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IMPROVED MANAGEMENT AND CONSERVATION OF CRITICAL WATERSHEDS PROJECT

**Carbon Market Feasibility Study:
Potential of Sonsonate and Ahuachapán Watersheds**



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Implemented by

Development Alternatives (DAI)

Dr. Steven Romanoff

Project Director

Improved Management and Conservation of Critical Watersheds

Calle Dr. José Zablah, 4-6 Col. Utila

Sta. Tecla, La Libertad, El Salvador

Phone (503) 2288-4198, (503) 2288-4318

Celular (503) 70507241

Email: Steve_Romanoff@DAI.com

**CARBON MARKET FEASIBILITY STUDY:
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AHUACHAPÁN WATERSHEDS**

**USAID IMPROVED MANAGEMENT AND CONSERVATION OF
CRITICAL WATERSHEDS PROJECT**

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Author: Keegan Eisenstadt USAID/DAI/CO₂OL-USA Assisted by: Carlos Isaac Perez and Christy Owen. Supervised Steven Romanoff, USAID/CTO Mary de Rodríguez.

Report

Carbon Market Feasibility Study: Potential of Sonsonate and Ahuachapán Watersheds

Improved Management and Conservation of Critical Watersheds

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TABLE OF CONTENTS

Executive Summary.....	7
1) Introduction.....	9
2) Project Background and Local Context.....	10
3) Climate Change and the Evolution of the Carbon Market.....	13
4) IMCW Regulatory Market Carbon Credit Options.....	18
5) IMCW Voluntary Market Carbon Credit Options.....	19
6) Policy, Legislative and Regulatory Framework for Carbon Market Entry.....	20
7) Local Institutional Capacity to Develop, Verify and Market Carbon Credits.....	22
8) Detailed Options for Supporting El Salvador’s Entry into the Carbon Market.....	24
a. Collaborating with BMI’s Café y Ambiente Program	24
b. Coffee Carbon Pilot Program.....	26
c. Avoided Deforestation in Protected Areas.....	32
9) Project Cycle, Timelines and Illustrative Costs.....	35
10) Estimated Potential to Make Carbon Credit Sales a Success.....	37

ANNEXES

A) Contacts made and meetings attended during the in-country portion.....	39
B) List of prospective project developers, project certifiers, carbon brokers, buyers, and contacts who could undertake the job of moving projects in El Salvador forward.....	44
C) Notes, news and information about carbon markets, carbon activities related to coffee forests, and additional reading.....	47
D) OBJECTIVES, TASKS, AND DELIVERABLES FROM SOW.....	62

BIBLIOGRAPHY

Table of contents provided with website reference to download.....	64
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Commonly used Acronyms

ADPA	Avoided Deforestation in Protected Areas
A/R	Afforestation/Reforestation project window within the CDM
BMI	Banco Multisectorial de Inversiones en El Salvador
CCPP	Coffee Carbon Pilot Program
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism of the UNFCCC
CERs	Certified Emissions Reduction Units – traded in the Kyoto regulatory market
CFCs	ChloroflouroCarbons
CNR	Centro Nacional de Registro
DNA	Designated National Authority – under the Kyoto protocol
ERUs	Emissions Reduction Units – traded in the EU ETS market
EU ETS	European Union Emissions Trading Scheme
GHGs	Greenhouse Gases
GOES	Government of El Salvador
IMCW	USAID’s Improved Management and Conservation of Critical Watersheds project
JI	Joint Implementation
LULUCF	Land Use, Land Use Change and Forestry - a sector of projects in the CDM
MARN	Ministerio de Ambiente y Recursos Naturales
OTC	Over the Counter sale of voluntary credits – retail sales
PES	Payment for Environmental Services
REDD	Reduced Emissions from Deforestation and Degraded lands, or avoided deforestation initiatives
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VERs	Verified or Voluntary Emissions Reduction Units – traded in the voluntary market

Executive Summary

The consultancy was to determine the feasibility of developing a strategy for Payment for Environmental Service (PES) schemes using carbon credits as the market commodity, specifically carbon sequestered from the atmosphere and stored in either standing forests, or newly planted forests, located in USAID's Improved Management and Conservation of Critical Watersheds (IMCW) project area (See Annexed OBJECTIVES, TASKS, AND DELIVERABLES FROM STATEMENT OF WORK). A particular focus was placed on carbon projects within the existing coffee plantations and vegetated protected areas that could be advanced under the IMCW project. There is a precedent for carbon market projects in El Salvador, and there are operational projects in the region – in Panama, Nicaragua, Costa Rica, Mexico and Honduras - that serve as potential models.

The three preferred options to facilitate a carbon market activity were arrived at through a stepwise analysis of current IMCW activities, the challenges of designing and implementing a carbon market project, legislative and institutional capacity in El Salvador, and the impact on Global Climate Change issues. Lastly, the potential to directly source carbon credits from Land Use, Land Use Change and Forestry projects to the carbon markets is used to guide the Assessment Team's rankings. All three IMCW preferred pilot carbon credit alternatives are directed to enter the voluntary market. This was a conscious choice, as the timeframe to bring credits to market can be significantly shorter, and potentially occur before the end of the IMCW.

Whether USAID is interested in: 1) collaborating with the Banco Multisectorial de Inversiones on its Café y Ambiente program, or 2) working with MARN to bring an avoided deforestation from protected areas carbon credit project to market, or 3) a coffee carbon pilot program with coffee producers in a smaller and more easily controlled activity, it will be taking an important step towards integrating climate change mitigation into its programming.

Based upon the findings presented in this report, the Team believes that the BMI project is unlikely to be a satisfactory pilot activity for the IMCW project. This determination stems from the belief that institutionally, BMI, is not focused on the Café y Ambiente project in the same way that it is on the development of its ever growing climate change portfolio under the CDM. BMI has numerous ongoing projects as well as many in the pipeline directed at the CDM. The only project that they have for the voluntary market is the Café y Ambiente program that appears to be a response by the bank to political pressure from the coffee sector. The very deliberate and slow pace that the program has started is cause for concern that it will not be able to generate positive results during the timeframe of the IMCW project.

An Avoided Deforestation project with MARN is likely to have moderate potential to be a satisfactory pilot activity for the IMCW project. While the avoided deforestation project from the mangroves protected area has the greatest potential of the pilot carbon credit activities, it also

faces some significant challenges. These challenges can be broadly categorized as depending upon the El Salvadoran government to quickly engage and facilitate the resolution to questions surrounding protected area registry, operational guidance on carbon credit revenue generation from public lands, and co-management arrangements as applicable. The sheer quantity of uncertainties, many identified in this report, lead the Team to be concerned that the ADPA would be more difficult to bring to market within the timeframe of the IMCW project.

Of the three options, it is the opinion of the Team that the CCPP has the greatest potential to be a satisfactory pilot activity for IMCW project support. The timeline that remains for the IMCW project make it a close judgment as to whether there could be actual sales of carbon credits prior to the end of the IMCW project. Depending upon the sophistication of the coffee producers, the CCPP could be selling credits to the market – or presenting credits to a broker by that point, or at least be well on its way. There are a number of advantages to working on the CCPP: the beneficiaries are motivated, have clear title to their lands, are used to working the land and have the capacity to do so, are likely to be technically capable, and are private sector actors interested in the time value of money. In the expert opinion of the Team, there is a better than average chance for this project to achieve carbon credit sales prior to project close out, if it is fully supported from the beginning.

1. Introduction

The purpose of the Carbon Market consultancy was to determine the feasibility of developing a strategy for one or more Payment for Environmental Service schemes using carbon credits as the market commodity (a “carbon credit” or “credit” is one metric ton of CO₂ equivalent). Carbon sequestered out of the atmosphere and stored in either standing forests, or newly planted forests, located in the project area in southern Sonsonate and Ahuachapán Departments were the target of the Feasibility Activity. The consultancy focused on carbon projects within the existing coffee plantations and vegetated protected areas that could be advanced within the time frame of USAID’s Improved Management and Conservation of Critical Watersheds (IMCW) project.

There is a precedent for carbon market project in El Salvador. Currently, there are at least five carbon credit projects in implementation. These projects were designed to generate credits for the regulatory carbon market, and are registered under the Clean Development Mechanism (CDM) of the United Nation’s Framework Convention on Climate Change. El Salvador’s carbon project experience is a useful start, but these projects generate credits from energy efficiency and renewable energy and are not in the Land Use, Land Use Change and Forestry sector (LULUCF). In the IMCW context, carbon market projects will come from forest-based activities. LULUCF projects have been established in the region, with operational examples in Panama, Nicaragua, Costa Rica, Mexico and Honduras that serve as potential models for El Salvador. Additionally, El Salvador’s Banco Multisectoral de Inversiones (BMI) is in the initial stages of implementing its ‘Café y Ambiente’ program which is designed to reduce the debt service payments of coffee producers through the sale of shade coffee carbon credits on the voluntary market.

The three preferred options for a technical assistance effort to facilitate a carbon market activity presented in this report were arrived at through a stepwise analysis of current IMCW activities, the challenges of designing and implementing a carbon market project, legislative and institutional capacity in El Salvador, and the impact on Global Climate Change issues. As such, this report contains sufficient background information to understand the process of how the Assessment Team arrived at, and ranked the carbon trading options for the LULUCF sector in El Salvador. For the regulatory CDM market, the Team looked at the feasibility of activities under both the Afforestation/Reforestation (A/R) and the Reduced Emissions from Deforestation and Degraded lands (REDD) project windows. For the voluntary market, specific emphasis was placed on the possible sale of credits from the maintenance of shade trees in coffee farms and forest cover in the limited protected areas. The potential to directly source carbon credits from LULUCF projects to the regulatory and/or voluntary carbon markets is also discussed.

Based on the Team’s assessments, three options present themselves as the most viable at this time. First, a technical assistance effort could directly assist BMI for the purposes of advancing

the timetable of bringing carbon products to market under the Café y Ambiente program. This option is desirable because BMI and Government of El Salvador (GOES) have not made rapid progress to sell the carbon credits that they hope to market. However, it would require that BMI will accept USAID assistance due to the confidential nature of the program's development. Second, IMCW could facilitate the bundling and marketing of a carbon project that includes coffee producers not included in the Café and Ambiente program. Finally, an Avoided Deforestation program could be developed in concert with the GOES for the purposes of marketing carbon stored within the protected areas system. Both the carbon product marketed by either the second and third option would likely find buyers in the voluntary market if packaged appropriately. Additional recommendations are included in this report should IMCW seek to facilitate the growth of the carbon market on a national scale.

2. Project Background and Local Context

Through promoting biodiversity conservation, improved forest management, and sustainable agriculture, USAID programs in more than 25 countries help mitigate climate change by absorbing and storing carbon dioxide from the atmosphere. They also help reduce the vulnerability of ecosystems to climate change. USAID has funded environmental programs that have reduced greenhouse gas emissions while promoting energy efficiency, forest protection, biodiversity conservation, and other development goals. This "multiple benefits" approach to climate change helps developing and transitioning countries achieve economic development without sacrificing environmental protection.

IMCW is the cornerstone of USAID efforts in El Salvador to promote improved management of natural resources, improve the lives of local residents, and conserve biodiversity within the Barra de Santiago/El Imposible corridor and Rio Grande de Sonsonate watershed. Project-financed activities support the effective management of selected areas of high biodiversity importance while promoting responsible economic growth. Interventions focus on the conservation and managed use of biodiversity, water, forests, and other natural resources contained within the activity areas. Balancing these interventions is the promotion of incentives for long-term conservation to bring about changes in human behavior, increased financing for conservation activities, and outreach and education campaigns to heighten public awareness of the value of this complex ecosystem.

The project's 'Increased Income from Environmentally Sustainable Activities and Services Component' contributes to developing income-generating opportunities that reinforce long-term conservation. As part of this effort, new incentives for conservation through payment for environmental services (PES) will be identified and designed for piloting and replication.

Activity interventions are expected to generate sufficient economic return for the communities and local governments located in/near target protected areas, buffer zones, and biological corridors to ensure positive changes to behavior and attitudes regarding fragile ecosystems are sustainable.

Currently, the project is working with 250 coffee farms. These farms comprise approximately 10,169 ha of both coffee and forest. In addition to the farms, IMCW is also working to delineate 33,000 ha of forested protected areas within the two target watersheds. These forested areas are the principle targets of PES schemes that will provide local managers and surrounding communities with the economic incentive to conserve and sustainably manage the existing natural resources.

El Salvador's Coffee Sector and the Link to Deforestation

Coffee farms comprise the majority of standing forest biomass, and thus it is important to understand the links between coffee farming and deforestation rates in El Salvador. Numerous publications by various social and environmental research programs including the World Bank and various GOES entities have alluded to the six main socio-economic factors that contribute to, or influence, tree cover loss in El Salvador's shade coffee areas over the last 17 years¹.

- *Downward Spiral of On-Farm Investment and Yields.* The coffee crisis of the 1990's led to a downward spiral of on-farm investment and yields in the coffee sector. The spiral began when growers reacted to low prices by cutting back or completely eliminating farm management activities, such as pruning and the application of fertilizers and pesticides, which together account for approximately half of per hectare coffee production costs². Although such cost-cutting measures helped balance cash accounts in the short term, they also had short- and long-term negative impacts on yields.
- *Debt Burden.* Coffee producers in El Salvador depend on annual infusions of working capital from large private banks, mainly channeled through cooperatives and coffee mills. Today, the total outstanding debt in the coffee sector is estimated at \$200 million to \$400 million, an average of \$100–\$210 per quintal or \$1,200–\$2,500 per hectare³. Indebted coffee producers sometimes sold their land, in part or whole, to developers, conventional farmers, or ranchers in an effort to pay debt. In some cases, banks foreclosed on farms

¹ Personal communication with Carlos Isaac Perez, 2008. Carlos has extensive experience with the coffee sector in El Salvador and provided the information ultimately presented in this section of the report.

² World Bank; El Salvador: Coffee Price Risk Management. Phase 2 Report. August, 2001. Washington, D.C.

³ Ibidem 1 and PROCAFE (Fundación Salvadoreña para Investigaciones del Café). 2004. Boletín Estadístico de la Caficultura Salvadoreña. PROCAFE, San Salvador.

that had been used as collateral and did the same thing. In addition, indebted growers sometimes sold trees on their land for cash⁴.

- *General Poverty.* During the 1990s, poverty was pervasive in rural areas of El Salvador, including coffee growing areas. After the onset of the coffee crisis, poor, small-scale growers unable to meet their basic subsistence needs from coffee alone cleared portions of their farms to grow maize, beans, and other basic food crops. In addition, poor rural households sold trees for lumber and firewood, both of which command a significant per unit price in El Salvador. Finally, in some cases, rural entrepreneurs harvested trees on abandoned or poorly supervised farms without obtaining permission⁵.
- *Expanding Urban Frontier.* Over the past decade, all manner of farms, including coffee farms, have been divided into small lots and sold to construction companies or directly to homesteaders, a process known as “lotificación.” Lotificación does not cater just to the middle or upper class. Rather, small lots averaging 250 square meters with no preexisting buildings, infrastructure, or services, are sold at modest prices to low-income households⁶.
- *Migration Patterns and Remittances.* External migration and associated remittances are likely to have had both beneficial and detrimental effects on tree cover in shade coffee regions. Remittances may have enabled coffee-growing households to continue producing despite low prices and scarce credit and to avoid clearing trees to harvest the lumber or grow subsistence crops. On the other hand, remittances have fueled the demand for urban land uses and have financed the conversion of coffee farms to alternative land uses. In addition, stakeholders report that migration—both external and internal—has created a scarcity of coffee labor in the eastern part of the country, making coffee production less profitable⁷.
- *A Weak Legislative and Regulatory Framework for Land Use and Land Cover Management.* By law, MARN is required to issue permits for any changes in land use. With the improved legislative framework, however, is the need for an improved

⁴ Most cooperatives were heavily in debt and all of their profits were allocated to servicing their loans, leaving no funds for investment. For example, managers of a small (85 hectare) reform cooperative in the west region stated that they paid \$64,000 per year to service their debt and that their creditor has threatened to foreclose unless they are able to repay the outstanding principal. Similarly, a large (945 hectare) reform cooperative in the west region reported that they owed \$1.8 million and paid \$225,000 each year to service the debt.

⁵ Cuéllar, N. I. Gómez, S. Kandel, and H. Rosa. 2002. Rural Poverty and the Environment in El Salvador: Lessons for Sustainable Livelihoods. Programa Salvadoreño de Investigación Sobre Desarrollo y Medio Ambiente (PRISMA), San Salvador.

⁶ Cerrutti, M., and R. Bertoncello. 2003. Urbanization and Internal Migration Patterns in Latin America. Centro de Estudios de Población. Argentina.

⁷ Ibidem 4: Cuéllar et al. 2002.

enforcement capacity to implement the regulations associated with the new law. Currently, MARN does not have the resources to conduct a detailed review of permit applications and typically approves the majority of submitted permit applications without an in-field review⁸.

Overall, the dynamic socio-economic forces that have driven the deforestation trends in El Salvador have led to a present-day situation where there is little forest cover remaining outside the numerous, but small, protected areas or the remainder of shade coffee forests. Given the spatial distribution of coffee farms up the lower and mid-slopes of the volcanic regions, and frequent protected areas located on the upper slopes, the shade forest associated with coffee production is a significant ecological buffer. The maintenance of intact ecosystem function is of vital importance for the populations of El Salvador, where rainfall and watershed function are critically important for water service provision, whether to farmers or to municipalities. Additionally, the loss of agricultural lands in an agriculturally-based economy contributes to the loss of jobs, which often leads to greater delinquency, increased security threats and a more inefficient and insecure society⁹.

3. Climate change and the Evolution of the Carbon Market

As the scientific evidence regarding climate change has become certain, the effort to address this global problem has picked up both urgency and pace. After a very complicated participatory process, the world's countries have taken the policy position that it is their role to facilitate and promote a reduction in Greenhouse Gases (GHG) from their territory. While, the Kyoto Protocol has not been ratified by all the signing countries, it has become the benchmark for a global PES program in the form of the market-based solutions related to trading carbon credits. This is a regulatory market with legally binding targets for emissions reductions. Simultaneously, there is an actively emerging voluntary market for carbon credits that are traded, brokered and bought by companies or individuals not regulated by their governments to do so. Both the regulatory and voluntary markets are growing rapidly in terms of both credits traded and dollar amounts involved in those trades.

The market-based solution to GHG emissions was modeled upon other large-scale problems previously addressed in a "pollution trading" scheme – namely the Montreal Protocol designed to curb global emissions of chloroflourocarbons (CFCs) into the ozone layer, the Clean Air Act in the USA that led to a significant reduction in acid rain and created pollution trading in Sulfur and Nitrogen derivatives (SOX, NOX) at a regional scale, and finally the Los Angeles County

⁸ Environmental Governance to El Salvador; FUSADES & CEDES, 2007.

⁹ Alvarez, Juan Marco; CEO Salvantura Foundation, San Salvador and Manuel Benitez, team leader Component 1, IMCW, DAI, March 2008.

smog marketplace to locally address the emissions of pollutants amongst businesses in the surrounding counties. These markets demonstrated that there was some benefit to allowing the private sector to adapt to the requirements of emissions caps by providing flexibility to their response. In looking at IMCW activities in El Salvador, it is assumed that the projects will be focused on generating credits to bring to the voluntary marketplace. This is due to the types of credits that are likely to come out of the project area, the need to register and broker credits in a timely fashion, and considerations regarding USAID’s interest in promoting voluntary market mechanisms.

Carbon Market Mechanisms

The following information is presented to raise awareness of the emissions trading market mechanisms that currently exist for carbon projects. It is meant to highlight the fact that these mechanisms have been designed for both the regulatory and voluntary markets. There are several types of market mechanisms, each having a different role to play (see Table 1). The complexity of the presentation is not meant to confuse the reader, but to highlight the rapidly changing nature of the emerging carbon marketplace.

Regulatory mechanisms are used by entities to meet their legally-binding regulated carbon emissions allowances. These include all entities in Annex 1 countries that have ratified the Kyoto Protocol, companies in the European Union Emissions Trading Scheme, or entities in a growing number of local and regional markets. Voluntary mechanisms operate for use by entities that are not legally regulated, although, most carbon market instruments are legally binding, even though they are voluntary. This includes all individual purchases to offset personal carbon footprints, companies that retire credits for strategic or personnel satisfaction reasons, and/or credits purchased as gifts or donations. The rules and regulations required for carbon credits to be registered differ markedly between the various regulatory and voluntary registries. As a consequence, different mechanisms are better suited to certain activities or project locations.

Table 1: Current Carbon Markets

<u>Mechanism</u>	<u>Geographic Coverage</u>	<u>Scope of Market Services</u>
Regulatory Carbon Market Mechanisms		
Clean Development Mechanism (CDM)	Global	A project based mechanism in which the host parties do not have an emission cap or emissions reduction target. Carbon credits produced by registered and approved entities are called Certified Emission Reductions (CERs). The 15 categories of eligible CDM project activities include: agriculture, and afforestation and reforestation (A/R). A/R is the only land use activity eligible under the current phase of the CDM.

Joint Implementation (JI)	Annex 1 Countries (does not include El Salvador)	A project mechanism that allows carbon credits to be purchased by emitters in one Annex 1 country from projects implemented in another Annex 1 country or a country with an economy in transition. Emissions are called Emission Reduction Units (ERUs).
European Union's Emissions Trading Scheme (ETS)	Global	Began in January 2005 as the first international trading system for CO ₂ e emissions. Over 11,500 installations are covered within ETS, representing almost half of Europe's GHG emissions. Participating companies can buy or sell emission allowances, allowing targets to be achieved at least cost. Credits traded within the system are called European Union Allowances (EUAs). Currently, LULUCF projects are excluded from being traded in the ETS.
The New South Wales Greenhouse Gas Abatement Scheme (NSW GGAS)	New South Wales	This is an Australian state-level mandatory program launched in 2003 that establishes statewide annual emission reduction targets and then requires electricity retailers to meet bench-marks. Credits such as ERUs or CERs are not accepted nor are any offsets created outside of New South Wales.
Voluntary Carbon Market Mechanisms		
<i>Chicago Climate Exchange (CCX)</i>	Global	Currently the dominant North American GHG trading system. As a legally-binding system, members must legally commit to reduce GHG emissions. Standardized rules exist for issuing Carbon Financial Instrument (CFI), CFIs for different project types. The Land Use project types allowed are: agricultural and rangeland soil carbon management, forestation and forest enrichment, urban tree planting, and, in specified regions, combined forestation and forest conservation projects. Projects can sell offsets directly on CCX by becoming a participant member, or if the project involves less than 10,000 metric of CO ₂ equivalent per year, the offsets can be registered and sold through a registered Offset Aggregator.
<i>The Over the Counter (OTC) Voluntary Market</i>	Global	Project-based credits produced in this market are termed Verified or Voluntary Emissions Reductions (VERs). Buyers in this market are not driven by regulation but instead by various reasons such as: public relations, philanthropy, desire to reduce carbon impacts, the desire to prepare for expected future regulations, or for re-sale. Sellers of VERs generally represent projects that they either believe will benefit greater by selling credits in the voluntary market, or for some reason do not meet the regulations required in the CDM or JI.

Current Status of Existing Markets

The regulatory emissions offset market has grown very rapidly over the last several years. The World Bank¹⁰ estimated that the regulatory market alone grew to be three times larger in 2006 than in 2005, to over US\$30 billion. Sales of allowances in the EU ETS reached almost US\$25 billion and thus dominated the market. Project-based transactions such as CDM and JI almost

¹⁰ The World Bank, State and Trends of the Carbon Markets 2007.
http://carbonfinance.org/docs/Carbon_Trends_2007- FINAL - May_2.pdf

doubled in size and supplied almost 450 Mt CO₂e with a market value of over US\$5 billion in 2006. With 86% of the volumes transacted, European buyers dominated the CDM market. Despite the large size of this market, the Land Use sector has remained one of the smallest sectors in the CDM with only 1% of all CDM volumes originating from land use, land use change and forestry (LULUCF) projects worldwide.

While the voluntary market is much smaller than the regulatory market, in 2006 the voluntary market reached a value of US\$91 million with about 40% of that market under the CCX¹¹. The distribution of project activity and project type in the over-the-counter market (OTC) differs markedly from the CDM market. The recent Ecosystem Marketplace report on voluntary markets found that according to surveys conducted, forestry type projects accounted for 36% of the volumes transacted with about 15% of those originating from Latin American projects. The Ecosystem Marketplace survey found that prices of VERs differed by project type, location, and whether the seller was the project developer or a wholesaler/aggregator (Table 2) with the average price from the developer being US\$3.88/t CO₂e.

Table 2: OTC VER Prices by Project Type

Project Type	Price Range (US\$/tCO ₂ e)
Afforestation/ reforestation monoculture	10 – 13
Afforestation/ reforestation mixed native	0.5 – 45
Avoided deforestation	10 – 18
Methane- Livestock	6
Methane- Landfill	0.75 – 26
Methane- Coal mines	20
Industrial gas	4
Direct Fossil Fuel reduction	0.5 – 20
Off- Grid Renewable	5 – 18
RECs	0.75 – 20
Mixed	7 – 10

from: State of the Voluntary Markets 2007

Guaranteeing Investor Confidence in Carbon Credits with Standards

For credits to be verified and sold under the CDM, certain regulations and standards must be met. Guidance on these standards can be found at the CDM website¹² or the Guidebook on CDM project formulation. In the voluntary market, one set of standards does not exist for the entire market. Instead, several organizations have created various guidelines and standards.

¹¹ Hamilton et. al. 2007.

¹² <http://www.cdmrulebook.org/PageId/1>

Confidence, reliability, certainty, reputation - these are the watchwords for the sale of credits in the voluntary market, thus the selection of a reputable standard is critical.

Several standards have emerged within the voluntary marketplace to assist buyers to determine if the project is indeed achieving what it claims, abiding by its commitments, and meeting minimum standards while generating CO₂ offsets. A comprehensive assessment and verification methodology for a voluntary market product will still address all of the characteristics that a credit needs to demonstrate for the regulatory market. Thus, a voluntary market credit from LULUCF would need to demonstrate that it incorporates the values that are expected in all carbon credits:

- That environmental and financial additionality are present,
- That an acceptable biomass baseline was used,
- That the GHG sequestration or avoided emissions relative to the baseline calculations are conservative,
- That an assessment for leakage was performed,
- That the credits address permanence, which is easy with avoided emissions, and easier with temporary credits such as 5-year tVERs,
- That there is clear ownership, land tenure, registered with the CNR and therefore the carbon tenure,
- That monitoring and verification are performed according to approved methods and by reliable sources, and
- That the credits are publicly registered to provide a paper trail to offset serial numbers.

Currently Accepted Standards

The certification standards below are all in use currently in the voluntary market. It is not yet clear which standards will survive the next 5 year period, but it is likely that a LULUCF project in El Salvador would benefit from applying one of them.

- Voluntary Carbon Standard 2007 (VCS 2007)
- VER+
- Voluntary Offset Standard (VOS)
- Chicago Climate Exchange (CCX)
- Climate, Community & Biodiversity Alliance Standards (CCBS)
- Plan Vivo System
- ISO 14064-2
- GHG Protocol for Project Accounting

Registries for Carbon Credits

Transparent carbon credit trading relies on the use of registries which create an inventory of credit creation and ownership and prevent credits being sold to multiple buyers. Most registries keep track of both credits verified in a given year by a project and credit transactions. The major registries for the voluntary market include the Chicago Climate Exchange, California Climate Action Registry, the US Department of Energy 1605(b) Voluntary GHG Reporting registry, Environmental Resources Trust GHG Registry, Triodos Climate Clearing house, and the Bank of New York Global Registry. Different registries may require third party credit certification under a specific standard(s) or may provide its own third party validation and verification services.

4. IMCW Regulatory Market Carbon Credit Options

The first option for carbon sales is in the regulatory carbon market. The most likely options for entry into the regulatory carbon market for IMCW participants would be through the CDM of the Kyoto Protocol. There are currently 5 registered CDM activities in El Salvador, all of which are working in the clean energy production and energy efficiency sectors. MARN shows continued interest in these activities and is looking for new projects to register. We do not recommend this option for immediate implementation in the IMCW case, as the LULUCF projects are complicated and typically very slow to develop. Within the IMCW project zone, the two options that could generate credits that would meet the standards of the regulatory market are:

- 1) Avoided emissions from the adoption of new agricultural practices:
 - No-burn sugar cane,
 - Co-generation of energy from the burning of sugar cane waste.
- 2) Carbon sequestration and avoided emissions from forestry practices:
 - Afforestation/Reforestation CDM activities,
 - Avoided Deforestation- through the REDD methodology under development.

Under option 1, any program would need to be able to quantify the amount of carbon released during the burning of the sugar cane as opposed to growing in a no-burn regimen. Initial calculations by DAI did not show sufficient emissions savings at feasible scale to offset the costs of such a program (Del McCluskey, personal communication). In addition to the quantification of the avoided emissions from not burning the cane after harvest, a producer should capture those emissions in a biomass powered turbine, or a cogeneration facility that uses the sugar cane waste, after processing it for sugar, to generate electricity. CDM projects of this type are currently being implemented in both Brazil and India, and potentially in other countries as well.

Under option 2, the IMCW project is actively involved in the forestry sector through reforestation of critical watersheds and improved management of protected areas. Through properly designed reforestation work the project could conceivably generate carbon credits. This is complicated by the spatial array of plantings, and would be most applicable for areas where a few landholders with firm land title. IMCW's work with protected areas provides the opportunity to work in avoided deforestation. Current discussions about the second reporting period of the Kyoto Protocol, 2013-2017, include the desire to include avoided deforestation in the carbon credit marketplace. These discussions are leading to the formal development of REDD methodology. Currently, however, the REDD process is just beginning. In El Salvador, the remaining standing forests to protect are typically public lands within the protected areas network or lands in the private protected areas network. While the idea is intriguing, the

majority of protected areas in El Salvador are so small that it is difficult to make the business case, as transaction costs to enter the regulatory market are high and there is uncertainty in land tenure for most of the protected areas.

Although both options are potential opportunities, they are not recommended for USAID support at this time for two reasons. First, the period of time needed to meet registration requirements, along with high transaction costs for establishing a project, do not fit the current timeframe or resource availability of the IMCW project. Second, the US Government does not currently support the pursuit of CDM activities.

5. IMCW Voluntary Market Carbon Credit Options

There are three clear options for entry into the voluntary carbon market which USAID could support in the short term. These are:

- 1) Carbon sequestration in the biomass on coffee farms within the IMCW project zone. This includes a total biomass accounting of the coffee farms – lands in shade coffee as well as lands in fragments of natural forest;
- 2) Avoided deforestation from national parks and other kinds of protected areas, particularly mangroves; and
- 3) Afforestation/Reforestation of 60,000 trees in a 3-year period by the project.

Option one would focus on the coffee producers that are not currently part of the BMI's Café y Ambiente program. There is a high density of coffee farms in the project area, containing the shade-grown coffee varieties under the 'coffee forest' mixed with natural forest. These farms often also contain fruit trees or firewood plantations that can add significant amounts of biomass to the overall farm. For the voluntary market, the concept of carbon sequestration in the coffee forest would be to compare shade coffee to full sun coffee agro-ecosystems in El Salvador, and hold the farmers to promises regarding their maintenance of shade cover for their crops. The promises would also encumber land use decisions for any standing forest fragments on their property for the period of years for which the carbon credit is valid. These agreements would form the legal basis for which a project developer could claim clear tenure of the carbon credits generated on the coffee producers' lands.

One of the advantages to implementing a coffee forest carbon activity is the existing certification programs that many of the coffee producers are under. The coffee certification programs in El Salvador implemented by the Rainforest Alliance and Starbucks both contain some of the elements of a carbon credit program. For instance they included agreements by the producer to

preserve their remaining forest and include minimum densities of shade trees. This is a very important start to establish the baseline conditions to begin monitoring for biomass and carbon content.

Additionally, the IMCW project has been effective and efficient in a short period of time by recognizing the power of working with higher-order federations and unions of marketing and exporting agents for the coffee sector, when they already have relationships with the coffee producers. Collaborating with higher-order federations or unions makes sense if they are appropriate agents to aggregate farmers to participate in such a carbon program. UCAPROBES and UCAFES are unions of cooperatives that export products. Private coffee mills that export, like ABECAFE, may also be able to bundle participants. The aggregation of coffee carbon producers, via cooperatives or high-order federations or unions (“gremios”), will enable a carbon broker to mitigate risks associated with a particular farm not having clear title to their farm. For example, members of Cooperativa La Majada (an important service coop in the IMCW project area), and Cooperativa Cuscachapa all have titles. Additionally, land reform cooperatives, several of which are participating in IMCW, have titles as well.

Option two would focus on the five delineated and registered protected areas with the Centro Nacional de Registro (CNR) that has been completed with IMCW support. The land registration regulations require the State to have previously registered their lands in the same manner as private lands. Therefore, the registration of these lands is an important and time-consuming step in the process toward development of a carbon market project. These registered protected areas offer an opportunity to establish a model for marketing an avoided deforestation carbon product for the voluntary market. The mangrove areas are of particular ecosystem interest and are also marketable in the voluntary market to a number of interested buyers.

Finally, option three would capitalize on the anticipated 60,000 trees- principally native species- that will be planted with IMCW support in degraded and sensitive areas within the watersheds. These trees could be packaged as an OTC voluntary market product principally targeting individuals or those not interested in wholesale purchasing.

6. Policy, Legislative & Regulatory Framework for Carbon Market Entry

Like in most countries, there is an incomplete framework at the policy, legislative and regulatory levels in El Salvador due to the relatively recent emergence of the carbon market. However, an analysis of the legal framework indicates that enough structure is present to meaningfully engage in the development of carbon credit projects. Up to this point only 5 projects have been registered in El Salvador, and all are private sector endeavors in energy efficiency with less complexity than a land-use project across multiple private landowners or on public lands. That

said a review of existing laws provides sufficient confidence that the legal mechanisms exist to support LULUCF projects.

Additionally, there are precedents for government-supported PES as evident by the preparations for the Environmental Services Fund project that was to be implemented with a loan from the World Bank. While the loan was not approved by El Salvador, the experience was positive in that it left the regulatory capacity in MARN and a model for an independent Fund has been thoroughly developed. There is also a designated national authority (DNA) for the regulatory market housed within MARN.

This office is charged with determining if climate change projects are in agreement with the national policies and goals, and whether they comply with local and national laws. In conversations with the climate change focal point in MARN, Rebecca Magaña, she mentioned that the Ministry was in the process of developing a climate change policy, due out in late 2008.

Recommendations for Improving Policy, Legislative and Regulatory Framework to Support LULUCF Carbon Market Projects

As MARN develops their policy regarding climate change, it is recommended that either the IMCW project or other interested

organizations encourage that the following points be clarified so that a healthy and transparent carbon market can grow in El Salvador.:

- Explicitly include both the regulatory and voluntary markets in policy formulation.
- Clarify the criteria used to determine if a carbon market project satisfies their expectations for “contributing to the sustainable development of the communities.”
- Determine the legal status of a carbon credit: Who owns it? Does it belong to the land, to the landowner, or to the nation?

Openings for Carbon Credit Projects within Existing El Salvador Legal Code

Environmental Law:

- Financial Mechanisms for Environmental Management. Art. 34: “The State will promote financial mechanisms for environmental management, public and private, with private resources or within the realm of international cooperation.....”
- Establishes the public sector Environmental Fund, as a subset of the general fund that can receive funds specifically destined to a specific project – such as receiving payment for carbon credit sales from State, or public lands. If credits are sold, the Environmental Fund is the mechanism for the money to be destined for use by the protected area that generated the carbon credits.

Protected Natural Areas Law:

- Art. 39: “The Areas...allow public and private, “municipal” and autonomous, institutions to participate in the markets of environmental services and their owners will be able to benefit from these markets....”
- Art. 40: “It will be able to create trust funds or financial programs with public or private funds, ..., specifically for the management of the System, generated by: ...,PES...the fund of Special Activities is already formed”

- Clarify the situation with the sale of credits from lands that do not have clean title, whether they are private or public lands. (For example, from National Parks not yet registered with the National Land Registry.)
- In relation to REDD from protected areas, examine the co-management agreement with the NGO-manager for each particular park area to make sure that cost recovery from the sale of carbon can be used to offset investments in capacity building and hiring of personnel to monitor and certify the carbon in the forest.
- Assist in the design of, or improvement of, a model for co-management contracts that specifically focuses on the issues surrounding carbon credits.
- Generate a new independent fund, separate from the state, managed by another entity for the sale and recuperation of revenue from Carbon Credits, and the payment for project investments and cost recovery.

7. Local Institutional Capacity to Develop, Verify and Market Carbon Credit Projects

The Team met with a number of people and institutions identified as players or potential players in the development El Salvador's carbon market.during their week in El Salvador (see annex A). Of the institutions and people, only MARN and BMI were actively involved in some aspect of a carbon credit generating activity. Numerous other entities expressed interested in participating in a carbon credit project, or were trying to determine how they might enter the marketplace, but were encountering daunting barriers in time, money and capacity to begin.

Banco Multisectorial de Inversiones (BMI)

BMI is actively developing their capacity to market carbon projects primarily for the regulatory market. They are in the process of implementing a voluntary market activity, Café y Ambiente, but are approaching the development of the carbon products generated through the program exactly the same as a project for the regulatory market. This is unfortunate, as the two markets have different criteria for entry, and the voluntary market credits can be ready for commercialization much faster than credits for the regulatory market. BMI has institutional experience with CDM projects and does not have any voluntary market experience, which is likely why they are treating 'Café y Ambiente' as another CDM project in their portfolio.

BMI has contracted EcoSecurities to consult on the project development, certification and brokerage for the voluntary market project. There is strict confidentiality around the ongoing work, so we could not determine anything about the current status of the work. The Team contacted half a dozen people in BMI and EcoSecurities to try to learn about the process and protocols that were being used in the Café y Ambiente program, but was unable to work through

the confidentiality setting. BMI has contracted SGS as their Validator – which mirrors their formal market orientation.

Representatives at BMI expect to sell tVERs to the voluntary market at a price of \$2-\$4 t CO₂ based on the assumption that the average biomass of their coffee producers' farms represents 350 tons CO₂/ha. This is a rather large amount, but not outside the possible. At those prices and quantities of CO₂, the BMI expects to get a Gross Income of M\$52.5-M\$105 over a 5-year period, with options to make it 10. They currently have 2,500 coffee producers registered in the program that represent 75,000 has. It appeared as though BMI had capacity but that they were more interested in the regulatory CDM market - and that the Café y Ambiente project was a response to the relieve the debt burden carried by coffee producers.

Ministerio de Ambiente y Recursos Naturales (MARN)

The National GCC office and Focal Point office are housed within MARN in order to support the formal carbon market (Kyoto Protocol). They are currently elaborating a national climate change policy, which should also incorporate actions in the voluntary market, due in the latter half of 2008. There are good intentions at MARN, but there is a scarcity of resources, especially human resources, to achieve their goals and meaningfully participate in the carbon credit marketplace.

SalvaNatura

As the leading environmental NGO in El Salvador, Salvanatura is well positioned to become active in the development of El Salvador's carbon market. Their experience in coffee certification with the "ECO-OK Label": promulgated by the Rainforest Alliance is a useful stepping stone for launching themselves as providers of services to monitor biomass baselines and incremental growth in order to certify carbon credits and develop carbon credit projects of their own. They have been invited by the BMI to present a proposal for carbon verification/certification in the coffee plantations for Café y Ambiente.

PROCAFE

As a representative entity for 23,000 coffee producers in El Salvador, they are interested in determining how best to facilitate the entry of their members into a carbon credit project. Of the overall PROCAFE membership, 14,000 producers registered in BMI's Café y Ambiente program – which is only applicable to indebted producers. That leaves 9,000 members who are not eligible for entry into the BMI program. PROCAFE is interested in making a strategic alliance with USAID's IMCW project to get a pilot project started with the 9,000 producers who do not carry debt and are therefore not able to participate in the BMI program. PROCAFE stated that they will contribute field teams, farm info, and personnel to assist in developing a pilot carbon credit PES project. An unresolved issue is the degree to which these farmers have land titles.

Recommendations for Improving Institutional Capacity to Support LULUCF Carbon Market Projects

A successful carbon market project for El Salvador would benefit in the short and long term if there were strong national capacity along all layers of the project development chain. The following are recommendations for capacity building of national organizations which could either be supported by IMCW or other interested organizations:

- Develop the capacity to monitor carbon stocks in biomass (whether different forest types – broadleaf, mangrove, coffee agroecosystems, sugar cane, etc.) and certify credits for the voluntary market.
- Develop an Environmental Services Registry within MARN. A simple database listing what environmental service was created, by what activity/project, and then the database assigns a specific serial number for those services marketed from activities within the country. Or add the serial number to already marked credits (perhaps with GPS coordinates and a vintage year).
- Promote the establishment of a separate entity to market environmental services from the country, or develop a relationship with a reputable broker.
- Develop the capacity of local NGOs co-managing protected areas to work with carbon measuring, accounting, reporting for ongoing certification/validation of previously sold credits – whether through REDD or voluntary market programs.
- Create or identify and strengthen an organization to serve as an Environmental Services National Fund with the fiduciary responsibility to sustainably divide the benefits from the sale of ecosystem services to the interested parties – people changing their behavior.

8. Detailed Options for Supporting El Salvador's Entry into the Carbon Market

a) Collaborating with BMI's Café y Ambiente Program

As there is already an existing coffee carbon market effort in El Salvador, it makes sense for IMCW to try to coordinate its activities to support this ongoing activity. There are many benefits to taking this course of action. The Café y Ambiente Program shows signs of sophistication in the policy and legal levels of its project design and early implementation. The project design included a significant effort to register over 2,500 coffee producers and organizations; PROCAFE states that 14,000 of their members are registered in the Café y Ambiente program. These 2,500 coffee producers (a producer can include many individual farmers – as with a cooperative or a coffee growing association) have all committed to a number of land use compromises that add credibility to the potential for BMI to expect carbon credits from the land. Additionally, all of the coffee producers have had a thorough legal assessment done of their

farms/roasters/export facilities, whatever coffee asset is in debt. This process required that information be gathered about the production facility, the financing and debt profile, the exact land area under each specific land uses (farm map), and a legal encumbrance on the land.

This initial project screening and legal due diligence was a large task. It involved many people to complete a thorough database with sensitive legal and financial information and it covers a total land area of approximately 75,000 has. That is large enough to capture an economy of scale that absorbs the high transaction costs into a functional business model. The project theoretically includes 75,000 has for a period of 5 years (with an option for 10). Lastly, the project has formal government support, as it is responding to a request from the coffee sector directly to the government for assistance with their debt burden.

By undertaking the effort to implement CDM projects, significant capacity has been created within BMI to understand the carbon credit marketplace and design and implement projects for the regulatory market. Unfortunately, none of their active projects were for the voluntary market, and none of them are in the LULUCF sector. These two distinctions are very important, and are proving to be difficult for the BMI to handle as distinct from a CDM clean production project. The fact that the Café y Ambiente program is being managed internally at the BMI as though it were a regulatory CDM project raises a number of questions about the capacity for implementation in a timely manner. The program, to this point, has spent a very long time getting designed, having the preliminary legal work done to register lands in the project, and begin to explore how to monitor baseline biomass; yet it is not at all clear if it can actually be implemented. This uncertainty provides room for IMCW to provide assistance in addressing the gaps.

First, IMCW could provide a different perspective to their project design activities. Currently, BMI is in a highly confidential advisory relationship with EcoSecurities to do everything technical related to the design and preliminary implementation of the Café y Ambiente program. This relationship may or may not be serving BMI well. BMI appears to be happy with their carbon marketplace partners, EcoSecurities and SGS, and have benefited from working with them on their previously registered CDM projects, the Café y Ambiente program is destined for the voluntary marketplace which makes it different than their previous projects. It would make sense adjust the procedures and protocols used to the more streamlined ones of the voluntary market. BMI's Café y Ambiente program is following the same path that their CDM, regulatory market, projects follow with respect to project design, validation, verification and certification – not all of which are necessary in the voluntary marketplace. Additionally, projects in the LULUCF sector are significantly more complicated than the clean production or energy efficiency projects that BMI has experience with. IMCW could provide significant assistance by

clarifying these two distinctions in BMI, and facilitating their internal learning process about how best to handle this unique voluntary market LULUCF project.

Secondly, IMCW has strong relations with the coffee farmers in the project area. These strong relations, combined with those of PROCAFE, could stimulate a rapid adoption of carbon accounting and improved land use practices by the coffee farmers in the program. It is also more likely that the IMCW project, in conjunction with PROCAFE's technical teams, could assist the coffee producers to build the capacity to monitor their own farms for biomass and carbon content. There is limited capacity in El Salvador to mobilize communities and farmers around environment considerations, and the IMCW project has already made these connections as well as implemented other PES activities.

Prior to IMCW assistance, it is preferable that the Café y Ambiente program address several questions regarding the implementation of the program. Responses to the following questions will help determine the risk involved for USAID's investment as well as the likelihood that the project will be viable for a commercial market.

- A number of items related to the lack of transparency in the process: in exchange for debt relief what exactly are the coffee producers responsible for?
- Who will do the baseline assessment? What methodologies will be used? What role will the farmers have in monitoring the biomass from their farms?
- Will the farmers know how many carbon credits are generated from their lands and at what price is BMI selling them?
- The benefit distribution questions – related to the how much, who, what, where and when of the financial flow. The coffee producers know they get 30% reduction in their debt service payments, but what do the other parties involved get out of the program?
- The agreements between the project proponents. There is a non-transparent process with the project proponents stipulating what their agreements are – this is specifically true between BMI and EcoSecurities. Does EcoSecurities already have an exclusive claim to either purchase or broker the credits from the program?
- The field level activities with coffee farmers and cooperatives, over 75,000has, have not been described or defined other than in general terms.

b) Coffee Carbon Pilot Program (CCPP)

In the meetings with people, institutions, government and communities it was clear that there is significant interest amongst project stakeholders and area landowners to participate in a carbon credit project. USAID, through the IMCW project could enter into a pilot carbon market activity that is not linked to the Café y Ambiente program with the coffee producers in the project zone who were not eligible or interested in the Café y Ambiente program. PROCAFE

has stated that of their 23,000 members, 14,000 are registered in the BMI program and 9,000 are not. These 9,000 members either do not have any debt, did not qualify for the program for whatever reason, or they carried their debt in a different name than that of the farm or production unit. The Coffee Carbon Pilot Program (CCPP) would work with the coffee producers in the IMCW project area who are interested and willing to make the necessary commitments to conform to the market standards. The IMCW project would play a facilitative role and train and mobilize the producers to achieve the goals of the Pilot Project, but would not have a vested 'stake'.

IMCW could facilitate a CCPP that would be small enough that project participants could properly manage it, and it would enable all participants to learn from their experience. If IMCW were to promote a Coffee Carbon Pilot Project, it should make full use of its competitive advantages and recognize its limitations.

- IMCW is not a permanent entity in El Salvador, it is not a land owner, and it is not a carbon asset owner.
- The project has a short-term presence with the coffee producers and communities and is not able to make promises regarding land use.
- Coffee producers and communities must be mobilized for action if a carbon market project is to succeed in reforestation, conservation and protection. In El Salvador, that capacity is weak and outside of IMCW, the organizing capacity is almost absent.
- IMCW does provide an essential "missing link" for carbon projects – a scalable capacity to organize coffee producers and communities around environmental awareness and provide training for the essential tasks of reforesting, protecting and monitoring the areas included in the Pilot Project.

Bundle Services Among Self-Selected and Committed Coffee Producers

As the landowner, the coffee producers are interested in including both Afforestation-Reforestation on the lands that they are planting, rehabilitating, or re-establishing shade coffee plantations, and Avoided Deforestation on forested fragments that are under threat of deforestation. The proposal to bundle carbon credits from the two types of forestry activities is relatively new, and would provide for a more integrated approach for fitting a carbon PES into the actual activities and needs on the ground in Sonsonate and Ahuachapán. Initially, IMCW would perform a comparison of the databases between the USAID project's coffee farmer beneficiaries with the member databases of PROCAFE & the Consejo Nacional del Café to create a list of coffee producers in the project zone. That list should then be compared to the database of coffee producers registered in the Café y Ambiente program to finally create a list of eligible coffee producers in the IMCW project zone that have had prior contact to the project. From that list, a self-selected group of the coffee producers that will commit to selling the carbon

stored in the biomass on their farms to the voluntary market under the criteria of the CCPP will emerge.

In order to develop a pilot carbon credit PES activity with this self-selected group of coffee producers, the IMCW project would require formal compromises on behalf of all CCPP landowners. These compromises would take the form of legally binding contracts that encumber the coffee farms to certain standards of behavior with respect to their land use management for the period of time that the carbon credits sold from their lands are valid. The recommended carbon credit instrument for the CCPP is a temporary Verified Emissions Reduction unit, or tVER, that has a 5-year period of validity that would be renewable every 5 years for at least 3 periods - or 15 years. In exchange for the following promises by the farmers, the IMCW would initiate the project development process. The CCPP farmers must:

- Commit to not reduce the aboveground biomass on their farm, below the amount that they present to the program at the time of initial verification.
- Demonstrate a farm level commitment to sustainable environmental management and the conservation of natural resources and biodiversity.
- Demonstrate clear land title to their farm – and therefore clear tenure to the carbon.
- Enter into the formal agreement with the joint CCPP joint venture representing all of the producers. This includes agreements stipulating the operating principles of a new entity based upon the representative portion of biomass that a farm brings to market. Management of this entity will transparently share all figures about costs and benefits with all members.

Guatemala Carbon Sequestration and Sustainable Coffee Project

Coffee is one of the most important agricultural exports in Central America and shapes the economies and societies of the region. Traditional shade-grown coffee is an important alternative to sun-grown coffee because it does not require as intensive labor and produces less stress on natural resources – water and soils. As farmers shift to more sustainable agriculture practices like this, they typically incur short-term yield and income losses, a strong disincentive for poor growers. This is where carbon inventory and monitoring becomes important. Methods have been developed and field-tested for inventorying and monitoring carbon storage in forests and coffee production systems. In Guatemala, the methodologies for shade coffee biomass monitoring were developed and successfully applied. This was completed over a one year period, from 1998-1999, under a USAID and Ford Foundation financed activity by Winrock International.

The Guatemalan cooperative “La Voz Que Clama en el Desierto” (The Voice that Cries in the Desert) was selected as the test site for the carbon inventory and monitoring plan. Technicians from the national coffee cooperative (ANACAFE) and Fundación Solar were trained in carbon measurement protocol and permanent sample plots were established. The inventory data was analyzed and estimates of the total biomass, converted to carbon, in four coffee/shade-tree production systems were generated. These biomass estimates were then used to project the potential carbon offsets from two project scenarios with the Guatemalan coffee farmers. The projections led to the development of a carbon inventory and monitoring plan in the Lake Atitlan Region of Guatemala where farmers produce shade-grown coffee akin to the El Salvadoran coffee production systems, and determine the potential carbon accumulation or “sequestration” benefits of this agricultural activity.

The Guatemalan coffee cooperatives developed applicable carbon monitoring protocol for their coffee/shade tree systems. Staff was trained to continue the carbon monitoring methods, and the results of the project were used in the development of a USIJI proposal for the generation of carbon credits on the regulatory market.

- All farms will allow CCPP related technicians to visit with adequate notice for the purposes of marketing, monitoring, verifying, certifying, validating, and adaptive management purposes.
- Potentially all farms will participate in monitoring their lands according to established protocols and report those figures annually to the CCPP joint venture.

Forming a Legal Entity to Represent CCPP in the Market

One of the more interesting elements of the criteria above is the willingness to enter into a joint venture with all of the other coffee producers to collectively market the carbon credits from each producer's farm. This is necessary for a number of administrative reasons, but no carbon credit project could withstand the transaction costs of each farm designing its own project and having third party certification. Therefore, an interesting organizational development challenge is created in the need to organize all of the producers into an entity to represent them in the carbon marketplace. They need to have an entity that can legally sell or transfer the carbon credits from the CCPP as a whole to the marketplace or to a broker to do so on their behalf. That means that they must create a CCPP joint venture that includes all of the coffee producers as members with proportional share equal to the number of carbon credits their farms contribute to the total available for market. This CCPP joint venture will:

- Submit all carbon stocks to be sold in the voluntary market to MARN to be recorded in their Environmental Services Registry, if it exists. If not, the CCPP will maintain its own registry of the carbon credits produced and uniquely identified by serial numbers.
- Develop an institutional governance structure that enables them to make policies and operational decisions on behalf of the membership in a transparent manner to all members. The institutional governance should include specific corporate officers and a board of directors – and elections for corporate officers and board members should be held at regular intervals, and include term limits.
- Coordinate the initial training of the CCPP extension teams (whether they come from PROCAFE, IMCW or another entity or some combination thereof) by a well respected entity within carbon monitoring: Winrock, CATIE, SGS or TUV.
- Coordinate with PROCAFE who has mentioned their interest in participating in a coffee forest carbon credit program by working with IMCW technicians to train the CCPP producers how to perform carbon monitoring on their farms. Including the establishment of fixed, permanent plots. (variable radius permanent plots – for monitoring different aboveground carbon pools).
- Coordinate all technical activities of the CCPP: baseline audits, biomass inventory, periodic certification, verification and registration of credits.

- Develop a financial governance structure that enables them to distribute costs and benefits amongst its members in a transparent manner to all members.

Transparent Management of Carbon Project Benefits to Sellers

The question “How does the money get distributed?” came up repeatedly during the field component of the Assessment. The coffee producers’ familiarity with the BMI program and in some cases with PES related to their water supplies made it easier for them to internalize the carbon market concept. A well designed distribution mechanisms for the benefits from the sale of carbon credits should be clear to all parties and be negotiated amongst all parties at the beginning of the project. IMCW could facilitate a process that models:

- Transparency in measurement of the assets – carbon accounting, monitoring, conversion of biomass measurements into credits. This assures that everybody knows how many credits there are for sale.
- Transparency in the distribution of benefits. Everybody knows what price the credits sell for and how it is distributed.
- Clarity on the timing of the release of benefits, according to a payment schedule, and who is able to access the funds.

An example distribution mechanism that the CCPP might consider would include the following elements:

- All project participants would know how many credits they can sell from the various activities: reforestation and avoided deforestation across farms.
- All project participants would be informed of what purchase agreements have been made, what volume was purchased, by whom, and at what price.
- All project participants would be informed about all the costs are associated with the transaction and what the net return will be.

Once transaction and operations and maintenance costs have been recovered, and the brokerage fee has been paid, IMCW should consider promoting a system to distribute the net return according to a relative split. As an example, given that the coffee producers are doing the reforestation and conservation work on the ground, they could receive as high as 90% of the benefits. The remainder of the revenue could be distributed amongst the various government entities that actually own the roads and infrastructure that service the farms, or have a say in forestry and forest management. Perhaps 7% could go to the district government and 3% to the Ministry of the Environment to improve their climate change capacity, or an environmental trust fund at the National level.

IMCW should facilitate a participatory decision-making process that identifies how they gain access to the benefits. Whether they want to distribute them according to some measure of the

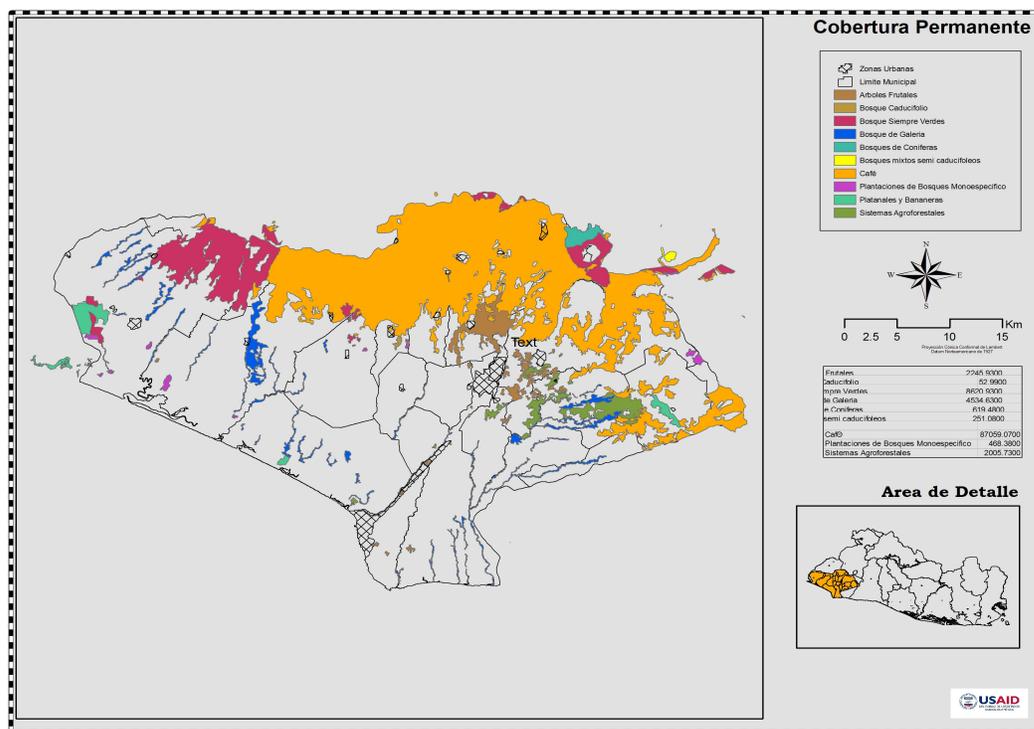
relative contribution of carbon credits or land area or labor, these decisions should be taken by the members themselves and be clear to all. Operationally, all levels of payment will likely be some sort of wire transfers from the seller/broker directly to banks and sub accounts. The direct deposit from outside reduces the potential for problems and undue influence on the financial flow. Then, each producer needs to decide who can withdraw funds from their account and by what mechanism. For individually owned farms this is an easy choice, for a cooperative it may be more sensitive to determine who has access to withdrawal PES funds, perhaps with a countersignature required.

Lastly, a good distribution mechanism will identify the timing of payments. In the case of 5-year tVERs, with a sale of avoided deforestation credit inventory up front, the payment should be put into bank CDs with a payout plan for even payments over a 6-year period. Because the money came in up front, but needs to last for at least 5 years, it is paid out over time, perhaps with quarterly distributions, so as not to put too much money into the coffee producers' communities at one time, and to make sure that there is a continued flow of funds.

A brief representation of the broad steps that the CCPP would have to take, who might take them, and who might pay for the initial project development is presented below.

Broad Activities of the Coffee Carbon Pilot Program	Candidate	Who pays
Project promoted with the coffee producers	PROCAFE, gremios, exporters	PROCAFE – already involved
Create CCPP Joint Venture as a legal entity	To be created	The coffee producers themselves
Technical Assistance to do biomass inventory	TBD, PROCAFE & IMCW	TBD – in kind from CCPP Joint Venture
International certification	To be contracted	TBD
Technical Assistance to design and package the C-Credit project for market	To be contracted	TBD and CCPP joint venture
Brokerage or Sale of C Credits	TBD – options exist in the marketplace	CCPP joint venture pays through brokerage fees

A map highlighting the areas in Sonsonate and Ahuachapán watershed that have forests and 'coffee forests' is presented below. The IMCW project currently works throughout these watersheds. For the purposes of a CCPP, it would focus on the upland areas where both coffee and natural forests are present.



c) Avoided Deforestation in Protected Areas (ADPA)

IMCW is an ideal GHG mitigation program because one of its main objectives is conserving forest and reducing deforestation. Many wildlife species live in El Salvador's protected areas – but the mangrove swamp areas provide a particularly useful convergence of climate and biodiversity issues. This is especially true as the mangrove swamp forests have significantly more tons of CO₂e in them than forested ecosystems on mineral soils – as the peat and highly organic mineral soils themselves act as a large carbon sink. This linkage of biodiversity conservation and avoided deforestation through a carbon credit PES is certain to generate demand for carbon from a project of this type in the voluntary market.

In order to achieve this goal, IMCW would need to carefully select a site where there is a capable on the ground conservation partner, a willing local government, and entities that have clear control over land use and well defined land tenure. IMCW could directly work to build capacity to design and implement a project, train carbon accounting and forest inventory techniques, and/or seek assistance from a public-private partnership. The main objective of IMCW's involvement in the avoided deforestation activities would be to encourage the inclusion of poverty alleviation, improved governance, equitable benefit sharing, and biodiversity conservation in the carbon project approach.

The IMCW project has established the precedent of legally registering small protected areas with the CNR. The IMCW has over 12,000 ha in the project area. These lands stretch across the terrestrial ecosystems from cloud forests to mangroves, with roughly 1,000 ha of cloud forest, 5,000 ha of broadleaf forest, and 6,000 ha of mangroves. Currently, there are 5 small protected areas, all smaller than 184 hectares, within the Salvadoran Protected Areas network that have been registered with the CNR and the IMCW is currently working towards the registration of the larger protected areas that include the mangrove forests.

At 6,000 hectares, a pilot avoided deforestation project for the voluntary market incorporating the coastal mangrove ecosystem would have some benefits of scale. It is likely that it could not only recover the costs associated with designing and implementing the project, but that there would be additional revenue that could be channeled back into the management of the park. There are, however, a number of questions that need to be clarified with MARN and other relevant GOES agencies prior to investing heavily in an avoided deforestation project from public or state owned lands. The following questions must be satisfactorily answered:

- What is the capacity to legally sell an environmental service from state lands?
- Who has the authority to sign sales/purchase agreements?
- Is there an established mechanism, and capacity, to transparently manage the financial transactions and directly reward the Protected Areas that generated the PES without the funds going through the general fund?
- Is there a willingness on the part of MARN to strengthen the co-management agreements with the NGOs managing the Protected Areas, especially those that are generating revenues from carbon credits?

If the answers to the above questions are found to be satisfactory, then active assistance from MARN should be provided in order to implement an ADPA project. MARN would have to work directly with the NGO co-manager to create a Protected Area management plan that includes the sale of carbon credits. If, for example, IMCW would pursue ADPA for the mangrove protected area it is in the process of registering, the co-management NGO will need a significant organizational capacity building effort to bring them meaningfully into the project. Additionally, as the landowner, MARN would have to grant the right to market and sell/broker carbon credits to a third party and provide a formal letter of support of the carbon project, not only a letter of no objection or letter of approval, as the project is taking place on their lands. This documentation will be necessary to ensure buyer confidence.

In addition to the tenure-related and organizational management aspects of the protected areas, it is also important to consider the groundwork required to bring ADPA to market. Specifically, the project will need to carry out a field inventory of the targeted forest. Using the mangroves as an example, this inventory is best designed as a sampling effort. This sampling strategy will

need to utilize accepted methods. A stratified sampling strategy, likely based upon salinity gradients or distance from mean sea level or high tide line, will be used to gather information about the forest species, height, DBH, and GPS coordinates for basal area and density measurements. This inventory data can be converted to an average aboveground biomass number per hectare with the use of appropriate allometric equations, which are available for most mangrove species.

Once the amount of CO₂ is known, it is a matter of packaging the carbon credits for the voluntary market, with an eye to the types of consumers interested in buying them and preparing the information packets and marketing plans accordingly. An IMCW consultancy could be used to create a carbon product package for market from El Salvador's Protected Areas Network, or from any particular park that is selected to implement a carbon credit project. It should be noted that the scale of the mangroves protected area combined with the importance of that ecosystem and the severe threat that it is experiencing globally make that the most compelling choice for an ADPA.

A brief representation of the broad steps that the CCPP would have to take, who might take them, and who might pay for the initial project development is presented below.

Broad Activities of the Avoided Deforestation in Protected Areas Program	Candidate	Who pays
Project promoted with the PAs	MARN	MARN – already involved
Clarification of Co-management agreement and PA Management Plan	MARN & NGO - Determined by PA	MARN and NGO
Technical Assistance to do biomass inventory	TBD, MARN & NGO	TBD
International certification	To be contracted	TBD
Technical Assistance to design and package the C-Credit project for market	To be contracted	TBD and PA Group (MARN and NGO in representative fashion)
Brokerage or Sale of C Credits	TBD – options exist in the marketplace	PA Group pays through brokerage fees

The following map shows the vegetation types in the various types of land use categorized as natural or protected in the Sonsonate and Ahuachapán watersheds. Additionally, it shows in

- b. **Project due diligence.** *(2-6 weeks duration)* An extension of the previous step, this element produces an environmental monitoring plan and socio-economic survey work to determine baseline levels against which the project can be evaluated during and after implementation. A reasonable cost range is \$5,000-\$10,000.
- 3) **Planning for distribution of carbon credits.** *(1-2 weeks duration)* This step compares the options available in the marketplace, and is based upon connections to the right people. It involves determining the brokerage, direct sale, emissions reductions purchase agreements and distribution mechanism to project participants and may require the services of an attorney. A reasonable cost range is \$1,000-\$2,500.
- 4) **Validation of baseline and operational plans of the project.** *(6-12 weeks duration)* This is an external, third party validation. Typically it is dependent upon the availability of the validator and their turn around time for the final report. This depends upon what certification standard the project is using to generate credits – as the criteria for the validation are different. A reasonable range is \$20,000-\$30,000.
- 5) **Registration of the project with pertinent authorities.** *(2 to 6 weeks duration)* This step usually is pro-forma and can take only a couple weeks for formal communications to take place. However, if the relevant authorities are not familiar with the process, this can be a long and slow process. This should be relatively inexpensive, but if the project wants to register on a membership registry it may cost to gain entry. A reasonable cost range is \$2,000-\$5,000.
- 6) **Project start.** *(duration dependent on type of project)* This is where all the action in the field takes place. This is the coffee producers planting trees, the GOES registering boundaries of the protected area, the BMI technicians performing biomass inventories over time. These are costs that should be recovered through the sale of the carbon credits, but will need to be paid the first time. These costs are too variable to estimate in general terms. Many will be subsidized through other ongoing activities, and the scale of activities between various potential projects is too great.
- 7) **Verification of the carbon sequestered.** *(2-8 weeks in duration)* This is the step where a third party verifies that carbon credits have been generated either in standing or additional biomass since the beginning of the project, as defined in the PDD, and what volume was generated by which project activity. This usually takes place after the first or second year, depending upon how frequent the project’s monitoring plan calls for it. A reasonable range is \$25,000-\$40,000 with greater expense being paid for the first verification, with decreasing costs for the service over time.
- 8) **Certification and Issuance.** *(several days to 2 weeks)* Once the carbon is verified, the credits are then added to a carbon trading ‘registry’ to be identified with unique serial numbers and become eligible for trading. A reasonable cost estimate is \$3,000.

- 9) **Sale or Brokerage of the project generated credits.** If this is a straight sale, then the funds will be transferred back after the sale. If it is a brokerage arrangement, the funds will be sent back to the project developer/implementer on a rolling basis as they sell. The cost for brokerage is dependent upon a number of factors – the expectation of how fast the inventory will move, the expected price point that the credits will sell at, the overhead of the brokerage house, etc. Brokerage fees for LULUCF projects vary between 5%-25% of the value of the sale, while brokerage fees for avoided emissions are typically significantly lower. This stems from the permanence problems that are inherent in LULUCF projects, and their generally bad reputation in Europe, where they are not even allowed on the EUTS.

10. Estimated Potential to Make Carbon Credit Sales a Success

All three IMCW preferred pilot carbon credit alternatives are directed to enter the voluntary market. This was a conscious choice, as the timeframe to bring credits to market can be significantly shorter, and potentially occur before the end of the IMCW. Whether USAID is interested in: 1) collaborating with BMI on the Café y Ambiente program, or 2) working with MARN to bring an avoided deforestation from protected areas carbon credit project to market, or 3) a coffee carbon pilot program with coffee producers in a smaller and more easily controlled activity, it will be taking an important step towards integrating climate change mitigation into its programming.

Based upon the findings presented in this report, the Team believes that the BMI project is unlikely to be a satisfactory pilot activity for the IMCW project. This determination stems from the belief that institutionally, BMI, is not focused on the Café y Ambiente project in the same way that it is on the development of its ever growing climate change portfolio under the CDM. BMI has numerous ongoing projects as well as many in the pipeline directed at the CDM. The only project that they have for the voluntary market is the Café y Ambiente program that appears to be a response by the bank to political pressure from the coffee sector. The very deliberate and slow pace that the program has started is cause for concern that it will not be able to generate positive results during the timeframe of the IMCW project.

The ADPA is likely to have moderate potential to be a satisfactory pilot activity for the IMCW project. While the avoided deforestation project from the mangroves protected area has the greatest potential of the pilot carbon credit activities, it also faces some significant challenges. These challenges can be broadly categorized as depending upon the El Salvadoran government to quickly engage and facilitate the resolution to questions surrounding protected area registry, operational guidance on carbon credit revenue generation off public lands, and co-management arrangements as applicable. The sheer quantity of uncertainties, many identified in this report, lead the Team to be concerned that the ADPA would be more difficult to bring to market within the timeframe of the IMCW project.

Of the three options, it is the opinion of the Team that the CCPP has the greatest potential to be a satisfactory pilot activity for IMCW project support. The timeline that remains for the IMCW project make it a close judgment as to whether there could be actual sales of carbon credits prior to the end of the IMCW project. Depending upon the sophistication of the coffee producers, the CCPP could be selling credits to the market – or presenting credits to a broker by that point, or at least be well on its way. There are a number of advantages to working on the CCPP: the beneficiaries are motivated, have clear title to their lands, are used to working the land and have the capacity to do so, are likely to be technically capable, and are private sector actors interested in the time value of money. In the expert opinion of the Team, there is a better than average chance for this project to achieve carbon credit sales prior to project close out, if it is fully supported from the beginning.

ANNEX A

Contacts made and meetings attended during the week of 3/10/08 – 3/14/08.

Date	Hour	Meeting	Participants
March 10	8:30-10:00 am.	<p>Kick-off meeting in the IMCW Project Office with Mary Rodríguez, USAID, El Salvador.</p> <p>This meeting was for the IMCW Project Team to meet with the USAID mission and learn the background and context within which this activity was created. The team learned the nature of the political pressure that was brought to bear by the El Salvadoran coffee sector on its government and that one of the many responses to this pressure was to study how a PES activity on coffee lands might be undertaken. That led, in part, to the interest in a prefeasibility study of the potential for carbón credit sales form El Salvador's Coffee Forest.</p>	Steve Romanoff, Keegan Eisenstadt & Christy Owen
March 10	3:00-5:00 pm.	<p>Juan Marco Alvarez, Executive Director of Salvanatura is out of the country at the moment. We met with Maximiliano Jovel the Director of Operations and Carlos Pleitez one of the auditors from the sustainable coffee certification program.</p> <p>Rainforest Alliance Certification Program. SALVANATURA. Tel: 2279-1515.</p> <p>This meeting was used to determine the interest of Salvanatura in carbon forestry dynamics. They are actively involved in trying to participate in the BMI Café y Ambiente program as a program auditor entity. They are also actively trying to learn about the market space but currently lack experience and knowledge about what it would take to become carbon certifiers.</p> <p>Given their experience with the Rainforest Alliance Coffee certification program, however, they are likely to play a role in El Salvador's carbon certification dynamic in the future. They are also something of the only game in town.</p>	Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez
March 11	8:00 – 8:45 pm	<p>Manuel Benitez, team leader Component 1, IMCW, DAI.</p> <p>This meeting was to learn information about the protected areas system in El Salvador. What Mr. Benitez thought about the option of using protected areas for the sale of avoided deforestation credits, and the relative strengths and weaknesses of the Protected Areas system.</p>	Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez
March 11	9:00 – 11:00	<p>Rebeca Magaña, Climate Change Initiative, Carbon Market & Environmental Services (Focal Point). Cecilia Caranza, Climate Change Office. Ministerio de Medio Ambiente y Recursos Naturales</p>	Keegan Eisenstadt, Christy Owen

Date	Hour	Meeting	Participants
	am.	<p>(MARN). Tel: 2267-9334 & 7871-8330.</p> <p>This meeting was to learn about the current and future situation (short & middle term) of the national regulations and institutional capacity to promote the carbon market & other environmental services in El Salvador. The Ministry plays a critical role as the focal point for all regulatory market activities (of which there are currently 5 projects), but has not yet entered the voluntary market in any way at all.</p> <p>There is currently no national policy regarding climate change, but there is a developing group of project implementers in El Salvador, especially in the clean production and energy efficiency project sectors. No forestry projects have been undertaken, other than the Café y Ambiente with BMI.</p> <p>They were unsure of their role, if any, with projects in the voluntary market – but viewed it as not their responsibility. Additionally, they were unsure about the possibility of using state lands/protected areas in a voluntary market project. They did, however, clarify that there is no direct fee or tax that is paid to the Govt. of El Salvador for the sale of carbon credits.</p>	& Carlos Isaac Pérez
March 11	3:00 - 5:00 pm.	<p>Mario Acosta – president of PROCAFE and Eduardo Nuñez – General Manager of PROCAFE. Additionally, a number of staff members were present.</p> <p>PROCAFE Foundation. Ministerio de Agricultura y Ganadería (MAG). Tel: 2228-0250.</p> <p>Given that we learned from USAID at the beginning of this activity that PROCAFE started the political pressure about this topic, this was an important meeting. PROCAFE and their associates (coffee producers) played a key role in trying to develop a national environmental services program, according to international standards. They have seen coffee sectors in other countries succeed with this endeavor and want to see the same in El Salvador.</p> <p>They presented a preliminary proposal to their President. This proposal was altered and led to the creation of the BMI Café y Ambiente program. Unfortunately, the BMI program with the coffee producers has not yet yielded the results that were anticipated, and the coffee producers continue to feel disappointed with the progress. This is true, even though MI has kept its side of the agreement and paid the debt forgiveness to the farmers it promised in the agreement. That said, BMI hasn't come close to creating a single carbon credit, no less actually brokering one to the voluntary market. The coffee producers have seen this ineffective project development and are concerned that</p>	Steve Romanoff, Edgardo Perez, Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez

Date	Hour	Meeting	Participants
		<p>the window of opportunity to participate is passing them by. Additionally, a number of the coffee producers in the project zone are not eligible for the BMI program, if they do not currently hold debt on their farms.</p>	
<p>March 12</p>	<p>9:00- 11:00 am.</p>	<p>Alfredo Alfaro – Manger of the Banco Multisectorial de Inversiones (El Salvador’s Development Bank) – is currently involved in meetings. We met with Diana Rivera – the Forestry Sector Specialist for BMI. Salvadorian Environmental Services Fund to Coffee Plantations. Coffee and Environment Program. Banco Multisectorial de Inversiones (BMI). World Trade Center. Tower Two. Tel: 2267-0000.</p> <p>BMI is the main actor in the country operating in the Climate Change market. They are working with KfW to develop projects for the CDM regulatory market in energy efficiency and clean production. They have also created a program to pay coffee producers for their environmental services from their farms. The payment, however, is a 30% reduction in their debt service payments. These debts are held by coffee producers and are owned by the BMI through two different fidecomisos –FINSAGRO and FICAFE. If a coffee farmer has debt and wants to enter the program they can, if they agree to the requirements placed on them by BMI. Coffee farmers without debt are not eligible.</p> <p>Numerous items came up, during the meeting, that BMI was unable to answer. They have created a project and enrolled the producers, but they do not yet have any of the operational actions in place: monitoring & evaluation program; relationship with international brokers (Who & How); how they expect to sell the carbon credits; needs for institutional strengthening; requirements asked to the coffee producers and fulfillment guarantees; international certification of carbon credits (Who & How).</p> <p>Their goal is to generate roughly M\$8/yr in CO2 payments. They understand that they will need to sell these credits on the voluntary market, but they are unsure of what the product actually will be and how it will be certified. Interestingly, they have entered into a formal relationship with EcoSecurities, a well respected Carbon Credit consulting company. BMI is having EcoSecurities handle the project development, as well as the contracting for other services under the Café y Ambiente project. The IMCW Team repeatedly contacted EcoSecurities, at numerous institutional levels, to try to understand what the current status of the project is and where it is headed. Unfortunately, the BMI/EcoSecurities relationship is bound by a strict confidentiality agreement that precluded any information being shared</p>	<p>Steve Romanoff, Edgardo Perez, Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez</p>

Date	Hour	Meeting	Participants
		<p>with the IMCW Team.</p> <p>The IMCW Team did, however, deduce that BMI is currently developing a number of regulatory market projects as well as the voluntary market Café y Ambiente project in the forestry sector. It appears as though the BMI is treating all of their projects identically. The project development pathway is seen, internally, as being identical. This has led the BMI to take their voluntary market project through the same steps as a regulatory project – which is one of the reasons that it is moving through the project development cycle so slowly. This is a clear weakness in the BMI strategy, as a voluntary market project does not need the same level of front-end work as a regulatory market project. Institutionally, however, it appears that the BMI is learning about the carbon market and are taking all of their projects through the same process.</p>	
March 12	2:30 – 4:30 pm.	<p>Julio Juarez. “Bono Forestal”. General Directorate of Forestry. Ministerio de Agricultura. 2241-1714; 2228-3662; 7706-2288.</p> <p>The bono forestal is a financial incentive for producers to reforest lands. The funds came from the privatization of the telcom company, where part of the sale went to FANTEL – a trust for the environment that is administered by the Minsitry of Environment.</p> <p>They pay 30% of the establishment costs (based upon a fixed scale) for reforestation post-facto. This is typically for small reforestation efforts on small land areas. Additionally, the monies have been around for years and are not being spent – as there is not sufficient subscription for the program’s services.</p> <p>The program is interesting, but it is woefully understaffed and does not look as though it will play any role in generating anything akin to an afforestation/reforestation sector in the country. Because it is not actively subscribed, it does not have a role in the environmental services market.</p>	Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez
March 13	8 am – 5 pm	<p>Field Trip to Ahuachapán and Sonsonate. Coffee Plantations. Rainforest Alliance Certification. Edgardo Perez made the arrangements and Gil Magana from IMCW accompanied the trip.</p> <p>The field trip went to the land-reform cooperative ATAISI to get a sense of the different conditions of shade coffee as currently grown in El Salvador. The Cooperative has roughly 1,650 Hectares of shade coffee in different management regimes. Some of the coffee farms are essentially abandoned, others are under active management and others are experiencing a renewal process. All of them are under “shade” and</p>	Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez

Date	Hour	Meeting	Participants
		the various conditions of shade are important for any shade coffee forest biomass accounting.	
March 14	9:00 - 10:00 am	<p>Ing. Roberto Escalante, Vice Minister of MARN. rescalante@marn.gob.sv Zulma de Mendoza , MARN Director of Protected Areas. Rebeca Magana and Cecilia Caranza, Climate Change Office. Two MARN protected areas specialists were also present. MARN (503) 2267-9422</p> <p>This meeting was requested by the Ministry during the course of our week of interviews. We were to meet with a number of the key government actors in the climate change sector to try to come to some conclusion, or agree upon, the next steps. This meeting had the people in charge of Protected Areas (who could have spoken about avoided deforestation), the climate change focal point (who could have spoken about the desire for the government to enter – in some way – or catalyze through supportive action the voluntary market, as well as political appointees. I believe that there is significant interest in this activity on the part of the government, but that there is uncertainty about how to proceed.</p>	Steve Romanoff, Mary Rodriguez, Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez
March 14	2:00- 4:00 pm.	<p>Dr. Larry Rubey. USAID, El Salvador. Tel:(503)2501-3458</p> <p>This meeting was to present a Power Point presentation of initial findings to Dr. Rubey, who called for this activity under the IMCW Project. The power point presentation presented some background about the specifics of the Carbon Market, the climate change marketplace and products on the market, observations about the feasibility of various proposed options for El Salvador and some recommendations for the design, and type, of carbon-based environmental services activities that USAID could help to promote.</p>	Steve Romanoff, Keegan Eisenstadt, Christy Owen & Carlos Isaac Pérez

ANNEX B

PROSPECTIVE PROJECT DEVELOPERS, PROJECT CERTIFIERS, CARBON BROKERS, BUYERS, AND CONTACTS THAT COULD UNDERTAKE THE JOB OF MOVING PROJECTS IN EL SALVADOR FORWARD

Project developers:

ClearSky Climate Solutions - CO₂OL-USA
Keegan Eisenstadt – keegan@clearskyclimatesolutions.com
CEO
Missoula, Montana USA

EcoSecurities
Jan Fehse - Jan@ecosecurities.com
Project Development Consultant
London, UK

EcoResources
Philippe Crete – philippe.crete@ecoressources.com
Climate Change Analyst
Quebec, Canada

Trexler & Associates
Mark Trexler – taa@teleport.com
CEO
Portland, Oregon USA

Project Certifiers:

SGS
Cesar Berni - cberni@sgsgroup.com
Regional Manager, Natural Resources Monitoring Services
Asunción, Paraguay

Tüvrheinland/ Precisely Right
Kay Lallweit - kkallweit@mex.tuv.com
Forest Project Certifier
Mexico City, Mexico

Smartwood/Rainforest Alliance
Richard Donovan – rzd@smartwood.org
Director
Burlington, Vermont USA

TUVsud
iso@tuvmex.com.mx
Monterrey, Mexico

Carbon Brokers:

ClearSky Climate Solutions - CO₂OL-USA

Keegan Eisenstadt – keegan@clearskyclimatesolutions.com

CEO

Missoula, Montana USA

EcoSecurities

Steve Gutmann - Steve.Gutmann@ecosecurities.com

Commercialisation Manager

Portland, OR USA

First Climate

Head Office – info@firstclimate.com

Frankfurt, Germany

(formerly 3C Company & Factor merged to become First Climate in April 2008)

Natsource

Rodrigo Iturralde - riturralde@natsource.com

Director Project Development Latin America

New York, NY USA

TFS Energy

Adam Raphaely - araphaely@tfsenergy.com

Environmental Markets Trader

New York, NY USA

CantorCO₂e

Carbon Trading Desk - mexicocity@cantorco2e.com

J Margoulis – jmargoulis@cantorco2e.com

Mexico City, Mexico

Terra Pass

Erik Blachford, CEO

Business Development – bd@terrapass.com

San Francisco, CA USA

The Carbon Neutral Company

Maria Cappelen – maria@carbonneutral.com

Director, Carbon Sourcing

London, UK

Prospective Carbon Credit Buyers:

All of the above listed brokers have specific clients in their roster. In addition to those, contacts have been made with the following entities regarding the potential purchase of carbon credits from El Salvador's Shade Coffee Forests. These prospective buyers were contacted directly by ClearSky Climate Solutions – CO2OL-USA, and should be considered proprietary marketing/sales contacts.

Green Mountain Coffee Roasters

Lindsay Bolger - lindsey.bolger@gmcr.com

Director, Coffee Department - Board Member

Waterbury, VT USA

Starbucks

Megan Monihan – megan@starbucks.com

Seattle, WA USA

Specialty Coffee Association of America

Shauna Alexander Mohr – shauna@leucinajewelry.com

Portland, OR USA

The Climate Trust

Peter Weisberg - pweisberg@climatetrust.org

Portland, OR USA

Taylor Maid Farms – Organic Coffee & Tea

Mark Inman - mark@taylormaidfarms.com

Sebastopol, CA USA

ANNEX C

NOTES, NEWS AND INFORMATION ABOUT CARBON MARKETS, CARBON ACTIVITIES RELATED TO COFFEE FORESTS, AND ADDITIONAL READING

1. Estimation of aboveground biomass of shade trees and coffee plants, in agroforestry systems in Matagalpa, Nicaragua, using allometric models

Source: Revista Agroforestería en las Américas, edición 41/42¹

Basado en Suárez, D. 2002. Cuantificación y valoración económica del servicio ambiental almacenamiento de carbono en sistemas agroforestales de café en la Comarca Yassica Sur, Matagalpa, Nicaragua. Tesis Mag. Sc., Turrialba, CR, CATIE.

²CATIE, Turrialba, Costa Rica. Correo electrónico: dasuarezp@yahoo.com

³Proyecto Cambio de Uso de la Tierra y Flujos de Carbono para Centroamérica.

CATIE/Universidad de Helsinki. Correo electrónico: msegura@catie.ac.cr (autora para correspondencia).

⁴Center for International Forestry Research (CIFOR), Bogor, Indonesia. Correo electrónico: m.kanninen@cgiar.org

Key words: Basal area; *Coffea arabica*; *Cordia alliodora*; *Inga punctata*; *Inga tonduzzi*; *Juglans olanchana*; dry matter.

Abstract: Allometric models, to predict above ground biomass of shade trees and coffee plants (*Coffea arabica*) in agroforestry systems, were developed through destructive sampling of 35 trees and 96 coffee plants. The shade species were: *Cordia alliodora*, *Juglans olanchana*, *Inga tonduzzi* and *I. punctata*, the dominant species in the coffee plantations (>50% of basal area). The best model to predict the aboveground biomass of these shade species was $\text{Log}_{10}(\text{tb}) = -0.96 + 2.34 * \text{Log}_{10}(\text{dbh})$ (adjusted $R^2 = 0.94$), where tb = total above ground biomass (kg tree-1); dbh = stem diameter at breast height (cm). The best model for coffee biomass was $\text{Log}_{10}(\text{tb}) = -1.15 + 1.66 * \text{Log}_{10}(\text{d15}) + 0.54 * \text{Log}_{10}(\text{h})$ (adjusted $R^2 = 0.95$), where tb = total biomass (kg plant-1), d15 = diameter of the trunk at 15 cm above the soil (cm), and h = total height (m).

2. Coffee farms and carbon sequestration

Source: <http://www.coffeehabitat.com/2008/03/coffee-and-carb.html>

In my post, "[Why certifying shade coffee is so complex](#)," I ended with a comment regarding the upside-down nature of shade (or organic) certification. That is, the burden of certification costs are on the producers who are doing the right thing, rather than on the producers who are

damaging the environment. Small producers, who are more likely to preserve forests and grow coffee under diverse shade (both of which enhance biodiversity) and are less likely to use chemicals, are the least able to afford certification.

I've been ruminating about this ever since, and wondered if some sort of "[cap and trade](#)" system might be helpful. What I had in mind were "credits" for forest or habitat preservation and enhancement small eco-friendly farms could "sell" to naughty sun coffee growers. This was inspired by a similar system: [carbon credits](#). So while I let this idea simmer, it's worthwhile to briefly discuss the role of carbon credits themselves, and their potential to generate income for farmers practicing sustainable agriculture, including shade coffee.

Quick primer on terrestrial carbon sequestration

Trees (and other plants) sequester carbon by removing it from the atmosphere through photosynthesis and incorporating into their tissues. Existing forests are carbon sinks (or “carbon storage units”) and contain over half of the terrestrial carbon in the world. Carbon remains stored in plant tissues until released, in this case most often by burning and decomposition.

Agroforestry systems, including shade coffee farms, that preserve forest are therefore acting as carbon sinks.

Reforestation also contributes to the sequestration of carbon, although the rate in which carbon is taken up and stored by plants varies among species, as well as where they are grown and if and how they are managed. This means that sun coffee farms converted to shade in which the appropriate tree species are planted and managed have the potential to effectively sequester carbon.

Carbon is also stored in leaf litter and other organic matter in the soil. Sustainable coffee agrosystems frequently rely on fallen leaves from their shade trees as well as the application of coffee skins and other organic matter for soil moisture retention and fertilization, providing another means in which these farms can contribute to carbon sequestration.

How much carbon can coffee farms store?

Although measuring carbon storage is difficult due to the multiple variables involved (even plots in the same region with similar tree species composition can vary in their storage capacity depending on microclimate, soil types, etc.), recent research has revealed some encouraging facts. A few examples:

- In the tropics, potential carbon sequestration rates for smallholder, sustainable agroforestry systems range from 1.5 to 3.5 megagrams (tonnes) per hectare per year, or 2.1 billion megagrams annually worldwide.
- It has been estimated that each hectare of sustainable agroforestry in the tropics could potentially offset 5 to 20 ha of deforestation.
- Models have estimated a 5-year-old coffee farm shaded with two common Latin American tree species ([Erythrina poeppigiana](#) and [Cordia alliodora](#)) could sequester 5.3 megagrams per hectare.

- Soil carbon stocks in shade coffee were 60% of that expected in primary forest in Sumatra, versus 45% for sun coffee.
- In El Salvador, carbon sequestration values for various types of shade coffee management were estimated (in tons per ha per year): 174 for rustic shade to 77 for shade monoculture.
- A study of carbon stocks in Costa Rican coffee farms calculated aerial (above ground) carbon stocks ranging from 11 megagrams per ha for simple shade (one heavily pruned shade species) to nearly 32 for diverse shade.
- Using these figures, a farmer with 10 ha in diversified shade coffee could receive a one-time \$3000 payment (based on previously carbon transactions for the country), as well as a reduction in expenses from chemical inputs and have timber and fruit for additional income. The payment is over three times greater than would be obtained for the carbon stocks in simple shade coffee systems.

The non-profit [TechnoServe](#) is exploring the use of carbon credit trading for promoting sustainable agroforestry, using a Guatemalan coffee cooperative (more [here](#)). Small holders in Oaxaca and Chiapas, Mexico, are gaining access to carbon credit funds to pay for sustainable agroforestry there, where a great deal of coffee is grown (more [here](#)).

It appears sustainable coffee agroforestry can play a role in helping to mitigate global climate change through carbon sequestration, and in the process also provide additional income and further incentive to growing shade coffee. I have a feeling we'll be hearing much more about this in the future.

More reading, including sources for the figures above:

- Smallholder agroforestry projects: Potential for carbon sequestration and poverty alleviation. O. J. Cacho, G. R. Marshall, and M. Milne. 2003. [ESA Working Paper No. 03-06](#). Agricultural and Development Economics Division, The Food and Agriculture Organization of the United Nations.
- Carbon sequestration in tropical and temperate agroforestry systems: a review with examples from Costa Rica and southern Canada. M. Oelbermann, R. P. Voroney, and A. M. Gordon. 2004. *Agriculture, Ecosystems and Environment* 104: 359-377.
- Carbon sequestration: An underexploited environmental benefit of agroforestry systems. F. Montagnini and P. K. R. Nair. 2004. *Agroforestry Systems* 61:281-295.
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3. Carbon sequestration in coffee agroforestry plantations of Central America

Source: http://publications.cirad.fr/une_notice.php?dk=540109

Harmand J.M., Hergoualc'h K., De Miguel S., Dzib B., Siles P., Vaast P.. 2007. In : *21st International Conference on Coffee Science, Montpellier (France), 11th - 15th September 2006*. [Cd-Rom]. Montpellier : ASIC, p. 1071-1074. Colloque Scientifique International sur le Café. 21, 2006-09-11/2006-09-15, Montpellier, France.

The potential of coffee agroforestry (AGF) systems to act as a sink for carbon (C) is of high interest. Coffee farmers consider with interest the conversion of their coffee monoculture into AGF systems as an alternative to face the economical crisis of coffee prices, through diversification (e.g. timber production), production of high quality coffee and payment of incentives for environmental services such as C sequestration. For the last five years, research was undertaken on the potential of shade trees introduced in coffee (*Coffea arabica*) plantations in Central America to increase plant biomass and litter, and hence C sequestration. The work focused on gathering data from selected coffee systems (with or without shade trees) in long term experiments and coffee farms of Costa Rica. Finally a database on C stored in soil and plant biomass of coffee AGF systems in Central America was developed using published information and data collected in experiments and coffee farms. Compared to the amount of C in aerial phytomass (biomass + litter) of 7 year old full sun coffee systems, the total C in aerial phytomass of coffee systems shaded by *Eucalyptus deglupta* (110 shade trees ha⁻¹) or by *Inga densiflora* (280 shade trees ha⁻¹), was multiplied by 2.5. For approximately a ten year period, results from our experiments and published literature showed that the conversion of coffee monoculture to AGF system resulted in an additional mean annual increment in aerial phytomass varying from 1 t C ha⁻¹y⁻¹ in the case of regulated shading by *E. poeppigiana*, to (1.7-3.1) C ha⁻¹y⁻¹ in the case of shade timber tree. Depending on the derived products (fuel wood for coffee stems and *Inga* species; pallets, logs, etc for timber species) and their life span, various wood production and harvesting scenarios in coffee AGF systems can be considered with respect to C sequestration.

4. Carbon sequestration: An underexploited environmental benefit of agroforestry systems

Source: F. Montagnini and P.K.R. Nair, [Agroforestry Systems, Volume 61-62, Numbers 1-3 / July, 2004](#), 281-295

Abstract Agroforestry has importance as a carbon sequestration strategy because of carbon storage potential in its multiple plant species and soil as well as its applicability in agricultural lands and in reforestation. The potential seems to be substantial; but it has not been even adequately recognized, let alone exploited. Proper design and management of agroforestry

practices can make them effective carbon sinks. As in other land-use systems, the extent of C sequestered will depend on the amounts of C in standing biomass, recalcitrant C remaining in the soil, and C sequestered in wood products. Average carbon storage by agroforestry practices has been estimated as 9, 21, 50, and 63 Mg C ha⁻¹ in semiarid, subhumid, humid, and temperate regions. For smallholder agroforestry systems in the tropics, potential C sequestration rates range from 1.5 to 3.5 Mg C ha⁻¹ yr⁻¹. Agroforestry can also have an indirect effect on C sequestration when it helps decrease pressure on natural forests, which are the largest sink of terrestrial C. Another indirect avenue of C sequestration is through the use of agroforestry technologies for soil conservation, which could enhance C storage in trees and soils. Agroforestry systems with perennial crops may be important carbon sinks, while intensively managed agroforestry systems with annual crops are more similar to conventional agriculture. In order to exploit this vastly unrealized potential of C sequestration through agroforestry in both subsistence and commercial enterprises in the tropics and the temperate region, innovative policies, based on rigorous research results, have to be put in place.

Carbon market - Kyoto Protocol - PES (payment for environmental services) - Policy framework - Silvopasture - Soil carbon

This revised version was published online in June 2006 with corrections to the Cover Date.

5. Modeling carbon sequestration in afforestation, agroforestry and forest management projects: the CO2FIX V.2 approach

Source: Omar R. Masera, J. F. Garza-Caligaris, M. Kanninen, T. Karjalainen, J. Liski, G. J. Nabuurs, A. Pussinen, B. H. J. de Jong and G. M. J. Mohren, [Ecological Modelling](#), [Volume 164, Issues 2-3](#), 15 June 2003, Pages 177-199

Abstract

The paper describes the Version 2 of the CO2FIX (CO2FIX V.2) model, a user-friendly tool for dynamically estimating the carbon sequestration potential of forest management, agroforestry and afforestation projects. CO2FIX V.2 is a multi-cohort ecosystem-level model based on carbon accounting of forest stands, including forest biomass, soils and products. Carbon stored in living biomass is estimated with a forest cohort model that allows for competition, natural mortality, logging, and mortality due to logging damage. Soil carbon is modeled using five stock pools, three for litter and two for humus. The dynamics of carbon stored in wood products is simulated with a set of pools for short-, medium- and long-lived products, and includes processing efficiency, re-use of by-products, recycling, and disposal forms. The CO2FIX V.2 model estimates total carbon balance of alternative management regimes in both even and uneven-aged forests, and thus has a wide applicability for both temperate and tropical conditions. Results for the model testing and validation in selected temperate and tropical forest management systems are presented and discussed.

Author Keywords: Model; Forests; Carbon sequestration; Forest management; Afforestation; Agroforestry; Kyoto Protocol

6. CO₂-mitigation by agroforestry

Source: [Water, Air, & Soil Pollution, Volume 70, Numbers 1-4 / October, 1993](#), 533-544

7. Shade effect on coffee production at the northern Tzeltal zone of the state of Chiapas, Mexico

Source: Lorena Soto-Pinto, Ivette Perfecto, Juan Castillo-Hernandez and Javier Caballero-Nieto, *Agriculture, Ecosystems & Environment, Volume 80, Issues 1-2, August 2000, Pages 61-69*

8. Using carbon emission credits to promote environmentally sensitive agriculture

Source: http://www.solutions-site.org/artman/publish/article_19.shtml

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Problem Overview:

Carbon dioxide emissions

Carbon dioxide emissions are the principal component of the "so-called" greenhouse gases.

Industrial processes account for over 75 percent of the carbon dioxide emissions, roughly 21.8 billion metric tons annually. Deforestation due to demands for agricultural lands is the other main culprit, responsible for 6.4 billion metric tons of emissions annually. Trees contain stored carbon. When they are cut down, carbon dioxide is released.

Forests and tree plantations are seen as part of the solution since they store carbon at a rate 20 to 100 times more per acre than pastures and croplands. The substitution of composting and other organic techniques for fertilizers and pesticides on tree plantations also allows for increased carbon storage.

Background:

Small-Scale Producers and Carbon Sequestration

In rural areas where agriculture and forests compete for land, the forests are at risk because farmers are unlikely to protect and preserve them unless they have an economic incentive to do so. For this reason, tree crops such as coffee or cocoa offer both significant economic and environmental benefits. These crops prevent the destruction of forested areas because they can be planted under tree canopies and provide farmers with continuous cash income from fruit harvesting. Capturing stored carbon (or carbon sequestration) through tree cultivation can become an additional source of income for farmers.

Trading Carbon Emissions

At the Kyoto conference, the United States put forth a strategy to curb the build-up of greenhouse gases through the creation of an international market in emissions credits. This concept of emissions trading originates from the U.S. domestic experience with other market-based approaches to environmental amelioration. In the United States, there is currently an acid rain allowance trading system for sulfur dioxide emissions.

The first step to trading carbon dioxide emissions would be to establish equitable nation by nation emissions limits based on population, potential economic growth and past emissions history. Within these limits each government would allocate emissions allowances to accommodate various business and community needs. Offsets would then be tradable across industrial and, eventually, national lines. Credits will be generated by companies which invest in renewable energy, energy efficiency, improved land use, forestry and agricultural practices and methane control programs.

Carbon credits that can be traded for or developed into a more formal financial instrument (i.e., bonds, guarantees, credit lines, funds) may enable small-scale farmers to expand their production, retain greater shade coverage and use more environmentally sensitive and organic production systems.

Status:

TechnoServe and Carbon Measurement

In order for carbon credit trading to be a useful mechanism, measurement of carbon reduction and storage will need to be standardized. The carbon inventory process involves determining a baseline of the amount of carbon that exists at a particular site, establishing permanent sample plots, and periodically surveying the vegetation at the site and in other areas.

TechnoServe is undertaking a pilot project, supported by The Ford Foundation and U. S. Agency for International Development, to investigate the use of carbon trading by small-scale coffee farmers in Central America. TechnoServe is compiling "carbon offset" data at a Guatemalan coffee cooperative, in partnership with Winrock International and Fundacion Solar, a Guatemalan environmental organization. TechnoServe will then use this data to propose a mechanism by which carbon credits can be traded for investment capital. Ideally, these funds will encourage small-scale coffee farmers to expand their environmentally sensitive production systems.

At the policy level, TechnoServe is building consensus for this type of program by establishing consultative groups in several countries of the region, including El Salvador, Nicaragua, Guatemala and Panama, as well as the United States. These working groups, comprised of business, government and non-governmental organizations, are examining the issues surrounding emissions trading.

Follow-up:

Pilot activities to measure the carbon absorption capacity of coffee are still ongoing. The results of this study will be used to develop a model to quantify the carbon offset potential of coffee. With this model, TechnoServe will propose a mechanism by which carbon credits can be traded for investment capital.

Documentation:

The results of the carbon offset study will be included in a technical proposal submitted to the U.S. Initiative on Joint Implementation - a partnership between the U.S. Environmental Protection Agency, the U.S. Department of Energy and the U.S. Agency for International Development.

9. Shade Coffee Agro-Ecosystems in Mexico A Synopsis of the Environmental Services and Socio-Economic Considerations

Source: Sarah Davidson Journal of Sustainable Forestry , Volume: 21 Issue: 1 81 - 95

Abstract: Coffee-growing ecosystems have significant environmental benefits and social importance. A review of the literature on ecosystem services, especially for biodiversity, is presented on Mexican coffee cultivation. This study describes the characteristics of the five main coffee cultivation systems in Mexico. Coffee farms can be classified on a continuum according to the extent of shade that is incorporated in cultivation systems and how well they represent traditional coffee farms: traditional 'rustic' or 'mountain' coffee gardens, traditional poly-cultures, commercial poly-cultures, shaded monoculture coffee systems and unshaded monoculture crops. After assessing the importance of the presence or absence of trees for each system, this paper examines the ecosystem services' potential of the different systems and the implications of these services for local and global populations. Finally, the potential use of certification for shade coffee is assessed. Over the last few years, it has become clear that a rigorous shade-certification system is important, but that its promotion must keep abreast of the ecological diversity and farmers' realities.

10. Carbon credits paid to preserve forest

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Source: Mongabay.com 7&15/2/08, The Economist 14/2/08, Bloomberg 7/2/08, The Age 7/3/08 Tuesday, 26 February 2008
[9/3/08: Updated with Aust-PNG developments. Corrected Ulu Masen carbon credit calculations]

Attempts to preserve threatened rainforests in Asia and Africa are providing early examples of how carbon markets might be used to halt rapid rates of tropical deforestation, and the massive carbon emissions and biodiversity losses that result.

Momentum is building behind Reduced Emissions from Deforestation and Degradation (REDD)

initiatives to extend carbon markets to “avoided deforestation” - activities that produce payments for preserving existing forest. Early 2008 has seen the first rainforest project of this kind win independent validation to carbon market accreditation standards in Indonesia while a similarly bio-diverse forest in Cameroon has so far failed to attract carbon investors.

Meanwhile, in Papua-New Guinea (PNG), the government has struck an agreement with Australia to develop a carbon trading regime around credits for avoided deforestation.

The Indonesian project covers a 770,000 hectare (1.9m acres) swathe of the Ulu Masen forest in Sumatra’s Aceh province, home to orang-utans, tigers and elephants. The provincial government claims the support of the local communities for a preservation operation run by Fauna & Flora International and Carbon Conservation that would generate carbon credits for the prevention of logging and clearing for palm oil plantations.

Preliminary budget calculations for the project allow for local communities to receive \$26 million in the first five years of the envisaged 30-year project. This would be their share of the carbon credits generated for the avoided emissions in that first stage of 16.85 million tons of carbon dioxide. The overall revenue to local communities would include payments for forest monitoring and law enforcement, reforestation, restoration and sustainable community logging programmes.

The locals’ revenue share is around half of the total expected value of the credits. The project has won the backing of the most credible carbon offset accreditation standard available in the voluntary market for forestry carbon, that of the Climate, Community and Biodiversity Alliance (CCBA).

"The project shows how solid partnerships with local communities are likely to deliver real reductions of greenhouse gas emissions by conserving a globally-significant tract of rainforest," said the director of the CCBA, Joanna Durbin.

The clearing of native forests at current rates is estimated to be responsible for at least 20 per cent of total world human-related greenhouse gas emissions each year.

REDD is not yet part of the UN’s carbon trading mechanisms, so any projects starting now can only earn credits in the voluntary market. But there is some expectation among investors that projects begun now will eventually enjoy a value in official markets.

The UN climate conference in Bali last December agreed to move forward on inclusion for REDD in global carbon market mechanisms. This would allow developed countries to offset

such credits against their national emissions targets. But this “compliance” market initiative will undergo a pilot stage before probable full-scale introduction after 2012.

Meanwhile, the government of Cameroon says an 830,000 hectare tract of rainforest on the Congo and Gabon borders is under threat because neither conservation groups nor carbon investors have yet taken up an offer to pay for its preservation. The government is asking \$1.6 million a year, just under \$2 per hectare for Ngoyla-Mintom, a tropical rainforest home to gorillas and elephants.

Some quick analysis by Rhett A Butler at Mongabay suggests a REDD project could well be economically viable and worth more to the government than logging. According to his calculations, an avoided deforestation programme could generate \$64 million in today’s dollars in carbon credits over 30 years, compared to \$26 million that could be earned by selling logging concessions.

The \$64m in credits is based on Cameroon’s deforestation rate of 1 per cent per year, conservative estimates of 160 million tons per hectare in emissions from clearing and credits paid at \$3 per ton avoided.

The Australia-PNG Forest Carbon Partnership would see Australia pay to preserve Papuan rainforest and earn carbon credits for use in its own emissions trading scheme under development, or other regional and global emissions trading schemes. Australian prime minister Kevin Rudd says the aim would be to tie in with the emerging Kyoto framework.

11. New Hope for Threatened Sumatran Rainforest: Auditors Green-Light Innovative Carbon Finance Proposal

Source: http://www.climate-standards.org/news/news_feb2008.html

The Ulu Masen Forest Ecosystem in the Indonesian province of Aceh is a poster-child for a threatened rainforest. It is the last large unprotected fragment of rainforest on Sumatra, an island ravaged by decades of rampant deforestation. For years, loggers could not cut the forests of Ulu Masen due to an armed-civil conflict in Aceh, which kept industry at bay. That conflict ended a few years ago, following the massive Tsunami that killed hundreds of thousands and left almost half a million people homeless. The peace accord and the tsunami have increased pressures on the Ulu Masen forests. Peace brings the possibility of loggers; the tsunami created urgent needs for timber and wood.

But deforestation may not be the future for this forest with populations of Sumatran elephant (*Elephas maximus*), Clouded Leopard (*Neofelis nebulosa*), Sumatran Tiger (*Panthera tigris sumatrae*), and Sumatran Orangutan (*Pongo abelii*). An innovative collaboration between the

Government of Aceh, Fauna & Flora International (FFI) and Carbon Conservation to use carbon credits to conserve Ulu Masen passed a major milestone. The Rainforest Alliance, an international nonprofit conservation organization, validated that the collaboration's Ulu Masen conservation plans meet the widelyrespected Climate, Community & Biodiversity (CCB) Standards. The CCB Standards are meant to ensure that land use projects are designed to mitigate climate change and deliver compelling community and biodiversity benefits. The Ulu Masen project is the first project for reducing emissions from deforestation in developing countries (REDD) to be independently-approved as conforming to the CCB Standards.

The global carbon market has grown rapidly and forest conservation carbon credits are almost certain to play a central role in the carbon market's 2nd phase (after 2012). Negotiations for how forest carbon credits will be included continue at the diplomatic and technical level. As the first of its kind, the Ulu Masen project is likely to have a significant impact on the methods used and the valuation of so-called REDD carbon credits.

Governor Irwandi Yusuf said, "As Aceh's Governor, I am very pleased that my office, Fauna and Flora International and Carbon Conservation passed the CCB audit. Aceh is serious about leading the world into a sustainable future, by implementing an integrated green approach to land and forest management and by curtailing illegal logging. This is only the first step. The hard work will be in financing and implementing our proposed project to help preserve the largest remaining bloc of unprotected Sumatran forests."

Dr. Joanna Durbin, Director of the CCBA said: "The Climate. Community & Biodiversity Alliance congratulates the developers of the Ulu Masen Ecosystem project for becoming the first project for reducing emissions from deforestation in developing countries (REDD) to be validated under the CCB Standards. The project shows how solid partnerships with local communities are likely to deliver real reductions of greenhouse gas emissions by conserving a globally-significant tract of rainforest. We hope world leaders will adopt a policy framework that supports developing countries, forests, local and indigenous people and biodiversity to benefit from global climate change efforts.'

Mark Rose, Chief Executive Officer of FFI, the world's oldest conservation group and lead conservation partner, said, "We are very pleased our Aceh team has received such a strong endorsement for their conservation field programme. The team works in difficult conditions, responding to many post-tsunami humanitarian and ecological challenges. FFI will continue to work closely with Aceh's Governor Irwandi Yusuf and our national Indonesian partners to develop this mechanism for large scale forest conservation."

Dorjee Sun, Carbon Conservation's CEO said, "We are ecstatic to be the first REDD project independently validated as meeting high global standards. The fate of tropical forests hinges on the ability of global carbon markets to rapidly mobilize adequate resources to communities with clear, defensible plans for reducing CO2 emissions. This conservation strategy is part of Aceh Green, a bold strategy in Aceh to develop greencertified soft commodities, to relieve pressure on forests and provide sustainable livelihoods. We will be working with Merrill Lynch on the credit monetization strategy."

Tensie Whelan, Rainforest Alliance President said, "We congratulate the government of Aceh, FFI, and Carbon Conservation on the significant steps they've made to develop an ambitious project to conserve a vital forest landscape in Indonesia. The urgency in linking deforestation to the fight against global warming was the take-home message from Bali. While conditions in Aceh are challenging, by working with communities living in the Ulu Masen ecosystem this project is poised at a critical opening in time for progressive change that could catalyze similar conservation elsewhere in Indonesia."

12. Merrill Lynch's carbon bet: Why a Wall Street firm wants to save a forest

Merrill Lynch's carbon bet Why a Wall Street firm wants to save a forest in Sumatra.

Source: Marc Gunther, Fortune, April 18, 2008

(Fortune) -- The business of "carbon farming" is growing fast -- and Merrill Lynch is the latest big company to bet that it will become profitable. What's carbon farming, you ask? It's a business designed to recognize the value created when trees store carbon dioxide and prevent global warming. So people who plant new trees or prevent existing trees from destruction can get paid for doing so.

That doesn't mean that the tree in your backyard or mine will help pay college tuition or fund a 401(k). For now, the payments are going to villagers in the developing world who agree to protect endangered forests. Starbucks, Marriott, and Rio Tinto, among others, have all agreed to finance projects designed to deter deforestation.

This week, Merrill Lynch, announced that it will invest \$9 million to help save a tropical forest in Aceh, Indonesia. It's the first time a Wall Street firm has invested in carbon farming, and let's be clear: this isn't philanthropy or public relations; it's strictly business. In fact, the man who put the deal together to save the 1.9-million acre forest, called Ulu Masen, believes it could be a very big business. "It will be the biggest carbon project in the history of the world if we can pull it off," says Dorjee Sun, the 31-year-old founder of an Australian startup company called Carbon Conservation <<http://www.carbonconservation.com/>>.

Here's how the deal will work: Merrill will pay villagers in Aceh, a province on the island of Sumatra, to stop logging their forests. Aceh, of course, is the place that was devastated by a tsunami in 2004 and, before that, wracked by civil unrest. It's also home to Sumatran tigers, clouded leopards and orangutans, and therefore of special interest to

environmentalists. The money will be used to train the villagers in alternative livelihoods, like growing coffee, cocoa or palm trees for oil. In exchange, Merrill will get carbon credits, which are also known as carbon offsets -- that's the "crop" in carbon farming. The credits will meet quality standards set a group called the Climate, Community and Biodiversity Alliance (CCBA),

whose members include environmental groups Conservation International, The Nature Conservancy and the Rainforest Alliance, and companies as BP, Intel and SC Johnson. The alliance functions as a regulator, albeit without legal clout.

Merrill will pay about \$4 per credit for 500,000 credits per year over the next four years --\$8 million in all. (The other \$1 million buys an option to acquire more credits.) Merrill then hopes to sell them for a profit to companies that want to voluntarily offset their carbon emissions. Currently, these voluntary credits --each one represents a ton of CO₂ that is prevented from entering the atmosphere -- sell from between \$2 and \$20 each, according to Andrew Ertel, the president and CEO of Evolution Markets, a leading broker of emissions credits.

The credits will be worth a lot more if they can be sold into regulated markets. Greenhouse gases are regulated in Europe and Japan, and laws to control them are being considered in the U.S. and Australia. So far, though, projects like this one -- called "avoided deforestation" or REDD projects, for Reducing Emissions from Deforestation and Degradation -- have not been approved for regulated markets. Deforestation is said to account for about 20% of all global greenhouse gas emissions.

"This is uncharted territory," says Abyd Karmali, global head of carbon emissions at Merrill Lynch. "That's part of the risk that Merrill is taking. How much appetite will there be for credits from projects of this type?"

Speaking by phone from Jakarta, Dorjee Sun says he has pitched large-scale avoided deforestation projects to more than 200 banks, hedge funds, pension funds and conservation groups. He's working with governors in Indonesia and Brazil, and came to the U.S. last fall where he pitch deforestation projects to Howard Schultz of Starbucks and investor George Soros. Sun, a former Internet entrepreneur, is frank about his motives. "The more hectares we manage, the more land we 'farm' carbon on, the more money we make," he says. "Our goal is to be the amazon.com of the Amazon."

13. VERs trade in 3-4 euro range

Source: <http://www.carbonpositive.net/viewarticle.aspx?articleID=998>, Tuesday, 19 February 2008

While trade in Verified Emission Reductions ([VERs](#)) continues to expand worldwide as the demand for carbon offsets grows among organisations and individuals, prices and volumes vary widely according to local conditions, as does the integrity of the credits.

Pointers to any emerging benchmark VER price level are few at this stage with the best indicators coming from Asia and the US. An auction at the Asia Carbon Exchange (ACX-change) in late January saw 15,000 VERs sold at €4.00. The credits were generated from a wind energy project in India with CDM registration. The €4 per VER sale price is up slightly from the €3.76 struck at an ACX-change auction of 100,000 tonnes last August.

Prices in the biggest voluntary market for VERs, the Chicago Climate Exchange in the US, have jumped above \$4 after falling as low as \$1.80 in November 2007. Prices for Phase II vintages (2007-10) of carbon financial instruments (CFIs) on the CCX closed at \$4.40 (€3.00) on February 15. CFIs are the standardised futures contracts by which emission offsets are traded.

Almost 23 million tonnes of CO₂ emission reductions traded on the CCX in 2007, more than double the previous year but volumes are still a fraction of those in the mandatory European and Kyoto markets.

There is very little transparency in the Chicago voluntary market and market observers have found it difficult to determine what is driving price movements. This has led to speculation that prices are being influenced by the stage managing of demand and supply. There is also concern expressed in some quarters over the additionality of offsets generated under the scheme.

VERPAs

This may be among the reasons why a group of legal and environmental interests in US have begun a process to develop a standardised verified emission reduction purchase agreement, or VERPA, contract. VERPAs would be the equivalent of ERPAs that have become so crucial to the financing and development of offset projects in Kyoto's [CDM](#) market. Such contracts are struck in advance of a project delivering emissions reductions and associated offset credits and guarantee project developers, the sellers, a market for their credits when eventually issued.

The American Council on Renewable Energy, the Environmental Markets Association and the American Bar Association say a VERPA standard will help firm up the definition of VERs in the US market. This is amid concern over varying levels of disclosure by VER sellers and possible double counting with renewable energy credits.

The proposed VERPA is designed to work within the frameworks of existing carbon registries and accreditation schemes and will require sellers to come up with the equivalent of the Project Design Document ([PDD](#)) in the CDM. They envisage it also helping users gain credit for early action under a future mandatory emissions trading scheme in the US – now looking increasingly likely.

The VERPA initiative reflects the growing push to raise the standards of transparency and verification in the voluntary offsets market around the world. A number of third-party accreditation schemes are now emerging. The UK government is expected this week to announce the details of new accreditation standards for the British market.

Tighter standards in the voluntary market may see some narrowing of the price gap between VERs and CERs, now trading around the €15 mark, as the integrity disparity reduces.

14. Carbon market snapshot

Sources: [Reuters Interactive](#), [ECX](#), [CCX](#), [Nord Pool](#),
<http://www.carbonpositive.net/viewarticle.aspx?articleID=1014#1>

April, Week 1

INSTRUMENT	PRICE	MNTH CHG
EUAs Dec08 Phase II	€21.38	+1.61
EUAs Dec09 Phase II	€21.92	+1.47
CERs Dec08 EU secondary	€15.70	+1.20
CERs Dec08 US secondary	\$24.19	+2.90
VERs Asia voluntary	€4.00	n/a
VERs US voluntary	\$5.50	+1.60

€=euros \$=US dollars

15. Online resources for information about carbon market, carbon sequestration topics, and a glossary of related terms

Source: <http://www.carbonplanet.com/>

ANNEX D. OBJECTIVES, TASKS, AND DELIVERABLES FROM STATEMENT OF WORK

OBJECTIVES

The purpose of this consultancy is to work with the project staff and partners in San Salvador and the Sonsonate and Ahuachapán watersheds, to determine the feasibility for developing a strategy for one or more Payment for Environmental Service schemes using carbon sequestration as the environmental service appropriate for the conditions in the project area in southern Sonsonate and Ahuachapan Departments and focusing on coffee, and to make contacts that will allow a strategy to move forward in the time frame of the project. This will be achieved by analyzing current project activities and impact on Global Climate Change issues, focusing on coffee farms, and by making contacts with brokers and/or programs interested in purchasing carbon credits.

Exploring how carbon credits can be used in the Sonsonate and Ahuachapan watersheds as a conservation tool, is a planned activity under the bilateral Watershed project being implemented by DAI, including a feasibility study of how carbon credits can be used to encourage conservation in the watersheds, focusing on the shade forests of the coffee plantations.

The project will explore the potential of land-based/biomass carbon as an environmental service that can be traded and/or sold, either as part of the CDM framework, the Reducing Emissions from Deforestation and Degradation (REDD) framework, or in the voluntary carbon market. The structured sale of carbon credits will be designed so they maximize the capacity to finance upper-watershed conservation and forest rehabilitation activities.

An assessment of carbon trading options, and its potential, in El Salvador to directly source carbon credits to the regulatory and voluntary carbon markets will be completed. Specific emphasis will be placed on the sale of credits based on maintenance of shade coffee in the voluntary market and potential for activities under either the Aforestation/Reforestation (A/R) project window within the CDM or under the newly opened market window pertaining to REDD avoided deforestation initiatives. The consultancy will provide specific recommendations for the development of one or more carbon-based Payment for Environmental Services schemes. Recommendations will include site selection that either incorporates A/R CDM eligibility, or is linked to REDD, as well as specific approaches for carbon monitoring and accounting. Preliminary contacts will be made with entities that are likely to broker coffee-based carbon credits on the voluntary market.

TASKS

Over the course of this consultancy, the consultants will:

1. Meet with USAID staff, national institutions, Banco Multisectoral de Inversiones (BMI), and project staff or contractors (including SalvaNATURA) to understand current efforts, and opportunities, to implement payments for CO₂ or greenhouse gas reductions for the regulatory and/or voluntary markets.
2. Contact EcoSecurities, the firm responsible for advising the existing program related to maintenance of coffee forests (BMI's "Fondo de Servicios Ambientales para el Bosque Cafetalero,") and potential brokers on the voluntary carbon market.
3. Meet with Ministry of Agriculture's General Directorate of Forestry (Forestry Bonds Program) and Ministry of the Environment (MARN) officials, including the Kyoto Protocol focal point within MARN, as well as representatives from World Bank and Banco Multisectoral de Inversiones to learn about on-going A/R

CDM, REDD, and Voluntary carbon market initiatives in El Salvador, especially any plans for demonstrations projects in or near existing sites.

4. Review the relevant GOES institutional and legislative framework for carbon credit certification and verification requirements for entering the carbon market.
5. Summarize relevant international options for carbon offset payments for USAID and project partners, with focus on coffee-based credits.
6. Make contacts for the sale of coffee-based carbon credits on the voluntary market and obtain information on documentation and verification requirements; estimate costs, benefits and likelihood of success of availing this option in the timeframe of the project.
7. Present initial findings to USAID and the project staff in San Salvador.
8. Delivery of Final Report, with specific recommendations.

DELIVERABLES

1. Power Point presentation of initial findings, observation on feasibility, and recommendations for design of carbon-based environmental services activities, delivered on final day in San Salvador.
2. Report, in English, of the most viable options for the sale of carbon credits on the voluntary market, **with inclosing section** on the sale of coffee-based credits. This report will include the requirements for the project to generate voluntary credits, illustrative costs, potential/prospective interventions to make carbon credit sales most likely to happen in the period of the project, and the consultants' estimates of the likelihood to success. The report will include illustrative ranges of costs, and generalized budget projections for such actions.
3. Final Report with findings, recommendations, trip report, and contacts, delivered electronically. Final report will include a special emphasis on the generation of carbon credits from coffee lands, since this is a request from the GOES.

BIBLIOGRAPHY

A Bibliography on Carbon Sequestration and Biomass Estimation

<http://www.winrock.org/fnrm/files/biblio.pdf>

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Prepared by:
John Rombold
College of Forest Resources
University of Washington
Forest Carbon Monitoring Program

Table of Contents

I. ABOVE-GROUND AND BELOW-GROUND CARBON STORAGE IN AGRICULTURAL SYSTEMS

EFFECTS ON MANAGEMENT PRACTICES ON SOIL ORGANIC MATTER
SOIL EROSION EFFECTS ON SOIL ORGANIC MATTER
SOIL ORGANIC MATTER DYNAMICS IN GRASSLANDS

II. ABOVE-GROUND AND BELOW-GROUND CARBON STORAGE IN FORESTS

ORGANIC MATTER IN FOREST SOILS
DEFORESTATION EFFECTS ON SOIL ORGANIC MATTER
REFORESTATION AND AGROFORESTRY EFFECTS ON SOIL ORGANIC MATTER
CARBON STORAGE IN ABOVE-GROUND FOREST BIOMASS
STIMATING THE ABOVE-GROUND BIOMASS OF FOREST VEGETATION

III. THEORETICAL ASPECTS OF THE BEHAVIOR AND MEASUREMENT OF ORGANIC MATTER IN SOILS

EDAPHIC AND CLIMATIC INFLUENCES ON SOIL ORGANIC MATTER
SPATIAL AND TEMPORAL VARIATION OF ORGANIC MATTER IN SOILS
DYNAMICS OF SOIL MICROBES AND ORGANIC MATTER DECOMPOSITION
MODELS OF SOIL ORGANIC MATTER BEHAVIOR
METHODOLOGIES FOR THE ESTIMATION OF CARBON IN SOILS

In the interest of simplicity, the website link to this document is presented above. The bibliography is extensive and covers 34 pages of references. It includes all references related to the carbon pools being looked at in El Salvador.