

Article

# Estate Crops More Attractive than Community Forests in West Kalimantan, Indonesia

James D. Langston <sup>1,\*</sup>, Rebecca A. Riggs <sup>1,\*</sup>, Yazid Sururi <sup>1</sup>, Terry Sunderland <sup>2</sup> and Muhammad Munawir <sup>3</sup>

<sup>1</sup> College of Science & Engineering, James Cook University, Cairns, QLD 4870, Australia; yazid.sururi@myjcu.edu.au

<sup>2</sup> Center for International Forestry Research (CIFOR), Bogor 16115, Indonesia; T.Sunderland@cgiar.org

<sup>3</sup> WWF-Indonesia, West Kalimantan Programme, Jalan Karna Sosial Gang Wonoyoso II No. 3, Pontianak 78121, Indonesia; nawir\_1778@yahoo.co.id

\* Correspondence: james.langston@myjcu.edu.au (J.D.L.); rebecca.riggs@myjcu.edu.au (R.A.R.); Tel.: +61-7-423-215-29 (J.D.L. & R.A.R.)

Academic Editors: Jeffrey Sayer and Chris Margules

Received: 19 January 2017; Accepted: 4 February 2017; Published: 8 February 2017

**Abstract:** Smallholder farmers and indigenous communities must cope with the opportunities and threats presented by rapidly spreading estate crops in the frontier of the agricultural market economy. Smallholder communities are subject to considerable speculation by outsiders, yet large-scale agriculture presents tradeoffs that they must navigate. We initiated a study in Sintang, West Kalimantan in 2012 and have returned annually for the last four years, building the baselines for a longer-term landscape approach to reconciling conservation and development tradeoffs in situ. Here, the stakeholders are heterogeneous, yet the land cover of the landscape is on a trajectory towards homogenous mono-cropping systems, primarily either palm oil or rubber. In one village on the frontier of the agricultural market economy, natural forests remain managed by the indigenous and local community but economics further intrude on forest use decisions. Conservation values are declining and the future of the forest is uncertain. As such, the community is ultimately attracted to more economically attractive uses of the land for local development oil palm or rubber mono-crop farms. We identify poverty as a threat to community-managed conservation success in the face of economic pressures to convert forest to intensive agriculture. We provide evidence that lucrative alternatives will challenge community-managed forests when prosperity seems achievable. To alleviate this trend, we identify formalized traditional management and landscape governance solutions to nurture a more sustainable landscape transition.

**Keywords:** conservation development tradeoffs; smallholder agriculture; agricultural market frontiers; community-based forestry; landscape approach

---

## 1. Landscapes in the Heart of Borneo

Communities in the Heart of Borneo (HoB), West Kalimantan, Indonesia are receiving international attention from the work of activist groups and action-research scientists [1]. External discourse often deafens us to the articulated perceptions of local people's lives and landscapes [2,3]. Mostly, the discourse victimizes people and their landscapes, subjecting them to scrutiny over their socioeconomic disadvantages. Science often situates their problems at the frontier of agribusiness economies and Indonesia's problematic, and often complex, governance arrangements [4–7]. A common concern entry-point emerges from the challenges and opportunities of new and rapidly-expanding oil palm plantations [8]. Locally, the millions of people living there ultimately face the consequences of this change [9]. Nationally, Indonesia generally prioritizes economic growth over

achieving conservation goals [10]. Internationally, the environmental community focuses on enhancing and maintaining global public goods [11,12]. Communities in the HoB inhabit some of Indonesia's most dynamic frontier land. They are often Indonesia's poorest people, reside in the world's largest transboundary rainforest and face some of the world's greatest rates of deforestation due to the rapid expansion of oil palm [13–15].

The HoB is a tri-national transboundary initiative led by the World Wide Fund for Nature (WWF). Their coordinated efforts aim to sustainably manage landscapes for increased prosperity and biodiversity in Borneo's geographical center [8]. The HoB initiative aims to coordinate Indonesia, Brunei Darussalam and Malaysia to achieve the long term goal of conserving one of the world's most regarded biodiversity hotspots [16]. The initiative was established in response to high rates of forest conversion and degradation. The extent of Borneo's forests declined by 34% from 1973–2015, primarily due to agricultural expansion and El Niño Southern Oscillation (ENSO)-induced wildfires [17,18]. By 2015, Kalimantan (Indonesian Borneo) contained 5.7 million hectares of industrial plantations [18]. Oil palm drives the majority of agricultural expansion in Kalimantan [19]. In 2010, in West Kalimantan, more than half a million hectares of oil palm were under cultivation, with a planned 5 million more hectares, already under concession [1]. Then, 79% of allocated oil palm leases remained undeveloped [10]. Projections show that full development would convert approximately 90% of remaining available forest lands [20]. Oil palm would occupy 34% of lowlands outside protected areas (ibid). Realistically, the development of the oil palm sector receives greater governmental support than meeting conservation targets, including those underlining the HoB initiative [10]. In 2011, the oil palm industry contributed US \$20 billion in foreign exchange earnings to Indonesia [14].

To increase conservation impact, HoB operational management is devolved to the landscape scale—a spatial delineation defined by combination of social-ecological parameters including watersheds and political jurisdictions [8]. This stems from evidence that biodiversity and environmental conservation action also aimed at addressing the aspirations and poverty of locals is best addressed at the landscape scale [21]. However, while conservationists lament the rapidly increasing pressures on tropical landscapes from increasing global agricultural needs, agricultural investment is often the only opportunity available to meet rising development aspirations of rural forest dwellers [9,22,23]. Agricultural innovation at the landscape scale must benefit smallholders for inclusive development, a pre-requisite to achieving long-term conservation goals if they are to remain living there [24,25]. In West Kalimantan, local management of resources includes both indigenous management and community-based management. In these local landscape contexts, customary forests have new found legal support for local decision-making and user rights. Conservation and development organizations will need to come to terms with the choices that these groups make for their own interests. The problem is evident: assumptions and expectations of development and conservation are clearly at odds in this landscape.

We have worked with WWFs regional Sintang and Kapuas Hulu offices in West Kalimantan as an entry point for building landscape approach platform for action-research. Ownership and power are hotly contested issues within this landscape [26] and thus taking a landscape approach provides a framework to make progress toward achieving satisfactory outcomes for the broad range of stakeholders concerned [27]. We hypothesize that conservation efforts will fail if local people remain living in poverty. We ask: *what will happen to forests in the control of local people when development opportunities arise?* We use the case study of Kenyabur Baru village in Sintang Regency, West Kalimantan to demonstrate that community forest management fails when the economic returns of converting forest to oil palm exceed those of intact forest. The following reports on lessons from our observations in the Sintang Regency as part of the HoB initiative.

## 2. Conceptual Framework

The landscape approach is the latest iteration of attempts to integrate conservation and development in defined geographic spaces [28]. A landscape approach is defined as “A long-term

*collaborative process bringing together diverse stakeholders aiming to achieve a balance between multiple and sometimes conflicting objectives in a landscape or seascape*" [28]. The landscape approach seeks to address global challenges of poverty alleviation, food security, climate change, and biodiversity loss [29]. Though it is a refinement of prior approaches, it is distinct as it explicitly acknowledges that satisfying all stakeholders will often be unachievable. However, its aim is to manage these tradeoffs transparently through governance principles that aspire to reach consensus, whereas other approaches portend spurious 'win-win' outcomes by failing to acknowledge the magnitude of stakeholder diversity and the need for compromise and negotiation [27]. Primarily, landscape approaches are a question of governance. The most recent research identifies how landscape practitioners might measure governance processes, recognizing that process is vital to contextualizing and then achieving desirable and sustainable outcomes [28]. Landscape approaches provide a conceptual framework to make long-term improvements to conservation and production by engaging and empowering local stakeholders [30]. Capacity building, local empowerment, improving governance and providing transparency in resource management negotiations are fundamental components of landscape approaches [31–33].

### 2.1. Community Management in Indonesia's Landscapes

*If we truly want to address issues of climate change, poverty, forest and biodiversity loss effectively, the global community will have to devote far greater efforts than has occurred to date to accessing the views, preferences, and goals of marginalized peoples, understanding local social systems, and incorporating such information into policies, laws, and regulations [2].*

The communities in the HoB are diverse. Smallholder oil palm communities in West Kalimantan are similarly heterogeneous. Likewise, indigenous groups, non-indigenous farming groups, and transmigrants live side-by-side. There are no simple typologies of oil palm farmers—yet in the discourse, generalizations abound [1,10,14,23]. There are also wide ranging opinions on the promise of community-based natural resource management to deliver environmental benefits [34]. However, policy fails if it is too top down and if it does not acknowledge and involve the power and interests of local people [35]. These communities make decisions over the use of their lands and their decision-making is in the context of rapidly spreading oil palm, stemming from large and intermediate-sized companies [36]. Large and mid-size companies provide economies of scale for smallholder participation in a cash crop economy, triggering its expansion (ibid).

There is a long convoluted history of land-use decision making in Indonesia [34]. Indigenous groups, currently through the National Alliance of Indigenous Peoples (Aliansi Masyarakat Adat Nusantara, AMAN), recently succeeded in moving policy agendas beyond community forest management. They now call for an end to State control over customary land. AMAN defines community indigenous peoples (*masyarakat adat*) as "communities living on the basis of ancestral origins in an adat region, that have sovereignty over land and natural resource wealth; a sociocultural life regulated by adat law; and an adat council that manages the daily life of its people" [37]. By 2014, AMAN claimed to be representing well over 2,000 indigenous communities [37]. Laws to remove customary forests from state control were codified by the Indonesian Constitutional Court in May 2013. Muddying the waters, a powerful union of peasant groups also claim development-related rights and responsibilities over resources. AMAN and the peasant unions campaigning for agrarian reform have very different understandings about claims to adat lands [37]. AMAN wants to reclaim land for 'indigenous' groups who have, by their definition, historic and collective rights to it. The unions however aim to recover as much land as possible to redistribute for poorer communities—indigenous, otherwise local, and migrant alike. The federal land allocation agency codified the ambiguity over adat claims to land when the Ministry of Environment and Forestry issued Ministerial Regulation No. 9 of 2015, that simplifies the concept of indigenous rights into communal rights [38]. Although securing land for the poor and marginalized is noble, the process encourages more groups to claim adat land and to manage it as they wish, within a very broad range of contexts. The implementation of

customary laws in ambiguous contexts causes concern among those who worry about the future of environmental assets, reviving an old fear of the ‘tragedy of the commons’ [34].

## 2.2. Flawed Assumptions

Confounding the issue, it is abundantly clear that hierarchies of power do not share the same realities. According to Astuti and McGregor [39], a federal-level stakeholder management leader stated that ‘indigenous people owned the wisdom of treating the forest with care, the wisdom that respects nature and the cultural spiritual values’. Indigenous knowledge and wisdom is revered for living harmoniously with nature. This perception of ‘the indigenous’ reality is a spurious caricature disconnected to reality; indigenous groups also want to benefit from extractive industries and modernity [40]. The assumption that indigenous people are bound to be ‘green’ has led to conservation organizations associated with concerns about green grabbing strategically engaging with indigenous activist organizations to pursue land claims [39]. Our data shows that in West Kalimantan, heterogeneous communities possess multiple interests, including benefitting from estate crop development at the expense of forest [39].

So-called ‘green grabbing conservation organizations’ (green grab being a style of land grab to ostensibly pursue conservation or environmental outcomes as core objectives) have also perpetuated the notion that conservation can succeed in the long run in places where people continue to live in poverty [41–43]. This is contrary to evidence that while a population is living in poverty, they will continue to exert pressure on natural resources with negative conservation outcomes [44–46]. More egregiously, conservation efforts can inhibit development pathways and fail in areas where poverty persists [47–50]. We examine these interactions in our study and hypothesize that conservation efforts will fail if local people remain living in poverty.

## 3. Methods

In 2012 we began applying landscape approach principles [27] to engage and assess landscape level interventions in the Sintang Regency. WWF was our institutional entry-point for building landscape-level governance coalitions, with whom we had previous collaboration. We assert that building a landscape-level process of determining objectives, measuring progress to meet those objectives, and reflecting on lessons learned must be undertaken with the participation of all stakeholders [28]. The sustainable livelihoods framework’s capital assets provide our framework for determining landscape explicit assets [51]. We conducted participatory modeling to begin to allow for scientific rigor in establishing the links between interventions and outcomes [52–54]. The process was driven by a multi-stakeholder forum. The forum comprised of representatives of conservation and development organizations (local non-governmental organizations (NGOs), international research organizations and private industry), staff of landscape level government agencies (sub-district and village level), and local people from communities where our WWF connections allowed access. Gender was accounted for in settings both through mixed gender and isolated gender focus group discussions and interviews. In 2015 we provided training in simple modeling techniques using the software STELLA [53]. At this initial meeting, we decided that long-term perception data in villages would prove useful. We therefore utilize villages as sentinel sites for setting up long term panel data [55]. Our panel data is based on interviews with local key informants over the last three years. We interviewed respondents using an interpretivist approach, using a general inductive method [56]. By doing so, we sought answers to specific questions but exercised considerable flexibility to enable exploration of unanticipated issues that may arise. We also held focus group discussions (FGD) around topics of interest, maintaining the same approach as our semi-structured interviews. The working languages of our group were English and Indonesian. The data used for this paper is based on interviews within one village at one end of a landscape transition, they retained forests over which they exercise their adat rights. This paper is based on recent visits and the fledgling panel data to a series of villages, focusing

on one village, Kenyabur Baru in the Sintang district, where community-based forest management remains part of their social-ecological system.

## 4. Results

### 4.1. Sintang Case: Development Opportunities Arise

In Kenyabur Baru and nearby villages, transmigrants, indigenous, and local farmers live side by side. Local farmers identified themselves as locally indigenous, i.e. of the local Dayak clan group, or from other clan groups that were not historically from that land, whereas the term “transmigrant” refers to the government-led re-location schemes. Spontaneous and government-sponsored transmigration has brought waves of Javanese migrants to the area since the early 1900s. The indigenous Dayak populations currently co-exist with migrants and there is a diverse ethnic mix in the area. Dayaks have adopted Javanese cultural ways whilst migrants adopt those of the local Dayaks. Oil palm and rubber are the dominant agricultural endeavors but livelihood outcomes are not homogenous; each family engages in a unique way. This does not fit into the neat dual business model typology of either ‘tethered scheme’ (plasma) smallholders or independent smallholders. Plasma smallholders usually receive credit from a plantation for planting and inputs. Independent smallholders are unassisted but are dependent on an estate mill to process their fruit. Locals have land in estates through various terms of engagement, and possess land locally. Local respondents indicate that government rules matter much less than local arrangements in the community and between companies with which they have profit sharing/crop agreements. Local people cut forests for either larger companies or themselves, and their cropping size ranges from two to 50 hectares. Land assets do not reflect ethnicity but instead local power relations, which are ethnically mixed; those possessing the greatest social capital in the area are the most land and resource rich. These richer farmers are early adapters of agricultural innovations and are most connected with the town of Sintang and external markets.

“I have connections in the city and think that the opportunity to live well out here depends on my willingness to be opportunistic, investing in expansion and experimentation so that risk is counterbalanced by delivering products to market, and my freedom to choose that market.” (panel data respondent No. 1)

Until oil palm arrived in the 1990s, most of these villages practiced swidden rice cultivation and had plots of rubber agroforests. Consequently, much of the land now occupied by oil palm plantations in this landscape had previously been managed as rubber agroforests. There was very little old growth forest (Figures 1 and 2). Locals have increasingly abandoned traditional shifting agriculture due to increased land pressure from rising population and establishments of estate crops by larger companies.

“There is not enough land left for us to do what we use to do, some of that is because of our population expansion, some of that is because companies now own large plantations.” (FGD respondent)

If local communities can accumulate more land, they prioritize rubber or mono-cropping of oil palm. More recent migrants from Java are more likely to plant something new, such as oil palm in an otherwise rubber-dominated landscape, as they have connection to companies and have been exposed to contemporary industrial processes and economies. A co-operative based in one village with a Javanese leader will often try to push greater oil palm engagement, but many local people still prefer to farm rubber, a practice with years of accumulated knowledge. More migrants have arrived recently, as the promise of prosperity from cash-crops and growing social-networks provided socioeconomic pulls to the forest frontier.



**Figure 1.** Mosaic of land uses including oil palm and rubber surrounding Kenyabur Baru.



**Figure 2.** Children clearing root vegetables from newly cleared peatland drainage ditch. The area is being prepared for a rubber plantation.

#### 4.2. A Forest at Stake

We visited Kenyabur Baru to observe the adat forest (Figure 3). Kenyabur Baru is a frontier village, specifically an agricultural market frontier village [42]. Frontier and disputed areas are where pressures for deforestation and degradation are increasing, and control is often insecure and in conflict. Many of the villages closer to the district capital city Sintang have no more natural forests of significant size left. The regional villages are increasingly tied to the economy of Sintang. Sintang's economic growth is primarily linked to the growth of industrial oil palm plantations; rural communities are increasingly participating in this economy. Roads have been developed by the government to get products to market and to access services. The roads are in poor condition—they are unpaved and only accessible by four-wheel drive vehicles or motorbikes. The community desires better access to markets and services via improved roads and economic networks.

“The road has existed for a long time, without it we would not be here doing what we do now. But we want more, we want to be able to reach markets, we want paved roads so that we are safe in cases of emergencies and for easier day to day lifestyle.” (panel data respondent No. 2)



**Figure 3.** The village maintains adat-managed forests, which lie adjacent to the end of their road. The beginning of the forest can be seen in the left lower hand of the image.

The adat forest in Kenyabur Baru retains high conservation value. Of high conservation value are *Shorea seminis* Slooten (critically endangered) and the *Shorea stenoptera* Burck (endangered). High social and cultural conservation values exist in the forest as food resources, traditional medicine and home-building materials. The adat forest is an old growth, minimally-used forest. There is evidence of large mammals. We observed sun bear markings on trees and locals report recent and regular but diminishing sightings of pig-tailed macaques (Figure 4). However, elders last observed orangutans in their forests more than a generation ago. There are mature strangling figs, abundant lianas and other secondary regrowth due to previous forest clearance, and diverse and abundant mature dipterocarps. The forest sits on peatlands approximately 1m deep, has a leaf litter depth of 15–25 cm, and has a mature complex structure.



**Figure 4.** Recent sun bear markings on a tree inside the adat forest.

Focus group discussions informed us that the forest adjacent to the community land remains adat forest due to the cultural values they derive from it. While the focus group discussion was comprised of indigenous and migrants, both recent and old, they affirmed a mutual communal attachment to the forest. This attachment is based in benefits provided to them. Benefits provided include non-timber forest products (NTFPs), ecosystem services, and rarely, timber for cash. The NTFPs do not generate income but are used for ceremonial or medicinal purposes (Figure 5). It is prohibited to cut down trees except during financial emergencies when people can sell felled trees to pay for health or schooling (they cited a case of a health emergency). They acknowledged, without prompting, that the forest also benefits them through other provisional services such as micro-climate benefits and watershed stability.



**Figure 5.** Adat elder showing ceremonial plants found in the adat forest.



For the time being, local adat culture impels those of Kenyabur Baru to maintain forest even if other land uses seem more lucrative to them. However, economics is further intruding on their decision to manage the forests for adat value. In our focus group discussion, there was consensus that the value of converting adat forests to either palm oil or rubber plantation exceeded the value of forests as they stand. When asked why they had not cleared more, they claimed they were waiting until improved seeds became affordable and accessible. Villagers also claimed it would be too arduous to clear the land but they welcomed help to clear it (they did not identify burning the forest as a potential and easy clearing method). Priorities are not the same now as they were in the past; values have changed with proximity to the agricultural market economy. As roads and associated spillover infrastructure have developed, the village has become more integrated into market economies wherein the benefits of engaging with the market economy are more apparent. According to villagers, children suddenly had opportunities to go to schools, healthcare was better, and information technology put the visions and accessibility of modern amenities within reach.

“The economic opportunities provided by road access originally stimulated by the oil palm industry has made life better. There are some social costs but we all now have a desire for modern amenities and want to live prosperously.” (panel data respondent No. 3)

Villagers acknowledge that accessing these amenities means greater participation in the cash economy and that this is incompatible with more traditional livelihood activities. During a ranking exercise, the community prioritized rubber above oil palm as a preferred land use—it was the highest priority land use option for them. As stated earlier, rubber provides daily income, something more valuable than less frequent value chain payoff commodities such as oil palm. They also identified freedom and independence over their silvicultural practices and choice of buyers and middle-men as major reasons for preferring rubber. However, the villagers also contextualized their preferences for rubber. In the present situation, they lack capital, labor and power to manage oil palm. They foresee that with greater incomes, greater connectivity to market with better roads, and with social capital remaining strong, they will convert existing rubber to oil palm. The heterogeneity of the community and their relative ‘development’ isolation has not led to simple patterns of adat vs local vs transmigrant values in the landscape. Rather, similarities emerged: they firstly aspire for capital reliability. Secondly, once they have reliable incomes and safety nets, they aspire for capital accumulation. Thirdly, they aspire to capital re-investment for their kin.

However, younger community members have a different vision for their future. They foresee a landscape void of smallholders and villagers. The alluring amenities they can see on the internet do not seem as out of reach as they do to their elders. Elders describe a future wherein their progeny can have better access to education and can live better lives without abandoning social values based in adat culture. Young people increasingly regard urbanization processes as desirable.

“We would ideally choose office jobs but invest in land. We want some forests to remain, but want to profit from our lands and while living in the city. In 100 years there will be no people living here anymore. They will all be either working on plantations or in jobs in the city.” (panel data respondent No. 4)

## 5. Conclusions

*Local people almost always express a strong desire for development and lament their few opportunities . . . . [1]*

While locally managing the forest in Kenyabur Baru has succeeded in maintaining biodiversity and conservation values, maintaining adat management now appears less attractive to the local community than conversion to estate crops—rubber or oil palm. Many other poor rural communities within the HoB find that managing forests is less profitable than intensive agriculture, and the communities desire prosperity and development [1]. This case illustrates how poverty is a threat

to community-managed conservation success when profitable opportunities to convert forest lands present themselves. While communities aspire to conserve environmental and cultural values, this desire is outweighed by economic factors. The communities' willingness to court more economically attractive uses for the adat land for either oil palm or rubber illustrates how community-based resource management can fail. This is in line with the arguments that biodiversity provides few instrumental values for poor people [57]. As the village furthest from the city with poor road access, those of Kenyabur Baru do indeed lament their few opportunities to develop and they are not going to keep the forest if they can derive benefits from other land uses. Currently there are no other mechanisms offering an equivalent pathway to livelihood improvements.

In the HoB, as agricultural markets approach frontier landscapes, forest dwellers and smallholder communities have transitioned from shifting cultivation and timber production to more sedentary extraction and intensified agriculture. Here, the realities of new economic frontiers force community forestry management to adapt to increasing pressures or they will not succeed. Conservation organizations need to recognize the extent of these tradeoffs and the mode by which local people determine land use if they wish to engage in community driven conservation. Similarly, if community advocacy groups in Indonesia fail to acknowledge local heterogeneity, the desire for development and agency with which local communities determine land use, collaboration or collusion between them will be weak, and outcomes will be unsatisfactory. Past successes of adat management in maintaining the biodiversity in forests are unlikely to be replicable in the face of lucrative alternatives. Adat management cannot be kept separate from modern incentive systems. If elders and community members can obtain benefits from adat management in the face of economic pressures, there could be room for innovation in the form of adat formalization.

An example of successful adat formalization where conservation values were retained is in Danau Empangau, Kapuas Hulu, West Kalimantan [58]. By garnering support from district heads, the community succeeded in checking the power of the industrial actors, reconciling power asymmetries in the landscape. Adat management of high conservation value resources succeeded by coexisting with industrial corporate estate cropping in a spatially optimal way. Other examples exist where the evolution of adat power is decentralized and empowered at a community level and can coexist with formal resource management systems within formal structures of land use governance [59–61]. We assert that governance processes in the form of a landscape approach must be applied to enable this process because it provides a framework and guidance on good practice for landscape processes. Multi-criteria assessments can provide tools for achieving spatially optimal solutions that empower adat management through a landscape approach process [62,63]. Landscape scale governance learning processes could adhere to new measurement principles that ensure societal beneficial landscape outcomes [28].

Poverty and deforestation historically have shared a win–lose relationship, meaning that deforestation is the price of development [46]. The win–lose trajectory has historically been associated with rural development: the conversion of forest to intensive agriculture. In that scenario forests shrink but employment and incomes increase [64]. To reach landscape transition, forest cover must rebound without having lost its ecological memory. This would best approximate a win–win outcome in the long run. Forest conversion resulting in unprofitable agriculture, only providing subsistence or ephemeral income to a poor population that might be even worse off if they were cut off from the market economy, would be the worst, lose–lose case for forests and people.

Landscape management coalitions should direct their effort on improving livelihoods, moving through a forest transition, and maintaining conservation values within a mosaic of different lands uses. Multi-stakeholder forums as part of a management coalition in a landscape approach must engage in good process management to reconcile the local socioeconomic pressures with external drivers of change. Good process management includes negotiation and communication of clear goals, a clear and agreed theory of change, a rigorous and equitable process for continuing stakeholder engagement, connection to policy processes and key actors, effectiveness of governance, and transparency [28].

These should be measured for continual landscape learning, for better evidence-based decision-making. Adat management can coexist within more formal land tenure arrangements, but must benefit from a legal recognition of its role in current formal governance structures. It is clear that organizations must recognise that under some conditions the benefits of deforestation and infrastructure development may outweigh the costs [65]. The governance of local forest resources for long-term gain is only possible if local stakeholders are committed to conservation goals and these goals are supported by durable policy arrangements. If local community and indigenous groups are stakeholders with longer-term commitments for stewardship of resources than politicians making unpredictable volatile policy environments, then they need to be a major driver of policy durability. In Indonesia this is problematic because of complexities and contestations over local lands. AMAN groups have championed the rights of indigenous communal land ownership, yet a competing ‘community rights’ organization has also championed rights of local communities. A landscape approach wherein a management coalition coordinates visions between actors and agents in the landscape will provide a backbone for durable policymaking.

Presently, there are insufficient institutions in place to guarantee that the forests are managed sustainably. Governance must include coordinated visions and address development needs but forested lands will suffer losses in the face of more profitable endeavors if they are wholly managed by communities in an agricultural market frontier. Ideological arguments that have dominated the discourse and have polarized the conservation and community rights advocates must be met with evidence. Our evidence shows that conservation will not succeed in a community that wants the benefits of more financial prosperity when development opportunities arise.

**Acknowledgments:** We would like to thank all our colleagues in the HoB. We especially thank CIFOR for funding and other in-kind assistance. We are grateful to Albertus Albertus (WWF), Aseop Asep Bee (WWF), and all our friends in Kenyabur Baru, Mererai 1, and Mererai 2. We also thank the two reviewers for their valuable comments on this manuscript.

**Author Contributions:** James D. Langston conceived and designed the study; James D. Langston and Yazid Sururi performed the field study; Muhammad Munawir helped facilitate field study and contributed to the biophysical and social data; James D. Langston, Rebecca A. Riggs and Yazid Sururi analyzed the data; Terry Sunderland provided insightful edits and ideas to enrich the context, results, and discussion. James D. Langston and Rebecca A. Riggs drafted the original paper and Yazid Sururi, Muhammad Munawir, Terry Sunderland contributed edits and comments to subsequent drafts.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Levang, P.; Riva, W.F.; Orth, M.G. Oil palm plantations and conflict in Indonesia: Evidence from West Kalimantan. In *The Oil Palm Complex: Smallholders, Agribusiness and the State in Indonesia and Malaysia*; NUS Press: Singapore, 2016; pp. 283–300.
2. Colfer, C.J.P. Marginalized forest peoples’ perceptions of the legitimacy of governance: An exploration. *World Dev.* **2011**, *39*, 2147–2164. [[CrossRef](#)]
3. Meijaard, E.; Abram, N.K.; Wells, J.A.; Pellier, A.-S.; Ancrenaz, M.; Gaveau, D.L.; Runting, R.K.; Mengersen, K. People’s perceptions about the importance of forests on Borneo. *PLoS ONE* **2013**, *8*, e73008. [[CrossRef](#)] [[PubMed](#)]
4. Peluso, N.L. The political ecology of extraction and extractive reserves in East Kalimantan, Indonesia. *Dev. Change* **1992**, *23*, 49–74. [[CrossRef](#)]
5. Bullinger, C.; Haug, M. In and out of the forest: Decentralisation and recentralisation of forest governance in East Kalimantan, Indonesia. *Austrian J. South-East Asian Stud.* **2012**, *5*, 243–262.
6. Gallemore, C.T.; Rut Dini Prasti, H.; Moeliono, M. Discursive barriers and cross-scale forest governance in Central Kalimantan, Indonesia. *Ecol. Soc.* **2014**. [[CrossRef](#)]
7. Myers, R.; Sanders, A.J.; Larson, A.M.; Ravikumar, A. *Analyzing Multilevel Governance in Indonesia: Lessons for REDD+ from the Study of Landuse Change in Central and West Kalimantan*; CIFOR (Center for International Forestry Research): Bogor, Indonesia, 2016.

8. Hitchner, S.L. Heart of Borneo as a 'Jalan Tikus': Exploring the links between indigenous rights, extractive and exploitative industries, and conservation at the world conservation congress 2008. *Conserv. Soc.* **2010**, *8*, 320–330. [[CrossRef](#)]
9. Sayer, J.; Cassman, K.G. Agricultural innovation to protect the environment. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 8345–8348. [[CrossRef](#)] [[PubMed](#)]
10. Potter, L. *Managing Oil Palm Landscapes: A Seven-Country Survey of the Modern Palm Oil Industry in Southeast Asia, Latin America and West Africa*; CIFOR (Center for International Forestry Research): Bogor, Indonesia, 2015.
11. Carlson, K.M.; Curran, L.M.; Asner, G.P.; Pittman, A.M.; Trigg, S.N.; Adeney, J.M. Carbon emissions from forest conversion by Kalimantan oil palm plantations. *Nature Clim. Change* **2013**, *3*, 283–287. [[CrossRef](#)]
12. Boons, F.; Mendoza, A. Constructing sustainable palm oil: How actors define sustainability. *J. Clean. Prod.* **2010**, *18*, 1686–1695. [[CrossRef](#)]
13. Lindsay, E.; Convery, I.; Ramsey, A.; Simmons, E. Changing place: Palm oil and sense of place in Borneo. *Hum. Geogr.* **2012**, *6*, 45–53. [[CrossRef](#)]
14. Byerlee, D.; Naylor, R.L. *The Tropical Oil Crop Revolution: Food, Feed, Fuel, and Forests*; Oxford University Press: Oxford, UK, 2016.
15. Runting, R.K.; Meijaard, E.; Abram, N.K.; Wells, J.A.; Gaveau, D.L.A.; Ancrenaz, M.; Possingham, H.P.; Wich, S.A.; Ardiansyah, F.; Gumal, M.T.; et al. Alternative futures for borneo show the value of integrating economic and conservation targets across borders. *Nature Commun.* **2015**. [[CrossRef](#)] [[PubMed](#)]
16. WWF. Heart of Borneo. Available online: [http://wwf.panda.org/what\\_we\\_do/where\\_we\\_work/borneo\\_forests/](http://wwf.panda.org/what_we_do/where_we_work/borneo_forests/) (accessed on 15 November 2016).
17. Gaveau, D.L.; Sloan, S.; Molidena, E.; Yaen, H.; Sheil, D.; Abram, N.K.; Ancrenaz, M.; Nasi, R.; Quinones, M.; Wielaard, N. Four decades of forest persistence, clearance and logging on Borneo. *PLoS ONE* **2014**, *9*, e101654. [[CrossRef](#)] [[PubMed](#)]
18. Gaveau, D.L.; Sheil, D.; Husnayaen, M.A.S.; Arjasakusuma, S.; Ancrenaz, M.; Pacheco, P.; Meijaard, E. Rapid conversions and avoided deforestation: Examining four decades of industrial plantation expansion in Borneo. *Sci. Rep.* **2016**. [[CrossRef](#)] [[PubMed](#)]
19. Deakin, L.; Kshatriya, M.; Sunderland, T. *Agrarian Change in Tropical Landscapes*; CIFOR (Center for International Forestry Research): Bogor, Indonesia, 2016.
20. Carlson, K.M.; Curran, L.M.; Ratnasari, D.; Pittman, A.M.; Soares-Filho, B.S.; Asner, G.P.; Trigg, S.N.; Gaveau, D.A.; Lawrence, D.; Rodrigues, H.O. Committed carbon emissions, deforestation, and community land conversion from oil palm plantation expansion in West Kalimantan, Indonesia. *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 7559–7564. [[CrossRef](#)] [[PubMed](#)]
21. Colfer, C.J.P.; Pfund, J.L. *Collaborative Governance of Tropical Landscapes*; Routledge: Abingdon, UK, 2011.
22. Laurance, W.F.; Sayer, J.; Cassman, K.G. Agricultural expansion and its impacts on tropical nature. *Trends Ecol. Evol.* **2014**, *29*, 107–116. [[CrossRef](#)] [[PubMed](#)]
23. Rist, L.; Feintrenie, L.; Levang, P. The livelihood impacts of oil palm: Smallholders in Indonesia. *Biodivers. Conserv.* **2010**, *19*, 1009–1024. [[CrossRef](#)]
24. Vadjunec, J.M.; Radel, C.; Turner II, B. Introduction: The continued importance of smallholders today. *Land* **2016**. [[CrossRef](#)]
25. Hettig, E.; Lay, J.; Sipangule, K. Drivers of households' land-use decisions—a critical review of micro-level studies in tropical regions. *Land* **2016**. [[CrossRef](#)]
26. Moeliono, M.; Limberg, G. *The Decentralization of Forest Governance: Politics, Economics and the Fight for Control of Forests in Indonesian Borneo*; Earthscan: London, UK, 2012.
27. Sayer, J.; Sunderland, T.; Ghazoul, J.; Pfund, J.L.; Sheil, D.; Meijaard, E.; Venter, M.; Boedhihartono, A.K.; Day, M.; Garcia, C. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 8349–8356. [[CrossRef](#)] [[PubMed](#)]
28. Sayer, J.A.; Margules, C.; Boedhihartono, A.K.; Sunderland, T.; Langston, J.D.; Reed, J.; Riggs, R.; Buck, L.E.; Campbell, B.M.; Kusters, K.; et al. Measuring the effectiveness of landscape approaches to conservation and development. *Sustain. Sci.* **2016**. [[CrossRef](#)]
29. Reed, J.; Van Vianen, J.; Deakin, E.L.; Barlow, J.; Sunderland, T. Integrated landscape approaches to managing social and environmental issues in the tropics: Learning from the past to guide the future. *Glob. Change Biol.* **2016**. [[CrossRef](#)] [[PubMed](#)]

30. Estrada-Carmona, N.; Hart, A.K.; DeClerck, F.A.; Harvey, C.A.; Milder, J.C. Integrated landscape management for agriculture, rural livelihoods, and ecosystem conservation: An assessment of experience from Latin America and the Caribbean. *Landsc. Urban Plan.* **2014**, *129*, 1–11. [[CrossRef](#)]
31. Smith, R.J.; Veríssimo, D.; Leader-Williams, N.; Cowling, R.M.; Knight, A.T. Let the locals lead. *Nature* **2009**, *462*, 280–281. [[CrossRef](#)] [[PubMed](#)]
32. Pfund, J.-L. Landscape-scale research for conservation and development in the tropics: Fighting persisting challenges. *Curr. Opin. Environ. Sustain.* **2010**, *2*, 117–126. [[CrossRef](#)]
33. Milder, J.C.; Hart, A.K.; Dobie, P.; Minai, J.; Zaleski, C. Integrated landscape initiatives for African agriculture, development, and conservation: A region-wide assessment. *World Dev.* **2014**, *54*, 68–80. [[CrossRef](#)]
34. Riggs, R.A.; Sayer, J.; Margules, C.; Boedhihartono, A.K.; Langston, J.D.; Sutanto, H. Forest tenure and conflict in Indonesia: Contested rights in Rempek Village, Lombok. *Land Use Policy* **2016**, *57*, 241–249. [[CrossRef](#)]
35. Bull, G.; Elliott, C.; Boedhihartono, A.; Sayer, J. Failures in tropical forest and conservation policy: What is the solution? *J. Trop. For. Sci.* **2014**, *26*, 1–4.
36. Li, T.M. *Social Impacts of Oil Palm in Indonesia: A Gendered Perspective from West Kalimantan*; CIFOR (Center for International Forestry Research): Bogor, Indonesia, 2015.
37. Institute for Policy Analysis of Conflict. *Indigenous Rights VS Agrarian Reform in Indonesia: A Case Study from Jambi*; Institute for Policy Analysis of Conflict: Jakarta, Indonesia, 2014.
38. Nusantara, A.M.A. *2015 Year-End Note*; University of Illinois: Champaign, IL, USA, 2015.
39. Astuti, R.; McGregor, A. Indigenous land claims or green grabs? Inclusions and exclusions within forest carbon politics in Indonesia. *J. Peasant Stud.* **2016**. [[CrossRef](#)]
40. Li, T.M. *Land's End: Capitalist Relations on an Indigenous Frontier*; Duke University Press: Durham, NC, USA, 2014.
41. Fairhead, J.; Leach, M.; Scoones, I. Green grabbing: A new appropriation of nature? *J. Peasant Stud.* **2012**, *39*, 237–261. [[CrossRef](#)]
42. McCarthy, J.F.; Vel, J.A.; Afiff, S. Trajectories of land acquisition and enclosure: Development schemes, virtual land grabs, and green acquisitions in Indonesia's outer islands. *J. Peasant Stud.* **2012**, *39*, 521–549. [[CrossRef](#)]
43. Corson, C.; MacDonald, K.I.; Neimark, B. Grabbing "green": Markets, environmental governance and the materialization of natural capital. *Hum. Geogr.* **2013**, *6*, 1–15.
44. Sandker, M.; Suwarno, A.; Campbell, B.M. Will forests remain in the face of oil palm expansion? Simulating change in Malinau, Indonesia. *Ecol. Soc.* **2007**, *12*, 37. [[CrossRef](#)]
45. Sandker, M.; Ruiz-Perez, M.; Campbell, B.M. Trade-offs between biodiversity conservation and economic development in five tropical forest landscapes. *Environ. Manag.* **2012**, *50*, 633–644. [[CrossRef](#)] [[PubMed](#)]
46. Sunderlin, W.D.; Angelsen, A.; Belcher, B.; Burgers, P.; Nasi, R.; Santoso, L.; Wunder, S. Livelihoods, forests, and conservation in developing countries: An overview. *World Dev.* **2005**, *33*, 1383–1402. [[CrossRef](#)]
47. Adams, W.M.; Aveling, R.; Brockington, D.; Dickson, B.; Elliott, J.; Hutton, J.; Roe, D.; Vira, B.; Wolmer, W. Biodiversity conservation and the eradication of poverty. *Science* **2004**, *306*, 1146–1149. [[CrossRef](#)] [[PubMed](#)]
48. Pimbert, M.P.; Ghimire, K. *Social Change and Conservation: Environmental Politics and Impacts of National Parks and Protected Areas*; Earthscan Publications: London, UK, 1997.
49. Colchester, M. *Salvaging Nature: Indigenous Peoples, Protected Areas and Biodiversity Conservation*; Diane Publishing: Collingdale, PA, USA, 1994.
50. Norton-Griffiths, M.; Southey, C. The opportunity costs of biodiversity conservation in Kenya. *Ecol. Econ.* **1995**, *12*, 125–139. [[CrossRef](#)]
51. Bebbington, A. Capitals and capabilities: A framework for analyzing peasant viability, rural livelihoods and poverty. *World Dev.* **1999**, *27*, 2021–2044. [[CrossRef](#)]
52. Sandker, M.; Campbell, B.M.; Nzooh, Z.; Sunderland, T.; Amougou, V.; Defo, L.; Sayer, J. Exploring the effectiveness of integrated conservation and development interventions in a central African forest landscape. *Biodivers. Conserv.* **2009**, *18*, 2875–2892. [[CrossRef](#)]
53. Sandker, M.; Campbell, B.M.; Ruiz-Pérez, M.; Sayer, J.A.; Cowling, R.; Kassa, H.; Knight, A.T. The role of participatory modeling in landscape approaches to reconcile conservation and development. *Ecol. Soc.* **2010**, *15*, 13. [[CrossRef](#)]
54. Collier, N.; Campbell, B.M.; Sandker, M.; Garnett, S.T.; Sayer, J.; Boedhihartono, A.K. Science for action: The use of scoping models in conservation and development. *Environ. Sci. Policy* **2011**, *14*, 628–638. [[CrossRef](#)]

55. Frees, E.W. *Longitudinal and Panel Data: Analysis and Applications in the Social Sciences*; Cambridge University Press: Cambridge, UK, 2004.
56. Thomas, D.R. A general inductive approach for analyzing qualitative evaluation data. *Am. J. Eval.* **2006**, *27*, 237–246. [[CrossRef](#)]
57. Buys, P. *At Loggerheads?: Agricultural Expansion, Poverty Reduction, and Environment in the Tropical Forests*; World Bank Publications: Washington, DC, USA, 2007.
58. Eghenter, C.; Putera, M.H.; Ardiansyah, I. *Masyarakat Dan Konservasi 50 Kisah Yang Menginspirasi Dari WWF Untuk Indonesia*; WWF-Indonesia: Jakarta, Indonesia, 2012.
59. Wollenberg, E.; Iwan, R.; Limberg, G.; Moeliono, M.; Rhee, S.; Sudana, M. Facilitating cooperation during times of chaos: Spontaneous orders and muddling through in Malinau District, Indonesia. In *Managing Forest Resources In A Decentralized Environment*; CIFOR (Center for International Forestry Research): Bogor, Indonesia, 2007; pp. 65–74.
60. Kusters, K.; de Foresta, H.; Ekadinata, A.; Van Noordwijk, M. Towards solutions for state vs. Local community conflicts over forestland: The impact of formal recognition of user rights in Krui, Sumatra, Indonesia. *Hum. Ecol.* **2007**, *35*, 427–438. [[CrossRef](#)]
61. Thorburn, C.C. The plot thickens: Land administration and policy in post-new order Indonesia. *Asia Pac. Viewp.* **2004**, *45*, 33–49. [[CrossRef](#)]
62. Sarkar, S.; Dyer, J.S.; Margules, C.; Ciarleglio, M.; Kemp, N.; Wong, G.; Juhn, D.; Supriatna, J. Developing an objectives hierarchy for multicriteria decisions on land use options, with a case study of biodiversity conservation and forestry production from Papua, Indonesia. *Environ. Plan. B: Plan. Design* **2016**, *4*, 0265813516641684. [[CrossRef](#)]
63. Margules, C.; Sarkar, S. *Systematic Conservation Planning*; Cambridge University Press: Cambridge, UK, 2007.
64. Chomitz, K.M.; Buys, P.; Giacomo, D.L.; Timothy, S.; Sheila, W. *At Loggerheads? Agricultural Expansion, Poverty Reduction and Environment In the Tropical Forests*; World Bank: Washington, DC, USA, 2007.
65. Andersen, L.E. *The Dynamics of Deforestation and Economic Growth in the Brazilian Amazon*; Cambridge University Press: Cambridge, UK, 2002.



© 2017 by the authors; licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).