

LIVELIHOODS IN PEATLANDS OF CENTRAL KALIMANTAN PROVINCE, INDONESIA: OPTIONS FOR UTILIZING LAND RESOURCES IN BUNTOI VILLAGE, BASARANG JAYA VILLAGE, SABANGAU PERMAI VILLAGE AND KARANG SARI VILLAGE

Mata Pencaharian di Lahan Gambut Provinsi Kalimantan Tengah, Indonesia: Opsi Pemanfaatan Sumber Daya Lahan Gambut di Desa Buntoi, Desa Basarang Jaya, Desa Sabangau Permai dan Desa Karang Sari

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ABSTRACT

Peatland resources in Central Kalimantan have long been utilized by the local communities for various activities such as agriculture, gathering, hunting, and timber extraction. The successful exploitation of peatland prompted the Indonesian Government to develop the region through a transmigration program, providing new settlements for people from Java, Madura, and Bali islands who were initially have no experience cultivating peatland. Land suitability issues have resulted in surprises, stress, and a decline in livelihoods among transmigrant populations, particularly concerning the failures in agriculture, especially in cultivating rice, the primary staple food for Indonesians. This research aims to examine the sustainability of livelihoods, determine the conservation aspirations and perceptions of stakeholders, and present alternative land use scenarios. Four villages were selected as samples, including a local village (Buntoi), two migrant villages in peatlands (Basarang Jaya and Sabangau Permai), and one migrant village outside the peatland area (Karang Sari). Data were obtained through interviews and group discussions involving farmers, entrepreneurs, and government officials. The research findings indicate that agriculture on peatlands can be developed through three stages of evolution: the early period, transition and recovery period, and stability or failure period. The stability period may take a long time, up to 20 years, as experienced by farmers in Basarang Jaya. This study provides insights into the sustainability of livelihoods and land use aspirations in Central Kalimantan.

Keywords: Livelihood, peatlands, sustainable, utilization

ABSTRAK

Sumber daya gambut di Kalimantan Tengah telah lama dimanfaatkan oleh masyarakat lokal untuk berbagai kegiatan seperti pertanian, pengumpulan, berburu, dan ekstraksi kayu. Kesuksesan pemanfaatan lahan gambut ini mendorong Pemerintah Indonesia untuk mengembangkan wilayah ini melalui program transmigrasi, memberikan pemukiman baru bagi penduduk pulau Jawa, Madura, dan Bali yang awalnya tidak pernah bercocok tanam di lahan gambut. Masalah kesesuaian lahan dan tidak adanya pengalaman mengakibatkan kejutan, stres, dan penurunan sumber penghidupan di antara penduduk transmigrasi, terutama terkait kegagalan pertanian, terutama tanaman padi sebagai produk pertanian utama. Penelitian ini bertujuan untuk menguji keberlanjutan mata pencaharian, menentukan aspirasi dan persepsi konservasi stakeholder, dan menunjukkan skenario opsi penggunaan lahan lainnya. Empat desa dipilih sebagai sampel, termasuk desa lokal (Buntoi), dua desa pendatang di gambut (Basarang Jaya dan Sabangau Permai), dan satu desa pendatang di luar gambut (Karang Sari). Data diperoleh melalui wawancara dan diskusi kelompok dengan petani, pengusaha, dan pejabat pemerintah. Hasil penelitian menunjukkan bahwa pertanian di lahan gambut dapat dikembangkan melalui tiga tahap evolusi, yakni periode awal, transisi dan pemulihan, serta stabilitas atau kegagalan. Periode stabilitas dapat dicapai dalam waktu lama, seperti yang dialami oleh petani Basarang Jaya. Penelitian ini memberikan wawasan tentang keberlanjutan mata pencaharian dan aspirasi penggunaan lahan di Kalimantan Tengah.

Kata kunci: Keberlanjutan, Lahan Gambut, Mata Pencaharian, Pemanfaatan

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INTRODUCTION

The focus of this study is on "sustainable livelihood" - a new approach to fight poverty developed in the 1990s (DFID 1999). Chambers & Conway (1992) define livelihoods as something that comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. The Millennium Ecosystem Assessment (Alcamo *et al.* 2003) characterizes "sustainable livelihoods" as the ways in which individuals and communities of individuals use goods or services provided by an ecosystem in order to survive. (Johnson 1997, cited from Millennium Ecosystem Assessment, Alcamo *et al.* 2003). Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life. They maintain biodiversity and the production of ecosystem goods, such as timber, fuel, natural fibre, medicines and pharmaceuticals, industrial raw materials and food. The rural poorest people are dependent on forests, cropland, rangeland, rivers, and seas for their livelihoods. For them, mismanagement of ecosystems threatens survival (Millennium Ecosystem Assessment 2005). On peatland that can provide a wide range of goods and services important for direct and indirect human use, maintenance of environmental quality as well as for the welfare of wildlife (Maltby 1997), so mismanagement threatens sustainable use. For peatland to maintain its functions sustainably, there must be a balance between the need of development (production functions) and for conservation (environmental functions). To achieve these aims, Safford & Maltby (1998) have proposed the integrated management of tropical lowland peatland. Key components are collaboration between the various stakeholders; taking into account not only ecological but also economical, societal and cultural aspects; and a multi-disciplinary approach.

Globally, the conservation and wise use of tropical peatlands are important as means of maintaining their fundamental ecosystem services, especially their role as regulators of water, habitats for flora and fauna, and as carbon sinks (Rieley & Page 2005). The latter function is particularly important given that carbon dioxide (CO₂) is the principal greenhouse gas and is released from tropical peatlands in large quantities when drainage, deforestation and other disturbances occur (Page *et al.* 2002, Jauhainen *et al.* 2004). Unfortunately, conversion of tropical peatlands to agriculture or excessive logging and fire largely ignores the many different functions carried out and services provided by tropical peat ecosystems in their natural condition (Sargeant 2001; Jaya *et al.* 2004; Rieley & Page 2005).

In Indonesia, however, high rates of population growth and poverty in the islands of Java, Madura and Bali forced the Government of Indonesia to develop new agricultural land in other islands, such as Kalimantan, Sumatra and West Papua as a way to provide better livelihoods for some of these people. This was facilitated through the 'transmigration programme', with the vast peat-covered lowlands of Central Kalimantan one of the main areas targeted (Simatupang 1999; Muhamad &

Rieley 2002). This led to massive land use changes, especially in peat swamp forests.

In the light of the above information the key question that needs to be addressed is: What can the environmental and development communities do to significantly improve the livelihood sustainability of people living on and near to degraded tropical peatland and on primary peat swamp forest that is proposed for protection area.

In Indonesia land resources are the main factor, directly or indirectly, in people's economic development activities. The author distinguishes five stages of economic development: (1) traditional society, (2) prerequisites for take-off, (3) take-off, (4) towards maturity and (5) high mass consumption. According to Rostow's linear economic development model, Indonesia as a developing country is in the second stage, where economic activity is dominated by commercial land exploitation for agriculture and extractive activities.

Research objectives, this research also seeks to examine:

- the extent to which different communities are limited by the availability of and access to certain natural resources and assets
- the main conservation aspirations and commitments of local communities
- how different local stakeholders seek to improve their livelihoods including investigations of local government views on conservation or plantation crops and how these different projects might benefit local communities

In order to achieve the first objective, concepts of sustainable livelihoods will be examined through comprehensive analysis based on participatory evaluation of existing and potential use of peatland resources by three contrasting communities in relation to their function as life-supporting systems. The second objective requires information to be obtained by conducting group discussions and semi-structured interviews involving respective stakeholders in these different communities. The third objective involves the formulation of different scenarios of potential peatland resource utilisation based on the comparison of a wide range of regional data from other sites inside Central Kalimantan peatland areas such as Kalampangan which is situated on inland peat.

METHODOLOGY

In this research, the fifth analysis is modified to focus more on agricultural evolution and land use options because on peatland where this research conducted, the main land use is agriculture.

In this chapter, data requirements and sampling techniques are presented. This part is mainly following the sustainable rural livelihood framework. Based on this framework as presented in table 3.1, the analysis is split into five parts: (1) contextual analysis of conditions and trends, and assessment of policy setting; (2) analysis of livelihoods resources; trade-offs, combinations, sequences, trends; (3) analysis of institutional/organizational influences on access to livelihood resources and composition of livelihood strategy

Official land use and pattern of land ownership

In order to manage land use in Indonesia, a regulation known as Regional Spatial Planning operates at both provincial (RTRWP) and regency level (RTRWK). In such planning land is divided into two main categories, namely, Protected Forest and Cultivation areas, which are further divided into sub categories based on Table 1 of 2015. Land use planning in Central Kalimantan.

General livelihood practices

Since this research is focusing on rural areas, most economic activity is concerned with the agricultural sector. Therefore, in the following, agricultural livelihood practices will be examined, with a brief analysis of trading and services as these are the main activities of people not working in the agricultural sector.

Rice farming on wetland, dry land and peatland

Rice (*Oryza sativa*) is the staple food in the region and, as a result, is the main crop planted by farmers in the study area. Owing to its great genetic variability, rice can be cultivated under a wide range of environmental

conditions (Mackinnon *et al.* 1996). In Central Kalimantan, rice is planted on hilly areas (dry land), wetland and even on thin peat. According to Mackinnon *et al.* (1996), different systems of growing rice have evolved to suit specific environments and socio-economic conditions.

In South part of Kalimantan, wet rice farming involves using tidal movement cycles to irrigate the farming land. Rice grows best in fertile, heavy soils but in wet rice farming (sawah), the physical properties of the soil are relatively unimportant as long as sufficient water is present (Mackinnon *et al.* 1996). In upland areas of Kalimantan, by contrast, hill paddy (dry land rice) is a more important crop and its cultivation is often taken to be synonymous with shifting cultivation (Chin 1984, cited by Mackinnon *et al.* 1996). In hilly areas, seeds and cuttings of other crops are planted at the same time as the rice crop. This is to enable the farmers to maximize the benefit of the initial input of nutrients from the ash derived from clearing and burning the site. This kind of farming is carried out by both local people and transmigrants that settled in dry land areas. Indigenous people carry out this type of farming on land surrounding their village while transmigrants undertake it on so-called business land (lahan usaha), 2.0 hectares of which is owned by each family.

There are two cultivation seasons on wetland areas including peatland. The cultivation of rice usually takes place at the end of October until the beginning of November for the first season and in April for the second season. Harvesting time for the first season is normally in March and for the second season is in August. On hilly areas, or on peatland areas that do not get the benefit of tidal movement cycles, there is usually only one cultivation season from August to October with harvesting usually in the following March. Wetland farming areas are usually more productive than dry land areas with average rice yields in 2008 of 2.4 – 3.1 ton/ha-1 on the former compared to just 1.5 – 2.1 ton/ha-1 on the latter (BPS Kalimantan Tengah 2008).

Plantation and gardening

The Indonesian language does not differentiate between 'plantation' and 'gardening', both are called 'kebun'. To distinguish between them it is important to know what plants are being cultivated. If these are fruit trees such as durian, jack fruit, mango, rambutan, etc., it is generally referred to as a fruit tree plantation (kebun buah-buahan). In indigenous villages, kebun is usually located in land surrounding the village while transmigrants plant on the 0.5 acres of 'home garden' land (lahan pekarangan) that surrounds their house. In indigenous villages, the plantation is usually located quite far away from the village, since the land nearer the village is usually used for gardening, ladang (dry rice field) or sawah (wet rice field). It is usually planted with rubber and some fruit trees or rattan combined with fruit trees. In the transmigration study villages, many households had planted the area that was initially designed for rice fields with rubber or fruit trees as these

Table 1 Land use planning in Central Kalimantan

No.	Regional spatial planning class	Area (hectares)
I. Protected Forest Areas		
1	Protected Forest (HL)	766,332
2	Nature Reserve (CA)	235,079
3	Recreation Park (TW)	19,142
4	National Park (TN)	480,056
5	Wildlife Reserve (SM)	71,664
6	Forest Protection and Conservation (PPH)	1,628
7	Mangrove Conservation (KM)	31,018
8	Black Water Conservation (KEAH)	37,225
9	Flora and Fauna Conservation (KFF)	161,849
10	Thick Peat Conservation (KGTB)	253,797
11	Hydrological Conservation (KH)	185,023
Total I		2,242,817.67
II. Area of Cultivation		
1	Limited Production Forest (HPT)	3,784,485.64
2	Production Forest (HP)	4,232,518.88
3	Production Development Zone (KPP)	2,789,108.09
4	Area for Settlement and for Other Uses (KPPL)	1,920,054.79
5	Industrial Forest (HT)	21,958.04
6	Transmigration Area (T1 & T2)	137,320.32
7	Drainage Canal (KHR)	59,046.32
8	Waters (DS)	155,716.95
Total II		13,078,250.80
Totals I + II		15,321,068.47

Source: Government of Central Kalimantan, Provincial Spatial Planning Regional (2015)

are better suited (and more profitable) than rice on the land that they have been allocated.

In indigenous villages, the land allocated for gardening is usually situated either near to their dry rice fields or on non-irrigated/drainage land near their wet rice fields. In this garden land, local people usually cultivate cassava, some vegetables, corn or short-term fruits such as banana and apple, primarily for subsistence needs. Some transmigrant people do the same but others undertake larger scale 'gardening' activities, allocating their 'business' land for gardening and cultivating it with profitable vegetables and fruits that they sell as cash crops.

Plantation and gardening activities are mainly secondary agricultural activities for the rural people as this work can be done when they are not busy with rice cultivation. Harvesting of plantation trees such as rubber tapping is carried out throughout the year by adult family members in the early morning until around midday. Harvesting of gardening plantations is carried out in advance of the weekly market where crops and cattle and are sold.

Animal husbandry / livestock

Many so-called 'farmers' in rural Central Kalimantan actually have a range of different livelihood sources, including livestock husbandry. The main types of livestock owned by local people are chickens, pigs, sheep and cows. Livestock represents an important source of saving for a family as it can be sold when the households or one of the family members need cash. Both indigenous people and transmigrants practice this strategy.

The number of livestock owned by rural households can also be used as a measure of their livelihood assets. During the field research, families who owned many types or large numbers of livestock tended to be wealthier than families with smaller numbers of livestock. Responsibilities for looking after livestock were shared amongst family members, with children often taking care of raising chickens and other small cattle, while adults focused on larger animals such as pigs, sheep or cows. Villagers had few problems selling cattle when they wanted to as they could do this at the local weekly market or with the help of a middleman

Non-agriculture (off farm)

Non-agricultural activities also play an important role in the livelihoods of some rural families. Trading, service activities or even fishing and gathering are widely undertaken by the people. Traders supply farming communities with their essential needs such as fertilizers and pesticides. Those with special skills such as builders and those engaged in the transport business (river and road based) provide essential services in the rural area. Fishing, gathering and hunting are also carried out by many local people as sources of both cash and subsistence needs. Many of these activities are carried out in combination with farming; especially during less busy times of the farming calendar.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

There are three stages of evolution of agriculture in order to achieve sustainability of livelihoods on tropical peatland: (1) the early years of occupation, (2) the recovery and transition period and (3) the stability and failure period. In the early years of occupation there are three types of land condition and ways of farming: (1) farmers develop rice farming on swamp areas that are irrigated by rain and if successful can produce a reasonable yield which on average is 2.5 t / ha (until the swamp land become dry as happened in Basarang Jaya), (2) rice farming on land irrigated by fresh water intrusion as a result of tidal movement (hard to achieve in the early years, but over time it becomes more feasible and productive) and (3) rice farming on area that in the early years of occupation are in a dry condition and which can generate an average yield of 1.5 to 2 t / ha but which decreases sharply when irrigated (with acid and/or saline water as happened in the early years at Sabangau Permai).

In the recovery and transition period that is marked by a change in land conditions, the swamp area becomes dry as a result of drainage. The area of water intrusion slowly becomes more suitable for rice cultivation and its production increases slightly. In contrast, dry rice farming areas become wetter as a result of irrigation improvements and peat subsidence/compaction. In this period, the rice farmers on ex-swamp areas are searching for the most suitable variety of rice and other food crops to grow there and are also starting to plant fruit trees and plantation plants. For irrigated areas since the beginning their rice yields have reached optimal level and for areas that are recently become area of water intrusion are in their efforts looking for the suitable farming way in term of its rice variety and time of cultivation. That is why this period is referred to as the transition and recovery period because the former land conditions are changing and if the farmers are successful in gradually increasing yields as the land conditions change, this means the areas are recovering.

The stability and failure period follows the transition and recovery period. The milestone for determining stability is the success of farmers to achieve reasonable yields from their rice farming and others crops while, at the same time, starting plantation production. Failure period is marked by the inability of farmers to obtain adequate rice yields and results and massive abandoning of farming land with many people leaving their villages. Among the sample sites of this present research, Basarang Jaya transmigrant village reached its stability while Sabangau Permai village is in the transition and recovery period leading to stability.

The time needed to switch from one stage to another one depends on peat thickness, type of substrate underneath the peat, irrigation availability, and frequency of fresh and saline water intrusion, availability of transportation infrastructure and mode of transport to support marketing activities. Quantity and quality of assets owned and controlled by the people change over the stages of livelihood development. In the early years

of occupation farmers are able to generate high rice yields so their assets increase but, since this is followed by frequent harvest failures, their assets then decrease sharply but will increase again if they are able to pass the transition period successfully.

It is now becoming accepted that conservation is an important activity to support the harmony between human beings and nature. Transmigration people have quite a different opinion on the value of conservation since formerly they had no natural forest areas in their original environment although, in their abandoned farming land, they started to grow a few native trees. They prefer, however, to grow fast growing commercial tree species if their land is unsuitable for plantation crops. Local people are more sympathetic towards conservation efforts since they have lived for generations surrounded and supported by the rich resources of the natural forest. The establishment of conservation areas such as Sabangau National Park has removed large areas of their common natural forest and therefore, at present, they do not fully support this new situation.

Their support is in their respect to the law and government not coming from their fully consciousness. They prefer if conservation efforts take place on areas that are agreed by them and are fully under their jurisdiction, which are no longer used for farming, and where there is no customary claim over the land. Reforestation activities should support their long-term livelihood. So, commercial trees (fast growing and long-term species) should be planted, in combination with plantation and fruits trees. This is actually the coping strategy of their ancestors in developing rubber which led to growth of wild trees plantations. Meanwhile, local government official does not have a clear position about conservation because they must follow the policy of top local government leaders as well as the policy of ministry of forestry that controls almost all forest areas in Indonesia.

There is a massive tendency for the conversion of forest areas to plantations through the decisions of Government leaders (Regent and Governor). These are political decisions made in attempts to boost local economy and increase local government taxes and retributions as the means to fund local government development budgets. Local people are mostly in silent disagreement with this massive conversion and, in the future, it could become a source of serious and long-term conflict, because it results in exclusion of future generations from generating their own sources of livelihood. Conservation that involves conserving sources of livelihood and conversion that ensures possibilities for livelihood diversification is definitely wanted by all villagers.

Traditional plantations that also can be regarded as a traditional conservation method are very important in supporting the income sources of villagers. The income generated from traditional plantations will enable them to adapt and practice new farming methods such as cultivation of new varieties and using fertilizer and insecticides. Success will then enable them to generate savings in form of livestock, jewellery and cash. But the traditional way is mostly directed for long term, and so,

the future options of peatland use could be developed based on traditional ways with some enrichment, especially to provide sources of livelihood on a daily, weekly and monthly basis. The people so far find it quite hard to get involved in the new options of peatland use because they do not provide them with their immediate needs. The plantation project or conservation linked with livelihoods should be done hand in hand with the efforts to provide the people with weekly or monthly income. This is a lesson from the development of livelihood stability as demonstrated by the people of Buntoi who have reached it long time ago and recently by the people of Basarang Jaya.

Some areas of peatland in Central Kalimantan have been converted to plantations, mainly of oil palm. On the other hand, there is good possibility to grow rubber with some fruits trees such as practiced by local people or leaving some of the peatland area as forest reserve but planting it with some commercial non-timber trees such as jelutong. The mode of conservation through the development of a national park is an unacceptable and unpromising way to do conservation since many people believe this will limit their access to natural resources.

Degraded peatland areas surrounding villages could be rehabilitated naturally by preventing fires in the dry season. The people prefer, however, to use these areas for traditional plantation as well as forest reserves that further support the security of their livelihood.

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