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Practitioner perspective on REDD: Commercial challenges in project-based rainforest protection financing in the Asia Pacific region

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Abstract: *This paper presents a practitioner perspective on community-based REDD (Reducing Emissions from Deforestation and forest Degradation) projects in the Pacific Islands. It draws upon the author's experience in forest conservation financing since 1987, and REDD project and programme design, development and implementation since 2006. The aim is to highlight the commercial challenges faced by REDD practitioners, and explore strategic (including policy) solutions to meet these challenges. The paper begins by situating REDD as a tool for forest conservation and community development. Following a brief overview of the key elements of REDD project development procedures, the paper examines commercial (particularly market access) challenges faced by project proponents, together with challenges associated with the supply and demand dynamic for REDD credits in the global carbon market. This is situated against a backdrop of global policy stagnation in the REDD sector and the implications of this for those at the frontier of community-based forest protection efforts on the ground. The paper culminates by showing the importance of an effective partnership between governments, rainforest communities and the private sector in regional and global rainforest conservation financing.*

Keywords: *REDD, deforestation, forest carbon, carbon trading, rainforest*

Introduction

One of the most common challenges in forest conservation in developing countries is finding tangible ways to address the opportunity cost of giving up the right to logging or land clearance. Without realistic economic alternatives, the trade-off for forest rights owners and developing country governments is usually a choice between revenue to finance economic development on the one hand, and no revenue from forest conservation on the other hand. With economic incentives working in favour of logging and land clearance, tropical deforestation and forest degradation have continued apace.

The practice of rainforest protection using REDD as a financing framework poses many challenges, some of which are generic to forest protection in developing countries, and others that are more particular to REDD. Although the range of challenges includes funding, logistical, social, economic, cultural, political and commercial nuances, this paper will focus on commercial issues. Of particular interest here are barriers to market access and the discordant relationship between supply and demand for REDD carbon credits. Rather than looking across all scales of REDD activity, the analysis is constrained to community-based REDD projects operating in the international voluntary carbon market. The core motivations of such projects are to enable/cause/facilitate a trilogy of benefits to: (i) the atmosphere; (ii) rainforest protection; and (iii) participatory community economic development. In other words, this analysis applies a lens from the supply side of the supply–demand dynamic.

This exploration of commercial challenges will proceed by means of an overview of REDD

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as a forest protection financing framework, followed by a brief explanation of the technical requirements of REDD project development. This establishes a context for the elaboration of commercial challenges at a project scale, and an exploration of possible solutions, including an examination of the potential role of governments in supporting this sector locally and globally.

REDD as an environmental financing framework

By the late twentieth century, the need for globally coordinated action to curb deforestation was well recognised internationally. In spite of this, the global community failed to deliver a global forest agreement at the 1992 Rio Earth Summit. The Kyoto Protocol forest negotiations in 2000 (The Hague) and 2001 (Bonn) threw tropical deforestation into the 'too hard' basket. But fortunes changed in 2005 when Papua New Guinea and Costa Rica jointly sponsored Agenda Item 6 at the 11th Conference of Parties to the UNFCCC in Montreal: 'Reducing emissions from deforestation in developing countries: Approaches to stimulate action' (UNFCCC, 2005). Its acronym is REDD.

The meaning of the second 'D' was changed in 2007 from 'developing countries' to 'forest degradation', and in 2009 a 'plus sign' was added to enable the inclusion of 'conservation of forest carbon stocks, sustainable management of forest, and the enhancement of forest carbon stocks' (UNFCCC, 2010). The scope of REDD+, therefore, covers most aspects of forest carbon management in developing countries. 'Afforestation/reforestation' – not included in 'REDD+' – is included in the Clean Development Mechanism of the Kyoto Protocol and other carbon financing systems to the point where all change in forest carbon stocks now have a carbon financing framework of some form, in theory.

The tropical forest conservation sector had reason to celebrate the arrival of REDD, because at last a comprehensive financing instrument for forest protection was beginning to emerge. Carbon finance (it was hoped) would present an opportunity to harness a new and potentially larger source of funds to finance forest conservation and rural community development aspirations (Peskett and Yanda, 2009). However, it has not been a smooth run, with a divide emerging between REDD critics and the more hopeful responses of practitioners (see McGregor, 2010; McGregor *et al*. 2014).

Many involved in tropical forest conservation through the 1980s and 1990s had learned that protecting tropical forests necessitates delivering tangible and enduring economic development outcomes to communities and stakeholders who would otherwise benefit from deforestation or forest degradation. This work was called 'integrated conservation and development' – or ICDP – in the 1990s (e.g. Hughes and Flintan, 2001). Under an ICDP approach, projects tend to impose restrictions on forest access and conversion in conjunction with non-conditional livelihood enhancements (Sunderlin *et al*., 2014), such as payments for ecosystem services. The key difference with REDD from a forest conservationist point of view is that livelihood enhancements in the form of incentive payments become conditional on measurable environmental outcomes.

One of the biggest challenges in ICDP was finding enduring ways to finance alternative development or non-conditional livelihood enhancements in rainforest regions, particularly in competition with the very tangible, immediate and often lucrative financial benefits that unsustainable logging and land clearance could deliver. Sustainable forest management (SFM) presented a middle path involving low-impact logging that maintains the forest canopy and can (in theory) be sustained in perpetuity. While often technically robust, SFM was not always commercially viable long term (particularly in the Pacific Islands) because of myriad logistical challenges (Bosma, pers. comm., 2014),[1] such as capacity constraints among local communities for managing the physically demanding workloads associated with portable mill operations, poor financial discipline, poor project governance and low cash flows. To cite two prominent examples, the Butmas SFM project on Espirtu Santo in Vanuatu (de Vletter *et al*., 2004) and the Drawa SFM project on Vanua Levu, Fiji (Fung, 2005) both failed commercially because *inter alia* either the logging operation was too difficult to manage by local labour force, and/or independent logging contractors were unwilling to persist with logging contracts

with such low returns on investment. This was in spite of being well supported through several years of funding and technical assistance from the Secretariat of the Pacific Community, the German government, and the Vanuatu and Fiji governments, respectively.

By the late 2000s, carbon was added to the environmental financing toolbox. But in some ways carbon is simply old wine in new bottles, because many of the challenges faced by forest conservationists in the 1980s and 1990s were either rediscovered in a new context or re-emphasised as requirements under REDD (Peskett and Yanda, 2009). However, the methodological and financial discipline required in carbon trading (applying a conceptual framework aligned with The Economics of Ecosystems and Biodiversity (TEEB, 2010)) helped to significantly upgrade the forest protection 'value proposition' to buyers/funders in an environmental financing context and enabled it to align with new demand for carbon offsets. For example, under REDD, *ex post* (i.e. conditional) crediting means that public or private sector buyers or funders seeking to cause rainforest protection with their money are presented with a 'value proposition' comprised of independently verified environmental protection outcomes on the ground (complete with detailed and transparent outcome reporting) prior to making any commitment to pay. For many buyers/funders, this is a far less risky and far more transparent 'value-for-money' option compared with more traditional speculative funding of project inputs by way of grants in exchange for promises of future outcome delivery.

In some settings, the more established ICDP approaches have been combined with REDD approaches as project development entities built their REDD project development capability. For example, almost all of the 23 REDD projects (located in Africa, South America, Southeast Asia) surveyed by Sunderlin *et al*. (2014) comprised a hybrid between ICDP and REDD approaches.

Project-scale REDD carbon financing

The end game in most forms of forest carbon financing is performance-based payments for the measured, reported and verified delivery of a specifically defined ecosystem service outcome. The core ecosystem service (carbon benefits to the atmosphere) can be delivered through either: (i) reducing or avoiding CO_2 emissions (reducing or avoiding deforestation and/or forest degradation); or (ii) enhancing CO_2 removals from the atmosphere (removing impediments to forest regeneration or enhancing such regeneration). In addition to the carbon benefits, forest protection and enhancement also delivers several other benefits long held to be important to sustainable land management. These include biodiversity protection, flood and drought mitigation, river sediment reduction, stream and inshore water quality, water security, and climate resilience.

The main REDD financing instruments currently operational (i.e. buying forest protection and enhancement outcomes and not just funding capacity building) include the Carbon Fund of the World Bank's Forest Carbon Partnership Facility (FCPF 2014) and the Brazil Amazon Fund[2] (for national-scale and jurisdictional scale activities), and the international voluntary carbon market (for project-scale and jurisdictional-scale activities). At the time of writing (December 2014), progress on the UNFCCC REDD negotiations between December 2005 and December 2014 had produced guidance on measurement reporting and verification (UNFCCC, 2010 – Paragraph 70), guidance on REDD social and environmental safeguards (UNFCCC, 2010 – Appendix 1), and a framework for results-based REDD financing (UNFCCC, 2013). Notably, the UNFCCC REDD negotiations have so far failed to deliver a REDD financing instrument for buying carbon units representing beneficial carbon stock change on the ground. This is principally because the overarching UNFCCC process has also failed to deliver a post-2012 global climate change agreement. Such an agreement would need a tighter collective emissions cap than the Kyoto Protocol and/or include sectors not covered by the Kyoto Protocol (e.g. international aviation and international marine transport sectors) to accommodate large volumes of additional REDD units into the intergovernmental emissions trading regime.

The most rapid progress in developing and testing rainforest carbon transactions has been made in the voluntary carbon markets. For

example, in 2012 private sector buyers purchased $216 million worth of forest carbon units, thereby financing the implementation of management, conservation or expansion activities in 26.5 million ha of forest (Peters-Stanley *et al*., 2013). REDD projects doubled their transaction volumes between 2012 and 2013 to 22.6 $MtCO_2e$, with their market value increasing by 35% to US$94 million (a subset of the forest carbon sector not including afforestation/reforestation). This is in spite of a decline in mean offset value from US$7.4 in 2012 to US$4.2 in 2013 (Peters-Stanley *et al*., 2014). Forest carbon buyers surveyed in 2012 were motivated by: resale to pre-compliance buyers (27%), corporate social responsibility (23%), demonstration of climate leadership in industry (20%), pre-compliance (14%), resale to purely voluntary buyers (12%), climate-driven mission (2%) and PR/branding (1%) (Peters-Stanley *et al*., 2013: 43).

The forest carbon market has developed quality control and quality assurance infrastructure to mitigate non-delivery of purchased outcomes in the form of *ex post* performance-based payments for ecosystem services (PES) (i.e. carbon credits). This involves transferring the bulk of outcome delivery risk from the supplier of money to the supplier of ecosystem service outcomes. This is the opposite of most traditional environmental finance, which operates under (predominantly) *ex ante* financing arrangements where outcome delivery stakeholders seek funding up front on the basis of promises to deliver outcomes in the future. This creates significant risk of non-delivery or only partial delivery of targeted outcomes to buyers/funders.

Accordingly, stakeholders seeking carbon finance for forest protection or enhancement usually need to deliver carbon and co-benefits first, and then receive payments from the sale of carbon credits after those outcomes have been measured, reported and verified. A survey of 23 REDD initiatives found that the most important intervention for effectively reducing deforestation and forest degradation was conditional (i.e. performance based) livelihood enhancements (Sunderlin *et al*., 2014). Conditional livelihood enhancement interventions also generated the highest levels of proponent satisfaction with their own performance (Sunderlin *et al*., 2014).

Measurement, Reporting and Verification (MRV)

The technical engine of forest carbon production is measurement, reporting and verification (MRV) of carbon benefits. The core MRV attribute in REDD is carbon stock change within a set of measurement boundaries (geographic, temporal, chemical) that define the operational space of REDD implementation. This is because the core purpose of REDD financing is to help cause (through incentive payments) change in forest management that is beneficial to the atmosphere. Of particular importance to these financial stakeholders is additionality: to ensure that forest management change financed through REDD channels would not have occurred anyway.

To this end, REDD financing (and PES financing generally) tends to focus on comparing two contrasting trajectories of change:

1 Ecosystem conditions conservatively modelled into the future (based on historical data) under business-as-usual conditions (e.g. deforestation, forest degradation). This is called the 'baseline scenario' (without payments for ecosystem services).
2 Ecosystem conditions conservatively measured as project implementation progresses (e.g. forest protection). This is called the 'project scenario' (with payments for ecosystem services).

Measurement is conducted on the basis of a carbon measurement methodology approved by a carbon standard. If an approved methodology suitable for the project conditions is not available, then the project will need to develop and validate a new methodology. The approved methodology is then populated with local project data to develop the Project Description (PD) as a detailed proposal. This will include a baseline timber harvest plan to enable the calculation of baseline emissions and opportunity costs to forest rights owners. The PD is then validated (audited) to the methodology and standard. During the course of project implementation (e.g. a 30- to 50-year project), project monitoring results are presented in regular (e.g. 3- to 5-yearly) monitoring reports and subject to verification audits.

Validation and verification audit reports are sent to credit-issuing bodies (e.g. carbon

standards, or carbon registries), which then issue credits to the project proponent matching the credit volumes confirmed in verification audit reports. The carbon credits can then be sold. Once purchased, credits will either be transferred to the buyer's registry account (if the buyer is a trader or reseller) or retired. Credit retirement in a registry is the final act of consumption of carbon credits, where thereafter they can no longer be used or traded. This signifies the end of the life of the carbon credit and is analogous to the person who buys a rice commodity and eats it. The entity that retires the credit is the only entity that can legitimately use the credit in a carbon-related claim. As soon as an entity sells a non-retired carbon credit, they (including the originator of the credit) can no longer legitimately make a carbon-related claim associated with that credit because they have sold the rights to making that claim to the carbon buyer.

In this way, the cogs of ecosystem accounting are aligned with the cogs of commodity and financial accounting to create a marriage of ecology and economics inside the black box of forest carbon financing systems.

Commercial challenges

Having outlined the principles and approach of project-scale REDD, the focus will turn to some of the challenges faced by practitioners in the community-based REDD sector. Among the most significant are commercial challenges relating to market access and demand – both of which affect commercial viability.

Market access

A key factor determining market access is the standard applied to the project. The decision on what standard to apply is also driven by the availability of a standard for the particular project activity in question. Some forest carbon standards (e.g. Clean Development Mechanism, and Gold Standard) are only applicable to afforestation/reforestation activities (non-forest to forest land-use change). Whereas others (e.g. Verified Carbon Standard, Plan Vivo, ISO14064-2[3]) support a range of REDD activity types, including different forms of improved forest management (forest-remaining-as-forest), or reducing or avoiding deforestation (reducing/avoiding forest to non-forest land-use change).

Ideally, the standard applied will also enable the project to certify and verify the range of benefits delivered by the project. This is particularly relevant for community-based projects aligned to an ICDP-styled approach. Such projects will commonly deliver high biodiversity, social and cultural co-benefits, and community development outcomes of value not only to ethical project developers but also ethical buyers seeking to support community development and environmental protection.

Standards available for these kinds of projects include the Verified Carbon Standard (VCS), the ISO14064-2[4] standard (certifying carbon), the Plan Vivo standard (certifying carbon, biodiversity and community co-benefits), the Social Carbon standard, and the Climate Community and Biodiversity (CCB) standard (certifying non-carbon co-benefits only). When applying non-carbon co-benefit standards, however, a project will also need to apply a carbon-specific standard such as the VCS for the carbon element of the project. This can significantly increase project transaction costs unless operating at larger scales (e.g. tens of thousands of hectares). Projects could elect to apply the VCS only, but, in so doing, risk making any non-carbon biodiversity and community co-benefits invisible or at least under-represented in the certified value proposition to buyers.

The VCS is the leading forest carbon standard in the REDD sector, but can be prohibitively expensive to apply, particularly when a project or programme of activities involves the development of new methodologies. One of the reasons is that the VCS require all new methodologies to be double validated (costing approximately US$25 000 for each validation audit). A VCS project with a single new methodology will require approximately US$100 000 for auditing costs at start-up. Then if the project is delivering significant biodiversity and community co-benefits, it will need to gain additional co-benefit certification, further increasing auditing costs. This can be compared with the Plan Vivo standard, which certifies carbon, biodiversity and community benefits at approximately a tenth of the price of the VCS auditing component. These transaction costs are particularly relevant for community-

based projects that start at a relatively small scale (e.g. 1000–5000 ha).

Community-based REDD projects in the Asia Pacific region will typically need to target markets that have some geographical, trading and to some extent, cultural connectivity with the producer region. This is principally because voluntary buyers of carbon offsets attentive to positive community outcomes usually want to support projects that are closer to home or are connected with familiar geographies. The Australian, New Zealand, and to a lesser extent, European and North American markets are important sources of potential demand.

To access these markets, REDD projects will need to apply a supply-side carbon-offset producer standard (e.g. VCS, Plan Vivo, ISO) that is approved by demand-side carbon-offset consumer standards that influence purchase decisions by carbon buyers seeking carbon neutrality certification. The key demand sector in question for REDD projects are carbon offset buyers at scale – medium and large businesses seeking voluntary carbon neutrality certification. These buyers commonly want their carbon neutrality assertion to be certified to a carbon=offset consumer standard in order to minimise reputation risk. Such buyers will typically source carbon credits from a carbon credit reseller who will advise them about what credit types are eligible under carbon-offset consumer standards.

Examples of demand-side carbon offset consumer standards include the Australian National Carbon Offset Standard (NCOS), the International Carbon Reduction and Offset Alliance (ICROA) and the Quality Assurance Standards (QAS). These carbon-offset consumer standards impose quality controls upon buyers for: (i) carbon footprint measurement; and (ii) carbon offset supplies. This includes requiring offset buyers to purchase approved carbon offsets certified to a restricted range of carbon-offset producer standards (see Table 1).

Of the offset producer standards approved under ICROA, NCOS and QAS systems, only the VCS is available for REDD projects. So in order to gain access to mainstream carbon markets in Australia, Europe and North America, community-based REDD projects will need to apply the VCS for its carbon certification and then a co-benefit standard if they want to certify (and successfully market) their community and biodiversity co-benefits. But, as mentioned above, the combination of the VCS and co-benefit standards can be prohibitively expensive to apply (with a 10-fold increase in transaction costs compared with Plan Vivo), especially for community-based projects not backed by multimillion dollar grant funding and large organisations.

Table 1. Carbon-offset producer standards (available for REDD projects) approved by offset consumer standards

Offset producer standard	Offset consumer standard		
	ICROA[a]	NCOS[b]	QAS[c]
American Carbon Registry	✓		
Australian Carbon Farming Initiative		✓	
Australian Greenhouse Friendly Program		✓	
Australia's Carbon Price Mechanism		✓	
Climate Action Reserve	✓		
Kyoto Protocol	✓	✓	✓
Gold Standard	✓	✓	✓
Verified Carbon Standard (VCS)	✓	✓	✓
ISO 14064-2 Standard			
Plan Vivo Standard			

[a]International Carbon Reduction and Offset Alliance: http://www.icroa.org/index.php.
[b]Australian National Carbon Offset Standard: http://www.environment.gov.au/climate-change/carbon-neutral/ncos.
[c]Quality Assurance Standard: http://qascarbonneutral.com/carbon-offset-standards/.

The Plan Vivo Standard was developed out of an ICDP heritage and is perhaps the world's leading fair trade-styled community-based REDD carbon standard. Plan Vivo is cheaper to apply (lowering the bar to community participation in REDD), but is shut out of the main offset markets in Australia, New Zealand[5] and Europe by NCOS, ICROA and QAS-type rules (because these offset consumer standards do not approve Plan Vivo). One of the key reasons for offset consumer standards not approving Plan Vivo appears to arise from Plan Vivo (but not VCS) allowing *ex ante* crediting[6] for early stages of project implementation for some projects – this is to enable communities to generate cash flows early on in the project cycle as part of the project business model. This *ex ante* option

in the Plan Vivo system applies primarily to a cohort of projects established when Plan Vivo was pioneering forest carbon in the 1990s well before REDD (and other standards) came on the scene in the mid to late 2000s.[7] But Plan Vivo-certified projects, issuing carbon credits *ex post* (as with the VCS), remain ineligible under these carbon-offset consumer standards. This is because offset consumer standards tend to approve or reject a standard as a whole rather than differentiating between methodologies within a standard.

One solution for Plan Vivo certified projects is to retail directly to buyers not influenced by carbon offset consumer standards, such as corporate social responsibility (CSR) buyers interested in community-based rainforest protection rather than carbon, and small-scale offset buyers who are not seeking NCOS, ICROA or QAS-type certification. But this strategy requires projects to commit a much greater investment in sales and marketing (because they cannot easily sell wholesale through carbon resellers) for a market with unproven demand for the volume of REDD credits capable of being produced.

Another possible solution to this market access problem is to influence carbon-offset consumer standards and standard-like entities sufficient to enable producer standards like Plan Vivo to be approved. But attempts by the author and colleagues to move this forward have not thus far succeeded. Alternatively, projects could opt to buy cheap Kyoto Protocol credits (e.g. Certified Emission Reduction units or 'CERs' from large-scale energy projects) and bundle them tonne for tonne with their own fair-trade-styled credits certified to Plan Vivo. These bundled units (two tCO_2e, but sold as one tCO_2e) can (in theory) access NCOS, ICROA and QAS-approved markets where Kyoto Protocol units are accepted. Under these conditions, boutique 'top shelf single malt' community-based rainforest carbon credits that deliver a broad range of high priority outcomes according to society's need analysis[8] become reduced to a non-carbon co-benefit attached to (approved) cheap 'bottom shelf cardboard' carbon.[9] But for some projects, this will be the only way to access these markets – provided there is any real demand and at prices that can cover project costs.

This strategy can also be used to bundle carbon for the compliance carbon market, but compliance carbon buyers are more often likely to want commodity carbon at the lowest prices rather than boutique products at higher prices. This is because compliance buyers are compelled by regulation to buy, whereas voluntary (e.g. carbon neutrality) buyers are already self-selecting in favour of environmental leadership.

Demand

This leads to another commercial challenge endemic to community-based REDD projects relating to demand and pricing. International carbon prices are driven by supply and demand and go up and down with the times. But community-based carbon-financed rainforest protection activities are usually contingent on offering forest-rights owners a realistic alternative development option that adequately addresses the opportunity costs of giving up the property right to logging or land clearance.

This does not pose a problem when the global mean carbon price rises, but does pose a problem when it drops – average prices for REDD carbon went from US$7.40 to US$4.20 between 2012 and 2013 (Peters-Stanley *et al.*, 2014). In contrast, the 2014 indicative break-even wholesale unit price for three REDD projects developed by the author were US$10.03, US$10.18 and US$9.39, respectively. The global average price for REDD carbon would not even cover the timber opportunity costs in these projects. It is worth noting that the supply-side MRV and transaction criteria (and associated costs) required to comply with international carbon-offset consumer standards (e.g. NCOS, ICROA and QAS) were originally conceived when carbon prices were considerably higher than at present, with bullish expectations of enduring or rising prices under assumptions of increasing public recognition of the social cost of carbon.[10] Furthermore, community-based REDD projects maturing in 2016 will have taken several years to develop, with the economic outlook at the start of project development being considerably better than the point when their first credits can be issued. For example, the author is involved in four community-based REDD projects certified to Plan Vivo in Fiji, Vanuatu and the Solomon Islands. Project development for this set of projects began in 2009, but first issuance is not due until late 2015.

During the last decade, the global financial crisis turned many governments away from ambitious climate change mitigation policies, reflected in over-allocation of allowances to carbon-intensive industries in the compliance carbon market. This helped the carbon price to plummet to levels that make the commercial prospect of forest carbon projects look ridiculous in comparison with conservative estimates of the Social Cost of Carbon, timber opportunity costs, project MRV and transaction costs, and competing prices. At the time of writing, offset buyers could source Kyoto Protocol compliant offsets (CERs – approved credit types under NCOS, ICROA and QAS) for US$0.15 per tonne[11]. In contrast, CER prices during the early stages of market development were around US$10–20 per tonne. Allowances in the European Union Emissions Trading System (EU ETS) peaked in April 2006 at US$36 per tonne, with enthusiastic 2007 projections of CER prices rising in EU ETS Phase II to between US$32 and US$57 per tonne (Capoor and Ambrosi, 2008). The 2007 CERs from projects with high sustainability and community benefit profiles were then trading at around US$18 (Capoor and Ambrosi, 2008) – i.e. around the time that forest carbon-offset producer standards like the VCS were being established.

Even when unit prices are sufficient to meet project costs, this only works in practice when a project sells all of the credits that it produces at each (e.g. 3 yearly) issuance. Respondents to a 2013 annual global survey of the voluntary carbon markets signalled that (in aggregate) 31.8 million units remained unsold by the year's end (Peters-Stanley *et al*., 2014). An underdeveloped market where intergovernmental and domestic policy has failed to stimulate demand has led to a situation where credit supply is forecast to outstrip demand by a considerable margin. According to the Interim Forest Finance project (IFF 2014:1), 'There is currently no source of demand that will pay for [the total supply of] medium to long-term emission reductions from REDD+ in the period between 2015 and 2020'. Similarly, an analysis by Conservation International (2013) suggested that the existing REDD project pipeline would produce an oversupply of credits at a rate of 55 $MtCO_2e$ per annum by 2014 onwards.

The combination of barriers to market access and insufficient demand signals an additional source of financial risk for credit producers relying on: (i) adequate unit prices; and (ii) sales of all units issued to their project to cover all costs of production and opportunity costs. This raises an interesting challenge for forest conservationists seeking to engage rural communities with the proposition of selling carbon instead of timber to finance rural development. It shows that there is considerable risk in contemplating a shift away from conventional logging and land clearance. In contrast, the same communities can be confident that markets for timber and agricultural commodities are far more stable.

If forest-rights owners are not alerted to these potential risks, then projects will fail to meet the criteria of free, prior, and informed consent (FPIC) demanded of any self-respecting project, some carbon standards and many market watchdogs. Once they are fully aware of these challenges, one could hardly blame forest-rights owners for seriously questioning REDD as a realistic commercial proposition set against a backdrop of compelling economic development needs among rural communities in developing countries. The irony is that for REDD to work even at a small (i.e. project) scale, it needs to attract participants who are making decisions on land use and land-use change based on commercial criteria. In a recent survey, Sunderlin *et al*. (2014) reported that some REDD project proponents have been reluctant to offer conditional livelihood support (i.e. performance-based incentive payments) because of the very real risk of future funding or markets not being able to deliver on such promises. The same survey found that performance-based payments were the single most important success factor, while the disadvantageous economics of REDD was second only to land tenure as the most significant challenge.

Payments for ecosystem services present a valuable contribution to environmental financing. The effort that forest-carbon-market actors have put into the commercial financing model for REDD has helped to unlock significant volumes of new private sector finance for rainforest protection, and built valuable infrastructure and protocols for performance-based payments for protecting and enhancing high-priority ecological infrastructure. For many

practitioners though, the early action called for by the intergovernmental REDD policy community is being rewarded with a failing market amid policy indifference, despite social entrepreneurs and rural forest-rights owners taking considerable risks for the global common good.

Some can correctly argue that governments have invested billions into REDD. US$4.5–6.1 billion was pledged by Annex I countries in 2010–2012 (IFF 2014). The majority of this, though, is allocated to national-scale capacity building (and expectation raising) for developing country governments – not performance-based payments for measurable carbon stock change on the ground. The policy backdrop is an intergovernmental mechanism to finance REDD outcomes (not just REDD capacity building) that has stalled and stagnated. As a result, the resourcing of REDD capacity building in developing-country governments is akin to financing pre-season training for a sporting tournament that all indicators suggest may never happen. If a larger proportion of REDD readiness funding were allocated to buying credits directly from REDD projects, then not only would projects gain a valuable source of demand, but they would provide valuable opportunities for developing-country governments to grasp not just the technical realities of REDD (which tend to be the focus of forestry departments), but the economic and commercial realities up and down the value chain.

The role of government in stimulating demand

This section explores the potential role governments can play in bridging the widening gap between supply and demand in the REDD financing sector.

There is a common misconception that REDD is synonymous with carbon trading. It is not. REDD stands for 'reducing emissions from deforestation and forest degradation'. How it is financed is open to many financing strategies, from government-imposed policies and measures, to grants, funds or market-based instruments. Similarly, payments for ecosystem services using carbon credits are not synonymous with market instruments either, although market-based finance is an option. Funds sourced from public sector money can be established to buy carbon credits from REDD projects. The Carbon Fund of the World Bank Forest Carbon Partnership Facility is an example (but operates at a national rather than project scale).

Performance-based, *ex post*[12] funding models are gaining ground in public-sector financing because they represent a lower risk investment with higher impact returns compared with more traditional *ex ante* funding models. An example is the social impact bonds model now gaining momentum in the UK, Canada and New Zealand.[13] It is clear, though, that there is insufficient motivation in the global private sector to invest in the production of ecosystem services at the current or potential rate of supply. This underscores the need for governments and multilateral organisations to start playing a more proactive role in supplying funds to purchase certified credits directly from REDD projects. This can happen ahead of the crediting phase of national scale REDD programmes operated by developing-country governments, and nested within the latter should they ever get to the international or intergovernmental crediting phase. Furthermore, for Pacific Island countries (populations of a few hundred thousand people), a well-managed project-scale/programmatic approach operated by the private sector and community organisations could conceivably cater for the national need for REDD outcomes at a much lower administrative, logistical and capability cost than participating in a national-scale intergovernmental crediting instrument.[14] After all, Pacific Island governments do not normally participate in timber production or forest product commercialisation – they usually leave this to the private sector and focus instead on regulating forestry. The same could apply to creating and selling carbon assets instead of timber assets from their rainforests.

Governments of industrialised countries also need to stimulate demand in their private sector through policies and measures imposed on emitters, together with facilitating a reduction of financial risk for institutional investors contemplating investing in clean development. One way to do this is to include project-based REDD credits as legitimate units in domestic emissions trading schemes, which require only national level legislation rather than an intergovernmental agreement. At present, the domestic compli-

ance schemes include the EU ETS, Australia's Carbon Farming Initiative, the New Zealand Emissions Trading Scheme, California's Cap-and-Trade programme,[15] Quebec's Cap-and-Trade Scheme, the Regional Greenhouse Gas Initiative (USA), and Japan's Cap-and-Trade Schemes (Tokyo and Siatama) – none of which yet allow trade in REDD credits (IFF 2014). Creating new demand in these markets would be necessary to accommodate REDD credit volumes, but could be brought about by including sectors not currently covered by the Kyoto Protocol (e.g. international aviation and international marine transport sectors).

When one considers the scale of the climate change mitigation and adaptation task (not to mention the task of biodiversity conservation, flood protection, drought mitigation and the myriad of other ecosystem services provided by rainforest ecosystems), there is simply insufficient finance at the disposal of the global public sector to meet this challenge (alongside all the other demands on taxpayer funds). For example, a report commissioned by the United Nations Foundation and the Asian Development Bank (Ward 2010: 4) assessing the financial requirements to meet the global climate change mitigation challenge concluded:

> To have any chance to peak global emissions in the next decade and be on a 2°C path, in the next ten years we need to invest over 2 trillion dollars in new zero and low carbon energy infrastructure and another over two 2 trillion dollars in energy efficiency.

It stands to reason that private sector funds are needed to help meet the global climate change and rainforest protection challenge (see Dixon and Challies, 2015, this issue). This will necessitate redirecting a significant proportion of private sector investment into clean development. The global fund management industry managed over $80 trillion in investment funds at the end of 2008 (i.e. after large reversals associated with the global economic crisis of that year) (Ward, 2010). This amount increased slightly by the end of 2012 to around $85 trillion (TheCityUK, 2012). A significant proportion of these funds are currently invested in relatively liquid asset classes (i.e. potentially available for clean development), but there are important investment barriers to overcome for clean development proponents. These barriers relate to financial risk. Clean development activities usually carry more financial risk than traditional (unsustainable) development. This is because clean development often comprises technical and social innovations charged with uncertainty due partly to lack of support from institutions, policies, subsidies and political economies (but the opposite is true for many forms of dirty development).

More conservative institutional investors such as pension funds, insurance funds and sovereign wealth funds are mandated to avoid risk, and as a result can supply funds at relatively low cost of capital – interest rates potentially within reach of clean development innovators (Ward, 2010). But clean development in the form of rainforest protection carries significant financial risk as illustrated in the previous section. This risk profile lies above the risk threshold tolerable to many conservative institutional investment stakeholders. In contrast, less conservative investment stakeholders commonly have a greater appetite for risk, but they charge higher interest rates as a result, and this pushes the cost of capital to a level above the threshold that many clean development proponents can endure. This creates a two-sided structural gap in green investment (Ward, 2010) and represents a core challenge for unlocking private sector finance at scale for the REDD sector.

While private sector investment will be a necessary component of REDD financing, it is also clear that such investment will require support by governments to help manage (and lower) investment risk. There is a compelling need for public policy innovations capable of lowering the risk backdrop to clean development investments by the global private sector, and particularly for investments in developing countries (where interest rates on borrowing tend to be much higher than in the Organisation for Economic Co-operation and Development (OECD)). An example of how governments can lower investment risk to unlock private sector capital for rainforest protection is to provide collateral (i.e. carry risk) to enable private sector lenders to offer secured loans to REDD projects for project development. The combination of government-stimulated demand and investment finance at scale will help to overcome the

current financing crisis in REDD and other forms of clean development.

At a larger scale, the exchange of value between two parties needs not be restricted to money. For example, bilateral agreements have long been available for such exchanges between nations. Developing countries support rainforest ecosystems of significant value to the global climate system. Concurrently, industrialised countries will fail to bring about any significant change in global greenhouse gas (GHG) emission trends if they fail to tackle the problem of tropical deforestation.

REDD potentially provides a framework for North–South bilateral trade negotiations between rainforest nations and their OECD trading partners. Consider, for example, the possibility of a strategic trade agreement between a group of rainforest nations and a group of key trading partners that enabled the former to beneficially alter its terms of trade and market access for strategic exports. Such an outcome could significantly shift the fortunes of the developing country group, causing a positive shift in key development indicators such as the millennium development goals. Such a transformational outcome in the rainforest sector is not inconceivable in international politics, with ambitious bilateral initiatives looking increasingly necessary as the multilateral UNFCCC-REDD process continues to underperform.

Conclusion

The economic deck has been stacked against forest conservationists for a long time. The arrival of carbon trading through REDD financing models has the potential to change this. The broader economic forecast for community-based REDD practitioners aware of the global situation is drought. But in spite of this many continue because of a dedication to forest conservation and community development, and the hope that there will continue to be pockets of opportunity. But to significantly shift the drivers of deforestation and forest degradation, some key barriers still need to be overcome, some of which have been highlighted in this paper. Of particular importance is the need to overcome barriers to market access, and stimulating sufficient demand to meet current and future supply of carbon credits from REDD activities.

The advances made in forest carbon-markets since 2005 are clearly a valuable step as part of a larger equation that includes policies and measures, and economic instruments. But these gains will lose momentum unless a more effective partnership is enabled between the public and private sector, and between rainforest nations and industrialised counterparts. Without transformational change in the political economic support for deforestation and degradation drivers, REDD proponents run the risk of gaining top marks for effort, but ultimately failing to make serious headway swimming against an unchanging current. Ultimately, there will be little in the way of realistic government and rural community interest to support REDD at scale, until the tangible economic development value of REDD activities trumps the value of business-as-usual.

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Notes

1 BosmaWilko Bosma, Natural Resources Development Foundation, Solomon Islands pers comm. 14/11/2014.
2 See Amazon Fund website: http://www.amazonfund.gov.br/FundoAmazonia/fam/site_en/.
3 Note that the VCS and Plan Vivo standard specifically relate to forest carbon, whereas the ISO14064-2 standard is a generic, non-specific carbon project standard that can be applied to forestry activities.
4 The ISO14064-2 standard is somewhat unpopular among buyers and some registries because of its generic character, and lack of detailed requirements in some areas relevant to forest carbon projects. For example, Markit Environmental Registry no longer lists ISO14064-2 forestry projects for this reason (Joanna Silver, Director, Markit Environmental, pers. comm., 2012).
5 New Zealand does not have a carbon offset consumer standard as such, but the market leader in carbon neutrality certification is the CarboNZero Program (run by a government-owned company), which requires its buyers to purchase Kyoto compliant credits – excluding the entire voluntary carbon market supply chain (Ann Smith, CEO CarboNZero Program, pers. comm., 2013).
6 *Ex ante* crediting involves issuing carbon credits prior to outcome delivery (e.g. issuing 2016–2018 vintages in 2015). *Ex post* crediting involves issuing carbon credits after outcome delivery (e.g. issuing 2012–2014 vintages in 2015).

7 Chris Stephenson, CEO, Plan Vivo Foundation, pers. comm., December 10, 2014.
8 For example, poverty alleviation, biodiversity protection, climate change mitigation, climate resilience, flood and drought mitigation, and water quality.
9 In theory, bundling NCOS/QAS-unapproved rainforest VERs with high-quality compliance credits is still an option, but in practice this will likely push the price of the bundle to a point so far above competitors that very few buyers would be willing to pay.
10 For example, the US EPA conservatively estimated the Social Cost of Carbon (SCC) for 2015 to be US$61, assuming a 2.5% discount rate (EPA, 2013). The SCC estimates the economic damage caused by GHG emissions and the value of damages avoided as a result of emission reductions. The IPCC Fourth Assessment Report noted that the SCC likely underestimates the cost of damages (EPA, 2013).
11 Craig Milne, Associate Director, Commodities, Carbon and Energy, Financial Markets, Westpac Institutional Bank, pers. comm., November 26, 2014.
12 *Ex post* funding is where funds are received after the targeted outcomes have been delivered. *Ex ante* funding is the opposite.
13 See Cabinet Office (UK) (2013) for a description of social impact bonds.
14 This option for Pacific Island country REDD programmes is included as an option in the Pacific Islands Regional Policy Framework for REDD+ – of which the author of this paper was the lead author (see Secretariat of the Pacific Community, 2012).
15 California has a Memorandum of Understanding (MOU) with the state of Acre (Brazil) and Mexico to facilitate REDD trading through the California Cap-and-Trade Program, but no transactions had occurred at the time of writing. *Source*: http://www.v-c-s.org/news-events/news/vcs-sees-redd-california-carbon.

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