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Lessons for REDD+ from complex mosaic landscapes

The GLP endorsed research project I-REDD+ (Impacts of reducing emissions from deforestation and forest degradation and enhancement of forest carbon stocks) ended formally in December 2014. Six main lessons emerge from the research conducted mainly in Southeast Asia and they all indicate a rapidly closing window of opportunity for REDD+. This is especially the case in mosaic landscapes where many types of mature and degraded forests co-exist with agriculture and other land uses and where land use changes are occurring very rapidly.

1) Reference emission levels may not predict uncertain futures

Sudden or unanticipated changes in land systems make it challenging to establish credible reference emission levels that allow for prediction of 'business-as-usual' changes in future carbon stocks as a benchmark for compensating emission reductions. Therefore, the current approach to market-based national level REDD+ relying on performance-based payments and prediction of future carbon dynamics is highly risky and may not lead to the expected emission reductions. Payments or investments in better forest management and co-benefits may be more efficient than a mechanism based on emission reductions compared to unknown future emissions.

2) Drivers of deforestation and degradation are difficult to address

Many underlying drivers of carbon emissions from tropical land-use change originate from the global

level and are beyond the control of national or sub-national institutions (e.g., demand for rubber, palm oil and other globally traded cash crops). Interventions to mitigate emissions that are an indirect result of increases in world market prices are costly and difficult to tackle by the currently proposed REDD+ interventions. Moreover, these drivers are mostly decoupled from the forestry sector and expansive land development of cash crops often co-occurs with efforts to promote REDD+ without cross-sector coordination.

3) Carbon stocks in mosaic landscapes and secondary forests may be underestimated

Large areas of forests in the tropics are secondary and still being used occasionally for cultivation. Carbon stocks in such mosaic landscapes may be larger than what has been previously assumed in allometric equations because high belowground biomass under secondary forest is not captured. Small trees in these forests often reveal large underground root and horizontal stem systems, from which they are resprouting and that are not proportional to their small aboveground stems.

4) Forest degradation must be monitored at different scales

The use of dense Landsat time series for temporal analyses of individual pixels is recommended for mosaic landscapes as it can better capture forest degradation associated with felling and regrowth of secondary forests over large areas. It has also been demonstrated that measuring sub-national and local carbon-stocks – needed for verification of broader national measurement efforts – can

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include community-based measurement for enhancing feasibility, efficiency and potential equity benefits. Community members can monitor above ground carbon as accurately as professional foresters and should be considered in local REDD+ projects, but also if national REDD+ integrate sub-national approaches to monitoring. With repeated rounds of measurement, both the reliability and the cost-effectiveness of community monitoring increase.

5) Just benefit distribution needs elements of both state and community control

Benefit distribution mechanisms for REDD+ are important in relation to effectiveness, efficiency, equity and their trade-offs. From the local perspective, the combination of state and community control is considered more just, while top-down state control is more effective, but only where states commit significant resources in the form of specialized staff and operating budgets. However, state control performs badly from a justice perspective in terms of distribution, participation and recognition. Decisions about payment distribution at the local level should take into account tenure arrangements (private or collective), which affect the tolerance and perceived equity of payment methods. The risk of elite capture and harming the poorest households, who rely the most on forest resources and have limited power in local actor-networks, remains high in many potential REDD+ countries and should be addressed openly before REDD+ is implemented.

6) Locating REDD+ activities should match desirable qualities for REDD+


Desirable qualities for REDD+, both at national level and for localized interventions, include a high degree of dense forests, low population density, low level of losses from foregone opportunities, high biodiversity benefits, high poverty reduction potential and commitment to engage in REDD+. However, so far locations for REDD+ pilot activities have typically been selected on the basis of specific interests of the external implementing agencies and other powerful players – with or without the potential to reach the intended climatic, ecological and social objectives in REDD+. This is likely to remain an issue if national REDD+ has an important sub-national/nested component.

REDD+ activities on the ground in the four countries studied by I-REDD+ are still under preparation. However, there is considerable scope for co-design and co-production of new research as local Pilot REDD+ programmes are being implemented and if an international REDD+ agreement will make national REDD+ programmes get off the ground. This is especially relevant for monitoring systems, which have been set up in many areas and countries, but need to be evaluated jointly by researchers and implementing agencies once they are operational.

References

- Ankersen J, Mertz O, Fensholt R, Castella JC, et al. (2015): Vietnam's forest transition in retrospect: demonstrating weaknesses in business-as-usual scenarios for REDD+. *Environmental Management*, <http://dx.doi.org/10.1007/s00267-015-0443-y>
- Brofeldt S, Theilade I, Burgess ND, Danielsen F, et al. (2014). Community monitoring of carbon stocks for REDD+: Does accuracy and cost change over time? *Forests* 5(8): 1834–1854.
- Danielsen F, Adrian T, Brofeldt S, van Noordwijk M, et al. (2013). Community monitoring for REDD+: international promises and field realities. *Ecology and Society* 18(3): 41.
- Fox J, Castella JC, Ziegler AD (2013). Swidden, rubber and carbon: Can REDD+ work for people and the environment in Montane Mainland Southeast Asia? *Global Environmental Change* 29: 318-326.
- Mertz O, Müller D, Sikor T, Hett C, et al. (2012). The forgotten D: challenges of addressing forest degradation in complex mosaic landscapes under REDD+. *Geografisk Tidsskrift-Danish Journal of Geography* 112(1): 63-76.
- Müller D, Sun Z, Vongvisouk T, Pflugmacher D, et al. (2014). Regime shifts limit the predictability of land-system change. *Global Environmental Change* 28: 75-83
- Sikor T (2013). REDD+: Justice Effects of Technical Design. Pp 46-68 in Sikor T (ed.) *The Justices and Injustices of Ecosystem Services*. London: Routledge.
- Vongvisouk T, Broegaard RB, Mertz O, Thongmanivong S. (In review) Rush for cash crops and forest protection: neither land sparing nor land sharing. In review in *Land Use Policy*.
- Yuen JQ, Ziegler AD, Webb EL, Ryan CM. 2013. Uncertainty in below-ground carbon biomass for major land covers in Southeast Asia. *Forest Ecology and Management* 310: 915–926.
- See all I-REDD+ publications on <http://www.i-redd.eu>

PERSPECTIVE

**Co-design and
co-production
of knowledge
in land system
science**A photograph showing two men in a rural, hilly landscape. One man, wearing a brown jacket and a wide-brimmed hat, is bent over, working on a wall made of large, reddish-brown mud bricks. The other man, wearing a colorful patterned sweater and a brown hat, stands next to him, looking down at the work. The background shows a vast, open landscape with rolling hills and a clear blue sky with some clouds.

Contributing to a more sustainable world requires more integrated and socially relevant science. This is especially true for land systems. How can academics and non-academics interact to produce joint knowledge on the land? This issue presents some experiences of co-design and co-production of knowledge related with land systems.

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GLP
news



Coverpage

Rural builders in Waka Playa, Bolivia

Photo by Sébastien Boillat

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