

Sowing Seeds for REDD+

Chris J. Kettle

Institute of Terrestrial Ecosystems, ETH Zürich, Zurich 8092, Switzerland

Global partnerships that support reducing emissions for deforestation and forest degradation including reforestation (REDD+) have the potential to contribute not only to climate change mitigation but also to biodiversity conservation and poverty alleviation (1). These potentials can be realized by deliberate targeting of REDD+ programs at regions that will maximize both emissions reduction and biodiversity conservation ("Harnessing carbon payments to protect biodiversity," O. Venter *et al.*, *Brevia*, 4 December 2009, p. 1368). Indonesia is an obvious target. The Norwegian government's recent pledge of US\$1 billion toward REDD+ in Indonesia provides a ray of hope for the country's imperiled forests (2). However, the Oslo pact is short-sighted in that it provides no funding for forest restoration or sustainable forestry (3).

Forest destruction in Southeast Asia—Indonesia in particular—is among the most rapid and devastating in the world (4). To reverse this trend, we urgently need to reduce the rate of deforestation and forest degradation. We ultimately also need to restore degraded forests, and maintain these forests through multiple and sustainable uses (5–7). Restoration of degraded forests is facilitated by enrichment planting with native tree species such as those in the timber family Dipterocarpaceae (8, 9). Forest restoration will not only enhance forest carbon storage and provide higher-quality habitats for forest-dependent species (10), but will also prevent the conversion of degraded forests to other environmentally damaging land uses, such as oil-palm production (11). From a rural development perspective, forest restoration would increase employment opportunities, both directly through restoration activities and indirectly in associated service industries, such as tree nurseries and seed markets. Furthermore, sustainable timber extraction in rehabilitated forests would provide a stable source of revenue for local communities in the long term (12). However, forest restoration is an expensive endeavor and has been estimated to cost as much as US\$500 per ha (13). Therefore, REDD+ (as opposed to just REDD) needs to be adopted and implemented to provide valuable financial support for forest restoration. The Norwegian government should take the lead by ensuring that the "plus" is firmly added to their REDD+ partnership with Indonesia.

Chris J. Kettle

Institute of Terrestrial Ecosystems, ETH Zürich, CHN G 73.1, Universitätstrasse 16, Zurich 8092, Switzerland.

References

1. A. Angelsen *et al.*, "Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report" (2009).
2. R. A. Butler, in *mongabay.com*, vol. 2010 (2010); http://news.mongabay.com/2010/0601/indonesia_reforestation.html, accessed 3 June 2010.
3. A. P. Simamora, "Norway won't fund RI tree planting program: Govt.," *The Jakarta Post* 31 May 2010; www.thejakartapost.com/news/2010/05/31/norway-won039t-fund-ri-tree-planting-program-govt.html.

4. N. S. Sodhi, L. P. Koh, B. W. Brook, P. K. L. Ng, *Trends Ecol. Evol.* 19, 654 (2004).
5. R. L. Chazdon, *Science* 320, 1458 (2008).
6. D. Lamb, P. D. Erskine, J. A. Parrotta, *Science* 310, 1628 (2005).
7. D. Normile, *Science* 325, 557 (2009).
8. C. J. Kettle, *Biodiversity Conserv.* 19, 1137 (2010).
9. A. Paquette, J. Hawryshyn, A. V. Senikas, C. Potvin, *Ecol. Soc.* 14, 15 (2009).
10. D. P. Edwards, F. A. Ansell, A. H. Ahmad, R. Nilus, K. C. Hamer, *Conserv. Biol.* 23, 1628 (2009).
11. D. S. Wilcove, L. P. Koh, *Biodiversity Conserv.* 19, 999 (2010).
12. R. A. Dennis, E. Meijaard, R. Nasi, L. Gustafsson, *Ecol. Soc.* 13, 25 (2008).
13. R. Tipper *et al.*, in "Greenhouse Gas Mitigation: Technologies for Activities Implemented Jointly," P. W. F. Riemer, A. Y. Smith, K. V. Thambimuthu, Eds. (Pergamon, Amsterdam, 1998), pp. 177–185.