governments
- **Voluntary markets**, where companies voluntarily offset their emissions

In India, the carbon market is still developing, but there is growing interest from private companies and international organizations. Farmers usually participate through aggregators such as Farmer Producer Organizations (FPOs), NGOs, or project developers who help in measuring, verifying, and trading carbon credits.

Practices To Promote Carbon Credits

To generate carbon credits, farmers need to adopt practices that either increase carbon sequestration or reduce emissions. Many of these practices are already familiar and can be implemented at low cost.

1. Cover Cropping

Cover crops such as legumes (cowpea, sunhemp, daincha) are grown between main crops. These crops add organic matter to the soil and improve nitrogen content. When incorporated into the soil, they increase soil carbon levels.

2. Reduced or Zero Tillage

Frequent ploughing exposes soil carbon to air, leading to its loss as CO₂. Reduced tillage or zero tillage minimizes soil disturbance, helping retain carbon in the soil and improving soil structure.

3. Agroforestry

Growing trees along with crops helps store large amounts of carbon both above and below the ground. Trees also provide additional income through timber, fruits, and fodder.

4. Organic Amendments

Application of farmyard manure (FYM), compost, vermicompost, green manure, and biochar increases soil organic carbon. These inputs also improve microbial activity and nutrient availability.

5. Crop Residue Management

Burning crop residues releases carbon dioxide and other harmful gases. Instead, incorporating residues into the soil helps in carbon sequestration and improves soil fertility.

6. Crop Rotation and Diversification

Growing different crops in sequence improves soil health and enhances carbon storage. Inclusion of legumes in cropping systems is especially beneficial.

7. Improved Water Management

Efficient irrigation practices like drip irrigation reduce methane emissions in certain crops and improve overall sustainability.

These practices not only help in carbon sequestration but also result in better soil health, higher productivity, and reduced input costs.

Government Policies Introduced

The Government of India has taken several steps to promote sustainable agriculture, which indirectly supports carbon farming:

1. National Mission for Sustainable Agriculture (NMSA)

This mission promotes climate-resilient agricultural practices, including soil and water conservation, organic farming, and efficient nutrient management.

2. Paramparagat Krishi Vikas Yojana (PKVY)

This scheme encourages organic farming by providing financial assistance and training to farmers, which helps in increasing soil organic carbon.

3. Soil Health Card Scheme

This initiative helps farmers understand the nutrient status of their soil and adopt appropriate practices, leading to improved soil management.

4. Natural Farming Initiatives

Government programs promoting natural farming methods reduce chemical usage and enhance carbon sequestration.

5. Emerging Carbon Market Framework

India is gradually developing a carbon trading system, and policies are being framed to allow farmers and other stakeholders to participate in carbon markets.

In addition, several private companies and international agencies are working with Indian farmers to develop carbon credit projects and provide market access.

Need For Carbon Farming In Futuristic Days

In the future, agriculture will face increasing pressure due to climate change, population growth, and resource limitations. Carbon farming offers a sustainable pathway to address these challenges. Firstly, it helps in reducing greenhouse gas emissions, thereby mitigating climate change. Secondly, it improves soil health, which is essential for maintaining long-term productivity. Thirdly, it enhances the resilience of farming systems against drought, floods, and temperature extremes. As global awareness about climate change increases, the demand for carbon credits is expected to grow significantly. This will create new opportunities for farmers to earn income. Carbon farming can thus become an integral part of climate-smart agriculture in the future.

Beneficiaries Of Carbon Credits To Farmers

Carbon credits provide a new income stream for farmers beyond traditional crop production. Farmers can benefit in the following ways:

- Direct income from selling carbon credits
- Improved soil fertility, leading to higher yields
- Reduced cost of cultivation due to lower dependence on chemical inputs
- Better market opportunities through participation in organized groups

However, individual small farmers may generate limited carbon credits. Therefore, collective approaches such as Farmer Producer Organizations (FPOs) or cooperatives are essential. These groups can aggregate carbon credits from multiple farmers, making it easier to participate in carbon markets and negotiate better prices.

Advantages

Carbon farming offers multiple benefits:

- Enhances soil organic carbon and fertility
- Improves soil structure and water retention
- Reduces soil erosion
- Lowers input costs by promoting organic practices
- Increases crop yield stability
- Provides an additional source of income through carbon credits
- Contributes to environmental conservation and climate change mitigation

Constraints

Despite its potential, there are several challenges:

- Lack of awareness and knowledge among farmers
- Difficulty in measuring and verifying carbon sequestration
- Limited access to carbon markets
- High initial costs for monitoring and certification
- Delayed financial returns
- Need for technical support and institutional backing

Conclusion

Carbon farming represents a sustainable and innovative approach to modern agriculture. It not only helps in mitigating climate change but also improves soil health, enhances productivity, and provides additional income opportunities for farmers. Although there are challenges in implementation, increasing awareness, supportive policies, and collective efforts can make carbon farming a practical reality. In the coming years, carbon farming has the potential to transform agriculture into a climate-resilient and economically viable system, ensuring both environmental sustainability and farmer prosperity.