Challenges and opportunities of a landscape governance approach to the REDD+ programme: a conservation outlook

Richard Mbatu

Abstract Implementing the Reducing Emissions from Deforestation and forest Degradation (REDD+) programme has the potential to significantly reduce greenhouse gases whilst also helping to maintain biodiversity. However, a proposed landscape governance approach to the REDD+ programme, encompassing all land-use activities, could alter these desirable outcomes. Under the proposed approach, governments and private entities could encourage types of land use that have the potential to threaten biodiversity and disrupt ecosystems. Yet a landscape governance approach could also stimulate governments to develop land-use management policies to facilitate adaptation to climate change. I organized focus group discussions with members of conservation groups, REDD+ scholars, and members of the REDD+ agroforestry research community at the Association of American Geographers 2016 Annual Meeting, to identify potential conservation challenges and opportunities associated with carbon-farming in grasslands and plantations under the proposed landscape governance approach to REDD+. I evaluate and synthesize this information, making recommendations for strategies to maximize the conservation opportunities and minimize the challenges. Understanding the challenges and opportunities will enable policy makers and other stakeholders to improve the presentation of their arguments in their efforts to shape the course of the REDD+ programme in the post-Paris Agreement era.

Keywords Biodiversity conservation, carbon-farming, forest governance, grasslands, landscape governance approach, plantations, REDD+

Introduction

Over the past 10 years the international community has sought to make the protection of forests a key element of plans for addressing climate change. The idea is to reduce emissions from deforestation and forest degradation (REDD+) and to enhance the role of conservation and sustainable management of forests in developing countries. REDD+ developed from the initial idea of avoided deforestation (Humphreys, 2008): the idea that because forests can sequester significant amounts of carbon, and because carbon emissions are linked to climate change, protecting forests is a vital way of protecting the world from climate change. The idea is to compensate developing countries that reduce carbon emissions from forests (Santilli et al., 2005). Following years of conversations in the international community, REDD was agreed by the Parties to the United Nations Framework Convention on Climate Change during COP-13 (the 13th Conference of the Parties) in Bali, Indonesia, in 2007. In 2008, barely 1 year after REDD was formally accepted (in principle), its scope was broadened to include other possibilities, on the grounds that 'climate benefits can arise not only from avoiding negative changes (deforestation, degradation), but also from enhancing positive changes, in the form of forest conservation and restoration' (Wertz-Kanounnikoff & Kongphan-apirak, 2009). Thus, at COP-14 in Poznań, Poland, in 2008, REDD became REDD+ in recognition of these other possibilities. Some scholars and agroforestry researchers (e.g. Sayer et al., 2013; Naughton-Treves & Wendland, 2014; Minang et al., 2015; Turnhout et al., 2016) have advocated for a broader scope for REDD+, calling for an approach that encompasses all land-use activities, arguing that such an approach would significantly reduce terrestrial emissions (Herold, 2013). This holistic approach has been deemed the landscape governance approach; that is, a comprehensive and integrative multi-functional use of land to foster interaction between sectors such as forests, agriculture, biodiversity, natural resource conservation, and their actors and institutional systems, to achieve social, economic and environmental objectives (Minang et al., 2015).

Even though climate treaty negotiations (in Doha 2012, Warsaw 2013, Lima 2014, Paris 2015, and Marrakesh 2016) have endorsed a landscape governance approach, and such an approach is largely promoted by the Global Landscapes Forum (GLF, 2013), it presents new challenges, as well as some opportunities for enhanced conservation. Therefore, the implications of a landscape governance approach to REDD+ for conservation and tropical forest governance should be a priority for researchers and policy makers. As the international community debates the possibility of accepting a landscape governance approach, it is vital to examine the potential challenges and opportunities

Richard Mbatu College of Arts and Sciences, University of South Florida St. Petersburg, 140 Seventh Ave South, St. Petersburg, FL 33701, USA
E-mail mbatu@mail.usf.edu

Received 24 January 2017. Revision requested 27 March 2017. Accepted 7 April 2017. First published online 15 June 2017.

the approach may present to conservation and forest governance beyond forests. Here I examine two probable features of the landscape governance approach: carbon-farming in grasslands and in plantations.

Although a number of carbon-farming initiatives are currently being undertaken (e.g. revegetation of agricultural land using woody tree species, and soil carbon enhancement techniques such as no-till farming), I focus here on grasslands because under the landscape approach grasslands "may contribute more to the 'missing sink' than was previously appreciated" (Scurlock & Hall, 1998), and on plantations because under the landscape approach an across-the-board definition of 'forests' that includes plantations may be adopted, thus increasing forest carbon sequestration offsets.

Methods

To evaluate challenges and opportunities associated with adopting a landscape governance approach I reviewed the literature and conducted a focus group at the Association of American Geographers Annual Meeting in San Francisco, USA, on 30 March 2016. Thirty-five members of conservation groups, REDD+ scholars, and members of the REDD+ agroforestry research community participated in the focus group discussion. Participants were recruited from the Association's list of specialty group sessions by identifying potential participants and inviting them to join the focus group. I randomly divided participants into seven groups of five people, aiming for homogeneity (to take advantage of participants' shared experiences) and diversity (to capitalize on different perspectives) within the groups. I presented a documented history of the landscape approach to participants, asked them open-ended questions in relation to the REDD+ programme adopting the approach, and encouraged them to report their own experiences. The discussion groups met 2–3 times. Here I analyse the transcripts of these discussions, describe the areas of agreement and disagreement, and offer some recommendations to facilitate conservation while minimizing any potential damage from the landscape governance approach.

Results

I found three encompassing themes permeating the seven focus groups.

Theme 1: Risks of carbon-based conservation In many of the focus groups members expressed concerns about dangers of carbon-based conservation. Participants discussed management interventions aimed at increasing carbon stock that are deleterious to biodiversity. Many participants deplored the fact that in grasslands where carbon stocks are the focus, management interventions that favour carbon stock enhancement put natural grassland ecosystems at risk.

Theme 2: Confounding plantations with forests Across all focus groups many participants expressed concerns about the lack of distinction between a forest and a plantation: the so-called 'forest definition question'. Participants feared that substituting oil-palm plantations for natural tropical rainforest damages biodiversity, as there are fewer species of birds and mammals in oil-palm plantations. However, on marginally fertile land, plantations can enhance biodiversity.

Theme 3: Adaptive management practices In many focus groups participants discussed a variety of factors that can enhance carbon stocks in both grasslands and plantations while benefiting biodiversity and enhancing the people's well-being. Participants discussed unique conditions under which plantations can enhance biodiversity conservation, considered sustainable practices in grasslands, and explored land rights and tenure problems.

Discussion

The challenges and opportunities of carbon-farming in grasslands

Although most terrestrial biomass carbon is in trees, there is potential to sequester significant amounts of carbon in grasslands through appropriate grassland management (Conant, 2010). A landscape governance approach to the REDD+ programme that goes beyond forests to encompass all landscapes would generate the desire to sequester carbon in non-forest ecosystems such as savannahs and other grasslands, which could lead to unacceptable conservation outcomes. Although biodiversity conservation has been addressed mainly in a landscape setting since the early 1980s (Noss, 1983), participants across all focus groups agreed that delivering REDD+ climate action through a landscape approach could be problematic for biodiversity conservation in grasslands. For example, when carbon stock becomes the focus in low-carbon-density landscapes, such as the eastern African grasslands, which support some of the greatest diversity of protected species, the impact in terms of patterns and consequences of changes in biodiversity could be enormous (Putz & Redford, 2009). Recipient governments are likely to promote grassland carbon-farming, which would encourage carbon-enhancing activities such as fire suppression to increase grass and soil carbon, fertilization (using nitrogenous fertilizers and composting) to spur grass growth and soil formation, and irrigation to counter high evapotranspiration rates.

Table 1 Effects of some carbon-enhancing activities on grassland biodiversity and ecosystem.

Carbon-enhancing activity	Impact on grassland biodiversity & ecosystem	Source
Fire suppression	Loss of native vegetation; increase in non-native plant species; loss of native wildlife	Leach & Givnish (1996); Brooks & Pyke (2000); Keeley (2006)
Fertilization	Weak grassland species diversity; reduced species asynchrony; decreased species richness	Conant et al. (2001); Silveira et al. (2007); Socher et al. (2012); Hautier et al. (2014)
Irrigation	Leaf distribution alteration; dominance of noxious weeds; changes in orthopteran populations	Srivastava & Singh (2005); Bullock et al. (2011); Riedener et al. (2013); Andrey et al. (2014)

Patterns and consequences of changes in biodiversity resulting from such perturbations have been well documented (Table 1), particularly in relation to species diversity through knowledge of species traits such as richness, evenness, composition and interactions, and of ecosystem functioning through responses such as resilience and resistance to environmental change (Chapin et al., 2000).

Although participants across all focus groups agreed that adopting a landscape governance approach to emissions reduction in grasslands would be detrimental to biodiversity, participants in some groups argued that it could also act as a strong incentive for recipient governments to develop and enforce climate resilience and climate change adaptation policies based on grassland management practices. Management practices such as rotational grazing systems, sustainable stocking rates, mixed stocking (cattle, horses and sheep/goats), grazing season planning (anticipating when and how much it will rain), and use of fire–grazing interactions tend to make systems more resilient to climate variation and climate change (O'Connor et al., 2010). With more than 2 billion people inhabiting the world's grasslands and depending on them for their livelihoods (Conant, 2010), some participants contended that requiring comprehensive grassland climate resilience and climate change adaptive management policies under a landscape governance approach to the REDD+ programme could encourage both national governments and grassland communities to reach general agreement on major land-use issues such as land rights, clarification of tenure and carbon ownership, and the need for negotiations with stakeholders. These participants argued that under a landscape governance approach both national governments and grassland communities would seek to maximize the carbon market value of grasslands, as payments would be performance-based.

Carbon-farming in plantations: the forest definition problem

The forest definition problem, which was at the centre of negotiations to incorporate forests into the global climate action plan prior to the Paris Agreement, could be exacerbated by a post-Paris Agreement adoption of a landscape governance approach to REDD+. The definition of forest has never been clear. The inconsistent elements of the etymology and power politics of resource use in medieval England indicate that the definition of forest has always been perceived by stakeholders in different ways (Putz & Redford, 2010). For example, the forestry profession's definition of forest emphasizes instrumental/utilitarian value (Helms, 2002), in contrast with the environmentalist definition, which emphasizes preservation (Putz & Redford, 2010). The definition of forest used by the United Nations Framework Convention on Climate Change emphasizes land area (at least 0.05–1 ha), canopy cover (10–30% threshold) and height (minimum of 2–5 m; UNFCCC, 2002), which further broadens these discrepancies as it allows every country to define 'forest' to meet its objectives as long as it falls within these ranges.

The current conflicting wishes of stakeholders are at the centre of the controversial discussion over whether or not to grant plantations equal standing with natural forests. Throughout all focus groups participants affirmed that the development of plantations affects biodiversity conservation and poses serious ecological problems for natural forests, as plantations are sustained by intensive management practices (clear cutting, tree rotation, pesticide application and other agro-engineering practices; Bhagwat et al., 2008), which are at odds with characteristics of natural forests and conservation. For instance, clear cutting often takes place before plantations are established in tropical regions, which not only have the biophysical conditions most conducive for growing cash-crops but are also the most conducive for the growth of rainforests.

Many tropical forest-rich countries are therefore engaged in clear-cutting of their rainforests to establish plantations. In Malaysia and Indonesia, for instance, two of the world's biggest producers of palm oil, 9 million ha of tropical rainforests were clear-cut during 1975–2005 (Wicke et al., 2011). The rainforests of Malaysia and Indonesia are among the world's biodiversity hotspots (UNEP-WCMC, 2004), and more clear-cutting of these countries' rainforests to make way for oil-palm plantations under a landscape governance approach could be catastrophic to the cause of biodiversity conservation.

Many participants insisted that adopting a landscape governance approach to the REDD+ programme could

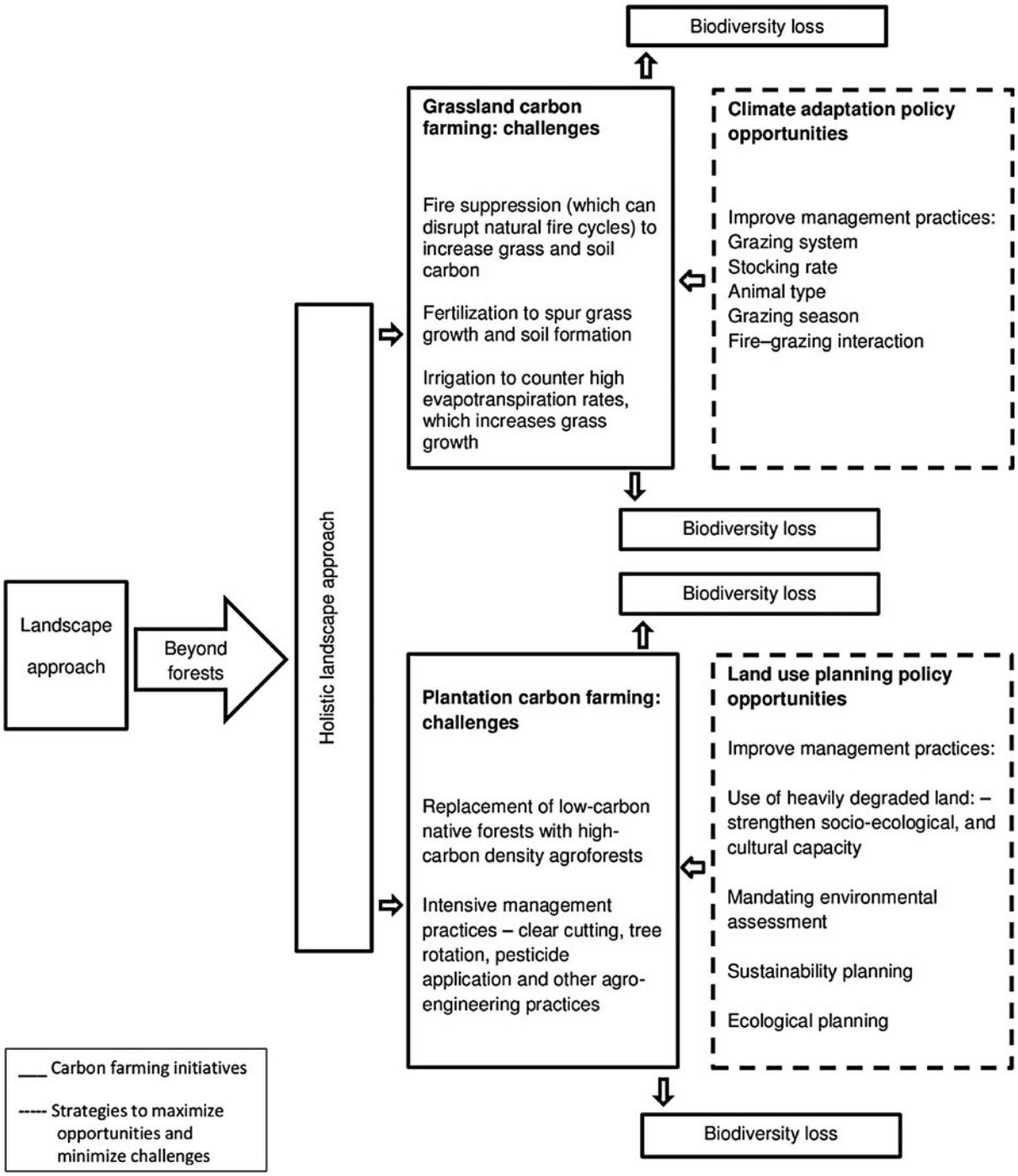

FIG. 1 Potential conservation challenges and opportunities of a landscape approach to REDD+.

precipitate expansion of oil-palm plantations, as the approach may overlook the forest definition question, which is an active issue at national level in many countries (e.g. Indonesia; Romijn et al., 2013). A landscape governance approach would render the forest definition debate meaningless, as plantations would automatically fall within the scope of the broader landscapes approach, thus allowing plantation developers to benefit from carbon credits at the expense of natural forests and the biodiversity they preserve.

Despite the known negative effects of plantations and their management practices on biodiversity, some research has indicated that plantations can contribute to biodiversity conservation (Hartley, 2002). This is especially true in cases where plantations established in areas of heavily degraded natural forest 'help restore native biota to degraded sites. . .by stabilizing soil and creating site conditions favourable for native animals and plants to recolonize' (Hartley, 2002, p. 82). Although all focus groups agreed that

plantations have potential to conserve biodiversity, many participants argued that this was possible only in specific conditions, such as in degraded forests. Adopting a landscape governance approach to the REDD+ programme could provide opportunity for recipient governments to develop and enforce land-use policies that encourage the use of heavily degraded lands for plantation cultivation. However, such policies would need to be approached with caution given that secondary logged natural forests, which are often considered to be degraded, can in some cases still preserve natural forest biodiversity, as they are used by species of high conservation value (Maddox, 2007).

These potential challenges and opportunities of the proposed landscape governance approach for the REDD+ programme (Fig. 1) suggest that policy makers and other stakeholders need to give full consideration to the various outcomes of the approach, so as to articulate their positions on REDD+ and make appropriate choices in the post-Paris Agreement era.

Conclusions

Given the potential challenges and opportunities presented by a landscape governance approach to the REDD+ programme, policy makers and stakeholders will need to assess carefully the potential outcomes of adopting the approach. The way forward is to look for strategies to maximize the opportunities and minimize the challenges associated with the approach. The new United Nations Sustainable Development Goals (UN-SDG Summit, 2015) provide two important avenues for this to be accomplished: 'Responsible consumption and production' (Goal 12), and 'Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss' (Goal 15). National governments could embark on attaining these goals by focusing on developing strategies by which grassland landscape managers and plantation developers can enhance productivity through sustainable practices; for example, by limiting new plantations to already deforested or degraded lands (to strengthen socio-ecological and cultural capacity), and by making environmental assessment a mandatory condition for the establishment of plantations on degraded lands (to determine the presence or absence of high conservation values; i.e. ecological planning). Similarly governments could encourage grassland communities to adopt sustainable grassland management practices that can simultaneously enhance carbon sequestration and the biodiversity potential of grasslands, by investing in education, research and technical assistance programmes to help communities prioritize the long-term productivity of their land over short-term gains from carbon-farming alone (Conant, 2010).

Acknowledgements

I would like to thank members of the REDD+ focus group and related special groups at the Association of American Geographers Annual Meeting in San Francisco, California, 29 March–2 April 2016, who participated in thoughtful discussions. I thank H. LaFollette for reading a draft of this article and for his many helpful suggestions, and M. Fisher and anonymous reviewers for their valuable comments.

References

Andrey, A., Humbert, J.Y., Pernollet, C. & Arlettaz, R. (2014) Experimental evidence for the immediate impact of fertilization and irrigation upon the plant and invertebrate communities of mountain grasslands. *Ecology and Evolution*, 4, 2610–2623.

Bhagwat, S.A., Willis, K.J., Birks, H.J.B. & Whittaker, R.J. (2008) Agroforestry: a refuge for tropical biodiversity? *Trends in Ecology and Evolution*, 23, 261–267.

Brooks, M.L. & Pyke, D.A. (2000) Invasive plants and fire in the deserts of North America. In *Proceedings of the Invasive Species Workshop: The Role of Fire in the Control and Spread of Invasive Species*, pp. 1–14. Tall Timbers Research Station, Tallahassee, USA.

Bullock, J.M., Aronson, J., Newton, A.C., Pywell, R.F. & Rey-Benayas, J.M. (2011) Restoration of ecosystem services and biodiversity: conflicts and opportunities. *Trends in Ecology and Evolution*, 26, 541–549.

Chapin, III, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L. et al. (2000) Consequences of changing biodiversity. *Nature*, 405, 234–242.

Conant, R.T. (2010) *Challenges and Opportunities for Carbon Sequestration in Grassland Systems*. FAO, Rome, Italy.

Conant, R.T., Paustian, K. & Elliott, E.T. (2001) Grassland management and conversion into grassland: effects on soil carbon. *Ecological Applications*, 11, 343–355.

GLF (Global Landscapes Forum) (2013) *Global Landscapes Forum Executive Summary*. Http://www.landscapes.org/executive-summary-key-messages-global-landscapes-forum [accessed 30 March 2017].

Hartley, M.J. (2002) Rationale and methods for conserving biodiversity in plantation forests. *Forest Ecology and Management*, 155, 81–95.

Hautier, Y., Seabloom, E.W., Borer, E.T., Adler, P.B., Harpole, W.S., Hillebrand, H. et al. (2014) Eutrophication weakens stabilizing effects of diversity in natural grasslands. *Nature*, 508, 521–525.

Helms, J.A. (2002) Forest, forestry, forester: what do these terms mean? *Journal of Forestry*, 100, 15–19.

Herold, M. (2013) *REDD+ and a Landscape Governance Approach: On the Sidelines of COP 19, Warsaw, 12 November 2013*. Http://blog.cifor.org/20524/landscapes-approach-dovetails-with-redd-scientist-says [accessed 20 September 2016].

Humphreys, D. (2008) The politics of Avoided Deforestation: historical context and contemporary issues. *International Forestry Review*, 10, 433–442.

Keeley, J.E. (2006) Fire management impacts on invasive plants in the western United States. *Conservation Biology*, 20, 375–384.

Leach, M.K. & Givnish, T.J. (1996) Ecological determinants of species loss in remnant prairies. *Science*, 273, 1555–1558.

Maddox, T. (2007) *The Conservation of Tigers and Other Wildlife in Oil-palm Plantations: Jambi Province, Sumatra, Indonesia* (*October 2007*). Zoological Society of London, London, UK.

Minang, P.A., Van Noordwijk, M., Freeman, O.E., Mbow, C., De Leeuw, J. & Catacutan, D.E. (eds) (2015) *Climate-smart Landscapes: Multifunctionality in Practice*. WAC/ICRAF, Nairobi, Kenya.

Naughton-Treves, L. & Wendland, K. (2014) Land tenure and tropical forest carbon management. *World Development*, 55, 1–6.

Noss, R.F. (1983) A regional landscape governance approach to maintain diversity. *BioScience*, 33, 700–706.

O'Connor, T.G., Kuyler, P., Kirkman, K.P. & Corcoran, B. (2010) Which grazing management practices are most appropriate for maintaining biodiversity in South African grassland? *African Journal of Range & Forage Science*, 27, 67–76.

Putz, F.E. & Redford, K.H. (2009) Dangers of carbon-based conservation. *Global Environmental Change*, 19, 400–401.

Putz, F.E. & Redford, K.H. (2010) The importance of defining 'forest': tropical forest degradation, deforestation, long-term phase shifts, and further transitions. *Biotropica*, 42, 10–20.

Riedener, E., Rusterholz, H.P. & Baur, B. (2013) Effects of different irrigation systems on the biodiversity of species-rich hay meadows. *Agriculture, Ecosystems & Environment*, 164, 62–69.

Romijn, E., Ainembabazi, J.H., Wijaya, A., Herold, M., Angelsen, A., Verchot, L. & Murdiyarso, D. (2013) Exploring different forest definitions and their impact on developing REDD+ reference emission levels: a case study for Indonesia. *Environmental Science and Policy*, 33, 246–259.

Santilli, M., Moutinho, P., Schwartzman, S., Nepstad, D., Curran, L. & Nobre, C. (2005) Tropical deforestation and the Kyoto Protocol. *Climatic Change*, 71, 267–276.

Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J-L., Sheil, D., Meijaard, E. et al. (2013) Ten principles for a landscape governance approach to reconciling agriculture, conservation, and other competing land uses. *Proceedings of the National Academy of Sciences of the United States of America*, 110, 8349–8356.

Scurlock, J.M.O. & Hall, D.O. (1998) The global carbon sink: a grassland perspective. *Global Change Biology*, 4, 229–233.

Silveira, M.L., Vendramini, J., Rechcigl, J.E. & Adjei, M.B. (2007) *Soil pH and Liming Issues Affecting Bahiagrass Pastures*. U.S. Department of Agriculture, University of Florida, Gainesville, USA.

Socher, S.A., Prati, D., Boch, S., Müller, J., Klaus, V.H., Hölzel, N. & Fischer, M. (2012) Direct and productivity-mediated indirect effects of fertilization, mowing and grazing on grassland species richness. *Journal of Ecology*, 100, 1391–1399.

Srivastava, R. & Singh, K.P. (2005) Species diversity in dryland and irrigated agroecosystems and marginal grassland ecosystem in dry tropics. *Community Ecology*, 6, 131–141.

Turnhout, E., Gupta, A., Weatherley-Singh, J., Vijge, M.J., De Koning, J., Visseren-Hamakers, I.J. et al. (2016) Envisioning REDD+ in a post-Paris era: between evolving expectations and current practice. W*IREs Climate Change*, 8, e425.

UNEP-WCMC (2004) *World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC). Species Data*. Http://rainforests.mongabay.com/03highest_biodiversity.htm [accessed 14 October 2016].

UNFCCC (2002) *Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001 (FCCC/CP/2001/13/Add.1, UNFCCC, Marrakesh, Morocco, 2001)*. Http://unfccc.int/resource/docs/cop7/13a01.pdf [accessed 15 September 2016].

UN-SDG Summit (2015) *Transforming Our World: The 2030 Agenda for Sustainable Development*. Https://sustainabledevelopment.un.org/post2015/transformingourworld [accessed 20 October 2016].

Wertz-Kanounnikoff, S. & Kongphan-apirak, M. (2009) *Emerging REDD+: a Preliminary Survey* of *Demonstration* and *Readiness Activities*. CIFOR Working Paper no. 46. Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Wicke, B., Sikkema, R., Dornburg, V. & Faaij, A. (2011) Exploring land use changes and the role of palm oil production in Indonesia and Malaysia. *Land Use Policy*, 28, 193–206.

Biographical sketch

Richard Mbatu's research interests are in two interconnected areas: forest resource management and policy aspects of sustainable development and climate change, and the structure and function of plans, programmes, bilateral and multilateral agreements and conventions dealing with forest resource management and climate change. His current work is focused on the role of the REDD+ programme within the international climate change mitigation regime.