



INSTITUTE FOR AGRICULTURE AND TRADE POLICY

Soil Carbon and the Offset Market:

Practices, Players and Politics

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The arcane topic of soil carbon sequestration has become an item of significant political debate around the edges of the U.N. Framework Convention on Climate Change (UNFCCC). This brief provides an introduction to:

- the market basics of soil carbon sequestration;
- the organizations involved in turning soil and other agricultural carbon into a commodity and creating a supply of that commodity;
- the curious role of the World Bank as carbon broker, trader and political manipulator, seeking rules at the UNFCCC that could serve to create demand for soil carbon.

We end the brief looking forward at new initiatives by agricultural carbon market proponents and the need for alternative policies that refocus attention on the needs of the small-scale farmers who are the least responsible for climate change and yet suffering its greatest impacts.

Box 1: Defining soil carbon and sequestration.

Soil carbon is simply carbon that is found in soils. All soils contain some amount of carbon—remnants of living matter that has been degraded over time. Soils of industrial agricultural systems are fairly devoid of soil carbon, as frequent tillage causes carbon in the soil to mix with oxygen and escape to the atmosphere as carbon dioxide.

Sequestration refers to practices that can take excess carbon and store it somewhere. In the case of soil carbon, it is sequestered by those practices that put more carbon into the soil than is released through normal processes of decomposition.

Practices that can increase the amount of carbon in soils are actually common practices of organic and sustainable agriculture systems. Adding manure and compost to soil or tilling in cover crops and green manures are practices that add carbon, through living material that will degrade over time.

Soil carbon cycles: Soil carbon concentrations are not constant. Tilling of soil causes oxygen to mix with carbon, mediated by microorganisms, turning it to a gas. Carbon can be added to soils, but the carbon that is added is organic: it comes from living organisms and will eventually decompose. Some of it will combine with oxygen and some will remain, depending on temperature, moisture and other physical characteristics of the soil.¹ The carbon will be stored in the soil only as long as proper conditions are maintained. Soils can only store so much carbon, eventually reaching saturation, and they can only sequester so much carbon in a year.

1. The market basics of soil carbon sequestration

Under their Kyoto Protocol obligations, most developed countries that are Parties to the Protocol must reduce their carbon emissions below 1990 levels. To do so, countries can either actually emit less carbon, or they can find a way to compensate for their emissions elsewhere—also called *offsetting*.

CREATING A NEW COMMODITY: CARBON OFFSETS There are two ways to create carbon offsets, also called carbon credits: by *reducing* or *preventing* carbon emissions or *sequestering* carbon by taking it out of the air. Carbon offsets are traded on a carbon market, similar to tangible commodities such as oil, gold or wheat. Carbon credits indicate that the purchaser is receiving credit for an emission reduction or sequestration in one location, and is therefore entitled to emit that same amount in some other location. Credits are sold in units of tonnes of carbon.

There are actually two types of offset markets: *compliance* and *voluntary*. Compliance markets trade in offsets for legally mandated emissions reductions. The Clean Development Mechanism established under the Kyoto Protocol and the European Emissions Trading System are two examples of compliance markets. Compliance markets have been and are being developed at national and sub-national levels, in jurisdictions such as Australia and New Zealand, the U.S. state of California, and the Canadian state of Alberta, among others.

Voluntary markets, on the other hand, trade in offsets for individuals or companies who *want* to purchase credits to offset their emissions, but they are (as the name suggests) voluntarily doing so, whether out of personal conviction or to promote an environmentally responsible image. The voluntary carbon market is a fraction of the size of the compliance market.² To date, soil carbon offset credits are primarily sold on the voluntary market.³

The basic idea of a soil carbon offset is that if the carbon that can be sequestered in soils can be measured and valued, it can then be traded. Soil carbon offset credits are created based on the increase in carbon sequestered through a change in farming practices. Farmers would adapt their agricultural practices to maximize the amount of carbon stored, such as incorporating compost and manures into their fields or reducing tillage; technical experts would then calculate how much carbon they were storing per hectare, and sell that credit on the carbon market.

EMISSION REDUCTION VS. SEQUESTRATION The bulk of the credits on both voluntary and compliance carbon markets result from emissions reduction or prevention, rather than sequestration, for good reason: emission reductions or

prevention have significantly more *environmental integrity* than sequestration, and therefore more value. Trees and soil sequester carbon that *has already been emitted*, thus not contributing to the urgent real reductions needed in greenhouse gas emissions. Moreover, the carbon sequestered is only temporary—it may be taken out of the air for a while, but through natural processes it will eventually cycle back into it. Exactly how quickly this happens depends on the soil's biological, geological and chemical properties, and other environmental conditions, which can vary considerably. The only truly effective way of reducing emissions is to actually reduce or prevent emissions, so that they never even reach the atmosphere.

THE SCIENCE AND ECONOMICS OF SOIL CARBON VALUE

Voluntary credits from soil carbon are valued at a fraction of the value of voluntary credits from avoided emissions—often by an order of magnitude. For example, the average price in 2010 of solar energy credits was \$33.80/ton, while agricultural soil credits were trading at \$1.20/ton.⁴ Four characteristics keep soil carbon offsets from being valued as highly by the market as offsets created through emissions reduction or prevention:

- First, measurement is difficult and uncertain. Carbon credits, as a commodity bought and sold in a financial market, gain their monetary value from the underlying asset: the amount of carbon that is either not released into the atmosphere to begin with (avoided emissions), or is later taken out of the atmosphere (sequestered emissions). This valuation is easier with avoided emissions because the amount of carbon avoided is easily quantifiable. With soil carbon sequestration however, measurement is costly over large areas and landscape-scale estimation methods are extremely imprecise. Carbon can easily react with oxygen and re-enter the atmosphere at any time; different soil types in different climates will store varying amounts; particularly rainy or dry seasons will change the rate of carbon storage. An accurate accounting of soil carbon for the purposes of creating a standard commodity requires direct measurement, which most soil carbon projects and methodologies seek to avoid.
- Second, there is the issue of *non-permanence*. For a credit to have value for an investor, it must have value over the time the investor owns the commodity. Therefore, because carbon captured in soil/trees is only temporary, it is worth much less than permanent emission reductions; the non-permanence also undermines the environmental integrity of the practices.

- Third, questions still remain as to exactly how much carbon soils can store on a yearly basis—important for investors and project participants who want to see an immediate return on their effort. Many policy analyses assume that at least one ton per hectare per year can be sequestered on a steady, long-term basis; however, this figure is contradicted by even a cursory analysis of the scientific literature. In a 2004 review, soil carbon sequestration expert Professor Rattan Lal of Ohio State University concluded that “observed rates of SOC [soil organic carbon] sequestration in agricultural and restored ecosystems depend on soil texture, profile characteristics, and climate, and range from 0 to 150 kg carbon per hectare per year in dry and warm regions, and 100 to 1000 kg carbon per hectare per year in humid and cool climates.”⁵

- Finally, soil carbon projects naturally have diminishing returns over time: Soils eventually become saturated and cannot absorb any more carbon.

Professor Lal's research indicates, then, that the “one ton assumption” applies only in humid, cool climates—even then, as the highest estimation. Given that most current soil carbon sequestration projects are taking place in warmer, drier climates of developing countries, the estimation is grossly optimistic.

Despite these characteristics that make soil carbon a less-than-desirable type of carbon credit, there are a number of players interested in developing its potential, including the World Bank and the U.N. Food and Agriculture Organization (FAO). Both of these institutions are attracted by the possibility that a market for soil carbon offsets could mobilize needed investment in developing country agriculture. They have defined a concept called “climate-smart agriculture,” which includes practices that sequester carbon in soils, and are investing significant resources to promote climate-smart agriculture and link it to developing soil carbon markets.

2. Manufacturing a carbon commodity: the path to creating marketable soil carbon

“Africa's new asset—carbon.” – African Development Bank, 2012

The steps needed to create soil carbon as a commodity are many. The first challenge for sellers is to develop a commodity that investors want to buy. The final challenge is creating demand for the commodity, an issue we address in much more

detail in the final section of this report. The path from soil to market includes the following steps, roughly in the order outlined:

- Find a project site.
- Develop the project methodology and determine what practices will be used to put more carbon into the soil and what methods will be used to measure and verify the incremental carbon? Other elements of a methodology include proving additionality: the fact that without carbon finance, the project would not have happened otherwise.
- Have the methodology validated. Validators subject methodologies to technical review to determine that the methodology used will actually accomplish the carbon sequestration claimed.
- Carry out the project.
- Once carbon is sequestered, a separate third-party entity (which could be the methodology validator, inserting into the process an interesting potential for conflict of interest) verifies that the stated amount of carbon has actually been sequestered.
- Once the credits have been verified, they can be sold on the market, assuming that buyers exist.

The steps for the voluntary market are roughly the same as those for the compliance market. This is at least partly due to the fact that many developers would prefer to sell their credits in compliance markets, such as the CDM, as prices have generally been higher there, and they develop credits that could some day be sold on those markets if rules change.⁶ They name their credits “pre-compliance” grade, and both forest and soil carbon credits might be marketed this way.

Who are some of the main players involved in creating soil carbon as a commodity?

Project developers

In simple terms, project developers design projects. In the case of soil carbon projects, they must identify farmers and the potential practices that will lead to soil carbon sequestration. Because of small parcel size and the large number of farmers that need to be aggregated to produce the volume of carbon credits that is attractive to investors, project developers will also play the role of aggregator. They may provide extension services to farmers to ensure that the practices that

lead to soil carbon sequestration are adopted. In some cases the project developer may also be the entity that develops the methodology.

Examples of project developers with soil carbon sequestration projects include:

The **Swedish Cooperative Centre (SCC)** and its subsidiary **Vi Agroforestry**. They are currently implementing the Kenya Agricultural Carbon Project with the World Bank.

CARE International, A humanitarian organization active in 87 countries. CARE runs several community-level projects in soil carbon sequestration.⁷ CARE and the Climate Change, Agriculture and Food Security (CCAFS) program of the Consultative Group on International Agricultural Research (CGIAR) have launched a long-term project with funding support from the Rockefeller Foundation: Making carbon finance for sustainable agriculture work for poor people in western Kenya.⁸

The **Environmental Defense Fund (EDF)** is a U.S.-based NGO with a long history of promoting market mechanisms to reduce pollution⁹ (the organization was one of the pioneers of cap-and-trade in the U.S. for addressing pollution from power plants). In keeping with their principles, EDF is helping create soil carbon offset markets. They are engaged in several pilot projects in California to test-drive measurement and operational feasibility, and are synthesizing “the scientific information and generating economic information necessary to determine if sequestration and GHG emission reduction projects in forestry, agriculture and ranching make financial sense.”¹⁰ They have also started collaborating in agriculture mitigation projects with a soil carbon component in countries such as India.

Technical contributors.

Behind the on-the-ground project is a significant amount of technical investment, leading critics to argue that most of the money earned from carbon finance goes to international consultants, rather than farmers on the ground.

As noted above, the development of methodologies is an essential early step in the making of carbon credits. Methods for direct measurement or models to estimate sequestration based on input parameters must be developed. Technical experts are being contracted to explore the possibilities of using remote sensing and other sophisticated means of measuring carbon flows over large areas in order to reduce unit costs and make projects of a size that will attract investors. Currently there is also significant investment in consultants, such as PricewaterhouseCoopers¹¹ to help create more

simplified methodologies, data collection, and estimations for sequestered carbon whilst still creating a carbon commodity that will interest investors.

A representative sample of the international technical consultants—from methodology developers (Nicholas Institute, PricewaterhouseCoopers, Unique Forestry Consultants), to market players (TerraGlobal Capital), to policy consultants (Climate Focus, EcoAgriculture Partners, IFPRI)—who have been retained by the World Bank, the Rockefeller Foundation, DFID, and other funders include:

NICHOLAS INSTITUTE OF DUKE UNIVERSITY The Nicholas Institute for Environmental Policy Solutions has as its mission “to help decision makers create timely, effective, and economically practical solutions to the world’s critical environmental challenges.”¹² The institute coordinates the Technical Working Group on Agricultural Greenhouse Gases (T-AGG), in operation since 2009 to “assemble the scientific and analytical foundation to support the implementation of high-quality agricultural greenhouse gas mitigation activities” in the United States.¹³

The T-AGG has recently taken on a project sponsored by the Packard Foundation, CCAFS, and the FAO related to soil carbon sequestration in developing countries to quantify agricultural greenhouse gases in developing countries “to support the development of simple, low-cost methods for the quantification of agricultural greenhouse gas emissions and removals at national and project scales to support enhanced management for mitigation and track performance for national planning, international financing, voluntary markets, regulatory markets, and supply chain initiatives.”¹⁴

PRICEWATERHOUSECOOPERS (PWC) PricewaterhouseCoopers is one of the world’s largest professional services firms. Based out of the UK and U.S., they help carbon asset developers develop transaction strategies, implement their ideas and manage risks (and of course maximize value). At the UNFCCC Seventeenth Conference of Parties (COP17) in Durban, South African, PwC distributed—along with the Rockefeller Foundation—a publication entitled “Making climate finance work for smallholder farmers in Sub-Saharan Africa.”¹⁵ The publication was part of the Climate-Smart Agriculture (CSA) in Sub-Saharan Africa Project, led by PwC with support from the Rockefeller Foundation. The project aims to support smallholder farmers in accessing climate finance through development of CSA accounting frameworks for mitigation and adaptation benefits; MRV and data management solutions; and fund disbursement mechanisms for CSA. “The project is also supporting the development of a new (activity-based) carbon methodology for climate-smart agriculture and an associated data management system.”¹⁶

UNIQUE FORESTRY CONSULTANTS Unique Forestry and Land-Use is a forest management land-use and timber sector-specific advisory company based out of Freiburg, Germany, with offices in Paraguay and Ghana. They refer to themselves as “climate pioneers”¹⁷ and have supported over 50 projects, some of which were the “firsts in the land-use carbon sector ... including supporting the first soil carbon methodology under the VCS and the first soil carbon transaction of the World Bank BioCarbon Fund, i.e., the Kenya Agricultural Carbon Project.” Unique Forestry offers carbon finance project development, climate audits, carbon accounting methodology development, and MRV of GHG emission reduction projects and NAMAs, among other things.

Unique Forestry Consultants, with EcoAgriculture Partners and others, was one of the organizations contracted by the Rockefeller Foundation to conduct a feasibility assessment and offer design recommendations for an African Agricultural Carbon Facility. In 2010 the project was launched, but the facility seems to have disappeared from public view since that time.

In 2008, they conducted a pre-feasibility study for the World Bank on an African Agricultural Climate Exchange (modeled on the now-defunct Chicago Climate Exchange). The World Bank contracted with Unique Forestry Consultants to get the Vi Agroforestry project in Western Kenya off the ground, “coaching project developers to develop and implement the project; methodology and Project Design Document development; and supporting project validation against voluntary carbon standards.”¹⁸

One of its current projects for the World Bank is to assist in developing capacity in the Kenyan government:

...in particular the Ministry of Agriculture, to prepare and implement priority measures aimed towards achieving readiness for climate-smart agriculture. ... UNIQUE was contracted to implement this pioneering project with a focus on three pillars that have been identified to be essential for a climate smart agricultural readiness process: strengthening the Government institutional and implementation framework to spur climate-smart agricultural development; identifying and supporting early action climate-smart investments at scale; [and] developing climate performance and benefit measurement systems that are well integrated and strengthen existing agricultural monitoring and evaluation system.¹⁹

TERRA GLOBAL CAPITAL AND TERRA GLOBAL INVESTMENT MANAGEMENT²⁰ Terra Global Capital provides organizations strategic advice on environmental markets. They “facilitate

the market for land use carbon... by providing technical expertise for the measurement and monetization of land use carbon credits and carbon finance.” In their own words,

...by combining remote sensing based measurement methodologies with carbon finance we aim to lower costs and increase accuracy for carbon from afforestation, reforestation agro-forestry, changes in agricultural practices, and avoided deforestation projects globally. By providing this expertise we can bring feasibility to many valuable projects, particularly those in areas of rural poverty.

Combining our experience in the carbon markets with financial services expertise puts Terra Global Capital in a unique position to manage private environmental funds.²¹

The “private” Terra Bella Carbon Fund has recently received \$40 million of capital investment from the public U.S. Overseas Private Investment Corporation, “the U.S. Government’s premier development finance institution.” OPIC also recently provided Terra Global with \$900,000 in political risk insurance for a REDD project in Cambodia.²² This transfer of resources from the public to the private sector is sometimes termed “leveraging.”

Leslie Durschinger, Founder and Managing Director of Terra Global Capital, said, “Given the long-term nature of our investment, we believe it is prudent to reduce our exposure to future changes in national and local governments and laws by executing this insurance policy.” Durschinger also stated that the value of having political risk insurance as a mechanism to reduce investors’ risk cannot be overstated in this emerging sector, as the political risk insurance will help to improve the investment profile for private capital investments in REDD projects.²³

CLIMATE FOCUS Another “carbon market pioneer,” Climate Focus is an advisory company involved in international and national climate law, policies, project design and finance. They have authored numerous reports on the carbon market and climate finance for agriculture in developing countries. With EcoAgriculture Partners and Unique Forestry Consultants, as well as Forest Trends and the Katoomba Group, they worked together with funding from the Rockefeller Foundation to develop an African Agriculture Climate Finance Facility.

One of the most recent reports by Climate Focus was done for the CGIAR/CCAFS program, entitled “Towards policies for climate change mitigation: incentives and benefits for smallholder farmers.” An interesting shift seems to be taking place

among many of the early cheerleaders for agricultural carbon markets, including Climate Focus, who have this to say in their recent report:

Accurately measuring carbon stock changes may be costly, in particular in agricultural systems. In addition, the carbon benefit at the farm level for smallholders may not justify the transaction costs related to carbon measurement and accounting. Barriers to carbon transactions in the agricultural sector in developing countries include:

- low GHG mitigation and removal potential at the farm level, and the need for aggregation at the landscape level;
- the expense, complexity and uncertainty of establishing new market infrastructure;
- the fear that carbon markets would expose countries and farmers to excessive delays, lack of liquidity, transaction costs and downside risks or detract from policies that promote more efficient agricultural practices;
- limited focus on productivity and smallholder benefits by current carbon standards;
- lack of protocols for MRV and high costs of establishing baseline emissions; and
- high initial risks and low initial returns, given early project costs and slow accumulation of carbon over years or decades.

ECOAGRICULTURE PARTNERS EcoAgriculture Partners have a long-standing engagement with the soil carbon market, providing policy guidance and intellectual support to the development of the carbon market, in particular in an advisory role to the World Bank. They have produced numerous publications about soil carbon sequestration since 2008, frequently authoring policy documents with or for the World Bank, the GEF, UNDP, and other funding institutions. For example, some of their work over the last several years includes:

- One of the main sponsors of the Investment Forum on Mobilizing Private Investment in Trees and Landscape Restoration, along with the World Bank and the World Agroforestry Centre
- One of the organizations contracted by the Rockefeller Foundation to conduct a feasibility assessment and offer design recommendations for an African Agricultural Carbon Facility

- Author of briefs published by TerrAfrica,²⁴ on sustainable land management and carbon sequestration, supported by the World Bank

EcoAgriculture Partners are advocates of landscape-scale accounting methods described in the final section of this report.

Like a number of organizations that have been staunch proponents of soil carbon markets (see also the comments under Climate Focus), EcoAgriculture Partners have become a bit more circumspect about the potential for a soil carbon market. For example, in a recent policy paper on climate and agriculture finance, they note that:

Meanwhile, given the current low price of carbon, costs of project implementation and the length of time required for credit development, carbon revenues are far less than the full costs of the project. (describing a CARE-supported agricultural carbon project in Western Kenya) This kind of project requires more appropriate financial mechanisms ...²⁵

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE (IFPRI) IFPRI is one of the member institutions of the Consultative Group on International Agricultural Research (CGIAR). It has provided policy and economic analysis to underpin the claims of carbon market proponents of substantial potential for earnings from carbon sequestration, although it must be pointed out that these analyses look almost exclusively at supply rather than demand. IFPRI authors have reached the rather fantastic conclusion that “linking smallholder farmers to voluntary carbon markets—though fraught with difficulties—can have a large monetary payoff (estimated at up to \$4.8 billion USD per year for SSA as a whole) if implemented successfully.”²⁶

The authors base their calculations on an estimate of 265 million metric tons of sequestration resulting *annually* from implementing changes in cropland management, grazing land management, restoration of organic soils, restoration of degraded land, and other practices *on over a billion hectares* across the continent (based on theoretical calculations of sequestration potential by Smith et al. 2008).²⁷ Simple math shows the IFPRI economists are using *a carbon price of \$18/tonne*. They are also assuming, clearly, that the voluntary markets would spend \$4.8 billion annually on soil carbon credits in sub-Saharan Africa alone. The value of the entire voluntary market in 2009 was \$387 million.

Institutional drivers

CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY (CCAFS) PROGRAM OF THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURE RESEARCH (CGIAR) AND THE WORLD AGROFORESTRY CENTRE (ICRAF) The CCAFS program is a product of reorganization within the CGIAR centers and was created at the end of 2010. It consolidates and expands the work of the CG system on climate change and agriculture, principally started by the World Agroforestry Center (formerly known as ICRAF).

Since at least 2008, the World Agroforestry Center, principally through its then-Director General Dennis Garrity, has sought to use the carbon market to mobilize resources for agriculture. One target of advocacy of ICRAF is to fund an “evergreen” revolution in Africa through combining conservation agriculture and nitrogen-fixing trees such as *Faidherbia* in agricultural systems in southern Africa.²⁸ Another early ICRAF analysis looked at the potential for carbon finance in rangelands.²⁹ As part of this work, with funding from the Rockefeller Foundation and the Government of Norway, ICRAF provided technical support for the creation of the African Biocarbon Initiative, launched in 2008 at COP14 in Poznan, Poland.

The CCAFS has taken the foundational work of ICRAF and expanded and multiplied it. One of the four themes of the CCAFS work for its first five-year program is “Pro-poor climate change mitigation.” According to CCAFS,

If the poor are to contribute to climate change mitigation,³⁰ there is a need for mitigation options that have a positive impact on livelihoods, otherwise unacceptable trade-offs may occur. Carbon markets are unlikely to provide significant benefits to smallholder farmers in the near run and are highly uncertain, but livelihood options that produce mitigation co-benefits and carbon finance schemes that provide additional incentives should help farmers to meet both livelihood and environmental objectives.³¹

Despite this seemingly sanguine assessment of carbon market benefits for smallholder farmers, the CCAFS program is a continuing advocate of policies for soil carbon commodification at the UNFCCC. One of the most recent CCAFS initiatives, along with the FAO, is to build capacity in national ministries to develop Nationally Appropriate Mitigation Action (NAMA) plans in agriculture sectors, including developing capacity to measure and monitor sequestered carbon.

THE U.N. FOOD AND AGRICULTURE ORGANIZATION (FAO) The FAO was another early driver of the agricultural soil carbon market, involved at least since 2008. In early 2009,

FAO released a policy brief for the UNFCCC negotiations laying out several essential international policy elements necessary for such a market, including:

(i) Expand the scope of the Clean Development Mechanism (CDM) so that the potential sequestration of soil and above ground carbon in agriculture (89% of the technical potential of mitigation from agriculture) can be tapped. AFOLU activities could include: reducing emissions from deforestation and forest degradation (REDD); sustainable forest management; restoration of wetlands; sustainable cropland and grassland management and other sustainable land use. Temporary/long-term certified emission reductions (ICER and tCER) units for land use credits (Afforestation/Reforestation) are not accepted on the market for various reasons. A fully fungible unit could be created by adopting a buffer approach to ensure permanence.

(ii) Establish new financing mechanisms with broader, more flexible approaches, integrating different funding sources and innovative payment/incentive/delivery schemes to reach producers, including smallholders. A phased approach using aggregating modalities for greater cost-effectiveness, front-loaded payments guaranteed by insurance or performance bonds, simplified rules and recognition of community/individual, formal/informal property rights are some design elements that would seem to hold promise in this regard.³²

In 2010, the FAO, along with other Rome-based agencies and the World Bank, coined the term “climate-smart agriculture.” For FAO, climate-smart agriculture is “agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals.”³³ In this broad definition, climate-smart agriculture (CSA) includes something for everyone. It is thus important to consider how the various actors use the term in practice. In the World Bank’s usage of the term, climate-smart agriculture is first and foremost about mitigation and the financing link with carbon markets, evidenced by the title of a recently released brief by the International Finance Corporation: *More Than Just Hot Air: Carbon Market Access and Climate-Smart Agriculture for Smallholder Farmers*.³⁴ Adaptation and sustainable food production are clearly co-benefits.

THE WORLD BANK The World Bank is the leading driver of the initiative to quantify and commodify the carbon in agricultural soils. We discuss the World Bank and its role in development of the carbon market generally, and specifically with respect to agricultural carbon, in detail in sections 3 and 4.

Funders

The UK **DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (DFID)** has been a key funder of policy development for the soil carbon market for a number of years. In 2010, they contracted with Climate Focus, Unique Forestry Consultants, and the International Institute for Applied Systems Analysis to undertake a large study on “*how climate finance for the agriculture sector can incentivize climate mitigation and food security in the developing world*.”³⁵ The final study, entitled “Carbon market and climate finance for agriculture in developing countries,” was published by Climate Focus in April 2011.³⁶

Most recently, DFID, along with the Government of Norway and the European Union, has substantially funded³⁷ a 5-year program on climate change adaptation and mitigation of COMESA (Common Market of Eastern and Southern Africa), SADC (Southern African Development Community) and the EAC (East African Community). According to the DFID business plan for the project, “policy advocacy will develop the ‘African Climate Solution’ [based on conservation agriculture] to attract climate change mitigation and adaptation funds to effective programs on the ground.” DFID predicts that the African Climate Solution will mobilize \$300 million in climate finance by 2015.³⁸

According to the parallel COMESA plan document, one of the specific objectives of the program is “to apply mitigation solutions in the COMESA-EAC-SADC region with carbon trading benefits.”³⁹

THE ROCKEFELLER FOUNDATION was established by John D. Rockefeller in 1913 to “promote the well-being of humanity around the world.”⁴⁰ Among their many ongoing initiatives, the Rockefeller Foundation has been behind the scenes funding Climate-Smart Agriculture initiatives over the past several years.

In August 2010 they granted Forest Trends Association \$600,000 to launch the African Agricultural Climate Finance Facility (AACFF) in two countries. The AACFF was to build capacity in African financial institutions so that small-shareholder farmers can access carbon finance, and “identify and screen agricultural climate finance opportunities and projects that sequester carbon, reduce emissions and support adaptation of agricultural production.”⁴¹ Forest Trends (through the Katoomba Group, a subset of their organization) collaborated with Climate Focus, Unique Forestry Consultants, and the Nature Conservation Research Center in Ghana to launch a Climate-Smart Agriculture Finance Facility (CAFF) in Ghana and Ethiopia.

The foundation committed a total of \$1.5 million in grants to Climate-Smart Agriculture initiatives in November 2010.

In August 2011, the foundation gave \$402,011 to the Food Agriculture and Natural Resources Policy Analysis Network (FANRPAN) in support of a project to build advocacy capacity for climate-smart agriculture. This project entailed producing policy papers, training practitioners with “advocacy messages,” and training journalists on climate change and agriculture issues, and participating in policy dialogues and climate change negotiations.⁴²

The foundation provides funding to the CGIAR/CCAFS program. It is also supporting the long-term collaboration between CCAFS and CARE International on “Making carbon finance for sustainable agriculture work for poor people in Western Kenya.”

THE SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY (SIDA) provided over \$1 million USD in pre-financing for the Kenya Agricultural Carbon Project, without which it is unlikely the project would have gone ahead.

3. Manufacturing a market: The World Bank’s role in creating the soil carbon market

From the beginning, the World Bank has been on the leading edge of the carbon market, starting its Prototype Carbon Fund in 1999, before rules for the CDM had even been agreed in Marrakech (2001) and years before the Kyoto Protocol would come into force (2005). Indeed, James Wolfensohn, as president of the World Bank, proposed a Global Carbon Initiative to the General Assembly in 1997, before the ink was even dry on the emissions trading article in the Kyoto Protocol.⁴³

The World Bank’s stated objectives regarding its involvement in the market are to support market development and to focus on the development and pro-poor orientation of carbon finance: “Our mission is to catalyze a global carbon market that supports sustainable development, reduces transaction costs, and reaches and benefits the poorest communities of the developing world.”

Michelowa and Michelowa examine these objectives with regard to actual World Bank investment strategies and find that other objectives such as the generation of new markets and the fortification of the Bank’s own commercial interest in the market better explain the patterns of projects and investments undertaken.⁴⁴

The World Bank has played a number of roles in the development of the carbon market: project developer and facilitator as well as carbon broker and trader. According to Michelowa and Michelowa, “the World Bank does not only provide its services as a manager of climate funds or as a promoter of

new market mechanisms and activities through these funds. It also directly acts as a project developer, broker and consultant for both the supply and the demand side of the market.”⁴⁵

After the negotiation of the Kyoto Protocol and prior to its entry into force, the World Bank quickly positioned itself to play a role in project development under the Clean Development Mechanism (CDM). It solidified its central role as organizer and enabler of the carbon market when it created a set of credit-return investment funds, where firms and sovereign governments could invest capital and the return on investment would be provided in carbon credits. The Bank would use the invested capital to fund projects. As noted above, the first fund, the Prototype Carbon Fund was created in 1999, prior even to the development of structure and rules for the CDM.

In a market that believers think will grow to trillions of dollars in the coming decades, the creation and further development of carbon as a commodity is essential. The Bank recognized that it could help with development of new sources of carbon, such as biological carbon. In 2004, it set up the BioCarbon Fund as one of the credit-return funds, specializing principally in tree carbon. The second tranche of the fund would see the first project in agricultural soil carbon, the Kenya Agricultural Carbon Project.

Box 2: The World Bank’s BioCarbon Fund and the Kenya Agricultural Carbon Project.

The Kenya Agricultural Carbon Project is the first agricultural soil carbon sequestration project to be funded by the World Bank’s BioCarbon Fund. The pilot project provides farmers with technical assistance, helping them adopt sustainable agricultural land management practices (SALM) such as cover cropping, mulches, crop rotations, compost management, agroforestry, use of organic fertilisers, and residue management (World Bank Carbon Finance Unit, no date).

The project developer and implementer is the Swedish NGO Swedish Cooperative Centre – Vi Agroforestry Programme, “a development cooperation organization that works with support to farmers in the Lake Victoria Basin in Eastern Africa.” (SCC-Vi Agroforestry, <http://www.sccportal.org/Vi-Agroforestry-Programme.aspx>.) Vi Agroforestry is the technical advisors helping farmers adopt SALM practices. In terms of carbon credits, Vi Agroforestry will gather the baseline data needed for the carbon credits, will likely do all of the monitoring, will serve as the aggregator of the 15,000 farmers on the project, and will also be the intermediary body selling the carbon credits back to the BioCarbon Fund. The BioCarbon Fund is funding them to develop a verifiable method of measuring soil carbon, as well as Vi’s technical support and monitoring costs.

In developing and promoting this first project, the World Bank has again played a central facilitative role in the development of agricultural soil carbon as a commodity. The Bank approached Vi Agroforestry in 2007 through the consultancy Unique Forestry Consultants, asking if they were interested in developing a carbon finance project. Unique Forestry Consultants wrote the original Project Idea Note in 2007, which was eventually approved by the BioCarbon Fund.

The World Bank continues to invest heavily from its own budget to make the Kenyan Agricultural Carbon project seem like a success. In 2011, the World Bank commissioned two projects (*Readiness mechanisms* and *Readiness support*, see below) with outside consultants to build capacity and institutional infrastructure in the Kenyan government to manage soil carbon investments (one project will be carried out by Unique Forestry Consultants in 2012–2013).⁴⁶ These projects are being funded directly from the Bank budget, in a budget line called “Readiness mechanisms for climate-smart agriculture.” Note the emphasis in both project descriptions on development of guidelines for monitoring, reporting and verification (MRV)—essential for trading soil carbon on the market.

READINESS MECHANISMS The consultancy would build on the Kenya Agricultural Carbon Project, which is a pioneering project implemented by the NGO SCC-Vi Agroforestry supported by the Government of Kenya and the World Bank aimed at sequestering carbon and transact verified voluntary carbon credits generated from the adoption of sustainable land management (SALM) practices. To scale the experiences and to reach meaningful impacts on agricultural productivity, climate change mitigation and adaptation, climate-financing mechanisms have to be scaled-up, aligned with national development objectives, and integrated into public and private agricultural financing mechanisms. This consultancy would lead to: (i) sectoral and institutional readiness mechanisms for climate-smart agriculture; (ii) measuring, reporting, and verification guidelines for agricultural land management; (iii) economic assessment of financial attractiveness of climate-smart agriculture.⁴⁷

READINESS SUPPORT The overall objective of this assignment is to design and implement a readiness process aimed at facilitating the widespread implementation of climate-smart agricultural programs in Kenya. This process will include: (i) support for the development of an institutional and implementation framework within existing structures to facilitate climate-smart agricultural development; (ii) development of MRV systems for performance and benefit monitoring of adaptation and mitigation actions at national level in the

agricultural sector; (iii) identification of financing needs and instruments leading to scaling-up of climate-smart agriculture investments.

This process also aims at strengthening coordination and implementation capacity for climate-smart agriculture across relevant departments within the Ministry of Agriculture at national and local government level. In particular, the consultants will closely work with and strengthen the coordinating role of the Climate Change Unit of the Ministry of Agriculture.

The assignment should strongly contribute and be fully integrated into efforts of AU/NEPADs Comprehensive Africa Agriculture Development Program (CAADP) to operationalize the AUC-NEPAD Agriculture Climate Change Adaptation-Mitigation Framework at country level. The AU/CAADP aims at translating this framework into scaling-up of climate-smart agricultural programs and activities in African countries, such as Kenya. As part of this process it was recommended to develop an Africa Union Climate-Smart Agriculture Investment Program (AU-CSAIP). This will provide assistance and financial resources to Africa’s Regional Economic Communities (RECs) and countries to plan, implement, and monitor climate-smart investment programs leading to improved productivity and food security by explicitly addressing the challenge of climate variability and change. The Program also aims at mobilizing additional finance for climate-smart investments and at enabling countries to benefit from climate finance, such as the Green Climate Fund. The AU-CSAIP will define the African investment needs for the transformation of the agriculture sector to meet growing demand for food in a changing climate by building synergies and manage trade-offs across multiple objectives of food security, climate change adaptation and mitigation. This assignment needs to be fully integrated into these processes.⁴⁸

Manufacturing consensus: The World Bank’s push toward Durban and beyond

The World Bank has also played a central role in attempting to create a “consensus” on the need to involve agriculture more directly in the climate regime under the UNFCCC. One central motivation for this move is clearly an end goal of opening the CDM to agricultural carbon projects. To bring soil carbon into the compliance market, and develop the necessary common and standardized metrics for MRV of agriculture soil carbon for compliance-grade credits, the Bank and allies want a work program on both adaptation and mitigation in agriculture under the UNFCCC Subsidiary Body on Scientific and Technological Advice (SBSTA).⁴⁹

To generate international interest in “climate-smart agriculture,” the World Bank, the U.N. Food and Agriculture Organization and, the Dutch government, among others, teamed up to create the first Global Conference on Agriculture, Food Security and Climate Change. Held in The Hague in the fall of 2010, a stated intent of the conference was to influence the UNFCCC negotiations in Cancún that December. Among the conclusions of the meeting was the need to scale up programs to access voluntary and compliance markets, particularly for sequestered soil carbon. The roadmap developed as an outcome of the meeting was long and unfocused and ultimately of little use in political terms.

In 2011, the World Bank—apparently learning from this experience—funded a series of events designed to have more focused outcomes. The common theme of all the outcomes of these events was a call for a SBSTA work program on agriculture. Such a work program could potentially facilitate their goal of the acceptance of sequestered soil carbon in CDM methodologies and voluntary markets.

In September of 2011, the World Bank sponsored a meeting of African agriculture ministers. Despite the fact that only 9 of the continent’s 54 agriculture ministers or deputy ministers actually attended, and only 23 African countries sent any representative at all, the Bank and other political players (including the US government’s agriculture negotiator) heavily reference the Johannesburg Communiqué resulting from this meeting. They call particular attention to paragraph 6, “Call upon the COP17/CMP7 to establish an agriculture Programme of Work that covers adaptation and mitigation.”⁵⁰

The World Bank was a behind-the-scenes sponsor of a scientific conference on climate-smart agriculture held a month later in Wageningen, Netherlands. The final statement resulting from the conference, drafted by the conference organizers rather than the conference participants, contained a similar paragraph:

We call upon the COP17/CMP 7 in Durban, South Africa to adopt a decision to establish a Subsidiary Body for Scientific and Technological Advice Programme of Work on the scientific, technical and socio-economic aspects of agricultural adaptation and mitigation as a first step to mainstreaming agriculture in international climate change policy. This Programme of Work should address the challenges of food security, climate adaptation and mitigation in an integrated fashion.⁵¹

In November, through its ally the International Food Policy Research Institute (IFPRI), the World Bank sponsored a meeting of 19 “leading scientists in the BRICS countries,

Indonesia and the United States.” In its concluding statement, the “leading” scientists recommend that: “the UNFCCC delegates in Durban establish a work program on agriculture.”⁵²

The lead IFPRI organizer for this conference, Gerald Nelson, was subsequently named as lead author for a report on food security and climate change to be written for the Food and Agriculture Organization’s High-level Panel of Experts of the Committee on World Food Security. Again the final conclusions of the report reflect the work program mantra:

A work program of the UNFCCC Subsidiary Body for Scientific and Technological Advice that more clearly identifies the pros and cons of various adaptation and mitigation measures and possible synergies with food security could provide a forum both for organizing existing research and motivating new research of relevance to the negotiations. We recommend it be implemented.⁵³

The icing on the Durban roadmap cake came with the publication in December 2011 of the preliminary findings of the Commission on Sustainable Agriculture and Climate Change, a project of the CGIAR and funded through the Global Donor Platform, of which the World Bank is a steering committee member. There the call for a work program gets top billing, in recommendation number 1:

Establish a work program on mitigation and adaptation in agriculture in accordance with the principles and provisions of the United Nations Framework Convention on Climate Change (UNFCCC), based on Article 2, as a first step to inclusion of agriculture in the mainstream of international climate change policy.⁵⁴

4. Where to next for the agricultural carbon market?

“We’re on a road to nowhere.”—The Talking Heads

In fact, a work program was not initiated in Durban, but instead SBSTA was directed to engage in an “exchange of views” on agriculture issues.⁵⁵ In this final section, we examine reasons why the World Bank and its allies might have been so keen to establish a work program and contemplate their unwavering faith in a future market, the rules of which have not yet been decided, to deliver billions annually from the sale of soil carbon. This faith is leading key funders to continue to invest mostly public resources (likely including significant amounts of fast-start financing) in the development of new methodologies and in the creation of capacity in developing countries for monitoring, reporting and verification of ephemeral carbon. Needless to say consultants

continue to make significant amounts of money in this proof-of-concept phase. Yet in recent policy documents, some of the proponents' most trusted allies in the NGO/consultant world have flagged serious problems that need to be addressed, as we saw in earlier sections of this report, which we examine in more detail here.

Why were the key players so keen on a work program?

Currently, land-use carbon credits have little to no value. As mentioned earlier, their value in the voluntary markets is a fraction of the value of credits from avoided emissions. Soil carbon credits are not eligible to be sold either within the CDM or on the European ETS.

However, proponents clearly believe that decisions taken within the UNFCCC regime could increase both demand for and value of land-use credits. For example, if the CDM were opened up to land-use credits, demand might be generated for those credits.⁵⁶ However, such a vision does not seem to take into consideration a number of important variables that would affect both price and demand: the current situation of oversupply of CDM credits relative to demand,⁵⁷ the lack of legally binding targets for a post-2012 regime that are essential for creating demand, the impacts on oversupply and hence price that flooding the mechanism a substantial amount of land-use credits would have⁵⁸ and the continuing understanding that large numbers of temporary credits would undermine the environmental integrity of the mechanism.

Opening the CDM to land-use carbon has been a long-standing goal of both the World Bank and the U.N. Food and Agriculture Organization. Given the uncertain future of the Kyoto Protocol and the CDM—established as a mechanism under the protocol—and the desire to create additional market mechanisms that could involve more actors, soil carbon proponents are seeking more global sanctioning of methodologies, including those for monitoring, reporting and verification (MRV) of emissions in all countries of the UNFCCC. This sanctioning of methodologies is clearly the objective sought in a new SBSTA work program on agriculture, articulated as early as 2009 by the FAO (see previous section).

It is also very clear that the Bank and other soil carbon proponents continue to encourage developing countries to invest significant resources to mitigate their agricultural emissions and to develop frameworks for monitoring, reporting and verifying those emission reductions. They have done so by convincing countries that when they count their carbon, someone on the global market will be willing to compensate

them for it. Until now, the proponents have yet to deliver on their promises that compensation will quickly follow, but new mechanisms under the UNFCCC could yet allow them to do so.

A remarkable faith in a non-existent market

"Alice laughed. 'There's no use trying,' she said, 'one can't believe impossible things.' 'I daresay you haven't had much practice,' said the Queen. 'When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast.'" – Lewis Carroll, *Through the Looking-Glass*

While the World Bank and other players have been successful in laying out a roadmap to generate a supply of soil carbon credits, the other end of the market—the demand side—has yet to materialize.

The World Bank seems to recognize, at least in theory, that lack of effective demand for soil carbon credits is a problem. In March 2012, the Bank released their concept paper for the third tranche of the BioCarbon Fund.⁵⁹ It contains a wealth of cautious statements about the current lack of a carbon market:

- "Until there are clear regulatory signals that cap emissions, market demand for compliance grade land use carbon assets will remain uncertain." (para 3)
- "A carbon finance model is proposed ... which is especially relevant during the uncertain climate for future markets where there is no obvious outlet for carbon credits from the land use sector."⁶⁰ (para 19)
- "Risk allocation and risk mitigation ... will examine how the risks to all parties of developing a high-quality carbon asset be minimized in an uncertain regulatory environment;" (para 21, iv)
- "The structuring of financing should provide incentives for sustainability of ... financial flows, despite uncertainty in carbon markets and the market value of carbon assets from such landscape projects;" (para 21, iv)
- "The evolving regulatory environment and lack of market predictability means there is some uncertainty over carbon asset pricing causing inherent risk for both sellers and investors," (para 21, iv)
- "Given the lack of certainty in the carbon markets, and in particular for land-based activities," (para 23)

- “Given the uncertainties in the market and that there is no certain outlet in post-2012 markets for land-based credits,” (para 24)
- “Participants would have to accept certain risks, for example, that they are contributing to the purchase of carbon credits which may not be compliance-grade under future agreements.” (para 25)
- “Uncertain markets: There are no clear market signals for land use. The international compliance market is pending decisions of the UNFCCC process; the European compliance market bans land-use credits.” (para 32, ii)
- “Overall, carbon markets are fragile due to the uncertainty of the future of the Kyoto Protocol.” (World Bank Environment Strategy 2012-2022)

Their theoretical understanding about the substantial uncertainty surrounding markets for soil carbon and other land-use credits leads to interesting conclusions about what to do in practice “It is precisely because of this uncertainty that the World Bank will remain involved and bridge any [really, any?] time gap before the compliance market is on-track and there is an outlet for developing countries.” (para 32, ii)

Markets function when there is both supply and demand for a commodity. There is currently little demand for soil carbon on voluntary markets, and little indication that voluntary market demand will grow to generate the resources the World Bank and its allies have promised to developing countries. Compliance markets are closed to land-use carbon for an indefinite future—in the case of the EU at least until 2020 and in the case of the UNFCCC likely the same. Yet, the World Bank continues unwavering in its efforts to increase the supply of carbon credits and ignore the role of demand in a functioning market. Its new Environment Strategy for 2012–2022 is clear about this: “...the Bank will support building up the potential supply for a scaled-up future carbon market.”⁶¹

Apparently for the World Bank, a lack of demand is merely a “market imperfection” and should not deter its mission:

The WBG must further participate in the pioneering work to create innovative ways to use public finance to bridge the current period of uncertainty and to overcome market imperfections. This includes using public finance not only for the development of scaled-up carbon crediting schemes but also for initiating pilot purchases as an effective way of performance-based public spending, with the option of recycling public funds by selling generated assets in a future compliance market.⁶²

New methodologies, same problems

“The BioCF will continue developing new methodologies by pioneering activities in areas that have not yet been tested for land use but that have significant GHG mitigation potential.” –World Bank Environment Strategy 2012–2022

In its description of the next generation, or the third tranche, of the BioCarbon Fund, the World Bank describes its agenda for the agricultural and land-use carbon market:

The next phase of the BioCarbon Fund will ... expand to new strategic areas and focus on i) scaling up afforestation/reforestation and regeneration of degraded lands, ii) piloting areas not yet tested for agricultural land use which have significant greenhouse gas emissions potential, including methane emissions from rice paddies, grassland and pasturelands, and wetlands and coastal areas, and iii) exploring how new approaches such as “landscape accounting” can be put into practice.⁶³

For the Bank, the voluntary land use markets are testing ground for new methodologies, and the BioCarbon Fund should be developing and testing those methodologies.

As they indicate, the Bank is planning to support new methodology development for other sources of soil carbon or other agricultural carbon equivalents (methane and nitrous oxide emissions). Agricultural soil carbon seems to take a back seat in the next tranche to soil carbon from grassland and pasturelands and to other new methodologies, such as for methane emission reduction from rice paddies or wetlands. This move echoes a move by one of the main methodology developers in California’s cap-and-trade market, Climate Action Reserve (CAR), who in April 2012 abandoned an agricultural soil carbon methodology. Observers close to the process commented that the abandonment was likely due to an inability to fulfill a strict standard for additionality, as the practices that would be used, such as minimum tillage and conservation agriculture, were already being adopted on significant acreage across the United States.⁶⁴ CAR instead started work on a soil carbon methodology for “...grassland and pasturelands.”⁶⁵

Allies such as CCAFS and FAO are trying other strategies to get around the complexity and difficulties of monitoring, reporting and verification of soil carbon by thousands of smallholders in a single project, let alone the challenge of establishing baselines and collecting data on actual carbon sequestered.⁶⁶ One strategy is to develop simplified methodologies for carbon accounting, and, as noted earlier in the report, consultants PricewaterhouseCoopers and Duke University

scientists have been enlisted in this effort.⁶⁷ Measurement of carbon is avoided altogether by simply recording farmer practices and creating computer models to provide a somewhat plausible number for amount of carbon those practices might have sequestered.⁶⁸ This is currently how sequestered carbon is “measured” in the Kenya Agricultural Carbon Project.

Various actors, including the World Bank, are also pursuing the idea of whole landscape accounting, which would simplify carbon accounting on a grand scale and allow the integration of forest and land-use carbon projects in large-scale, sub-national accounting schemes, primarily through use of models and remote-sensing technologies. They have been encouraged in this effort by the recent decision in Durban to initiate a SBSTA work program to consider the feasibility of landscape accounting for land use, land-use change and forestry (LULUCF) accounting by developed country parties under the Kyoto Protocol.

What is the prognosis for these new methodologies and accounting approaches? Will they save the agricultural carbon market? They may certainly help to increase supply of credits—the clear goal of the Bank and allies. The central problem of the market is not supply, as we have already noted. The problem is lack of demand.

A few years ago, The Munden Project—derivative traders with a clear commitment to addressing climate change—wrote a hard-hitting analysis of the REDD design for forest carbon markets.⁶⁹ Many of the criticisms and recommendations are also relevant for the design of the agricultural carbon market. In particular, The Munden Project addressed head on the problem of asset uncertainty in land-use carbon, uncertainty that would ultimately generate unacceptable risks for, and rejection by, investors in the market. They had this to say about uncertainty and how actors in the market might act:

Uncertainty is a permanent feature of markets, but it has a deep impact on market participants’ behavior. If the accounting methods that generate the credits are uncertain, and if they are allowed to vary by territory, ... the market may produce three possible reactions. Each of them would be equally unproductive for REDD’s stated objectives:

1. This uncertainty will be considered a significant risk, and used as justification to significantly discount the price of carbon. That discounting diminishes the amount being invested in forests.
2. If the forest carbon market is large enough, participants will choose the most complex methodology and rig it in order to produce artificially

high numbers of credits. Given remote project locations and lack of external verifiability, this seems highly likely to succeed.

3. The easiest accounting method will be chosen, regardless of scientific accuracy, in a bid to reduce start-up costs. Once this is in place, regulators will come under tremendous pressure to maintain the status quo, in much the same way as financial regulatory authorities worried about credit-default swaps or subprime mortgage-backed securities did during the years before the financial crisis.

The Munden Project concludes a rather detailed analysis by saying that forest carbon, as currently constructed as an asset class suitable for trading and for achieving REDD goals, is unacceptable. Because of similarities to forest carbon in the design and production of agricultural carbon as commodity, their analysis is absolutely relevant to the development of agricultural carbon as an asset class, and the agricultural carbon market as a means to achieve goals similar to REDD. The analysis should be read and internalized by all the actors we have described here in this report, particularly those investing huge sums of public money, including fast-start finance, to create this commodity/market.

New ways of treating non-permanence using buffers, landscape accounting and simplified methodologies are all likely to flood markets with cheap, poorly validated credits. They will dilute or destroy whatever market value there might have been for agricultural soil carbon. But for institutions that myopically concentrate on generating supply rather than demand, these new approaches are not at all surprising.

Fiddling with soil carbon markets

“The [now defunct] Chicago Climate Exchange, one subset of the voluntary market, shows the possible benefits of trading the carbon sequestration from landscape-related activities. [...] The exchange shows that simplified rules and modern monitoring techniques can overcome technical barriers.” – World Bank Development Report 2010⁷⁰

The fact is, despite the continued optimism⁷¹ and millions of dollars of mostly public monies flowing towards creating soil carbon as a commodity, technical problems of measurement, aggregation and permanence remain and there is currently no functioning market. In an earlier section on players in the soil carbon market, we quoted recent policy analyses written by Climate Focus⁷² and EcoAgriculture Partners⁷³ that demonstrate growing doubts on the part of players involved for years in the promotion of a soil carbon market.

Both organizations provided less than rosy prognostications about the market for soil carbon, particularly with regard to benefits that smallholder farmers might obtain.

The BioCarbon Fund will continue to invest millions to keep the hope alive, extending it to an even broader framing of emission reductions from landscape accounting. Individual governments look set to do the same, from the UK \$60 million investment in the Africa Climate Solution to the \$900,000 investment by the US government in political risk insurance for TerraGlobal Capital's land-use carbon project. Consultants, from PricewaterhouseCoopers to Unique Forestry Consultants to Duke University researchers will continue to earn large salaries trying to solve the intractable problems of the soil carbon market.

Who pays the ultimate price here for a failed market and failed investments? Not the World Bank staff, nor the high-paid consultants, nor firms that can afford risk insurance against the possibility that a carbon price does not materialize. It will be the developing countries who have been told to invest resources into MRV systems now, and to expect revenues later to address the adaptation challenges that climate change will bring to their agriculture, who will ultimately pay a high price. Unfortunately this diversion of resources from adaptation towards counting carbon poses huge opportunity costs for governments who are facing imminent threats to agricultural production from climate change. It is a scandalous use of public money, of fast-start finance, and of limited developing country capacities in their agriculture sectors.

5. Conclusions

Soil carbon markets are being promoted as a way to generate resources for and reduce emissions from agriculture, particularly in developing countries. This framing is a political distraction. It is difficult not to conclude that all the attention being put on mitigation in Southern countries by Northern governments obscures the fact that per capita emissions in the North far exceed emissions from most Southern countries. In agriculture, the excessive use of fertilizers in the North contributes the bulk of global nitrous oxide emissions. High levels of emissions from animal agriculture, deriving both from industrial methods of animal production as well as overconsumption of meat products, also dwarf Southern emissions, particularly those of the small-scale farmers who are among the least responsible for climate change.

This is also a market being driven primarily by credit developers, brokers such as the World Bank and consultants who assert that this approach is a win-win situation for the agriculture sector. In reality, even the World Bank and the FAO

acknowledge that, few, if any, resources will be generated for farmers from a market that doesn't exist for a good that is essentially an illusion.

Drastic emissions reductions are needed in all sectors, including agriculture. The promise of a soil carbon market reduces pressure, especially on Northern governments and agribusinesses, to take strong action to change their own mode of production and make systemic changes in the way agriculture is practiced. That is the urgent task for agriculture, as well as energy, transportation and industrial production in the North, and it will require dedicated public resources and effective regulations to make that transition.

For most countries in the South, agriculture will be disproportionately affected by climate change. Many small producers in developing countries rely on rainfall to water their crops, and the increase in rainfall variability, coupled with declining soil moisture levels due to increasing ambient temperatures, will severely stress their systems. There are many technologies that can be adopted to buffer agricultural systems from these impacts—increasing soil carbon and soil health through increased use of manures and compost; diversification of crop varieties and intercropping, including with trees in agroforestry systems; diversification into crop-livestock systems; and increased use of traditional water harvesting methods. Much support will be needed from the international community—in enabling the spread of seasonal forecasts, development and execution of an ambitious research agenda, improvement of extension and farmer-to-farmer information-sharing programs—the challenge for all of us of adapting to a too-rapidly changing climate is great, and for marginal smallholder farmers is daunting.

The centrality and urgency of the adaptation challenge should be what focuses the international community towards policies, programs and practices that can successfully address the problems in front of us. Diverting attention away from these central challenges towards counting carbon for a non-existent market is, needless to say, foolish policy. Yet this is exactly what the World Bank and allies like CCAFS, FAO and DFID are doing—convincing ministries of agriculture to set up elaborate mechanisms for monitoring, reporting and verifying an ephemeral commodity. The millions spent on creating and propping up the agricultural carbon market are at best a gross misuse of public resources, at worst a cynical and costly effort to distract global attention away from where mitigation responsibility really lies.

Endnotes

1. As global temperatures increase, more carbon will be lost from soils. See for example Hopkins, et al. 2012. "Warming accelerates decomposition of decades-old carbon in forest soils." Proceedings of the *National Academy of Sciences* doi:10.1073/pnas.1120603109.
2. In 2009, 93.7 million tonnes of carbon were traded on the voluntary market, with a value of US\$387 million. In the same year the compliance markets traded over 8 billion metric tonnes, valued at US\$144 billion. Hamilton, C., M Sjardin, M Peters-Stanley and T Marcello. 2010. *Building Bridges: state of the voluntary carbon markets 2010*. Washington, D.C.: Ecosystem Marketplace.
3. The Alberta compliance system allows for soil carbon offset credits, but those credits must be created and traded within the state.
4. Hamilton, C., M Sjardin, M Peters-Stanley and T Marcello. 2010. *Building bridges: state of the voluntary carbon markets 2010*. Washington D.C.: Ecosystem Marketplace.
5. Lal, R. 2004. "Soil carbon sequestration impacts on global climate change and food security." *Science* 304: 1623-1627.
6. Most land-use carbon, either from agriculture or forestry projects, is not currently tradable within either the CDM or the European Emissions Trading System due to rules that prevent eligibility.
7. <http://www.care.org/careswork/projects/NIC173.asp>
8. http://ccafs.cgiar.org/sites/default/files/assets/docs/care-pro-poor-carbon_finance.pdf
9. <http://www.edf.org/climate/agricultures-ability-offset-climate-change>
10. <http://apps.edf.org/article.cfm?contentID=7828>
11. Personal communication from PricewaterhouseCoopers technical expert.
12. <http://nicholasinstitute.duke.edu/about/>
13. <http://nicholasinstitute.duke.edu/ecosystem/land/pubslan/ecosystem/t-agg>
14. <http://nicholasinstitute.duke.edu/ecosystem/t-agg/international-project>
15. <http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CF0QFjAD&url=http%3A%2F%2Fwww.rockefellerfoundation.org%2Fmedia%2Fdownload%2F4a5dd8d-49b2-4ed9-906b-c7b840612e07&ei=zc8-T9-wGMH-g0QHn-LS4Bw&usq=AFQjCNEI0kMVE5f1IHDb7T8nq7K5rD7OLA>
16. <http://www.pwc.co.uk/sustainability-climate-change/issues/climate-smart-agriculture.jhtml>
17. http://www.unique-forst.de/v2/index.php?option=com_content&view=article&id=50&Itemid=60&lang=en
18. http://www.unique-forst.de/v2/index.php?option=com_content&view=article&id=51&Itemid=54&lang=en¶m1=¶m2=Climate
19. *ibid.*
20. Terra Global Investment Management, LLC, the investment manager of the Terra Bella Forest and Land-Use Carbon Fund, is a Luxembourg SIF-SICAV currently in structuring and capital raising.
21. <http://terraglobalcapital.com/About.htm>
22. <http://www.opic.gov/news/press-releases/2009/pr110911b>
23. *ibid.*
24. According to its website, TerrAfrica is a partnership that aims to address land degradation in Sub-Saharan Africa by scaling up harmonized support for effective and efficient country-driven sustainable land management. TerrAfrica is nationally driven and depends on the leadership and commitments of Sub-Saharan African countries. The Executive Committee consists of Sub-Saharan African governments, NEPAD, the UNCCD Secretariat, the UNCCD's GM, the FAO, IFAD, UNDP, the AFDB, the European Commission, bilateral donors, civil society representatives, and the World Bank.
25. EcoAgriculture Partners. 2011. *Blending climate and agriculture finance to support climate-smart landscapes*. Washington, D.C.: EcoAgriculture Partners.
26. Bryan, E., W. Akpalu, M. Yesuf, and C. Ringler. 2010. "Global carbon markets: opportunities for sub-Saharan Africa in agriculture and forestry?" *Climate and Development* 2 (4): 309-331.
27. "Greenhouse gas mitigation in agriculture." *Philosophical Transactions of the Royal Society B* 363: 789-813.
28. World Agroforestry Centre. 2009. *Creating an Evergreen Agriculture in Africa for food security and environmental resilience*. Nairobi, Kenya: World Agroforestry Centre.
29. World Agroforestry Centre. 2008. *An assessment of the potential for carbon finance in rangelands*. Working Paper No. 68. Nairobi, Kenya: World Agroforestry Centre.
30. A rather problematic starting assumption, since the poor are not responsible for greenhouse gas emissions leading to climate change, and have more important and pressing challenges in adapting to the changing climate caused by someone else.
31. <http://ccafs.cgiar.org/our-work/research-themes/pro-poor-mitigation>
32. FAO. 2009. *Anchoring agriculture within a Copenhagen agreement*. Rome: FAO.
33. FAO. 2010. "Climate-smart" agriculture. Rome: FAO.
34. http://wbcarbonfinance.org/docs/Mor_ThanHotAir.pdf
35. Climate Focus, Unique Forestry Consultants, International Institute for Applied Systems Analysis. Policy brief. *Role of climate finance in agriculture*. December 2010.
36. http://www.dfid.gov.uk/r4d/pdf/outputs/misc_Env/60921-Agriculture_and_Carbon_Markets_Final_Report.pdf
37. DFID is providing 2/3 of the \$90 million budget for the 5-year programme.
38. Unfortunately DFID does not provide the assumptions and calculations used to derive that number.
39. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CF0QFjAD&url=http%3A%2F%2Fwww.gcca.eu%2Fusr%2FIntra-ACP%2FDescription-of-the-Action_COMESA_revised-annex1_feb2012.pdf&ei=qF7RT4_THuW26gHCgqjGAw&usq=AFQjCNEKhdTZjiuUGQSiMSLplwRrcHwB0A
40. <http://www.rockefellerfoundation.org/who-we-are>
41. <http://cenafrica.net/wp-content/uploads/2011/05/Forest-Trends-CAFF.pdf>
42. <http://www.rockefellerfoundation.org/grants/grants-and-grantees/9292fb88-85fe-4cc0-8429-e764adb0440e>
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44. Michelowa and Michelowa 2010, *ibid.*
45. Michelowa and Michelowa 2010, *ibid.*
46. http://www.unique-forst.de/images/unique/_pdf/2011-1121-PSstB-WB-Climate-smart-agriculture-Kenya-EN.pdf
47. <http://www.devex.com/en/projects/readiness-mechanisms-for-climate-smart-agriculture-in-kenya>
48. <http://www.devex.com/en/projects/readiness-support-for-climate-smart-agriculture-in-kenya>
49. From a CGIAR publication (*Farming's climate-smart future: placing agriculture at the heart of climate-change policy*) released in Durban in December 2011: "A wide range of interests and organizations have argued that a reformed Kyoto Protocol ... should make a broad range of agricultural activities eligible for inclusion under the CDM. ... Measures should be ... taken to ensure that smallholders can benefit from carbon markets and the CDM."
50. <http://climatechange.worldbank.org/sites/default/files/documents/CSACom-munique14.09.11.pdf>
51. http://climatechange.worldbank.org/sites/default/files/documents/Wageningen_Statement_final.pdf
52. <http://icccfs.ifpri.info/>
53. http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-3-Food_security_and_climate_change-June_2012.pdf
54. <http://ccafs.cgiar.org/commission/reports>

55. Several other decisions were made in Durban that brightened the spirits of soil carbon enthusiasts, including the establishment of several SBSTA work programs related to land use, land-use change and forestry (LULUCF) activities under the Kyoto Protocol and the Clean Development Mechanism (CDM). Specifically, Parties were asked to consider whether new land use activities might be eligible for inclusion in the CDM and were asked to consider whether there might be other approaches to address non-permanence of stored carbon beyond the current method of issuing temporary Certified Emission Reductions (tCERs). A third work program would look at landscape accounting methodologies.

56. "In the near term the voluntary market incubates methods for agricultural and landscape-level sequestration. But for these measures to really expand in this direction, the market for them will need to be linked to the future global compliance market." World Development Report 2010.

57. <http://www.bloomberg.com/news/2011-12-30/record-surge-in-co2-credit-volume-may-hamper-2012-price-rebound.html>

58. IFPRI estimates the carbon market value of soil carbon in Africa alone to be \$4.8 billion annually. (See footnote 25).

59. BioCarbon Fund – Next Generation. Executive Summary. 3/1/2012. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CElQFjAA&url=http%3A%2F%2Fwbcarbonfinance.org%2Fdocs%2FBioCF_Tranche_Three_Concept_Note_03.01.12.pdf&ei=9v4mUMGsBOiA7AGr9lCwAg&usq=AFQjCNHw9_SgUWO6OD1PbxGRLW2fZAz-tA

60. The paragraph continues: "*This is despite the fact that a number of developing countries are gearing up to undertake such projects.*" With this conclusion, the authors seem to indicate surprise that even though developing countries are ready to supply credits, the market has yet to respond. Or perhaps it is a subtle indication of remorse that although they have led developing countries to develop such projects, there is no foreseeable demand for credits on the horizon.

61. World Bank Environment Strategy 2012-2022.

62. World Bank Environment Strategy 2012-2022.

63. BioCarbon Fund – Next Generation. Executive Summary. 3/1/2012. See footnote 56.

64. Anonymous, personal communication with author. The same problem is likely to apply in a number of countries in sub-Saharan Africa, where conservation agriculture is quite popular and acreage is growing significantly, even in the absence of a market for sequestered carbon. "In 2008, 100 million hectares, or about 6.3 percent of global arable land, were farmed with minimum tillage—about double the amount in 2001. About 45 percent of Brazilian cropland is farmed using these practices." World Bank Environment Strategy 2012-2022.

65. CAR has also recently adopted a methodology for methane emission reductions in rice paddies, developed by the Environmental Defense Fund, as well as a methodology for the reduction of nitrous oxide emissions through altered fertilizer management. Note that both of these methodologies will lead to the avoidance of emissions, rather than the sequestration of carbon already emitted, and thus are likely to be much more preferred by the market than soil carbon.

66. The World Bank first noted the need for simplified methodologies in its 2010 World Development Report. "Rather than attempt to monitor detailed emissions and uptakes in each field, the people involved in the carbon markets (local and international) need to agree on a simplified actuarial-based accounting system that monitors the activities of farmers and conservatively estimates the associated carbon sequestration. It would not be cost-effective or feasible to measure carbon sequestration across multiple, dispersed smallholder parcels in the developing world."

67. For an indication of how difficult such an undertaking is likely to be, see Smith et al. 2012. "Towards an integrated global framework to assess the impacts of land use and management change on soil carbon: current capability and future vision." *Global Change Biology* 18: 2089-2101.

68. "The carbon monitoring should follow an "activity-based" approach, where emission reductions are estimated based on the activities carried out by the farmer rather than on much more expensive soil analyses. Specific and conservative emission reduction factors can be applied for different agroecological and climatic zones. This is simpler, cheaper, and more predictable for the farmer, who knows up front what the payments, and possible penalties, are for any given activity." World Development Report 2010.

69. The Munden Project. 2011. REDD and forest carbon: market-based critique and recommendations. www.mundenproject.com

70. The Chicago Climate Exchange ceased trading in December 2010, in large part because of the failure of US climate legislation that would have created the hoped-for US compliance market. At the time that trading in soil carbon credits ceased, the value of credits was \$0.10 per ton of carbon.

71. "Carbon sequestration from changes to land use remains one of the great untapped opportunities, particularly in low income countries, so there is an ongoing need for the work of the BioCarbon Fund." BioCarbon Fund – Next Generation. Executive Summary. 3/1/2012. See footnote 56.

72. "Accurately measuring carbon stock changes may be costly, in particular in agricultural systems. In addition, the carbon benefit at the farm level for small-holders may not justify the transaction costs related to carbon measurement and accounting."

73. "Meanwhile, given the current low price of carbon, costs of project implementation and the length of time required for credit development, carbon revenues are far less than the full costs of the project. (describing a CARE-supported agricultural carbon project in Western Kenya) This kind of project requires more appropriate financial mechanisms ..."