Carbon credits from avoided deforestation
a pilot project in the Seima Protection Forest, Cambodia

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Cambodia’s conservation areas

- Ministry of Environment + Ministry of Agriculture,
  Forestry and Fisheries
- Over 4.6 M ha, 26% of the country, 40% of forest estate

- Protects rare biodiversity and national heritage
- Important for many economic sectors
  - rural livelihoods (land and forest products, fisheries)
  - tourism
  - energy (hydropower catchments)
  - water resources (irrigation, flood control, clean water etc)

- Financing is difficult - many of the services lack a market
Forests and Forest Carbon

• Each ha of tropical forest contains 120-400+ tons of CO₂ equivalent in above-ground biomass.
• Slowing deforestation may be a cost-effective part of the solution to global warming

• **Countries that demonstrate reduced deforestation will probably be eligible for payments from major emitting countries**
• The legal system is being developed, but a voluntary market already exists

The no-project scenario – business as usual – no credits

The ‘Business-as-usual’ (BAU) is what happens if we do nothing new
With project – fewer emissions, credits generated

Success is measured by decreasing losses compared to the historical baseline.

Emissions reductions.

These emissions reductions can be credited.

A pilot project in Mondulkiri

This is Cambodia’s second REDD pilot site for the voluntary market and the first in a conservation area.
The carbon is owned by the Government of Cambodia.

→ The site was a logging concession, now suspended.
→ Seima Protection Forest created Aug 2009.
→ Carbon sequestration is one of stated goals.
→ 293,000 ha site (REDD within 187,000 ha Core Area).

WCS has a long-term collaboration with the Forestry Administration covering all aspects of site management.
Proposed REDD project

The whole reserve will be managed by MAFF/FA under the authority of a subdecree. Carbon finance strengthens protection and benefits all stakeholders.

Advantages of the pilot site

1. Large area of forest with high carbon stocks
2. Existing government/NGO partnership
3. Positive results from feasibility study
4. Many similarities to other forests in Cambodia
5. Good community and biodiversity co-benefits
Baseline deforestation rates are increasing

Feasibility study (Winrock International)
Estimates 1,566,000 tCO₂e saved in first 5 years
Conservative estimate $5.4 m revenue (@$5/t and 30% buffer)

Nuts and bolts of certification

Designed for the voluntary market

It will be certified by:
 a) Voluntary Carbon Standard (project design)
 b) Climate, Community and Biodiversity Association (co-benefits)

Will use the Modular Methodology being developed by Avoided Deforestation Partners – (much delayed!)

Project start date set for 1 July 2008. PDD drafting underway.
Additional carbon protection activities

• Adjustment of existing strategies to increase focus on deforestation (mid 2008 onwards)

• Passage of the Subdecree (Aug 2009)

• Expansion of patrolling, land titling and alternative livelihoods when funds increase

• New direct incentives programs (not yet developed)
Community work in Seima - links to carbon

The community program began in 2003 and now covers 8 villages out of c. 20. Recognition of resource-use rights is central to management.

Carbon funds will allow:
- full coverage (>5000 people)
- increased choice of interventions
- long term sustainability
- law enforcement support

It is expected that a large portion of revenues will be directed to community benefits.

These will need to be linked to forest protection outcomes, to motivate changes in behaviour and ensure future revenues. WCS has a number of pilots exploring how to do this in the Cambodian context.

Transparent revenue sharing mechanisms will be set up.

Benefit-share arrangements

- Discussions with government still at an early stage
- Preferred model centres on a Trust Fund
  - drawn from WCS experiences in Madagascar
  - government approved
  - independent
  - site-linked
  - offshore
- Benefits to be divided between central government, site management and benefits for participating communities
- Community benefits likely to be a mixture of village groups (e.g. Indigenous Legal Entities), individual incentives (e.g. patrol payments) and possibly also Commune Investment Funds (although these lack conditionality)
Carbon stock surveys – pools chosen

Include
• Above ground (AG) living [plots]
  – Trees (by far the main pool); saplings; bamboo
• Lying and standing dead wood [plots]
• Long-lived forest products [separate study, pending]
• Below ground living [from literature, % of AG woody]

Omit
• Soil carbon (limited expected change; see AFOLU Tool)
• Litter and herbs (trivial)
• GHGs from burning (expected to decline, not eligible for credits)
• Other GHGs from fertiliser, vehicles (assumed insig. in modules)
Basic plot techniques

- Standard forestry plots are recommended
- Winrock provided us SOPs and training for these
- They recommend nested plots set to capture about 10 stems/nest – our largest nest was 20m radius
- We found the SOPs broadly effective and easy to use

- The electronic plot radius sensors (DMEs) are expensive and optional – but quite useful
- SOPs suggest relocating plots to areas of uniform slope; we chose a different protocol
- We had to develop our own procedures for bamboo and various other local issues

Permanent or temporary plots?

- The current modules are ambiguous on the need for perm vs temp plots in REDD projects
- Only needed if you want to claim credits for reduced degradation - but also insurance against rule changes?
- Permanent plots need doing properly or not at all – there are many practical pitfalls

- We only set up a few, once we were sure the logistics of the main survey were feasible
- However, we marked all plots with buried steel bars to facilitate relocation
- We may have to go back and do this next dry season
How it has worked in SPF

- Complex mosaic of forest types
- Choice of national forest cover datasets
- Decided on systematic sampling with random start and post-stratification
- Pilots suggested that clusters would improve performance
- Clusters small enough to cover in one day

Pilots led us to survey 77 plot clusters across three major forest types
Data analysis and review now underway

Enormous logistical and personnel challenges!

Results to date
(above ground living tree data only)

The most efficient stratification identified so far (following FA 2006) gives:

<table>
<thead>
<tr>
<th>Stratum</th>
<th>tC/ha</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evergreen/semi-evergreen</td>
<td>221</td>
<td>14%</td>
</tr>
<tr>
<td>Deciduous dipterocarp</td>
<td>121</td>
<td>22%</td>
</tr>
<tr>
<td>Open woodland</td>
<td>61</td>
<td>25%</td>
</tr>
</tbody>
</table>

The CIs are substantially larger than expected from the pilots. More plots required?

The means are rather high compared to IPCC Tier 1 norms and should be seen as provisional until results of the destructive sampling work to confirm suitable conversion factors from dbh to biomass.

12 trees were destructively sampled to validate the biomass equations (a major task) – results pending. A Khmer student is doing 15 more trees, results also pending.
Post deforestation stocks

Recently deforested land is not relevant.

Estimate eventual carbon stocks through a combination of land-use forecasting, literature values and surveys in older areas with stabilised land use.

Conceptually difficult approach. Forecasting is difficult, cash crops are especially dynamic. How to define a representative area?

How did it work in SPF?

Three known agro-ecological zones were sampled separately.
Baseline deforestation rates

- Historical baseline derived from Landsat 1998, 2002, 2008 across a large reference area
- Major challenge to get acceptable accuracy in deciduous landscapes
- We are using Land Use Change Modeller (LCM) within IDRISI Taiga to make projections into the future
- SPF has relatively low historical rates (0.15%/year) but accelerating rapidly due to road construction etc – tricky to model within the conservative framework set by VCS
- Quantification of leakage due to prevention of in-migration is not yet clear in the AFO methodology. Detailed surveys planned this dry season.

Thank you