How Carbon Trading Can Help Preserve Coastal Ecosystems

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Introduction

The ocean is the largest long-term carbon sink on the planet, storing and cycling 93% of the earth's CO_2.[6] The ocean's vegetated habitats, in particular **mangroves, salt marshes, and seagrasses**, comprise only 0.05% of the plant biomass, but store equal amount of carbon as terrestrial biomass per year, and thus stand among the most efficient carbon sink. However, the rate of loss of these so-called **blue carbon** ecosystems is the highest amongst all ecosystems. If more action is not taken to sustain these vital coastal ecosystems, the majority may vanish within two decades, resulting in an enormous release of stored carbon. On the positive side, if managed properly, blue carbon sinks have tremendous potential to play an important role in climate mitigation. This article explores the potential for leveraging carbon finance for blue carbon ecosystem restoration.

Blue carbon matters

Coastal ecosystems and oceans form the largest connected system for storing and redistributing carbon dioxide (CO_2). Out of all the biological carbon captured in the world, over half (55%) is captured by marine organisms, ranging from phytoplankton and bacteria to ocean vegetation. In particular, carbon stored in the form of biomass and sediment from mangroves, salt marshes and seagrasses accounts for over 70% of all carbon in ocean sediment;[6] hence it is called blue carbon. While blue carbon ecosystems make up only 2 percent of the global area, studies have shown that these coastal ecosystems are 10 times more effective at carbon sequestration and storage on a per area basis than temperate or tropical forests (Figure 1). In total, blue carbon sinks capture and store the equivalent of up to half of the global annual transport emissions.

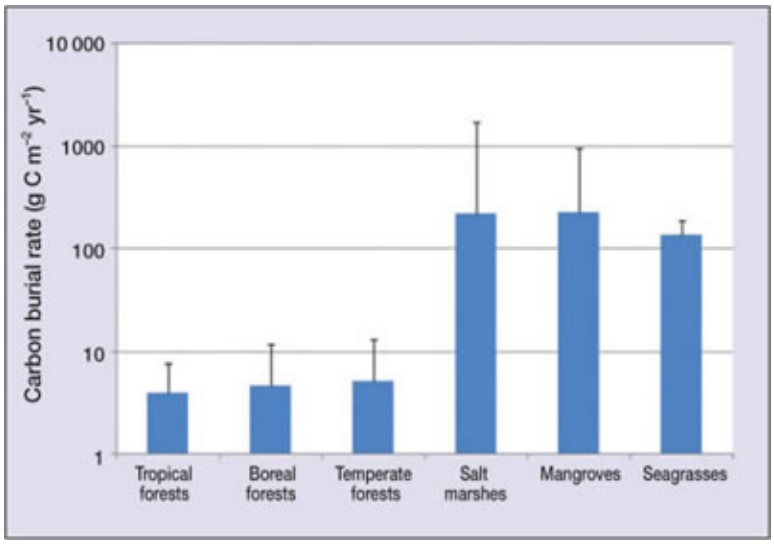

Figure 1: Carbon Storage Abilities of Different Habitat Types[4]

Despite the ecosystem services provided by coastal blue carbon ecosystems, they are some of the most threatened ecosystems in the world. A study conducted by Murray et al. showed that about one third of the global blue carbon ecosystems have been lost over the past several decades. Threats to coastal ecosystems include anthropogenic development along coasts and rivers; agricultural expansion, especially along coastal watersheds; and an increase in sea level, which has been shown to decrease the ability of coastal ecosystems to sequester carbon, leading to the degradation or destruction of these communities. When these ecosystems are degraded, they not only fail to act as a carbon sink, but also contribute to carbon emission by releasing stored carbon into the atmosphere. By preventing the degradation of these ecosystems, we can offset up to 7% of current emissions within 20 years.

Blue carbon for carbon credit

In response to the significant negative effects of coastal ecosystem degradation, blue carbon conservation projects have been developed across the globe with the goal of mitigating climate change. One of the most popular methods for encouraging the conservation of blue carbon ecosystems is through the sale and trading of carbon credits. As with all carbon-credit projects, blue carbon programs require specific procedures, transparent documentation, and close audits (Figure 1).

Establishing a carbon credit program is a multi-step process. The first phase is project identification and documentation. Before project registration can occur, a 12-month period is required to properly identify and document the project. Once the project has been registered with verification bodies, and once implementation has begun, the project will be monitored for as long as it is active. The monitoring follows a monitoring plan and tracks the implementation and outcome of the project. After the completion of the monitoring report, it is passed on to a third party organization for further verification. The final step is credit issuance, where the verified amount of carbon credits is approved and issued by the selected standard. Those credits can be sold to brokers in the market, forward sales contract (customized contract to sell carbon credits at a specified price on a future date) , or prospective buyers. In total, it takes about 2 to 3 years for a project to receive its first credit. In terms of transaction costs, most fixed costs occur before project registration. Monitoring is another important source of expense. Overall, fixed costs to pursue carbon finance add up to $90,000, which can be expensive depending on the scale of the project.[2]

Figure 2: Blue carbon project cycle

The certification process is vital for verifying the carbon credits. The main standards for certifying credits that could potentially apply to blue carbon projects are:

1. Gold Standard (GS)

Gold Standard is a voluntary registry that issues Voluntary Emission Reductions and Emission Reduction Units. The Gold Standard has been a leader in innovating methodologies in the carbon market, particularly household devices. In order to receive credits issued by GS, projects must display co-benefits generated by activities. These co-benefits include environmental, social and economic benefits, as well as "technological sustainability." (Gold Standard) The GS provides sustainability metrics to facilitate project developers in determining their sustainability requirements. The latest version of Gold Standard goes one step further to comprehensively evaluate project impacts in the nexus of climate, energy, and water security.

Gold Standard released its mangrove afforestation (the establishment of trees in an area with no prior forest cover) and reforestation guidelines in 2013. However, no mangrove project has received carbon credits from Gold Standard since.

2. Verified Carbon Standard (VCS)

Verified Carbon standard is a voluntary registry that issues Verified Carbon Units. It focuses on greenhouse gas (GHG) reduction only and has no requirements for environmental or social co-benefits. However, it has become increasingly popular for projects registered with VCS to pursue additional certifications, such as CCBS and SOCIAL CARBON in order to receive a premium price in the market.

VCS is a leading player in Agriculture, Forestry, and Other Land Use (AFOLU) projects. It has successfully developed over 10 methodologies for wetland and forestry ecosystems. Two of them are most relevant to blue carbon projects: the "methodology for avoided ecosystem conversion" and the "methodology for tidal wetland and seagrass restoration."[8] The former outlines a methodology to measure GHG emission reductions from project activities that prevent ecosystem-type conversion. While blue carbon is not specified in this methodology, it offers valuable insight into how similar concepts could be applied to the preservation of blue-carbon ecosystems. The latter provides a means to measure GHG emission reductions from tidal wetland restoration projects. Such projects include "creating or managing the conditions required for healthy, sustainable wetland ecosystems."[8] This methodology directly addresses benefits generated by blue carbon, such as increased biomass and autochthonous soil organic carbon. Mangrove, salt marsh, and seagrass projects can all be included under the methodology.

3. Plan Vivo

Plan Vivo is a voluntary registry for land-use projects that work closely with rural smallholders and communities dependent on natural resources for their livelihoods. Eligible activities include afforestation, forest conservation, restoration, and avoided deforestation. The standard aims to serve as an all-inclusive standard incorporating social and biodiversity safeguards along with certified emission reductions.[7]

4. CCBS and Social Carbon

The Climate, Community and Biodiversity Standard (CCBS) and Social Carbon are both add-on certificates to projects approved by another credit issuance standard. The CCBS identifies land use conservation projects that generate net positive outcomes "for climate change mitigation, for local communities and for biodiversity." Similarly, project developers can establish a baseline using the Social Carbon Standard indicators to point out degrees of sustainability in six resources: "social, human, financial, natural, biodiversity and carbon." Projects must then demonstrate that there is an improvement over the lifetime of the project in relation to this baseline through Social Carbon monitoring reports, which are independently verified.

According to the results from 2015's voluntary market analysis, projects certified with these additional standards received premium market prices. For example, then average price of a VCS project was $3.3/credit. In contrast, projects with a CCBS or Social Carbon license traded for over 25% more.

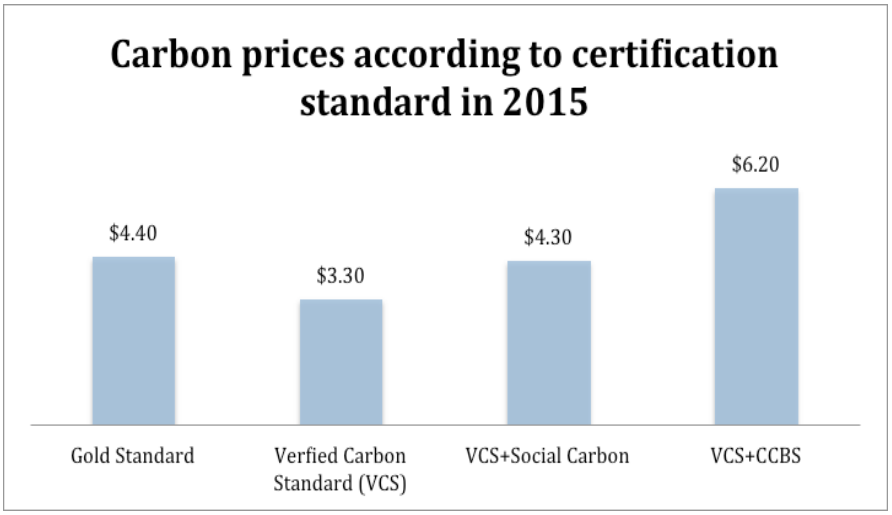

Figure 2: Carbon prices according to certification standard

Blue carbon for revenue

Apart from standard credit certification process, there are opportunities available in other program and funds. For example, Nationally Appropriate Mitigation Actions (NAMAs) are starting to explore ways to incorporate blue carbon projects. Countries are allowed to propose their own mitigation measures and funding mechanisms under NAMAs, which could be promising for blue carbon projects. Plans are underway to implement a pilot mangrove restoration project in the Dominican Republic in 2017. Another option is funding from the Green Climate Fund (GCF). This United Nations Framework Convention on Climate Change funding mechanism is available for projects with adaptation or mitigation purposes. It can also be viable for certain blue carbon projects to sell offsets to some national or subnational offset program. Additionally, mangrove ecosystems are associated with higher seafood production. Projects can opt to pursue organic certification, a type of add-on benefit, that raises products to premium. Last but not the least, to capitalize on the full carbon storage services provided by blue carbon, projects should consider bundling three carbon ecosystems together in future project, incorporating mangrove, seagrass and salt marsh systems all together.

Based on the regulations and rules, the voluntary carbon market is more ideal for small scale projects to leverage carbon financing. Over the last few years, several projects have certified their emission reductions and been awarded with carbon credits from the voluntary carbon market. For instance, a 117ha mangrove restoration and reforestation project in Gazi Bay, Kenya has achieved annual sale of carbon credits of $12,500 USD.

However, several hurdles could hamper the process. It is predicted that the voluntary market price will remain relatively low in the near future.[3] Subsequently, low carbon price might not be able to make up for the increasing costs of project. The high cost of certification is likely to pose another

challenge for projects, especially for small-scale projects in developing countries. In part, this is because most of the fixed costs are incurred before project registration, while the carbon revenue can only be obtained after the project has been registered and credits are issued and traded in the market.[1] Figure 8 shows the estimated transaction costs for a carbon project. To cover the transaction costs, a project has to reach a certain scale to generate enough credits.

In the meantime, the long-term framework for carbon certification might also stretch the local capacity, making it a less feasible solution for financing in the carbon market. In Vietnam and Madagascar, the length of time and planning required for such process made it difficult for project developers to continue pursuing carbon credits.[9] Carbon financing also poses new challenges to capacity building. Projects tend to certify carbon emission reductions without considering carbon stored within the soil, which is "by far the largest carbon pool for all the focal coastal habitats."[5] This exclusion prevented those projects from realizing their full potential. However, quantifying the amount of carbon stored in soils incurs even greater expenses.

Climate change itself also creates uncertainty about the viability of blue-carbon projects. 20-foot tidal changes took place during the lifetime of the Sundarbans mangrove project. It is likely that new blue carbon projects may be influenced by future sea level rise. Therefore, it becomes more and more imperative for project developers account for potential climate change impacts. Small-scale interventions that lack the capacity to interpret current climate data and future climate projections may not in the best position to secure long-term blue carbon project success.

Although the voluntary market only represents a small portion of the carbon market, "the voluntary market is a fertile testing ground" for new ideas, methods, and impacts that could be adopted in the regulatory market. As more countries agree to mitigate and adapt to climate change by reducing carbon emissions, the regulatory market is expected to expand and subsequently incorporate more blue carbon projects. Therefore, despite a number of obstacles and uncertainties, it is still viable for interventions to use carbon finance to fund part of the project.

Conclusion

Coastal ecosystems remove carbon from the atmosphere and store it in soil and plants. In fact, coastal ecosystems are some of the most powerful carbon sinks in the world. As a result, if they are threatened or destroyed, their blue carbon stores will be released and contribute to climate change. To combat this undesirable impact, it may be possible to mitigate climate change through blue carbon conservation projects. And the international community has starting to direct efforts on incorporating these ecosystems into existing policy frameworks. Meanwhile, blue carbon pilot projects have successfully secured carbon money in the voluntary carbon market.

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Notes

1. Ellis, J. and Kamel, S. 2007. Overcoming barriers to Clean Development Mechanism projects. OECD. Working paper.

2. GACC . Global Alliance for Clean Cookstoves. The Carbon Project Cycle. Available: http://carbonfinanceforcookstoves.org/implementation/project-cycle/

3. Hamrick, A. and Goldstein, A. 2015. Ahead of the curve: State of the voluntary carbon markets 2015. Ecosystem Marketplace. Working paper.

4. Mcleod, E., Chmura, G., Bouilon, S., Salm, R., Bjork, Mats., Duarte, C., Lovelock, C., Schlesinger, W., and Silliman, B. 2011. A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering C02. Frontiers in Ecology 9(10): 552-560.

5. Murray, B., Pendleton, L., Jenkins, W. and Sifleet, S. 2011. Green payments for blue carbon economic incentives for protecting threatened coastal habitats. Nicholas Institute for Environmental Policy Solutions. Working paper.

6. Nellemann, C., E. Corcoran, C.M. Duarte, L. Valdés, C. DeYoung, L. Fonseca, G. Grimsditch. (2009). Blue Carbon. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal.

7. Plan Vivo. The Plan Vivo Standard. Available: http://www.planvivo.org/docs/Plan-Vivo-Standard.pdf

8. VCS. Verified Carbon Standard. Methodology for avoided ecosystem conversion, v3.0. 2014. Available: http://www.v-c-s.org/methodologies/methodology-avoided-ecosystem-conversion-v30

9. Wylie, L., Sutton-Grierb, A. and Moorec, A. 2016. Keys to successful blue carbon projects: Lessons learned from global case studies. Marine Policy. Vol. 65. pp 76-84.