

'Nature Based Solutions'

The risks of soil carbon markets

Over half of the organic matter in the world's agricultural soils has been lost, driven by decades of industrial farming practices.

As soil depletion reaches levels that jeopardise yields, agribusiness corporations are looking to the new subsidies and incomes available through soil carbon farming programmes.

Because carbon is the largest component of soil organic matter, the depletion of soils has released huge amounts of carbon dioxide into the atmosphere. These factors, combined with the surging corporate and government demand for carbon offsets, are making soil carbon farming an attractive 'nature based solution' (NBS)¹ to the climate crisis.

What are soil carbon markets and why are they spreading?

Carbon farming is an offset scheme wherein farmers are paid to sequester extra carbon to offset continued carbon emissions of a company, country, or individual.

Carbon farming schemes involve paying farmers to implement 'climate-smart' farming practices that supposedly increase the amount of carbon stored in their farms. The change in practices is used to verify the creation of carbon offset credits which are sold to corporations or governments, through 'soil carbon markets'. Though the buyers are still emitting greenhouse gases, they claim to have 'offset' these emissions by paying others to sequester more carbon, in line with their 'net zero' emissions goals. Demand for offsets is increasing, with 82 countries and 44% of the world's 2000 largest companies having made 'net zero' commitments.²

Most existing carbon farming schemes rely on carbon stored in trees with agroforestry and tree plantations, but **the number of 'soil carbon farming' schemes is growing.** Four soil carbon projects are already active in the Verra registry (the largest certifier of carbon credits worldwide),

and approximately 100 more are under development, primarily in China.³

Soil carbon farming schemes promote practices such as cover cropping, reduced tillage, and 'regenerative' grazing – the same industry-friendly farming practices that corporations have pushed for decades under the name of 'conservation agriculture', 'regenerative agriculture' or 'climate-smart agriculture'. The practices do not change the system of industrial farming but rather tinker with farming practices to make them marginally less harmful in the short term.

So far, soil carbon farming schemes have taken root in countries where large industrial farms dominate.

Soil carbon offsets rely on intensive data collection to supposedly verify that prescribed practices were implemented or that the amount of carbon in the soil increased. Many schemes for industrial farms rely on digital agriculture software that communicates with 'intelligent' farm machinery which automatically collects data while working. These methods are best suited to standardised

monocultures that are easy to quantify, and heavily-mechanised factory farms that are already collecting extensive data or can afford data collection machinery. These schemes have first taken root in areas with widespread industrial farming such as the US, Australia and Brazil.

However, soil carbon offset programmes are increasingly targeting smallholder farmers globally.

For example, the Climate Neutral Group's AgriCarbon soil carbon farming programme launched in 2021 in South Africa with large farms, but is expanding in South America and Africa. The company says that currently "the programme

is only open to bigger farmers as they tend to have more data," but will expand to smallholders as their "tool becomes more and more sophisticated."⁴

The African Carbon Markets Initiative launched in 2022 also intends to make a dramatic expansion of carbon credits from Africa, including soil carbon credits with smallholder farmers.⁵

Other projects working with smallholder farmers include: Nurture.farm in India,⁶ the Northern Rangelands Trust project which has disrupted traditional herding practices in Kenya,⁷ and ViAgroforestry's Kenya Agricultural Carbon Project which has continued despite a documented failure to deliver real carbon sequestration.⁸

Soil carbon offsets are dangerous for climate justice and food sovereignty because...

- 1. Soil carbon offsets increase the entrenchment of unsustainable corporate-controlled seeds and agrochemicals.** Schemes often encourage or require specific farming practices that rely on proprietary seeds and agrochemicals, like using affiliated pesticides to control weeds instead of tilling. Algorithms and digital farm machinery that are needed to earn carbon credits may require specific crop varieties and practices to function. For example a combine harvester's sensor may only be able to detect the specific shade of yellow of a patented corn variety.⁹ Enrolled farmers are often locked into contracts that commit them to continue the prescribed farming practices and soil carbon monitoring for years, if not decades, often even after carbon offset payments have stopped.
- 2. Soil carbon offsets are an excuse for data grabbing,** increasing the power of the food and technology corporations that control the digital platforms which monitor and market soil carbon credits. Digital agriculture and carbon market platforms funnel previously unimaginable quantities of environmental, agronomic, and personal data to these corporations. Especially when the platforms are responsible for recommending "carbon-sequestering" practices, they disempower farmers by moving agricultural knowledge from the hands of farmers into the hands of a corporate-controlled algorithm, creating a similar situation as with gig workers.
- 3. Soil carbon schemes drive farm consolidation and mechanisation,** giving an advantage to the largest farmers. Soil carbon farming as it has been deployed in industrial farms so far is part of a "climate-smart" vision where one farmer, armed with a crew of artificially intelligent machines, manages a vast monoculture using extensive remote data collection. This vision leaves no future for farmworkers, family-scale farms, or diversified farms which are more difficult to quantify and market. The FAO's main recommendation to increase the uptake of carbon farming is to increase the scale of carbon farming projects because larger projects are easier for investors to manage.¹⁰
- 4. Carbon farming schemes accelerate the loss of traditional agricultural knowledge** by teaching that traditional practices degrade soil and by locking farmers into contracts requiring 'climate-smart' practices. Carbon farming necessitates that farmers change their practices because investors look for 'additionality' (that the carbon would not have been sequestered without the offset scheme). This additionality requirement means that existing agroecological farms will be less attractive for carbon farming. Such farms are already marginalised in funding and policy support.

5. **Not all carbon is equal.** The “carbon is carbon” assumption behind offsets ignores the violence, health consequences, and economic and socio-ecological damage created locally around mines, fossil fuel processing plants and factory farms.
6. **Offset schemes distract from real solutions** and shift public subsidies from agroecology to carbon farming.

Soil carbon offsets are not a climate solution because...

1. **Offsets are not emissions reductions,** they are an excuse for big emitters to continue business as usual. To prevent runaway climate change and keep global temperature rise as far below 1.5 degrees as possible, we need immediate and deep emissions cuts. These must be made first in the historically polluting developed nations and then everywhere, in line with justice. Soil carbon markets are the latest in a long line of failed voluntary carbon market schemes where the only assurance that total emissions will reduce is voluntary commitments, which countries¹¹ and companies¹² have so far dramatically failed to meet.
 2. **Soil carbon sequestration can never make up for fossil fuel burning.** The fossil fuel carbon cycle is extremely slow – it takes thousands of years for the carbon released from fossil fuel burning to reform fossil fuels underground. Carbon stored at the surface in soils, plants, oceans and the atmosphere is on a much faster cycle and can be sequestered or released into the air within hours. So, no matter how much carbon is temporarily sequestered in soils, the total amount of carbon in the surface carbon cycle – the cycle that shapes the climate system – still increases with each ton of fossil carbon burned.
 3. **Most carbon offsets vastly overestimate the amount of carbon that has been sequestered.** An independent review of Verra, which approves 75% of all voluntary carbon credits globally, looked at their rainforest protection credits and found that 90% did not represent any real carbon sequestration.¹³
 4. **Soil carbon programmes falsely assume that ‘climate-smart agriculture’ sequesters carbon.** Many schemes like the Bayer Carbon
- Program don't measure soil carbon. Instead they pay farmers for implementing practices like reduced tillage and cover crops, on the assumption that this leads to carbon sequestration, even though research shows that these practices do not reliably increase soil carbon.¹⁴ In another example, The Northern Rangelands Trust project assumed that indigenous “unplanned” grazing practices were degrading the soil, so implementing “planned” grazing necessarily increased soil carbon.¹⁵
5. **It is practically impossible to measure soil carbon reliably.** Even when companies do the best they can to test for soil carbon changes, the numbers can vary drastically between different testing points in the same field. Moreover, there is no guarantee that soil carbon at the time of measurement will remain in the soil – if there is erosion, tillage, land use changes, or weather changes, carbon that has built up over years can be released in just a few hours.
 6. **The offset industry doesn't take into account its own costs and environmental footprint.** The digitalisation necessary for monitoring carbon credits comes with resource trade-offs that could otherwise be used directly for food systems, such as data storage centres taking farmland and guzzling water in drought regions,¹⁶ energy infrastructures disturbing biodiversity, and all computing hardware requiring mined minerals. The carbon market industry also takes significant monetary resources that could otherwise go directly to real climate solutions. The OECD estimates that the costs of managing schemes, monitoring and verifying carbon sequestration, making transactions, etc. can add up to over 40% of the price of a carbon credit.¹⁷

Who is pushing soil carbon markets?

GOVERNMENTS

make policy, develop schemes



CORPORATIONS

buy offsets, develop and fund schemes, sell technology



NGOs

influence policy, develop schemes



DEVELOPMENT AID

funds schemes



MULTISTAKEHOLDER ALLIANCES

influence policy and investors



INTERNATIONAL GOVERNANCE

makes policy



Example:

Fertiliser company profits from soil carbon schemes



Yara is the world's largest producer of synthetic nitrogen fertiliser, which is responsible for around 10% of direct greenhouse gas emissions globally. Yara is also Europe's biggest industrial buyer of fossil gas, a key ingredient in the production of nitrogen fertiliser.

The company tripled its profits in the first quarter of 2022 at the height of the global food price crisis, sparking accusations of profiteering. Yet, it is portraying itself as a sustainability champion, co-hosting the 'food systems pavilion' at the UN climate conference in 2022 and playing an active role in the The Global Alliance for Climate Smart Agriculture.

Yara is investing in soil carbon offsetting for both industrial and smallholder farms. On the industrial farm side, Yara started the company Agoro Carbon Alliance¹⁸ in 2021 which pays US farmers with over 200 hectares to implement conservation agriculture practices. Farmers are locked into 10-year contracts and use Yara's digital tools, meaning that the company gets their data. Most of their carbon credits so far are avoidance credits, so they are based on Yara's assumption that the soil carbon would have decreased without Yara's recommended practices.

At the same time, Yara invested \$4 million in Boomitra, a Silicon valley startup that also received funding from Chevron and American billionaires.¹⁹ Boomitra works with farmers with a minimum of two hectares in India, Mexico and South America. Enrolled farmers adopt promoted 'climate-smart' practices, and get paid for carbon credits when Boomitra's soil scanning drones and data-based models claim to detect an increase in soil carbon.

Boomitra is expanding in East Africa through a partnership with the Farm to Market Alliance, a venture of Yara, RaboBank, Bayer, Syngenta, AGRA and the UN World Food Programme.²⁰ Boomitra plans to enrol 10,000 East African farmers and use the project as an excuse to map 30,000 hectares of land in Kenya. Boomitra will work with the Farm to Market Alliance's "Farm Service Centres" which promote mechanisation and digitalisation, and sell proprietary agrochemicals and seeds. The Centres are led by unpaid locals who act as sales representatives for corporate partners' products and preferred practices, and take commissions when they sell farm inputs or connect farmers to markets.²¹

Some policies driving soil carbon offset schemes

Actor	Policy	Relevance for soil carbon farming
African Union	Climate Change and Resilient Development Strategy and Action Plan (2022-2032) ²²	The AU stated it will prioritise “sustainable intensification and integration of agricultural systems...that improve soil carbon storage” and “support development of market-based mechanisms” such as carbon markets.
European Union	EU Commission communication on Sustainable Carbon Cycles (2021) ²³	The EU commission “takes up the challenge of launching an EU carbon farming initiative,” calls for directing EU funding to carbon farming, and encourages member states to do the same.
World Bank	Climate Change Action Plan (2021-2025) ²⁴	“The World Bank will support countries in providing incentives to farmers to invest in NBS to improve soil carbon storage and build resilience. The WBG [World Bank Group] will pilot in operations a low-cost, near real-time Monitoring, Reporting and Verification (MRV) Protocol that can leverage private capital for enhanced soil carbon sequestration.”
FAO	Strategy on Climate Change (2022-2031) ²⁵	The FAO will support “the design of carbon market mechanisms for agrifood systems” by “promot[ing] the provision of international and domestic climate finance”, offering expertise in “measurement, reporting and verification systems, baseline setting and capacity development.” The FAO is acting on these commitments through the RECSOIL initiative and by leading soil carbon farming schemes in the Philippines and Mexico.
United Nations Food Systems Summit (UNFSS)	Private Sector Guiding Group’s Call to Action for Soil Health (2021) ²⁶	Members commit to “supporting the development of voluntary and transparent carbon market and pricing mechanisms, including carbon credits as a tool and incentive to transition to sustainable agriculture and to provide extra income for farmers”
Brazil	Law 14.119/21 (2021) ²⁷ ; Law 1151/22 (2022) ²⁸	Lays out a framework for payments for ecosystem services and connects buyers to sellers. Allows carbon credit schemes in land concessions which can include soil carbon in degraded pastures. ²⁹

<p>China</p>	<p>Implementation Plan of Emission Reduction and Carbon Sequestration in Agriculture and Rural Areas (2022)³⁰</p>	<p>A major component of the plan is increasing agricultural carbon storage and decreasing methane emissions from rice farming. This comes as China's own emission trading market has reopened and China has the largest number of agricultural carbon credit projects under development.</p>
<p>United States Agency for International Development (USAID)</p>	<p>Climate Strategy (2022-2030)³¹</p>	<p>USAID is “supporting placing a price on carbon through carbon taxes and carbon markets” and has funded agricultural carbon credit schemes globally.</p>
<p>Australia</p>	<p>Emissions Reductions Fund³²</p>	<p>Australian farmers can sell emission reduction credits to the government or private buyers if they implement approved practices.</p>

Endnotes

- 1 Friends of the Earth International (2021). Nature based solutions: a wolf in sheep's clothing. <https://www.foei.org/publication/nature-based-solutions-a-wolf-in-sheeps-clothing/>
- 2 Net Zero Tracker. Accessed June 2023. <https://zerotracker.net/>
- 3 Verra. "Verified carbon standard." Accessed June 2023. <https://registry.verra.org/app/search/VCS/All%20Projects>
- 4 Ludolph, Nicole. 2022. "Carbon credits: How farmers can reap the rewards." Foodformzansi.co.za, July 5, 2022. <https://www.foodformzansi.co.za/carbon-credits-how-farmers-can-reap-the-rewards/>
- 5 Africa Carbon Markets Initiative. 2022. Roadmap Report. <https://www.seforall.org/publications/africa-carbon-markets-initiative-roadmap-report>
- 6 nurture.farm. 2022. nurture.farm generates India's first agriculture-related carbon credits. https://nurture.farm/wp-content/uploads/2022/03/nurture.farm-Indian-carbon-credit-trading-press-release_21March2022.pdf
- 7 Survival International. 2023. Blood Carbon: how a carbon offset scheme makes millions from Indigenous land in Northern Kenya. https://assets.survivalinternational.org/documents/2466/Blood_Carbon_Report.pdf
- 8 Institute for Agriculture and Trade Policy. 2012. An Update on the World Bank's Experimentation with Soil Carbon. https://www.iatp.org/sites/default/files/2012_09_29_ElusivePromises.pdf
- 9 Michael Carolan. 2020. "Acting like an algorithm: digital farming platforms and the trajectories they (need not) lock-in." Agriculture and Human Values 37, pages 1041-1053. Accessed June 2023. <https://doi.org/10.1007/s10460-020-10032-w>
- 10 FAO & The Nature Conservancy. 2021. Nature-based solutions in agriculture: Project design for securing investment. <https://www.fao.org/3/cb3144en/cb3144en.pdf>
- 11 Joeri Rogelj et al. 2023. "Credibility gap in net-zero climate targets leaves world at high risk." Science, Vol 380, Issue 6649 pp. 1014-1016. Accessed June 2023. <https://www.science.org/doi/10.1126/science.adg6248>
- 12 Accenture. 2022. "Nearly All Companies Will Miss Net Zero Goals Without At Least Doubling Rate of Carbon Emissions Reductions by 2030, Accenture Report Finds." <https://newsroom.accenture.com/news/nearly-all-companies-will-miss-net-zero-goals-without-at-least-doubling-rate-of-carbon-emissions-reductions-by-2030-accenture-report-finds.htm>
- 13 SourceMaterial. "The Carbon Con." SourceMaterial, Jan 18, 2023. <https://www.source-material.org/vercompanies-carbon-offsetting-claims-inflated-methodologies-flawed/>
- 14 Ogle, S.M., Alsaker, C., Baldock, J. et al. 2019. "Climate and Soil Characteristics Determine Where No-Till Management Can Store Carbon in Soils and Mitigate Greenhouse Gas Emissions." Sci Rep 9, 11665. <https://doi.org/10.1038/s41598-019-47861-7>
- 15 Survival International. 2023. Blood Carbon: how a carbon offset scheme makes millions from Indigenous land in Northern Kenya. https://assets.survivalinternational.org/documents/2466/Blood_Carbon_Report.pdf
- 16 Solon, Olivia. 2021. "Drought-stricken communities push back against data centers." NBC News, June 19, 2021. <https://www.nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344>
- 17 OECD. 2022. Soil carbon sequestration by agriculture: Policy options. <https://www.oecd.org/fr/publications/soil-carbon-sequestration-by-agriculture63ef3841-en.htm>
- 18 Agoro Carbon Alliance. Accessed June 2023. <https://www.agorocarbonalliance.com/carbon-buyers-how-it-works/>
- 19 Yara. 2021. "Yara invests in Boomitra to advance soil carbon capture". June 22, 2021. <https://www.yara.com/news-and-media/news/archive/2021/yara-invests-in-boomitra-to-advance-soil-carbon-capture/>
- 20 World Food Programme. 2022. "Boomitra". Last updated September 14, 2022. <https://innovation.wfp.org/project/boomitra>
- 21 Farm to Market Alliance. "Farmer Service Centres (FSC's) explained". Video. August 28, 2022. <https://ftma.org/farmer-service-centres-fscs-explained/>
- 22 African Union. 2022. AFRICAN UNION CLIMATE CHANGE AND RESILIENT DEVELOPMENT STRATEGY AND ACTION PLAN (2022-2032). https://au.int/sites/default/files/documents/42276-doc-CC_Strategy_and_Action_Plan_2022-2032_23_06_22_ENGLISH-compressed.pdf
- 23 European Comission. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL: Sustainable Carbon Cycles. Brussels. https://climate.ec.europa.eu/system/files/2021-12/com_2021_800_en_0.pdf
- 24 The World Bank Group. 2021. Climate Change Action Plan 2021-2025. Washington, DC. <https://openknowledge.worldbank.org/server/api/core/bitstreams/19f8b285-7c5b-5312-8acd-d9628bac9e8e/content>
- 25 UN Food and Agriculture Organization. 2022. Strategy on Climate Change 2022-2031. <https://www.fao.org/3/cc2274en/cc2274en.pdf>
- 26 Private Sector Guiding Group Coalition for Soil Health. 2021. Call to Action for Soil Health. <https://www.coalitionforsoilhealth.org/resource-library/call-to-action-for-soil-health>
- 27 United Nations Environment Programme. 2021. "Law No. 14.119 creating the National Payment Policy for Environmental Services." Accessed June 2023. <https://leap.unep.org/countries/br/national-legislation/law-no-14119-creating-national-payment-policy-environmental>
- 28 Presidência da República. 2022. "Medida Provisória nº 1151, de 2022: Atratividade das concessões em unidades de manejo florestal." Accessed June 2023. <https://www.congressonacional.leg.br/materias/medidas-provisorias/-/mpv/155634>
- 29 The Nature Conservancy. "TNC launches study on carbon potential in the Amazon and Cerrado and its role in soy and cattle ranching financing." December 20, 2022. <https://www.nature.org/en-us/about-us/where-we-work/latin-america/brazil/stories-in-brazil/carbon-finance-study-amazon-cerrado/>
- 30 DCZ China. "China announces plan to reduce emissions in agriculture." July 12, 2022. <https://www.dcz-china.org/2022/07/12/china-announces-plan-to-reduce-emissions-in-agriculture/>
- 31 United States Agency for International Development. 2022. Climate Strategy 2022-2030. <https://www.usaid.gov/sites/default/files/2022-11/USAID-Climate-Strategy-2022-2030.pdf>
- 32 Australian Government Department of Agriculture, Fisheries and Forestry. "Emissions Reduction Fund." Accessed June 2023. <https://www.agriculture.gov.au/agriculture-land/farm-food-drought/climatechange/mitigation/cfi>

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