



Jewitt, Sarah and Nasir, D. and Page, S.E. and Rieley, J.O. and Khanal, K. (2014) Indonesia's contested domains: deforestation, rehabilitation and conservation-with-development in Central Kalimantan's tropical peatlands. *International Forestry Review*, 16 (4). pp. 405-420. ISSN 1465-5489

**Access from the University of Nottingham repository:**

[http://eprints.nottingham.ac.uk/3597/1/jewitt\\_et\\_al\\_e-print\\_version.pdf](http://eprints.nottingham.ac.uk/3597/1/jewitt_et_al_e-print_version.pdf)

**Copyright and reuse:**

The Nottingham ePrints service makes this work by researchers of the University of Nottingham available open access under the following conditions.

- Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners.
- To the extent reasonable and practicable the material made available in Nottingham ePrints has been checked for eligibility before being made available.
- Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.
- Quotations or similar reproductions must be sufficiently acknowledged.

Please see our full end user licence at:

[http://eprints.nottingham.ac.uk/end\\_user\\_agreement.pdf](http://eprints.nottingham.ac.uk/end_user_agreement.pdf)

**A note on versions:**

The version presented here may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the repository url above for details on accessing the published version and note that access may require a subscription.

For more information, please contact [eprints@nottingham.ac.uk](mailto:eprints@nottingham.ac.uk)

**DRAFT VERSION (PRIOR TO BEING REVISED ON BASIS OF REFEREES' COMMENTS). PLEASE DO NOT CITE FROM THIS BUT SEE PUBLISHED VERSION: doi: <http://dx.doi.org/10.1505/146554814813484086>**

**Indonesia's contested domains. Deforestation, rehabilitation and conservation-with-development in Central Kalimantan's tropical peatlands.**

**S.L. JEWITT<sup>+</sup>, D. NASIR<sup>\*</sup>, S.E. PAGE<sup>^</sup>, J.O. RIELEY<sup>+</sup>, and K. KHANAL<sup>+</sup>**

<sup>+</sup> School of Geography, University of Nottingham, University Park, Nottingham. NG7 2RD. [sarah.jewitt@nottingham.ac.uk](mailto:sarah.jewitt@nottingham.ac.uk), [jack.rieley@btinternet.com](mailto:jack.rieley@btinternet.com), [lgxkk4@nottingham.ac.uk](mailto:lgxkk4@nottingham.ac.uk)

<sup>\*</sup> University of Palangkaraya, Central Kalimantan, Indonesia. [handnasir@hotmail.com](mailto:handnasir@hotmail.com)

<sup>^</sup> Department of Geography, University of Leicester, Leicester LE1 7RH, UK. [sep5@le.ac.uk](mailto:sep5@le.ac.uk)

**Abstract**

*Tropical peat swamp forests (TPSF) in Indonesia have long faced competition between industrial demand for timber, the subsistence requirements of local communities and, more recently, global concern about the need to conserve tropical peat carbon stores, ecosystem services and biodiversity. This paper uses concepts of ecological distribution and environmental justice to investigate how tensions between conservation and livelihood goals have played out on the ground and examine who has gained and lost out from recent TPSF exploitation, conservation and rehabilitation initiatives. A central focus is how peat-based communities in Central Kalimantan have adapted their livelihoods to changing peatland conditions and management policies with particular emphasis on the livelihood impacts of conservation-with-development initiatives in the area. It is argued that despite recent emphasis on 'win-win' initiatives, the costs of environmental conservation are rarely distributed in proportion to their benefit.*

*Keywords: Tropical peat swamp forest, Indonesia, deforestation, conservation-with-development, carbon.*

**Titre :** Les domaines contestés de l'Indonésie. La déforestation, la réhabilitation et la conservation-avec-développement dans les tourbières tropicales de Kalimantan Central

**Résumé :** *Les forêts tropicales de marécages tourbeux en Indonésie ont longtemps fait face à la concurrence entre la demande industrielle de bois, les besoins élémentaires des collectivités locales et, plus récemment, la préoccupation mondiale sur la nécessité de conserver les stocks de carbone tropicales de tourbe, les services écosystémiques et la biodiversité. Ce document utilise les concepts de la distribution écologique et la justice environnementale pour étudier les tensions entre les objectifs de conservation et ceux de la subsistance et pour examiner qui a gagné et qui a perdu à cause de récentes initiatives d'exploitation, de conservation et de réhabilitation des forêts tropicales de marécages tourbeux. Un des axes centraux est de savoir comment les communautés de Kalimantan Central qui dépendent de la tourbe ont adapté leurs moyens de subsistance à l'évolution des conditions de tourbières et des politiques de gestion avec un accent particulier sur les impacts sur les moyens de subsistance des initiatives de conservation-avec-développement dans la région. Nous suggérons que les coûts de la conservation de l'environnement sont rarement distribués en proportion à leur avantage, malgré la prépondérance récente des initiatives gagnant-gagnant.*

**Título:** *Los dominios controvertidos de Indonesia. La deforestación, la rehabilitación y la conservación con el desarrollo de las turberas tropicales de Kalimantan Central.*

**Abstracto:** Los bosques tropicales pantanosos de turba (BTPT) en Indonesia han enfrentado durante mucho tiempo la competencia entre la demanda industrial de la madera, las necesidades de subsistencia de las comunidades locales y, más recientemente, la preocupación mundial sobre la necesidad de conservar los depósitos de carbono de turba tropicales, los servicios de los ecosistemas y la biodiversidad. Este artículo utiliza conceptos de la distribución ecológica y la justicia ambiental para investigar cómo las tensiones entre los objetivos de conservación y medios de vida han evolucionado en la realidad, y examinar quien ha ganado y perdido de la reciente explotación, conservación y las iniciativas de rehabilitación del BTPT. Un tema central es cómo las comunidades a base de turba de Kalimantan Central, han adaptado sus medios de vida a las condiciones cambiantes de turberas y políticas de gestión, con énfasis especial de los impactos sobre el medio de vida de las iniciativas de conservación con el desarrollo en la zona. Es importante de notar, que a pesar del reciente énfasis en las iniciativas de “ganar-ganar”, los costos de la conservación del medio ambiente rara vez se distribuyen en proporción a su beneficio.

## INTRODUCTION

Indonesia’s tropical peat swamp forests (TPSF) have long been strongly ‘contested domains’ (Pathak 1994) facing competition between industrial demand for timber, the subsistence and livelihood requirements of local communities and, more recently, global concern about the need to conserve tropical peat carbon stores, ecosystem services<sup>1</sup> and biodiversity (Luttrell *et al.* 2012). Concern about carbon losses from tropical peat has risen since 1997-8 when large-scale forest and peat fires released 0.81-2.57 Gt of carbon; around 13–40% of the global carbon emissions from fossil fuels during for that year (Page *et al.* 2002). TPSF act as carbon sinks and stores in their natural state<sup>2</sup>, but rapidly become carbon sources when deforested and drained for commercial logging, plantation development or conversion for agricultural use (Rieley and Page 2005).<sup>3</sup> Drained peat is highly susceptible to fire which has major livelihood impacts as well as creating regional and national air pollution/smog problems (Stuart 2013, Quiano 2013) plus global environmental problems in the form of CO<sub>2</sub> and other toxic gas emissions (Page *et al.* 2002).

To address these issues, attention has focused on conserving Indonesia’s remaining TPSF and rehabilitatating deforested and drained areas (Galudra *et al.* 2011). From the late 1990s, community-based natural resource management (CBNRM) has been promoted as a means to unite forest conservation and livelihood goals (Li 2002).- There has also been international interest in the potential of carbon credit schemes to promote forest restoration (Smith 2002, Peskett and Harkin 2007, Richards and Jenkins 2007, Luttrell *et al.* 2007, Peskett *et al.* 2006, Kerr *et al.* 2006, Wunder 2005). In particular, Stern’s (2007) argument that reducing deforestation-related emissions is more economical than planting new forests to sequester CO<sub>2</sub> has stimulated interest in the potential of ‘Avoided Deforestation’ (AD) and ‘Reducing Emissions from Deforestation and Forest Degradation’ (REDD) initiatives for protecting natural forest carbon stocks and offering pro-poor benefits if suitably targeted (Richards and Jenkins, 2007). More recent REDD+ initiatives<sup>4</sup> that focus on enhancing carbon stocks through improved forest management as well as from reduced deforestation and forest degradation are viewed as even more suitable for degraded tropical peatlands as they could provide funding for their rehabilitation.

---

<sup>1</sup> Key ecosystem services (Watson and Zakri 2008) provided by TPSF include carbon sequestration

<sup>2</sup> Tropical peat is about 50% carbon on a dry mass basis (Jauhiainen and Vasander 2007: 45).

<sup>3</sup> Fire risk on tropical peatland increases dramatically when water tables drop deeper than 40 cm below the peat surface (Wosten and Ritzema 2007: 38)

<sup>4</sup> Launched in September 2008; jointly administered by FAO, UNEP and UNDP

Despite emphasis by key multilateral REDD+ initiatives<sup>5</sup> on stakeholder participation in REDD+ activities, concern has been raised about the need to balance national and international priorities for reduced GHG emissions and biodiversity conservation with the protection of indigenous livelihoods and natural resource rights (Luttrell *et al.* 2012). These tensions reflect wider concerns (Oates 1999, Adams 2001, Sanderson and Redford, 2003) that ‘win-win’ solutions to conservation and development (IUCN, 2002, Roe *et al.* 2003) rarely distribute the costs of environmental conservation in proportion to their benefits (Adams *et al.* 2004: 1146). With respect to CBNRM initiatives that seek to achieve conservation and development objectives, for example Li (2002: 271) cautions that:

‘Without denying the populist commitments of innovative legislators and advocates, it is necessary to consider the possibility that the rural people designated as appropriate subjects for CBNRM are expected to conserve trees and soil rather than exploit them for profit because they are poor and marginal, and can therefore be asked to bear a burden from which more powerful players are exempt’.

In this paper, trade-offs between conservation and livelihood goals in Indonesia’s tropical peatlands are investigated with the use of a quadrant diagram. Figure 1 denotes livelihood outcomes on the vertical axis and conservation outcomes on the horizontal axis giving four main poverty and livelihood combinations within which different initiatives can be situated. Quadrant 1 contains broadly ‘lose-win’ outcomes favouring livelihoods at the expense of conservation goals. Quadrant 2 contains a range of ‘lose-lose’ outcomes where neither conservation nor livelihood goals are effectively met. Quadrant 3 contains ‘win-win’ outcomes where both livelihood and conservation goals are met (although the balance between the two varies widely). Quadrant 4 contains ‘win-lose’ outcomes that broadly favour conservation over livelihood goals.

To examine who has gained and lost from recent TPSF exploitation, conservation and rehabilitation initiatives, the paper utilises the concept of ‘ecological distribution’ (Martinez-Alier 1997: 91) as it highlights the ‘social, spatial, and temporal asymmetries in the human use of traded or non-traded environmental resources and services, with respect to the depletion of natural resources (including the loss of biodiversity).’ Ideas of environmental (in)justice, employed primarily to examine environmental pollution burdens borne by poor and minority communities in industrialised countries (Bullard 2005, Pellow 2004, Pellow and Brulle 2005, Walker and Bulkeley 2006, Watson and Bulkeley 2005) are also drawn upon to examine how TPSF exploitation and conservation affects local populations; especially as high levels of biodiversity frequently overlap with concentrations of resource poor populations.

As Adams *et al.* (2004: 1147) point out, the difficulties of finding lasting ‘win-win’ solutions mean that many conservation-with-development initiatives are ‘overambitious and underachieving’ (*ibid* 1147). To illustrate these tensions, they developed a ‘conceptual typology’ illustrating four different approaches to meeting conservation and livelihood goals which complements the Quadrant diagram in Figure

---

<sup>5</sup> There are three main multilateral initiatives that support REDD+: the Forest Carbon Partnership Facility (FCPF) and the Forest Investment Program (both administered by the World Bank) and the UN-REDD programme.

1. The first approach views poverty and conservation as ‘separate policy realms’ (*ibid* 1147) that can be pursued independently. This approach echoes quadrants 1 (‘lose-win’) and 4 (‘win-lose’) depending on the balance between conservation and livelihood goals. The second approach views poverty as a ‘critical constraint on conservation’ (*ibid*) arguing that conservation goals will fail unless poverty is addressed. The third approach emphasises that conservation goals must not compromise poverty reduction and, taking on board moral obligations to consider the socio-economic impacts of conservation, emphasises the ‘payment of the full local opportunity costs in protected areas’ (*ibid*). The fourth approach embodies the idea that ‘poverty reduction depends on living resource conservation’ and that the livelihoods of resource poor communities can be improved with appropriate conservation initiatives. Ideas of social justice are important here with conservation being seen as a ‘tool for achieving poverty reduction’ (Adams et al. 2004: 1148).

Building on this typology, we investigate tensions associated with initiatives to exploit and later protect, rehabilitate and develop sustainable livelihoods in Indonesia’s TPSF. A key focus is how the ecological distribution of social and environmental burdens associated with such initiatives reflect changing environmental management priorities at regional, national and increasingly global levels. In an effort to develop locally specific understandings of environment-development tensions (rather than extend theoretical frontiers, as such), our research provides a place-sensitive investigation of how the tropical peat-based communities in Central Kalimantan have adapted their livelihoods to policy shifts and environmental change.

The originality and rigour of this work lie in the analysis of the ‘ecological distribution’ (Martinez-Alier 1997) of recent tropical peat exploitation, conservation and rehabilitation initiatives and the environmental injustice of resource poor communities bearing the burden of TPSF conservation and climate change initiatives promoted by powerful national and global players. Its significance lies in its relevance to researchers and policy makers attempting to promote TPSF rehabilitation/conservation and resolve tensions surrounding conservation-with-development initiatives (including REDD+).

## **METHODOLOGY**

The research is focused on peatland areas in Kotawaringin Timur, Pulang Pisau and Kapuas Regencies in southern Central Kalimantan Province (see Figure 2) where agriculture (followed by trading and services) is the main livelihood. Rivers are important means of transportation and sources of food (fish) and fresh water with about 90% of the population living along river banks (BPS Kalimantan Tengah, 2008). The research is focused mainly on Settlement and Other Use Areas (KPPL) located around villages or in areas allocated for local agricultural and plantation activities. KPPL land is owned by local people both legally and in accordance with traditional land ownership customs linked to forest clearing for dry-field cultivation.

Three peatland-based villages with different settlement dates, ethnicities, levels of peatland resource degradation, substrate conditions and landuse options (influenced by their location within Central Kalimantan’s river catchments) were studied. They were selected according to their location within Central Kalimantan’s river catchments and their exposure to tidal movement cycles, which in turn influences irrigation potential, nutrient status and broader livelihood options.

Buntoi is an indigenous village located on the Kahayan river and influenced by tidal movements. It has been occupied since the early eighteenth century by Dayaks and migrant Banjarese. Basarang Jaya is a transmigration village established in the late-1960s and occupied by Balinese and Javanese households. Situated 1.5-3m above sea level and 7km from the Kapuas river, it is irrigated by tidal movement cycles. Sabangau Permai is a transmigration village settled in the late 1980s. Although it didn't initially receive tidal movement-based irrigation, subsequent peat subsidence has made this possible. The forests that used to exist in Basarang Jaya and Sabangau Permai were cleared during their establishment but Buntoi is surrounded by TPSF. Nevertheless, villagers from Basarang Jaya and Sabangau Permai have similar common property rights to indigenous Buntoi households and harvest local forest products for subsistence and cash purposes. Sabangau Permai has easy access to forests in the Sabangau river catchment that were integrated into Sabangau National Park when it was created in 2004. In addition to these villages, Karang Sari, a non-peatland village far from the influence of tidal movement regimes and occupied mainly by Javanese, was studied to compare livelihoods..

A range of qualitative data were collected using semi structured interviews, group discussions, direct observation and field surveys. Interviews were conducted with a total of 53 people across the 4 villages (35 male, 28 female). Of these, 15 were indigenous people and 38 were migrant settlers (16 Balinese, 22 Javanese). Additional interviews were conducted with 8 businessmen (6 loggers, 2 fish traders) and 12 government officials from the forest, agriculture and transmigration departments). Direct communication with respondents was possible because Author X is an Indonesian Dayak who speaks Javanese and Dayak and all Balinese settlers interviewed were fluent in Dayak. Quantitative data were collected mainly from Government of Indonesia publications. To provide context for the analysis, the following section illustrates how livelihoods in Central Kalimantan's tropical peatland have been affected by initiatives to exploit and develop TPSF from the 1960s.

### **CHANGING PEATLAND-BASED LIVELIHOODS**

According to Safford & Maltby (1998), the suitability of tropical peatland for agriculture depends on its nutrient status which depends in turn on its water sources. In southern Central Kalimantan, villages situated close to rivers or canals influenced by tidal movement cycles are more suitable for rice cultivation than inland villages that rely on rainfed cultivation. This is because inundation caused by tidal movement cycles provides irrigation water plus nutrients and helps to 'flush' the peat, reducing the risk of salinity and lowered soil pH caused by exposure and oxidation of pyritic material (Rieley and Page 2005: 71). Nevertheless, peatland can take a long time to become suitable for rice cultivation.

Reflecting these difficulties, most indigenous villages, although surrounded by peatland, have their main rice-growing and garden areas located on alluvial soils alongside rivers. Villages influenced by tidal movement cycles can usually grow two crops annually with dry or wet rice<sup>6</sup>, cassava, corn and vegetables being key subsistence crops. Apple, banana, durian, jack fruit, mango, rambutan are also commonly grown while indigenous wild rubber (*Jelutong - *Dyera costulata**) and

---

<sup>6</sup> Wet rice can only be grown if irrigation is available.

rattan are often cultivated away from the village; often in TPSF (Nasir 2010). Nearby TPSF are typically also used for hunting, gold mining (in river beds), charcoal making, shifting cultivation, fishing and the gathering of timber, fuelwood, latex, gemur (*Alseodaphne coriacea*) bark, rattan, food, honey, and medicinal plants.<sup>7</sup> Swidden systems are common with farmers clearing and burning new cultivation sites to provide initial nutrient inputs (Tahan 1993) but their impacts TPSF ecosystems are relatively minor when carried out at low population densities.

### **Commercial timber exploitation from TPSF**

During Soeharto's period in office (1965-1998), licenses were granted to national and international companies (logging concessions) for the exploitation of vast forest areas, typically creating 'lose-lose' outcomes for peatland environments and local livelihoods (Quadrant 1). Large-scale commercial timber exploitation from TPSF increased dramatically after 1980 as timber stocks declined in more accessible and lucrative dryland forests (Rieley and Page 2005). Regional and local stakeholders often received only small (if any) returns from forest resources (Barr *et al.* 2006) and local people's customary land and *de facto* forest rights were often ignored (Galudra *et al.* 2011) but protests were limited by the risk of repression during Suharto's regime, resulting in a rather weak civil society which only recently started to become more assertive (Yasmi *et al.* 2009, Luttrell *et al.* 2012).

### **Transmigrant livelihoods on tropical peat**

Another key driver behind 'lose-lose' outcomes in Central Kalimantan's tropical peatlands from the 1960s was transmigration. Originating under Dutch colonial rule, transmigration sought to provide alternative livelihoods for landless people (mostly Javanese and Balinese) by re-settling them in Indonesia's under-populated islands (Rieley and Page 2005). The program was taken up again after Independence in 1947 and expanded with support from the World Bank, Asian Development Bank and bilateral donors. Transmigration to Central Kalimantan occurred in the late-1960s but increased in the 1990s as other land categories were becoming scarce (Rieley and Page 2005).

Unfortunately arable agriculture on clear-felled peatland is often unsuccessful due to nutrient deficient and frequently toxic soils, the tendency of cultivation to promote peat subsidence/shrinkage and an increased risk of erosion and fire (Rieley and Page 2005, Jauhiainen and Vasander 2007). Using of lime and ash to increase fertility often increases microbial activity (hastening peat decomposition) and soil pH which depresses micronutrient availability. When pyritic material lies under the peat, tillage may expose it, allowing oxidation which can lower soil pH to 2.0 or less (Rieley and Page 2005: 71).

One of the study villages, Basarang Jaya, was designed for transmigrant rice growing in the late-1960s and settlers were allocated 0.5 ha for gardening and 2 ha of 'business

---

<sup>7</sup> The overall economic value of these 'bio-natural resources' (including timber) is considerable, amounting to around US\$ 1.5 billion annually between 1980-95 in Kalimantan (Rieley and Page, 2005). Village-based research in Central Kalimantan indicated a high level of dependence by local people on bio-natural resources for both subsistence and cash incomes with villagers obtaining 38% of their subsistence and 41% of their cash income requirements from non-timber forest products (Nasir, 2010). 23% of villagers' cash income came from logging, producing an average of 64% of household income derived from bio-natural resources

land' (*lahan usaha*) for irrigated rice cultivation. Over time, many settlers had to change their landuse to cope with peat subsidence. The most successful farmers planted *lahan usaha* with rubber, fruit trees, cassava and pineapple and restricted rice cultivation to land benefitting from tidal movement-based irrigation and nutrients. Sabangau Permai was occupied in 1990 by transmigrants from Java and initially, many households were unable to grow rice or vegetables due to saline water intrusion and pyrite exposure in the dry season and flooding in the rainy season. Over time the use of fire to clear land, provide nutrients and raise soil pH caused peat subsidence yet, ironically, some villagers' livelihoods improved as more peatland benefited from tidal movement-based irrigation.

The most notorious transmigration scheme in the region was the failed 'Mega Rice Project' (MRP), launched in 1995 by President Soeharto, which sought to develop a million hectares of wetland (mostly covered by TPSF) for rice cultivation by 250000 transmigrant families.<sup>8</sup> Despite attempts to inventory indigenous people's community land in advance of the project, compensation was given only for lost access to forests situated 90-150m from the MRP canal banks (Galudra *et al.* 2011). Many MRP transmigrants also struggled to meet their livelihood needs due to their unfamiliarity with the difficulties of cultivating peatland ecosystems. An additional problem was the increase in peatland fires following the MRP-related deforestation and drainage which exacerbated its 'lose-lose impacts.'<sup>9</sup> In 1997 around 55% of the MRP area burned releasing about 0.15 Gt carbon to the atmosphere (Rieley and Page 2005).

The MRP was officially abandoned in 1999 and efforts soon focused on the 'ex-MRP' area's rehabilitation (Galudra *et al.* 2011). Nevertheless, further 'lose lose' outcomes for TPSFs and local communities frequently occurred as transmigrants diversified their livelihoods into urban labourer, illegal logging or illegal mining (Rieley and Page 2005). Canals cut in the peat by illegal loggers for timber transportation acted as drains that dried out the surface peat causing a loss of ecological services, increased fire risk (which threatened livelihoods at a regional scale) and CO<sub>2</sub> emissions of up to 10,000 t/km<sup>2</sup>/yr (Jauhiainen and Vasander 2007) that attracted international attention. Shifts in livelihood patterns also exacerbated ethnic tensions in a context of wider resource pressures and regional poverty (Rieley and Page 2005, Galudra *et al.* 2011). Communities living along Sungai Kahayan that lost access to TPSF due to the MRP, for example, obtained 12% less subsistence resources and 18% less cash income than communities on the banks of the Sungai Sebangau river that retained access to TPSF (Nasir 2001, Rieley and Page 2005).

### **A shift to 'win-win' conservation with development approaches.**

In Indonesia's post Soeharto era, national and international concerns about TPSF degradation, GHG emissions and cross-border smog following the 1997-8 fires sparked emphasis on 'win-win' solutions to the 'lose-lose' failures of TPSF exploitation, drainage and conversion for agriculture/plantation crops. Simultaneously the negative livelihood impacts of some 'win-lose' conservation oriented initiatives were attracting attention (Guha 1997). To discourage such 'fines and fences'

---

<sup>8</sup> Block A has been settled with 13,500 families of local people and transmigrants but only around 50000 ha. is equipped with water controlling devices. Most of the forest has been removed or degraded in Blocks B, C and E although logging is still continuing in some areas.

<sup>9</sup> The risk of fire on peatland increases dramatically when water tables fall more than 40 cm below the surface (Wosten and Ritzema, 2007: 38).



conservation, the WWF promoted integrated conservation and development projects (ICDPs) that combined biodiversity conservation with improved human well-being from the mid-1980s (Fisher 2005).

By the early twenty-first century, ICDP initiatives were largely superseded by ‘win-win’ forest rehabilitation programs that prioritised community welfare goals (Fisher 2005, Nawir *et al.* 2007). Influenced by international interest in the potential of community-based natural resource management (CBNRM) for promoting sustainable livelihoods (Angelsen and Wunder 2003a), most forest rehabilitation initiatives fell within sectors 3 and 4 of Adams *et al.*’s typology. In particular, they emphasised how local communities can enrich biodiversity and create stable environmental conditions. The CBNRM literature also drew on critiques of simplistic population-environmental degradation linkages (Blaikie and Brookfield 1987, Tiffen and Mortimore 1993) bringing social justice arguments into debates over conservation versus livelihood priorities in the form of ‘rights based approaches’ (Maginnis and Sayer 2008, Johnson and Forsyth 2002).<sup>10</sup> The latter sought to reconcile the rights of nature and those of humans dependent on it whilst recognising that there is no guarantee that local communities will exercise any rights they obtain in ways that ‘preserve the ‘non-instrumental’ values, such as species diversity, that conservationists are particularly concerned about’ (*ibid.*: 2).<sup>11</sup>

### *Reformasi*

Under Indonesia’s Reform (*reformasi*) process, IMF recommendations for more balance between state- and community-based forest management (CBFM) were taken on board as more community-oriented objectives were incorporated into forest policy and rehabilitation initiatives. The 2001 *Hutan Kamasyarakatan* community forestry scheme sought to promote conservation whilst promoting community access to production and protected forests. It also sought to reward farmers with increased tenure security in degraded protected state forests in exchange for forest protection (from fire as well as felling) and sustainable land management/watershed protection activities (Kerr *et al.* 2006). Nawir *et al.* (2007) point out, however, that while many farmers found such approaches attractive, others were disappointed with the lack of income sources beyond what they could achieve from more intensive, tenure-secure agriculture.

So although forest rehabilitation-based CBFM demonstrated potential to offer ‘win-win’ benefits, it offered less scope for sustained poverty alleviation. Likewise, approaches involving community-based exploitation of non-timber forest products (NTFP) were often found to be ‘poor instruments for poverty reduction’ (Angelsen and Wunder 2003b: 3) as they provide only a transitory ‘safety net’ for the poor. In a comprehensive study of Indonesian forest rehabilitation schemes, Nawir *et al.* (2007) found that a lack of clear formal rights (to either the forests being restored or the harvesting of planted trees) discouraged long-term interest in state forest-based CBFM. Other criticisms included the failures to give local customary institutions

---

<sup>10</sup> Maginnis and Sayer stress that the need for ‘conservation to recognise the rights of those people who are most directly impacted by global conservation initiatives makes rights-based thinking not only a question of ethics and social justice but also a practical imperative for saving species and ecosystems’ (2008: 2)

<sup>11</sup> Maginnis and Sayer (2008: 2) therefore urge natural resource conservationists to engage with emerging grassroots and environmental movements ‘since it is these movements which will be driving the forest rights agenda in their own contexts’.

adequate partnership roles and the lack of ground-based verification and conflict resolution mechanisms. Consequently, these schemes often provided more ‘win-lose’ than ‘win-win’ outcomes as participants’ financial benefits comprised mainly of short term incomes from labour opportunities such as tree planting (Nawir *et al.* 2007).

### *Decentralisation*

With the introduction of Indonesia’s regional autonomy law in 1999, considerable authority for forest exploitation and management was devolved from central to Regency governments. Following decentralisation, Regency heads could grant 100 ha timber harvesting permits as well as ‘small’ logging concessions to private landowners and communities with customary forest rights (Galudra *et al.* 2011). Although this meant that legal timber exploitation in TPSFs continued, local communities had greater potential access to forest resources and the right to participate in forest-related decision-making creating a ‘lose-win’ shift towards greater livelihood benefits compared to the Soeharto era. Indeed, many district regulations made it mandatory for timber companies to collaborate with local communities and in some provinces, large-scale concession holders had to pay them compensation (Barr *et al.* 2006). In the wake of the recognition of customary institutions and rights in the post Soeharto era (Galudra *et al.* 2011), many forest-dependent communities also took the opportunity to (re)assert claims to (mostly KPPL) land and forests. Barr *et al.* (2006: 12-13) argue that through participation in small-scale logging and forest conversion activities (under district permits) many also ‘obtained substantial benefits from forests that were never available to them during the Soeharto era’. At the same time, however, corruption was widespread and these benefits were often ‘enjoyed by only a small number of elite groups’ (Yasmi *et al.* 2009: 100), creating distrust and sometimes violent conflict between local communities and logging companies.

In addition to permit-based forest exploitation, ‘lose lose’ scenarios were common due to the rapid expansion of illegal logging following Indonesia’s economic collapse in the late 1990s. This was carried out by local and imported labour and supported by (legal) logging companies and timber processing industries. Conflicts over forest and other land access were common, however, as customary laws were increasingly used to justify land ownership by local communities as ‘everyone had their own interpretation of who should rule and use the land in the ex-MRP area’ (Galudra *et al.* 2011: 437).

### *2002 Recentralisation*

In an attempt to re-prioritise forest conservation (at the expense of livelihood) goals (Quadrant 4), the Ministry of Forests sought, from 2002, to reclaim authority over forest administration as part of a process of ‘recentralisation’ (Barr *et al.* 2006). According to Galudra *et al.* (2011: 437), local governments resorted to ‘different regulations to exploit the remaining good forest cover’ resulting in a ‘tug-of-war’ over concession-granting in the ex-MRP area. Although central government withdrew authority for Regency heads to issue small-scale concession permits in June 2002, 369000 ha of the ex-MRP area was allocated for oil palm concessions in 2003 (*ibid.*). In 2007, the centre-regency tug-of-war took a different turn when Presidential Decree No. 2/2007 emphasised the ex-MRP area’s rehabilitation through conservation and restoration initiatives. This was followed in 2008 by the Ministry of Forestry’s Decree

No 55/2008 that set out a 10 year Master Plan to conserve and rehabilitate peatlands and restricted the area allocated for oil palm plantations to 10000 ha (Galudra *et al.* 2011).

#### *Presidential Instruction 4/2005*

In order to address deforestation caused by illegal logging, meanwhile, Presidential Instruction 4/2005 on ‘Eradication of Illegal Logging in Forest Areas and Distribution Throughout the Territory of the Republic of Indonesia’ was issued in 2005. This directed local government officials as well as 18 different government agencies to cooperate to eradicate illegal logging. It also stressed the need for greater coordination between the Ministry of Forestry, the Police and other law enforcement agencies (The Redd Desk 2013).

In Central Kalimantan, this ‘win lose’ Instruction was quite successful in promoting TPSF conservation goals, but local livelihoods often suffered; especially in ex-MRP villages where agricultural failure forced many transmigrants into illegal logging. Sabangau sub-regency’s population fell sharply following the illegal logging ban as many transmigrants returned to Java and Bali. Sebangau Permai’s population fell from 1532 in 2005 to 1335 in 2007 and poverty levels rose with 60% of households classified as poor in 2007 (BPS Kalimantan Tengah 2007a).

As agriculture in Sabangau Permai was problematic for many, the loss of forest-based income was particularly significant. By 2010, income from natural forests accounted for 10% of the village’s total income compared to 50% in the early years of occupation. A touring trader in the village described a significant decline in business after 2005 and sawn timber activities virtually disappeared. The village’s accessibility also decreased following the logging ban as it is not served by a road and the daily motor boat taxis to Palangkaraya (the provincial capital) reduced in frequency to once every two days.

The attitudes of many Sabangau Permai residents towards the logging ban and TPSF conservation more generally, were negative as they live close to the Sabangau river catchment and resented the loss of important livelihood options in nearby forests. Many also criticised the logging ban for restricting their ability to clear land for agriculture. Interviews with stakeholders in the logging sector, meanwhile, indicated frustration that initiatives to conserve TPSF had had negative economic impacts as well as causing animosity between legal and illegal lumber actors. Actors representing the illegal lumber business blamed the government for the overly bureaucratic (and frequently corrupt) system of obtaining timber concessions while legal lumber business representatives blamed the police for turning a blind eye to illegal logging. Statistical records for Pulang Pisau Regency show a decrease in the forestry sub-sector from 14.25% in 2001 to 2.97% of regional gross domestic produce in 2007. For the same period, income from the Plantation subsector increased from 6.21% in 2001 to 15.03% in 2007.

In terms of local attitudes towards TPSF conservation more generally, indigenous farmers in Buntoi were quite positive stressing that no more TPSF should be cleared. They also favoured the rehabilitation of degraded peatlands, so long as they were managed in ways that ‘care about local needs rather’ than as ‘prohibited areas.’ Interviews with migrant households in Basarang Jaya and Sabangau Permai also showed concern about this issue as degraded peatland is viewed as potential

agricultural land that they can clear and obtain customary rights over in the way that indigenous people have done traditionally. Although they were emphatic that new transmigration areas should not be situated on peatland, their views on TPSF conservation were generally less positive than those of indigenous villagers in Buntoi.

#### *Villager-initiated conservation initiatives*

Interestingly, however, villagers from both Basarang and Buntoi described their farming methods as making a contribution to TPSF reforestation as they encourage natural tree regeneration on abandoned farm land. *Galam* (*Melaleuca cajuputi*), grows quickly on farm land influenced by tidal movements and can be used for underwater plus indoor construction purposes. *Galam* seeds can survive in fire-damaged soil and trees can be harvested for cash when they reaches 7-10 cm in diameter. Sites beyond tidal influence are usually dominated by *tumih* (*Combretocarpus rotundatus*) trees (Morley 1981). As the occurrence of *tumih* and *galam* on abandoned farm land essentially signals the beginning of natural reforestation on cleared or burned peatland, these largely unintentional (but locally acceptable) 'restoration' practices represent potential 'win win' strategies for both tropical peatland rehabilitation and alternative income generation elsewhere.

Another villager-initiated strategy responsible for 'win win' outcomes in the study villages is plantation crop cultivation which provides income diversification plus longer-term livelihood security. Rubber plantations have a long history in indigenous villages like Buntoi but also work well in Basarang Jaya and Sebangau Permai as indigenous wild rubber (*jelutong*) and conventional rubber (*Hevea brasiliensis* or *karet*) are fast growing and thrive in deep and shallow peat with minimal care.

Rubber plantations are normally established in abandoned rice fields can be combined with rice cultivation until the canopy closes. As the plantations grow, other naturally regenerating saplings are usually encouraged and native species are often planted for commercial and subsistence purposes. Common examples include Rattan (*Calamus spp*), *galam* for wood and medicinal oil, *tumih* for timber, *nyatu* (*Palaquium javense*), for guttapercha, *damar* (*Shorea balanocarpus*) for resin, and *gemur* (*Alseodaphne coriacea*) bark for mosquito repellent. By the time latex production from older rubber trees starts to decrease, natural regeneration will have produced a supply of younger productive trees.

In villages situated close to TPSFs, the establishment of rubber plantations often draws on traditional methods of claiming customary *jelutong* rights in TPSF. Echoing the establishment of connecting footpaths to claim customary ownership, villagers plant their rubber trees in transects or along footpaths in forests they have rights over. When the trees are ready for tapping, the footpaths leading to an individual's trees are cleared whilst surrounding trees are allowed to grow, thus promoting forest conservation and creating ready supplies of timber.

This method of combining latex harvesting with forest conservation (although villagers do not see it in these terms) has been a good long-term livelihood strategy in many indigenous villages as both *karet* and *jelutong* grow well in TPSF and have maintained good market prices since the Dutch colonial period. In Buntoi, most farmers have *karet* plantations and rubber cultivation has been a successful diversification strategy in both Basarang Jaya and Sebangau Permai. In Buntoi, Mr

Andus, told us: ‘My father had about 3 ha of rubber. By tapping this plantation, he was able to send three of my brothers to university in Banjarmasin’.

In a similar vein, Mr Sukeni from Basarang Jaya said:

‘Here along the Basarang Canal, households that do not have rubber plantations or fruits trees find it very difficult to improve their economic status. They will not be able to send their children to university, because the income from crop farming is usually only just sufficient to cover their daily living expenses.’

Mr Sumarno from Sabangau Permai suggested that rubber plantations could act as a pension scheme for retired transmigrant farmers stating: ‘The people of Sabangau Permai who are my age but who don’t have rubber plantations will suffer in their old age because they have no stable income source.’ For him and many other respondents, rubber plantations are seen as a ‘win win’ strategy for peatland-based villagers as they promote peatland reforestation (which benefits livelihood by reducing fire risk) and income security/diversification. As a tried and tested peatland-based livelihood rooted in indigenous practices rather than a ‘top down’ conservation-with-development initiatives, it may also have potential to achieve ‘win win’ outcomes for degraded peatland-based communities elsewhere so long as they enjoy secure rights of tenure.

Where customary forest rights are not secure, however, TPSF-based rubber cultivation may be problematic and TPSF exploitation or development goals could come into conflict. Villagers with customary *jelutong* rights in the Sabangau river catchment forests, for example, disagree with their integration into the Sebangau National Park (quadrant 4). In these villages, traditional peatland-based cultivation methods combined with ‘wise use’ principles (Rieley and Page 2005) may have more potential for transmigrants struggling to obtain livelihoods on degraded peatlands.

Echoing sector 2 of Adams *et al.*’s typology in quadrant 3, poverty can be a critical constraint to peatland restoration, but community fire fighting initiatives have had some success in the ex-MRP area by simultaneously protecting livelihoods and helping to raise the economic value of degraded peatlands (OuTROP, 2013). Where a lack of irrigation from tidal movement patterns makes rice cultivation problematic, maize, soybean, groundnut, cassava, rambutan, oil palm and coffee may be more suitable than rice as they will grow on 1-1.5m thick peat while perennial crops such as coconut and pineapple often thrive on thicker peat (Rumawas 1986). Sago cultivation, meanwhile, can help delay acid sulphate soil exposure due to its high optimum water table depth (Wosten and Ritzema 2007).

On highly degraded, drained and deforested peat with a low water table, oil palm can provide livelihood and environmental benefits by reducing the risks of erosion (by re-vegetating the peat), fire and associated livelihood losses (Limin *et al.* 2003, Silpola 2007) although it contributes little to carbon store conservation (Jauhiainen and Vasander 2007: 45). Indonesia’s nucleus and plasma concept can benefit communities that link their ‘land, labour and production to the nucleus estate with its processing and marketing facilities’ (Li 2002: 271) so long as they maintain control of their land. Farmers in Karang Sari, for example, prioritised increased access to roads and schools provided by the plantation company at the expense of longer term problems linked to

the difficulties of re-planting oil palm land to other crops when tree productivity declines.

*Carbon credits as a mechanism for promoting conservation-with-development*

In contrast to these ‘bottom-up,’ villager led conservation and rehabilitation approaches, there has been much recent emphasis on the potential of REDD+ schemes to provide funding for maintaining carbon stocks in TPSF and degraded peatland (Page Rieley and Hoscolo 2007, Silvius and Diemont 2007, Sawyer and Yusuf 2007). REDD+ is seen as playing a key role in President Susilo Bambang Yudhoyono’s 2009 commitment to reduce net CO<sub>2</sub> emissions by 26% below a 2020 baseline or by 41% with international assistance (Galudra *et al.* 2011, Luttrell *et al.* 2012) and Indonesia has attracted significant investment from international donors seeking to promote REDD+ on its tropical peatlands (Luttrell *et al.* 2012). In 2010, the Indonesian and Norwegian governments signed a Letter of Intent for ‘Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation’ followed by a Presidential Instruction in 2011 to introduce a 2 year moratorium prohibiting new licences to clear or convert peat and primary forest land to other uses (Luttrell *et al.* 2012). The latter was extended in May 2013 for a further two years (WRI 2013).

Indonesia’s REDD+ National Strategy clearly emphasises ‘win-win’ goals with its emphasis that REDD+ ‘is not solely about carbon emissions from the forest, it is a fundamental and momentous opportunity and challenge to reform forest and land governance’ (Indonesian REDD+ Task Force, 2012: 4). It also emphasises active community participation as ‘a pre-condition in implementing REDD+’ to ensure REDD+ activities will ‘deliver real benefits for the people’s welfare’ (*ibid*: 5). Indonesia’s REDD+ ‘readiness’ activities involve the formation of three key national institutions: a National REDD+ Agency (that recently took over from the REDD+ Task force), a REDD funding instrument and a REDD+ MRV institution to coordinate measurement, reporting and verification activities. In December 2010, Central Kalimantan was selected as a REDD+ pilot province and part of the ex-MRP area was chosen for REDD+ feasibility studies (Galudra *et al.* 2011).

Despite emphasis by bilateral and multilateral donors on potential ‘win-win’ benefits from REDD+, their primary focus is ‘the role of forests in regulating a global ecosystem service’ (Luttrell 2012: 5). As such, questions about environmental justice and the ecological distribution of conservation burdens at global, national and regional scales need to be raised. The main resistance to REDD+ in Indonesia comes from its perceived threat to national sovereignty (stemming from its international origin) and its potential economic impacts (*ibid*). With respect to sovereignty, Luttrell *et al.* (2012: 5-6) argue that many aspects of REDD+ reflect: ‘international priorities such as the need to conserve carbon sequestration functions of forest and (if more tangentially) those of biodiversity conservation and protection of the rights and livelihoods of indigenous peoples.’<sup>12</sup> According to Brown and Peskett (2011), the creation of ‘ad hoc’ agencies like the REDD+ Task force reflected a desire by donors

---

<sup>12</sup> There is also concern that climate financing approaches in Indonesia have paid insufficient attention to both the Paris Declaration and the Jakarta Commitment which emphasises that ‘partner country systems will be used to deliver aid as the first option based on the developing country’s own development objectives’ (Luttrell *et al.* 2012: 6).

to maintain control over climate financing projects whilst avoiding the need to reform existing institutions.

Tensions surrounding the potential economic impacts of REDD+ include the difficulties of meeting GHG emission reduction targets whilst simultaneously maintaining an annual economic growth rate of 7% (Indonesian REDD+ Task Force 2012). The Ministry of Forestry estimated a potential loss of \$3 billion from the moratorium alone (Burhani 2011, cited in Luttrell 2012) and as forestry and landuse contribute significantly to emissions, Luttrell *et al.* (2012: 2) argue that achieving the '41% emission reductions target, will require significant changes to business as usual in these sectors.'

This creates grounds for concern about the ecological distribution of potential REDD+-related restrictions on economic growth and, in turn, on the livelihoods of TPSF-dependent communities. Although REDD+ coupled with payments for ecosystems services (PES) initiatives could provide these communities with significant financial benefits for TPSF conservation/rehabilitation, Fisher *et al.* (2011) question the 'win-win' rhetoric surrounding many REDD+ discussions. Using logging records from Malaysian Borneo, they estimate that to match the current financial benefits of converting forests to oilpalm plantations (with additional benefits from logging during conversion), REDD+ would need to offer \$46–\$48 per tCO<sub>2</sub>. Other limitations to achieving 'win-win' REDD+ outcomes include intersectoral conflict between different state ministries, vertical power struggles between different levels of government and horizontal power struggles between parliament, bureaucrats and presidential institutions (Luttrell *et al.* 2012: Purnomo *et al.* 2012). The delay in creating Indonesia's REDD+ Agency (finally achieved in September 2013) did little to help the long term development of clear REDD+ governance structures (REDD-Monitor.org, 2013).

At the local level, meanwhile, unresolved land tenure and ownership issues create ongoing conflict between local communities and the state in many areas with the result that 'carbon rights' will 'come as an addition to the already complex layers of unresolved property rights' (Galudra *et al.* 2011: 432). These conflicts also have an interesting environmental justice dimension in that the 'perceived injustice to local stakeholders stemming from the 'resource extraction' phase of governmental development planning, mirrors the claims that industrialized nations have a historical carbon debt towards developing nations and need to act accordingly' (*ibid* 440).

## CONCLUSION

Since the 1960s, competition and conflict over commercial, subsistence and conservation value of Central Kalimantan's TPSF has been associated with a shift from 'lose-lose' deforestation and drainage initiatives to 'win-win' approaches that prioritise conservation and livelihood goals. Along the way, international emphasis on biodiversity conservation and GHG emission reductions coupled with national- and regional-scale environment versus development tensions have resulted in vacillation between 'win-lose' conservation/rehabilitation oriented projects and 'lose-win' activities centered on natural resource exploitation. The ex-MRP area in particular has been subjected to deeply contrasting management objectives that reflect the changing priorities of a range of different stakeholders (Galudra *et al.* 2011).

Achieving an equitable balance between livelihood and conservation goals has proved extremely difficult in this area and it is clear that resource poor indigenous villagers and transmigrants have often borne the brunt of government-sponsored 'lose-lose' and 'win-lose' initiatives prioritising conservation over livelihood goals. The ecological distribution of tropical peatland conservation/rehabilitation burdens has frequently been environmentally as well as socially unjust resulting in the allocation of:

'marginal resources to marginal people, to be used in limited ways which are only marginally productive for those people but which have rather significant benefits to the country (especially its national image and access to donor funds), the globe (concerned with biodiversity, forest cover) and future generations of ecotourists...who will be able to contemplate nature and natives preserved in place' (Li 2002: 273).

A key difficulty is that many local communities lack formal land rights or rights of access to forests and Indonesia lacks the tradition of civil society protest that has characterized recent efforts in India to correct 'historic injustices' (Kumar and Kar 2012, Springate-Baginski 2009) to forest-based populations. Without rights or broader support from civil society organisations, peatland-based communities are more likely to suffer from environmental injustices, especially when the resources that they lack formal rights to are valuable. REDD+ adds an important financial dimension natural resource rights that the most powerful players will want to exploit; potentially resulting in increased conflict (Galudra *et al.* 2011).

As Luttrell *et al.* (2007) point out, REDD+ is not inherently pro-poor and its impact on resource poor communities will reflect how payments are distributed, which is yet to be determined. Risks that need guarding against include intra-community conflict, elite capture and the erosion of livelihood opportunities through the sale of carbon rights that prevent forest-dependent communities from harvesting NTFPs and timber (Peskett and Harkin 2007).

Despite sustained efforts by key multilateral donors and national governments supporting REDD+ to promote stakeholder engagement and protect indigenous rights, genuine 'win-win' solutions must overcome significant difficulties linked to tackling land tenure issues, corruption and REDD+ related intersectoral, vertical and horizontal coordination issues. As 'organizations committed to the preservation of species and those committed to sustainable rural livelihoods based on natural resource use are likely to engage with issues of poverty and biodiversity in very different ways' (Adams *et al.* 2004: 1148), care must be taken to ensure that resource poor communities are not forced to bear the burden of global and national priorities for addressing GHG emissions and TPSF conservation goals. Clearly, local community involvement is central to the development of successful 'win-win' initiatives and sensitive approaches that can foster complex conservation and livelihood interactions in geographically specific contexts should form an essential part of REDD+ schemes as and when they come on stream.

Perhaps surprisingly, however, relatively little attention has been focused on how existing village-based conservation initiatives might promote 'win-win' benefits at a broader scale or even as part of REDD+. In the study villages, longstanding peatland-based livelihood strategies such as rubber plantations have been quite successful in meeting livelihood and rehabilitation goals on degraded peat. Being locally rather than externally initiated, there is also less risk of environmental injustice linked to the



burden of environmental conservation falling on resource poor populations. Whilst it acknowledging heterogeneity within local communities and challenging simplistic assumptions about their supposedly innate effectiveness as natural resource managers is important (Corbridge and Jewitt 1997, Jewitt 2002, 2008), it may still be worth considering the value of locally initiated conservation activities in future REDD+ or other TPSF rehabilitation-related initiatives. Ultimately, responsibility for achieving a successful balance of conservation and livelihoods goals lies less heavily with local villagers than with the ability of donors, governments and NGOs to supply the necessary 'helpful intervention' (Shepherd 1993a, 1993b) to simultaneously protect/rehabilitate tropical peatlands, address local livelihood priorities and address conflict between users.

**Word count: 6842**

## References

- ADAMS, W.M. (2004) *Against Extinction: The Story of Conservation*. Earthscan, London
- ADAMS, W.M. AVELING, R. BROCKINGTON, D. DICKSON, B. ELLIOTT, J. HUTTON, J. ROE, D. VIRA, B. and WOLMER, W. 2004. Biodiversity conservation and the eradication of poverty, *Science* **306**, 1146-9
- ANGELSEN, A. and WUNDER, S. 2003a. 'Exploring the forest - poverty link: Key concepts, issues and research implications'. CIFOR Occasional Paper No. 40. Center for International Forestry Research, Bogor, Indonesia.
- ANGELSEN, A. and WUNDER, S. 2003b. 'Exploring the forest - poverty link' CIFOR infobrief 6, May 2003. Bogor: CIFOR [www.cifor.cgiar.org](http://www.cifor.cgiar.org) (accessed 5.12.11)
- BARR, C., RESOSUDARMO, I.A.P., DERMAWAN, A. and MCCARTHY, J. 2006. *Decentralization of Forest Administration in Indonesia. Implications for Forest Sustainability, Economic Development and Community Livelihoods*, Jakarta, CIFOR. Pp 1-178
- BPS (Badan Pusat Statistik) Kalimantan Tengah, 2007a. Indikator kesejahteraan rakyat. Palangka Raya: BPS Kalimantan Tengah Province.
- BLAIKIE, P. and BROOKFIELD, H. (1987) *Land Degradation and Society*. Methuen. London.
- BROWN, J. and PESKETT, L. 2011. Climate Finance in Indonesia: Lessons for the Future of Public Finance for Climate Change Mitigation. ODI Working Paper No. 1. Overseas Development Institute, London
- BULLARD, R D. (Ed) 2005 *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*. Sierra Club Books, San Francisco.
- BURHANI, R. 2011. Moratorium hilangkan potensi investasi hingga Rp29 triliun. Antara News 17 February, In: <http://www.antaraneews.com/berita/1297950827/moratorium-hilangkan-potensi-investasi-hingga-rp29-triliun> (accessed 5.12.11).
- CORBRIDGE, S. and JEWITT, S. 1997. From forest struggles to forest citizens? Joint forest management in the unquiet woods of India's Jharkhand, *Environment and Planning A* 29 (12): 2145-2164.
- DEWI, S. E. A., GALUDRA, G., AGUNG, P. and JOHANA, F. 2011. LUWES: Land use planning for Low Emission Development Strategy. Bogor, Indonesia, World Agroforestry Centre - ICRAF-Regional Office: 47.
- FISHER, B., EDWARDS, D.P., GIAM, X. and WILCOVE, D.S. 2011. The high costs of conserving Southeast Asia's lowland rainforests. *Frontiers in Ecology and the Environment* 2011, 9(6): 329-334,

FISHER, R. J., MAGINNIS, S., JACKSON, W., BARROW, E. and JEANRENAUD, S. 2005. Poverty and Conservation. Landscapes, People and Power. Landscapes and Livelihoods Series No.2. IUCN, Gland, Switzerland and Cambridge, UK.

GALUDRA, G., VAN NOORDWIJK, M., SUYANTO, S., SARDI, I., PRADHAN, U. and CATAUTA, D. 2011. Hot Spots of Confusion: Contested Policies and Competing Carbon Claims in the Peatlands of Central Kalimantan, Indonesia. *International Forestry Review*, 13(4):431-441. 2011.

GUHA, R. 1997. The Authoritarian Biologist and the Arrogance of Anti-Humanism; Wildlife Conservation in the Third World. *The Ecologist* 27(1).

IUCN. 2002. Beyond Rhetoric: Putting conservation to work for the poor. IUCN, Gland, Switzerland.

INDONESIAN REDD+ TASK FORCE. 2012. REDD+ National Strategy. SATGAS REDD+: Jakarta.

JAUHAINEN, J. and VASANDER, H. 2007. 'Possibilities to Cut Down Tropical peat C-Losses.' *Peatlands International* (2): 45-46.

JEWITT, S. 2000. Mothering Earth? Gender and Environmental Protection in the Jharkhand, India, *The Journal of Peasant Studies*, 27 (2), pp. 94-131

JEWITT, S. 2002. *Environment, Knowledge and Gender: Local Development in India's Jharkhand*, Ashgate Publishing Company, Aldershot (SOAS Development Geography Series).

JEWITT, S. 2008. Political Ecology of Jharkhand Conflicts, *Asia Pacific Viewpoint*, 49 (1) 68-82.

JOHNSON, C. and FORSYTH, T. 2002. In the eyes of the state: Negotiating a "rights-based approach" to forest conservation in Thailand. *World Development* 30 (9) 1591-1605.

KERR J., PENDER, J. and SUYANTO. 2006. 'Property Rights and Environmental Services in Lampung Province, Indonesia', presented at "Survival of the Commons: Mounting Challenges and New Realities." 11th Conference of International Association for the Study of Common Property, Bali, Indonesia, June 19-23, 2006. World Agroforestry Centre.

KUMAR, K. and KAR, J. M. 2012. Democratic assertions: The making of India's Recognition of Forest Rights Act. *Development and Change* 43(3): 751-771.

KVAM, R. and NORDANG, H. 2005. *The Jharkhand participatory forest management project. Social assessment for inclusion, cohesion, and accountability*. Government of Jharkhand and the World Bank Social Development Department Training Workshop on Social Assessment, Jharkhand, India. February 3-9, 2004. World Bank: Washington DC

- LI, T. M. 2001. Engaging simplifications: Community-based resource management, market processes and state agendas in upland Southeast Asia. *World Development* 30(2): 265-283.
- LIMIN, S., NASIR, D., JAYA, A., SETIADI, B., RIELEY, J., PAGE, S., HUSSON, S., RADJAGUKGUK, B., DIEMONT, H., VERHAGEN, J., RITZEMA, H., TAKAHASHI, H. and SILVIUS, M. 2003. Financial mechanisms for poverty-environment issues - The case of Central Kalimantan (II), 24 pp., Alterra / Wetlands International, Wageningen
- LIMIN, S.H. 2000. Forest exploit contribution for community welfare, Presented in Seminar Advokasi Kependudukan dan Lingkungan Bagi Gubernur, Bupati/Wali Kota, Camat dan DPRD Palangka Raya, 28.03.2000
- LUTTRELL, C., SCHRECKENBERG, K. and PESKETT, L. 2007. The implications of carbon financing for pro-poor community forestry. ODI Forestry Briefing 14, December 2007. Overseas Development Institute, London.
- LUTTRELL, C., RESOSUDARMO, I. A. P., MUHARROM, M. BROCKHAUS, M. and SEYMOUR, F. 2012. The political context of REDD+ in Indonesia: Constituencies for change." *Environmental Science and Policy*. AIP. Available at <http://www.sciencedirect.com/science/article/pii/S1462901112001724> (accessed 5.7.13)
- MAKELA, M. 2007. From the President's desk: Keep it simple but not too simple. *Peatlands International* 2/2007, p 4
- MAGINNIS, S. and SAYER, J. 2008. Editorial. *Arborvitae* 36: 2
- MARTINEZ-ALIER, J. 1997. Environmental justice. Local and global. *Capitalism, Nature and Socialism*, 1: 91-108
- MORLEY, R.J., 1981. Development and vegetation dynamics of a lowland ombrogenous peat swamp in Kalimantan Tengah, Indonesia. *Journal of Biogeography*, 8:383-404
- NASIR, D. 2001. The effect of peat swamp forest land use change on commercial bio-natural resources commodities and relationship to changing economic activities of local people in Central Kalimantan, Indonesia, MSc. Thesis, School of Geography, University of Nottingham, Nottingham
- NASIR, D. 2010. Sustainable Livelihood on Peatland Areas in Central Kalimantan, Indonesia: The Land Resources Use Option. Unpublished PhD dissertation, School of Geography, University of Nottingham
- NAWIR, A., MURNIATI, A. and RUMBOKO, L. 2007. Forest rehabilitation in Indonesia: where to after three decades? Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- OATES, F. 1999. *Myth and reality in the rain forest: How conservation strategies are*

*failing in West Africa*. University of California Press, Berkeley, CA.

OUTROP, 2013. Community Patrol and Fire-fighting Team  
<http://www.outrop.com/fire-fighting.html> (Accessed 13.11.13)

PAGE, S.E., SIEGERT, F., RIELEY, J.O., BOEHM, H.-D.V., JAYA, A. and LIMIN, S. 2002. The amount of carbon released from peat and forest fires in Indonesia during 1997. *Nature* 420: 61-65.

PAGE, S, RIELEY, J. and HOSCILO, A. 2007. A Burning Issue: Tropical Peatlands and Fire. *Peatlands International* 2/2007 p27-8.

PATHAK, A. 1994. *Contested Domains: The State, Peasants and Forests in Contemporary India*. SAGE Publications Pvt. Ltd. New Delhi.

PELLOW DN, 2004 *Garbage Wars: The Struggle for Environmental Justice in Chicago*. Cambridge, Massachusetts. MIT Press, Cambridge MA.

PELLOW D.N. and BRULLE R.J. (Eds). 2005. *Power, Justice, and the Environment A Critical Appraisal of the Environmental Justice Movement*. MIT Press, Cambridge MA.

PESKETT, L., BROWN, D., and LUTTRELL, C. 2006. Can payments for avoided deforestation to tackle climate change also benefit the poor?, ODI Forestry Briefing 12, November 2006. Overseas Development Institute, London.

PESKETT, L. AND HARKIN, Z. 2007. Risk and responsibility in Reduced Emissions from Deforestation and Degradation', ODI Forestry Briefing 15, December 2007. Overseas Development Institute, London.

QUIANO, K. H. A. K. 2013. Indonesia apologizes for 'hazardous' pollution levels. Available at: <http://www.cnn.com/2013/06/24/world/asia/malaysia-haze/> (accessed 14.11.13)

REDD-MONITOR.ORG. 2013. Indonesia's REDD+ Agency 'will not be able to take any actions' says Ministry of Forestry Secretary General". Available at: <http://www.redd-monitor.org/2013/09/11/indonesias-redd-agency-will-not-be-able-to-take-any-actions-says-ministry-of-forestry-secretary-general/> (accessed 5.11.13)

RICHARDS, M. and JENKINS, M. (2007) 'Potential and Challenges of Payments for Ecosystem Service from Tropical Forests' ODI Forestry Briefing 16, December 2007. Overseas Development Institute, London

RIELEY, J.O. and PAGE, S.E. (eds). 2005. *Wise use of tropical peatlands: Focus on Southeast Asia*, ALTERRA: Wageningen University and Research Centre and the EU INCO - STRAPEAT and RESTORPEAT Partnerships.

RIELEY, J.O. and PAGE, S.E. (2008) Carbon budgets under different land uses on tropical peatland. Proceedings of the 13<sup>th</sup> International Peat Congress, 8-13 June 2008, pp. 245-249. International Peat Society, Jyväskylä, Finland.

- ROE, D. and ELLIOTT, J. 2004. Poverty reduction and biodiversity conservation: rebuilding the bridges. *Oryx* 38, 137.
- RUMAWAS, F. 1986. Present status of tidal land agriculture, in: Symposium on Lowland Development in Indonesia, August 1986, Jakarta (unpublished).
- SAFFORD, L. and MALTBY, E. (eds). 1998. Guidelines for integrated planning and management of tropical lowland peatlands, with special reference to South East Asia, IUCN, Gland, Switzerland and Cambridge, UK
- SANDERSON, S.E., and REDFORD, K. H. 2003. The defence of conservation is not an attack on the poor. *Oryx* 37, 1.
- SAWYER, B. AND YUSUF, S. 2007. Rehabilitation and fibre plantation management of degraded wetlands in South Sumatra. *Peatlands International*, 2007/2, p 40-43
- SHEPHERD, G. 1993a. Indigenous and participatory forest management and the role of external intervention, Paper presented at National Resources Institute workshop on Stakeholders and Tradeoffs, March 1993.
- SHEPHERD, G. 1993b. Africa: Semi-arid and sub-humid regions, in D.A. Messerschmidt (ed.), *Common forest resource management. Annotated bibliography of Asia, Africa and Latin America*. FAO, Rome pp. 99-192.
- SILPOLA, J. 2007. Deputy Minister Bambang Setiadi: Great Dilemma in Using Tropical Peatlands. *Peatlands International*, 2/2007, p 44-5.
- SILPOLA, J. 2007. Tropical Peatlands Need Rapid Actions. *Peatlands International* 2/2007, p 4
- SILVIUS, M. AND DIEMONT, H. 2007. Deforestation and Degradation of Peatlands. *Peatlands International*, 2/2007 p32-34
- SMITH, J. 2002. Making forest carbon markets work for low-income producers. CIFOR infobrief 2. CIFOR, Bogor.
- SPRINGATE-BAGINSKI, O., SARIN, M., GHOSH, S., DASGUPTA, P., BOSE, I., BANERJEE, A., SARAP K., MISRA, P., BEHRA, S., REDDY, M.G., and RAO, P.T. 2009. Redressing 'historical injustice' through the Indian Forest Rights Act 2006-A Historical Institutional analysis of contemporary forest rights reform. Discussion Paper Series Number twenty-seven, Institute for Pro-Poor Growth' Research Programme Consortium- Manchester University.
- STERN, N. 2007. *The economics of climate change. The Stern review*. Cambridge University Press, Cambridge.
- STUART, H. 2013. Indonesia fires, Singapore smog likely caused by palm oil companies. Available at: [http://www.huffingtonpost.com/2013/06/21/indonesia-fires\\_n\\_3479727.html](http://www.huffingtonpost.com/2013/06/21/indonesia-fires_n_3479727.html) (accessed 14/11/13).

- SWYNGEDOUW E, HEYNEN, N. 2003. Urban political ecology, justice and the politics of scale. *Antipode* 34 4 898-918
- TAHAN I. 1993. Social economics analysis of shifting cultivation in Kotawaringin Barat Regency. Unpublished Masters dissertation. Bogor Agricultural University, Bogor, Indonesia.
- THE REDD DESK. 2013. Available at:  
[http://www.theredddesk.org/countries/indonesia/info/policy/presidential\\_instruction\\_no\\_42005\\_on\\_eradication\\_of\\_illegal\\_logging\\_in\\_forest\\_areas\\_and\\_district](http://www.theredddesk.org/countries/indonesia/info/policy/presidential_instruction_no_42005_on_eradication_of_illegal_logging_in_forest_areas_and_district) (Accessed 18.07.13)
- TIFFEN, M. and MORTIMORE, M. 1993. *More people, less erosion: Environmental recovery in Kenya*. Wiley, London.
- WALKER G, and BULKELEY H. 2006. Geographies of Environmental Justice. *Geoforum* 37 (5) 671-681
- WATSON M., and BULKELEY, H. 2005. Just waste? Municipal waste management and the politics of environmental justice. *Local Environment* 10(4) 411-426.
- WATSON, R.T. AND ZAKRI, A.H. 2008. *Living Beyond Our Means. Natural Assets and Human Well-Being. Statement from the Board*. Millenium Ecosysem Assessment.
- WORLD BANK. 2001. *Indonesia environment and natural resource management in a time of transition*. World Bank, Washington DC.
- WOSTEN, H. AND RITZEMA, H. 2007. Subsidence and Water: Tropical Peatlands. *Peatlands International* 2/2007 p 38-9.
- WUNDER, S. 2005. Payments for environmental services: Some nuts and bolts. CIFOR infobrief 9, May 2005. Bogor: CIFOR [www.cifor.cgiar.org](http://www.cifor.cgiar.org) (Accessed 18.07.13)
- YASMI, Y., GUERNIER, J. and COLFER, C.J.P. 2009. Positive and negative aspects of forestry conflict: lessons from a decentralized forest management in Indonesia, *International Forestry Review* Vol.11(1), 2009

**Figure 1: Conservation and livelihood combinations**

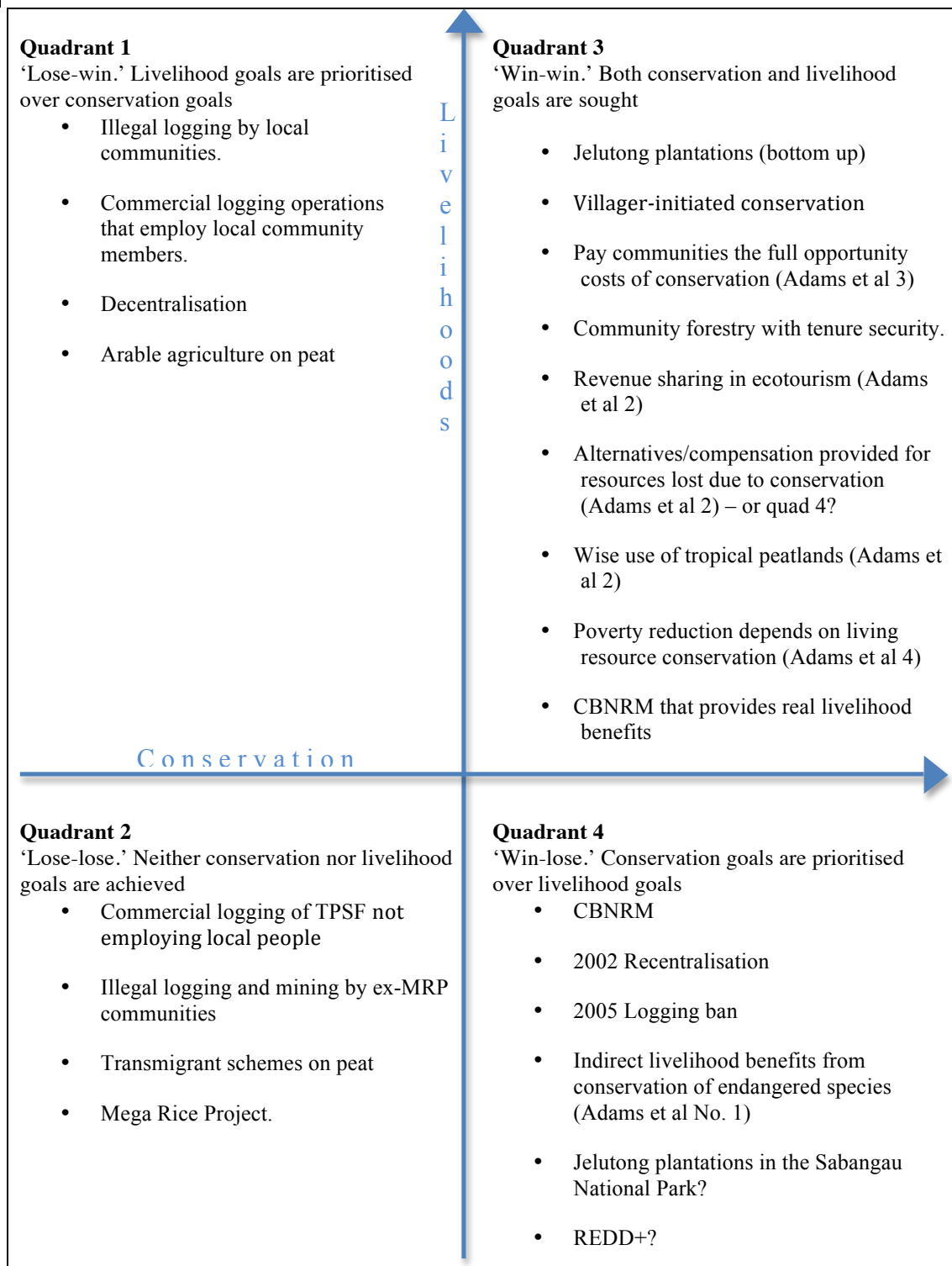




Figure 2: Research sites in Central Kalimantan

