Next Generation Climate Mitigation

Integrating Global Sustainable Development and Environmental Conservation

by F. Douglas Muschett

This article describes how the science and art of global climate mitigation has evolved from early so-called "no regrets" activities to the point of being able to integrate the other critical needs of environmental conservation and poverty alleviation.

INTRODUCTION

The emergence of global climate change demonstrates the dynamism of the environmental field, with new issues and approaches appearing regularly over time and geographic space. Some of the issues faced by the United States in the recent past, such as environmental health, air pollution, indoor air quality, water quality, water supply, and soil erosion, have now become endemic problems in the developing world as a result of rapid population growth and development. In combination with poverty, environmental degradation has had tragic consequences, including widespread mortality from indoor air pollution associated with poorly designed charcoal and biomass stoves[1] and from devastating mudslides, such as those recently experienced in Haiti in the aftermath of Hurricane Jeanne.

Global concerns about the environmental effects of population and economic development led to the Rio Earth Summit in 1992. Notable outcomes from the summit included international agreements like the Convention of Biodiversity, Convention of Desertification, and the United Nations Framework Convention on Climate Change (UNFCCC), which led to the Kyoto Protocol. The Rio Summit also helped bring the concept of sustainable development into the mainstream of international consciousness. With the new millennium, international attention has become newly focused upon pressing social problems (e.g., global poverty, health, and education), in addition to environmental issues under the rubric of the Millennium Development Goals.

KYOTO AND THE UNITED STATES

It is probably a miracle that global negotiations have taken place on climate change. Blocks of countries representing shared interests, individual countries representing individual interests, philosophical differences about the use of markets versus regulation, philosophical differences about equity versus economic efficiency, and conflicts among industry groups and between industry and environmental nongovernmental organizations (NGOs) are just some of the obstacles to climate negotiations. The United States is still a part of the UNFCCC, the international body that reviews climate science and policy and convened the Kyoto Protocol. However, due to perceived economic self-interest, the Bush Administration withdrew the United States from Kyoto in 2003 and instead initiated a voluntary program with the goal of reducing greenhouse gas (GHG) emissions per unit of economic output by 18% over 10 years, while actually allowing total GHGs to increase over time.[2]

Drivers

Although the Kyoto Protocol has not yet reached its targeted goal of having participation from enough countries to account for 55% of global GHGs—as of this writing, it is still waiting for Russia to sign—it is already an important driver for emissions trading in Europe and Asia. Emissions trading in Europe reached more than 500,000 tons in July 2004,

and the European countries are in the midst of setting mandatory emission reductions targets in support of the overall Kyoto objective of reducing emissions by 5% below the 1990 global baseline. (*Editor's note:* The Russian Parliament had just ratified the Kyoto Protocol as this publication was going to press.)

Current voluntary programs in the United States include the registry of entity emissions and reductions being managed by the U.S. Department of Energy, the recently initiated GHG trading program by the Chicago Climate Exchange, and several other private and public programs. Many of the factors contributing to the business case for sustainability, as recently discussed in *EM* by Miriam and Perry Lev-On,[3] have begun to motivate corporations both in Europe and the United States. In particular, drivers have included increased revenue through resource conservation and reduced financial risk, demonstrating social responsibility and building a positive reputation.

Defining Key Issues

Despite the divergent path chosen by Kyoto participants and the United States, there are many important commonalities. Ironically, the fact that the European countries are now implementing international emissions trading is due in large measure to the insistence of the United States during earlier negotiations to allow international trading to promote economic efficiency. Wherever emission reductions and offsets are traded, however, it is necessary to have independent bodies verify the reductions and offsets, certify the results, and analyze the following additional criteria, which have evolved as important considerations during several years of global dialogue:[4]

- Baseline analysis. Document the "before and after" GHG impact of the proposed project.
- Persistence. Demonstrate that emission reductions and offsets would not be reversed.
- Leakage. Ascertain whether there is some kind of displacement from the proposed project, which would tend to counteract the emission reductions or offsets being claimed.
- Additionality. Determine that the proposed project is "additional" and would not have occurred in the absence of climate policy.

Early Projects and Approaches

A couple of observations from early climate mitigation projects can be made. First, most initial projects that have been undertaken during a period of regulatory uncertainty in both the United States and Europe have tended to be "no regrets"

projects, including energy-efficiency, fuel-switching, cogeneration, heat recovery biomass niche, waste-to-energy, methane recovery and reforestation, and carbon sequestration. The latter, including several projects by the U.S. electric industry through Utilitree Carbon Corporation, tend to be low-cost ($1 per ton of carbon) and provide local environmental benefits (e.g., wetlands, flood control, outdoor recreation). Second, many entities have undertaken projects to gain experience with carbon mitigation and markets rather than from a present sense of commitment.

Opportunities from Differences

Anyone who is seriously concerned about global climate change and mitigation has to be disappointed with the current pace of activity in the United States under the voluntary system, notwithstanding new initiatives among the states. Many observers expect that the United States will eventually join the Kyoto signatories and forge a new agreement. In the meantime, however, there are compelling opportunities and challenges before U.S. climate stakeholders to develop new and creative approaches outside the Kyoto Protocol.

For a variety of reasons, participating countries in the Kyoto Protocol have been slow to accept the utility of land use, land use change, and forestry (LULUCF). The Kyoto Protocol limits the amount of such mitigation to a maximum of 5% of the total and only permits afforestation and reforestation as means of sequestration, despite the fact that it is widely accepted that approximately 20% of effective GHG emissions are directly caused by land use changes, including clearing and burning. Thus soil sequestration, despite great potential and its importance to restoring land productivity in regions with highly depleted soils (such as the "Sahel" region in sub-Sahara Africa), is not accepted under Kyoto; but the Chicago Climate Exchange accepts it. Therefore the United States and its climate stakeholders have an opportunity to (1) demonstrate and implement in project portfolios some of the kinds of carbon projects with added environmental and global sustainable development benefits as described below for "next generation" projects; (2) help develop and differentiate markets and market prices for carbon, based upon different project types and co-benefits; and, in so doing, (3) stimulate creative carbon project applications without getting too bogged down in the controversial issue of "additionality," which is currently an obstacle to project approval under the (Kyoto) Clean Development Mechanism.

NEXT GENERATION OF CARBON PROJECTS

Rural Development, Environment, and Poverty

Destructive cycles of land clearing and "slash and burn" policies, a large global source of GHG emissions, have become widespread in response to population pressures and inappropriate land use and stewardship. In moist tropical climates, ramifications have included subsistence farming and poverty, widespread deforestation, soil erosion, altered water flows and water quality, and severe threats to biodiversity, including endemic species. One of the world's 10 "biodiversity hotspots" is the Atlantic Forest in Brazil, parallel to the 2000-mile coastline; yet only 6% of the original forest remains, largely in the form of discontinuous forest remnant patches. In some drier climates, land clearing and erosion, coupled with drought, are causing desertification and hardship.

Landscape Approaches to Climate, Biodiversity, Conservation, and Poverty

Degraded landscapes may be restored with a combination of reforestation, agriculture, agroforestry, and livestock management. NGOs, university researchers, governments, and donors are joining to transfer improved technologies and techniques to rural populations. An increasingly popular method to protect biodiversity is the "landscape" approach with multiple land uses. Land recuperation and reforestation connect forest remnants; and buffer zones, where sustainable agriculture and forestry are practiced, protect extant forests. When rural people can become more productive and increase their income, there is economic incentive to cease destructive practices.

A leading NGO, Pro-Natura, has been implementing a landscape approach in a central portion of the Atlantic Forest, which protects the forest with a buffer zone and teaches good agroforestry and pasture practices to provide economic opportunities and reduce "slash and burn" policies.[5] Other organizations, such as Conservation International and the Rainforest Alliance, are likewise developing the "landscape" approach. Closer to home, the California-based Wild Farm Alliance has been promoting the connection of farms to larger landscapes with wildlife corridors, protected waterways, hedgerows, and other natural habitats.[6] In all of the preceding examples, there is an opportunity to design the projects to combine the other objectives with carbon storage in landscapes, forests, and/or soils.

To help stimulate new, state-of-the-art carbon sequestration projects, which also protect biodiversity and improve rural incomes, the World Bank recently launched its BioCarbon Fund with an initial capitalization of $15 million.[7] Also in recognition of the emerging importance of this multiple purpose approach, Conservation International, together with The Nature Conservancy and corporate sponsors British Petroleum, Intel, and others, recently formed the Climate, Community, and Biodiversity Alliance to develop quality standards for conducting these complex carbon projects.[8]

Productive Uses of Renewable Energy

The term "productive uses" refers to applications of renewable energy and energy efficiency that are not only cost-effective, but also improve productivity and output and, thereby,

improve incomes to fight poverty. In countries where billions of people still do not have access to grid electricity and live in poverty, there are many such potential applications for renewable energy. These opportunities are now being actively supported by USAID and multilateral banks, as discussed in the accompanying article by Prabhu Dayal.[9]

Increasingly, international consulting firms are developing local variations of waste-to-energy, including heat and cogenerated electricity. Feedstocks include larger waste streams, such as timber wastes, sugarcane bagasse, and rice husks. However, it may be the somewhat smaller-scale and newly emerging farm and village applications that hold an even greater potential to improve the lives for many families. Millions of people are affected by what they can produce, consume, and export/import owing to extreme climates (e.g., wet and dry seasons), a lack of transportation, a lack of refrigeration, and a lack of food processing facilities. To take a simple example, it is difficult to produce milk during the dry season, ship it during the wet season, and pasteurize it anytime.

However, many productive applications currently being proposed can repay the renewable energy and other capital costs, improve family incomes, develop new local and export markets for products, and generate carbon credits:

- hydro and solar photovoltaic (PV) systems (i.e., water pumping) provide irrigation for additional crops during the dry season for local and export markets (including corn, fruits, and lettuce);
- solar PV systems power "fish farming" for local consumption and export and for producing animal feeds;
- solar PV systems provide electric fencing for livestock management and biogas provides hot water for sanitary milk production;
- hydro and solar PV or wind systems provide electricity and biomass heat and hot water for value-added secondary processing and products (including cheese, cereal, animal feeds, coffee, and artisan products); and
- solar PV systems also provide rural electrification for basic lighting, refrigeration, radio, and television.

Because many of these applications tend to be small (on the order of hundreds of watts to hundred of kilowatts), to produce a viable carbon project and limit transaction costs, it is desirable to (1) aggregate and replicate a large number of these applications and (2) include small-to-medium biomass generation and cogeneration projects, which use the feedstocks discussed above to increase the amount of carbon emissions offsets. To help stimulate smaller community projects and rural enterprises using renewables and clean technologies, the World Bank has solicited an investment pool of $100 million for its Community Development Carbon Fund.[7] Although there are only a handful of approved projects, there seems to be an early emphasis on biogas. There are project plans to develop 100,000 biogas plants for small livestock farms in rural Vietnam to supply 60 MW of electricity and cooking fuel, which will lead to a reduction of 2.7 million tons of carbon dioxide equivalent (CO_2e) over 10 years and to develop 60,000 biogas units for cooking and lighting in Nepal, which will also reduce deforestation and eliminate 1.4 million tons of CO_2e.

CONCLUSION

Despite traveling separate paths, the Kyoto participants and the United States have resolved several common methodological issues required for establishing their respective emissions trading schemes for global climate mitigation. At the same time, other critical global environmental issues raised at the Rio Earth Summit, like biodiversity protection, conservation, and desertification, remain unresolved; and the global community has pledged to meet Millennium Development Goals to battle pervasive poverty issues.

In a shrinking world where countries, security, poverty, well-being, and the global environment are all interrelated, climate stakeholders in the United States have an important opportunity to use emerging climate mitigation techniques to demonstrate a concern for—and to directly help—other human beings and the planet. Recently established institutions like the World Bank Carbon Funds have begun to stimulate pilot projects, which obtain tradable carbon credits and demonstrate these other co-benefits from global climate mitigation. However, there is both a compelling need and opportunity, within and outside the Kyoto framework, for additional and more creative applications that fight poverty through economic opportunity and restore and protect the environment.

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