Implications of local peoples' preferences in terms of income source and land use for Indonesia's national REDD-plus policy: evidence in East Kalimantan, Indonesia

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Abstract: This article tries to reveal the field reality in East Kalimantan, especially the preferences of villagers in terms of income source and land use, to ascertain the implications for Indonesia's national REDD-plus policy or one of the emerging regimes under UNFCCC. In forest lands, the villagers have no expectations for labour opportunities involving logging and planting trees in concession areas. In non-forest lands, villagers want to continue practicing swidden agriculture, to expand traditional rubber gardens, and to develop commercialised rubber plantations. They also think that rattan gardens and orchards are important. In order to suppress competition over land used for coal mining and oil palm plantations, to ensure villagers' rights to resources, and to conserve natural resources, it is recommended that Indonesia introduce programmes to support, as REDD-plus activities, the sustainable management of remaining forest and forest-like land uses such as orchards, rattan gardens, and traditional rubber gardens. This study shows the importance of not confining one's perspective to the REDD-plus policy framework determined by the government, but rather evaluating it by checking actual conditions in the field to aid constructive discussion.

Keywords: income source; land use; REDD-plus; East Kalimantan; Indonesia; environment; sustainable management; climate change.

Reference to this paper should be made as follows: Inoue, M., Kawai, M., Imang, N., Terauchi, D., Pambudhi, F. and Sardjono, M.A. (2013) 'Implications of local peoples' preferences in terms of income source and land use for Indonesia's national REDD-plus policy: evidence in East Kalimantan, Indonesia', *Int. J. Environment and Sustainable Development*, Vol. 12, No. 3, pp.244–263.

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1 Introduction

A new mitigation mechanism called Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) was proposed at the Eleventh Conference of the Parties (COP 11) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2005. UNFCCC COP16 at Cancun in December 2010 decided to encourage five mitigation activities in developing countries: reducing emissions from deforestation, reducing emissions from forest degradation, conserving forest carbon stocks, sustainably managing forests, and enhancing forest carbon stocks. REDD-plus or REDD+ is commonly used as a comprehensive term for these five activities. The decision also referred to the 'safeguards' in its Annex I, such as transparent and effective national forest governance, respect for the knowledge and rights of indigenous peoples and members of local communities, full and effective participation of relevant stakeholders, and consistency with the conservation of natural forests and biological diversity. In the decision, however, safeguards are not to be 'ensured', but 'promoted' and 'supported' when undertaking REDD-plus activities. It is also unclear how those provisions will be effectively operationalised (Parker, 2011).

Proponents of the REDD-plus mechanism at COP16 seemed to share the scientific view that land use change, especially deforestation, is responsible for around 20% of anthropogenic greenhouse gas emissions (IPCC, 2007), and that avoiding deforestation is a cost-effective way to reduce greenhouse gas emissions (Stern, 2006). A widely cited recent article (Pan et al., 2011) indicates that carbon emissions produced by tropical deforestation during 1990–2007 was equivalent to 40% of global fossil fuel emissions. Although avoiding deforestation is considered a cost-effective way to reduce emissions (Stern, 2006), this does not hold when considering the opportunity cost of giving up development of oil palm plantations and of maintaining forests (Hunt, 2009). Discussions based solely on the viewpoint of economic efficiency tend to support the assertion that oil palm companies should receive large compensation.

The role of governance is essential to REDD's success (Bofin et al., 2011). Governance is defined as the setting, application, and enforcement of the rules of the game, and such rules need to be legitimated if they are to be stable (Kjaer, 2004). One might expect that implementation of REDD-plus can potentially enhance the legitimacy of national forest policy by improving forest governance, in which the rights and participation of local people, including indigenous people, are ensured (Inoue, 2010). To evaluate the state of governance, the three criteria of 'effectiveness', 'efficiency', and 'equity' (Angelsen, 2008, 2009) should be taken into consideration. If governance issues are not addressed, however, that could result in failure to reduce emissions and even create perverse incentives to increase emissions and threaten the rights and livelihoods of forest-dependent communities (Bond et al., 2009). As such, REDD-plus appraisals should ensure the legitimacy of governance; they should introduce the perspectives of not only

'efficiency' in terms of economic aspects, including the issue of opportunity cost, but also 'effectiveness' in conserving forests and 'equity' for empowering local people and alleviating poverty.

Since the early 1980s, forest governance in developing countries has gradually been changing from a centralised top-down mode, in which local people are marginalised, to a decentralised bottom-up mode, in which they regained a certain degree of autonomy. The FAO (2010) reports that 80% of the world's forests are publicly owned, but that ownership and management of forests by communities, individuals, and private companies is on the rise. Other scholars (Sunderlin et al., 2007; Agrawal et al., 2008) even estimate that 27% of all forest lands are owned and administered by communities. The introduction of the REDD-plus mechanism should not discourage the trends that have prevailed over the last few decades. In the so-called 'REDD paradox' (Sandbrook et al., 2010), deforestation and forest degradation are promoted, and poverty is not alleviated, because of growing political incentives to recentralise governance. Recentralisation in turn is due to rising forest values resulting from the enormous amount of carbon trading (Clements, 2010). Preventing this paradox makes it important to ensure the 'safeguards', especially the rights and participation of local people. Recent articles (Hirsch et al., 2010; Phelps et al., 2011) have suggested that an optimistic 'win-win' outcome – wherein biodiversity conservation, sustainable development or poverty alleviation, and reducing emissions and enhancing carbon stocks are attained simultaneously and accompanied by appropriate safeguards – is too simplistic a description for REDD-plus, and possibly wrong. Both articles indicate that achieving equitable, efficient, and effective REDD-plus implementation will require a much better understanding of the long-term investment risks and inherent trade-offs involved.

In this context, the authors will focus on discrepancies between national REDD-plus policy and the field reality where REDD-plus activities are to be implemented. Indonesia is the focus of this study. One reason is that Indonesia has the most developed REDD legislation (Mather, 2010) among the initial nine member countries of the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD), which has the collaboration of three key UN agencies: UNDP, FAO, and UNEP. The other reason is that Indonesia is one of the countries which lost much forest between 2000 and 2010, together with Cambodia, Myanmar, and Papua New Guinea, while deforestation in that decade dropped significantly in Southeast Asia (FAO, 2011) overall. It definitely makes sense for Indonesia to implement REDD-plus activities appropriately to provide incentives for the conservation and sustainable management and development of forests.

When policy makers desire to create effective incentive mechanisms for local people, they must keep in mind that local people's main hopes and worries concern their incomes and livelihoods, while on the other hand they see REDD-plus as being primarily about forest protection (Angelsen et al., 2012). Thus, it is important to understand how local people intend to obtain income in the near future. It is also important to know what type of land use is preferable to them for generating income, because land is one of their most important income sources. Especially important are their genuine intentions, which are free of political bias arising from expectations of incentives from REDD-plus activities.

The objective of this article is to make constructive suggestions for Indonesia's REDD-plus policy by exploring local people's near-future preferences for income sources and land use, as these will greatly influence the implementation of REDD-plus

activities. Provided that community-based forest management, including REDD-plus (Molnar et al., 2011), is a major strategy for climate-change adaptation and mitigation, it is worthwhile to focus on the preferences of local people, who are the main stakeholders in community-based forest management.

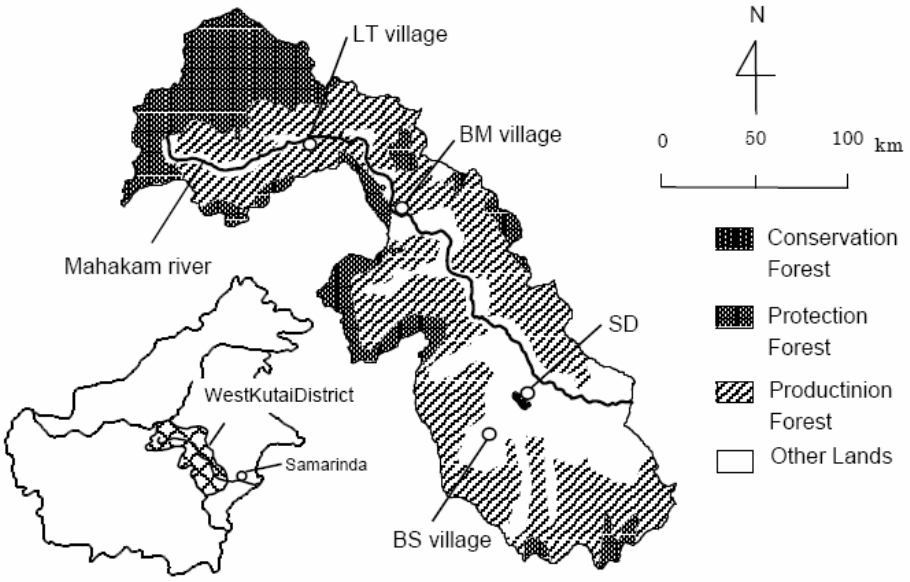
2 Methods

2.1 Selection of research villages

The province of East Kalimantan was selected for the research villages because the province is the centre of timber production and forest cover in Indonesia. According to the statistics of the Ministry of Forestry (Departemen Kehutatan, 2008), the province stands first in terms of natural forest concession area, at 6,581,712 ha, accounting for 25% of the national total; first in the volume of annual allowable cut, at 2,425,000 cubic meters, accounting for 27% of the national total; and third in terms of forest land area, at 14,651,553 ha, accounting for 11% of the national total, after the provinces of Papua and Central Kalimantan.

In this province, the authors selected West Kutai district, which has an area of 33,052 km^2 and in 2009 had a population of 168,900 (population density: 5.3 persons/km^2). The district is located along the uppermost reaches of the Mahakam River, is close to the border with Malaysia's state of Sarawak, has high predicted botanical richness and endemism values (Raes et al., 2009), and is on the forefront of natural forest logging operations.

Figure 1 Map of research villages in West Kutai district, province of East Kalimantan



Source: Created by authors based on Peta Peruntukkan Kawasan Kabupate Kutai Barat Propinsi Kalimantan Timur Kabupate Kutai Barat Propinsi Kalimantan Timur

In West Kutai district, four villages were selected for a questionnaire survey, based on two criteria: difficulty of access to the capital city Samarinda, and ethnicity (Table 1). Four ethnic groups, the Bahau, the Kenyah, the Benuaq, and the Tonyooi (or Tunjung), account for the majority of the indigenous people, known generally as the 'Dayak', in West Kutai district. All of them have a long history of practicing swidden agriculture for their livelihood, which is supplemented by hunting in the forest, fishing in the river, cultivating vegetables and fruit trees in former swiddens, and collecting various non-timber forest products (NTFPs) for their own use and for cash sale. But the Tonyooi, who live in village SD, independently started planting rubber trees (*Hevea brasiliensis*) extensively around their houses or in the bush and the fallow areas of former forest swiddens in the late 1950s. These are called 'traditional rubber gardens' in this article. The Tonyooi started planting a high-yield variety of rubber tree under projects supported by the government and Asian Development Bank in the 1980s and 1990s. Called 'commercialised rubber plantations' in this article, these are the main income source for the villagers at present; accordingly, they practice swidden agriculture only to supplement their income.

Table 1 Outlines of the villages

Village	*Major ethnicity*	*Population*	*Main subsistence*	*Other subsistence*
LT (most upper reaches)	Bahau	527	Swidden agriculture	Swallow nest/gold dust/wage labour (logging)
BM (upper reaches)	Kenyah	1,052	Swidden agriculture	Swallow nest/gold dust
BS (upper reaches)	Benuaq	1,063	Swidden agriculture	Orchard/rattan garden/wage labour
SD (middle reaches)	Tonyooi	1,820	Commercialised rubber plantation	Orchard/wage labour (coal mining)/gold dust

	Degree of modernisation	*Land category*	*Remarks*
LT (most upper reaches)	Low	Production forest and protection forest located	Primary forest remained/logging operation ongoing
BM (upper reaches)	Middle	Various land categories	Primary forest remained/logging operation expired
BS (upper reaches)	Middle	Various land categories	Primary forest remained/logging operation ongoing
SD (middle reaches)	High	Protection forest located	Primary forest exhausted

2.2 Data collection in villages

To explore the preferences of the villagers in terms of cash income sources and land-use options in 2013, the authors selected 30–70 married men in each village for two reasons: First, domestic decision-making in terms of future income sources and land-use patterns

usually reflects the preferences of husbands in indigenous communities in East Kalimantan, and second, it is more appropriate to ask married men than single men about the near future because the former are less likely to move out of the village.

The authors presented the following income options to respondents and asked them to choose the most, second-most, and third-most important ones for the year 2013, when the post-Kyoto framework will start:

1 Sale of timber: Meranti (*Shorea* spp.), kapur (*Dryobalanops* spp.), ulin (*Eusideroxylon zwageri*), sengon (*Albizia* spp.), and other species

2 sale of NTFPs: rattan, aloes-wood, Damar resin, deer, wild boars, birds, monkey gallstones, swallow nests, and honey

3 sale of gold dust and white sand

4 oil palm plantations

5 other perennial crops: rubber, coffee, and cacao,

6 rice

7 fruit

8 vegetables

9 commerce and brokerage

10 public officer or teacher

11 working at private companies

12 other labour: car or speed boat driver, carpenter, automobile repairman

13 others.

Using the questionnaires obtained in the villages, a score was then assigned to each income source selected by a respondent: 5 to the first priority, 3 to the second, and 1 to the third. Scores of all respondents were totalled according to income source.

Vegetation types in West Kutai district have a dynamism stemming from land-use patterns including primary forest, forest and bush fallows created by swidden agriculture, grassland due to overuse, oil palm plantations developed by private companies, and other vegetation on formally designated non-forest land, while on formally designated forest land there are natural and plantation forests created by forestry activities including reforestation and afforestation (Figure 2).

Respondents were also presented with the following land-use options in accordance with present land-use categories:

1 Swidden agriculture

2 traditional rubber gardens

3 commercialised rubber plantations

4 rattan gardens

5 orchards

6 sustainable timber production in forest lands

7 production of NTFPs

8 tree plantations

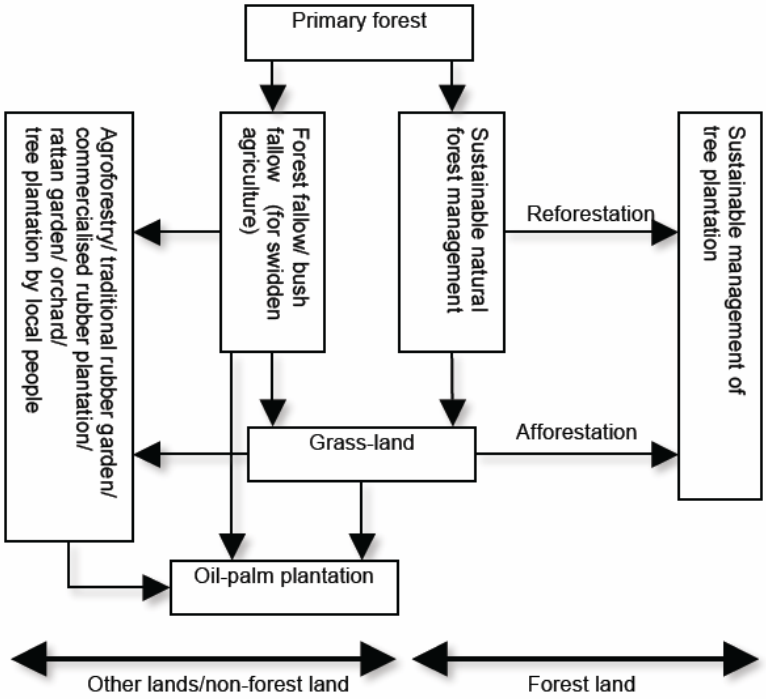
9 tree gardens, such as for sugar palms

10 oil palm plantations

11 others.

Respondents then evaluated the land-use options based on the 'pair-wise ranking' method.

Figure 2 Dynamism of key vegetation types in West Kutai district



In the pair-wise ranking method, respondents choose between a pair of options for every possible pair-wise combination of options, then sum the number of times each option was chosen across all such combinations. Table 2 shows an example of the questionnaire. Questionnaires were used to total the score of each land-use type by counting the frequency of selection by the respondent (e.g., swidden agriculture: 5, traditional rubber garden: 10, commercialised rubber plantation: 9, and rattan garden: 3).

The authors conducted a questionnaire survey in November and December 2010, requiring a stay of up to a week in each village. There were 33 respondents in village LT, 33 in village BM, 70 in village BS, and 34 in village SD. After the questionnaire survey, respondents were categorised by applying the 'simple wealth ranking' method in collaboration with the leaders of each village. The authors interviewed the leaders and discussed the criteria they used to recognise wealth in their villages. Based on their criteria, they divided all the respondents into three wealth classes, or 'emic' categories:

'very rich', 'rich', and 'fair' (instead of 'poor' because of their hesitation to use the term 'poor').

Table 2 An example of questionnaire: priority of land use type in 2013

Land use category		*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*Total**
(1)	Swidden agriculture	×	2	3	1	5	1	1	8	9	1	1	5
(2)	Traditional rubber garden	×	×	2	2	2	2	2	2	2	2	2	10
(3)	Commercialised rubber plantation	×	×	×	3	3	3	3	3	3	3	3	9
(4)	Rattan garden	×	×	×	×	5	④	④	8	9	10	④	3**
(5)	Orchard	×	×	×	×	×	5	5	8	9	10	5	5
(6)	Sustainable timber production	×	×	×	×	×	×	6	6	6	6	6	5
(7)	Production of NTFP	×	×	×	×	×	×	×	8	9	7	7	2
(8)	Tree plantation	×	×	×	×	×	×	×	×	9	10	8	5
(9)	Tree garden; sugar palm, etc.	×	×	×	×	×	×	×	×	×	10	9	6
(10)	Oil palm plantation	×	×	×	×	×	×	×	×	×	×	10	5
(11)	Others	×	×	×	×	×	×	×	×	×	×	×	0

Notes: *The authors get the total score of each land use pattern by counting the frequency of appearance.
**For example, the authors find number 4 (rattan garden) three times in the table.

No mention of REDD-plus was made to respondents during interviews because the object was to determine their genuine preferences, free from political bias arising from the expectation of incentives from REDD-plus activities. This research tactic also has the advantage of reducing respondents' tendency to lie about the level of importance of forest products even if such activities are illegal.

2.3 Information on national REDD-plus programmes and the reality in the field

The study collected and described relevant laws and regulations issued by the government of Indonesia, and local ordinances issued by West Kutai district, with special attention to their purposes and implementing agencies. Interviews were also conducted with district forest service staff members and village leaders to determine how the programmes were actually being implemented.

3 Indonesian national programmes to accommodate REDD-plus

National forest lands, which are under the jurisdiction of the Ministry of Forestry, are categorised into production forests (*Hutan Produksi*), protection forests (*Hutan Lindung*), conservation forests (*Hutan Konservasi*), and convertible production forests (*Hutan Produksi dapat Dikonversi*). These categories are based on 1983 forest land use planning with consensus (*Tata Guna Hutan Kesepakatan: TGHK* in Indonesian). Meanwhile, overall land-use planning is under the authority of local governments, based on Law No. 24/1992 (renewed by Law No. 26/2007) regarding spatial planning (*Rencana Tata Ruang: RTR*). Under spatial planning, land has since 2007 been divided into forestry zones (*Kawasan Budidaya Kehutanan: KBK*) and other zones (*Areal Penggunaan Lain: APL*), including conservation zones, although it was initially classified into three types: forestry zones (*KBK*), non-forestry zones (*Kawasan Budidaya Non Kehutanan: KBNK*), and protected zones (*Kawasan Lindung*).

When the Ministry of Forestry agrees that convertible production forests within concession boundaries may be utilised for non-forestry activities (e.g., crop estates), they can be classified as other zones (*APL*) in spatial plans and placed under the jurisdiction of local governments (district or city). When a local government proposes to change a forestry zone that was classified under a previous spatial plan into a different zone (which might also be a non-forestry zone) under a new spatial plan, and the Ministry of Forestry approves the proposal, timber companies are allowed to continue logging activities until their concessions expire, after which the land status changes. Since most lands including other zones (that is, non-forestry zones) in West Kutai district are traditionally occupied without legal certificates, it is officially difficult to recognise private forests, although many timber plantations are found in the area.

The Minister of Forestry issued two important decrees to prepare for the implementation of REDD-plus activities. Minister's decree No. 30 in 2009 declared that REDD would be implemented for all forest categories such as production forests, protection forests, and conservation forests, and that REDD would be implemented for every type of forest ecosystem, such as natural forests and plantation forests. Minister's decree No. 36 in 2009 determined that the carbon-sink and absorption project would last 25 years. More importantly, the decree showed the distribution of profits among stakeholders (Table 3) to show which activity benefits whom.

The government benefits by receiving 50% of the profits from the management of forests for specific purposes such as research and education, and the management of protection forests. Project initiators and sponsors benefit by receiving 60% of the profits from forest management for timber utilisation based on concessions in natural forests, plantation forests, and restored ecosystems, and they receive 50% of profits from activities in the capacity of Forest Management Units. Local people benefit the most because they receive 70% of the profits from managing individual forests (*Hutan Rakyat*) on privately owned land and managing customary forests (*Hutan Adat*) on national land, while 50% of profits go to villager groups managing plantation forests (*Hutan Tanaman Rakyat: HTR*) and community forests (*Hutan Kemasyarakatan*) on national forest land, and 50% to village organisations managing village forests (*Hutan Desa*). Except for rights and concessions issued on individual forests on private land, all other rights and concessions are issued on national forest land.

Table 3 Distribution of profit among stakeholders

Unit: %

Rights/concession	*Governments**	*Local community*	*Project initiator/sponsor*
Timber utilisation (of natural forest/plantation forest/ecosystem restoration)	20	20	60
Timber utilisation (of plantation forest by people's group	20	50	30
Individual forest (on private land)	10	70	20
Community forest (by people's group)	20	50	30
Customary forest (by indigenous community)	10	70	20
Village forest (by village organisation)	20	50	30
Forest management unit	30	20	50
Forest for specific purposes and utilisation/protection forest	50	20	30

Notes: *Distribution on governments: state (40%), province (20%), district (40%)

Source: Appendix III of Minister's Decree No. 36, 2009

4 Villagers' preferences

4.1 Preferences in terms of income sources

The study determined the preference rankings of income sources in 2013 (Table 4). It was not possible to categorise the people of village LT into wealth classes because village leaders found it difficult to apply the 'wealth ranking' method to the villagers', who were largely homogeneous in term of wealth.

In village LT, other perennial crops (rubber and cacao) are prominent, followed by rice. Other income sources (pig raising) and NTFPs (swallow nests, aloes-wood, rattan, wild boars, and deer) are also considered to be important income sources to some extent. Results imply that villagers do not expect continuous logging activities by a concessionaire as an income source in the near future.

In village BM, rice and other perennial crops (rubber and cacao) are the most important, followed by gold dust and commerce (management of small shops) for the village as a whole. Villagers categorised in the 'fair' wealth category, however, expect that timber will be an income source even though they risk arrest, because such activities imply illegal logging.

In village BS, rice and other perennial crops (rubber) are the most important, followed by timber and NTFPs (rattan, wild boar, deer, resin, aloes-wood) for the village as a whole. In village SD, sale of other perennial crops (rubber) is prominent, followed by public officer salaries, rice, and commerce for the village as a whole. No remarkable differences among wealth categories were found in either village.

Table 4 People's preferences in terms of income sources

Village	*Wealth category (number of households)*	*Percentage of farmers**	*Preference ranking of income sources (total score)*			
			1st	*2nd*	*3rd*	*4th*
LT	Whole (33)	94%	Other perennial crops (140)	Rice (88)	Others (18)	NTFP (14)
BM	Very rich (5)	60%	Commerce (14)	Rice (10)	Public officer and teacher (8)	Other perennial crops (6)
	Rich (20)	80%	Rice (64)	Other perennial crops (54)	Private company (15)	Gold dust (11)
	Fair (8)	88%	Other perennial crops (27)	Rice (17)	Gold dust (8)	Timber (8)
	Whole (33)	79%	Rice (91%)	Other perennial crops (87)	Gold dust (22)	Commerce (22)
BS	Very rich (6)	67%	Rice (15)	Other perennial crops (13)	NTFP (13)	Timber (5)
	Rich (41)	85%	Rice (108)	Other perennial crops (97)	Timber (53)	NTFP (32)
	Fair (23)	96%	Rice (72)	Other perennial crops (40)	NTFP (39)	Timber (29)
	Whole (70)	87%	Rice (195)	Other perennial crops (150)	Timber (87)	NTFP (84)
SD	Very rich (5)	20%	Other perennial crops (21)	Public officer and teacher (11)	Commerce (4)	Other labours (3)
	Rich (11)	18%	Other perennial crops (49)	Public officer and teacher (24)	Commerce (8)	Rice (7)
	Fair (18)	72%	Other perennial crops (84)	Public officer and teacher (19)	Rice (14)	Others (12)
	Whole (34)	47%	Other perennial crops (154)	Public officer and teacher (54)	Rice (21)	Commerce (17)

Notes: *The number of farming household/total household × 100.

Source: Result of survey conducted by authors in November–December 2010.

4.2 Preferences in terms of land use

The study determined the land-use preference ranking in 2013 (Table 5). Land-use type ranking over 10 other land-use types in 2013 gets a score of 10.

In village LT, swidden agriculture is the most important land-use type, followed by traditional rubber gardens, commercialised rubber plantations, and other uses (cacao gardens), in that order of preference. There is a growing tendency to plant perennial crops such as rubber after harvesting rice from a swidden. The income generated by rubber gardens has gradually become more attractive to the Bahau people, though the importance of swidden agriculture as the mainstay of their livelihood has not changed. Although they did not select orchards on the questionnaire, they always plant fruit trees around their houses because orchards are considered important evidence of their rights, ownership of the land, and claim over the territory (Nanang and Inoue, 2000).

In village BM, commercialised rubber plantations, followed by traditional rubber gardens, other crops (cacao gardens), and swidden agriculture, are the most important for the Kenyah people who migrated from Apau Kayan, that is, the central plateau of Borneo island, in the early 1970s (Imang et al., 2008). The fact that most of them had little knowledge about commercialised rubber plantations implies that their preference for commercialised rubber plantations over other land-use types familiar to them might be a transitory phenomenon. The Kenyah people are unenthusiastic about new agricultural practices due to the legacy of traditional values, though they are quite responsive to changes in livelihood diversification in general (Imang et al., 2008). On the other hand, the questionnaire survey shows that NTFPs would not be important to their future livelihood, even though they have until now been largely dependent on the collection of NTFPs and the practice of swidden agriculture (Imang et al., 2009).

In village BS, the traditional rubber garden is the most important land use, followed by swidden agriculture, commercialised rubber plantations, and orchards. A characteristic of the village is the preference for traditional rubber gardens over commercialised rubber plantations. The other feature is the preference for rattan gardens by villagers in the 'fair' wealth category because the area has been a rattan-producing district since the colonial period (Inoue and Lahjie, 1990). A recent article revealed that villagers selected rubber production as a source of cash income because of its high 'return on labour', and they sustained rattan production because of high 'flexibility' in terms of daily use. On the other hand, they hesitated to cultivate oil palms because of low 'flexibility' and 'autonomy' due to domination by oil-palm company policy, even while expecting a high 'return on labour' (Terauchi et al., 2010).

In village SD, commercialised rubber plantations are the most important, followed by traditional rubber gardens, swidden agriculture, and orchards. Even though the village is somewhat urbanised, orchards are still considered by villagers to be one of the important land-use types. Traditionally, village scenery was characterised by orchards, in other words family-owned forest gardens, called *lembo* in the local language (Arifin, 2000), which look like forests at first glance. An important fact is that the 'very rich' do not prefer swidden agriculture any more because of the land shortage; the 'very rich' and the 'rich' prefer oil-palm plantations as a future income source.

Table 5 People's preferences in terms of land use type

Village	*Wealth category (number of households)*	*Preference ranking of land use types (average score per respondent)*			
		1st	*2nd*	*3rd*	*4th*
LT	Whole (33)	Swidden agriculture (8.2)	Traditional rubber garden (7.7)	Commercialised rubber plantation (7.3)	Others (7.1)
BM	Very rich (5)	Commercialised rubber plantation (8.6)	Traditional rubber garden (7.2)	Cacao garden* (7.2)	Swidden agriculture (6.6)
	Rich (20)	Commercialised rubber plantation (7.5)	Traditional rubber garden (7.5)	Cacao garden* (7.2)	Swidden agriculture (6.6)
	Fair (8)	Commercialised rubber plantation (8.0)	Cacao garden* (6.3)	Swidden agriculture (6.1)	Orchard (5.9)
	Whole (33)	Commercialised rubber plantation (7.1)	Traditional rubber garden (6.4)	Cacao garden* (6.3)	Swidden agriculture (5.9)
BS	Very rich (6)	Traditional rubber garden (9.0)	Orchard (7.0)	Swidden agriculture (6.2)	Rattan garden (6.2)
	Rich (41)	Traditional rubber garden (8.5)	Commercialised rubber plantation (6.3)	Swidden agriculture (6.2)	Orchard (5.8)
	Fair (23)	Traditional rubber garden (8.8)	Swidden agriculture (7.0)	Rattan garden (7.0)	Orchard (6.0)
	Whole (70)	Traditional rubber garden (8.6)	Swidden agriculture (6.4)	Commercialised rubber plantation (6.1)	Orchard (6.0)
SD	Very rich (5)	Commercialised rubber plantation (9.6)	Traditional rubber garden (8.6)	Oil-palm plantation (6.8)	Orchard (6.6)
	Rich (11)	Commercialised rubber plantation (9.6)	Traditional rubber garden (8.7)	Swidden agriculture (6.0)	Oil-palm plantation (5.9)
	Fair (18)	Commercialised rubber plantation (9.6)	Traditional rubber garden (9.1)	Swidden agriculture (6.9)	Orchard (5.9)
	Whole (34)	Commercialised rubber plantation (9.6)	Traditional rubber garden (8.9)	Swidden agriculture (6.2)	Orchard (5.8)

Notes: *In village BM, all of 'others' refer to 'cacao garden'.

Source: Result of survey conducted by authors in November–December 2010

4.3 Implications in cultural context

Throughout history, the indigenous people in Kalimantan have always adapted themselves to their circumstances or their surrounding ecology and economy. They changed the rotation cycle of swidden agriculture, collected profitable NTFPs in accordance with market prices, introduced new crops for sale, left their villages in search of temporary work such as logging, and migrated from their native lands to other places (Inoue, 2011). Swidden agriculture, however, was indispensable to their livelihood as the core of their culture and identity. Their high adaptability to circumstances was considered dependent on swidden agriculture and forest ecosystems as a safety net.

Provided that they do not desire to completely convert their lifestyle in the adaptation to industrialisation, but to enjoy the benefits of modernisation while maintaining their livelihood assets, such as land and forests (Inoue, 1994), the result of the questionnaire survey might simply reflect their attitude. Basically, the villagers desire to diversify income sources and land use to achieve a better life. They take every opportunity for effective land use, such as rubber production and seeking income sources such as NTFPs, but would hesitate to dismantle and lose their safety net. Such understanding might be the premise for the introduction of REDD-plus mechanisms.

5 Discussion

5.1 Challenges to improving activities on national forest land

Although private companies are the main actors on national forest land, this study has perhaps found implications for activities conducted by local people. Based on the information obtained, currently in West Kutai district the management of community forests and the management of village forests are not found among the formally recognised four activities implemented by local people. This is because:

1 most of the national forest lands are already under concessions held by private companies

2 local people hesitate to navigate the complicated formalities for obtaining permission

3 local people do not get enough information on national programmes because the commitment of the local government is limited to merely passing on information

4 the programmes are not very attractive to local people because they cannot get land ownership.

However, some villagers have applied for permission to manage plantation forests as a group. The authors were unable to find instances of customary forest (*Hutan Adat*) management, which is formally supported by the government, because a minister's decree has not yet been issued to guide the formalities for approval. It is evident that the authors' future studies should focus on these three activities: management of village forests (*Hutan Desa*) by village organisations, management of community forests (*Hutan Kemasyarakatan*) by local people's groups, and group management of plantation forests (*Hutan Tanaman Rakyat: HTR*). Future studies should further investigate these activities in terms of achieving equitable, efficient, and effective forest governance to ensure legitimacy of REDD-plus policies.

The questionnaire survey revealed that people still somewhat prefer the income generated from selling timber and NTFPs such as swallow nests, aloes-wood, resin, and forest game. This finding implies that it is possible for them to use these resources as livelihood assets, even though forest lands are usually far from their residences. At the same time, they do not expect work opportunities for logging and planting trees in the concession areas held by private companies. In addition to the group management of plantation forests (*Hutan Tanaman Rakyat: HTR*), the authors recommend incorporating the management of timber and NTFPs by local people into the programmes approved as REDD-plus activities.

5.2 Significance of REDD-plus activities on non-forest land

Indonesia has two tracks for land-use planning: *TGHK* for forest lands under the authority of the Ministry of Forestry, and *RTR* for all the land under the authority of local governments, as explained above. It is important to note that these two plans target different land types. The provincial government of East Kalimantan is revising its spatial plan and will set a target different from that in Governor's Notification No. 50/K.443 of 1999. In accordance with district land use planning (*Rencana Tata Ruang Wilayah Kabupaten: RTRWK*) in 1996, 69% of the total land area of West Kutai district was designated as forest land, and 31% as non-forest land. The National Development Planning Agency of Indonesia (BAPPENAS, 2010) used Landsat to estimate that 30% of legally designated forest land was not forested, while 15% of legally designated non-forest land was forested. One can easily imagine that certain portions of non-forest land in West Kutai district are still forested.

In accordance with national policy, all programmes supported by the district should be practiced on non-forest land or other zones (APL), consisting of legally designated private land and national non-forest land without clear legal ownership. West Kutai district issued local ordinance No. 12 in 2003 regarding implementation of community forestry in accordance with local ordinance No. 18 of 2002 regarding forestry, and proposed four landmark models of forest management: customary forest management, village forest management, individual forest management, and collaborative forest management involving timber companies and local people. In 2009, the ordinance was revoked because of opposition by the Ministry of Forestry (Nugroho et al., 2009). As a result, the authority of the district forest service over non-forest land was considerably limited because the central government delegated authority over that land to the local government (mainly other sectors such as agriculture and mining services), even though a large portion of that land is probably forested.

The questionnaire survey of local people reveals that the continuation of swidden agriculture, developing and extending traditional rubber gardens and commercialised rubber plantations, and developing cacao gardens will constitute an important basis for their livelihood in 2013. Furthermore, the fact that people have a preference for rattan gardens and orchards, which look like forests, implies the importance and effectiveness for landscape conservation of sustainably managing non-forest land resources.

Although Forestry Minister's Decree No. 30 in 2009 declared that REDD activities are conducted on any type of land ownership, large portions of the non-forest land in West Kutai district have an ambiguous legal status. First, the land is regarded as national land, because none of the land has been registered in the names of individuals. Second,

the land is categorised as non-forest land or other land under local government spatial planning.

The 'national non-forest lands' in West Kutai district, where district forest service authority is highly limited, are major targets for coal mining and development of large-scale oil-palm plantations. According to information from the district agricultural service, there are 40 concession holders for development of large-scale oil-palm plantations in West Kutai district. The total concession area amounted to 547,000 ha in 2010. According to information from the district mining service, 198 companies have official permission for coal mining, which accounts for the second-largest number of concessions in the province of East Kalimantan, where 22% of the total land area is allocated to coal mining. There are concerns that oil-palm plantation development by private companies will have irreversible negative impacts on the livelihoods of the local people (Kawai and Inoue, 2010), and that most of the forest vegetation of national non-forest land will be rapidly devastated.

In order to combat the deterioration of the land, to ensure the rights of local people, and also to provide appropriate incentives to local people in accordance with the villagers' preferences, it is recommended that the government support the sustainable management of remaining forest and forest-like land uses such as orchards (*lembo or munatn*), rattan gardens, and traditional rubber gardens as REDD-plus activities. However, since those traditional forest-based activities are mostly small-scale and managed by individuals or small groups of people, assistance is needed to strengthen institutional capacity that will enable coordination among the land users. Academicians or NGOs could play very important roles for this purpose.

6 Conclusions and policy implications

This study revealed the villagers' true preferences. Specifically, in forest lands, they have no expectations for labour opportunities of logging and planting trees in concession areas. In non-forest lands, villagers want to continue practicing swidden agriculture, to expand traditional rubber gardens, and to develop commercialised rubber plantations. They also think that rattan gardens and orchards are important. As discussed above, in accordance with the villagers' preferences, the authors recommend that the management of timber and NTFPs by local people be incorporated into the programmes approved as REDD-plus activities in forest land, and also that support be given to the sustainable management of remaining forest and forest-like land as REDD-plus activities in non-forest land.

Fortunately, Indonesia has a national programme called 'Forest and Land Rehabilitation' (*Rehabilitasi Hutan dan Lahan: RHL*), which is, however, not formally connected to REDD-plus activities. The programme supports various activities initiated by local people:

1 reforestation activity on protected forest land

2 re-greening activities on non-forest land including 'individual forestry'; 'individual agroforestry', in which trees are intercropped with rice, maize, or other crops; 'forest-related activities', including the management of NTFPs such as rattan, aloes-wood, and sugar palm; and 'individual gardens' of rubber and cacao.

Actually, some people in West Kutai district have received government support to start such activities, and their approval as REDD-plus activities by the government even on non-forest land might provide an excellent incentive for local people to contribute to carbon sequestration and to biodiversity conservation, which would achieve effective, efficient, and equitable REDD-plus implementation.

The study implies that one should not confine one's perspective to the REDD-plus policy framework determined by the government, but evaluate it by checking actual conditions in the field, especially grassroots preferences in terms of income sources and land-use type, in order to fuel constructive discussion on how to improve the REDD-plus mechanism.

Acknowledgements

The authors thank Mr. Martinus Nanang for supporting evaluation of the national programme, Mr. Hiroyuki Oba for assisting the questionnaire survey, and many respondents in the villages. The authors gratefully acknowledge financial support by the Environment Research and Technology Development Fund (D-1005, headed by Professor Toshinori Okuda, Hiroshima University) of the Ministry of the Environment, Japan.

References

Agrawal, A., Chhatre, A. and Hardin, R. (2008) 'Changing governance of the world's forests', *Science*, Vol. 320, No. 5882, pp.1460–1462.

Angelsen, A. (Ed.) (2008) *Moving ahead with REDD: Issues, Options and Implications*, Center for International Forestry Research (CIFOR), Bogor.

Angelsen, A. (Ed.) (2009) *Realising REDD+: National Strategy and Policy Options*, Center for International Forestry Research (CIFOR), Bogor.

Angelsen, A., Brockhaus, M., Sunderlin, W.D. and Verchot, L.V. (Eds.) (2012) *Analysing REDD+: Challenges and Choices*, Center for International Forestry Research (CIFOR), Bogor.

Arifin, M. (2000) 'Lembo, Simpukng, dan Sipungk: Suatu Studi Etnoekologi Terhadap Orang Dayak Tunjung, Benuaq dan Pasir', *Media CSF*, Vol. 1, No. 1, pp.7–9.

BAPPENAS (2010) *Draft Strategi Nasional REDD+*, BAPPENAS, Jakarta.

Bofin, P., Du Preez, M.L., Standing, A. and Williams, A. (2011) *REDD Integrity: Addressing Governance and Corruption Challenges in Schemes for Reducing Emissions from Deforestation and Forest Degradation (REDD)*, Chr. Michelsen Institute (CMI), Bergen.

Bond, I., Grig-Gran, M., Wertz-Kanounnikoff, S., Hazlewood, P., Wunder, S. and Angelsen, A. (2009) *Incentives to Sustain Forest Ecosystem Services: A Review and Lessons for REDD*, International Institute for Environment and Development, London.

Clements, T. (2010) 'Reduced expectations: the political and institutional challenges of REDD+', *Fauna & Flora International, Oryx*, Vol. 44, No. 3, pp.309–310.

Departemen Kehutatan (2008) *Statistik Kehutanan Indonesia Tahun 2008*, Departemen Kehutatan, Jakarta.

FAO (2010) *Global Forest Resources Assessment 2010*, FAO, Rome.

FAO (2011) *State of The World's Forests 2011*, FAO, Rome.

Hirsch, P.D., Adams, W.M., Brosius, J.P., Zia, A., Bariola, M. and Dammert, J.L. (2010) 'Acknowledging conservation trade-offs and embracing complexity', *Conservation Biology*, Vol. 25, Issue 2, pp.259–264.

Hunt, C.A.G. (2009) *Carbon Sinks and Climate Change: Forests in the Fight against Global Warming*, Edward Elgar, Cheltenham.

Imang, N., Inoue, M. and Sardjono, M.A. (2008) 'Tradition and the influence of monetary economy in swidden agriculture among the Kenyah People of East Kalimantan, Indonesia', *International Journal of Social Forestry*, Vol. 1, No. 1, pp.61–82.

Imang, N., Inoue, M. and Sardjono, M.A. (2009) 'Importance of boundaries in customary resource management under decentralized policies: case study in indigenous Kenyah Dayak, East Kalimantan, Indonesia', *Journal of Forest Economics*, Vol. 55, No. 3, pp.35–43.

Inoue, M. (1994) 'Forest utilization and economic development in Indonesia', in Nagata, S., Inoue, M. and Oka, H. (Eds.): *Utilization and Regeneration of Forest Resources*, (in Japanese), pp.92–145, Nobunkyo, Tokyo.

Inoue, M. (2010) 'Appropriate incentive distribution mechanisms under emerging REDD-plus regime: focusing on triple-benefit and legitimacy', (in Japanese), *Research on Environmental Disruption*, Vol. 40, No. 1, pp.16–22.

Inoue, M. (2011) 'Local commons in a global context', in Osaki, M., Braimoh, A.K. and Nakagami, K. (Eds.): *Designing Our Future: Perspectives on Bioproduction, Ecosystems and Humanity*, pp.254–266, United Nations University Press, Tokyo.

Inoue, M. and Lahjie, A.M. (1990) 'Dynamics of swidden agriculture in East Kalimantan', *Agroforestry Systems*, Vol. 12, No. 3, pp.269–284.

IPCC (2007) *Climate Change 2007: The Physical Science Basis*, Cambridge University Press, Cambridge.

Kawai, M. and Inoue, M. (2010) 'Possibility of moderate industrialization as alternative development strategy to oil palm plantation: the case of middle-upper Mahakam Region in East Kalimantan, Indonesia', (in Japanese), *Forest Economy*, Vol. 63, No. 7, pp.1–17.

Kjaer, A.M. (2004) *Governance*, Polity Press, Cambridge.

Mather, R. (Ed.) (2010) *Preparing REDD in Vietnam, Lao PDR and Cambodia: Designing a REDD – Compliant Benefit Distribution System*, IUCN Asia Regional Office, Bangkok.

Molnar, A., France, M., Purdy, L. and Karver, J. (2011) *Community-Based Forest Management: The Extent and Potential Scope of Community and Smallholder Forest Management and Enterprises*, The Rights and Resources Initiative, Washington, DC.

Nanang, M. and Inoue, M. (2000) 'Local forest management in Indonesia: a contradiction between national forest policy and reality', *International Review for Environmental Strategies*, Vol. 1, No. 1, pp.175–191.

Nugroho, Y., Russel, I. and Sardjono, M.A. (2009) *Policy Brief: Desentralisasi dan resentralisasi menajemen hutan-dampak dan implikasi di Kutai Barat dan Gunungkidul*, Crawford School of Economics and Government, The Australian National University, Canberra.

Pan, Y., Birdsey, R.A., Fang, J., Houghton, R., Kauppi, P.E., Kurz, W.A., Phillips, O.L., Shvidenko, A., Lewis, S.L., Canadell, J.G., Ciais, P., Jackson, R.B., Pacala, S., McGuire, A.D., Piao, S., Rautiainen, A., Sitch, S. and Hayes, D. (2011) 'A large and persistent carbon sink in the world's forests', *Science*, Vol. 333, No. 6045, pp.988–993.

Parker, C. (2011) *Policy Brief: The Outcome for Forests Emerging from Cancun*, Global Canopy Programme (GCP), Oxford.

Phelps, J., Webb, E.L. and Koh, L.P. (2011) 'Risky business: an uncertain future for biodiversity conservation through REDD+', *Conservation Letters*, Vol. 4, No. 2, pp.88–94.

Raes, N., Roos, M.C., Slik, J.W.F., Van Loon, E.E. and Ter Steege, H. (2009) 'Botanical richness and endemicity patterns of Borneo derived from species distribution models', *Ecography*, Vol. 32, Issue 1, pp.180–192.

Sandbrook, C., Nelson, F., Adams, W.M. and Agrawal, A. (2010) 'Carbon, forests and the REDD paradox', *Fauna & Flola International, Oryx*, Vol. 44, No. 3, pp.330–334.

Stern, N. (2006) *The Economics of Climate Change*, Cambridge University Press, Cambridge.

Sunderlin, W.D., Dewi, S. and Puntodewo, A. (2007) *Poverty and Forests: Multi-Country Analysis of Spatial Association and Proposed Policy Solutions*, Center for International Forestry Research (CIFOR), Bogor.

Terauchi, D., Setsuda, T. and Inoue, M. (2010) 'Preference of swiddeners to rattan, rubber and oil palm: based on the evidence from Besiq Village, Indonesia's Province of East Kalimantan (in Japanese)', *Journal of Japanese Forest Society*, Vol. 92, No. 5, pp.247–254.