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Missing the forest for the trees? Navigating the trade-offs between mitigation and adaptation under REDD

Micah L. Ingalls [1] · Michael B. Dwyer [2]

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Abstract Forested landscapes play a critical role in mitigating climate change by sequestering carbon while at the same time fostering adaption by supporting ecosystem services, the recognition of which is reflected in the recent Paris Agreement on climate change. It has been suggested, therefore, that the conservation of forested landscapes may provide a potential win-win in the fight against global environmental change. Despite the potential synergies between mitigation and adaptation efforts, recent studies have also raised concerns about possible trade-offs. Our research employs the analytic lens of social-ecological resilience to explore the intersection between mitigation and adaptation in the context of a Reduced Emissions from Deforestation and forest Degradation (REDD) project in Lao PDR. Drawing on ecosystem analyses, group discussions and interviews with policy makers, practitioners and resource-dependent communities, we identify three potential limitations of REDD for achieving climate synergies. First, by disrupting existing disturbance regimes, REDD interventions run the risk of reducing diversity and structural heterogeneity and thus may undermine functional redundancy core to resilience. Second, REDD-as-practiced has tended to select local, rather than structural, drivers of deforestation, focusing disproportionately on curtailing local livelihood practices, reducing local resources for adaptation. Third, REDD risks redirecting ecosystem service benefits away from local communities toward state agencies, incentivizing recentralization and limiting the scope of local governance. We argue that REDD's potential for delivering synergies between climate change mitigation and adaptation in Laos is currently attenuated by structural factors rooted in development policies and broader political-economic trajectories in ways that may not be legible to, or adequately addressed by, current programmes and policy.

✉ Micah L. Ingalls
mli6@cornell.edu

Michael B. Dwyer
dwyerdwyer@gmail.com

[1] Cornell University, Ithaca, NY, USA

[2] Centre for Development and Environment, University of Bern, Bern, Switzerland

1 Introduction

Leading up to the 21st Conference of Parties (COP21) in Paris, there was a growing consensus that climate interventions must seek not only to mitigate the extent and severity of climate change, but also support adaptation leading, in the final text of the climate deal, to an acknowledgement of 'alternative' Joint Mitigation and Adaptation approaches and the non-carbon benefits of reducing deforestation and forest degradation. This represents a significant step forward for while both mitigation and adaptation are about reducing the risks of climate change and thus share common long-term goals, they have seldom been brought together explicitly within policy frameworks (Biesbroek et al. 2009; Dang et al. 2003). The conservation of forested landscapes in the Global South has thus been highlighted as a way to bring together mitigation and adaptation for a win-win; mitigating climate change through carbon sequestration as well as ensuring the provision of ecosystem services that underlie the adaptive capacities of forest-dependent communities (see for example Locatelli et al. 2011; Mbow et al. 2014). There are, however, some obstacles (Moser 2012). In forest systems, important trade-offs may exist between carbon sequestration and biodiversity values (Gilroy et al. 2014), local livelihoods (Bluffstone et al. 2013) and tenure security for forest-dwelling communities (Awono et al. 2014), problematizing the notion of a simple win-win through carbon-based approaches to forest governance (Buizer et al. 2014; Klein et al. 2005).

In this paper, we analyse synergies and trade-offs under Reducing Emissions from Deforestation and Degradation (REDD) within a forested landscape in the Lao People's Democratic Republic (Lao PDR or Laos) to ask in what instances proposed interventions for climate mitigation under REDD support climate resilience, and what circumstances are likely to produce conflict between these objectives? We focus our attention on how REDD is framed within the context of specific projects, not on what REDD says it will do in theory, thus making an analytic distinction between REDD-in-policy or rhetoric and REDD-as-practiced. This analytic dualism thus gives substance to the practical and material implications of forest governance through REDD (Arts and Buizer 2009). Interrogating the complex interactions between climate mitigation interventions and the adaptive functions of forested social-ecological systems, we draw on an analytic framework that conceptualizes this forested landscape as a conjoined social-ecological system, allowing us to go beyond dyadic trade-offs between individual system components (such as with biodiversity and carbon values) by elucidating those deriving from macro-scalar, interactive and dynamic processes that underlie the resilience of the system to climate change (Berkes et al. 2000).

Resilience in the context of climate change refers to the ability of a system to recover from and adapt to changing social-ecological conditions emerging from the interactive effects of both climate and non-climate drivers. Ecosystem services[1] provide the necessary basis for social-ecological system functions. The ability of ecosystems to provide these services under changing climatic conditions depends to a large degree on the ability of that system to respond (i.e. be resilient) to change drivers without loss of these service functions. Among other factors, climate resilience relates to the degree of diversity of system elements, allowing for functional redundancy amongst species assemblages such that changes in species diversity or the loss of individual species does not affect ecosystem functions (Loreau 2004) and response-diversity (Groffman et al. 2006) in the face of changing climatic conditions. This functional

[1] Such as the provision of clean water, extractable resources of food and fodder, pollination and pest regulation, etc.

diversity relates both to ecological elements (such as biodiversity) as well as social elements (such as diversified livelihood strategies).

In addition to diversity (and related to it), climate resilience is also supported by flexibility and mobility of system elements to adapt to spatially and temporally distributed impacts and resource abundance (Adger 2001) and to maintain desirable ecosystem service functions under changing conditions (Norström et al. 2014). Mobility and flexibility in ecological system components may involve migration or adaptation of species' range. In social systems, this may similarly involve migration and changes in use-environments for agricultural production or movement out of climate-impacted sectors. Resilience is a function, however, not only of these endogenous elements and processes but also exogenous forces, inter-scalar dynamics and macro-scalar change drivers rooted in environmental, social and economic processes (Carpenter et al. 2001).

Across these endogenous and exogenous factors, governance plays a key role in adjudicating trade-offs between various costs and benefits. In this, both the locus of decision-making and the structures of accountability that support it are critical. Devolved governance is in general believed to enhance resilience by positioning local resource users as central decision-makers (Adger et al. 2006), while transparent and equitable governance conditions foster social capital and positive norms of cooperation. A multi-country study, for example, found that the quality of governance (rather than technological or financial variables) was the most consistent predictor of national adaptive capacity (Berrang-Ford et al. 2014). Understanding how REDD programming might impact climate resilience involves an analysis of how specific proposed interventions enable or constrain the governance dynamics described above.

Our analysis suggests that while REDD-as-practiced may achieve some synergies for climate resilience, its conservative and regressive application in practice may also undermine complex processes that foster climate resilience at the local level. By neglecting structural drivers of forest change rooted in the broader political economy and focusing unhelpfully on restricting local forest uses, current REDD programming may undermine elements of system resilience and thus achieve limited synergies with adaptation.

2 Research setting and approach

Our research focuses on a case study in the 1498 km^2 Xe Sap National Protected Area (NPA), in the Annamite Mountain range along the border between Laos and Vietnam (Fig. 1). Xe Sap is located within Sekong and Salavanh Provinces in southern Laos, both of which were identified by Laos' National Adaptation Programmes of Action (GoL 2009) as priority provinces due to high risks of climate change impacts such as increased mean annual temperatures and flood risks (GFDRR 2011). The NPA is largely forested comprising of a mix of Dry Evergreen Forest, Mixed Deciduous Forest, and areas dominated by tropical Dipterocarp species. It is significant for conservation and livelihoods values due to its unique ecosystems, high degree of biodiversity including a number of large mammal species of global and regional conservation significance (Timmins and Vongkhamheng 1996), and its substantial resources that support more than 15,000 individuals, primarily from the Pako, Katang and Ta-Oy ethnic groups.

In order to conserve Xe Sap and the forested landscapes which adjoin this area in Vietnam, the World Wide Fund for Nature (WWF) and the Government of Laos initiated the US$9 million transboundary Carbon and Biodiversity (CarBi) Project in 2011. As one component of

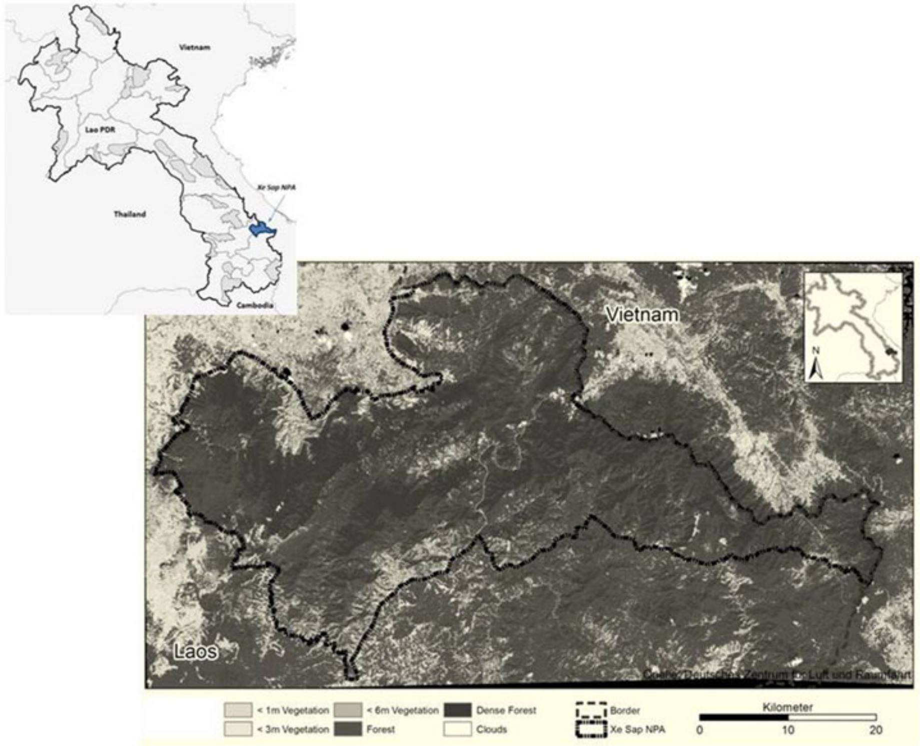

Fig. 1 Xe Sap NPA Forest Cover (adapted from Bender 2013)

this project, WWF commissioned the consultancy company Forest Carbon to undertake a REDD Feasibility Study using Voluntary Carbon Standards' (VCS) Methodology for Avoided Unplanned Deforestation. Remotely-sensed imagery was obtained from 2001 and 2011 in order to develop the baseline carbon emissions rate for the 10-year period leading up to the initiation of the study, supplemented by driver analyses and field visits with government officials.

Our research draws on WWF's (2013) Feasibility Study's identification of forest change, drivers, and proposed interventions. In order to set these analyses and proposed activities against the ecological dynamics of Xe Sap, we reviewed published and unpublished biodiversity and habitat surveys and species range studies carried out during the 1990s (particularly that of Timmins and Vongkhamheng 1996) and in the 2010s (Timmins and Duckworth 2013), as well as field surveys carried out by WWF staff during the CarBi Project. We reviewed sociocultural and economic data provided by government staff, local development workers and, especially, data procured during participatory rural appraisal (PRA) research carried out by Village Focus International (VFI) in ten villages within the NPA. PRA research involved household representatives and village leaders (n = 282), identifying livelihood patterns, socioeconomic information on household incomes, resource governance and spatial patterns of use, and village histories. Oral data was collected through note-taking and flipcharts, while community maps were hand-drawn by community members and collected. We supplemented community data with semi-structured interviews involving government authorities (n = 7) and conservation practitioners (n = 10) which were carried out between 2012 and 2015. This data was analysed to elucidate current livelihood strategies, drivers of change and existing and proposed mitigation activities and how these may interact with or shape the social-ecological system.

3 Results

Local communities adjacent to and within the NPA exhibit a high degree of reliance on local natural resources, with 100 % of local participants reporting that agriculture is their primary occupation. Rice, the staple diet, is largely procured through shifting-cultivation on communal lands along low and medium-elevation slopes and secondarily from privately-owned paddy fields along stream margins, supplemented through the management and collection of Non-Timber Forest Products (NTFPs). According to local communities, 121 animal species and more than 50 species of wild plants are used, distributed diffusely across portions of the NPA but primarily within swidden[2] fallows and secondary forest mosaics. Remittances from economic migrations and the sale of NTFPs, poultry, small livestock and scrap metal remaining from the Indochinese Wars constitute the primary sources of household income, supplementing insufficient rice harvests and providing resources for expenses such as clothes, medicines and school fees. According to local participants, historic settlement patterns and the spatial dimensions of agricultural activities have been highly fluid. Village establishment, abandonment and relocation have been prompted by exogenous factors such as armed conflict during the 1960s and 70s and government resettlement programmes aimed at eradicating shifting cultivation (particularly in the 1990s), as well as endogenous factors such as movements toward resource-rich forest areas. Communities reported that shifting cultivation takes place on a rotational basis in old fallows and secondary forests within village territories, often several kilometres distant from the village centres, intercropped with vegetables, herbs and other crops, with fallow areas providing NTFPs and wildlife for consumption and sale.

Mature, contiguous forests systems dominate upland areas. In 2011, mature forests constituted 81.4 % of land area within the NPA, while fallow vegetation comprised an additional 16.6 %. Analysis of RapidEye imagery indicated that while the amount of forest has decreased at an average rate of 0.28 % per year since 2001, there has been a general increase in the rate of deforestation in recent years. During the period from 2010 to 2011 alone, the rate was closer to 0.43 % (Bender 2013). While hydropower development, agricultural and mining concessions, and the expansion of road networks within and adjacent to the NPA were determined to constitute significant threats to forest conditions (WWF 2014) and causal factors displacing shifting cultivation into the NPA (for example, where communal agricultural lands in Atouk village were given in concession to a Vietnamese rubber plantation company, local farmers had to clear land for shifting cultivation within the NPA, see WWF 2013), these were authorized by government authorities and thus did not constitute 'unplanned' drivers of deforestation under the selected VCS methodology as interpreted within the context of this project.[3] Consequently,

[2] In this paper we use 'shifting cultivation' and 'swiddening' interchangeably.

[3] While the distinction between 'planned' versus 'unplanned' deforestation is critical within the VCS methodology—which seeks to avoid incentivizing intentional state-sanctioned deforestation that would drive up deforestation rates and thus potential carbon revenues—it is complex and debated. In the context of this feasibility study, and consistent with the way this is assessed in projects in Laos, 'planned' deforestation is considered to result from activities for which any written permission by government authorities is available, though it is often not possible to establish whether permission is consistent with law.

the Feasibility Study identified shifting cultivation as the primary driver of unplanned deforestation, citing a draft of Bender's (2013) logging study to support the contention that it accounted for up to 70 % of total deforestation in Xe Sap. With a view toward curtailing shifting cultivation as the project's selected driver of unplanned deforestation, the Feasibility Study recommended Land Use Planning (LUP), boundary demarcation, patrolling and law enforcement as the most efficient mechanisms to curb emissions and enhance carbon stocks. These mechanisms reduced the amount of forested areas used for shifting cultivation in favour of short-fallow swiddening and intensified, settled agricultural activities. In order to address drivers of deforestation resulting from planned events (those authorized by the state) that were not included in the proposed REDD project, WWF developed parallel activities including transboundary law enforcement, timber trade analyses, and protected area management. These complementary activities were funded by German government sources until the end of 2015.

In keeping with current government direction and common practice (see Dwyer and Ingalls 2015), the national-level Department of Forest Resource Management (DFRM) was identified as the proponent for this project,[4] though this has not yet been made explicit within the Feasibility Study or associated project preparation documents. Potential revenue from the sale of carbon credits would cover the costs of management interventions and patrolling activities, which are currently infeasible given limited government financing, due to the remoteness of the area and the cost of access. Any funds remaining from these management activities and the costs of monitoring, reporting and verification (MRV) would presumably be used to compensate local communities, though this was not made explicit and no benefit-sharing arrangement was proposed.

Based upon current carbon pricing under the voluntary market, the Feasibility Study indicated that revenues from carbon sales would be insufficient to cover the costs of carrying out a REDD project and associated MRV. As of 2015, WWF has determined to delay proceeding with the proposed REDD project until carbon market pricing is sufficient to justify the investment, but has continued with REDD preparation activities and capacity building for government agencies as well as exploring alternative Payment for Ecosystem Services (PES) opportunities.

4 Discussion

4.1 Synergies and trade-offs

The proposed REDD pilot project in Xe Sap NPA provides an opportunity for reflecting on the ways in which forest values and threats to these values are addressed within existing REDD practice and allows us to interrogate how REDD may shape the relationship between mitigation and climate resilience within a particular local social-ecological system. In addition to supporting climate mitigation through the enhancement of carbon stocks, interventions proposed to conserve forest biomass under the REDD pilot project in Xe Sap may also promote ecosystems services such as water regulation and the diversity and abundance of those species suited to mature forest ecosystems. Potentially-improved water regulation by enhanced forest cover in select areas would be expected to buffer stochastic variation in precipitation patterns

[4] The agency responsible for delivering the proposed REDD pilot project, and also the primary beneficiary of revenues generated by the sale of carbon credits.

by mitigating the severity of both flood and drought periods for downstream communities, moderating climate conditions (see also Bonan 2008) and stabilizing sloping areas against landslides and catastrophic erosion.[5] Potential increases in the abundance of forest-loving species may support overall resilience and enhance the provision of some consumable resources for local communities during periods of food insufficiency resulting from climate-related disturbances to agricultural production such as floods and droughts.

While these co-benefits for adaptation in the project indicate potentially important climate synergies consistent with other studies (e.g. Guariguata et al. 2008), there may also be important trade-offs, which we explore below. First, by disrupting existing disturbance regimes stemming from shifting cultivation, proposed REDD interventions may risk undermining key processes underlying biodiversity and landscape structural heterogeneity. Second, we will look at how the selection of local drivers of forest change rather than larger structural drivers of change, potentially undercut opportunities for climate synergies by allowing business-as-usual forest governance. Finally, we discuss how REDD may undermine local governance by incentivizing (re)centralization by changing ecosystem values streams from largely local (based on current livelihood patterns) to carbon-based values accruing to the central state.

4.2 Disruption of shifting cultivation as a key disturbance regime

Within Xe Sap, shifting cultivation constitutes a key interface between social and ecological system components, supporting local livelihoods not only through the provision of rice but also through the provision of NTFPs. Shifting cultivation's cycles of production and fallowing provide a disturbance regime that has played a key structuring role in the historical ecology of the system (see also Turner 2005), maintaining a mosaic of cropped and fallow lands and successional forests across the landscape. While intensive agricultural systems are relatively fixed in space and time and tend to establish permanent non-forest spaces, extensive shifting cultivation regimes are spatially and temporally mobile, capturing intermittent resource abundance and allowing communities to easily shift these agricultural spaces in response to changing ecological and climatic conditions (see also Fox et al. 2013) and arguably support more complex and varied functional relations to local communities due to their relatively higher degree of agrobiodiversity and species variance between cropped and non-cropped phases (Xu et al. 2006). Furthermore, as shifting cultivation represents a relatively minimal opportunity cost (versus permanent paddies or plantations), it has facilitated community migration away from other threats such as political instability and armed conflict (such as during the Indochinese Wars during the middle- and latter-20th Century) or movements in reaction to displacement events such as the agricultural concession of village lands for rubber plantations (such as in the case of Atouk village, above).

Shifting cultivation within the otherwise largely forested landscapes of Xe Sap may also enhance biodiversity values. The logic underlying the supposed positive relationship between forest carbon enhancement and biodiversity is certainly a simplification. While the conservation or enhancement of mature forest under conditions of low forest cover may have positive impacts for biodiversity (by reducing disturbances and enhancing forested habitat and vertical

[5] It should be noted, however, that the degree to which shifting cultivation results in increased erosion and sedimentation and negative impacts on hydrologic flows—and thus whether its cessation would result in enhanced water regulation—is highly contingent on field-level practices and alternative land-uses. Studies have noted that these negative impacts of swiddening tend to be overstated (see for example Forsyth 1996, 1999).

structure), large, mature forest stands themselves are not uniformly beneficial for all. Forest-loving and canopy species may benefit from increases in large areas of contiguous forest cover, but edge-loving species tend to exhibit a negative relationship to decreases in the edge-area ratio of forest stands (Fahrig 2003; Turner 2005). Despite pressures from road expansion, hydropower, mining and agriculture, Xe Sap NPA retains a high degree of forest cover across a large landscape. By creating breaks in forest cover and a mosaic of differential successional stages and habitat patches, shifting cultivation at the landscape scale increases structural heterogeneity and habitat diversity (Finegan and Nasi 2004). The diversity of species assemblages within these heterogeneous shifting cultivation mosaics have been shown in many cases to be higher than under conditions of contiguous mature forest cover (Xu et al. 2009). Swidden systems incorporate a broad diversity of species and cultivars both within the cropping area as well as in fallows in order to provide for diverse dietary needs of shifting cultivators, to spread risk in the event of crop failure, and to distribute labour requirements (Hett et al. 2012; Schiller et al. 2006). Ethnobotanical surveys of similar upland swidden landscapes in the region found an average of 60–70 domesticated and semi-domesticated species in upland rice fields and a further 25 species which had been incorporated into adjacent fallow lands (Rerkasem et al. 2009), presenting a much higher degree of agrobiodiversity than intensive, sedentary agricultural alternatives. Similarly, wild species such as ungulates, wild pig, a number of edge-loving species of birds and the predators of these species that are endemic to the project area such as large cats, show a marked preference for heterogeneous landscapes (Acevedo et al. 2006; Shrestha 2004). The diffusion of agricultural fields such as that created within shifting agricultural mosaics have been shown to maintain populations of pollinators and other species through the boom-and-bust masting cycles common to tropical Dipterocarp forests (Ickes 2001). Floral species assemblages may be similarly diverse. A biodiversity study in shifting cultivation areas found 418 plant species in fallows versus 319 species in nearby mature forest stands (Rerkasem and Rerkasem 1995), strongly suggesting that swidden landscapes compare favourably with mature forest stands for a number of biodiversity values. Given the foundational role that biodiversity (both wild and agricultural) plays in maintaining system resilience and the provision of ecosystem services, there is reason to question whether proposed REDD interventions to curtail shifting cultivation as a landscape-scale disturbance regime would in fact support, rather than undermine, the resilience of the social-ecological system.

4.3 Local versus structural drivers of forest change

Proposed REDD interventions in this context may intersect ambiguously with the local livelihood strategies that adapt to changing conditions through flexibility and mobility in space and time. While traditionally-practiced long-fallow shifting cultivation is not considered to be an important driver of deforestation in Laos due to its impermanence and its use of fallow areas and secondary forests rather than mature forest areas (Thomas et al. 2009), it was nevertheless identified as a key driver of unplanned forest carbon loss by the REDD Feasibility Study for which LUP (alongside improved legal enforcement of land use plans and NPA boundary demarcation) would serve as the appropriate corrective measure. Such selections (of driver and mitigation measures) are consistent with the constraints of how REDD is framed (or understood) at the project level, engaging with change-drivers resulting from local actions but not those that originate in the State's planning mechanisms. It is worth noting, however, that focusing on shifting cultivation versus other drivers of forest change has a long history in the contestation between state interests and local forest users. Since at least

1986, when timber revenues comprised the principle source of income to the state treasury, shifting cultivation has been discursively framed as 'backward' and environmentally destructive by government authorities (Ireson and Ireson 1991). While there are few realistic alternatives to swidden in these areas (Alexander et al. 2010), authorities have nevertheless sought to eradicate it through legal bans, forced resettlement of villages engaged in shifting cultivation (Ducourtieux et al. 2005), increasing central state control over forested areas (Vandergeest 2003) and, most recently, through LUP wherein the amount of land allowed for upland agricultural production is limited to 3 ha per family and fixed to specific parcels that are too small to enable long-fallow shifting cultivation (Fujita and Phanvilay 2004). By proposing LUP, the REDD project hopes to reduce carbon emissions and enhance carbon stocks by reducing the amount of forested areas impacted by shifting cultivation, and promote sedentarization and agricultural intensification. This may create a number of problems. The extensive use of communally held forested areas for shifting cultivation and the productivity of associated NTFPs in Xe Sap depend upon long-fallow periods. The long duration of the fallow period allows for the accumulation of nutrients in biomass for soil fertility, suppression of weeds, and enhancing the diversity and abundance of NTFPs and other species. Short fallow systems resulting from state-regulated LUP are, by contrast, typically depauperate of biodiversity (Foppes and Ketphanh 2000; Rerkasem et al. 2009), exacerbate negative impacts on soil and water resources through increased erosion (Mertz et al. 2009) and, where the fallow period falls below a minimum threshold, have been predicted to prompt the collapse of the agroecosystem more generally (Foley 2009). Further, declining rice yields under short-fallow systems have been shown to significantly increase supplementary hunting pressures, affecting local biodiversity (Robichaud et al. 2009) and fostering unsustainable extraction of NTFPs. Increased pest and weed pressures and declining soil fertility under short-fallow and intensive agricultural systems require additional pesticide and other chemical inputs (Crissman et al. 2001), each with their own sets of environmental and social impacts which are particularly problematic within poor regulatory environments such as Laos.

On a structural-ecological level, the cessation of shifting cultivation within the largely forested landscapes of Xe Sap would be expected to lead not only to the simplification of livelihood systems but also habitat diversity and the rupture in key disturbance regimes, thus contributing to declining overall biodiversity (Cumming et al. 2006) and possibly paving the way for a regime shift in the social-ecological system (Scheffer et al. 2001). The simplification of these landscape mosaics and the segregation of 'social spaces' from 'nature spaces' through LUP in Xe Sap would further limit the diversity and spatial fluidity of complex functional interactions between social and ecological system components (see also Xu et al. 2006), reducing resilience (Carpenter and Brock 2004) and the spatial and temporal parameters conditioning social responses to climate change impacts (Folke et al. 2004). Where shifting agricultural areas are managed communally, and allow for inter-annual variation in the use of cropped lands per family, the privatization of lands through LUP and sedentarization may further restrict flexibility in the system (see for example Barney 2009).

The impacts of climate-related interventions are socially differentiated, wherein the poor may bear a disproportionate cost (Adger 2001; Alcorn and Royo 2007). The proposed project activities under REDD necessarily entail social impacts by disrupting traditional agricultural practices. While WWF has sought to compensate for these anticipated costs through the infusion of donor funding for livelihood activities, REDD's potential to achieve climate synergies beyond this initial period of supplemental funding is ultimately contingent upon its ability to compensate for these impacts rather than to externalize them. In theory, the proposed REDD project might utilize revenues generated through the sale of carbon credits to compensate forest users at a rate equal to or greater than alternative land uses, but it remains an open question whether carbon revenue will (1) be sufficient to meet this criterion and (2) if it is, will in fact accrue to local forest users. There is no clear consensus on whether REDD needs to be specifically pro-poor, or merely not harm the poor (Arts and Buizer 2009) and thus be no more than a poverty reproducer (Evans et al. 2014). Recommended social safeguards suggest minimal standards for ensuring appropriate compensation, but these are weakly developed within the REDD framework in general—and under VCS in particular (Gilroy et al. 2014)—and are poorly regulated in practice. While the project may consider certification under the Climate, Community and Biodiversity (CCB) standards, giving greater weight to non-carbon values and adopting more robust social safeguards, it is doubtful there will be compensation for customary land-uses not recognized by formal tenure or that these additional provisions may be more than instrumental concerns, marginalized in the cost calculations of carbon market efficiency (Melo et al. 2014).

Nevertheless, robust social safeguards and the inclusion of biodiversity values within the REDD project, however enhanced, cannot by themselves address the larger structural issues which impinge upon the social-ecological systems in Xe Sap. Like many historic forest conservation interventions, the proposed REDD activities focus attention on the proximate drivers of forest loss stemming from the traditional livelihood strategies of poor communities without adequately addressing the macro-scalar dynamics of forest change and governance rooted in the broader political economy, including road expansion and the proliferation of concessions for commercial agriculture, mining and hydropower to promote foreign direct investment. This presents a deep problem for achieving local climate synergies through the REDD project, not only because it fails to address structural drivers of deforestation but also because it prompts state managers to curtail local forest uses by providing direct financial incentives that are contingent on the degree to which the proposed interventions are achieved, potentially undermining local livelihoods and exacerbating tension between communities and the state, particularly where the benefits of carbon revenues may not reach the local level.

4.4 (Re)centralizing forest governance

Beyond what is described above, REDD may in this case present a particular structural obstacle to achieving climate synergies by prompting recentralization of forest governance. In the absence of external financial resources and incentives and given the remoteness of the NPA, active state administration of Xe Sap has been superficial at most, effectively devolving the governance of forest areas to local communities. In general, community (versus state) management of forests has been shown to achieve better protection (Persha et al. 2011), deliver greater co-benefits for local livelihoods (Chhatre and Agrawal 2009) and, by positioning local resource users as decision-makers, enhance resilience (Folke et al. 2002; Sandbrook et al. 2010). Forest governance reform movements in Laos in recent years have been moving toward institutionalizing decentralization (Chokkalingam and Phanvilay 2015). The REDD project risks redirecting resource flows away from local communities and toward government forest agencies and pushing governance in the wrong direction, slowing—or possibly reversing (Phelps et al. 2010)—decentralization of protected area management and undermining local adaptive governance by creating a monetary incentive for increased control over forest governance by central state authority (Larson 2011; Okereke and Dooley 2010).

5 Conclusion

REDD's potential to achieve synergies for climate adaptation in practice is attenuated by its tendency not to see (the complexities of) the forest for the (simplicity of its) trees. While it is well-recognized that forests are much more than carbon, operationally it is still assumed that other values—including those that undergird resilience to climate change—will be preserved or enhanced under REDD. This is doubtful. In some cases, REDD-as-practiced may reduce landscape heterogeneity and biodiversity by disrupting local disturbance regimes, undermine the resilience of local communities by simultaneously curtailing the diversity of available livelihood strategies and allowing structural drivers of change to remain unchallenged and, by incentivizing centralization, undermine adaptive governance. REDD would be better positioned to achieve synergies for climate adaptation if it were larger and yet lighter. A larger, less reductionistic and more informed REDD could engage constructively with multi-scalar and structural drivers of change across the socially-constructed adaptive landscape, while a lighter, more nuanced and experimental REDD may play a more effective and navigational—rather than prescriptive and technocratic—role in negotiating change along the social-ecological nexus supporting, rather than undermining, dynamic processes foundational to climate resilience.

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