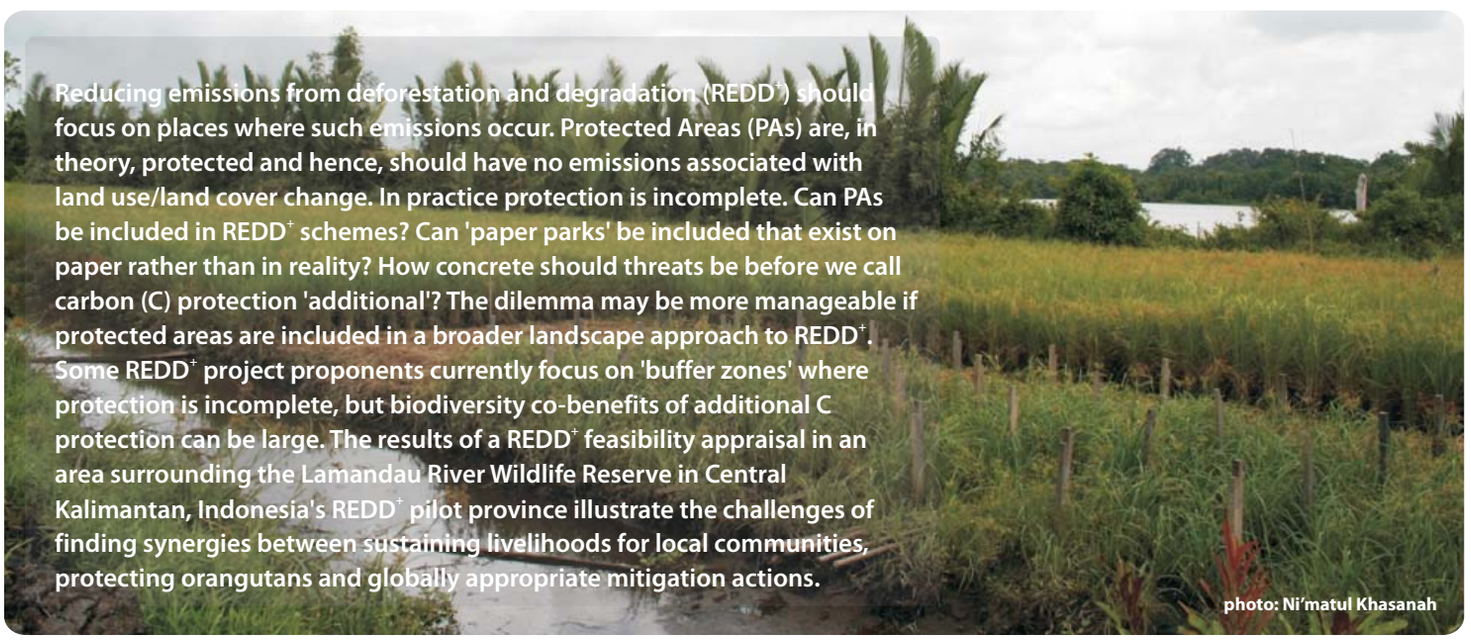
ASB Partnership for the Tropical Forest Margins

Policybrief 22

# Recognizing traditional tree tenure as part of conservation and REDD+ strategy

## Feasibility study for a buffer zone between a wildlife reserve and the Lamandau river in Indonesia's REDD+ Pilot Province



**Reducing emissions from deforestation and degradation (REDD+) should focus on places where such emissions occur. Protected Areas (PAs) are, in theory, protected and hence, should have no emissions associated with land use/land cover change. In practice protection is incomplete. Can PAs be included in REDD+ schemes? Can 'paper parks' be included that exist on paper rather than in reality? How concrete should threats be before we call carbon (C) protection 'additional'? The dilemma may be more manageable if protected areas are included in a broader landscape approach to REDD+. Some REDD+ project proponents currently focus on 'buffer zones' where protection is incomplete, but biodiversity co-benefits of additional C protection can be large. The results of a REDD+ feasibility appraisal in an area surrounding the Lamandau River Wildlife Reserve in Central Kalimantan, Indonesia's REDD+ pilot province illustrate the challenges of finding synergies between sustaining livelihoods for local communities, protecting orangutans and globally appropriate mitigation actions.**

photo: Ni'matul Khasanah

## Main findings

**1.** Protection of remaining forest and buffer zones means that there are limited sources of local income

**2.** Tree and land tenure rules don't match, with local tree tenure rules on valuable trees not recognized by government agencies

**3.** Remaining aboveground carbon stock is 1/3 of pre-human influence value. Peat contains ten times the aboveground C stock

**4.** Additonality of protection: Small-scale threat in the buffer zone is shown by guard post effectiveness. Large-scale threats stem from plans to expand oil palm production

**5.** Drainage of peatlands has resulted in saltwater intrusion in farmlands south-east and south of the PA: business-as-usual scenarios increase vulnerability to sea level rise

## Implications

• New sources of environmentally sustainable employment are needed. Planting more of the peat-compatible *jelutung (Dyera costulata)* and rubber trees can increase carbon storage but also provide income for people.

• Customary tree tenure arrangements remain a basis to build a co-management regime in the buffer zone between forest authorities (focused on land) and people (focused on *jelutung* trees)

• Local government's land use planning is key to success, but requires tangible solutions to local employment and income before conservation objectives can be assured. Salvage logging is currently one fall-back option for local communities.

• Guard posts are fairly effective but expensive to maintain; more integrated livelihood and conservation options through co-,management regimes may give higher returns on potential REDD+ investment

## Positioning the Lamandau landscape in broader patterns of change

Across Kalimantan rivers have been, and in many places still are, the main mode of transport and the main way economies and social systems are traditionally organized. The mouth of the river has always been the point of contact with the outside world and the place where outsiders often first settled. Communities claimed ownership of territories, but land as such was not scarce; people belonging to the local community were free to move and settle where resources seemed to be favourable. Many forest resources have been depleted because of the interest they had for trade, especially those that require destructive harvesting of bark (such as ***gemor*** from ***Alseodaphne spp*** harvested for making mosquito coils or wood (such as 'eaglewood', ***gaharu*** derived from ***Aquilaria spp***). Some species can be tapped for resin (such as jelutung or Dyera costulata) or maintained as a source of honey (such as ***Kempas*** or Koompassia spp.). Individual tree tenure rules were developed for several species of economic importance: those who found such a tree and started using it maintained a right to do so. During the colonial period land within 2 km of the river was left under the control of local communities, while forests further inland were considered to belong to the state. Many of these 'state' lands remained relatively intact until logging concessions (mostly since the 1970's) and roads started to cross the areas between rivers. After independence the state claimed all land, and the land closer to the river was logged as well whilst sawmills were established in the lower parts of the river, both in the 'contact zone' with the outside world. People from outside also started to settle in the area as the logging industry boomed.

Gemor *(Alseodaphne sp.)*

Gaharu *(Aquilaria sp.)*

Jelutung *(Dyera sp.)*

Kempas *(Koompassia sp.)*

Figure 1. Some tree species which local people were interested in. (photo: Janudianto, Subekti Rahayu, Asep Ayat)

In the case of Lamandau, a wildlife reserve was established by Decree No 162/1998 of the Ministry of Forestry away from the river. After 2000, the LRWR became an orang-utan release and rehabilitation site, with a series of guard posts protecting it from outsiders. Along the river, traditional use rights people were effectively retained, but areas in between the rubber agroforests were logged. Interest in tapping of the ***jelutung*** trees fluctuated with market proices and availability of other sources of income. However, individual claims on ***jelutung*** trees survived. Consequently, the landscape between the Lamandau River Wildlife Reserve (LRWR) and the Lamandau river comprises a heavily-logged zone of degraded forest, half of which lies on peat soils, with some old rubber agroforests and locally protected ***jelutung*** trees. The area between LWR and river acts a buffer zone for LWR, and

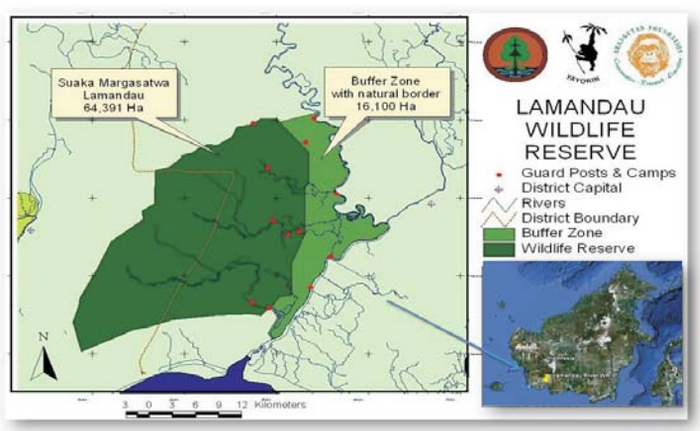
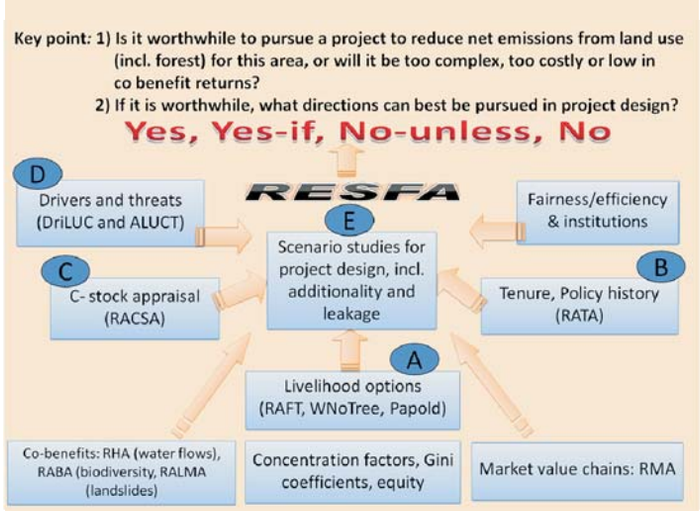



Figure 2. Lamandau River Wildlife Reserve and the buffer zone

## Box 1. REDD/REALU Site-level Feasibility Appraisal (RESFA)

RESFA, a tool developed by ICRAF, was used as the framework to studythe key livelihoods, tenure, land use change and carbon stock issues to develop prospective scenarios and impact predictions for the study area.



could be a target for ecosystem restoration. The 'business as usual' scenario in the absence of protection is probably that it will be converted to oil palm plantations. What are the implications of current options in terms of emissions and economic benefits? Can REDD+ investments be used? How could the remaining C stocks be best protected? Can new solutions build on existing locally-managed tree tenure rules governing access to, and use of *jelutung* trees? The RESFA tool (Box 1) was used to find answers to such questions.

## Main Findings

### *1. Protection of remaining forest and buffer zones will mean limiting potential sources of local income*

The recent closure of gold mining, logging[1] and sawmills as local sources of employment has forced people to seek alternative livelihoods in the study area. Currently *jelutung* extraction (Box 2), fishing and salvage logging provide incomes for communities and individual who have not migrated elsewhere, or sought employment with the expanding oil palm industry in different parts of Central Kalimantan.

### Box 2. Landscape scale dynamics of movement of people and opportunistic livelihoods on jelutung

The majority (66%) of *jelutung* tappers in the buffer zone comes from Kubu village, Kumai subdistrict, Kotawaringin Barat, and about 22% are Mendawai residents, and the rest are from Tanjung Putri and Mendawai Seberang. *Jelutung* tappers who come from Kubu village normally have official permission to work in the area. The newcomers rent houses in the villages where they maintain their families. These tappers enter the buffer zone every week, where they build temporary houses.

### *2. Tree and land tenure rules don't match*

Local communities across Kalimantan assert customary claims over areas that their forefathers used for farming, hunting and collection of forest products. *Jelutung* trees are viewed as part of their customary claim as the product was formerly under customary control and regulation; the trees can by tradition be individually claimed by tapping the trees for resin. Currently forest authorities try to control the tapping, with little regard for past institutions and practices. With the influx of migrants, there has been a rise in land ownership certificates issued by the National Land Agency. Conflicts over land are not easily resolved, as land administration is incomplete. The Spatial Plan for Central Kalimantan remains incomplete more than a year after the legal due-date. The unresolved legal status of the LRWR buffer area between provincial authorities and the Ministry of Forestry require urgent resolution. This legal discrepancy provides opportunities for investors to try and establish, for example, an oil palm plantation within the buffer zone area: one particular investor who explored the opportunities changed his mind, but the possibility remains.

### *3. Remaining aboveground carbon stock is 1/3 of pre-human influence value. Peat contains ten times the aboveground C stock*

The peat soils of the buffer zone contain approximately ten times greater carbon stocks (841 tC/ha) than is stored in aboveground vegetation (average 84 tC/ha). The peat swamps have an average depth of 1.3 m, but depths of up to 4.5 m were measured, with a carbon stock of 7 tC/ha per cm of peat. The land cover types with the highest C-stock in standing trees are old rubber agroforest and logged-over forest with high tree density. Aboveground carbon stock in 'high density logged-over forests' is about 77 tC/ha, or only 33% of the 230 tC/ha reported for unlogged lowland forests in Kalimantan. The current carbon sequestration rate for forest recovery in the buffer zone is estimated to be about 1.3 tC/ha per year.

### *4. Threats and 'additonality' of protection*

Deforestation rates slowed down between the two study periods (1990-2000, and 2000-2005). However, degradation, mostly due to logging did not stop and the fragmentation of remaining undisturbed forest has increased. This suggests that illegal logging is still an important source of income. However, guard posts have been effective in securing the forest, as illustrated by the

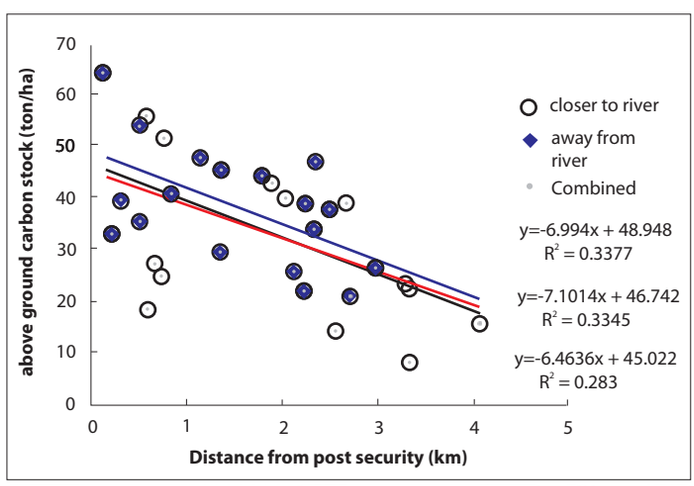



**Figure 3. Relationship between aboveground forest carbon stock and the distance of measured lots to the nearest guard post or camp, for plots and guard posts within 0.5 km of the river and those that are further inland. (photo: Muhammad Sofiyuddin)**

1 Salvage logging involves removing preserved logs (resinous 'sinkers') from riverbeds, riverbanks and farmland

negative correlation between distances to the nearest guard post with carbon stock.

The biggest threat, however, is not from forest-dependent people or the communities surrounding the protected area, but the risk of expansion of large scale oil palm plantations. Oil palm establishment will cause carbon loss of 40–50 $tCO_2e$/(ha y) (aboveground), and at least 20 $tCO_2e$/(ha y) (belowground) if on peat, depending on the depth of drainage and type of land management including use of nitrogenous fertilizers.

### *5. Scenarios of land cover change at landscape level: co-benefit options?*

A small technical irrigation scheme for rice production had been established in the coastal zone at the mouth of the river, but saltwater intrusion, linked to subsidence of the peatlands after drainage, lead to abandonment. The coastal area is vulnerable to sea level rise.

## Ways forward: Scenarios of land cover change at the landscape level suggest potential co-benefits

FALLOW (Forest, Agroforest, Low-value Land Or Waste), a simulation model developed by ICRAF, was used to project landscape dynamics over a 30-year period encompassing scenarios of oil palm and *jelutung* intensification. The *Jelutung* scenario is expected to increase aboveground biomass around 1.2 Mt across the landscape, whilst oil palm plantations will encourage farmers to clear plots in the area and would, after accounting for staple-food expenditure, allow an additional secondary consumption level of around 0.17 M Rp capita$^{-1}$ y$^{-1}$ [(2)]. Planting *jelutung* as a NTFP in the buffer zone will help to absorb labour and provide returns to labour above the average of the landscape as a whole. Establishment of oil palm plantations on degraded, non-peat soils outside the buffer zone will also absorb labour and reduce pressures on the relatively carbon-rich land cover types.

## The way forward for co-benefits in Lamandau

The first of the two scenarios explored could easily be adopted in a REDD$^+$ project design for the buffer zone, starting with increased security of tenure through a co-management regime; the second scenario requires a wider context of spatial planning. Combinations of these approaches may be feasible, but require a more detailed analysis. The focus of the feasibility appraisal of the LRWR buffer zone will need to be complemented by a broader understanding of the surrounding landscape in order to fully assess additionality, permanence and leakage issues for a spatially targeted REDD$^+$ pilot design.

The ASB Partnership for the Tropical Forest Margins is working to raise productivity and income of rural households in the 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 tropics, with benchmark sites in the western Amazon basin of Brazil and Peru, the Congo Basin forest in Cameroon, southern Philippines, northern Thailand, and the island of Sumatra in Indonesia.

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 tropics.

This research was conducted with the financial support of the Clinton Climate Initiative-Forestry with contributions from the World Agroforestry Centre (ICRAF), Yayasan Orangutan Indonesia (Yayorin), Orangutan Foundation (UK) and RARE Conservation. This work would not have been possible without participation of the community surround Lamandau river as our main partner in the field, staff of Yayasan Orangutan Indonesia, staff of Orangutan Foundation (UK) and colleagues from 'Kemitraan Pelestarian Ekosistem Lamandau' (Lamandau Ecosystem Conservation Partnership). The views expressed in this brief are not those of the funder.

**Contributors**

Janudianto, Elok Mulyoutami, Laxman Joshi, D. Andrew Wardell and Meine van Noordwijk

**Primary source**

Joshi, L. van Noordwijk, M. and Pradan, U. (eds.), 2010. Investment in carbon stocks in the eastern buffer zone of Lamandau River Wildlife Reserve, Central Kalimantan Province, Indonesia: A REDD+ feasibility study. Project Report, April 2010. 92pp. ICRAF, S.E. Asia, Bogor.

**Additional References**

Brookfield H, Potter L, Byron Y. 1995. In Place of the Forest: Environmental and Socio-economic Transformation in Borneo and the Eastern Malay Peninsula. Tokyo: United Nations University Press.

Cerbu G, Swallow B, Thompson D. 2010. Locating REDD: A global survey and analysis of REDD readiness and demonstration activities. Journal of Environmental Science & Policy 14 (2011) 168 – 180.

Hairiah K, Dewi S, Agus F, Velarde SJ, Ekadinata A, Rahayu S and van Noordwijk M. 2011. Measuring Carbon Stocks Across Land Use Systems: A Manual. . Bogor, Indonesia.World Agroforestry Centre - ICRAF, SEA Regional Office. 154 p

Jaenicke J, Rieley JO, Mott C, Kimman P, Siegert F. 2008. Determination of the amount of carbon storage in Indonesian peat land. Geoderma 147: 151–158

Li TM. 1996. Images of Community: Discourse and Strategy in Property Relations. Development and Change 27: 501–527.

Murdiyarso, D., Hergoulc'h, K. and Verchot, L. 2010. Opportunities for reducing greenhouse gas emissions in tropical peatands. PNAS Nov 16 2010 Vol. 107 No. 46: 19655-19660

Peluso NL. 1995. Whose Woods Are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia. Antipode 27: 383–406.

Silvius M. 2008. REDD+ and Peat land Conservation and Restoration. Wetland International. Presented at Forest Day, 6 December. Poznan: COP 14.

Stevens S. 1997. New Alliances for Conservation. In Stevens S, ed. Conservation Through Cultural Survival: Indigenous Peoples and Protected Areas. Washington (DC): Island Press.

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.

**Correct citation**

Janudianto, Mulyoutami E, Joshi L, Wardell DA and van Noordwijk M. 2011. Recognizing traditional tree tenure as part of conservation and REDD+ strategy: Feasibility study for a buffer zone between a wildlife reserve and the Lamandau river in Indonesia's REDD+ Pilot Province . ASB Policy Brief No. 22. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya.

Contact us at:

ASB Partnership for the Tropical Forest Margins,
P.O. Box 30677 - 00100 Nairobi, Kenya
Tel. +254 20 7224000
Email: asb@cgiar.org
http://www.asb.cgiar.org