
How nature is used and valued by villagers in two villages in Uut Murung

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ABSTRAK

Masyarakat lokal di bagian hulu Uut Murung hidup dalam lingkungan hutan yang terpencil, dengan sumber daya alam yang sangat kaya, sehingga banyak pihak yang tertarik, baik dari pemerintahan, industri ekstraktif dan pelaku konservasi. Penelitian ini bertujuan untuk memahami ketergantungan masyarakat lokal terhadap sumber daya alam dan perbedaan nilai pemanfaatan. Penelitian ini dilakukan dengan melaksanakan ekspedisi selama dua bulan ke dua desa di Uut Murung dengan menggunakan kuisioner, metode perangkian dan pertanyaan semi terstruktur. Secara umum masyarakat lokal melakukan berbagai aktivitas untuk mempertahankan hidupnya, seperti memancing, berburu, berkebun dan mencari kayu gaharu. Nilai terpenting sumber daya alam menurut responden dari dua desa tersebut adalah sebagai sumber makanan dan air, namun sumber daya juga penting sebagai tempat untuk hidup, cadangan untuk obat-obatan dan cadangan untuk kebutuhan komoditas lainnya. Berbagai spesies satwaliar yang dijumpai digunakan sebagai bahan makanan, komoditas, obat-obatan dan bentuk pemanfaatan lainnya, seperti untuk kebutuhan ritual tradisional. Kami berpendapat bahwa anggota masyarakat pada lokasi penelitian mungkin mempunyai pemahaman yang fleksibel dan untung-untungan. Temuan kami juga mendukung pendapat yang menyatakan bahwa sumber daya bisa saja memiliki lebih dari satu kegunaan, dan bukan itu saja, setiap komunitas berbeda dari komunitas lainnya, begitu juga, di dalam komunitas itu sendiri pemahamannya juga tidaklah sama. Temuan kami menekankan pentingnya pemahaman terhadap ketergantungan masyarakat lokal terhadap sumber daya, serta struktur sosial yang berperan di belakang pemanfaatan sumber daya, untuk kesuksesan inisiatif konservasi dan pembangunan jangka panjang.

ABSTRACT

Local communities in the upstream part of Uut Murung live in a remote forest environment. Due to its richness of natural resources there has been much interest in the region by various actors, including the government, extractive industry and conservationists. This study aimed at understanding local peoples dependencies on natural resources and the different kind of use values. Therefore, we conducted a two month expedition to two villages in Uut Murung where we conducted questionnaires, ranking methods and semi structured interviews. In general, locals were found to engage in a variety of activities to sustain livelihoods, such as fishing, hunting, gardening and searching for eaglewood. Respondents from both villages valued nature as most important from food and water supply, but also as a place to live, a stock for medicines and a stock for commodities. Animal species were found to serve different purposes for food, commodities, medicine to other purposes, such as traditional rituals. We argue that community members at our study sight might behave opportunistically despite being flexible. Our findings support the idea that a single resource might have more than one purpose; each community differs from each other, but also even within the community itself, is not homogeneous. Our findings stress the importance that locals dependencies on natural resources and social structures behind resource use, need to be understood for the long term success of any conservation or development initiative.

Keywords: *resource use, livelihoods, Murung Raya, perceptions, conservation*

Received 12th June, 2014; revision accepted 1st February, 2015

INTRODUCTION

Uut Murung covers 726,300 ha, is one of the largest sub-districts in the north-eastern part of Murung Raya, comprising of huge areas of rainforest (Badan Pusat Statistik Kabupaten Murung Raya, 2014). The biodiversity rich Muller-Schwaner mountain range lies in the North West of Murung Raya (WWF, 2012). Apart from being home to a wide variety of plant and animal species, of which many are endemic to Kalimantan, Uut Murung is rich in natural resources.

Logging companies had been operating and some of them were still operating in the area in 2014 (BRINCC unpublished data). In the same year, coal mining companies started to explore the area (compare Hoeing et al. 2015 in this issue). In 2014, the conservation of the area became the interest of, not only some local conservation initiatives, FFI (Fauna Flora International) and WWF's "Heart of Borneo programme", but also of an international REDD+ programme, mostly aiming at biodiversity conservation as well as on sustaining local peoples livelihoods.

Transformation

There is an ongoing transformation of ecosystems as well as local peoples livelihoods, among others, due to

the influence of outsiders approaching the area, such as companies and conservationists. The extractive industry might offer different kinds of work and provide better access to the area. They further should provide community development programs, but they are also known for often introducing prostitution, gambling and alcohol (World Rainforest Movement, 2004). The companies activities go alongside with the destruction of the surrounding nature of the communities. The destruction of nature mostly leads to biodiversity loss, which might be important for the subsistence of local people.

For various reasons, we found it important to give insight into how local villagers used and depended on nature. Our main reasons include, one, to be able to document social transformation, two, to enable conservationists and companies to get an insight on local peoples current livelihoods, which might lead to a better understanding of local peoples needs and hence, to secure mid- or long-term communities livelihoods. Therefore, this empirical study aimed at getting a better understand basic needs of local communities and their dependency on natural resources. Furthermore, the study tries to understand different meanings a resource might have to local people; for example, fish might be important for food, but can also be a source of cash

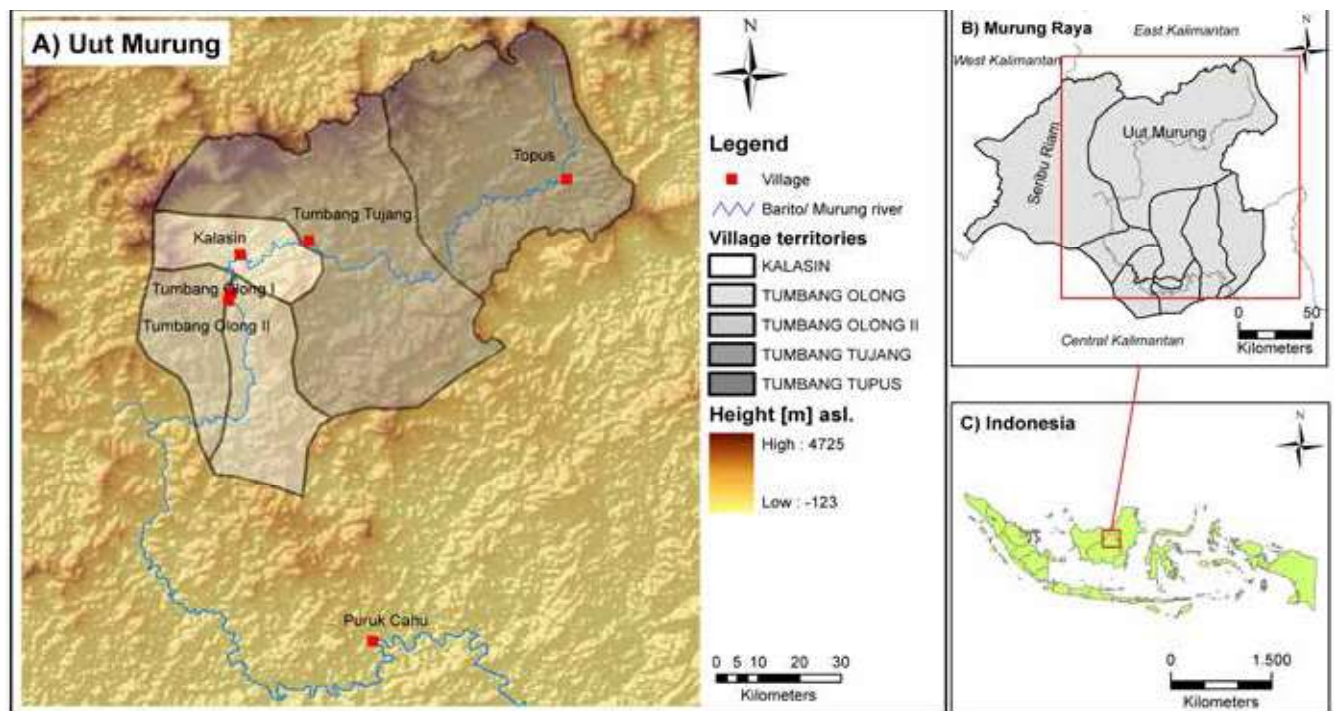


Figure 1: Location of study villages in the sub-district Uut Murung (A), and the district of Murung Raya (B), in Indonesia (C).

income, apart from that, it might be used for traditional ceremonies. We present in more detail, the perceived importance of different resources for different purposes as a complementary part to our biodiversity surveys.

METHODS

We used a variety of methods to gain a better understanding on how locals perceive and value different resources important to sustaining their livelihoods (compare Sheil et al., 2002).

Ethics statement

This study was conducted after in depth consultation with the local government, international NGOs operating in the Murung Raya Regency, such as “Fauna and Flora International”, as well as with the local communities themselves. In February 2011, a pre-expedition was conducted, aimed at gathering data, as well as on giving local communities the chance to influence research directions. Although BRINCC has its own academic and conservation research priorities, we aimed to incorporate a significant component of community directed research, whereby local people can request research on topics important to them. Therefore, the research plans were adapted accordingly to the request of villagers, to map an area of high social importance and subsequent support to strengthen community management rights through the application for a village forest (hutan desa).

Before conducting the research, all national and local research permits were obtained. At the beginning of the data collection in July 2011, further consultations was carried out. In the agreement between villagers and researchers, it was stated that original results from Focus Groups Discussions, e.g. maps, time lines, etc. would be left with the community and no maps would be published without permission. Personal data from interviews were anonymized.

Study site/Demographic data

The BRINCC research team intended to conduct research in the interior of Kalimantan, Borneo, hence, study sites were selected using the following criteria: a relatively unstudied, rural area, with high forest cover and forest dependency of the communities, but which is subject to land use change, e.g. anthropogenic disturbance, such as logging or mining.

The villages that were subject to this study belong to the sub-district Uut Murung, situated in the north east corner of the Murung Raya regency. The sub-district Uut Murung comprises a total area of 7,263 km². Uut Murung consists of five villages: Tumbang Olong I, Tumbang Olong II, Kalasin, Tumbang Tujang and Topus (Badan Pusat Statistik Kabupaten Murung Raya, 2009).

The villages are located along the upper part of the Murung River (also known as the upper Barito), which is geographically situated in the highlands of the Murung Raya regency in Central Kalimantan. They are surrounded by hilly to mountainous terrain with altitudes ranging between 200m in valleys- 1900m on mountains tops (compare Figure 1).

The ethnic groups which are thought to originate from the study area are Siang and Punan Murung. The Punan Murung were formerly known as one of the nomadic hunter and gatherer tribes in Kalimantan, whereas Siang were known for their swidden cultivation (Sellato, 1994). Nowadays, a variety of ethnic groups with origins in Kalimantan, such as the Punan, Bekumpai, Siang, Otdanum, Kahayan and Kapuas, but also some migrants e.g. East Nusa Tenggara were living in the villages (A. Hoeing personal observation). A detailed description of the study area, especially on demographic data, can be found in Hoeing et al. (2015) in this issue.

Survey Methods

A variety of qualitative methods were employed (mostly based on Participatory Rural Appraisal (PRA)) including, in depth and semi-structured interviews, questionnaires and Focus Group Discussions (FGDs). Topics covered during FGDs included the identification and detailed descriptions of activities related to natural resource use, seasonal calendars, village histories and participatory land use mapping of the area.

Data collection

Secondary data, such as demographic of the area, statistical data on resource use of the area, maps of the region, etc. were collected before and after entering the study area.

First contact with local villagers

A formal introductory meeting with the villagers was conducted by the entire expedition with the team intention to seek permission to carry out the research, as well as to clarify aims, motivation and perspectives of

the expedition. First, exercises were conducted, such as creating a historical time line of the village. Community members were grouped into main activities important to their livelihood for follow up FGD.

Focus Group Discussions (FGDs)

Focus groups were divided into main activities related to natural resources, such as farming, fishing, collecting eaglewood. Although men made up the majority of FGD participants, extra care was taken to invite women. The different exercises carried out within the focus group meetings were: description of activities, the possible commodities resulting from the activity, equipment which is needed for the activity, traders and other actors involved as well as potential problems. Seasonal calendars for the different activities were created to find out peak seasons and seasons in which the activity cannot be done. Participatory mapping was also conducted in FGDs.

Semi-structured and in-depth interviews

Semi-structured interviews were carried out with key informants in the village, which included village leaders, teachers, elders and a variety of villagers from different backgrounds e.g. local traders, migrants. Semi-structured interviews were used to get a basic understanding of life in the villages. These interviews were also used to adapt questionnaires to the local context.

Additionally, in-depth interviews were conducted, which were used to gain a deeper understanding on certain topics, especially regarding the use of certain main commodities (e.g. eaglewood and animal parts) and their relation to the local and global market chain. Furthermore, in depth interviews were conducted to triangulate results of the research.

Pebble distribution method

The pebble distribution method is a ranking method to assess the relative importance of different kinds of activities relating to resource use important to local peoples' livelihoods e.g.: the importance of different animal species as source of food, "others", commodity or medicine (compare Sheil et al., 2002). 100 pebbles were used by the group of participants. After achieving consensus, they were distributed on different cards representing categories, in this case, animal species. Participants thus valued the different categories with regards to different research questions, e.g. "How

important is each animal as a source of food?". If participants placed twice as many pebbles on category "A" than on category "B", it meant category "A" is twice as important than category "B". Categories which did not play an important role for the participant, was left empty. After all pebbles were distributed, confirmation that all pebbles were correctly placed by all participants. The group of participants were then asked to explain the reasons for the chosen importance. The facilitator made notes and recorded the discussion. We did compare the full range of categories in our analysis to get a first insight of what species might be important to local people for different purposes.

Participants were chosen opportunistically, gatherings of a mixture of mainly young (females and males <20 years) villagers were approached. The groups in both villages consisted of up to 10 young villagers who were joined by older men and sometimes women. The aim was to include a wide variety of villagers.

Sampling of Questionnaires

The research samples were derived by using non-probability quota sampling, that is often used to assess public opinion polls (Kerlinger, 1986). The method was chosen to aim for an equally distributed sample over four different categories which further were divided by: age class (20-39 years, >40 years) and gender. One additional category was made to include respondents in higher positions, such as the village head, the village representative, the village secretary and the head of the customary rights. Age classes were set after consulting with community members about the age-line between young people and adults as well as adults and elder person. For a more detailed description on the sampling of questionnaires compare Hoeing *et al.* (2015) in this issue.

Questionnaires represented individual opinions. They were tested and adopted before starting the sampling process in the villages. The questionnaires consisted of 32 questions covering several topics, such as: general information on the use of natural resources by community members, commodities, access to markets, attitudes towards nature, conservation, and environmental changes including perceptions on the impact of companies/NGOs and traditional beliefs.

The questionnaires contained open, as well as closed, questions. In some questions, the contingent ranking method (crm) was applied; for example, in order to figure out the relative importance of different forest

resources to people's livelihood. The questionnaires were filled in by A.H., A.S., D. and E.M. after reading out the questionnaires. In case the respondent agreed, we recorded the responses to be able to recheck information.

Data Analysis

Data from the questionnaires were analysed using Open Office Org. 3.1.1- Calculator and SPSS 17.0 (Statistical Package for the Social Sciences) for Windows.

RESULTS

The most important sources nature offers to locals

During the first village meetings, villagers named several activities important to sustain their livelihoods. The activities were similar in both villages and included: upland rice farming; gardening (vegetables, fruits and rubber); hunting; fishing; collecting eaglewood (a fungi infected heartwood from the genus *Aquilaria*); traditional gold mining; handicrafts, such as wood carving and weaving baskets from rattan; trading, mainly of groceries, animal parts, gemstones and gold. In Kalasin, respondents additionally listed sawn timber production from Meranti (belonging to the genus *Shorea*) and Ironwood (*Eusideroxylon zwageri*), for

local housing and the regional markets. Respondents mentioned that the wood is mainly used for government buildings in Puruk Cahu, or road constructions, such as bridges. From the questionnaires, it is revealed that in general, villagers did not just practice one activity but various activities. Only eight out of 53 respondents stated they only had one occupation/activity (Figure 2); four of them belonged to the category >40 years old. We identified activities not directly related to forest use and resource extraction, because they were mainly based in the village, for example: chicken breeders, shamans, house wives, teacher and government employees, etc.

What are the most important sources nature offers to locals?

From the questionnaires, we identified the most important sources nature offers to respondents' livelihoods (Figure 3). Villagers were asked to rank a maximum of five different main sources the forest offers for their daily lives. Results are presented as a percentage of respondents (per village). Results from questionnaires have shown that in both villages, respondents found "food" to be one of the most important sources nature offers, followed by "drinking water". The category "others" includes statements made by a few respondents, such as oxygen, firewood as well as forest as a protection against land slides. Main

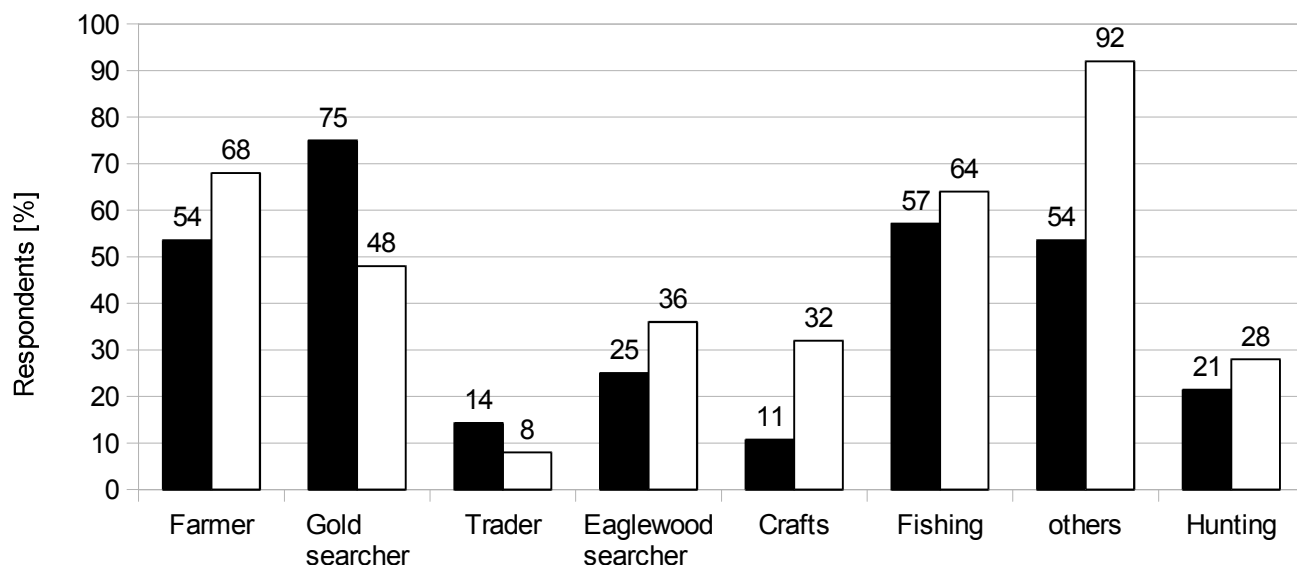


Figure 2: Activities which play an important role for the livelihoods of respondents in Tumbang Tujang (black) and Kalasin (white). The category "others" included activities not directly related to resource extraction or land use, such as chicken breeders (in the village), teaching, government employees and housewives.

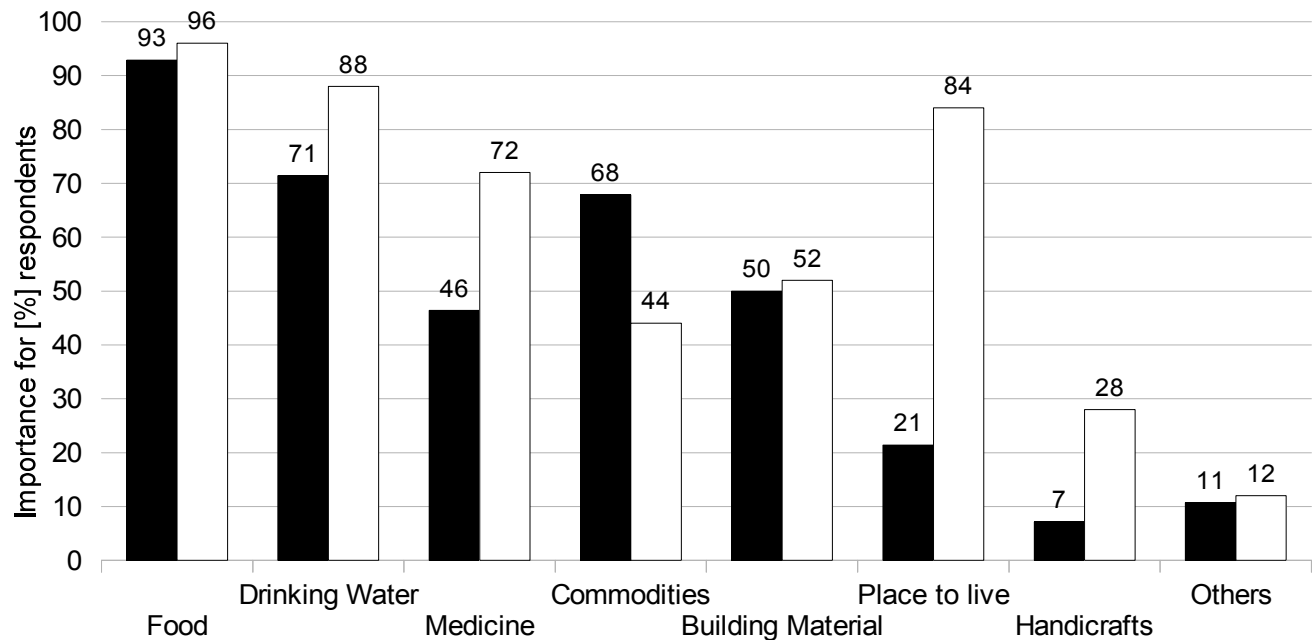


Figure 3: Respondents were asked to name the five most important sources which nature plays in their personal lives, Tumbang Tujang (black) and Kalasin (white).

differences in perceptions were found in the categories: “place to live” (63% higher in Kalasin), “stock for medicine” (26% higher in Kalasin), “commodities” (22% higher in Tumbang Tujang) and “material for handicrafts” (21% higher in Kalasin).

What kind of animals do locals depend on, for what purpose?

To get an overview of what kind of animals are hunted or collected by locals for different purposes, we conducted the PDM. Animals were ranked using four different categories: commodities, food, medicine and “others”. A total of 17 different kinds of animal species/animal groups were named by villagers in Tumbang Tujang and 28 were named in Kalasin. Questionnaires, ranking methods (pebble distribution methods) and focus group discussions showed that different animals are not only important for one purpose, but could be essential for different categories. For example, in Tumbang Tujang the samba deer (*Cervus unicolor*) was given the highest value of importance to nourishment, but it also played an important role for medicine; the skin is used as a medicine, for women with problems during birth, as well as the antler and meat are important as commodity. Antlers of *C. unicolor* were further categorized as “others” and are mainly used to decorate the walls of houses, with the belief that they would prevent fires.

Detailed tables on the ranking of animals for different purposes can be found in Table 1. The pangolin (*Manis javanica*) was found to be important to the different categories in Kalasin. It was valued to be important for food, commodity (scales, used for jewellery), as medicine against asthmatic sicknesses and as “others”.

Main differences between the valuing of the importance of different animals for different purposes between the two villages could be found that in Tumbang Tujang *C. unicolor* was valued as an important food species, whereas in Kalasin, the bearded pig (*Sus barbatus*) was valued higher than *C. unicolor*. Important sources of medicine were big spiders, such as tarantulas (Theraphosidae) and *C. unicolor*, whereas in Kalasin, *M. javanica* and sun bears (*Helarctos malayanus*) were most important. Main commodities were fish and *C. unicolor* in Tumbang Tujang, whereas in Kalasin *M. javanica* scales as well as meat from *C. unicolor* and *S. barbatus* were most valued as commodities. In Tumbang Tujang as “others”, participants valued the crestless fireback (*Lophura erythrophthalma*) as most important followed by birds, *S. barbatus*, fish and *C. unicolor*. In Kalasin, a favourite animal of participants in the category “others” were birds, that were kept as pets, followed by scales of *M. javanica* and antlers of *C. unicolor*. Many of the animals important to local livelihoods are listed in the IUCN Red list of threatened species, such as *M.*

Table 1: Results from the ranking method (PDM) on the importance of different animals for different purposes in two villages T.Tujang and Kalasin.

	T.Tujang	Kalasin	T.Tujang	Kalasin	T.Tujang	Kalasin	T.Tujang	Kalasin
	Medicine		Commodities		Food		Others	
Birds	11		9	4	10	4	10	27
Fish			18	7	14	12	10	
Flying fox					1	1		
Forest Chicken/ Argus pheasant	11		8	6	11	4	11	
Frog	10				7	7		
Monkeys/ Primates				4			7	
Mouse deer			6	3	10	7	8	
Pangolin	8	38	9	9		6	3	19
Pheasant			7		8		7	
Porcupines	9	7		5	9	5	7	
Samba deer	12		17	9	18	4	10	15
Snakes	6	7	8	3		2	4	13
Spiders	13							
Sun bear	9	17	7	4	1	1	4	14
Turtles	11	8		5	3	9	7	
Wild boar			8	9	8	16	10	
Wild cats			3	5		2	2	
Additional animals mentioned in Kalasin								
Banded linsang				4		1		
Big gekko				3				
Civets						3		
Flying lemur						1		
Forest rat		6			often, but mentioned after the exercise			
Green lizard		6						
Longtailed porcupine				3		3		
Monitor lizard						3		
Otter civet				3				
Deer				5		4		
Snail		11		3				
Soft shelled turtle				6		4		12
Squirrel						1		
Total	100	100	100	100	100	100	100	100

javanica, which is listed as endangered, *S. barbatus*, *H. malayanus*, *C. unicolor*, *L. erythrophthalma* are found to be in the category vulnerable.

Animals were mainly hunted in hunting groups as well as individually with the use of spears and dogs. To hunt some animals, rope traps were used. To kill birds, which were found to be an important food species (mentioned in

Kalasin) air rifles were mentioned to be used sometimes, as well as traps made from sticky rubber strings which were attached to trees. Fish were usually caught by nets, angles and spears. Illegal techniques for capture were electric fishing and poisoning, which were strictly prohibited by customary and governmental law.

Table 2: The table presents the use of markets for different products by villagers in Tumbang Tujang. In brackets (*) are trade routes used by middle men in the villages. Numbers represent the amount of responses from questionnaires. The data might not be complete and some trade routes of products might be missed out.

Level	Market	Eaglewood	Gold	Vegetable/ Fruits/ Rice	Fish	Gemstones	Handicraft	Meat	Animal Parts	Wood	Birds	Honey	Swallow Nest	Rice Wine
Village	Other villagers			2 (1*)	2 (1*)		1	1						
Village	Middle Man in T.Tujang	5	18			1								
Sub-district	T.Olong/ Company			1										
District	Puruk Cahu	(2*)	3 (4*)	1										
District	Buyer comes to village			1	1	(1*)	1	1						
Province	Muara Teweh													
National	Banjarmasin													

Table 3: The table presents the use of markets for different products by villagers in Kalasin. In brackets (*) are trade routes used by middle men in the villages. Numbers represent the amount of responses from questionnaires. The buyers who come to the villages were in the opinion of the respondents mainly from Puruk Cahu.

Level	Market	Eaglewood	Gold	Vegetable/ Fruits/ Rice	Fish	Gemstones	Handicraft	Meat	Animal Parts	Wood	Birds	Honey	Swallow Nest	Rice Wine
Village	Other villagers			17	11		4	9 (1*)		1	1	2		1
Village	Middle Man in Kalasin	7	11	2		1		4	5	7	1	1	1	
Sub-district	To T.Tujang			1										
Sub-district	T.Olong/ Company		1	3	1		1	1				2		1
District	Puruk Cahu	1 (2*)	5 (1*)	1	1 (1*)		1	3	2 (1*)	(2*)		2	1	
District	Buyer comes to village		1		1			3	1		1	1		
Province	Muara Teweh		1		1	1		1				1		1
National	Banjarmasin	(1*)							(1*)					

DISCUSSION

This research found that relatively remote living communities, which were the subject of this study, are still dependent on forest resources to maintain their livelihoods. It is important to understand use values and factors that influence people's perception on the forest, for example, for policymaking (Meijaard et al., 2013) as well as for projects aimed toward nature conservation or community development.

Our data, as it refers to a relatively small sample size, is not representative but gives an insight into resource use and perceptions of nature to inhabitants of the two communities in 2011. In our case study, respondents

mentioned a wide range of daily activities, from upland rice farming, to fishing, hunting, eaglewood collection, work with companies etc. We would like to point out that respondents mostly did not only conduct one activity to maintain their livelihoods, but that they combined several activities, such as farming, hunting, fishing, artisanal gold mining. When revisiting the area in 2014, almost all male villagers were engaged in the acquisition of eaglewood, as the prices on the international market increased vastly. Therefore, we conclude that community members might behave in an opportunistic and flexible manner. Dependencies, and the use of natural resources, might change over time due to various reasons; such as market value, change of abundance, government restrictions or outsiders activities.

In our case study, we found a wide variety of species used for different purposes such as for medicine, food, "others" or to be sold as commodity. Nevins & Peluso (2008) point out that a commodity itself is a highly dynamic and complex entity that has social lives and meanings. A commodity, as in example the pangolin, can be important to villagers for more than just monetary reasons, if it is also used for traditional medicines or for cultural purpose. Conservation that looks only for alternative sources of income to mitigate pangolin extinction might not be sufficient.

An observation which needs to be highlighted, is the fact that over the years, it has become more and more difficult to buy vegetables in the villages (AH personal observation, 2011-2014). In 2011, villagers already had problems planting paddy, apparently due to a shift in seasons, which made the timing to prepare the forest gardens and to plant paddy difficult. In 2011, villagers in Kalasin, which had always been subsistent in their rice production, had to buy subsidised rice from the government for the first time. In 2014, villagers from Tumbang Tujang mentioned that the harvest was poor and that most of the vegetable grown in the gardens were sold to the logging and mining companies, which operated upstream, close to the gardens. Thus, only small amounts of vegetable sources arrived in Tumbang Tujang. Therefore, we suggest more research is needed in terms of food security, adaptation mechanisms to seasonal changes and general research on social transformation.

Some differences were found regarding the perceived importance of nature between the two villages. A place to live, medicine and handicrafts were more important to respondents in Kalasin, the village that is closer to the capital of the district and sub-district, than to respondents in Tumbang Tujang. Between 2011 and 2014, we observed a transformation in Kalasin; some villagers moved to another location where they established their forest gardens and built small houses. Nevertheless, they still kept the old houses in the village. Living over weeks and months in those forest gardens does not allow regular access to the village, which also means to a nurse and shops. Hence, knowledge of medicinal plants and skills to produce handicrafts and to farm and hunt are essential to survive. On the other hand, one of those new locations, where several villagers settled, is situated next to the still accessible road to the capital of the district. In 2014, this was a huge asset, because the road connecting Tumbang Tujang and Kalasin collapsed in the rainy season between the year 2012 and 2013. Hence, the new location offers an easier road to Puruk

Cahu. It might be interesting to reassess the importance of nature to those villagers.

We found more differences between the two villages. In Kalasin, wild boar was more important to respondents than in Tumbang Tujang. This is mostly due to their religious affiliation. Additionally, in Kalasin the majority of respondents perceive themselves as Christians or Hindu-Kaharingan, whereas in Tumbang Tujang, the majority perceived themselves as Muslim, for whom eating pig is forbidden due to religious reasons.

This points out the importance of acknowledging that not only communities do differ from each other, but that a community itself is a heterogeneous dynamic group, which consists of multiple actors with various interests and interrelations forming institutional arrangements as stressed by Agrawal & Gibson (2001) (also compare Leach et al., 1999).

We furthermore observed complex structures of social relations related to resource use (e.g. patron-client relationships, as defined by Scott, 1972, in the extraction of eaglewood), which would go beyond the scope of this article, but which makes us believe that a more detailed social network analysis might be important to understand social relations related to resource extraction in the villages. Those understandings might be important to ensure long-term success of conservation.

Many of the animal and plant species identified to be used by local villagers in this study were listed in the IUCN Red List of Threatened Species. Apart from habitat loss, mainly caused by companies present in the area, some of the species, such as eaglewood, are endangered due to overexploitation by the villagers themselves (BRINCC unpublished data, 2011). To be able to conserve the area, we believe that a sound understanding of human nature interactions is essential. We further believe that the local communities themselves have to perceive the need for the protection of threatened resources in order to secure those resources for their future survival.

The programmes of Murung Rayas government are aiming at modernization, development and advancement. The future shall differ significantly from the present. Backwardness and so called "uncivilized jungle life" shall be exchanged against economic development, which is possible through the richness of minerals in Murung Raya. The aimed transformation of local people's livelihoods, which is perceived differently for a variety of reasons, should include the needs of those people who have to actually live in the area of concern (Harrington, 2014). To ensure a more just development and conservation approach, further research is strongly recommended.

ACKNOWLEDGMENTS

We would like to thank the Indonesian Ministry of Science and Technology, the Department of Forestry for permission to carry out research in Murung Raya and all offices in the Murung Raya Regency that supported our research. We further thank the "Centre for the International Cooperation in Sustainable Management of Tropical Peatlands" (CIMTROP) for sponsoring this research. Special thanks to the communities of Tumbang Tujang and Kalasin. Our biodiversity expedition team: Mila Rhamania, Laurio Leonald, Juli Setiawan, Muhamad Saputra (Yunus), Edwin Hermawan and Kursani as well as Leni Mentari, Dewi, Junaidy Shalat and Suparjan. Special thanks to Dominic Rowland for being an excellent expedition leader. Our gratitude goes to Godwin Limberg and Ratu from "Flora and Fauna International" (FFI), the team of the NGO POKKER in Plangkaraya, Horma from "Yayasan Tambuhak Sinta", Palangkaraya, Pak Sadiwibowo from the Bogor Institute of Agriculture "Institut Pertanian Bogor" (IPB) for their support and advice.

Furthermore, we would like to thank the "German Academic Exchange Service" - DAAD for supporting AH with a scholarship and Garmin Germany for providing a free one year ArcGIS license for thesis writing. We would also like to gratefully acknowledge all participators and helpers with the charity run "Run forest Run", especially Marcus Sanden and his family, Madlen Baumert, Irendra Radjawali and all participants and sponsors, Christian Oekermann, Claudia Garcia, Sven Krafft, Ludwig Thoma, Tabea Seitz, Merlin Schaefer, Paul Bomke and Emeline. A special thank you to all the school children and teachers, especially Joachim Lange from Waldhofschule in Templin, Germany, who financially supported our research by carrying out a charity run.

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