EM Market Insights :: Ecosystem Services

Beyond Borders: PES and REDD in the ASEAN Region



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Ministry of Agriculture, Nature and Food Quality



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www.forest-trends.org

Forest Trends is an international, non-profit organization that focuses on market-based mechanisms because of their powerful and lasting means of: ensuring the maintenance of ecological functions and services provided by forests and other ecosystem services; generating economic benefits; and promoting the equitable distribution of benefits among diverse stakeholders. Our approach integrates the fundamental dimensions of ecology, economy, and equity because our goal is for impact of a scale that is meaningful globally.

Forest Trends, originally focused on forest ecosystems, now covers a broad range of ecosystem services, from forest carbon to biodiversity to watershed and most recently to marine environments. The Forest Trends family of initiatives all share in the vision to harness the power of markets as innovative financing mechanisms for conservation.

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The Katoomba Group seeks to address key challenges for developing markets for ecosystem services, from enabling legislation to establishment of new market institutions, to strategies of pricing and marketing, and performance monitoring. It seeks to achieve the goal through strategic partnerships for analysis, information sharing, investment, market services and policy advocacy. The Katoomba Group includes over 180 experts and practitioners from around the world representing a unique range of experience in business finance, policy, research and advocacy.

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The Ecosystem Marketplace seeks to become the world's leading source of information on markets and payment schemes for ecosystem services (services such as water quality, carbon sequestration and biodiversity). We believe that by providing reliable information on prices, regulation, science, and other market-relevant factors, markets for ecosystem services will one day become a fundamental part of our economic system, helping give value to environmental services that, for too long, have been taken for granted. In providing useful market information, we hope not only to facilitate transactions (thereby lowering transaction costs), but also to catalyze new thinking, spur the development of new markets, and achieve effective and equitable nature conservation. The Ecosystem Marketplace is a project of Forest Trends.

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Payments for Ecosystem Services: Scaling Up...and Down

by Sven Wunder and Chris Santiago

A key question of any Payment for Ecosystem Services Scheme is how big — or small — to go. Size brings economies of scale, but often at the cost of focus. Here's a look at lessons learned in Latin America.

7 May 2010 | It should come as no surprise that Rafael Gallo wants to protect Costa Rica's watersheds: The island nation's sparkling rivers and waterways are both his playground and livelihood

In 1985, Gallo co-founded Rios Tropicales, an ecotourism company that takes travelers whitewater rafting on eight of Costa Rica's pristine rivers. Rios Tropicales later established a fund that assists in the preservation, protection, and restoration of the rivers, streams and watersheds of Costa Rica.

"It was natural to us to protect the rivers we were running, help the communities we were visiting, and train fellow Costa Ricans to do what we were doing," Gallo recently said.

Rios Tropicales is a relatively small outfit that Gallo and his partners grew organically from the ground up. But the company also partners with the national-scale *Fondo Nacional de Financiamiento* (FONAFIFO), the branch of the Ministry of the Environment and Energy that administers Payments for Ecosystem Services (PES). In this capacity, FONAFIFO acts as an umbrella for local organizations that earmark payments to recipients in their target watersheds.

While Rios Tropicales has the flexibility and focus of a small-scale PES, FONAFIFO has the legitimacy and managerial economy of a national-scale program. The scale of each organization plays a part in its overall effectiveness.

Scaling Decisions: Large or Small?

Choosing the right scale of operation is key when implementing a watershed PES, or PWS (Payments for Watershed Services) program. Some PWS schemes function better at one scale than another, in terms of cost-efficiency, sustainability, equity, and other performance indicators.

But when is a PES scheme too small? Imagine a program that doesn't integrate enough local service providers. As a result, the non-paid upstream actors could jeopardize the service. Conversely, the PES might be too large if varying degrees of rainfall cancel out peak flows in the catchment's larger basins. It may also be too large if political processes bog it down with side objectives.

Going big often makes sense from an economic and administrative point of view, due to economies of scale. The costs of both starting and running a PES scheme tend to be lower at larger scales. If the state is

generally recognized as a good custodian of resources, a national-level initiative may secure legitimacy for the PES more quickly than it would for an NGO or user-led initiative.

Marketing to investors may also be easier at larger scales. Donors financing the start-up costs of PES schemes often like the prospect of larger-scale impacts that benefit more people. For those doing advocacy work, the bigger the impact, the better.

Downsides to Going Big

However, when it comes to PES schemes, bigger isn't always better.

In fact, some large-scale government PES schemes are just too big to meet their stakeholders' needs. Because of this, many developing countries are enacting decentralization policies, effectively scaling *down* — or breaking up — large-scale schemes in order to provide transparency and a better fit.

Large-scale, government-run schemes also run the risk of being sidelined for the sake of competing political objectives. The Mexican national watershed scheme, for instance, initially zeroed in on areas that were highly threatened by deforestation. Over the years, though, the focus shifted toward the poorest providers, unintentionally compromising the scheme's environmental additionality.

National-level PES schemes, such as those found in China, Costa Rica, and Mexico, also have a harder time targeting high-value, high-threat zones. In addition, these schemes come up short in terms of differentiating payment rates in space, which is one of the best ways to make PES schemes more efficient: When payment rates are fixed, they fail to reflect variations in the quality or amount of service provided. Key economic signals between buyers and sellers get lost, making resource allocation less efficient. In particular, there is a high risk of paying for actions that would have happened anyhow (zero additionality).

Going Smaller

In cases where decentralization has given considerable decision-making power to regional governments, financing at the sub-national level makes sense. Colombia, for example, is currently engaged in efforts to create a nationwide PWS system. Colombia's best chance for success is to go regional, which in Colombia's case means the *corporaciones autónomas*. These regional environmental agencies collect legally mandated payments from both hydroelectric power producers and industrial water consumers.

For user-financed schemes, the PWS scheme's scale should fit closely with the scale of the principal biophysical service that users want. Accordingly, the most logical spatial unit with which to begin is often the micro watershed. Though the biophysical aspects of the service end up playing a big part in scaling decisions, economic, social, and political factors are just as important.

Other factors that should be considered include the number of units utilized; the source(s) of financing; the services and sub-services being provided, as well as their respective users; the dimensions of the watershed; the administrative context; the possibility of scaling up and/or scaling down; and time (e.g., contract length).

When Does It Make Sense to Scale Up?

When a pilot program succeeds, there may be a temptation to increase its scale. But when is "upscaling" a good idea?

To answer that question, let's use a hypothetical example. Imagine a pilot PWS scheme succeeded at reducing sedimentation in a single village. The first question to ask before upscaling would be: Can the PWS be scaled up *within* the watershed? In other words, can the scheme be made to encompass the entire watershed that makes up the potential area of influence?

The answer is yes if it certain conditions are met: First, water users would need to be willing to extend payments. Second, the critical areas would need to be distributed fairly within the entire watershed. Finally, the delivery of service would need to be significantly improved by extending coverage.

If, on the other hand, environmental threats are concentrated in "hot spots" that are already covered, and if user resources are likely to remain limited, intra-watershed upscaling is not desirable.

A second question to ask would be: Should the PWS scheme be extended beyond the single watershed? Under certain conditions, functions like aquifer recharge might depend on processes functioning in neighboring watersheds. If this were the case, it would be an argument in favor of upscaling.

Upscaling may also be a possibility if several services from the same watershed are sold simultaneously. If a PES scheme provides carbon services in addition to water, for example, then an extension beyond a single watershed could be meaningful, since carbon services are not limited to the watershed. If the scheme aims to produce other integrated ecological benefits (it aims to create a biodiversity corridor, for example), upscaling can also be a good idea.

When to Avoid Changes in Scale

However, upscaling should not be the goal of every PES program. Because risk and uncertainty are higher at the outset, starting out small may make it possible to manage and adapt the program more effectively. Starting from scratch with a single-design, large-scale scheme also precludes important learning experiences and experimentation.

There are several advantages to staying small. Besides being able to maintain flexibility and focus, small-scale PWS schemes foster a participatory process and negotiated solutions. On the down side, small-scale PWS schemes suffer from high transaction costs and receive rather than make policy. In addition, any innovations that might occur will have a limited impact.

Conversely, there are times to avoid "downscaling" a large-scale scheme. To mitigate climate change, "avoided deforestation" schemes are currently being developed. National-scale carbon accounting frameworks can limit project-induced displacements of environmental threats ("leakage") and are clearly preferable in these cases.

Besides being better at addressing leakage and the phenomenon known as "free-riding," (e.g., non-paying users exploiting non-excludable services), large-scale PES schemes enjoy economies of scale, are able to replicate good ideas quickly, and are able to fine tune their policies.

Because of these different considerations, PES scale decisions should be made according to the subsidiarity principle. In other words, PES schemes should be organized at the least-centralized, competent level of authority, given the nature of the environmental problem the program is trying to solve.

Vertical Upscaling

Once a decision has been made to scale up, how is it done?

In a typical upscaling process, a good idea develops in a suitable context for innovation and a pilot program is created. If the pilot looks promising, it can be scaled up vertically. In other words, it can be escalated to a higher level of decision-making.

For example, a pilot PES scheme in Los Negros, Bolivia, was the direct inspiration for the development of a larger-scale flood protection PES scheme in the Rio Grande basin. Similarly, Ecuador recently developed a national forest conservation PES (Sociobosque) that was clearly inspired not only by the Costa Rican national PES program, but also by smaller-scale field projects at home. (This process is also sometimes referred to as "scaling out.") In both cases, some of the same NGO actors also lobbied for the legal steps required to upscale vertically, and provided technical assistance as well.

Vertical upscaling, however, isn't always a spontaneous, bottom-up process. PES programs such as the seven-million hectare Chinese Sloping Land Conversion Program and the British Environmentally Sensitive Area Program first commissioned pilot phases. These pilot schemes tested strategies under different circumstances.

The advantage of these planned strategies was that certain factors of variation in the samples could be controlled. Each of these programs also made upscaling an explicit, stated aim.

Horizontal Upscaling

Upscaling can also be achieved horizontally. In these cases, the initiative is not escalated to a higher political-administrative level. Instead, upscaling can be achieved through the gradual inclusion of additional participants within a predefined zone (e.g., extending coverage of a PES scheme within a watershed). The previously mentioned Los Negros scheme, for instance, started off with only a few households under contract in 2004, but later spread by word-of-mouth and trust-building to cover 2774 hectares.

Horizontal upscaling also occurs through replication. Thanks to the NGO Fundación Natura Bolivia, the Los Negros scheme has been replicated in the neighboring Comarapa and Mairana watersheds. The Ecuadorian NGO Cederena piloted the Pimampiro watershed PES in 1999, and has since replicated the scheme at the El Chaco and Celica sites. Similarly, the PASOLAC program is involved in the execution and development of ten different municipal-level watershed PES schemes in Central America.

With 14 and 300 hectares under contract, the Comarapa and Mairana watersheds are still a lot smaller than the Los Negros scheme. But where replications are often small, repeated replication can arguably yield a significant cumulative impact. Moreover, replicating the same type of scheme under different circumstances contributes to the understanding of PES systems in general.

Upscaling and Dryland Agriculture

What scaling issues and obstacles might confront PES programs focused on dryland agriculture? These kinds of programs are still quite new: No government-financed schemes in the Southern Hemisphere are focused solely on dryland agriculture, and only a handful of small user-financed schemes exist.

One potential concern for upscaling water harvesting and water retention schemes is hydrological: If downstream areas suffer from water shortages, the intensification of large-scale agricultural schemes would make them worse.

In Colombia, an organic farming scheme involving poor farmers revealed low upscaling rates within the watershed. Thus far, it has not been possible to sell the organic farming concept to commercial banks in order to make use of their credit channels. Technical assistance is also scarce and costly. In similar settings, the lack of markets for new seeds can also constitute obstacles for upscaling, in spite of their superior economic returns. These problems will need to be analyzed on a case-by-case basis.

Multi-Scaling

In the world of PES schemes, not much up- or downscaling has actually occurred yet: Big schemes tend to stay big and small schemes tend to stay small although, as mentioned, the latter may be replicated at similar scales elsewhere.

The high financial and political costs of moving across scales may simply keep it from happening (ongoing payments are often expected to continue; renegotiating incentives and redesigning contracts can be cumbersome). This underscores the importance of choosing the right scale from the outset, before the initiative becomes locked into certain modalities.

It is also important to note that multiple PES scales can and do operate successfully on the same playing field. Though differently scaled, Rafael Gallo's ecotourism company Rios Tropicales and the Costa Rican government's FONAFIFO co-exist and supplement each other. In addition to partnering with Rio Tropicales to protect the island's rivers and waterways, FONAFIFO also acts as an umbrella for breweries and water-utility companies who provide services to users in other target watersheds.

What makes multi-scaling interesting is that you can have the best of both worlds: the legitimacy and managerial economies of the national-scale PES, and the flexibility and focus of small-scale schemes. Parallel implementation of large- and small-scale schemes encourages complementary experiences and cross-fertilization of knowledge.

"While government organizations and NGOs are certainly important in protecting Costa Rica's natural resources," says Gallo, "The partnership of local and indigenous communities to support and self-monitor wildlife and forest protection is our biggest achievement."

"Without such grassroots ownership and involvement, many valuable and well-meaning efforts at environmental protection ultimately fail."

State of the Forest Carbon Markets Asia

by Katherine Hamilton and David Diaz

Forests in the Global Carbon Markets

22 April 2010 | Forestry projects kicked off the global carbon offset market in the early 1990s, when environmental non-profits and industrial companies initiated partnerships to conserve and plant forests with the aim of balancing greenhouse gas emissions (GHG) by capturing carbon in trees. Although forestry transactions were the first-ever carbon offsets, they were soon sidelined in emerging global GHG regulations and a narrow band of forestry offsets were recognized under the Kyoto Protocol.

These developments left the voluntary markets as the most fertile land for forest carbon. Some buyers have been drawn to this tangible, land-based offset category and others have veered away from the complexities and risks of forest carbon offset projects. Over time, however, the role of forests in mitigating climate change has increasingly gained credence - thanks largely to the resolution of scientific disputes over how to measure and monitor the amount of carbon captured in trees, as well as growing political consensus on the need to reduce emissions as quickly and cost-effectively as possible.

This acceptance has begun to impact global climate policy. In 2007, at international climate change negotiations, the Bali Action Plan laid out a strategy for developing consensus on how to recognize reducing emissions from deforestation and degradation (REDD). In 2009, the Copenhagen Accord explicitly stated the need to develop mechanisms that would reward sustainable land-use practices that capture carbon in trees. Around the same time, land-based carbon offsets were explicitly included in the text of proposed US climate bills. These regulatory developments have the potential to stimulate tremendous demand for land-based carbon credits.

Currently, the forest carbon market is diverse on both the supply and demand fronts. Many offsets have been developed and purchased purely for the sake of philanthropy, while others have been created as commodity products to be sold as units of trade on global regulated and voluntary markets. In this context suppliers employ significantly varying project designs, methodologies, and implementation strategies to create credits.

In January 2010, Forest Trends' Ecosystem Marketplace published the first-of-its-kind State of the Forest Carbon Markets 2009 report, covering more than 100 project developers that supplied information from 226 forest carbon projects. This report included the most comprehensive survey of forest carbon projects to date.

Asia's Stake in the Global Forest Carbon Market

In 2008 Asia led the world in the supply, providing 17 MtCO2 of offsets from all project types (i.e., not exclusive to forest carbon) into voluntary carbon markets. However, the area's contribution of forest carbon offsets into the markets has been more muted. Compared to other regions, Asia has supplied a relatively small proportion (6%) of forest carbon offsets into the global markets to date. Of the 226 forestry projects that

reported transacting forest carbon credits, fifteen of these projects are based in Asia. Ecosystem Marketplace tracked projects in China, India, Bhutan, Indonesia, and Malaysia.

These projects reported transactions of 1.05 million metric tonnes of carbon dioxide (MtCO2), valued at \$9.9 million.

Forest Carbon under Kyoto's Clean Development Mechanism

The Kyoto Protocol is a legally binding international agreement that came into effect in 2005 and launched the world's largest greenhouse gas emission reduction market. As of November 2009, 189 countries had signed on. Under the Protocol, 37 so-called "Annex 1" countries, which include developed countries and countries with economies in transition, agreed to reduce their GHG emissions on average by at least 5% below 1990 levels over the first commitment period 2008-12.

The Kyoto markets are based on a cap-and-trade model with three major "flexibility mechanisms:" the Clean Development Mechanism (CDM), Joint Implementation (JI), and Emissions Trading. These mechanisms are the foundation of the regulated international Kyoto carbon market. Two of these mechanisms, the CDM and JI, directly allow for the development of carbon credits from land use, land-use change, and forestry (LULUCF) activities.

The Clean Development Mechanism (CDM) allows emitters in developed countries to purchase carbon offsets (Certified Emission Reductions or "CERs") from approved and registered emission-reduction projects, including afforestation and reforestation (A/R) projects, in developing countries. Developed countries can use CDM A/R offsets to meet their GHG emission-reduction commitments — but only up to 1% of their base-year emissions, multiplied by five (roughly 183 MtCO2 in total).

While no LULUCF credits have yet been issued under the CDM, fourteen projects have been registered in the system as of May 2010.¹

Asian Pioneers of Forest Carbon in the CDM

Asia has played a lead role in the pioneering of forestry credits under the CDM and continues to incubate projects. The first ever forest project registered under the CDM in 2006 grows in China. The "Facilitating Reforestation for Guangxi Watershed Management in the Pearl River Basin" project developed and used the very first approved CDM methodology, AR-AM0001. It involves the reforestation of 4,000 hectares of degraded barren land. Through this project, communities and individual farmers sequester carbon, enhance other environmental services, and generate additional income. The project targets a net GHG removal of 710,104 tCO2 over the thirty-year fixed crediting period. The World Bank BioCarbon Fund contracted a purchase of the project's credits.

According to the UNEP Risø Center's CDM Pipeline currently, six of the fourteen CDM registered A/R projects are based in Asia with two in China, three in India, and one in Vietnam. Of the 41 A/R projects awaiting registration under the CDM, eleven are based in Asia, including four in China, five in India, one in Laos, and

¹ http://cdm.unfccc.int/Projects/index.html, accessed May 1, 2010.

the first project to target mangrove forests based in Indonesia.² Even though credits have not been issued from these projects, many of them have signed Emission Reduction Purchase Agreements, exchanged rights to future credit ownership, and received initial payments.

Forests in the Voluntary Carbon Market

While Asia has been a forest carbon leader under CDM, most transactions have occurred in the voluntary carbon markets. Historically, 73% of all forestry-based carbon credit transactions have occurred in the voluntary carbon markets. The voluntary carbon markets include all carbon credit trades not driven by regulation. This includes transactions involving credits created specifically for the voluntary markets as well as transactions in which suppliers sold regulatory market credits (such as CDM Certified Emission Reductions) to voluntary buyers.

Within Asia, all forestry-based credits were transacted on the "Over the Counter" (OTC) voluntary market. The OTC market includes all voluntary transactions outside a formal cap-and-trade system or exchange, such as the Chicago Climate Exchange.

Over time, we estimated a total of 13.2 MtCO2 originating from 209 forest carbon projects were sold into the OTC market, valued at \$112 million. While forestry is a top choice for some buyers seeking to offset emissions, the same issues that kept forestry and other land-based projects from playing a major role in the Kyoto markets, such as permanence, leakage, investment risks and accounting questions, have also hindered this category of projects in the voluntary carbon markets. Over time the market share has decreased. Before 2002, forestry credits represented 6% of total voluntary carbon market transactions. In 2008, forests were the source 3% of credits transacted in the marketplace.

A Snapshot of Asia's New Forest Carbon Projects

Within Asia a diversity of projects sell credits into the regulated and voluntary markets. One common characteristic is an emphasis on A/R projects. With the exception of one REDD and one improved forest management project, all active projects in Asia were A/R. Of the nine Asian projects that reported the species mixes managed in the project area, six reported using native species only, one using exotic species only, and two reported using a mix of native and exotic species. The only project which claimed to include forest plantations also reported using only native species.

Despite this relatively common shared trait, there was no broader homogeneity among Asian forest carbon projects to be found. Projects have been developed by both for-profit and non-profit organizations, and cover a total area of more than 215,000 hectares. The projects varied dramatically in size, ranging from areas as small as 3 hectares up to as large as 100,000 hectares.

Credit sales from these projects fetched prices ranging from \$4.43 up to as much as \$22.00 per tCO2. Asian credits held a volume-weighted average price of \$9.45/tCO2, placing the average selling price from Asia above Europe and the Americas, but behind Africa and Oceania.

^{2 &}quot;CDM Pipeline Overview" Spreadsheet. UNEP Risø CDM/JI Pipeline Analysis and Database, accessed May 1, 2010. Available at http://cdmpipeline.org/

As with the broader trend in forest carbon markets, projects reported using a relatively small variety of offset standards to individual projects:

- Five of the offset projects reported using the Voluntary Carbon Standard (VCS) forest carbon standards, with one of these projects also in pursuit of an additional certification of co-benefits using the Climate, Community & Biodiversity (CCB) Standard
- One CDM pipeline project reported using solely the CCB standard while applying a CDM methodology to calculate carbon benefits
- Seven projects reported using an internal or proprietary standard
- Only one project did not report the use of any standard

Building Steam, Looking Forward

The rate of new project launches in Asia is accelerating, with half of the 12 projects reporting individual project data being launched in 2006 or later, four of which were launched in 2008 or 2009. Continued activity in the area points to continued growth.

For example, the State Forest Administration and China Green Foundation have been building the Chinese Green Carbon Fund, which is now generating credits for voluntary buyers. Intending to sequester from 5-10 MtCO2 within the next ten years, the program is an early leader in the pursuit of public-private partnerships for forest carbon activities.³

As international policy takes shape around the principle of REDD+, and the promise of \$4.5 billion to fund capacity-building and fast-start support for REDD+, the future of forest carbon in Asia looms large. For example, a recent study by the Center for International Forestry Research (CIFOR) identified more than 35 REDD projects taking shape in Indonesia alone.⁴

As an area rich in both forest assets and deforestation rates, Asia is well positioned to receive carbon finance for forest conservation. Whether the finance originates from a fund or a market is still to be determined. The outcome of international climate negotiations as well as the development of domestic legislation among Annex I countries will undoubtedly affect the market demand for REDD offsets.

^{3 &}quot;China Green Carbon Fund established in Beijing." 2007. Press Release from China National Petroleum Corporation. Available at http://www.cnpc.com.cn/eng/press/newsreleases/CSR/45c932ef-6bf6-467a-8fa1-97071268bef7.htm

⁴ Sills E, Myers Madeira E, Sunderlin W, and Wertz-Kanounnikoff S, 2010. "The evolving landscape of REDD+ projects," in Angelsen A ed., Realising REDD+: National Strategy and Policy Options. CIFOR: Bogor Barat, Indonesia. p.265-279. Available at http://www.cifor. cgiar.org/Knowledge/Publications/Detail?pid=2871

Round Peg, Square Hole: Forest Carbon under Existing Law in Southeast Asia

by Slayde Hawkins

How does existing law apply to payments for ecosystem services (PES)? As interest in PES has ballooned in recent years, this question has become increasingly important.

12 May 2010 | Clear answers are not readily available — and considering the slow pace of legislative and regulatory change, PES-specific legislation may still be a long time coming. In the meantime, a central issue for the successful use of PES will be determining how existing laws and regulations apply to these innovative economic arrangements.

Making this determination is not easy. Existing laws and regulations reflect a certain set of legislative priorities that may be outdated and at odds with the very heart of the matter when it comes to PES. In general, traditional land management laws were written to facilitate natural resource extraction and maximize mining, timber, or oil and gas revenues — not the preservation or conservation of existing ecosystems.

The inquiry is further complicated by politics — the ministry that has authority on paper may not exercise jurisdiction in practice, and coordination between ministries at the federal level or between federal and provincial authorities may be non-existent. Determining what the law says on paper is just the beginning; at the most basic level, lawmakers will also have to consider enforcement capacity, corruption, the likelihood of civil unrest interfering with investment activities, and the likelihood and effect of disrupting vested interests.

So - Who Does Have Jurisdiction?

Depending upon the specific type of PES (water, biodiversity, or carbon), the setting (forest, farmland, marine/ coastal, watershed, etc.), and the national circumstances, an inquiry into jurisdiction over PES begins by looking at who has control over:

- Agricultural land rights and management;
- Forest rights and management;
- Land rights and management;
- Rural, community, or indigenous issues and development;
- Natural resource extraction and use;
- Habitat preservation and protected areas;
- Fisheries rights and management;
- Watershed management;
- Water rights and allocation.

Payments for ecosystem services are directly tied to the land — making it unsurprising that nearly all of the regulatory topics listed above involve land and natural resources management. Jurisdiction over these issues may be vested with a variety of national and provincial government bodies, from environmental and agricultural ministries to dedicated land, forest, or mining agencies. In many countries, substantial responsibility over the issues above are divided between the agricultural and environmental ministries.

A number of countries in southeast Asia have dedicated land management ministries, but forest management appears more likely to fall within the realm of the agriculture or, occasionally, environmental ministry. For example, Vietnam's Ministry of Agriculture and Rural Development, Thailand's Ministry of Agriculture and Cooperatives, Lao's Ministry of Agriculture and Forestry, and Cambodia's Ministry of Agriculture, Forestry, and Fisheries each has a Department of Forestry to implement forestry regulations. Indonesia has a dedicated Forestry, but it is among the minority that we are aware of.

Habitat preservation and protected areas are likely to be under the oversight of the environmental ministry. However, natural resource management and use is usually vested elsewhere — with the agriculture ministry, mining, or other natural resource ministry — creating jurisdictional conflicts. In Thailand, for example, the Ministry of Natural Resources and Environment has jurisdiction over managing protected forests, but the Ministry of Agriculture and Cooperatives has jurisdiction over logging and forest resource exploitation. This has resulted in ongoing inter-agency conflicts over illegal logging and other forest issues.

Watershed and water allocation can also present tricky jurisdictional questions, potentially involving not only land use and allocation as it affects a watershed, but also water pollution, aquaculture and fisheries, and marine and coastal ecosystems. This may lead to split or shared jurisdiction among ministries — such as the case in China, where water pollution regulation falls to the Ministry of Environment, while regulation and allocation of the water itself falls to the Ministry of Water Resources. Southeast Asian countries are evenly divided in terms of whether they have a separate ministry for water issues or entrust water regulation to the environmental ministry.

Where PES involves local communities or indigenous peoples, it will also be important to take into account any government bodies responsible specifically for rural development or indigenous issues.

What Laws Apply?

Although applicable laws and regulations vary substantially from country to country, the inquiry into applicable law will revolve around the same central questions:

- Who has legal rights in the project area?
- Is an environmental impact assessment (EIA) required, and what must an EIA contain?
- What licenses or permits will be required for project activities?
- Must foreign entities that are involved in the project register with a government body?
- What reporting requirements apply, if any?
- What taxes apply?

Specific places to begin looking for answers include the country's framework laws for forest management and use, agricultural land uses, protected areas, environmental impact assessments, and taxes.

Of the questions above, the first might be both the most important and the most difficult to answer. Overlapping but separate possession and use rights can complicate the inquiry as to who has the right to sell ecosystem services in a given area. An additional difficulty is the existence and effect of unofficial use or possession rights in a project area. Traditional communities may have lived in the area and used natural resources for subsistence for years, or even generations, without formal recognition from the government. Although their rights do not appear in any government records, they must be taken into account through the process of project planning and regulation formation.

Other regulations such as EIA requirements, permits and licenses, foreign entity registration, reporting requirements, and taxes are often more straightforward. However, these technical regulations can still pose enormous hurdles for PES, mainly in terms of added complexity and transaction costs. This is because (1) technical regulations for PES may be unclear, making extensive government consultation a prerequisite for a PES project, and (2) duplicative or contradictory requirements for PES projects exist at the national level, or between national and provincial level authorities. For example, the ongoing process of decentralization in Indonesia has created uncertainty about whether natural resources are under the regulatory power of the federal or provincial governments.

Government officials that are looking at these issues will want not only to find clarity on technical regulations, but also to think about how different ministries can work together to streamline applicable requirements. They can merge reporting requirements, for example, or harmonize separate licensing and permitting systems and environmental impact assessment requirements. Forming an inter-ministerial committee, made up of officials from the relevant ministries, is one way to facilitate this kind of cooperation, which can be expected to reduce transaction costs for PES projects.

Conclusion

Regulation of PES under existing law is not a straightforward matter. Even the seemingly simple questions of who has jurisdiction and what laws apply can become convoluted upon closer inspection. Yet, it not impossible. On the contrary, reinterpretation of existing law to accommodate changing circumstances has occurred more or less with success since the dawn of regulation.

Oddar Meanchey: REDD in Cambodia

by Steve Zwick

Deforestation in Latin America is famous for its clear-cut swathes of devastation, but that's not how it is in much of Asia and Africa. In these parts of the world, deforestation tends to happen in a patchwork fashion that is more difficult to measure – and thus more difficult to earn carbon credits from.

22 May 2010 | When Bun Saluth left his home in the mid 1990s, the forests of his native Cambodian province of Oddar Meanchey were largely intact — protected, ironically, because potential settlers feared the remnants of the Khmer Rouge, who kept a base in the mountains until their dissolution in 1998.

After five years of meditation and study in Thailand, however the monk came home in 2001 to find that the absence of war had attracted migrants and one-time soldiers, who were settling in the forests and destroying it in small patches — a pattern called *"mosaic deforestation"* — at a rate of 2% per year.

Mosaic deforestation is common across Southeast Asia and large parts of Africa, where people clear small patches of land scattered across a large landscape for small-scale farming, unsustainable fuel wood needs, and illegal timber harvesting, leading to the degradation of forest ecosystems that have stood for millennia.

Alarmed, Saluth petitioned the government for the right to protect 18,000 hectares of land now called the Monk's Community Forest (MCF). He and his fellow monks began patrolling the land to keep away illegal loggers.

After passage of the Cambodian Forestry Law of 2002, he began reaching out to local communities to help them form Community Forestry Management Committees (CFMCs) under the law's Community Forestry Sub-Decree.

The REDD Solution

By 2006, it had become clear that CFMCs couldn't protect the forests without more resources — both for patrolling the land and for offering people a way to make their living by taking care of trees rather than destroying them. So Saluth teamed up with environmental non-governmental organization (NGO) Community Forestry International (CFI), which proposed a scheme that would make it possible for people living in the area to reduce emissions from deforestation and forest degradation (REDD).

They presented the idea to the Royal Government of Cambodia and the Forestry Administration, and with their backing created an innovative REDD scheme involving 12 CFMCs encompassing 55 villages. The scheme is designed to protect 60,245 hectares of forestland and sequester 8.7 million metric tons of CO2 over the next 30 years.

More importantly, it creates a template that can be used to reverse mosaic deforestation across Africa and Asia while also promoting local economies and protecting biodiversity by coupling the Climate Community and Biodiversity (CCB) standards with the Voluntary Carbon Standard (VCS).

Overcoming Obstacles

The project began in January, 2008, and in March of that year carbon developer Terra Global Capital (TGC) joined the partnership to help commercialize the project. TGC spent the next six months working out a 200-page methodology for measuring the amount of carbon emissions that would be avoided through reducing the drivers of deforestation and degradation. This involved measuring the rate of deforestation historically in the project acres and in similar areas to calculate the amount of carbon that would likely be lost if no action were taken — no easy task, since mosaic deforestation is notoriously difficult to measure.

Over time, CFI took on other projects and asked another NGO, Pact, to take over its work on the ground. Today, the scheme is being administered by the government of Cambodia together with Pact and TGC.

"A lot of the preparatory work had been done before we came in, and in our vernacular the project was 'carbon ready' when we started the carbon development process," says TGC founder and managing director Leslie Durschinger. "Our job was to develop marketable carbon credits from the project and define, manage, and develop participatory sampling procedures with our in-country partners. This first required developing a methodology for the VCS to get the carbon credits."

Read the Full Story in Ecosystem Marketplace

The story of the development of that methodology offers keen insight into the challenge of measuring the amount of carbon sequestered through human action and offers valuable lessons to anyone interested in using environmental finance to both save rainforests and provide a livelihood for people living in them. You can find the full story at **www.ecosystemmarketplace.com**.

Participatory Forest Management

by Tom Blomley

Local communities already help manage over 25-percent of the world's forests through what is called Participatory Forest Management (PFM). Tom Blomley, forestry advisor for the Danish government's international aid agency, DANDA, explore PFM's successes and shortcomings, and how lessons learned can be applied to the United Nations' Collaborative program, Reducing Emissions for Deforestation.

25 April 2010 | It sounded so simple. Preserve forests that absorb carbon dioxide and cut back on 20 percent of the world's greenhouse gas emissions. But now, after the recent UN Climate Summit held in Copenhagen endorsed forest preservation as a key weapon in the battle against global warming, a close look reveals that preserving forests is far from simple.

African, Asian and Latin American nations where residents depend on forests for food and income offer a wealth of data on the challenges of forest preservation. Studies compiled during the past three decades show preservation outcomes highest when local residents own and manage their forests. This is called PFM, short for Participatory Forest Management.

These studies also offer a wealth of ways to interpret just how "participatory" Participatory Forest Management should be. Most important, they reveal how different interpretations directly impact forest preservation success.

A look at achievements and challenges faced by Participatory Forest Management shines a light on the possibilities and pitfalls facing Reducing Emissions from Deforestation (REDD.)

Time for the Next Model Year

Participatory Forest management comes in two basic models. The first, often called Community Forestry, gives most ownership rights to people who live in the forests. The second, often called Joint Forest Management, maintains state ownership while allowing people living in forests to use and benefit from the land's resources.

Through Community Forestry, a number of rainforest nations transferred forest ownership from the state back to the indigenous groups that held traditional rights to the land. But these "returned-ownership" forests were often severely degraded and returned to people who were severely impoverished. To restore these forests and reap financial returns, residents would need to in invest time, effort and money they often did not have.

Joint Forest Management addresses this by keeping ownership in the hands of the government. But allowing the government to retain ownership has sometimes also meant allowing it to renege on its promises. Forest restoration efforts in a number of African and South East Asian countries have fallen victim to political and economic interests. When Nepal, for example, realized it could make more money by clearing and farming forested land, it unsuccessfully attempted what it called a "policy roll-back."

Follow the Dollar

Clearly, restoring and managing a forest can be expensive. Meanwhile, revenues, at least initially, can be minimal. Corruption and political influence also take their toll.

Experiences with PFM show that the poorest, most marginalized members of the forest community feel the initial brunt of restoration efforts. They lose their means of income, such as farming, and may initially gain little in return. When revenue begins to flow, a phenomenon called "elite capture" often occurs. Here, members of the village elite class hoard most forest management benefits.

Nepal's Maoist coalition government addressed this by establishing a second generation of PFM that introduced transparency, accountability and "pro-poor" targeting accountable to national as well as local interests.

Put the Light on REDD

Three decades of PFM establish that the greater the local autonomy over decision making, the higher the chances of effectively managing and improving forest conditions. PFM Outcomes are improved and land grabs avoided when ownership, tenure and benefits are defined and legally enforceable.

These lessons learned can serve as a model for REDD. To achieve successful carbon outcomes, states must provide clear legal guidance that establish carbon rights. They need to spell out how benefits from carbon sales could be shared on state-owned forestland managed or co managed by local communities.

Local control with carbon trading must be balanced with national accountability. This could be accomplished through what is called a "nested approach" that brings national oversight to local forest owners' actions. Representatives from carbon-managing forest communities could enter into direct negotiations to sell their carbon through the voluntary or in a future compliance market. Meanwhile, national mandatory carbon accounting systems would safeguard their efficiency and transparency.

Clearly, the costs of a REDD program will be significant. Experts predict that transaction costs for monitoring, verifying and marketing emission reductions could exceed their value if each forest was considered an individual entity. A successful REDD fund would have to aggregate and collectively market these individual forests. This would require a flexible payment mechanism that takes account of the spectrum of possible carbon-tenure-rights stakeholder groups including individual farmers and landowners, community groups, local governments and private companies.

Even tree tenure becomes an issue that must be addressed. In some West African countries, the state retains tenure over natural forests while landowners hold tenure over planted trees. This could create the perverse

incentive to replace natural forests with planted trees. A counter incentive would have to be structured that rewards management of natural forests.

REDD may not mean rich — but PFM does not have to mean poor, either.

Lessons learned from over 30 years of PFM in countries such as Nepal indicate that the poor may be worse off from PFM. Safeguards or mitigation measures are required to avoid this. A number of tools have been developed by PFM programs working in Nepal that can easily be adapted and used in other contexts to ensure that REDD funds are equitably distributed at the community level. These tools include:

- Participatory Wellbeing Ranking. A tool that leads to the identification of households of different social and economic status, including the "ultra-poor" (such as lower caste households, widows or the landless).
- Participatory Governance Assessments. Community members evaluate the performance of their forest management executive committees with regard to four main variables namely transparency, participation, accountability and sustainability.
- Monitoring and evaluating the participation of the poor. This is essential poverty monitoring and assesses how project interventions have impacted upon overall levels of poverty.
- Public Hearing and Public Auditing: Through regular open forums, executive committee members are required to provide a report on activities and financial transactions carried out on behalf of members. Group members are provided with opportunities to question specific actions and perceived mismanagement and demand redress (such as repayment of unaccounted funds or dismissal of office bearers)
- Introducing pro-poor measures into forest management plans. This includes pro-poor strategies such as graduated user fees (providing the poor with subsidized rates), mandatory representation of marginalized groups within executive committees, minimum percentages of total revenue targeted to pro-poor investments and inclusion of forest management activities targeted specifically towards poor households.

Roadmap for REDD

Participatory Forest Management offers REDD the roadmap it needs as it gears up to take on global warming. Clearly, skilled drivers must navigate this bumpy road.

PFM documents that people who live and work in forests make its best managers. To succeed, they need collective markets, mandatory accounting systems, efficiency, transparency and national oversight.

EM Cheat Sheet: What is a Social Impact Assessment?

by Steve Zwick and Fiona Mulligan

No man is an island — but even if he were, it's never that simple. Social impact assessments provide us with a user guide to these often island-esque project sites, along with a long list of do's and don'ts (do make as much positive impact as possible. Don't destroy stuff).

April 2010 | When Japan's Dojima Rice Market pioneered rice futures 300 years ago, it succeeded in part by establishing stringent standards of quality and clear guidelines of accepted behavior designed to ensure a fair and transparent market. The Chicago Board of Trade did the same for corn, wheat, and soybeans more than 100 years later, and every successful market has done the same ever since.

Markets that fail to establish such standards and guidelines usually die a quick death - or, worse, succeed as markets but fail as deliverers of value to society at large, as we've seen in the unregulated markets for over-the-counter derivatives.

Environmental markets are no different, which is why participants have created scores of standards and guidelines to help policymakers and project developers estimate the environmental impact of their actions *before* they are implemented.

Early standards and guidelines focused on the impact that projects had on nature, but they failed to fully measure the impact of such projects on society. That's why the International Association for Impact Assessment **(www.iaia.org/)** created the "social impact assessment" (SIA).

Putting People First

SIAs are designed to help policymakers and environmental project developers foresee the impact that their actions will have on the people living in and around the project area. Such projects should obviously avoid harming local communities, but ideally they will also generate positive 'co-benefits' for people living in and around the project area.

These co-benefits can range from the creation of jobs to the preservation of cultural values to the building of schools. From the developer's perspective, these additional advantages serve to strengthen the project and may even be considered to have market value if properly maintained and bundled with existing ecosystem service products.

Easier Said than Done

The challenge of SIAs can be summed up as one of how to combine credibility and economy, in view of the already high transaction costs facing land-based carbon projects. SIAs need to effectively identify not only the good that flows from a project, but — perhaps more importantly — the negative and unexpected social impacts. They also need to define acceptable quality levels.

Without appropriate guidance and research, these projects can lack the evidence needed for approval at a verification audit stage of the game. Properly implemented, they help ensure a project that benefits those around it. Poorly implemented, they amount to little more than greenwash.

What and How?

Credible SIA involves providing answers to two key questions — *what* needs to be measured and *how* should it be measured.

The answer to the 'what to measure' question is closely tied to the concept of 'attribution' or causality, and the selection of indicators. New standards such as the Climate, Community, and Biodiversity CCB (www.climate-standards.org/) standard, for example, require that projects demonstrate 'additional' and 'net positive' community impacts.

This involves showing that a project's social benefits outweigh the negatives — or at least outweigh the benefits that would have been achieved if the project had never been implemented. They also have to show that those benefits have been caused by the project rather than by other external factors — or, in other words, that they would not have happened anyway.

The 'how to measure' question relates mainly to data collection methods, especially measurement of the indicators. This question may be easier to answer, since there is considerable guidance on appropriate data collection methods. Cost-effectiveness can in general be improved by developing a strong project monitoring and evaluation (M&E) system at the design phase.

On the Ground

Considerable methodological guidance exists for measuring the social and environmental impacts of development projects and other land management activities, but no clear guidance currently exists for carbon project developers on how to choose and apply appropriate and cost-effective methods. Initial analysis has found that many land-based carbon projects, although they are still at the design or early implementation stage, seem to be struggling with the challenge of conducting cost-effective SIA, and would greatly benefit from this type of guidance.

The social impact assessment (SIA) manual is being developed to accompany the Climate, Community and Biodiversity (CCB) Standards, the most prominent and widely respected standards for the co-benefits of land-based carbon projects. It aims to help project developers monitor the socio-economic impacts of their projects, and meet the verification requirements of the CCB or other comparable Standards. The concepts described in this manual will be relevant to a wide range of site-level land-based carbon activities, whether designed for compliance or voluntary markets.

Asian Governments Explore Ecosystem Markets for Environmental Protection

by Steve Zwick

Cash-strapped governments across Southeast Asia are experimenting with market-based schemes to preserve nature by recognizing its economic value. Such schemes have proven effective in other parts of the world, and here's a look at the reasoning behind them.

18 April, 2010 | In his younger days, Vietnamese farmer Hoang Van Thang made a name for himself hunting birds. Now in his 60s, he's protecting the birds and their habitat.

"We need to preserve wildlife for the next generation," he told the author of a report on the web site of the Hanoi National University of Education's Mangrove Ecosystem Research Centre **(http://mangrovesvn.org/index.php/mangroves-wetland/)**.

So he and roughly 30 other volunteers spend much of their time patrolling small patches of mangrove forest near his village in Nam Dinh Province, about 150 kilometers south of Hanoi, removing illegal snares and keeping an eye out for tree-cutters. Their actions seem to be having an impact.

"Our team hasn't seen any cases of bird snaring for a long time," he says. "And local people don't cut down the mangroves anymore."

But the areas they patrol are just a tiny part of a 7100-hectare natural park, the bulk of which is manned by an understaffed team of park rangers. Funding for those rangers and the larger scheme within which they operate comes from charitable donations and taxes.

These funds pale in comparison to the needs of farmers, ranchers, and crabbers — all of whom inadvertently put tremendous stress on the mangrove forests, which have never really recovered from toxins unleashed during the Vietnam War.

To take the pressure off mangroves and other ecosystems, the government of Vietnam is exploring financing schemes that replace the economic incentive to destroy mangroves with an economic incentive to preserve them. These schemes begin by recognizing that mangroves aren't just pretty places for nature lovers — they are part of a critical ecosystem that feeds the local economy.

Short-Term Gain; Long-Term Loss

Nature and commerce have been at odds for centuries, with nature clearly getting the worst of it — especially in the developed world. The dynamic has accelerated in the last half-century, and in the developing world as well, where subsistence farmers often must choose between feeding their families and preserving fragile ecosystems.

But the apparent conflict between commerce and nature is a false one, because in the long run commerce is not opposed to nature. In fact, commerce depends on nature, because everything we buy, sell, eat, and produce is ultimately derived from nature — and not always in the most obvious way. Mangroves, for example, provide shelter for vulnerable fish and breeding ground for shrimp. They also shield the coast from slow erosion and sudden storms; they extract impurities from water and pull carbon dioxide from the atmosphere, depositing it in the ocean floor — thus helping to reduce the greenhouse effect and slow climate change.

Thang's actions, therefore, aren't just good for birds. They're good for coastal farmers, offshore fishermen, the tourism industry — and anyone threatened by climate change.

Payments for Ecosystem Services

Each of these groups has a vested interest in the health of the mangroves that Thang is voluntarily protecting. They should, in theory, be the ones paying the most to guard the mangroves that deliver the so-called "ecosystem services" upon which their livelihoods depend.

"Payments for Ecosystem Services" (PES) schemes begin with the premise that ecosystems are worth more alive than dead, but they work in several different ways.

Some begin by identifying the economic value of the services provided by living ecosystems and then persuading those who benefit the most to pay for its upkeep.

Others work by determining the amount of pollution that an ecosystem can handle and then auctioning off permits that emitters can then buy and sell among themselves. This are generally not called PES, but instead referred to as "cap-and-trade".

Either way, the goal is to promote the most efficient use of valuable resources by letting government establish the rules and leaving the market to find the best way to proceed within that framework.

Apples and Air

All of these services provide tangible benefits to people who receive them — just like apples and oranges do. Unlike apples and oranges, however, the benefits of ecosystem services are spread diffusely among different people, leaving little incentive for any individual to pay for them.

You can buy an apple, in other words, and you can buy an orange — but you can't buy the clean air you generate by saving a mangrove tree. What's more, if you grow an apple or an orange in a way that dumps insecticides into water, you spread that cost among scores of people who might not even be aware of it.

Pollution is called an "externality", because its cost is not borne by the person who creates the pollution, but rather by society at large. Society — in the form of government — has responded by passing laws against pollution and the wanton destruction of nature.

Such laws work quite well in many cases, but they can often be overly restrictive. They also create little incentive to find new and innovative solutions, and are often expensive to supervise.

PES schemes offer a new tool that is designed to encourage larger-scale and longer-term preservation of living ecosystems by incorporating the economic value of nature's services into our economy. Rather than simply banning certain practices, PES schemes aim to calculate the cost of environmental degradation and incorporate it into the cost of production. This way, someone who runs a clean apple orchard that doesn't muddy nearby streams will pay less for his externalities than someone whose orchard dumps pesticides and other chemicals into local water.

Who Should Pay?

In a straight PES scheme, you begin by figuring out who should pay, who should receive, and how the payments are measured. Mangrove guardians like Thang, for example, might be able to earn a commission from fishers if they can prove that their activities increase the number of healthy fish in surrounding waters. They could also earn commissions from tour boat operators, because mangroves often support the coral reefs that attract tourists and divers. Easiest of all: they can collect carbon payments from industrialists who want to reduce their "carbon footprint" by paying men like Thang to help them capture a percentage of their industrial emissions in trees.

The ecosystem services of a mangrove forest can, therefore, be broken into specific "products": namely, the protection of species (which are a sign of an overall environmental resiliency), the shielding of coastal areas, the filtration of water, and the sequestration of carbon, among others.

In this example, the carbon payments would come from a cap-and-trade scheme such as the ones outlined in the Kyoto Protocol's "flexibility mechanisms". Climate-change negotiators are now working on a successor to the Kyoto Protocol, and current proposals make it possible for factories to offset their industrial emissions by preserving or restoring a patch of rainforest, thus capturing carbon in trees.

The most advanced cap-and-trade program to date, however, has nothing to do with carbon. Instead, it has to do with sulfur dioxide, which is the leading cause of acid rain.

The United States launched its Acid Rain Program (http://en.wikipedia.org/wiki/Acid_Rain_Program) in the 1990s with a cap on sulfur dioxide emissions. A "cap" is the overall amount of pollution allowed into a system, and the government issues allowances based on that cap. Companies that emit sulfur dioxide receive some allowances for free and have to buy others. Then the government begins lowering the cap, and companies that reduce their emissions faster than the cap drops can earn a profit by selling their allowances, while companies that are slow to reduce emissions have to pay more for them. This creates an incentive to reduce emissions in the most efficient way possible, and emissions of sulfur dioxide in the United States are now more than 65% lower than they were in the mid 1970s.

Mitigation Banking and WQT

Cap-and-trade can also be applied to wetlands, biodiversity, and water — where it's called "mitigation banking" and "water quality trading" (WQT).

Pioneered in the United States, mitigation banking draws its strength from two laws: the Clean Water Act (CWA) and the Endangered Species Act (ESA), each of which contains provisions that, in a nutshell, say that

anyone who damages the habitat of an endangered species or dredges or fills certain kinds of wetland has to make sure he does so in a way that results in no net loss of habitat or wetland.

The law makes it clear that companies have to first look for ways to prevent damage to the environment. If, however, they can prove that their project is worthwhile and that some environmental damage is unavoidable, they can proceed — provided they restore wetland and/or habitat of equal or greater environmental value than what's destroyed.

This has led to the proactive restoration of degraded wetland and habitat across the United States as so-called "mitigation bankers" restore marginal farmland to its natural state in the hopes of selling credits to people building roads and houses nearby. In some cases, it's resulted in healthier habitat than existed before the construction took place, and the model could be tweaked for use across Asia.

Likewise, WQT schemes work by determining how much pollution a body of water can handle, and then letting farms and factories trade among themselves to encourage the most efficient way to reduce runoff into lakes, rivers, and streams.

A Tool in the Belt

None of these schemes is a panacea, and many are still in the early phases of development, but each has the potential to become a valuable tool in the effort to build a sustainable economy for tomorrow.

Their implementation, however, requires a re-thinking of the role of government, the role of the private sector, and the role of civil society. Just as we need to abandon the idea that commerce and environmentalism are in opposition to each other, we also need to recognize that all sectors of society have common goals.

A sustainable economy is one that incorporates all of society's goals and values — in part by recognizing all of the costs of production.

This will lead to more men like Thang working to preserve nature's services for future generations — and not as volunteers, but as providers of an ecosystem service.

State of Play in MRV and REDD

by Joerg Siefert Grazin

1 June 2010 | Reducing Emissions from Deforestation, Forest Degradation, Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (REDD+) is considered the most advanced topic under current negotiations of the post-Kyoto architecture. While the text on other mechanisms under consideration of the parties negotiating under the United Nations Framework Convention on Climate Change (UNFCCC) is still heavily bracketed, the general ideas on REDD+ have be consolidated. The advances in REDD+ negotiations aren't surprising . The technical discussion on REDD+ has a lead of two years compared to the other agenda items of the Bali Action Plan agreed by the Conference of the Parties (COP) in 2007. Besides, several governments are kicking off upfront finance schemes to make REDD+ work before the beginning of the next commitment period in 2013. At COP 15 in Copenhagen REDD+ could make it through, because several controversial issues, like the institutional and financial architecture, have been assigned to other working groups. Monitoring, Verification, and Reporting (MRV) is one of them.

According to Article 12 of the Kyoto Protocol establishing the Clean Development Mechanism (CDM) emissions reductions shall be real, measurable, and additional to any that would occur in the absence of the certified project activity. Although REDD+ is not negotiated under Kyoto track, its rational has influenced the efforts of making REDD+ work. While monitoring and reporting appear to be technical issues, MRV of developing country actions became one of the major stumbling blocks of COP 15 negotiations. One of the issues remained controversial is the answer to the question, who shall be in charge of verification. While countries like China are concerned that internationally mandated verification might challenge national sovereignty, others like the US insist on international MRV for those National Appropriate Mitigation Actions (NAMAs) which are supported by international finance.

As of now, MRV negotiations haven't yet touched base in technical issues. Instead, legal, financial, and institutional issues dominate the negotiations. In case of the emerging voluntary carbon markets schemes it's mostly the other way round. Project based REDD+ methodologies are constantly evolving, cutting edge remote sensing technologies are being field-tested, Intergovernmental Panel on Climate Change (IPCC) compliant carbon accounting schemes are being designed, existing validation and verification protocols are being complemented to establish socioeconomic and environmental safeguards monitoring criteria. What's missing is the rules how to link project-based, subnational, and national accounting. Obviously, they depend on the outcome of the UNFCCC negotiations and national political decisions.

IPCC in a nutshell

At COP 15, parties already agreed to use the most recent guidance and guidelines as a basis for estimating anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes. For each sector the 2006 IPCC Guidelines for National Greenhouse Gas Inventories requests to identify key categories, that is activities causing GHG emissions and removals, which are significant in terms of their absolute level, trend, and uncertainties. In case of Agriculture, Forestry, and Land Use (AFOLU), the guidelines provide a system categorizing transitions between forest, grass lands,

wetlands, croplands, and other lands. Within these key categories, deforestation figures as the change from forest to grass land, croplands, other lands, or in rare cases, to wetlands. Forest degradation is anticipated in the category "forest remaining forest, and reforestation or afforestation (A/R) fits into "croplands / grass lands / other lands / wetlands to forest". To track theses key categories across space and time the guidelines recommend to stratify the national territory anticipating ecosystems, climate, soils, and management classes. Combining the different stratification criteria generates a set of spatial entities which could be considered homogenous in terms of their carbon stocks. The overall carbon stock consists of 6 carbon pools (aboveground and below-ground biomass, dead wood, litter, soil carbon, harvested wood products) which have to be either directly measured or estimated using IPCC's default values provided by the Emission Factor Data Base. Different complexity and uncertainty levels ("tiers") are possible depending whether precise and accurate in situ measurements are being conducted, or whether default values with high uncertainties will be used. Activity data representing key categories (i.e. area change caused by deforestation within a homogenous spatial entity) has to be linked with corresponding emission factors (changes in carbon stocks due to changing forest to cropland). And of course, activity data and emissions factors have to be monitored. IPCC provides reporting tables, and UNFCCC already established review mechanisms for national communications on GHG inventories as well as for CDM projects. Thus, the conceptual framework to account for REDD+ already exists. But this is not the end of the story.

The Challenge of Getting Activity Data ...

Wall to wall deforestation detection is a straightforward exercise. Methodologies are readily available and mature. All the available remote sensing software packages provide the tools required to process multispectral optical or radar data. The challenges appear on the data side. In one way or the other all approaches to establish credible reference emission scenarios rely on historic deforestation rates and patterns. Ironically, REDD+ is kicking off in a period when the most important data fundament of change detection analysis across huge domains, the Landsat TM 5 and ETM 7 satellites, are going down; the former because he was never meant to operate that long, the latter due to technical failure. Of course, there are alternative systems already operating, some of them offering data characteristics far beyond what LANDSAT provided, but either they lack full spatiotemporal coverage (ASTER, SPOT, DMC, AWIFS) or the necessary spatial resolution (MODIS) to track small scale deforestation. At a project level, there are ways to deal with that challenge. But at a national domain, this endeavor becomes a cumbersome effort to puzzle different data sources together. Space agencies like NASA and ESA announced that new multispectral optical sensors providing huger scenes at higher resolutions will be available in 2012. In the meantime, workarounds have to be defined to deal with data gaps at national level. Radar sensors like ALOS PALSAR provide an interesting potential to determine the forest cover at reasonable spatial resolution (50m). Even better, they offer the means to overcome the cloud problem of optical data. However, combining optical and radar data isn't trivial, requires further calibration and might increase uncertainties in emission calculations.

In case of degradation the situation appears to be worth. Direct approaches to detect degradation patterns (logging roads, log landings, gaps, fire scarves, selective logging, edge effects) require multispectral data at high spatial and temporal resolutions. Seasonality effects in (semi)deciduous forest complicate the issue. Systems like CLASLite or the Normalized Difference Fraction Index featured in the GOFC-GOLD Sourcebook already got to a wall to wall level, but they rely on the availability of Landsat-type data. Again, at project-level similar data products (ASTER, SPOT, ALI) might be available, but at national level it won't for the next 2-3 years. While wall to wall deforestation detection could deal with this break, degradation detection requires annual or even semiannual processing to deal with regrowth dynamics. One way to by-pass this hurdle is

to base degradation emission accounting in other activity data sources. National forest statistics is based on reporting on harvesting activities at concession or management plan level. Compliance with forest management plans could be monitored using very high resolution optical data (IKONOS, QuickBird, BirdEye) or inspections guided by robust sampling schemes. Unfortunately, this option comes at higher costs and might increase uncertainties, too. Thus, it might be reasonable to field-test direct degradation detection with other sensor products (ASTER, SPOT, ALI) within subnational domains to gain experience until new optical multispectral sensors are getting operational.

... and Emission Factors

On the side of emission factors, the challenge is costs. Robust methodologies to establish biomass inventories are at hand. And IPCC provides methodological guidance how to establish them. However, it might not be worth the effort to measure every carbon pool in each stratum with the same accuracy or precision. Field campaigns are costly. Thus, the scarce financial resources should be directed to those pools, strata, and management systems, which show the highest potential to reduce emissions on short and medium term. The expensive development of national default methods, data and assumptions (tier 3) should be combined with using default methods and assumption in combination with national data (tier 2), or IPCC default values (tier 1), where it might not be worth going the extra mile to reach a full blown tier 1 or tier 2 approach. In any case, the decision, where and how to measure should be based on an IPCC 2006 compliant stratification.

Cutting edge earth observation science is currently developing airborne or space based processing systems which provide direct above ground carbon stock measurements. These systems could deliver activity data and corresponding carbon densities within one product. While airborne LIDAR systems provide high resolution data for a limited spatial domain, space born systems reach wall to wall coverage at medium resolution (250-500m). Both types might provide means to capture the low hanging fruit, that is changes in aboveground carbon stocks, but require field measurements for calibration purposes, too. However, even in future, other carbon pools have to be measured conventionally.

MRV Beyond IPCC

Spatiotemporal deforestation and degradation patterns depend on the drivers and underlying causes, which change over time. While some countries already deforested a substantial part of its forest cover, others are still at an initial phase of kicking off land use change dynamics. There are attempts, to categorize countries according to their remaining forest cover and current deforestation rate. It is obvious, that the development needs of a high forest cover low deforestation country in the Congo Basins differ from the options of low forest cover – low deforestation country like Costa Rica. With the COP15 decision on REDD+ parties recognized that developing countries should establish forest reference emission levels transparently taking into account historic data, and adjust for national circumstances. As the technical discussion on how to establish reference emission levels hasn't even started yet, it doesn't seem very probable that parties will reach a consensus until COP 16 on how to adjust for national circumstance or how this would have to be anticipated in a comprehensive MRV system. Subnational and project-based experience tells us, that the determination of future reference emission levels might be based in economic or demographic modeling to capture the dynamics of drivers and underlying causes. Complementary to these approaches, comprehensive monitoring systems are required which trigger economic and demographic parameter adjustments, if necessary. But even in case of a purely conservative approach taking the historic deforestation

rate as a reference emission scenario, the implementation of environmental and socioeconomic safeguards requires a comprehensive MRV system going beyond emission accounting. CDM tools and Climate, Community, and Biodiversity (CCB) design Standards indicate how to document and monitor these impacts comprehensively.

What's Missing

CDM and VCS are already providing validation and verification standards for afforestation and reforestation projects, which could be used as a fundament to develop genuine REDD+ certification tools. There is, however, a gap remaining. Neither IPCC 2006 nor its Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003 LULUCF) provide standards or protocols on how to validate and verify activity data. The remote sensing cosmos is already highly diverse. New sensor products and methodologies are rapidly evolving. Common standard on how to evaluate accuracy, precision, and suitability of methods applied in the AFOLU domain are overdue.

The same holds true for LULUCF modeling. Spatial, demographic, and economic modeling tools are being used either to determine reference emission scenarios or to guide policy decisions. While some negotiators take a dogmatic stand regarding emission projections ("All models are wrong, ..!"), others accept them as a scenario framework to guide REDD+ policy decisions (" ... some models are useful!"). Some VCS methodologies allow the use of modeling techniques. Again, what's missing is criteria to evaluate their performance and appropriateness. The majority of REDD+ modeling approaches builds on readily available software tools. What's needed, is guidance how to evaluate the relation between drivers, underlying causes, and agents, its representation in different modeling frameworks and their performance in projecting the LUC trajectory.

The Way Ahead

Regarding monitoring the glass is more than half full. Guidance on how to establish national and subnational accounting schemes is available, robust remote sensing activities are at hand, and the situation on the data side will improve, soon. Apart, IPCC already established accounting rules and reporting formats. Combining them with the methodologies approved under VCS provides a powerful toolbox to make REDD+ work at different scales. Common verification standards amongst compliance and voluntary schemes would certainly stimulate early action in implementing REDD+. However, efforts to bridge this gap are currently only occurring on the voluntary side.

2010 won't be the year parties will decide on technical issues. In case of the CDM it took for years (1997-2001) to get the rules clear (2001: Marrakesh Accords) and another 4 years to get the first A/R methodology approved. REDD+ deserves better! Fortunately, there are signs that parties are highly committed to build and operation framework in parallel to early action. Project and subnational activities are essential to test MRV procedures. They could guide the upcoming discussion on how to make REDD+ work at the national level.

The Prospects for Payment for Ecosystem Services (PES) in Vietnam

by Chris Santiago

29 May 2010 | A "miracle": That's what many news agencies and policymakers call Vietnam's rapid development of PES (Payments for Ecosystem Services). The nation's program is held up PES advocates as a model for the rest of Southeast Asia. And in fact, the Vietnamese model has already been adopted in Cambodia, Laos, and Thailand.

Just how successful is it? A few years ago, the PES concept was completely new to Vietnam. In 2008, the government's Decision 380 on the "Pilot Policy for Payment for Forest Ecosystem Services" got the ball rolling by determining who were the buyers and sellers. By 2009, it generated total revenue of 77 billion Vietnam Dong (approximately US \$4 million).

The Forests of Lam Dong

The success of Vietnam's PES policies is particularly reflected in Lam Dong, one of two provinces selected for implementing the pilot phase. PES are being distributed to 3,400 poor forest-dwelling households in Lam Dong, who are protecting 104,000 hectares of forest. When the payments are completed, each household will receive US \$500 a year, a 400% increase in income."

Located in the most upstream area of the Dong Nai river basin, more than 60 percent of Lam Dong is covered by forest. This area is crucial to the health of the river.

Thirteen state entities manage the vast majority of these forests. These include management boards of protection and special use forests, state forest enterprises, and private enterprises that rent the land for agro-forestry production and ecotourism.

Implementing Decision 380

To implement Decision 380, Lam Dong authorities determined the economic value of ecosystem services, identified buyers and sellers, and established organizational and institutional structures for the distribution of payments.

Around 516,800 ha of forest were identified as important, with potential for providing ecosystem services. Water regulation, soil protection, and scenic landscape values were determined as important services of this forest area and were economically measured according to these functions. (Other, more difficult to measure services such as carbon sequestration and biodiversity conservation were not accounted for during the piloting phase.)

Three watershed areas were selected as pilot sites. These areas provided ecosystem services to four buyers: two hydropower plants, one water supply organization, and one tourism company.

Calculating Payments

One of the most difficult parts of implementing Decision 380, of course, was calculating payments. "There is no existing literature on how much the company should pay," said a member of the policy drafting team in charge of determining payment figures. "We consulted many literatures, and international organizations also helped us." The team consisted of members of the Legal Department of the Ministry of Agriculture and Rural Development (MARD), the Office of the Government, and the Ministries of Finance and of Justice.

Eventually, the team developed a complicated equation for calculating payment level. The payment level for hydropower plants using water as a production input was determined at 20 VND (0.125 cents) per one kilowatt hour of electricity produced. For water supply companies, it was 40 VND (0.25 cents) per one cubic meter (m3) of water supplied.

Payments for Ecotourism

The team had difficulty in calculating the payment level for tourism companies, which benefit from landscape beauty provided by the forest. Different stakeholders were consulted about payment levels, including tourism companies themselves, with the end result being that The payment for these services was determined to be VND 0.5-2 percent of the companies' gross revenue.

"We suggested the figure to the province officials and they said they are okay with it," the team member said. "We also suggested the figure to some tourist companies and they said they can afford it."

The K Coefficient

However, according to the 2004 "Law on Forest Protection and Development," there are three different types of national forests: **Protection forest** (*rừng phòng hộ*), which accounts for 30 percent of the total forest area, is set aside for protection of watersheds, soil and the environment; **special use forest** (*rừng đặc dụng*), which accounts for 10 percent, is intended for nature conservation, protection of ecosystems and flora and fauna gene resources, and historical, environmental, and cultural sites; and **production forest** (*rừng sản xuất*), which accounts for 60 percent, is the source of wood and forest-based products and is meant to contribute to ecological protection.

To account for these different types of forest, as well as the different levels of services that can be provided in different geographical locations, the team introduced a "K coefficient." The K coefficient also recognizes the status of the forest — rich, average, or poor — as well as its origin: Did the forest occur naturally, in other words, or was it planted? Each of these factors is associated with a different monetary value.

Where Payments are Distributed

Since early 2009, the provincial Peoples' Committee has requested the four buyers to pay the service fee. The total annual revenue derived from the four buyers is about 47 billion VND (US \$2.8 million). Using the K

coefficient, three different levels of payments were suggested: 290,000 VND (\$16) per ha for water regulation, 270,000 VND (\$15) per ha for soil protection, and 10,000 VND (\$0.5) per ha for scenic landscape values.

Describing the dilemma in the top-down versus voluntary nature of PES, a member of the policy drafting team said, "We have just changed from a highly-centralized economy to a market-oriented one; we are at an intersection. As our level of awareness is low, the government has to request the buyers to pay."

Ten percent of the total payment collected from service buyers will be used by the government agency managing the payment, while the remaining 90 percent will be distributed to service providers, per Article 11 of Decision 380. If the service providers are government-owned organizations (e.g. management boards of protected areas or state forest enterprises), they are allowed to keep 10 percent, with the rest going to individuals, individual households, or rural communities who receive contracts from the state-owned organizations.

Payments to Local Households

To ensure that local households were able to derive benefit from these revenues, local authorities maintained their own contract arrangements with local households. Currently, \$2.8 million is being paid to 3,400 local households. On average, each household is contracted for around 20 ha of forest from the enterprises. When payment will be completed, each household will receive \$500/year, a 400 percent increase in income.

Lam Dong and the Future of Vietnamese PES

Lam Dong's success story will probably play a major part in forming a national decree on forest PES. The Vietnamese government is already drafting the decree, which may be passed by the Prime Minister in the second half of 2010.

PES proponents believe that once the decree is scaled-up to the national level, the derived revenues could reach \$1 billion. This figure — together with buzz in the state media about the positive results of the pilot projects — has strongly driven the rapid development of PES policy and practice in Vietnam.

Millions of dollars in funding from both government and overseas development assistance have been committed to these initiatives for years to come. Thanks to its rapid development of PES, the Vietnamese government is already realizing many of its goals. It is combating rural poverty by helping communities to protect forests and improve local livelihoods, and it is establishing a sustainable source of private funding for forest protection and rural development to fill current shortcomings in the state budget.

The Potential of Biodiversity Offsets in Vietnam

by Patrick Maguire

30 May 2010 | On April 22, 2010, the Government of Vietnam, through the Ministry of Agriculture and Rural Development (MARD) and the Ministry of Natural Resources and the Environment (MONRE) held an initial workshop with the Business and Biodiversity Offsets Program (BBOP), a program of Forest Trends, to discuss the potential for biodiversity offsets to help Vietnam achieve its conservation and development goals. Following this initial gathering, the government of Vietnam requested BBOP's assistance as it further develops policies on biodiversity compensation. BBOP and MARD have now initiated discussions on the objectives and activities of this collaboration, and are seeking donor support.

Given that biodiversity offsets are still a novel approach in many parts of the world, our Insight Series wanted to delve a bit deeper into BBOP's approach, Vietnam's developing biodiversity compensation framework, and what this new partnership hopes to achieve in the next two years.

What is a Biodiversity Offset?

A biodiversity offset is a way to demonstrate that a development (such as a mine or forest plantation) can be implemented in a manner that results in no net loss or a net gain of biodiversity. BBOP defines biodiversity offsets as "the measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity".

More than 30 countries have laws requiring biodiversity offsets, many others require some form of compensatory conservation, and others still are now exploring policy frameworks for biodiversity offsets. This is because biodiversity offsets offer a way to achieve better conservation outcomes than typically result from project planning, as developers using a biodiversity offset plan for 'no net loss' of biodiversity. This goes beyond traditional mitigation of impacts, and encourages business to take responsibility for its impacts. Biodiversity offsets thus result in new and additional investments in conservation outcomes by the private sector, which can help governments achieve the conservation targets they have adopted in national biodiversity strategies and action plans.

Developers are often unsure what is expected of them by government in terms of avoiding, minimizing and ultimately compensating for their impacts on biodiversity. Clear guidance by government through biodiversity offset policy is welcome as it offers companies legal certainty, efficiency and cost savings in the planning process, and flexibility in how to achieve agreed conservation goals.

What is BBOP?

The Business and Biodiversity Offsets Program is an international partnership of over 50 different company, financial, government, and civil society representatives, who are members of its Advisory Group. BBOP was established by Forest Trends, an environmental non-profit organization that works globally to support market-based approaches to conservation. Together, the BBOP members aim to test and develop best practice on biodiversity offsets and conservation banking worldwide.

BBOP's work is based on real experiences of biodiversity offset design in pilot projects with companies and involves governments which are leaders in the field of biodiversity offsets, often with many years of experience in designing and administering biodiversity offset systems at the national or state level.

One of BBOP's priorities is to provide technical support and policy advice on biodiversity offsets, landscapelevel and regional planning to governments, through general reports and specific advice. BBOP brings experience from around the world to governments which are preparing or reviewing policy related to biodiversity offsets. This experience comes from different sectors in society, and may include other governments that have developed and administered offset systems, companies that have developed voluntary biodiversity offsets and had experience of complying with offset regulations, financial institutions that include requirements for offsets in their loan conditions, and NGOs that have experience of designing offsets and analyzing offset policies around the world. BBOP does not speak on behalf of its various constituent members, but gathers and synthesizes lessons from their experiences.

In the absence of a policy requirement for no net loss, the companies BBOP works with are those that will gain the most from undertaking biodiversity offsets. These are generally companies which have a footprint on biodiversity that represents a business risk for them. For instance, infrastructure projects, mining, oil and gas, hydropower, wind power, road projects, railways, housing development, tourism and some forms of agriculture. These companies often find benefits to working with BBOP as governments, financial institutions, and civil society increasingly expect developers to take full responsibility for their biodiversity impacts. In many cases, biodiversity offsets offer companies a way to demonstrate no net loss of biodiversity, improve outcomes for local communities, and reduce operational and project development risks.

Government of Vietnam's Biodiversity Law and Draft Decree on Compensation for Environmental Damages

In Vietnam, a legal framework on biodiversity offsets already exists. Article 75 of the recent Biodiversity Law states that "organizations or individuals that infringe upon conservation areas or biodiversity conservation facilities... shall pay damages in accordance with law", and that "damage caused to biodiversity due to environmental pollution or degradation shall be compensated in accordance with law". In addition, MONRE has just submitted for approval to the Prime Minister a draft national decree on compensation for environmental damages. These pieces of legislation will serve as a foundational framework upon which biodiversity offset policy can be developed in Vietnam.

During the workshop held with MARD and MONRE on April 22, participants agreed that the Business and Biodiversity Offsets Program approach can be adopted in Vietnam.

The Next Steps

The Ministry of Agriculture and Rural Development, in the name of the Directorate of Forestry has stated that biodiversity offsets are potentially very useful for Vietnam and requested the technical support of BBOP, which gratefully accepted this opportunity to assist Vietnam balance its development and conservation objectives. Conclusions from the workshop included the following points:

- The Government of Vietnam is interested to learn more from international experiences and the existing knowledge developed by projects within Vietnam to establish suitable policies and support programs that work for government, companies and civil society.
- BBOP will assist MARD develop one or more pilot projects in special use forest areas.
- BBOP will run a regional or sub-regional training on biodiversity offsets, in order to build Vietnamese capacity in this field of expertise.
- BBOP will provide policy and research support to help improve and develop existing Vietnamese policies and supporting legislative arrangements, such as incorporating biodiversity offsets into the Environmental Impact Assessment framework, the Strategic Environmental Assessment, the Biodiversity Law, and/or the Compensation for Environmental Damages framework.

Over the next several months, MARD and BBOP expect to develop a Memorandum of Understanding that will capture shared expectations, roles and responsibilities for this work. They will develop a workplan for the following two year period that will define activities and objectives, as well as the resources needed to achieve them.

China and PES: New Approaches for Environmental Forestry

by Alice Kenny and Michael Bennett

A study of China's extensive and innovate ecosystem service programs by Michael Bennett, illustrates the valuable lessons they provide on how to develop market-based environmental policies worldwide.

26 May 2010 | China, today the world's second largest economy, seized a leadership role in the evolving field of environmental markets. Its global financial force drives some of the largest public payment schemes and market-based programs for ecosystem services in the world, particularly with carbon and water markets. China has more than US\$90 billion in existing or planned programs, hosts 22 percent of registered Clean Development Mechanism (CDM) carbon offset projects and by 2007 had supplied 73 percent of global CDM carbon credits.

Yet China's market-based initiatives remain relatively unknown. This is surprising, given the country's increasing importance in the world economic order and critical role for future international climate negotiations.

A study of China's developing ecosystem services reveals the amazing breadth and scale of what is currently happening on the ground. The environment is an important area for engagement with China; the central government says it is eager to learn from outside experience and collaborate with international organizations to develop capacity, broaden and refine its policy toolkit, and better evaluate and improve its current programs.

The world, as well, has much to learn from China; the sheer scale of the country's ongoing ecological payment programs and policy innovations suggests a hidden wealth of untapped experience exists that could provide valuable lessons and insights to both domestic and international policymakers and practitioners of PES and MES schemes.

Ecosystem Markets Serve Break-Neck Economic Growth

Policymakers in China have become increasingly interested in developing new approaches for environmental policy to address the country's multiplying conservation challenges and resource constraints in face of breakneck economic growth. This led China's central and local governments to rapidly expand its range of policy and program innovations, many under the broad heading of "eco-compensation", that lay the groundwork for the development of ecosystem services markets. Already, the government drives some of the largest public payment schemes for ecosystem services in the world. Local governments in China also serve as important contributors to this process. They are rapidly adapting centrally designed eco-compensation programs to their own needs. And they are creating hybrids, programs that weave together and draw upon multiple central and provincial policies and funding sources. They create their own distinct initiatives that often feed back into central government policy development.

The result has been a highly diverse mosaic of initiatives and public programs. They incorporate payments or market-based concepts into national, provincial and municipal levels. And they are almost all primarily developed and funded domestically, with relatively little involvement of international expertise or funding.

Range of Programs

China's broad range of ecosystem programs includes watershed, carbon, timber, landscape amenities, biodiversity conservation and anti-desertification services. An increasing number of initiatives aim to protect watershed services and resolve conflicts over the rights and access to water resources. China has also actively embraced the Clean Development Mechanism (CDM) of the Kyoto Protocol as well as voluntary carbon markets as means to finance a transition to renewable, cleaner and more efficient energy systems.

Other programs include China's green and organic food certification system, the central government's green procurement program and green product label certification system, promotion of energy efficiency, central and local government subsidies and fees regarding the impacts of development and infrastructural projects on soil erosion and watersheds, as well as continuing experimentation with air and water pollution emissions trading.

Policy circles have been abuzz with debate on how to improve these programs as well as how to explore and develop other market-based tools and regulatory innovations to better address China's environmental and development challenges.

Inside China's Markets

To understand these market's potential, it is important to first understand how they operate today.

Most of China's domestic eco-compensation policies and market-based environmental initiatives are domestically driven and funded. They are geographically concentrated in China's richer, coastal regions. Beijing, for example, which serves as a key local for provincial and local eco-compensation policies. ranked second among China's 31 provinces for per capita income in 2006.

Watershed ecosystem services are by far the biggest driver of eco-compensation policy in China, and where most local innovation is occurring. Even forest-related programs have been initiated due to water-related problems. For example, large-scale flooding in Southwest and Northeast China in 1998 spurred China to launch its Conversion of Cropland to Forests and Grassland program.

Private-sector involvement has been small but opportunities for growth exist. The majority of existing marketbased initiatives in China are government-mediated, publicly administered programs that use public funds to pay land users for the stewardship of ecosystem services on their land. Although the public sector is clearly the dominant player in these ecosystem service provision programs, government ministries and provincial governments often emphasize in their policy documents the development of multi-jurisdictional and multisectoral policy frameworks that diversify funding sources.

Local Innovations

Meanwhile, the wide variety of ecosystem markets developing locally throughout China reveals a significant degree of local innovation. This innovation is spurred by resource constraints and the need to find innovative ways to improve resource management and resolve regional administrative and property rights issues that span geographic boundaries.

Local variations in eco-compensation policies in China take three main forms. They include central government policies, local innovations independent of central policies and hybrid developments.

In the majority of cases, central-government policies provide frameworks for local innovation by stipulating for local matching funds or administrative support, or delegating management authority and the development of standards and fee structures to provincial or local governments. Examples include the Conversion of Forests to Cropland and Grassland Program (CCFG), China's water and soil conservation law, and policies governing the implementation and support of local eco-agricultural programs.

Significant local-level innovation also occurs in the creation of eco-compensation schemes and market-based instruments for environmental policy. The vast majority of these innovations resolve issues surrounding water resources, their effective sustainable protection and equitable and efficient distribution. Examples include arrangements between Beijing and Hebei regarding the upper watershed of the Miyun reservoir; water rights trading and water-based eco-compensation policies between various municipalities and irrigation districts and cost-sharing and integrated watershed management between various city governments.

Perhaps the most interesting and clearly the most innovative policies involve hybrid policies where local governments draw upon and weave together multiple central and provincial policies and funding sources to address local environmental concerns. The Jinhua River Watershed provides a good example of this type of hybrid innovation. Here, in addition to local water rights trading and downstream development zone policies, governments also draw upon funding from State Forestry Administration policies.

Ecosystem Markets Address Property Rights

Significantly, the Chinese term "shengtai buchang jizhi," meaning eco-compensation mechanisms, encompasses payments for ecosystem services as well as policies that foster cooperation between various levels of government to finance and share environmental protection and restoration costs. The term's growing use and importance within China's developing environmental policy framework indicates the greater emphasis on not only developing innovative market-based instruments for environmental policy, but also on resolving property rights and equity issues surrounding the use and protection of natural resources.

Getting the Word Out

Developments on the ground in China have been rapid, and policymakers still face numerous challenges in creating effective and financially sustainable policies. Part of this is because many of China's policymakers are still new to PES and market-based instruments in general. This, combined with a dearth of platforms for dialogue and information-sharing in China between government ministries, academic institutions and the private sector results in having a significant share of PES and MES-like programs, activities and initiatives

unrecognized, undocumented and "off the radar." Existing information sources are generally sector-specific, with minimal cross-sectoral information, comparison and analysis.

Moving Forward

As a result, policymakers and practitioners in China and internationally have not been able to fully benefit from China's own growing wealth of experience gained in just under 10 years developing innovative marketbased policies for conservation. China's experiences provide insight into the implementation and outcomes for evolving ecosystem markets worldwide. They can illustrate relationships between local institutions, social capital, property rights, local environmental conditions, equity and poverty, and how these interact with different program designs influence program efficiency and outcomes.

A clearer and more comprehensive picture of the status of markets for ecosystem/environmental services in China, the key actors, and the distribution of these activities and programs across ecosystem services and regions could provide valuable insights for policymakers. Cross-learning and collaboration across government ministries would benefit, illustrating where further research should be targeted, and where the private sector could most easily and effectively be brought in as a key partner and stakeholder in environmental programs.

To move forward, there is a need for greater documentation and analysis of existing programs and developing cross-sectoral platforms for dialogue, information-sharing and cross-learning between policymakers, practitioners, stakeholders and experts and linking to global innovations.

China Today; the World Tomorrow

China's extensive innovations in ecosystem markets offer tremendous opportunities for knowledge and growth in these evolving markets. China's ongoing, large-scale experiments in PES and other environmental policy innovations should be comprehensively studied to learn where further research should best be targeted and where the private sector could most easily and effectively be brought in as a key partner and stakeholder in environmental programs.

As nations face ongoing challenges to fund conservation, China's initiatives can provide guidance and insights that offer untapped lessons on policy experiments of potentially great importance for policymakers worldwide.



The Family of Forest Trends Initiatives



Using innovative financing to promote the conservation of coastal and marine ecosystem services

Ecosystem Marketplace

A global platform for transparent information on ecosystem service payments and markets



Building capacity for local communities and governments to engage in emerging environmental markets

BBSP

Business and Biodiversity Offsets Program, developing, testing and supporting best practice in biodiversity offsets

Building a market-based program to address water-quality (nitrogen) problems in the Chesapeake Bay and beyond

Forest Trade & Finance

Bringing sustainability to trade and financial investments in the global market for forest products

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