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Carbon Farming - A Regenerative Revolution in Food

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Abstract
Carbon farming is a promising new agricultural movement that has the potential to help mitigate climate change, improve soil health, and increase crop yields. As more farmers adopt these practices, we can help to create a more sustainable food system for the future. The global food system is a major contributor to climate change. Agriculture accounts for 21-37% of global greenhouse gas emissions. Conventional farming practices, such as tillage and the use of synthetic fertilizers, release carbon dioxide into the atmosphere. Carbon farming, on the other hand, seeks to capture emissions, not create them.

Carbon Farming
Intelligent farming methods are reducing greenhouse gas emissions by capturing and holding carbon in vegetation and soils. The project aims at mitigating climate change whilst improving agricultural soils, by implementing carbon sequestration techniques on the farm. Carbon farming is also known as carbon sequestration. Carbon farming is a system of agricultural management that helps the land store more carbon and reduces greenhouse gases released into the atmosphere. Sustainable forest management practices do similar good by minimizing greenhouse gases and accumulating carbon dioxide in wood. Tribal Nations can do this in a number of different ways. For example, Indian agriculture producers can manage grazing lands to conserve and restore vegetation, including tree cover along waterways. This practice helps the land store carbon, removes greenhouse gases from the atmosphere, and provides benefits to nearby water sources. Landowners can also implement fertilizer reduction strategies, such as applying compost or biochar (charcoal used as a soil additive to improve crop yield), that reduce the amount of greenhouse gases tied up in vegetation.

Why do we need sustainable farming practices to capture carbon in soil?
- Carbon is naturally found in soils. When the soil is disturbed, carbon dioxide (CO_2) gets released into the atmosphere where it's currently at dangerous levels that cause the planet to keep getting warmer. But the idea is to reverse the trend by utilizing the soil's capacity to keep carbon dioxide out of the atmosphere with sustainable farming practices to capture carbon in soil.
- To maximise the potential for soils to capture carbon where it can remain available for a prolonged period of time, carbon farming technologies like cover crops are aimed at maximising soil capacity. Farmer incentives are provided as carbon sequestration in soils requires a shift in agricultural practices that are helpful to the climate and more co-benefits.
- And how carbon farming works isn't just about helping the world remove greenhouse gas emissions from the air. In addition to soil health benefits, carbon farming methods can

also reduce the chemical release into water resources as well as improve biodiversity. These carbon farming techniques may in the long term contribute to cost reductions, impacts on yield quality and new sources of income for farmers.

Common methods in Carbon farming

Carbon farming is synonymous with the term "regenerative agriculture" when that term is explicitly rooted in an understanding of the underlying system dynamics and positive feedback processes that actually make a "regenerative" upward spiral of soil fertility and farm productivity possible

Forest management:- Carbon dioxide emissions generated by other sources and a major source of greenhouse gas sequestration are being captured and stored in forests, thanks to the health of those forests. Various strategies, such as avoiding deforestation and continuous land protection, replanting and reforestation activities or improving forest management and care in working forests where harvesting takes place, can be used to offset carbon emissions. As deforestation accounts for 15 to 20 % of global increases in greenhouse gases, better forest management aims at long term and sustainable practices that ensure continued CO_2 removal from the atmosphere. In order to enable productive and sustainable forest growth activities include thinning, selective harvesting, regeneration and planting as well as fertilization.

Grasslands Conservation: - The natural source of GHG absorption and sequestration is native grasses, similar to forestry; as are other vegetation. The objectives of offsetting the carbon emissions in this category are to maintain indigenous plant life by conserving land permanently and preventing conversion into commercial development or intensive agriculture.

Renewable Energy Production: - Renewable energy facilities, such as wind or solar, generate carbon offsets by displacing fossil fuel-based electricity production sources within the power grid. Carbon credits are generated by carbon that has been derived from the certification of a Third Party offset project, which is managed by an entity responsible for developing such projects. For example, the non-profit Alaska Village Electric coperative operates an Alaskan Native Wind Energy project to replace diesel power with renewable energy in Toksook Bay.

Effective carbon farming practices include

The carbon farming method, which has proven to sequester and mitigate greenhouse gas emissions, is a type of management practice. The Natural Resource Conservation Service NRCS identified at least 35 of these practices as conservation actions that improved soil health and carbon sequestration while generating important benefits, including: increased water holding capacity, hydrologic function, biodiversity and resilience.

- Afforestation and reforestation that respect ecological principles favourable to biodiversity and enhanced sustainable forest management, including biodiversity-friendly practices and adaptation of forests to climate change
- Agroforestry and other forms of mixed farming combining woody vegetation (trees or shrubs) with crop and /or animal production systems on the same land
- Use of catches, cover crops, conservation and improving the landscape features such as soil protection, a reduction in soil loss by erosion and organic carbon enrichment on degraded arable land
- Targeted conversion of cropland to fallow or of set-aside areas to permanent grassland
- A reduction in the oxidation of existing carbon stock and a greater potential for carbon sequestration are achieved through restoration of peat lands and marshes.

Conclusion

Through carbon farming practices, farmers have the potential to play a vital role in mitigating greenhouse gas emissions and contributing to global efforts to limit global warming. Additionally, carbon farming can offer economic opportunities to farmers, enhance food security, and reduce the environmental impacts associated with conventional agricultural practices. However, for carbon farming to reach its full potential, supportive policies, financial incentives, and educational programs are essential. Governments, businesses, and individuals must collaborate to create an enabling environment that encourages the widespread adoption of carbon farming practices.