

# Lessons from Reducing Emissions from Deforestation and Degradation: advancing agriculture in the UN Framework Convention on Climate Change

*Carbon Management* (2011) 2(2), 161–173



Christine Negra<sup>†1</sup> & Eva Wollenberg<sup>2</sup>

Reducing Emissions from Deforestation and Degradation (REDD) has gained significant policy momentum as an international mechanism for global climate change mitigation. The mobilization of funding, technical activity and institutional engagement for REDD has been relatively quick and widespread. The policy and technical lessons learned over the evolution of REDD are not yet widely understood, nor have they been widely integrated into efforts aimed at enabling and incentivizing agricultural mitigation. Within the UN Framework Convention on Climate Change, there are opportunities to include agricultural mitigation through the *ad hoc* working groups and technical work programs. To create the policy space and operational feasibility necessary for an international mechanism for agricultural mitigation, parallel advancement is needed on developing a shared vision, tackling high-priority analysis, coordinating efforts among stakeholders and getting money to flow from donor governments, foundations and industry.

Improved land management, including **agricultural mitigation**, is a necessary part of the global effort to avoid dangerous climate change [1]. There is a wide range of strategies for avoiding GHG emissions and increasing sequestration of atmospheric carbon in forested and agricultural lands. Many of these strategies have co-benefits, such as increased productivity, resilience and biodiversity, and can have positive effects on livelihoods and land rights [2,3]. Under the **UN Framework Convention on Climate Change** (UNFCCC) [101], countries are working toward agreement on specific policy mechanisms and **incentives** for improved land management in developing countries. At the same time, a range of public and private sector entities are building the foundation for implementation.

## Reducing Emissions from Deforestation & Degradation

Reducing Emissions from Deforestation and Degradation (REDD) has gained significant policy momentum as an international mechanism for global climate change mitigation under the UNFCCC. Importantly, at COP16

in December 2010, **REDD+** was included in the Cancun Agreements, the Subsidiary Body for Scientific and Technological Advice (SBSTA) was requested to undertake a work program and the Ad Hoc Working Group on Long-term Cooperative Action (AWG–LCA) was requested to explore financing options [102]. The basic intention of a REDD+ mechanism is to mobilize financial flows from developed countries for activities that reduce net GHG emissions from forests in developing countries. Depending on the nature of a future mechanism, some subset of developing countries will be able to capitalize on the REDD+ incentives [4]. The mobilization of funding, technical activity and institutional engagement for REDD has been relatively quick and widespread, with at least 37 countries already preparing national REDD programs [5] and a wide array of public and private entities investing attention and resources (**Figure 1**).

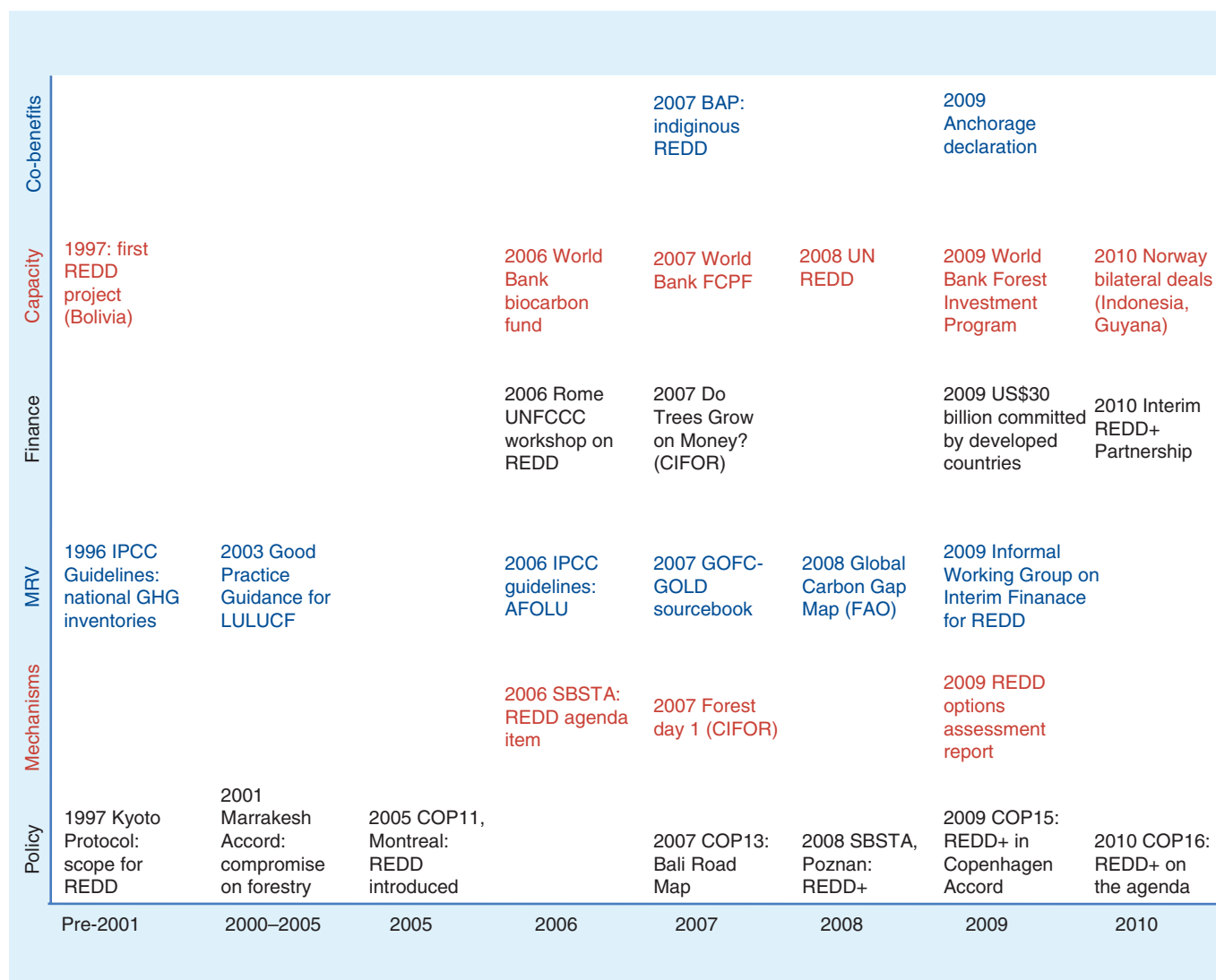
## Agriculture

Mitigation in agricultural settings appears to be more complex than in forests. High variability across landscapes, time scales, land ownership and management

<sup>1</sup>Program Director, H John Heinz III Center for Science, Economics & the Environment, 900 17th Street, NW, Suite 700, Washington, DC 20006, USA

<sup>2</sup>Research Associate Professor & Theme Leader, Pro-Poor Climate Change Mitigation Program on Climate Change, Agriculture & Food Security, University of Vermont, 617 Main Street, Burlington, VT 05405, USA

<sup>†</sup>Author for correspondence: Tel.: +1 202 631 9016; Fax: +1 202 737 6410; E-mail: [negra@heinzcenter.org](mailto:negra@heinzcenter.org)



**Figure 1. Selected events and publications relevant to the history of REDD.**

AFOLU: Agriculture, Forestry and Land Use; BAP: Biodiversity action plan; CIFOR: Center for International Forestry Research; FAO: UN Food and Agriculture Organization; FCPF: Forest Carbon Partnership Facility; GOFC-GOLD: Global observation of forest and land cover dynamics; IPCC: Intergovernmental Panel on Climate Change; LULUCF: Land use, land-use change and forestry; MRV: Monitoring, reporting and verification; REDD: Reducing Emissions from Deforestation and Degradation; SBSTA: Subsidiary Body for Scientific and Technological Advice; UNFCCC: UN Framework Convention on Climate Change.

practices presents challenges for estimating and monitoring net changes in GHG emissions. On an area basis, it is likely that mitigation potential will be lower than in forests, sparking discussion regarding the need for aggregating projects across large areas or conceiving of mitigation as a co-benefit under other incentive systems, such as climate change adaptation programs. The varied set of actors (e.g., agribusiness, producers and consumers) and issues (e.g., food security, national development goals and trade policy) inhibits easy characterization of synergies and trade-offs and makes agricultural mitigation more 'politically hot' [6].

Unlike REDD, for which mitigation potential is highest in countries with threatened rainforests, a potentially broader base of countries stand to benefit from an agriculture mechanism [7]. Important factors will include climate (e.g., humid conditions may promote soil carbon accumulation), adaptation needs and food security threats (i.e., likelihood of unacceptable tradeoffs with mitigation), agricultural infrastructure (e.g., extension support for climate-friendly farming practices) and governance conditions (e.g., robust systems to manage benefit allocation and attract investment).

Policy progress within the UNFCCC on agriculture lags behind REDD and further advancement is needed in developing commonly agreed principles, credibility and political capacity. Multiple approaches are under discussion (e.g., REDD++ [a broader scope of REDD+ that includes additional land-use activities] and nationally appropriate mitigation actions) although SBSTA has not yet been mandated to undertake a work program on agriculture. Beyond the UNFCCC process, agricultural mitigation could advance through other mechanisms such as intergovernmental collaboration, subnational or national-level action, supply chain initiatives or trade policy.

### Expert consultation

Some developments have been particularly instrumental in advancing (and delaying) REDD through the UNFCCC process. Recognizing that the historical context for REDD is unique, analysis of these developments and their impact on REDD indicates potential priorities for further investment and attention for agriculture. Owing to the complexity and rapid evolution of REDD and other proposals for land-based mitigation, only a limited number of experts possess a comprehensive view of the full range of issues, especially for both REDD and agriculture. The policy and technical lessons learned through REDD are not yet widely understood or integrated into efforts to enable and incentivize agricultural mitigation. To bridge this gap, during July–September 2010, 32 close observers and active participants in the development of REDD were interviewed about the most pivotal developments, instrumental investments and impactful partnerships. Interviewees were selected for their depth of experience in the policy, technical, financial and social dimensions of land-based mitigation and their involvement in policy processes through leadership roles within national or multilateral agencies and research or civil society organizations [8]. Interviews were conducted by phone and posed standard questions regarding: the historical development of REDD; the advancement of agricultural mitigation under the UNFCCC; and implications for agriculture going forward. To elicit candid responses, interviewees were informed that comments would not be directly attributed. Based on information and perspectives gathered through the interviews and a targeted review of the literature, the authors identified relevant lessons from REDD for an international mechanism for agricultural mitigation. It is worthy of note that the study does not directly address regulatory or voluntary markets, bilateral agreements or other mechanisms for agricultural mitigation.

### Lesson from REDD

This section presents a brief history, key lessons and implications for agriculture for six elements found to be important for REDD advancement and which are likely to be necessary for achieving a global mechanism for agricultural mitigation. A confluence of these elements is important; for example, technical investments are unlikely to mature without a policy framework that generates real demand, and finance is unlikely to achieve necessary scale without progress in governance and technical credibility.

### International policy support

#### ▪ The history

In 1997, the Kyoto Protocol (KP) set emissions reduction targets for the period 2008 to 2012 and implementation rules were negotiated from 1997 to 2001 [9]. Proposals to include forest-based offsets were made during this period, but key countries and NGOs stood in opposition. Concerns included failing to hold developed countries accountable for mitigation of their fossil fuel emissions, reducing the return-on-investment for fossil fuel mitigation through lower carbon prices and flooding the market with offset credits. In 2001, at COP6b, negotiators agreed not to include forestry in the first commitment period. In 2005, the Coalition for Rainforest Nations (CfRN) introduced the concept of avoided deforestation at COP11. In 2007, REDD and the requirement for monitoring, reporting and verification (MRV) were included in the Bali Action Plan at COP13. The AWG–LCA was also created in 2007 and subsequently undertook an intensive 2-year process of planning for an agreement on REDD at COP15 in 2009 [103]. While an international climate treaty was not achieved in 2009, REDD was considered by many to be one of the few ‘success stories’ from COP15 [10]. For example, methodological guidance was agreed under SBSTA, parties began consideration of draft decision text for REDD+ that included core implementation elements, and the UNFCCC Secretariat was requested to create a REDD web platform [11].

### Key terms

**Agricultural mitigation:** A wide range of climate-friendly agricultural practices, such as reduced tillage, residue and manure management and agroforestry, can reduce net GHG emissions and sequester carbon from the atmosphere

**UN Framework Convention on Climate Change:** Under the Framework, the Clean Development Mechanism (CDM) allows the purchase of emissions reduction credits from projects in developing countries to supplement efforts by developed countries to meet their Kyoto Protocol mitigation commitments. There are a limited number of CDM-approved methodologies for forestry-based and agricultural projects (avoided deforestation is not allowable under CDM). Land-based mitigation issues are also handled by other UNFCCC bodies including the Ad Hoc Working Group on Long-term Cooperative Action, the Ad Hoc Working Group on further commitments under the Kyoto Protocol and the Subsidiary Body for Scientific and Technological Advice.

**Incentives:** Different approaches can be used to incentivize agricultural mitigation such as payments to producers for offset credits in voluntary or compliance markets, higher prices or market access for certified products, food company incentives or requirements for suppliers and domestic subsidies or regulations.

**REDD+:** Climate change mitigation achieved by reducing net emissions from deforestation and degradation, conserving forest carbon stocks, sustainable forest management and enhancing forest carbon stocks.

### ■ The lessons

#### Policy progress requires alignment around a shared vision

From 2005 onwards, efforts of the CfRN and its allies mobilized support by:

- Enlisting high profile academic leaders to be spokespersons and provide rigorous analysis;
- Sustaining high-level political engagement;
- Framing REDD as an economic development strategy with clear incentives for developing countries rather than a mandatory reduction.

The 2006 Stern Review on the Economics of Climate Change [12] concluded that forest-based offsets were the most cost-effective approach to tackling climate change in the near term. Growing recognition of the need for political compromise and pursuit of all mitigation wedges, as well as shifts of leadership within governments and NGOs, began to counterbalance opponents' concerns about REDD.

The REDD policy process has been criticized for lacking attention to participation of local communities and other national or local level stakeholders, both at the international and national levels. A key concern is that national-level programs will lead to recentralizing of forestry decisions and will detract from decades of efforts to support forest communities' self-determination and rights [13].

#### A deliberate preparation period for policy & capacity building can support technical & financial confidence & consensus

Early articulation of key areas of concern regarding REDD implementation such as MRV, additionality, leakage, permanence and governance have mobilized focused and extensive analysis by the SBSTA, multilateral agencies, researchers, thought leaders and others [14,15]. Informal engagement of negotiators with technical experts and other stakeholders helped move the technical agenda and increase buy-in for REDD. High-profile events showcased REDD-related analysis and enabled open debate [104].

#### Demonstrating feasibility on the ground is essential

Decades of experience with forest conservation and forest inventories, the establishment of pilot projects [16], and technical consensus initiatives [1,17] around key issues and methods has built confidence in the technical feasibility of REDD. Country and donor leadership and financing have been critical, especially financial support from Norway, which has pledged approximately US\$3 billion and delivered over \$400 million to multilateral and

bilateral (e.g., Indonesia, Brazil and Guyana) initiatives [105], effectively catalyzing the policy and on-the-ground action needed to implement REDD. Readiness programs operated by the World Bank, UN-REDD, and NGOs have been successful in supporting country preparedness for REDD implementation.

### ■ Implications for agriculture

#### Barriers for agriculture

Developing a shared vision for an agricultural mitigation mechanism requires navigating politically challenging terrain. Agricultural mitigation is seen as more complex than REDD and still needs to pass the 'significance' and 'feasibility' tests. Opposition to a global agricultural mechanism arises from concerns about delaying or derailing a REDD+ agreement, trade-offs with food security, reduced profitability and viability of agriculture, impacts on trade and competitiveness and potential for agribusiness to dominate the agenda.

#### Opportunities for agriculture

In the lead up to COP17 in Durban, South Africa in December 2011, there are windows for proponents of an agricultural mitigation mechanism to garner attention through the *ad hoc* working groups and SBSTA processes. Country submissions and coalition activity are particularly important. There is growing awareness that national and global security is strongly tied to a resilient and productive agricultural system that ensures food security, and that public investments are needed to advance adaptation, food security and poverty reduction while achieving mitigation goals. Political momentum can be accelerated by: an authoritative synthesis of issues, potential and options that enables clear understanding of stakeholder interests and capacities; an overall framework for dealing with agricultural mitigation, land use and food security; cultivating high-level political and corporate champions; and building coalitions and aligning interests among countries and other stakeholders.

## Implementation mechanisms & governance

### ■ The history

Debates about REDD implementation mechanisms have covered:

- Scope (e.g., whether to include degradation or sustainable forest management) [18];
- Scale (e.g., whether REDD should take the form of subnational or national programs) [19];
- Financial flows (e.g., how to fund high upfront costs and whether to use fund- or market-mechanisms; how to share benefits; and how to cover the opportunity costs of parties that have to forego use of the forest);

- Technical issues (e.g., how to set reference levels and determine additionality, and how to address leakage and permanence) [20];
- Accountability (e.g., which entities should oversee and verify REDD credits);
- Rights and equity (e.g., how to address variable land tenure systems, how to reward countries with good forest stewardship) [16,21].

The concept of a **phased approach** to REDD [22] has allowed countries to begin to prepare and demonstrate feasibility, with support and oversight by international bodies such as the World Bank's Forest Carbon Partnership Facility and UN-REDD and enabled donors to test their involvement in stages and foresee a transition to the market [106,107]. Demands for safeguards and monitoring of governance have emerged from indigenous groups and other civil society stakeholders [13]. At COP16 in December 2010, the Cancun Agreements affirmed support for REDD+, addressed reference levels, monitoring and safeguards, and requested developing countries to develop national strategies, while leaving financing unclear [103].

#### ▪ The lessons

##### Progress on mechanisms depends on experimentation, rigorous analysis & conceptual innovation

Experience gained through the Clean Development Mechanism (CDM), voluntary markets, conservation and community forestry projects and trial REDD-style projects has informed the development of rules, methods, models, standards and guidance for GHG accounting and project design. While not all issues have been resolved, experience and analysis have enabled more sophisticated efforts to develop a REDD mechanism that usefully accounts for permanence, additionality, actual drivers of emissions (including agricultural expansion), multiscale activity and incentives, bundling projects and methodologies and transaction costs [16]. As debates have revealed fundamental obstacles, conceptual innovation by analysts, researchers and thought leaders has provided new approaches. Examples include: high-quality standards, methodologies and monitoring systems to minimize 'hot air'; discounting credits and pooled buffer systems to address permanence; incentives directed to actors responsible for drivers of land use; whole-landscape approaches to address leakage and actual drivers; and benefit-sharing proposals to address equity.

##### Technical information should be made widely available and accessible to decision makers early on

Decision makers need practical understanding on a wide range of topics, including mitigation potential, MRV

options and offset markets, which can take time to master. Numerous efforts (e.g., the REDD Source Book, UN-REDD capacity building workshops, NGO-convened dialogs, and SBSTA members attending COPs or meeting with negotiators) have sought to make information available in a quickly evolving field. Dedicated, full-time staff at the UNFCCC secretariat may be necessary to monitor technical developments.

#### Key term

**Phased approach:** Countries can prepare national REDD+ strategies and build capacity followed by adoption of relevant policies and measures, leading to full-scale REDD+ implementation.

##### Multiscale stakeholder engagement at all phases of mechanism development may accelerate progress & prevent roadblocks as well as result in a more pragmatic mechanism

Different stakeholder groups are best positioned to anticipate perverse outcomes (e.g., low equity, livelihood and rights infringements, burdensome requirements or inadequate financing). International UNFCCC, multilateral and parallel rule-making processes as well as national- and project-level governance will need to ensure that mechanisms reach designated beneficiaries, foster cross-sectoral coordination (especially among environment, finance, forestry and agriculture ministries), enable a nested approach to REDD (i.e., national accounting framework and subnational projects), protect country sovereignty and promote transparency and coordination. Advancement in policy processes requires ongoing feedback from field-level experiences.

#### ▪ Implications for agriculture

##### Barriers for agriculture

Key elements of REDD (e.g., pay-for-performance incentives and additionality) may not translate easily to agricultural mitigation, which is also complicated by diverse land ownership and management. Standard-setting processes are not well-coordinated and there is potential for increasing fragmentation. Benefit allocation will be strongly influenced by rules for reference levels and eligible mitigation practices. Tensions among proponents of industrialized and smallholder agriculture inhibit development of a shared vision for the future of global agriculture.

##### Opportunities for agriculture

An agricultural mechanism can build on experience with REDD-related standards and methodologies, emission-reduction strategies in farms and mixed landscapes [23] and experimentation with pilot projects and finance schemes. Standards and verification processes are under development through a number of venues including regulated (e.g., livestock under CDM) and

voluntary markets (e.g., voluntary carbon standard, [VCS]) [24]. Options for an agricultural mechanism can best be evaluated by enabling negotiators to confer with experts. Analysis and pilots can assess proposed approaches (e.g., aggregation of offset credits and sectoral approaches). Conceptual innovation is needed to find synergies among mitigation, adaptation, food security, livelihoods, trade and investment interests.

### Tools & technical guidance for monitoring, reporting & verification

#### ▪ The history

Considerable investment has led to advancement in the development of tools, methods, approaches [25,26] and technical guidance for emissions-related MRV for REDD. In particular, progress has been made in tracking deforestation; systems for data availability; accounting methods and inventories; and determination of baselines, reference levels, additionality, permanence and leakage. Synthesis and guidance by the Intergovernmental Panel on Climate Change, Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) and others has built a base of scientific credibility for REDD. The 2006 Rome UNFCCC Workshop on REDD fostered agreement among technical experts that existing measurement methods were sufficient to make REDD operational [108]. Informal engagement of negotiators with technical experts and other stakeholders has helped move the technical agenda and increase buy-in for REDD. However, capacities to use tools and technical measures as well as the practical aspects of establishing monitoring systems have posed challenges [27].

#### ▪ The lessons

##### Significant effort by technical experts is essential to progress

Broad agreement about the key credibility issues that need to be resolved for REDD has enabled progress on methodological issues, resulting in increased confidence that REDD would deliver results. Many agencies, NGOs and others implemented concerted, academic-style analysis, resulting in conceptual advancement and creation of 'communities of practice'. Policy and applied science journals and reports, as well as concrete suggestions put forth by well-respected individuals, have promoted convergence regarding how to address challenges.

##### A global MRV framework that is accessible & affordable to developing countries is a priority

To meet MRV expectations, accounting systems are required to ascertain: emissions reductions; carbon storage and sequestration; implementation of policy pledges; governance safeguards; impacts on livelihoods and land tenure; and impacts on biodiversity and other ecosystem

services. Ideally, methodologies will be straightforward and accessible so as not to exceed the capacity of all but a limited number of highly specialized consultants. Methods can be developed that allow cost efficiencies of scale such as the Program of Activities approach, pioneered by the World Bank, in which clusters of activities use a similar methodology, allowing addition of sites over time and anticipated cost savings. Over the next 5–10 years, as MRV methods progress, developing countries will require enhanced technical capacity (e.g., infrastructure, regionally relevant MRV tools and methods, national planning and pilot projects) so they are able to take full advantage of emerging incentives for agricultural mitigation [28].

##### A balance between measurement rigor & cost will be required to meet the needs of different incentive mechanisms or investors

Determining the precision of measurement required to meet standards or assure the confidence of investors is a particular challenge. The urgency of climate change mitigation requires REDD programs that can be speedily and widely implemented. Rules for afforestation/reforestation projects under the CDM are perceived by many as burdensome and a barrier to greater implementation (i.e., only 17 are presently operational [101]), while a wider spectrum of stringency in the voluntary market has not inspired market confidence. There is not yet clear agreement on cost-savings that would emerge from taking REDD to scale.

#### ▪ Implications for agriculture

##### Barriers for agriculture

A multiscale MRV system is needed to support estimating agricultural mitigation potential, monitoring GHG outcomes, and reporting and ensuring meaningful mitigation, yet relatively few countries have robust capacity [28]. The 2006 Intergovernmental Panel on Climate Change Good Practice Guidelines created two approaches (forest inventories and an input/output based approach), although these are not scheduled to be formally approved and implemented until 2015 [29]. There is a need for streamlined project approaches and more credible verification. GHG accounting in agricultural systems must account for difficulties in measuring N<sub>2</sub>O and CH<sub>4</sub> emissions, high potential for reversibility and knowledge gaps for managing N<sub>2</sub>O, fertilizer, livestock and biofuels.

##### Opportunities for agriculture

It is possible to combine field measurements, remote sensing, conversion equations, and models to estimate changes in carbon pools. Technical convergence initiatives can address: evaluating change in extensive areas over long time periods; balancing rigor with

feasibility; and cost-effective integration of models, ground measurements and management data.

Investment and institutional engagement can improve regionally relevant, whole-landscape field data and models; cost-effective, user-friendly tools and methods for all GHGs; data sharing across scales and sectors; and remote sensing information.

## Finance & incentives

### ■ The history

There are a variety of proposals for REDD financing including market-based trading of forestry offset credits and fund-based mechanisms [16]. Interest in a regulated REDD market grew from recognition that the voluntary markets were unlikely to provide adequate demand and that existing regulated markets (i.e., CDM and the EU's Emissions Trading System) were not likely to be suitable for major expansion of forestry offsets. Within the current mix of regulated and voluntary offset credit markets, biocarbon credits have had a relatively low market value [24], reflecting the delayed development of domestic cap-and-trade frameworks, and possibly, low confidence in future establishment of credible national MRV systems. In 2009, Norway launched the International Forest and Climate Initiative. The World Bank launched the Forest Carbon Partnership Facility and the Forest Investment Program in 2008–2009 to mobilize significantly increased funds for REDD and sustainable forest management. The formation of the Informal Working Group on Interim Finance for REDD (IWG-IFR) in 2009, and subsequent momentum for the Green Climate Fund (GCF), as agreed in the Copenhagen Accord, was important for boosting confidence in REDD. The GCF was included in the Cancun Agreements, yet uncertainty remains about how the fund should operate relative to other funding mechanisms.

### ■ The lessons

#### Early market activity for REDD-style projects has been limited

There appears to be greater market confidence in the regulated CDM (perceived by some as inadequate and politicized) than in the VCS (seen as having better standards). Lower market value for VCS, which has a relatively high proportion of biocarbon in its portfolio, raises concerns that, even with establishment of a credible market, biocarbon credits are likely to trade at a discount relative to industrial offsets.

#### Early donor support is critical to demonstrating feasibility & building readiness: coordination among donors & investors is a priority

Funding provided by foundations and developed country governments has been critical for supporting initial

pilots, as well as activities ranging from capacity building to negotiations. Norway's role has been pivotal in supporting international institutions (e.g., UN-REDD), bilateral REDD deals and fostering cooperation. Other developed countries, especially Australia, the UK, the USA, France and Germany, have provided financial and other important forms of support. Key foundations (e.g., the David and Lucile Packard Foundation, the Gordon and Betty Moore Foundation and the Climate Works consortium) were 'champions' on the issue of REDD and delivered a concentrated period of funding for a wide variety of studies that enabled significant capacity and progress at many levels. Informal donor coordination and relationship building was beneficial for cooperation and professionalism. More coordination is required at the country level among donors (bilateral, multilateral and private) and, in many REDD+ countries, among domestic government agencies. To shift the inertia and stimulate the flow of public and private finance, conceptual innovation and convergence on a shared vision for how the system will function at 'steady state' (i.e., long-term viability of supply and demand) is needed.

### ■ Implications for agriculture

#### Barriers for agriculture

Opportunity costs of 'normal' development (e.g., deforestation and high-emissions agriculture) and transition costs for shifting to alternative land management require compensation, and offset credits are unlikely to be a stand-alone incentive for the adoption of mitigation practices in agriculture. Early financing is needed from donor governments and foundations for readiness and capacity building activities. Credibility and market potential of agricultural offset credits has been hindered by low penetration in cap-and-trade system design, relatively few pilot projects [7] and challenges in establishing national MRV [28]. For example, systems in Alberta (Canada) and New Zealand include agriculture, but it is largely excluded from the EU Emissions Trading System, CDM and the new California system. The Chicago Climate Exchange, which included agriculture, collapsed in 2010.

#### Opportunities for agriculture

Aggregating projects may reduce transaction costs and facilitate investment. 'Assisted transitions' across supply chains can be explored with attention to regulation, insurance and best practices in addition to finance options. Integrated analysis of potential sources, types and magnitude of finance can compare financing approaches and assess likely impacts and opportunities. Synergies may be possible across financing for forestry and agricultural mitigation, adaptation and

development aid. Several governments and foundations have signalled leadership on agricultural mitigation (seen at The Hague Conference on Agriculture, Food Security and Climate Change in October 2010). A coordinated framework for government and foundation support can: build momentum and foster alignment across scales and sectors; leverage private sector and developing country investments; improve accountability; and protect existing development aid commitments.

### Capacity for implementation, especially at the national level

#### ▪ The history

There is a broad spectrum of readiness for REDD among forested developing nations and the needs for capacity building are significant [29]. Gaps in country readiness contribute to the risk of international leakage. A few larger countries (e.g., Brazil and Indonesia) are poised for REDD implementation and a number of other countries (e.g., Guyana) are moving quickly to build partnerships in technical and financial arenas [105]. Cross-learning among countries is emerging (e.g., Cambodia is accelerating based on lessons learned in Vietnam; and a regional approach has been adopted in the Congo basin). Two major multilateral efforts are helping to build confidence and readiness on the ground. The Forest Carbon Partnership Facility, facilitated by the World Bank, has established 37 'REDD countries', 11 of which have submitted Readiness Preparation Proposals [106]. In 2008, Norway and Denmark helped to establish UN-REDD to advance UN involvement and leverage the programs and capacities of the UN Environment Program, the UN Development Program and the Food and Agriculture Organization. UN-REDD delivers readiness support to 29 countries [107]. In addition, a number of NGOs have undertaken independent capacity building exercises in developing countries focused on training stakeholders, engaging indigenous communities and governments and addressing technical barriers (e.g., The Nature Conservancy, the Climate, Community and Biodiversity Alliance, Conservation International, the Rainforest Alliance, the World Wide Fund for Nature, the Wildlife Conservation Society and Forest Trends).

#### ▪ The lessons

##### Phased capacity building & implementation appear to be effective

Multilateral capacity building programs have quickly supported a large number of countries across the developing world. By creating a systematic way to prepare for REDD and providing funds, readiness programs have

spurred countries to explore what a national REDD program could look like and have helped to highlight differences among countries [105,106,107]. Broad implementation of REDD-style projects may be hindered by concentration of funds at the national level or inefficiencies that arise from rapid ramp-up of programs and funding streams.

#### Coordination in capacity building is a priority

The World Bank and UN-REDD programs have built confidence and readiness on the ground, although approaches differ in important ways. Although the co-existence of Forest Carbon Partnership Facility and UN-REDD was initially confusing, this enabled multilaterals to engage a broader range of countries. The two organizations have been working on modalities for coordination (e.g., back-to-back governance meetings; and a joint forum between the policy board of UN-REDD and the participants committee of the World Bank). The World Bank has asked UN-REDD to help in the Democratic Republic of the Congo [109]. They are creating a national joint program, by merging the World Bank's Rural Power Project with the National Joint Program Readiness Plan and both are providing funds.

#### ▪ Implications for agriculture

##### Barriers for agriculture

Most developing countries have biophysical agricultural mitigation potential, although capacity to capitalize on a future global mechanism is likely to vary. Type and magnitude of mitigation potential varies by country circumstances as does vulnerability to climate change impacts and food insecurity. Many developing countries have gaps in capacity for agricultural mitigation practices, offset market participation, MRV and governance structures and will need country-specific capacity building [25]. Institutional roles at global and regional scales for enabling agricultural mitigation are unclear [16] and structured frameworks are needed to harmonize initiatives across scales, regions and sectors.

##### Opportunities for agriculture

On-the-ground projects in different regions of the world can demonstrate: critical mass of credible emissions reductions and co-benefits; adequate incentives and cost-effectiveness; and compatibility with national objectives. A step-wise, 'learning-by-doing' approach can foster increasing accuracy thresholds and encourage early mitigation actions. Platforms for information-sharing and technical convergence can facilitate identification of agricultural mitigation practices that serve multiple objectives (e.g., productivity, resilience and net emissions reduction) in the full range of farming systems.

## Co-benefits and safeguards for the environment & poverty alleviation

### ▪ The history

Co-benefits of REDD can include biodiversity conservation and other positive environmental impacts, poverty alleviation and securing land, forest and carbon rights [16]. Co-benefits are closely related to the concept of safeguards, which are ‘do-no-harm’ rules that seek to limit negative impacts. REDD-style projects have demonstrated the feasibility of generating tangible co-benefits for income, land tenure, capacity and local culture as well as identifying the importance of investment in community development in addition to improvements to household incomes [30]. The Climate, Community and Biodiversity Alliance has established standards against which REDD projects’ co-benefits can be measured, commanding a premium price in voluntary markets [31]. CARE and Conservation International are also facilitating national REDD+ Social and Environmental Standards [110]. Donors for REDD and countries have started developing best practices rules for investments that reflect co-benefits. The 2009 Anchorage Declaration was a strong statement calling for recognition of indigenous peoples’ rights to land and resources as well as policy processes and incentive mechanisms [32]. The Cancun Agreements make specific mention of indigenous people’s knowledge and rights, as well as their participation in decisions.

Debates over indigenous rights in the REDD policy-making process have not yet been resolved. Indigenous groups and their proponents view most co-benefits as non-negotiable basic rights [13] and recommend that negotiating texts indicate adherence to human rights and use specific language that countries ‘will implement’ relevant measures. Policy makers have been reluctant to use rights-related language. Some REDD proponents are concerned that REDD will fail or that mitigation outcomes will be diminished if co-benefits are explicitly included while others believe that this will generate support across multiple stakeholders and better achieve REDD aims.

### ▪ The lessons

#### Safeguards for rights & co-benefits will emerge from a combination of advocacy & practice

Advocates can propose specific alterations to negotiating text. Standard-setting bodies and global donors can test strategies for protecting environmental and social goods while achieving mitigation aims. Windows for inserting practical solutions can be identified by learning from experimentation (e.g., payments for ecosystem services and projects), linking on-the-ground practice and institution-building to global processes for advancing policy, finance, development and accounting.

## Effective delivery of co-benefits for poverty alleviation requires further attention

For a REDD mechanism to achieve socially and environmentally sustainable outcomes, alignment is needed among definition of rights, access to finance and legal recourse, participation mechanisms and development strategies. Delivery of co-benefits will depend on improvements in mechanisms external to the UNFCCC (e.g., assuring land rights in national policies). Standards and safeguards will be important for promoting environmental and poverty alleviation aims if they are implemented independently and robustly. Independent verification is important for ensuring the credibility of certification systems that must balance upholding rigorous standards with generating significant emissions reductions.

### ▪ Implications for agriculture

#### Barriers for agriculture

Farmers undertake agriculture to secure food and livelihoods [33]; mitigation will often be a co-benefit associated with other incentives, especially adaptation. To make informed decisions, producers and farming communities need to understand liabilities associated with mitigation incentives such as offset credit contracts. Clarity is needed for tradeoffs (e.g., food security and mitigation) and priority investments (e.g., industrial vs smallholder production systems).

#### Opportunities for agriculture

Existing standards and certification programs can incorporate mitigation and adaptation-related principles and encourage private sector best practices. Safeguards can be developed for food security, livelihoods, economic development, pro-poor outcomes and environmental impacts through on-the-ground experimentation and assessment of outcomes. Mitigation and adaptation mechanisms can be ‘bundled’ where appropriate [34]. Facilitated stakeholder and expert consultations may help to develop robust mitigation schemes that promote good governance, transparency and equitable benefit allocation. Making provisions early on for structured participation and attention to free prior and informed consent principles and procedures is a priority.

## Conclusion

Emissions reductions strategies in agriculture are necessary for avoiding dangerous climate change, especially where these help to improve productivity and minimize deforestation driven by agricultural expansion. An agricultural mitigation mechanism can build on experience with REDD-related standards and methodologies and experimentation with pilot projects and finance schemes. Most developing countries have biophysical

agricultural mitigation potential although capacity to capitalize on a future global mechanism is likely to vary. There are areas of commonality for mitigation in forested and agricultural lands; however, key differences suggest that a REDD policy template cannot be directly applied to agricultural mitigation. As key concepts that shaped REDD (e.g., additionality and permanence) are translated to agriculture, they must be aligned with the need to protect livelihoods and basic rights to food security.

Reducing Emissions from Deforestation and Degradation offers valuable lessons relevant to the international political process and technical development of agricultural mitigation. Widespread agreement about the key credibility issues to resolve for REDD has enabled progress on methodological issues, resulting in increased confidence that REDD would deliver results.

Funding provided by foundations and developed country governments has supported pilot implementation, capacity building and improved communications. A phased approach has helped practitioners, donors and investors to push through roadblocks.

Within the UNFCCC, there are opportunities for agricultural mitigation through the AWG–LCA and Ad Hoc working Group on Further Commitments for Annex I Parties under the KP negotiating tracks and through SBSTA work programs. There is growing awareness of the interdependence between agriculture and forestry and the relationship to global security. Leadership from global donors, countries, researchers, practitioners and private companies is emerging. Conceptual innovation is needed to find synergies among mitigation, adaptation, food security, livelihoods, trade and investment interests. Near-term

## Executive summary

### The context for Reduced Emissions from Deforestation and Degradation & agricultural mitigation mechanisms

- Through the UN Framework Convention on Climate Change (UNFCCC), countries are developing policy mechanisms and incentives for improved land management. Public and private sector entities are building the foundation for implementation.
- Forest-based mitigation has gained significant technical policy momentum through Reduced Emissions from Deforestation and Degradation+ (REDD+), which was included in the Cancun Agreements and will be further developed through UNFCCC processes.
- Agriculture offers important mitigation potential; however, the complex set of actors and issues require rigorous exploration of synergies and trade-offs.

### International policy support

- Policy progress requires alignment around a shared vision and recognition of the need for compromise.
- Demonstrating feasibility on the ground is essential and a deliberate period of capacity building can support technical and financial confidence and consensus.

### Mechanisms & governance

- Progress on mechanisms depends on experimentation, rigorous analysis and conceptual innovation.
- Multiscale stakeholder engagement at all phases of mechanism development may accelerate progress and prevent roadblocks as well as result in a more pragmatic mechanism.

### Tools & technical guidance for monitoring, reporting & verification

- A global monitoring, reporting and verification framework that is accessible and affordable to developing countries is a priority. Significant effort by technical experts is essential to progress.
- A balance between measurement rigor and cost will be required to meet the needs of different incentive mechanisms or investors.

### Finance & incentives

- Market activity for REDD-style projects has been limited. Early donor support as well as capacity building by multilateral agencies and NGOs has been critical to demonstrating feasibility and building readiness.

### Implementation capacity

- Phased capacity building and implementation appear to be effective in boosting readiness and crystallizing what national REDD+ programs will look like.
- Clarity regarding institutional roles for enabling agricultural mitigation and structured frameworks are needed to harmonize initiatives across scales, regions and sectors.

### Co-benefits & safeguards

- Co-benefits of REDD can include positive environmental impacts, poverty alleviation and the securing of land, forest and carbon rights.
- Safeguards for rights and co-benefits will emerge from a combination of advocacy and practice.
- Alignment is needed among definition of rights, access to finance and legal recourse, participation mechanisms and development strategies.

### Advancing agriculture in the UNFCCC

- A confluence of these six elements is important since technical investments are not likely to mature without a policy framework that generates real demand and finance is unlikely to achieve necessary scale without progress in governance and technical credibility.
- The development of an agricultural mitigation mechanism within the UNFCCC requires a shared vision, rigorous analysis of options and impacts, coordination across efforts and adequate financial flows.

investments are needed to develop capacity and experience. Agreement on policy options can emerge as communication channels are created between projects and technical experts, negotiators and policy makers.

### Future perspective

To create the policy space and operational feasibility necessary for an international mechanism for agricultural mitigation, parallel advancement is needed on multiple tracks.

Developing a shared vision for achieving agricultural mitigation that reflects the highest priorities of stakeholders and major drivers of agricultural emissions is an essential and high hurdle to cross that requires:

- Acknowledging deadlocks, clarifying the basis for self-interested action at national and sectoral scales and merging top-down design with bottom-up operational experience;
- Developing a common language, increasing fluency on technical and policy concerns and clear framing of MRV policy options;
- Formal and informal stakeholder engagement, major events that bring diverse perspectives together and efforts by respected thought leaders.

Investigating policy and implementation options for agricultural mitigation through:

- Focused efforts to promote consensus on technical issues by multilateral agencies, as well as research consortia and other communities of practice (e.g., through synthetic modeling and analysis, as well as meetings and other platforms);
- A seminal independent review that puts agricultural mitigation in a global context, rigorously outlines the potential for mitigation options and financing strategies, and sets out a mandate for further research.

Coordinating efforts among countries, agribusiness and trade groups, farmers' associations, indigenous communities and multilateral agencies is needed to

avoid divisive policy blocks and fragmented technical and institutional responses. Convening efforts should:

- Be grounded in a comprehensive understanding of the drivers, actors and institutional arrangements currently influencing global agriculture;
- Identify and fill key gaps in communication;
- Clarify institutional roles and responsibilities and broad agreement on an overall policy strategy.

Getting money to flow from donor governments, foundations and industry to support readiness, infrastructure and action on-the-ground is essential to building confidence and momentum around agricultural mitigation and mobilizing technical activity and institutional engagement. Key elements include:

- Leadership by a constellation of 'anchor' donors, bilateral agreements, and multilateral programs;
- Supply chain projects, payments for ecosystem services initiatives, and other types of market experimentation;
- Mechanisms for sharing and synthesizing findings and feeding them back into policy processes.

### Acknowledgments

*The authors would like to thank the people interviewed for this study. We are also grateful to Sam Bickersteth, Bruce Campbell, Alison Nihart and Cecelia Angelone for their advice and support.*

### Financial & competing interests disclosure

*This article summarizes the full study findings presented in a White Paper on Lessons from REDD for Agriculture prepared by the authors for the UK Department for International Development for which they provided financial support. The full study is available at [www.ccafs.cgiar.org](http://www.ccafs.cgiar.org). The authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.*

*No writing assistance was utilized in the production of this manuscript.*

### Bibliography

Papers of special note have been highlighted as:

- of interest
- of considerable interest

1 Intergovernmental Panel on Climate Change: *IPCC Fourth Assessment Report: Climate Change 2007. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK. (2007).

2 UN Food and Agriculture Organization. *Low Greenhouse Gas Agriculture: Mitigation and adaptation potential of sustainable farming systems: Mitigation and Adaptation Potential of Sustainable Farming Systems*. UN Food and Agriculture Organization, Rome, Italy (2009).

3 Kahn B, Zaks D. *Investing in Agriculture: Far-Reaching Challenge, Significant Opportunity, An Asset Management Perspective*. DB Climate Change Advisors, Frankfurt, Germany (2009).

4 Bond I. *Estimated REDD Credit Supply into International Carbon Markets by 2035*. Climate Focus, Amsterdam, The Netherlands (2010).

5 World Bank Forest Carbon Partnership Facility. *Synthesis Report: REDD+ Financing and Activities Survey*. World Bank Forest Carbon Partnership Facility, Washington, DC (2010).

6 GO-Science. *Foresight 2011: The Future of Food and Farming*. UK Government Office for Science, London, UK (2011).

- 7 Seeberg-Elverfeldt C, Tapio-Biström M-L. *Global Survey of Agricultural Mitigation Projects*. UN Food and Agriculture Organization, Rome, Italy (2010).
- 8 Negra C, Wollenberg E. *Lessons from REDD for Agriculture*. CGIAR Climate Change, Agriculture and Food Security Program, Copenhagen, Denmark (2011).
- 9 Tropical Forest Group. *A History of Climate Change and Tropical Forest Negotiations*. Tropical Forest Group Articles (2007).
- 10 La Viña AGM, Ang LG. *From Copenhagen to Cancun: Challenges and Prospects for the UNFCCC Negotiations*. Foundation for International Environmental Law and Development, London, UK (2010).
- 11 Saenz-Sanchez M. REDD plus progress made: monitoring and reporting aspects. Presented at: *The Measurement Reporting and Verification joint Workshop*. Zapopan, Jalisco, México, 22–24 June 2010.
- 12 Stern NH. *The Economics of Climate Change*. Cambridge University Press, Cambridge, UK (2007).
- Commissioned by the British government, the review examines the economic and policy dimensions of climate change impacts, mitigation and adaptation.
- 13 Sikor T, Stahl J, Enters T *et al.* REDD-plus, forest people's rights and nested climate governance. *Global Environmental Change* 20(3), 423–425 (2010).
- 14 Houghton RA, Greenglass N, Baccini A *et al.* The role of science in Reducing Emissions from Deforestation and Forest Degradation (REDD). *Carbon Management* 1(2), 253–259 (2010).
- 15 Davis C. Governance in REDD+. Taking stock of governance issues raised in readiness proposals submitted to the FCPF and the UN-REDD Program. Background paper for Monitoring Governance Safeguards in REDD+ Expert Workshop, 24–25 May 2010, Chatham House, London, UK (2010).
- 16 Angelsen A. *Realising REDD+. National Strategy and Policy Options*. Center for International Forestry Research, Bogor, Indonesia (2010).
- Examines what REDD+ at the national level might look like in terms of institutions and processes, broad policy reforms to enable implementation, sectoral policies to change incentives and demonstration activities.
- 17 GOF-C-GOLD. *A Sourcebook of Methods and Procedures for Monitoring and reporting Anthropogenic Greenhouse Gas Emissions and Removals Caused by Deforestation, Gains and Losses of Carbon Stocks in Forests Remaining Forests, and Forestation*. GOF-C-GOLD Project Office, Alberta, Canada (2009).
- 18 Terrestrial Carbon Group. *How to include Terrestrial Carbon in Developing Nations in the overall Climate Change Solution*. Terrestrial Carbon Group Project, Washington, DC, USA (2008).
- 19 Cortez R, Saines R, Griscom B *et al.* *A Nested Approach to REDD+: Structuring Effective and Transparent Incentive Mechanisms for REDD+ Implementation at Multiple Scales*. The Nature Conservancy, Arlington, VA, USA (2010).
- 20 Griscom B, Shoch D, Stanley B, Cortez R, Virgilio N. *Implications of REDD Baseline Methods for Different Country Circumstances During an Initial Performance Period*. The Nature Conservancy, Arlington, VA, USA (2009).
- 21 Cattaneo A, Lubowski R, Busch J *et al.* On international equity in reducing emissions from deforestation. *Environ. Sci. Policy* 13(8), 742–753 (2010).
- 22 Streck C, Gomez-Echeverria L, Gutman P, Loisel C, Werksman J. *REDD+ Institutional Options Assessment: Developing an Efficient, Effective, and Equitable Institutional Framework for REDD+ Under the UNFCCC*. Meridian Institute, Washington, DC (2009).
- Commissioned by the Norwegian government, this report summarizes the institutional considerations and phases for establishment of an international Reducing Emissions from Deforestation and Degradation+ (REDD+) framework.
- 23 van Noordwijk M, Minang PA, Dewi S, Hall J, Rantala S. Reducing Emissions from All Land Uses (REALU): the case for a whole landscape approach. ASB PolicyBrief 13. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya (2009).
- 24 Hamilton K, Sjardin M, Peters-Stanley M, Marcello T. *Building Bridges: State of the Voluntary Carbon Markets 2010*. A Report by Ecosystem Marketplace & Bloomberg New Energy Finance. Washington, DC (2010).
- 25 Goetz S, Achard F, Joosten H *et al.* *Comparison of Methods for Measuring and Assessing Carbon Stocks and Carbon Stock Changes in Terrestrial Carbon Pools: Protocol*. Collaboration for Environmental Evidence Systematic Review No. 09–016 (2010).
- 26 Fagan M, DeFries R. *Measuring and Monitoring the World's Forests: A Review and Summary of Remote Sensing Technical Capability 2009–2015*. Resources for the Future. Washington, DC (2009).
- 27 Baker DJ, Richards G, Grainger A *et al.* Achieving forest carbon information with higher certainty: a five-part plan. *Environ. Sci. Policy* 13, 249–260 (2010).
- Outlines a five-part plan for estimating forest carbon stocks and emissions with the accuracy and certainty needed to support REDD+ policy and implementation in developing countries.
- 28 National Research Council. *Verifying Greenhouse Gas Emissions: Methods to Support International Climate Agreements*. National Research Council, Washington, DC, USA (2010).
- 29 Cerbu G, Minang PA, Swallow B, Meadu V. *Global survey of REDD projects: What implications for global climate objectives?* ASB PolicyBrief No. 12. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya (2009)
- 30 Virgilio NR, Marshall S, Zerbock O, Holmes C. *REDD: A Casebook of On-the-Ground Experience*. The Nature Conservancy, Conservation International and Wildlife Conservation Society, Arlington, VA, USA (2010).
- Drawing on experiences in Bolivia, Madagascar and Indonesia, the principal aspects of demonstrating REDD credibility are examined (e.g., baselines and additionality, measuring and monitoring, leakage and impermanence).
- 31 EcoSecurities. *The Forest Carbon Offsetting Report 2010*. EcoSecurities, Dublin, Ireland (2010).
- 32 Indigenous Peoples' Global Summit on Climate Change: *Anchorage Declaration 2009*. Anchorage, Alaska, USA 24 April 2009.
- 33 International Assessment of Agricultural Knowledge Science and Technology for Development. *Agriculture at a Crossroads: Global Report*. IAAKST, Washington, DC, USA (2009).
- Initiated in 2002 by the World Bank and UN Food and Agriculture Organization, the objective was to assess the impacts of agricultural knowledge, science and technology on the reduction of hunger and poverty, improvement of rural livelihoods and human health, and equitable, socially, environmentally and economically sustainable development.
- 34 Smith P. *Agriculture and Climate Change: An Agenda for Negotiation in Copenhagen For Food, Agriculture, and the Environment Synergies Among Mitigation, Adaptation, and Sustainable Development*. International Food Policy Research Institute, Focus 16, Brief 9 (2009).

## ■ Websites

- 101 CDM/JI Pipeline Analysis and Database.  
[www.cdmpipeline.org](http://www.cdmpipeline.org)
- 102 The UN Climate Change Conference in Cancun, COP 16 / CMP 6.  
[http://unfccc.int/meetings/cop\\_16/items/5571.php](http://unfccc.int/meetings/cop_16/items/5571.php)
- 103 Decision 1/CP.15: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention.  
<http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=3>
- 104 Report on Forest Day.  
[www.cifor.cgiar.org/events/forest-day/2007-bali.html](http://www.cifor.cgiar.org/events/forest-day/2007-bali.html)
- 105 The Forest Carbon Partnership Facility.  
[www.forestcarbonpartnership.org/fcp/node/248](http://www.forestcarbonpartnership.org/fcp/node/248)
- 106 UN REDD Programme.  
[www.UN-REDD.org](http://www.UN-REDD.org)
- 107 UNFCCC-SBSTA 24th session – reducing emissions from deforestation in developing countries.  
<http://unfccc.int/resource/docs/2006/sbsta/eng/l08.pdf>
- 108 What does the Norwegian Climate and Forest Initiative finance?  
[www.regjeringen.no/en/dep/md/Selected-topics/climate/the-government-of-norways-international-/what-do-we-finance.html?id=557700](http://www.regjeringen.no/en/dep/md/Selected-topics/climate/the-government-of-norways-international-/what-do-we-finance.html?id=557700)
- 109 UN-REDD Programme Newsletter: UN-REDD and FCPF Joint Mission in Republic of Congo.  
[www.UN-REDD.org/Newsletter12/UNREDD\\_FCPF\\_Congo\\_Joint\\_Mission\\_en/tabid/5539/Default.aspx](http://www.UN-REDD.org/Newsletter12/UNREDD_FCPF_Congo_Joint_Mission_en/tabid/5539/Default.aspx)
- 110 REDD+ Social & Environmental Standards.  
[www.climate-standards.org/redd+](http://www.climate-standards.org/redd+)