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REDUCING EMISSIONS FROM DEFORESTATION AND DEGRADATION (REDD) IN THE COFÁN BERMEJO RESERVE, ECUADOR

on the web at: http://www.bren.ucsb.edu/~cofan March 2009

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The Cofán Bermejo Reserve is a 55,451-hectare tract of primary Amazon rainforest located in northeastern Ecuador, bordering Colombia. Cofán Bermejo was established in 2002 by the Ministry of Environment of Ecuador as an ecological reserve under the condition that it would be sustainably managed and stewarded by the indigenous Cofán people. The Cofán have sustainably subsisted in the Amazonian rainforests of Ecuador and Colombia for centuries. The establishment of the Cofán Bermejo Reserve marked the first instance in Ecuador in which an indigenous group was granted the rights to manage, administer, and control their ancestral territories. Despite the Cofán Bermejo status as an ecological reserve, the Cofán receive no funding from the Ecuadorian government for its protection.

Throughout Ecuador, activities such as road construction, government infrastructure projects, oil, mining, mono-cultivation plantations, timber extraction, weak land tenure, and poverty have led to significant land use changes, and ultimately deforestation (Mena et al. 2006). Between 2000 and 2005, Ecuador lost 1.7 percent of its forested area per year, constituting the highest deforestation rate within South America (Mena et al. 2006, FAO 2005). Reserve status does not always protect areas from deforestation, as governments often grant concessions and illegal deforestation is widespread. The Sucumbíos Province, where the

Reserve is located, has a historic deforestation rate of approximately 1.1 percent per year (Viña et al. 2004). Similarly, the pressure of deforestation on the Cofán Bermejo Reserve is high and likely to increase in the future.

What is REDD?

Tropical rainforests provide one of the greatest vegetative carbon stores on the planet; consequently, deforestation results in a significant loss of carbon into

Figure 1: Map of the Cofán Bermejo Reserve (circled) and Other Cofán Territories along the Ecuador and Colombia Border.

the atmosphere (FAO 2006). According to the Intergovernmental Panel on Climate Change (IPCC) (2007), land use change, including deforestation, accounts for 18 to 20 percent of global annual greenhouse gas emissions (Figure 2). In December 2007, the United Nations Framework Convention on Climate Change (UNFCCC) acknowledged the considerable contribution of emissions from deforestation and forest degradation activities to climate change.

Subsequently, the UNFCCC has requested further research into developing a mechanism for reducing emissions from deforestation and forest degradation (REDD) and using such a mechanism in an international carbon emissions trading scheme. In the absence of an UNFCCC sanctioned REDD trading mechanism, voluntary markets have emerged to allow for the trading of carbon emissions credits generated from REDD projects.

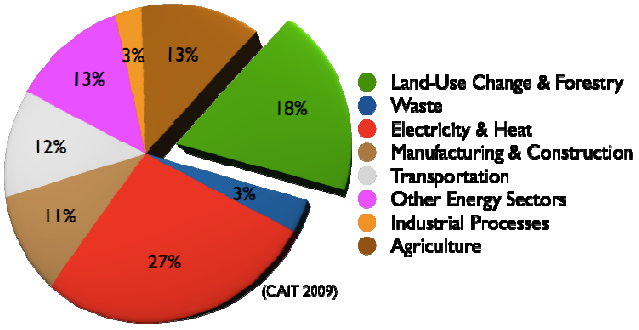


Figure 2: Greenhouse Gas Emissions by Sector. According to the IPCC and WRI Climate Analysis Indicator Tool (CAIT), land-use change and forestry, which includes deforestation and degradation, accounts for 18 to 20 percent of greenhouse gas emissions into the atmosphere.

The Cofán are interested in creating a REDD project for the Cofán Bermejo Reserve to generate a sustainable income for maintaining effective stewardship of their territories. Much of the funding generated by a REDD project would be directed to the Cofán Park Guard Program. Cofán park guards provide on-the-ground surveillance, biological research, and long-term monitoring of changes within the forest, and are the only source of forest protection. This program operates through inconsistent grant funding. In its current capacity, the Park Guard program lacks the resources to sufficiently protect the Reserve from deforestation. REDD-based carbon market funding can provide the consistent funds necessary to improve the Park Guard Program in order to preserve both the Cofán Bermejo Reserve and the Cofán way-of-life.

Research Question:

Is it feasible and economically viable for the Cofán to develop a REDD project for the Cofán Bermejo Reserve?

Feasibility Analysis

This project analyzes the feasibility of entering the Cofán Bermejo Reserve into a REDD-based carbon market by considering criteria used in existing voluntary market standards. Highlights from this analysis include:

REDD Standards - Currently, REDD projects are not recognized by the UNFCCC. However, voluntary market standards can be used to develop certifiable, REDD-based carbon emissions reduction credits. Should the UNFCCC adopt REDD, these voluntary market standards will influence the shape of future regulations.

Political Climate of Ecuador - Recently, Ecuador adopted a new Constitution, which provides additional rights to nature and indigenous groups, and developed Socio Bosque, a program that provides incentives for forest protection. These recent developments highlight Ecuador's recognition of the value of its ecological resources and interest in developing national-based programs that utilize market mechanisms to protect them. A REDD project in the Cofán Bermejo Reserve would likely gain government support, but uncertainty surrounds the distribution of benefits.

Carbon Stock and the Potential for Loss – Based on a literature review of comparative forests in South America and a limited field study, we estimate a potential deforestation rate of 0.5 percent per year, leading to a loss of 200 to 300 metric tons of carbon per hectare (Houghton 1999; Defries et al. 2002; IPCC 2006; Butler 2007). A REDD project would be designed to prevent the loss of this carbon stock.

Additionality – Most REDD standards require that a project can demonstrate emission reduction benefits in addition to a business-as-usual scenario. Reserves typically do not qualify because the forest and its carbon stocks are already protected. However, we argue that a case can be made for REDD projects for reserves in developing nations, including the Cofán Bermejo Reserve. These reserves are often subject to forest loss through illegal deforestation and development within protected areas because of government concessions. Considering this potential for carbon loss, a REDD

project for the Reserve would reduce emissions beyond a business-as-usual scenario.

Leakage – The development of a REDD project for the Reserve will only prohibit large-scale extractive activities of forest resources. Currently, extractive forest activities within the Reserve are limited to subsistence use by the Cofán. Sustainable use of the forest will not be limited by the implementation of a REDD project. Therefore, leakage, or the displacement of deforestation to other areas, is not expected to occur in the development of a REDD project.

Non-permanence – Ideally, a REDD project for the Reserve will enhance the Park Guard Program and thereby prevent anthropogenic deforestation. However, it is necessary to address the potential for unexpected carbon loss. Natural disturbances and infrastructure development within the Reserve present a low to medium risk of unexpected carbon loss. To address this risk of non-permanence, this REDD project must set aside a defined amount of salable carbon emission credits based on the level of risk.

Indigenous Culture Considerations – A REDD project and the Cofán lifestyle are compatible because both depend on protecting the forest in perpetuity. Such a project can be designed to accommodate existing Cofán cultural practices.

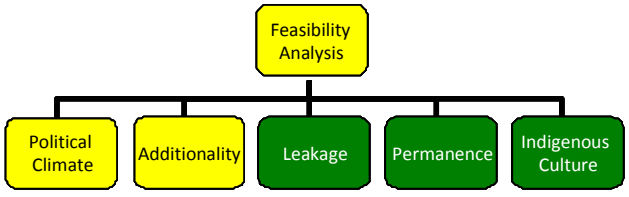


Figure 3: Feasibility Analysis Flowchart. Green demonstrates a component that will not hinder implementation, yellow demonstrates a component that could hinder implementation depending on certain external factors.

Overall, the implementation of a REDD project for the Cofán Bermejo Reserve is feasible, but contingent on external factors (Figure 3). The Cofán need Ecuadorian government support because the government owns the title to the Reserve and has developed the foundation to implement a national program. Both of these factors highlight the potential for the government to control the funds generated from a REDD project. Finally, there is uncertainty around whether REDD standards will recognize carbon emission reductions generated from protecting threatened reserves as additional to business-as-usual. This uncertainty arises because the UN does not yet recognize REDD as a mechanism to reduce carbon emissions. Adoption of a REDD mechanism within the UN could potentially change the entire shade of the REDD landscape.

It is important to note that if any of the components of the feasibility analysis—Ecuador's political climate, additionality, leakage, permanence, and indigenous and cultural considerations—are not fulfilled and/or would not promote a REDD-based carbon project in the Cofán Bermejo Reserve, then such a project could not be successfully implemented. Therefore, the overall feasibility is contingent on external factors.

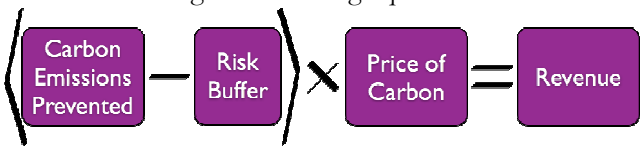
Is a REDD project economically viable?

The Cofán already lead a lifestyle that is highly consistent with what may be required under a REDD agreement. In order for the Cofán to sensibly enter into a REDD-based carbon trading agreement, the money generated by the carbon credits would at least need to match the expected project costs.

This would ensure that the expenses for the expanded Park Guard Program and implementation and design of the REDD project are met. The total expected cost for developing a REDD project can be determined using the following equation:

The total expected twenty-year project implementation cost, including design, voluntary standard certification, ongoing monitoring, a robust Park Guard Program, and general project oversight, is a conservative estimate of 7.7 million USD.

Potential revenue from the sale of carbon credits can be determined using the following equation:



The amount of carbon emissions prevented directly relates to how much deforestation the project prevents. The risk buffer determines how many credits can be sold: a low risk project would withhold 10 percent of its saleable credits from sale and a medium risk project would withhold 30 percent of its saleable credits.

Figure 4 compares both expected and historic carbon price ranges to various expected break-even price points (in $\$/tCO_2eq$). Even a medium risk project that prevents only 50 percent of the expected deforestation

may be financially viable in a voluntary market arrangement. The same scenario would almost certainly be viable within a regulated market context. Therefore, according to current rates, it is likely that a REDD-based carbon project is economically viable and the Cofán could at least break even to support a more robust Park Guard Program.

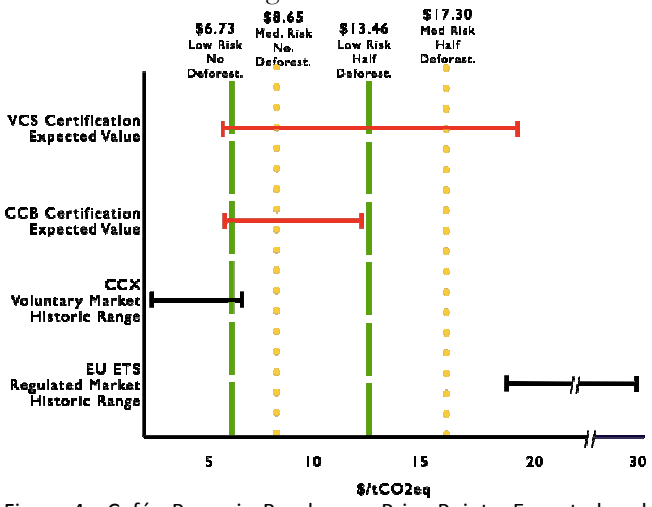


Figure 4: Cofán Bermejo Break-even Price Points. Expected and historic price ranges (dollars per metric ton of carbon dioxide equivalent) are represented with red lines for certification schemes (VCS & CCB) and black lines for existing carbon markets (CCX & EU ETS). Green dashed lines represent low risk scenario break-even price points; yellow dotted lines represent medium risk scenario break-even price points.

What are the options?

Based on the feasibility study and cost-benefit analysis, it is potentially feasible and economically viable for the Cofán to implement a REDD project for the Cofán Bermejo Reserve. Should the Cofán decide to pursue a REDD project, several options remain. First, they can wait for a regulated market recognized by the UNFCCC to accept REDD-based carbon credits, which would increase the value of their carbon assets. Second, the Cofán can pursue immediate entry into the voluntary market rather than wait for an internationally mandated set of standards to be approved. In the current voluntary market context, the Cofán would need to find a buyer that is interested in purchasing the carbon emissions credits generated from a REDD project for the Reserve. In either case, the Cofán could bundle several territories for inclusion in a REDD project, in order to build a stronger argument for benefits beyond what would happen without a project. The Cofán can also maximize entry into the new Socio Bosque program by applying with other ancestral territories besides the Cofán Bermejo Reserve. Finally, they could pursue other active carbon sequestration activities, including afforestation, reforestation, and biochar, throughout their territories.

Should the Cofán decide to refrain from pursuing carbon market entry, there are other options available for generating funding to support their way-of-life and protect the Cofán Bermejo Reserve. These options include procuring payments for ecosystem services, or expanding existing ecotourism, jewelry, and craft sales.

Final Thoughts

Threats to the Cofán and their ancestral lands represent a microcosm of a greater societal tension: human quality of life throughout the world depends on both the extraction from, and preservation of, forested lands. The Cofán are in the position to both limit extraction and enjoy the quality of life they desire; they just need the resources to dissuade extraction. Regardless of the actions taken, threats to the Cofán way of life and their ancestral lands can only be expected to increase in the future.

The Cofán have many options for generating funding to protect their forest and sustain their way-of-life. Of the options mentioned above, a REDD project would likely generate the most funding considering a) the generally increasing value of carbon emissions, and b) the expected increased demand for viable carbon offset credits. However, of the options, a REDD project carries the greatest uncertainty and requires the most forethought, preparation, time, and initial investment. Considering the potential pay-off, we believe the Cofán have a strong enough case to warrant pursuit of a REDD project.

References

Butler, R.A. 2007. Amazon Rainforest Locks up 11 Years of Co2 Emissions. Accessed November 10, 2008 <http://www.mongabay.com>.

CAIT. 2009. Version 6.0. World Resources Institute, Washington, D.C.

IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Prepared by the National Greenhouse Gas Inventories Programme. [Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Institute for Global Environmental Strategies, Japan.

IPCC. 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge United Kingdom and New York, NY, USA, 996pp.

DeFries R.S.; Houghton R.A.; Hansen M.C.; Field C.B.; Skole D.; and J. Townshend. 2002. Carbon emissions from tropical deforestation and regrowth based on satellite observations for the 1980s and 1990s. *Proceedings of the National Academy of Sciences of the United States of America* 99: 14256–14261.

FAO. 2005. Global Forest Resources Assessment 2005. Rome: Food and Agriculture Organization, 2005.

Houghton, R.A. 1999. The annual net flux of carbon to the atmosphere from changes in land use 1850–1990. *Tellus Series B: Chemical and Physical Meteorology* 51: 298–313.

Mena, C. F., R. E. Bilsborrow, and M. E. McClain 2006. Socioeconomic Drivers of Deforestation in the Northern Ecuadorian Amazon. *Environmental Management* 37.6 (2006): 14.

FAO. 2006. Global Forest Resources Assessment 2005: Progress Towards Sustainable Forest Management. Rome, 2006.