ASB Partnership for the Tropical Forest Margins

Policybrief 38

How feasible is a landscape approach to REDD+ in Vietnam?

There is growing concern amongst tropical countries on the emphasis of REDD+ to the conservation of forest areas alone, while significant tree cover can be found outside forest areas and officially demarcated forestlands may have little tree cover. A landscape approach to REDD+, which accounts for emission reductions from all land uses can help address this concern.

Reducing Emissions from All Land Uses (REALU) is a landscape approach that is being tested in selected tropical countries. The REALU concept is based on the argument that trees outside forests contribute to carbon-rich landscapes, and incentives for forest conservation alone may undermine the potential of local communities to conserve or enhance carbon outside forest boundaries. Drawing from our REALU feasibility study in Bac Kan province, in the northeast region, we provide insights for a national REALU strategy in Vietnam.

Key messages

1 REALU can provide significant emission reduction benefits with moderate income loss to farmers from production activities compared to business as usual and conventional REDD+ approach.

2 Forest plantation with fast growing species like acacia helped "re-green" large tract of forest land, but if not regulated, such planted forest may expand into natural forest areas, reducing C-stocks and undermining REDD+ efforts.

3 Cross-sectoral planning enables formulation of policies that address drivers of deforestation and provide long-term incentives to communities from adopting sustainable land use practices..

4 A forward looking scenario using models that rely on land use dynamics can help to estimate emission reduction potential of a landscape and formulate appropriate land use strategies with limited technical constraints and past data availability concerns.

Implications

- Carbon-rich land uses and practices outside forest lands should not be ignored while seeking for land based emission reduction strategies such as REDD+.
- To effectively address drivers of deforestation and forest degradation and sufficiently support sustainable practices, any REDD+/ REALU benefit-sharing mechanism should be designed based on opportunity cost of land use options.
- For a forest conservation landscape like Bac Kan province with very limited agricultural land, the sustainability of a REALU mechanism is uncertain, not only in terms of sustained financing, but also in terms of addressing widening economic tradeoffs and doing less harm to the poor.

A 'Green Development' vision

The objective of REALU is akin to the 'green development' vision, where both economic and ecological values of a landscape are to be enhanced.

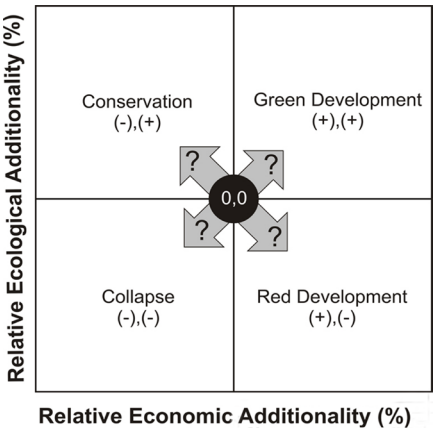

Figure 1. Impact of development strategies to economic and ecological values from an initial condition (baseline). Contrary to 'Red Development', 'Conservation' strategy will likely victimize economic values, whereas, 'Collapse' can be avoided through a 'Green development' strategy that increases both economic and ecological values.

Is REALU feasible in Bac Kan province? YES, IF:

1. An incentive mechanism is in place to compensate for income loss from production.
2. A whole landscape approach to carbon accounting is applied.
3. A forward looking Reference Emission Level (REL), which requires "reachable" data and will potentially offer more carbon credits than the conventional historical REL, is applied.
4. Carbon rich land use practices such as agroforestry are widely promoted and incorporated in major development plans in the province.

Facts and figures of Bac Kan province

- One of the most forested and poorest provinces in Vietnam with 60% forest cover and 37% poverty rate
- Total land area: 4,861km^2
- 90% of the province is mountainous
- Population and density: 293,628 people and 61 persons/ km^2
- Forestry and agriculture are major sources of income
- REDD+ pilot province

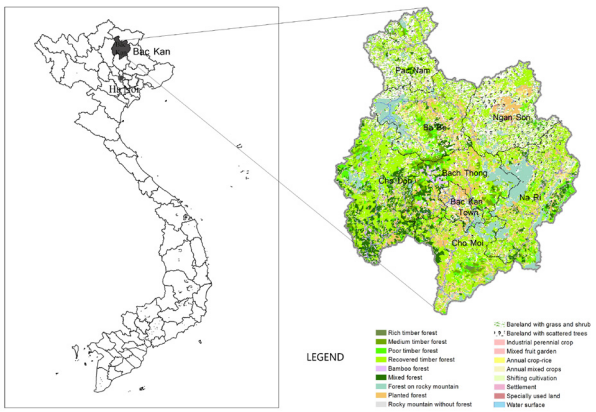

Figure 2: Land use map of Bac Kan province (2010)

Activities of REALU feasibility study (Feb. 2011- Aug. 2012)

- Review of government conservation programs
- Interviews and discussions with key stakeholders including the Chairman of the Provincial People's Committee (PPC) and the Department for Rural Development (DARD).
- Secondary data collection and analysis
- Cost-benefit analysis of current and potential (carbon rich) land uses
- Participatory rural appraisals (PRA) in selected communities
- Assessment of C-stocks, net present values of different land uses and defining of reference emission levels
- Land use modeling and trade off analysis (FALLOW model) for different land use scenarios, including REDD+ and REALU options.

We use the 'Forest, Agroforest, Low-value Lands Or Waste?' (FALLOW) model (van Noordwijk, 2002; Suyamto et al., 2009) to measure the economic and environmental benefits that can be derived from different development strategies. FALLOW is a dynamic land use model that can be used by local land use planners in designing 'greener', yet economically feasible land use strategies, by understanding:

- Land-use scenarios including 'business as usual' that reflect current trends, views and aspirations of different stakeholders.
- Economic and ecological impacts and trade-offs of different land use scenarios
- Potential carbon reward as compensation for loss of income from conservation programs.

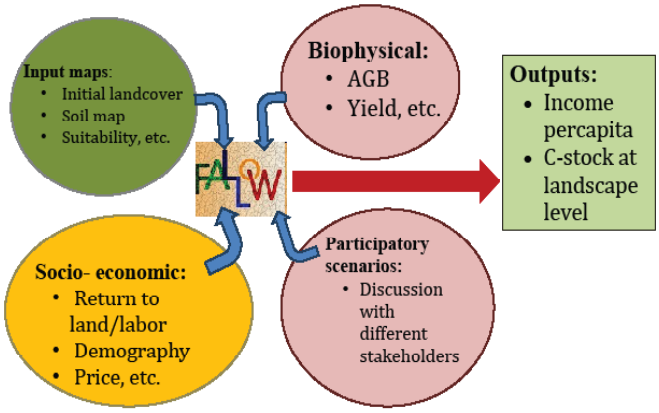

Figure 3. Inputs and outputs of FALLOW simulation

Historical land use changes and implication to CO_2 emissions

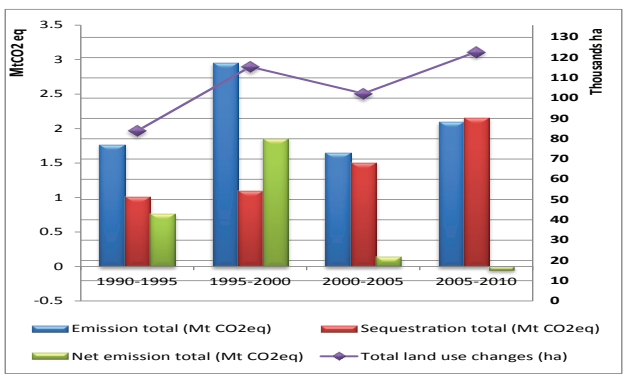

Figure 4: Land use changes in Bac Kan (1990 -2010)

- Land use changes between 1990 and 2010 resulted in both carbon emission and sequestration, but progressing towards carbon sequestration.
- Net emission increased from 1990-1995 to 1995-2000, followed by a significant drop in 2000-2005. During 2005-2010, the net emission was -56,385 tCO2eq/year, indicating that the landscape was sequestering carbon during this period. This was identical with reforestation efforts of the province, particularly 661 Programme initiated in 1998. As a result of the programme, during 2005-2010, a large area of fast wood plantation and generated forest (around 83,000 ha) replaced bare hills and shrubs, while deforestation was decelerated compared to the previous period (around 22,000 ha only).
- The total emission for the period 1990-2010 was still larger than total carbon sequestration, resulting in an average net emission of 539,014 tCO_2eq/year.
- The biggest emission was caused by conversion of poor timber forest to regenerated timber forest.
- Focused discussion groups at village level revealed two reasons for this change: (i) clear cut or heavily logged forest and (ii) slash and burn practices for a short period on poor timber forest land.
- Forest plantation on bare land and natural forest regeneration were the two main carbon sequestering land uses.
- Forest related land use changes were the biggest sources of both emission and sequestration among all land uses, contributing an average of 99.97% of total emission and 99.96% of total sequestration, respectively.

Simulated Scenarios

1. Business as Usual (BAU) - free competition of all land uses based on economic profit
2. Acacia forest expansion - 50% subsidy of the establishment cost is given to smallholders
3. Crop expansion - 20% subsidy is given to smallholders for annual crop production
4. REDD+ - bare lands of protection and special-used forest is planted with forest tree species and illegal logging is completely stopped
5. REALU-- REDD+ and maize mono-cropping is replaced with agroforestry e.g. combining xoan trees (*Melia azedarach*) with maize, in shifting cultivation areas, or trees planted in a parkland system or alley cropping system)

Trade-off analysis between scenarios

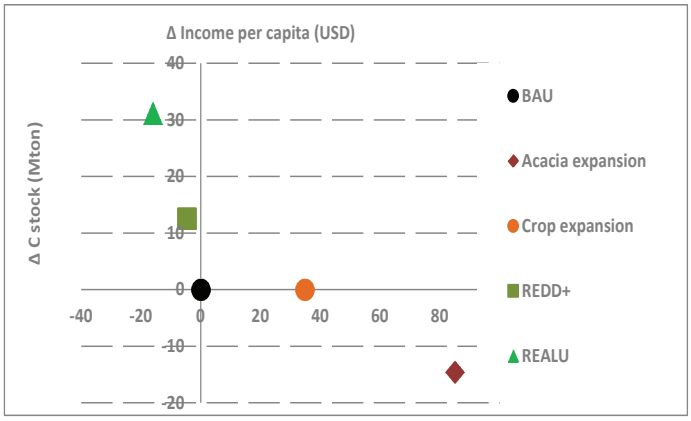

Figure 5 Trade-off analysis between scenarios simulated by FALLOW

Figure 5 represents the relative C-stock and income per capita of each scenario compared to "business as usual". In general, the simulated scenarios show that: (1) some tree-based land uses in Bac Kan landscape have high potential for carbon sequestration if well supported by C payment schemes; (2) stimulation of acacia plantation can result in a loss rather than a gain of landscape's carbon stock.

Acacia expansion increases income per capita accompanied with a significant loss of landscape's carbon stock, since the landscape emits more carbon as acacia replaces natural production forest that has high carbon stock.

Both REDD+ and REALU scenarios give carbon stock sequestration in the landscape, while economic benefit reduced slightly (4 USD/capita and 16 USD/capita, respectively). Introducing trees into shifting cultivation land thus brings carbon benefit to tree plantation within forest lands, but comes with greater economic costs to farmers.

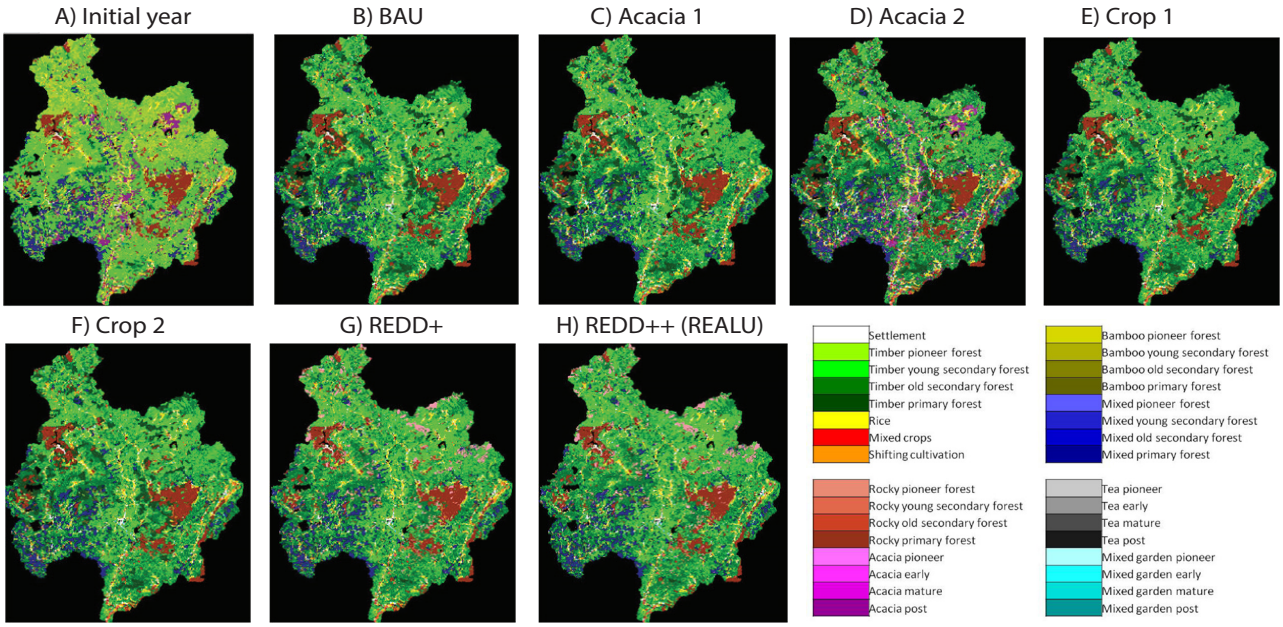

Figure 6: Projected land use maps of Bac Kan province by FALLOW for different scenarios (2030)

Opportunity costs are understood as financial incentives required to encourage local smallholders to switch from current unsustainable practices to more environment- friendly practices or to compensate smallholders for accepting restrictions from shifting from good practices to more profitable but less sustainable practices. Opportunity costs (in USD/ton CO_2eq) of relevant land uses were compared for feasibility assessment. The results are shown in Figure 7.

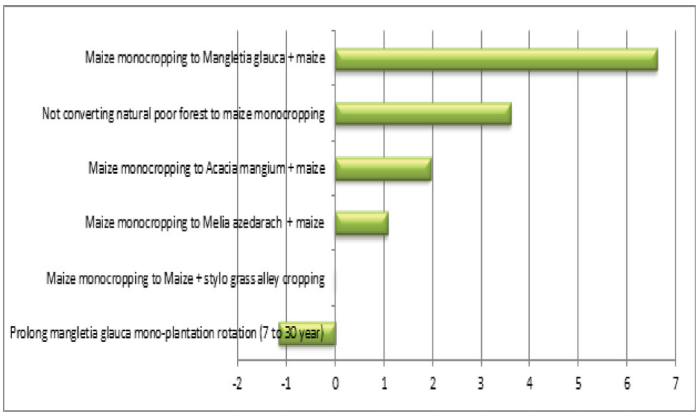

Figure 7. Opportunity costs of REALU land use changes in Bac Kan province

The opportunity cost for assisted natural forest regeneration is relatively higher than other options, thus bundling payments or benefits in combination with law enforcement may be needed.

Converting monocropped maize on sloping lands to agroforestry systems *Acacia mangium* + maize (7 year) and *Melia azedarach* + maize (10 year) is a superior option due to relatively low opportunity cost and diversified products.

For planted production forest, extending *Manglita glauca* plantation from 7 to 30 years to increase economic benefits and expand the market for *Manglita glauca* timber is likewise, a viable option.

Establishment of processing units to produce timber products from *Melia azedarach* and *Manglita glauca* is highly recommended as part of a suite of REALU incentives.

Emission reduction strategies

If the province adopts REALU as its emissions reduction strategy, at least two land use pathways should be considered:

- Enhancement of forest carbon stock under both REDD+ and REALU with activities including planting forest tree species in forest areas and assisting natural forest regeneration.
- Maintenance and enhancement of carbon rich land uses under REALU but may not be under REDD+, including forests, agroforestry and other sustainable land use practices, such as integrating native tree species such as 'xoan' (*melia azedarach*) in sloping maize farms.

Challenges to scenario analysis

- It may be unrealistic to expect that the high rates of plantations and forest growth witnessed over the last 20 years will not only be maintained but also exceeded through REDD+ payments.
- It may even create perverse incentives for not continuing with the forest management plans that are being considered by the government.

Conclusion and ways forward

- REALU is a better option if payments offered by the global REDD market are added to the incentives already proposed.
- However, the province' target of 84% forest cover and 6% agricultural land by 2020 suggests that significant economic tradeoffs may make local people poorer than they currently are.
- We therefore proposed the elements of a sustainable and adaptable REALU mechanism: (i) bundling environmental services and payments; (ii) linking the mechanism with rural development support programs; (iii) national guidance and support for building the capacity of local implementers; and (iv) increasing the effectiveness of (forest) law enforcement.

The ASB Partnership for the Tropical Forest Margins is working to raise productivity and income of rural households in the humid and sub-humid tropics without increasing deforestation or undermining essential environmental services.

ASB is a consortium of over 90 international and national-level partners with an ecoregional focus on the forest-agriculture margins in the humid and sub-humid tropics. The partners have established 12 benchmark sites in the tropical forest biome of Brazil, Cameroon, Indonesia, Peru, Philippines and Vietnam.

The ASB Policybriefs series aims to deliver relevant, concise reading to key people whose decisions will make a difference to poverty reduction and environmental protection in the humid and sub-humid tropics.

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References

van Noordwijk, M (2002) Scaling trade-offs between crop productivity, carbon stocks and biodiversity in shifting cultivation landscape mosaics: the FALLOW model. Ecological Modelling, 149, 113-126.

Suyamto, D.A., Mulia, R., van Noordwijk, M., and Lusiana, B (2009) FALLOW 2.0. Manual and Software. World Agroforestry Centre, Bogor, Indonesia, 68 pp.

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