EXECUTIVE SUMMARY
Carbon Market Incentives to Conserve, Restore and Enhance Soil Carbon

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Soils play a central role in the world's food security and sustainable development. Yet, soils are under stress, both from land management and climate change. While the potential for soil to mitigate climate change is important, so is the climate impact from soils. The soil carbon pool, at ~3000 gigatonnes (Gt), is three times larger than that of the atmosphere, even after having been reduced by degradation and wetland drainage. It is increasingly understood that even if we stopped all emissions today, we would not achieve our climate targets without negative emissions from the land sector – including soil. By contrast, due to the size of the soil organic carbon pool, the "4 per 1000" initiative's theoretical target of increasing soil organic carbon stocks by only 0.4% would be enough to reverse the net annual carbon input to the atmosphere.

One way to incentivize efforts to build soil carbon is through market mechanisms that provide revenue for reducing emissions from soil degradation and for sequestration. To understand this opportunity, this report describes the state of and prospects for market-based efforts to build and preserve soil carbon, around the world. It reviews the position of soil carbon projects in climate policymaking, and the specific challenges and opportunities for intervention – and explores to what extent carbon project finance tools can help the advancement of soil carbon building. By taking the voluntary market as the lens, it also serves to inform the wider issue of fate and utility of land sector carbon projects within the evolving political framework of the Paris Agreement. The report focuses on terrestrial soils and does not cover emissions and carbon removals from coastal wetlands. Key conclusions of this work are summarized here.

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Soil carbon market projects are rare

Soils were initially excluded from carbon markets in the early 2000s, and now fewer than 20 projects that address soil organic carbon in croplands, pasture, peatlands, and other terrestrial wetlands are registered in the voluntary market. A further few dozen projects are registered in compliance markets in Australia. These projects provide under 50 thousand tonnes of carbon removals per year globally. This is in stark contrast to the estimated potential that is more than a million times higher, and dwarfed by the 1500 projects in the forest sector.

Technical issues are less of a problem than commonly perceived

Solid progress has been made on development of methodologies and tackling technical implementation issues. Robust methodologies now exist for projects that provide benefits addressing climate for almost any project category covering croplands, grasslands, savannahs, and peatlands. Two tables summarize this progress. Table 1 rates the four main types of soil carbon projects for the most relevant issues when considering developing a project. Methodologies and issues such as additionality, permanence, and cost are already, or are rapidly being, solved. While some project attributes still need further research or improved conditions, none represents a persistent problem. Feasibility of soil carbon projects depends on a combination of technical and commercial and legal/institutional features. Currently, technical implementation features for soil carbon projects are largely in place, while commercial and legal/institutional features remain challenging (Table 2).

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Many barriers to implementation are now balanced with opportunities

Voluntary carbon markets have been the facilitators of global concerted action in the land-use sector, and compliance markets are slowly opening. Growth in offsetting mechanisms, interest of buyers in projects that combine mitigation with co-benefits, strong networks advocating for soil carbon restoration, and alignment between multiple Sustainable Development Goals, (SDGs) means that buyers for carbon credits from soil projects should be easy to find (Table 3). The Paris Agreement itself may turn the page towards soil carbon activities, and the land-use sector may ultimately play a prominent role in emissions trading in the context of nationally determined contributions (NDCs).

Table 1. Ratings of essential attributes of four types of soil carbon project interventions

	Geographic scope	Skills/best practices development	Upscaling of interventions	Additionality	Leakage	Non-permanence	Complexity of validation	Cost of implementation
Peatland restoration		A	B		C	D	E	F
Peatland conservation	G	A			C		E	
Agricultural soil restoration & sequestration		A	B		H	I	E	
Grassland conservation		A	B		J		E	

LEGEND
- No problems
- Additional technical development needed, and/or not available, in all countries or contexts
- Critical without further clarification or risk mitigation
- A persistent problem

A) Expertise exists in places but is not readily available in all countries or contexts. Way to resolve: Promote the establishment of professional service providers (along the model of Energy Service Companies (ESCOs)).
B) Way to resolve: Grouping or programmatic approaches, but multitude of landowners, tenure situations and regulatory uncertainty remain a challenge.
C) Way to resolve: Project design avoiding hydrological connectivity; activity shifting/marketing leakage may be unavoidable.
D) Opportunity to shorten project duration, e.g. 10-15-year cycles instead of >30 years.
E) Way to resolve: Pursuing standardization of procedures, including defaults and simplifications; but procedures are generally a challenge for project developers.
F) High expenses resolved by upscaling.
G) Limited opportunities in industrial countries (the remaining pristine peatlands are protected); high opportunity in developing countries (also in terms of costs).
H) Categorizing interventions that are unlikely to cause leakage (e.g. keeping levels of service intact).
I) Way to resolve: Apply a buffer withholding or other insurance scheme.
J) Activity shifting/marketing leakage may be unavoidable.

Table 2. Ratings for technical, commercial and legal/ institutional features	
Technical (including implementation)	**Rating**
Global potential for CC mitigation by soil carbon projects	
Availability of feasible project types	
Availability of carbon standards covering soil carbon	
Eligibility of soil carbon project categories	
Availability of GHG accounting procedures	
GHG accounting practicability	1
Commercial	
Presence of market for environmental services	2
Market prices	3
Upfront payment needs	4
Legal/institutional	
Land tenure and safeguards	5
Carbon rights and safeguards	6
Operations and governance	7

LEGEND
- No problems
- Additional technical development needed, and/or not available, in all countries or contexts
- Critical without further clarification or risk mitigation
- A persistent problem

1) See Table 1 (a and e).
2) Markets do exist but provide a niche for projects generating small numbers of emission reductions; they are too small to sell large numbers (millions).
3) Low prices for credits require projects to stack funding sources. A range of projects will be viable at credit prices of US$5–10. Various restoration projects, in industrial countries in particular, however, will incur higher costs.
4) Projects are front-loaded in terms of costs and back-loaded in terms of revenues. There are considerable pre-financing needs in some restoration projects (e.g. peatland restoration), but less so in many sustainable land management projects. Where high investment needs present a problem, proponents should seek equity arrangements or collateralization strategies (including through public co-funding).
5) Multitude of landowners and other tenure holders may present high challenges for implementation. Way to resolve: Work through farmers' associations or local government institutions (in particular those established under customary law) and install robust mechanisms for benefit-sharing and redress.
6) Absence of clear regulatory framework is the rule, rather than the exception. In a range of countries, however, emissions trading precedents exist and can be used to gauge legal risks. New challenges arise from accounting developments within the Paris Agreement. The ideal scenario is a contractual or else legal arrangement with the government. As in 5), strong benefit-sharing, safeguards, and redress mechanisms are essential.
7) Strong program entities are a key asset (see also Table 1 (a)). Close cooperation with governments both at the local and central level will strengthen overall governance and upscaling options.

Table 3. Soil carbon interventions are characterized in terms of opportunities and barriers or challenges	
Barriers	**Opportunities**
Ignored by compliance markets	Current availability of standards and accounting methods (including additionality, leakage, non-permanence)
Incurs considerable transaction costs in terms of project development, as long as level of experience and market perpetration is low	Modest market prices (for most project categories and countries)
Overall credit demand has plateaued (though the effect from the Paris Agreement is not yet clear)	Accumulating best-practices
No support to emissions trading from some influential NGOs	Wide networks advocating soil carbon restoration and conservation are active
Issues with scaling up of projects in the land-use sector (tenure, measure, report and verify (MRV) requirements)	Growth potential of mitigation-cum-co-benefits
Uncertain tenure situations in developing countries	Near-future aviation offsetting mechanism
Multi-stakeholder character of land-use projects	New opportunities in compliance regimes (Paris Agreement but also individual countries)
	Role as laboratory for testing new technologies in the land-use sector

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Size and scalability are consistent challenges

For soil carbon projects the number of stakeholders and farmers is often large – a single project can involve hundreds or thousands of farmers – requiring a substantial program entity to run. The priority of farmers and communities is on yields and resilience, not necessarily on carbon. This has implications for both the business model and the outreach strategy. Soil carbon projects are still novel and as such preparation has often required methodology development, requiring time and money. With protocols now available for most project types, this early investment will start to reduce transaction costs of future projects.

Triggering scale requires policy action

Carbon projects make useful laboratories for testing and spreading new technologies and practices and for channeling and leveraging finance. Non-state actors can provide relevant skills, technological and governance infrastructure, advance funding as well as investment to get a project off the ground. To leverage a project to trigger full-scale jurisdictional or even national roll-out, on the other hand, a supportive policy environment as well as domestically embedded partners – ideally both at the government and at the private level – are essential. Public climate finance has an important role to play when it comes to creating supportive policy environments, creating institutional platforms for engagements, and promoting domestic champions for change.

Synergy between projects and policy will make the difference

In the long run, soil carbon projects will not thrive in the absence of broader policy-level transformations addressing strategic plans, zoning, land tenure, investment climate, and more. Conversely, such policy-level transformations are best helped through strong back-bone projects, which show ambitious results in terms of soil protection, output (yields) and climate action. Carbon projects will be most effective, if they second and respond to government-to-government cooperation, building knowledge and adding real-time experience on the ground.

Technical and policy work still needed

Much can and should be done on the practical side to improve soil carbon standards and the investment environment for soil carbon projects in the short term.

Land-use focused carbon standards have adopted a laudable rigor in defining and applying carbon accounting rules to projects, and it is a major achievement that today only few question the integrity of their work. Perhaps most importantly, governments should guarantee offtake (e.g. into an existing emissions trading scheme) or help set up centralized funds to create predictable demand and, thus, trigger carbon project development.

Looking ahead

Soil carbon is on its way to getting recognition commensurate with its potential for the net zero emissions pathway of the Paris Agreement. Carbon projects can spread the much-needed technologies and skills, but governments must stand ready to support them with legal and governance reforms, planning security, and scaling mechanisms. In the long run, governments must also be prepared to remove negative incentives prevalent in many current agricultural subsidy programs. Promoting soil carbon is not just about climate action. It really is about feeding the world and working towards a sustainable future.

The content of this Executive Summary does not reflect the official opinion of the client, The Nature Conservancy. Responsibility for the information and views expressed therein lies entirely with the authors.

Find the full report at: https://global.nature.org/content/soil-carbon-markets

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