Designing a ‘Triple-Win’ Carbon Insetting Initiative

Date: May 2013
Authors: Daniella Malin, Eric Rahn, Jefferson Shriver, Peter Läderach, Wouter Leer, Charlotte Cressy, Stephanie Daniels, Emily Shipman
Designing a ‘Triple-Win’ Carbon Insetting Initiative
By Daniella Malin, Eric Rahn, Jefferson Shriver, Peter Läderach, Wouter Leer, Charlotte Cressy, Stephanie Daniels, Emily Shipman

Contents
Designing a ‘Triple-Win’ Carbon Insetting Initiative .......................................................... 2
OBJECTIVE .......................................................................................................................... 1
BACKGROUND ..................................................................................................................... 3
1. WHAT IS CARBON INSETTING? .................................................................................... 4
2. CARBON INSETTING – A COMPONENT OF CORPORATE CLIMATE STRATEGY .......... 6
3. BACKGROUND ON CARBON STANDARDS FOR AFOLU PROJECTS ......................... 9
4. INSETTING IN ACTION .................................................................................................... 15
5. CASE STUDY - THE PROCESS OF DESIGNING A CARBON INSETTING PROJECT ....... 16
   STEP 1. Site Selection ........................................................................................................ 17
   STEP 2-3. Map GHG emissions reduction, carbon sequestration activities and carbon credit generation potential ......................................................................................... 18
   STEP 4. Conduct a Vulnerability Assessment .................................................................... 21
   STEP 5. Combine carbon potential with vulnerability reduction ...................................... 23
   STEP 6. Solicit feedback from stakeholders ..................................................................... 24
CONCLUSION ....................................................................................................................... 24
Appendix .................................................................................................................................. 25
OBJECTIVE

The purpose of this paper is to encourage stakeholders interested in or pursuing carbon insetting and to lay the foundation for a learning community around this approach. The paper provides definitions of terms, an overview of private sector considerations as they approach insetting and a detailed case study of an insetting feasibility assessment conducted for Green Mountain Coffee Roasters in Nicaragua.

BACKGROUND

In November of 2011, a consortium of actors—Catholic Relief Services (CRS), FLO-CERT, International Center for Tropical Agriculture (CIAT) and the Sustainable Food Lab (SFL)—received approval from Green Mountain Coffee Roasters (GMCR) to carry out a project: Carbon Insetting to confront climate change, improve farmer livelihoods and enhance value chain security.

The project proposed to develop a carbon project that simultaneously improves smallholder livelihoods, mitigates climate change, and makes small scale farming systems more resilient to the impacts of climate change. Here farmers would be financially compensated for ecosystems services through the sale of carbon credits. These carbon payments would be the central vehicle to compensate for greenhouse gas (GHG) emissions reductions and/or the ecosystem service of (GHG) storage for climate regulation—through its current or potential storage in existing forest, newly planted trees, and soil. Mitigation activities would be chosen for their potential to also enhance the climate change resilience of the farmers. Depending on the final price of carbon paid to these producers, additional adaptation opportunities could be developed from the flow of carbon credit revenue.

This brief describes the project in the context of carbon insetting generally and proposes best practices for designing carbon insetting initiatives that deliver climate change mitigation, climate change vulnerability reductions and livelihood benefits as well. At their best, carbon insetting projects serve the interests of the producer community, the sourcing company and the environment.
1. WHAT IS CARBON INSETTING?

Example 1: A cocoa company pays smallholder cocoa farmers to produce biochar as well as cocoa, and provides them with carbon payments. The payments are proportionate to the quantity of biochar produced. This revenue provides an incentive for farmers to produce and apply the biochar to the cocoa trees, providing returns to the farmers and the company in the form of increased disease resistance and productivity enhancements.

Example 2: An ice cream company buys carbon credits that originate on the farms that produce milk for the ice cream. These innovative dairy farms generate these carbon credits by installing manure separators or digesters.

These are examples of “carbon insetting.” Here carbon payments provide incentives for greenhouse gas (GHG) reduction or carbon sequestration activities that take place within the sphere of interest—usually within a value chain—of a given company. These activities may or may not be monetized through the formal carbon markets.

Most carbon offsets refer to GHG reductions made in one place in order to compensate for GHG emissions created somewhere else. A common critique of carbon offsets is that they tend to originate outside a given company or value chain and thus have no direct relation to the company’s primary activities.

Carbon insetting is an approach that brings carbon credit generating activities inside the value chain and gears them towards created shared value among the partners in addition to mitigating climate change.

When successful, insetting can use carbon markets to create a funding mechanism for climate change adaptation and a financial strategy for reaching Scope 3 emissions reduction scenarios. Buyers of agricultural products can reduce costs while enhancing their reputation by combining climate change investments with needed offsetting purchases. Producers can benefit from a range of possible benefits including carbon revenues, improved eco-systems, better access to clean water, improved yields, and

---

1 The GHG Protocol categorizes direct and indirect emissions into three broad scopes:
- Scope 1: All direct GHG emissions.
- Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.

http://www.ghgprotocol.org/calculation-tools/faq
more. Possible project types include, but are not limited to: tree-planting (afforestation/reforestation, boundary tree plantings), avoided deforestation, wastewater treatment, fertilizer efficiency improvements, water filtration, cook-stoves and composting.

The term carbon insetting asks: What are the possibilities for using carbon payments to simultaneously improve smallholder livelihoods, mitigate climate change and make farm systems more resilient to the impacts of climate change? Can the proposed mitigation activities also enhance the resilience of producers?

In theory, carbon insetting seems a synergistic proposition. In practice, the success of a carbon insetting initiative depends on many details, including the carbon methodologies that can be used in the project, the types of vulnerability that exist in the source communities and the objectives of the company’s climate change engagement and communication strategy.

This paper begins by explaining the considerations of insetting from a corporate climate strategy perspective then continues with a proposed ‘how-to’ guide for combining carbon projects with vulnerability reductions.

On terminology: A “carbon credit” refers to a tradable certificate that represents one metric tonne of CO₂ equivalents, generally traded through a regulatory mechanism. By contrast “carbon offset” refers to the removal or avoidance of one metric tonne CO₂e. It assumed that the purpose of a carbon credit is to serve as a carbon offset. Nevertheless, the different terms are used to distinguish between a unit designed for trade (carbon credit) and a unit designed for compensation (carbon offset). (See appendix and glossary of terms for further clarification on “carbon insets” relative to other carbon terms such as “carbon offsets” and “carbon footprints.”)

“When you realize that you’re spending real money on carbon offsets you start to wonder if you can spend that same money to strengthen your supply chain.”
-Paul Comey, GMCR
2. CARBON INSETTING – A COMPONENT OF CORPORATE CLIMATE STRATEGY

Climate strategies in the private sector take multiple forms including carbon footprinting, emission reductions strategies, low carbon product development, carbon offsetting and assessing climate risk in Scopes 1-3. The strategy of offsetting a business’s GHG emissions through traditional carbon credits is one way for companies to demonstrate responsibility. Here the company compensates for the emissions the company is unable to reduce or avoid, thus providing the financial incentives necessary to ensure that those reductions happen elsewhere. The priority for these offsets is a high level of credibility and rigor (verifiable, standard, accountable) as a guarantee against accusations of green-washing. Thus the company needs every assurance that the offsets are real, permanent, additional\(^2\) and do not result in leakage\(^3\). Credits that come with all these guarantees do not tend to include agricultural activities. To make credits affordable, developers favor projects where monitoring, verification, documentation and accounting are most straightforward.

At the same time, the money spent on offsets is money not spent improving the company’s business or value chains. An alternative approach is to look for climate change mitigation opportunities that are monetizable and that also carry climate change adaptation and other benefits to the value chain.

Here the company and the producer’s incentives are aligned. The producer doesn’t just value the system for the carbon payments (short-term incentive but which can be unstable and expire) but for the increased farm production potential (long-term incentive).

As the examples in the beginning of the paper show, this approach has obvious advantages. The money serves more than one purpose; companies can compensate for their GHG emissions while delivering social, environmental and livelihood benefits. In some cases the farmers can gain additional revenue from the project and or lower expenses while lowering the company’s supply chain carbon footprint and in doing so also improve their resilience in the face of climate change and other major disruptions.

Stakeholders such as investors and customers expect businesses to anticipate future impacts on their value chains. By undertaking an *insetting* project, a company is gaining more insight and control into their value chain and thereby increasing their ability to anticipate and manage risk. Increased value chain security can be found through emissions reductions and increased resiliency for suppliers.

But as the project described below reveals, this approach also presents a dilemma: bringing the carbon activities to the land from which the company sources agricultural product means moving away from the energy based credits like solar or wind that are easier to document, quantify, validate and monitor. By contrast land-based projects are more difficult on all those fronts and also carry higher risk of reversal.

\(^2\) The project would not be financially feasible and as a result would not happen without the additional revenue from the sale of the offsets

\(^3\) The emissions must not show up elsewhere as a result of the project
If in switching to land-based offsets, the credibility and cost-effectiveness of the carbon credit is reduced, a company may need to “use” the credits in a different way. For example, the company may use the credits as part of their reporting on social responsibility but not in the company’s carbon accounting. Thus companies may have to evaluate the potential “triple win” of carbon Insetting projects relative to the company’s overall climate engagement and communications strategy.

At Green Mountain Coffee Roasters the feasibility assessment highlighted two project types in the Nicaraguan coffee chain: afforestation/reforestation and bio-digesters. While GMCR is interested in moving forward with these project types they are hesitant about using these projects to formally claim emissions offsets. Representatives feel that the energy projects that they have currently are highly verifiable, standard and accountable. By contrast, investing in forestry-related “insets” introduces risks associated with the possible impermanence of the credits. These risks could diminish the credibility of what they are doing on the energy side. Forestry related carbon projects are also perceived as more difficult to measure and verify. GMCR decided to consider the afforestation/reforestation (A/R) project as a pilot, but has deferred the decision of whether to count any of the credits against their emissions. This approach enables the company to see and evaluate the benefits of the project and the ‘Insetting approach’ before choosing whether to move towards Insetting with their carbon investments more broadly.

One insight from the experience with Green Mountain Coffee Roasters is different divisions of the same company may come to different conclusions in evaluating the pros and cons of carbon insetting vs. carbon offsetting. Environmental affairs directors, with experience in formal carbon markets and offsets, may prioritize the defensibility of traditional carbon offsets, whereas others in procurement may be more interested in combining carbon investment with value chain benefits such as increased resilience and capacity to adapt in source communities. These differences can stem from the underlying differences in orientation and responsibilities of different departments within the same company.

There are many ways companies can invest in carbon activities:

1. Developing carbon projects and buying carbon credits according to mainstream commodity carbon standards like VCS.
2. Developing carbon projects and buying carbon credits according to more specialized carbon standards like Plan Vivo.
3. Providing funds directly to producers in proportion to the carbon mitigation activities they perform. The biochar case is an example.
4. Providing workshops, training and recommendations to farmers to improve practices and the carbon performance of the agricultural product.
Companies wanting to use the carbon credits in the formal sense as “offsets,” may opt for an approach closer to option 1 above. The mainstream commodity nature of these offsets makes them more acceptable and less open to criticism. However if companies have other communications goals in mind for the carbon projects and value the supply chain benefits, options 2, 3 and 4 above are more likely to be of interest.
3. BACKGROUND ON CARBON STANDARDS FOR AFOLU4 PROJECTS

To develop carbon projects that would generate carbon credits (aka Carbon Credit projects), different standards can be used such as VCS or Plan Vivo. Each of these standards recognized different methodologies that can be followed to generate carbon credits such as reforestation or implementation of wind energy production (see Table 2). While many standards recognize similar methodologies, the primary objective of each standard, the costs of development of carbon credits project under each standard and the markets on which their carbon credits are usually traded are quite different.

The carbon standards investigated in this project were the Clean Development Mechanism (CDM), Verified Carbon Standard (VCS), Gold Standard5 (GS) and Plan Vivo (PV). These are the most recognized carbon standards which allow interesting AFOLU methodologies for the Nicaraguan small coffee farmers’ context of the project. Other standards are much smaller, with little market recognition or are more considered as add-on standards, examples include Social Carbon and Climate Community and Biodiversity Standard (CCBS).

For companies choosing the more formal carbon credit route (see Option 1&2 above) for carbon payments,

---

4 Agricultural, Forestry and Other Land Use (AFOLU) projects are carbon projects for which the carbon credits are generated thanks to activities linked to agricultural practices, forestry or other land use.
5 The Gold standard absorbed the Carbon Fix standards in late 2012 and will launch a common standard in mid-2013. For the project the Carbon Fix methodology on land use & forest carbon offset projects was considered. In this guide, all consideration on Gold Standard must be understood as consideration on the Carbon Fix part of the Gold Standard.
Table 1 summarizes some key differences between 4 relevant standards:
Table 1 - Benchmark of key Carbon Credit standards

<table>
<thead>
<tr>
<th></th>
<th>CDM</th>
<th>VCS</th>
<th>GS</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary objective</td>
<td>Carbon mitigation</td>
<td>Carbon mitigation</td>
<td>Carbon mitigation</td>
<td>Farmer’s Livelihoods</td>
</tr>
<tr>
<td>Perceived flexibility(^1)</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td>Type of credits</td>
<td>Ex post</td>
<td>Ex post</td>
<td>Ex ante</td>
<td>Ex ante</td>
</tr>
<tr>
<td>Main selling place(^2)</td>
<td>Mandatory market via brokers</td>
<td>Voluntary Market via brokers</td>
<td>Voluntary market via brokers</td>
<td>Direct sales to end users</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&amp; Voluntary market via brokers</td>
<td>&amp; Voluntary market via brokers</td>
</tr>
<tr>
<td>Recognition on voluntary carbon market(^3)</td>
<td>***</td>
<td>***</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>Volume of carbon credits available</td>
<td>***</td>
<td>***</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Carbon credit unit price(^4)</td>
<td>*</td>
<td>*</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Cost of project development(^5)</td>
<td>$ 200 000</td>
<td>$ 100 000</td>
<td>$80 000</td>
<td></td>
</tr>
<tr>
<td>Cost of project verification(^6)</td>
<td>$ 300 000</td>
<td>$ 225 000</td>
<td>$187 000</td>
<td></td>
</tr>
<tr>
<td>Total project establishment costs(^5)</td>
<td>over $ 500 000</td>
<td>$ 500 000</td>
<td>$ 325 000</td>
<td>$ 267 500</td>
</tr>
</tbody>
</table>

\(^1\) A standard is seen here as flexible if it is easy to implement different methodologies within one project such as Reforestation and Avoided deforestation.

\(^2\) When carbon credits are sold via brokers, the part of the price that goes to the project beneficiaries can be expected to be lower.
In the case of Insetting carbon credit project, the direct link between the credit owners and a particular company and the additional benefits that the project create for sustainability can outweigh the need to sell credits on voluntary carbon market. Therefore the level of recognition in the voluntary carbon market, of the carbon standard used is not necessarily of primary importance.

The unit selling price of GS and PV carbon credits are usually higher than the market price of CDM or VCS carbon credits because they represent more than carbon sequestrated.

For Reforestation carbon project.
**Clean Development Mechanism (CDM)**

Afforestation/Reforestation (A/R) project activities are currently the only land-use based project methodologies that are certifiable under the Clean Development Mechanism (CDM). Nevertheless, the high rigidity of the standard and the long certification process for CDM projects made the utilization of this standard not advisable in our case. The main advantage of CDM projects is that they generate carbon credits that can be sold on the compliance markets. The compliance (aka mandatory) markets are the markets where companies who are obliged by law to stay under a certain level of GHG emissions buy carbon credits to compensate for their surplus emissions. Therefore if a company that would like to finance the Insetting project belongs to an industry that has been regulated in terms of GHG emissions, the CDM standard should be used. The coffee industry had not been regulated in 2011 so the CDM standard was not of huge interest in this Insetting project.

**Verified Carbon Standard (VCS)**

VCS is the most recognized voluntary standard\(^6\) for A/R projects in the market. It implies high requirements in order to ensure that the project is additional and feasible. For the registration of the A/R project under VCS it would have been necessary to use CDM approved methodologies. All requirements that have to be satisfied for CDM projects are to be considered for VCS certification with some minor exceptions, which explains its high establishment costs. Given that the establishment costs are high, a VCS project needs to be really large for it to be viable. These projects are almost always industrial timber plantations requiring specialized expertise and the use of middlemen. Also, given that the carbon credits are ex-post, the carbon money cannot be the catalyzing factor for project establishment. On the other hand, large-scale projects generate important volumes of carbon credits that can then be sold at lower unit prices.

**Gold Standard**

Unlike the CDM/VCS, the AFOLU methodologies of the Gold Standard (Carbon Fix part) are consolidated in one document, which makes the standard easier to apply. The Gold Standard (Carbon Fix part) allows ex-ante sale of carbon credits which allow carbon finance to cover the project establishment costs. As the Gold Standard is quite well recognized on the voluntary markets, if there is a surplus of carbon credits generated in the project, these could be sold on the voluntary market to generate additional revenues.

**Plan Vivo Standard**

The Plan Vivo Standard has been especially designed for small-scale and community based projects. The standard has not been based on the strict UNFCCC guidance but instead uses its own simpler guidelines.

---

\(^6\) Voluntary standard as opposed to compliance standards generate carbon credits that can only be sold on the voluntary carbon markets and not on the compliance (aka mandatory) carbon markets.
Project development costs are considerably lower compared to other standards and ex ante sales are possible. The project involves the implementation of sustainable land-management plans by combining existing land-uses with one or more of the following additional eligible project activities:

- Afforestation and reforestation
- Agroforestry
- Forest restoration
- Avoided deforestation and forest conservation

The Plan Vivo standard does not allow for developing timber production in the form of large commercial plantations as a side activity of an A/R project. However, community forestry is allowed under the standard and the timber can be sold on the markets. All activities must be limited to the use of native or naturalized species and promote the restoration or protection of native ecosystems.

The main advantage of the Plan Vivo Standard is the flexibility of the standard. It includes different uses of the forests and also allows for activities based on different methodologies to be more easily added at a later stage. This means that the establishment of tree boundaries around the farms and/or protection of the standing forest in the project area could be considered under the Plan Vivo Standard. These combinations can increase the total amount of credits the project can claim.

The Plan Vivo Standard

The Plan Vivo model stems from the Scolel Té project in Chiapas, Mexico, developed since 1994 and supported by the Edinburgh Centre for Carbon Management (ECCM). Scolel Té involves over 700 farmers from 40 communities working with a range of agroforestry systems and small timber plantations. A trust fund provides farmers with financial and technical assistance based on the expected carbon revenues. Recent research on social impacts in this project indicates some trade-off between poverty and environmental objectives.

ECCM has now developed the Plan Vivo model as a management system and certification standard which incorporates sustainable livelihoods. The Plan Vivo model is now being tested in the buffer zone of a protected area in Mozambique, and one in Southwest Uganda. These projects involve agroforestry activities and small-scale plantations, diversification of income generation activities and re-investment of profits in community infrastructure. In Mozambique, it is estimated that farmers will receive an average of $35 per hectare per year for seven years for carbon sequestered by various land use activities. Although forest carbon is not profitable per se, positive net incomes are expected when it is combined with tree/crop product sales. Other reported benefits in Mozambique include fruit, fodder, fuelwood, better soil structure and improved organisational capacity.

For more information on Carbon standards and market trends see the Ecosystem Marketplace website and their annual state of the voluntary and Forestry carbon markets.
4. INSETTING IN ACTION

For companies choosing the less formal carbon credit route (see Option 3 & 4 on page 6) a few examples may help illustrate the range of options:

EXAMPLE 1 - Low Carbon Tea

The goal for the large multi-national retailer that funded this project was “low carbon tea”, however the retailer wasn’t interested in either a formal carbon footprint or formal carbon credits. The retailer simply wanted an assessment of the tea value chain, implementation of GHG reducing activities and a reassessment after the changes were made. The GHG emissions assessment revealed that the largest source of emissions came from the use of synthetic fertilizers. The retailer then asked the farmers to switch to replacing 25 percent of their fertilizers with compost and funded workshops for the growers on how to create their own compost.

In this project, the carbon payment took the form of payments for compost production workshops. As a result of these workshops, the growers were able to save money by not buying as much fertilizer, earn additional income from the sale of excess compost and at the same time reduce the retailer’s value chain carbon footprint. The use of compost also increases the soil organic matter content. Higher organic matter is associated with enhanced soil performance in terms of productivity, disease resistance, water retention, nutrient retention (less fertilizers and pesticides needed, thus additional financial savings) erosion control (due to better soil structure), moisture retention in drought situations and flood resistance (water absorption) during floods.

EXAMPLE 2 – Biochar

In the biochar example, a large multinational food manufacturer is providing carbon payments to farmers in exchange for producing biochar. Biochar is a solid material obtained from the carbonization of biomass. Biochar may be added to soils to improve soil functions and to reduce emissions from biomass that would otherwise naturally degrade to greenhouse gases. Biochar is an extremely stable form of carbon that has been known to remain in the soil for thousands of years. The carbon payments are in proportion to the quantity of biochar produced as this quantity is then converted from tons of biochar into tons of carbon dioxide equivalents (CO2eq) sequestered in the char (the conversion is about 1 ton biochar to 3 tons CO2eq). These payments do not qualify as formal carbon credits because there are no accepted methodologies or protocols for biochar production in the carbon markets. Nevertheless, the company provides these payments because they have determined that the benefits to their value chain from biochar application are worth the cost in terms of disease resistance and productivity increases. These increases benefit both the farmers and the buying company.

As these two examples show, with carbon insets, companies must evaluate how far they are willing to diversify their carbon investments—if at all—from highly rigorous and externally verified carbon credits.
5. CASE STUDY - THE PROCESS OF DESIGNING A CARBON INSETTING PROJECT

In the case when an ideal overlap between carbon activities and other value chain interests are not obvious from the start, parties can follow the systematic six-step approach used in the project with Green Mountain Coffee Roasters as follows:

1. Select the site and communities to work with based on either the identified carbon opportunity or a particular value chain of a private sector partner;
2. Map the range of possible GHG emissions reduction (GER) and carbon sequestration activities within the current production practices (in our case, coffee cultivation) with a GHG assessment;
3. Investigate the opportunities for carbon credit generation (CCG) in the source communities. The GER activities and CCG opportunities may or may not be the same.
4. Identify the possible activities to reduce farmer vulnerability to climate change via a vulnerability assessment;
5. Create matrix of the 3 criteria: GER, CCG, and vulnerability reduction. Project partners then overlay these activity maps to look for the ideal combinations.
6. With the possible project activities in hand, the next step is to seek feedback from the farmer communities and the private sector partners.

Figure 1. Provides a diagram of steps 1 through 6.

Figure 1.
Green Mountain Coffee Roasters funded the consortium project to undertake these 6 steps to learn about the potential for carbon Insetting in one of their coffee value chains. GMCR emphasized that it was important to restrict the carbon payments to formal carbon credits. Given these project stipulations, these are the steps followed in the consortium project to demonstrate the design process. Specific examples taken from the consortium project are in italics.

**STEP 1. Site Selection**

Site selection considerations include those regarding landscape/geography as well as the local population who will be participating and benefiting from the project.

When selecting a specific population to work with, it is important to consider the following:

- Whether the population can afford investment or opportunity costs necessary to participate in the project.
- Whether the farmers are organized or not. Working with organized farmers is much more efficient and therefore more apt to be successful. Certifications such as Fair Trade or Organic are good indicators of an existing basic organizational level of the farmers. If farmer’s are not organized, an intermediary organization will be needed.
- Farmers with secure land tenure are also easier to work with. However, providing land tenure to farmers can be an important project component to optimize pro-poor benefits.
• Depending on the corporate priorities, it may be important to choose a particularly vulnerable supplier community if this kind of information is available.
• Participation of farmer organizations in a particular supply chain. Buyers are more readily identifiable if farmers are producing a globally traded commodity, for example.

The study region for the Nicaragua initiative is San Juan del Río Coco, department of Madriz in the northern central region of Nicaragua. It is a rural area with the majority of the 21’114 (INEC 2008) inhabitants making their living from agriculture, with coffee as their main crop. Staple crops such as maize, beans and sorghum are most important for subsistence (INEC 2001). In addition to coffee cultivation, farmers use their land for maize and beans cultivation in fallow rotation, livestock farming, and forestry.

All coffee farmers are organic certified. Their coffee production systems can be classified as traditional and commercial polyculture according to Moguel and Toledo (1999), which differentiates systems based on their vegetation and structural complexity (shade tree density, co-product density, canopy height). The coffee farms of San Juan del Río Coco are surrounded by cattle ranches and have a unique microclimate due to their high tree cover.

As mentioned above, the project is already working in a well established legal and political context, with highly organized communities, relationships with CRS, FLO-CERT and CIAT. The relationship with CRS is especially advantageous given their extensive experience and presence in San Juan del Río Coco and throughout Nicaragua, understanding of different local contexts for project development/ project feasibility, and stakeholder engagement. This comes from their extensive relationships with the cooperatives and their local/ regional expertise. The fact that the cooperatives are certified Fairtrade by FLO-CERT is also an advantage in this project. To reach Fairtrade certification, the cooperatives had to implement internal control systems which will be very useful to build on when implementing and running the Carbon Insetting project. Also through this certification scheme the cooperatives management and members have been accustomed to rigorous external audits which will also occur for the Carbon Insetting project.

**STEP 2-3. Map GHG emissions reduction, carbon sequestration activities and carbon credit generation potential**

The next step is to look both within and around the agricultural production process for possible GHG emissions reduction opportunities and/or carbon sequestration opportunities. The Cool Farm Tool, a spreadsheet calculator for agricultural GHG emissions, can be used to identify the main sources of GHG emissions and available sinks for GHG in the agricultural production process.

If, as in Green Mountain Coffee Roasters case, the carbon credits need to be formal (that is, tradable in the carbon market), then the next step is to see which of these opportunities fall into acceptable carbon market “project types” (see below).
Table 2 Overview of the recognized carbon credit generating activities (aka Carbon Methodologies)

<table>
<thead>
<tr>
<th>PROJECT SECTOR</th>
<th>Project Types/Methodologies</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Forestry and Other Land Use (AFOLU)</td>
<td>Forestry &amp; Land Use</td>
<td>Afforestation, Reforestation &amp; Revegetation (ARR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved Forest Management (IFM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avoided Deforestation (aka REDD)</td>
</tr>
<tr>
<td></td>
<td>Agricultural</td>
<td>Land Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Livestock Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Irrigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fertilizers</td>
</tr>
<tr>
<td></td>
<td>ENERGY</td>
<td>Renewable Energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biomass (Plant material)</td>
</tr>
<tr>
<td></td>
<td>Energy Efficiency</td>
<td>Supply Side Energy Efficiency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand Side Energy Efficiency</td>
</tr>
<tr>
<td></td>
<td>Methane Capture</td>
<td>Methane Avoidance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methane Flaring</td>
</tr>
<tr>
<td></td>
<td>Industrial Gases</td>
<td>N2O (Nitrous Oxide)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HFCs (Hydrofluorocarbons)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PFCs (Perfluorocarbons)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SF6 (Sulfur Hexafluoride)</td>
</tr>
<tr>
<td></td>
<td>Fuel Switching</td>
<td>Fossil Fuel Switching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biomass Fuel Switching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodiesel Fuel Switching</td>
</tr>
</tbody>
</table>

Sources: State of the voluntary and Forest carbon market 2012, Ecosystem Market place & Project Development 101: Getting Started carbon development, Brokers Carbon

In the case of GMCR, the Cool Farm Tool (CFT) assessment was supplemented with other carbon market screens used to identify carbon project opportunities that are outside the production process itself. Examples of such projects include cook stoves or tree planting. Most project
developers have a high level set of survey questions that help determine what sort of carbon projects are most appropriate for the setting.

For this project, FLO-CERT and the Sustainable Food Lab worked with South Pole Carbon, a carbon project developer, to develop questionnaires to collect the necessary data to make the carbon footprint and carbon project feasibility assessments. While every effort was made to reduce the number of questions, in retrospect the questionnaires were still a bit too long and cumbersome. Further streamlining of the questions would have been beneficial.

The project partners learned a lot from this exercise about what were and weren’t carbon credit options. For example project partners learned that eligibility in projects involving water filtration/purification systems, depends on the ability to demonstrate that the wood currently used to purify water is being unsustainably harvested. That is, the credits are derived not from reduced combustion but from a change in the forest carbon stock.

Additionally, those agricultural production systems that are already heavily forested or are already implementing climate and/or environmentally friendly agricultural practices, are often ineligible for many different carbon credit options because these sites have difficulty proving that the carbon payment motivated a change that would not have happened otherwise.

In the case of the GMCR project, since the project area had already been forested for many years and was well protected, the producers weren’t able to claim carbon credits unless they were able to prove that there is a risk to future deforestation. Similarly, since the farmers in the participating coops were already using organic agricultural techniques, carbon credits from agricultural land management options were also limited. These conditions are sometimes referred to as the ‘cruelties of carbon financing’.

Of the possible GHG emissions reduction and carbon sequestration activities that emerged from the mapping exercise, the following were identified as potential carbon credit generating activities (see Table 3). These activities were then evaluated from the perspective of maximizing GHG emissions reductions, carbon sequestration potential and financial feasibility:

**Table 3** Potential Carbon Credit Generating Activities, GMCR Insetting study

<table>
<thead>
<tr>
<th>Practices</th>
<th>GHG emissions reduction</th>
<th>Sequestration potential</th>
<th>Financial feasibility</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afforestation/Reforestation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Forest on degraded land</td>
<td>-</td>
<td>High</td>
<td>Inexpensive</td>
<td>High area availability</td>
</tr>
<tr>
<td>2) Coffee agroforestry systems on degraded land</td>
<td>-</td>
<td>High</td>
<td>Inexpensive</td>
<td>High area availability</td>
</tr>
</tbody>
</table>
### 3) Boundary tree plantings

- **Medium**
- **Inexpensive**

Currenty there is little pressure on forest, but this is expected to change due to suitability shifts of coffee production, land use changes, and population growth.

### Avoided deforestation

- **High**
- **Inexpensive**

### Waste water treatment

- **High**
- **Expensive**

Complex technical and infrastructural implementation due to decentralized post-harvest infrastructure on farms.

### Sustainable Agricultural Land Management on coffee plots

- **Soil conservation**
- **Optimized fertilization**
- **Low**
- **Inexpensive**

Organic certified.

## STEP 4. Conduct a Vulnerability Assessment

A vulnerability assessment provides a local vision of current conditions of resources and key elements of major risk concerning household capital. This enables a producer typology based on necessities and links identified practices with farmers' livelihoods.

From the vulnerability assessment performed by CIAT for this project, the activities presented in Table 4. were identified as adaptation options and practices:

### Table 4 Vulnerabilities identified, adaptation options and practices

<table>
<thead>
<tr>
<th>Vulnerability</th>
<th>Adaptation options</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>High variability of coffee productivity</td>
<td>• Better agronomic management related to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Soil conservation</td>
<td>• Soil conservation practices</td>
</tr>
<tr>
<td></td>
<td>o Fertilization</td>
<td>• Site specific fertilization</td>
</tr>
<tr>
<td></td>
<td>o Pest &amp; disease management</td>
<td>• Diversified shade trees for pest suppression</td>
</tr>
<tr>
<td>Climatic suitability decrease for</td>
<td>• Agronomic practices that adapt coffee crops to changing climate (temperature</td>
<td></td>
</tr>
<tr>
<td>coffee growing</td>
<td>&amp; water stress; increase of pest &amp; disease incidents)</td>
<td>• Diversified multi-strata shade management</td>
</tr>
<tr>
<td></td>
<td>• Infrastructural practices that reduce water stress</td>
<td>• Adapted varieties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Irrigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• More efficient use of water in post-harvest processing</td>
</tr>
</tbody>
</table>
High dependency on coffee
• Diversification
• Crop insurance

Migration
Access to:
a. Information
b. Alternative technologies
c. Financial resources
d. Labor

Higher productivity/income
a. Capacity building
b. Capacity building
c. Microfinance, carbon credits
d. Interventions that decrease migration

As outlined above

Figure 2 shows the relative potential for these activities to offer both adaptation benefits and carbon credit generation potential in a matrix form

Figure 2. Matrix of adaptation and carbon credit generation potential

<table>
<thead>
<tr>
<th>CARBON CREDIT GENERATION POTENTIAL (CCGP)</th>
<th>CLIMATE CHANGE ADAPTATION BENEFITS (Adaptation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOSE/LOSE</td>
<td>TRADE-OFF</td>
</tr>
<tr>
<td>Low Adaptation / Low CCGP</td>
<td>Low-Medium Adaptation / High CCGP</td>
</tr>
<tr>
<td>Activities: Silvi-pastoral systems, efficient cook stoves, biomass to energy, water purification, improved forest management</td>
<td>Activities: bio-digesters or waste water treatment</td>
</tr>
</tbody>
</table>

| WIN/WIN |
| High Adaptation / High CCGP |
| Activities: new agro-forestry systems on degraded areas, boundary tree plantings, or avoided deforestation |

| TRADE-OFF |
| High Adaptation / Low CCGP |
| Activities: diversify current agro-forestry systems, improve soil conservation practices, promote adequate fertilization |
STEP 5. Combine carbon potential with vulnerability reduction

The final step was to combine the three criteria of adaptation potential, GHG emissions reduction potential (GERP) and carbon credit generation potential (CCGP). This exercise resulted in activities with strong synergies, activities with high mitigation potential but that less meet adaptation needs, and activities that have high adaptation value but are not able to generate carbon credits:

Table 5 Synergies and trade-offs of practices between adaptation potential, GHG emissions reduction potential (GERP), carbon credit generation potential (CCGP)

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Practice</th>
<th>Adaptation potential</th>
<th>GERP</th>
<th>CCGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/-Reforestation</td>
<td>• Forest on degraded areas</td>
<td>Medium</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coffee agroforestry on degraded areas</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tree plantings as windbreaks and in current coffee systems</td>
<td>High</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Sustainable Agricultural Land Management</td>
<td>• Improved soil conservation practices in coffee agroforestry systems</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>• Promote adequate fertilization</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>• Quesungual slash and mulch agroforestry system for bean-maize cultivation</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>• Silvopastoral system</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Post-harvest processing</td>
<td>• Biodigesters at wastewater treatment</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Avoided deforestation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Selection of Carbon Sequestration/Carbon Emissions Reductions Activities-
The type of site selected will have a substantial impact on the type of mitigation activities undertaken. If the activities have been determined since the inception of the project, site/population selection should be based on the characteristics of each type of mitigation activity. See Table 3 for a description of each type of activity.

Afforestation/Reforestation (A/R) projects have hidden impacts and, like all activities, must be carefully considered with regard to the population. In the case of AF/RF, increased land devoted to forest will often decrease the land available for crops and therefore have unintended effects on the poorest in the community—those that work the land. Selecting carbon emissions reduction/carbon sequestration activities in concert with the supplier community can do much to expose any unfavorable unintended consequences.

STEP 6. Solicit feedback from stakeholders
For the purposes of the consortium project, the activities that the study suggested were discussed with the farmers for feedback on numerous occasions. Enthusiasm was high amongst farmer cooperative leaders that this project would provide needed incentives to plant new coffee agroforestry systems on fallow land. Farmer groups have proposed to CRS and the consortium large scale participation amongst their membership, anticipating that the project methodology will be accepted widely. Some activities of most interest to the farmers were planting boundary trees and reforestation of degraded areas with coffee agroforestry systems. Feedback was also sought from GMCR.

CONCLUSION

There are many advantages to carbon projects that operate within the purchasing company’s own value chain. The work creates competitive advantage for a company by providing the company with greater insight and control within a value chain. At the same time, the project provides carbon finance as a means of reducing emissions and helping source communities adapt to climate change and other value chain risks. The project also potentially increases farmer incomes and productivity. The promise of carbon insetting is in the triple “wins” of meeting company objectives around emissions reduction and reputation management, meeting source community needs and serving the environment.

The challenge is in matching carbon opportunities that can pass a company’s threshold of risk aversion with activities that reduce vulnerability.
Appendix

Figure 3 below clarifies the term “carbon Insetting” relative to other carbon terms and value chain carbon activities. There are overlaps that can make these terms confusing. The diagram illustrates the overlaps between four spheres of activities:

1. “GHG reduction and carbon sequestration activities.” This is the big sphere of all carbon activities.
2. “Carbon footprint reductions:” GHG reduction and carbon sequestration activities that reduce carbon footprints. Example: using fertilizers that were produced more energy efficiently. If carbon footprinting is taken in the formal sense—those activities that comply with Publically Available Specification 2050 (PAS 2050)—then not all GHG reduction and carbon sequestration activities qualify as carbon footprint reductions. For example, cookstove projects, water filtration, tree planting and activities that increase soil organic matter content are all activities that can reduce net GHG emissions but these reductions may not be included in PAS 2050 compliant carbon footprint calculations.
3. “Carbon offsets.” GHG reduction and carbon sequestration activities that can be turned into a carbon credit and bought/sold. Example: Tree planting (afforestation or reforestation). Not all GHG reduction and carbon sequestration activities can be monetized through the carbon markets.
4. “Vulnerability reductions.” This is the big sphere of potential activities that increase resilience, improve farmer livelihoods and enhance value chain security

Relative to all this, carbon insets are those activities that lie in the overlapping space between all manner of carbon activities and vulnerability reductions (or value chain enhancements). See also the glossary of terms.

Figure 3.
GLOSSARY OF TERMS

Definitions by Goetz Schroth with contributions from Eric Rahn and Daniella Malin:

- **Carbon offsets**: Any net GHG emissions reduction or carbon sequestration, measured against a baseline, that can be used to compensate for GHG emissions elsewhere. Offsets are often traded as "carbon credits" on voluntary or compliance markets but other forms of compensation of the offsetting activity are also possible.

- **Carbon insets**: Any carbon offset or GHG reduction/carbon sequestration activity that is linked to the supply chain or direct sphere of influence of the company or individual that acquires or supports the Insetting activity. This can take the form of credit trading or other forms of compensation or support for the Insetting activity. Carbon insets are intended to generate mutual benefits between the partners that are additional to the climate change mitigation itself.

- **Carbon footprint reduction**: Any reduction of the net GHG emissions resulting from a production process that are covered by a recognized methodology for measuring carbon footprints, such as PAS 2050. Carbon footprint reductions can compensated (as insets) but rewards are often more fuzzy, possibly providing an advantage on the marketplace for the respective product, support a specific labeling, and potentially result in a price premium. In many cases additional GHG reductions and carbon sequestration opportunities exist that are not covered by recognized methodologies for measuring carbon footprints but are never the less actionable by farmers.

Definitions adapted from the “Glossary of Terms” from the IPCC Third Assessment Report (2011).

- **Adaptation**: Initiatives and measures designed to reduce the vulnerability of natural human systems against actual or expected climate change effects.

- **Mitigation**: An anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases.

- **Resilience**: The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self organization, and the capacity to adapt to stress and change.