Agriculture and soils in carbon trading

Including soil carbon sequestration in a Copenhagen agreement may provide opportunities for commercialization and profit, but should not be confused with proven strategies for reducing greenhouse gas emissions, building resilient food systems and empowering rural communities.

In the negotiations and debates leading up to Copenhagen, there has been growing emphasis on carbon credits for agriculture and the inclusion of soil carbon sequestration into the Clean Development Mechanism (CDM) and other mechanisms including REDD. Soil carbon sequestration has so far been explicitly excluded from the CDM under the Kyoto Protocol, because of major uncertainties in measuring and verifying the permanence of soil carbon stores. But there is now a major push, by agribusiness, the FAO and some governments to change this. If soil carbon sequestration (also called 'enhanced removals in agriculture') is included in a Copenhagen agreement, as experience with carbon trading in general and the CDM in particular has shown, the benefits will go to large companies who can afford specialist carbon consultants, not to small-scale farmers, their communities and sustainable, local ecological food provision.

Industrial agriculture and plantation corporations are increasingly profiting from carbon credits. For example, in Mexico half of all CDM credits benefit industrial pig farms, while soya and palm oil plantations for biofuels and eucalyptus plantations for charcoal have recently become eligible under the CDM. Yet the industrial model of agriculture is profoundly polluting, being responsible for a very large part of global emissions. Agriculture is by far the largest source of emissions for the potent greenhouse gases nitrous oxide (predominantly from chemical fertilizer) and methane (largely from industrial livestock production). Most significantly, land use change driven by the demands of industrial agriculture leads to the production of well over 18 per cent of global emissions, through the burning of above-ground biomass and the loss of soil carbon, while destroying or degrading the ability of ecosystems to help regulate the climate.

Instead of reforming industrial agriculture, countries in the North want to see attention focused on carbon offsets and sequestration through agricultural and forestry projects located in the South. Carbon offsets legitimize continued fossil fuel burning by the affluent and thus continued global warming, and in the agricultural sector would neither prevent emissions from industrial agriculture, nor support a resilient, sustainable alternative.

If offsetting through soil carbon sequestration is accepted as a principle for action on mitigation, it will incentivize the large-scale application of unproven technologies – and in particular, of no-till biotechnology and biochar. The first involves the adoption of **"no till"** or **"conservation agriculture"**, which means instead of tilling the fields to remove weeds, large applications of herbicide are employed. This technique in most cases combines proprietary herbicides with genetically modified (GM) herbicide-resistant crops. By tying food production to agribusiness-owned seeds and chemicals, this approach could displace small-scale farmers or place them in debt, while undermining their capacity to adopt, adapt and share locally appropriate technologies that increase climate resilience. For longer-term sustainability, the approach also makes no sense.

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In the United States and South America, in a short time super-weeds have developed that are resistant to the herbicides, and soil structure and health has suffered from the use of heavy machinery and the application of chemicals. A long term positive impact on greenhouse gases has also not been proven and no-till GM soya is directly linked to accelerated deforestation. If no-till agriculture is incentivized through offsetting, monocultures will further displace complex and diverse agricultural ecosystems, further hastening climate change and destroying the biodiversity that underpins the climate resilience of food production.

A second technology with strong industrial backing is known as “biochar”, a technique in which fine-grained charcoal is added to the soil. Biochar research is in its infancy and the IPCC has found no scientific basis on which to recommend it. Although some charcoal carbon remains in the soil for long periods, the overall impacts on *soil* carbon vary, are not fully understood and in some cases have been shown to negative - releasing carbon from soils into the atmosphere. While there are claims that biochar can improve the performance of fertilisers, the evidence from experimental plots has been mixed and inconclusive. Worse, the large-scale application of biochar paradoxically demands land clearance for plantations to produce wood for the charcoal. Biochar quantities commonly promoted for ‘climate change mitigation’ would require hundreds of millions of hectares of land. The current rate of emissions from land clearances driven by industrial plantations must be reversed rather than accelerated by any proposed mitigation strategy.

A persistent claim in debates on climate change and agriculture is the availability of so-called marginal land for the application of proposed mitigation technologies. While marginal lands may not be recognised as productive or suitable for industrial food production, they are in many cases a basis for the livelihoods of and food for marginalised communities. Worse, a lot of good arable land, savannahs and even forests are categorised by unthinking authorities as ‘marginal’. Proposals for new activities on these lands could displace and impoverish local communities, as the recent upswing in large-scale land purchases by commercial interests, often government brokered, has demonstrated. The inclusion of soil carbon sequestration in carbon markets would exacerbate this trend - through land acquisition for no-till GM monocultures, plantations for biochar and biochar sequestration sites - further pushing smallholder farmers, pastoralists and indigenous communities out of their territories and off their land.

Proponents of both no till biotech and biochar claim they can quickly store excess carbon in soils. Their enthusiasm arises from the profits they could potentially make: a US industry body predicts that their agriculture and forestry sector could realize over $100 billion from domestic offsets alone. Yet far more is at stake for climate change adaptation and mitigation, food production and rural communities. Soils are complex systems with rich biodiversity, organic matter, water flows, layers and aggregates to take into account. While degradation comes fast, the rebuilding of soils takes decades through the development of soil organic matter - which consists of much more than simple inorganic carbon.

Agricultural soils, already degraded in many regions, need the application of local, context-specific ecological approaches to sustainably support and rebuild their fertility and enhance productivity. The debate about offsetting and carbon trading, while legitimizing and increasing fossil fuel burning, has diverted attention away from existing, widely practiced ecological approaches to agriculture that build resilience to climate change while reducing emissions. Quick-fix methods for sequestering carbon may provide opportunities for commercialization and profit, but should not be confused with proven strategies for reversing environmental decline, building resilience and empowering rural communities.