Finding alternatives of livelihood sources for forest dependent communities in protected areas: a case study of Sebangau National Park, Central Kalimantan Province, Indonesia

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Abstract. This study evaluates the impacts of the establishment of Sebangau National Park (SNP) in Indonesia, on local people’s livelihoods. SNP was established in 2004 and covers more than 560 thousand hectares of peat swamp forest in Central Kalimantan Province. SNP was a production forest for more than 20 years and almost half of the area has been degraded. SNP is surrounded by almost 50 thousand people whose livelihoods depend on SNP’s resources before, during, and after the changing status of the area from production to conservation forest. Nowadays, about 6-7% of local community are categorised as poor people and surviving from their subsistence livelihoods. This study shows that the establishment of the park changes the livelihood strategies of local communities. People shifted their livelihood sources from forest resource extractions, particularly logging, to agriculture (farming and fishing). Some strategies to maintain and improve the livelihoods of local communities within the restrictive regulations of SNP management include: (1) regulating the collection of non-timber forest products so that it would not threaten the ecological balance of the forests; (2) developing agroforestry system; (3) involving local communities in the rehabilitation programs within rehabilitation zone; (4) developing ecotourism; and (5) involving in communities in the REDD+ program prepared by SNP.

1. Introduction

The establishment of protected areas in Indonesia’s remaining peat swamp forests is very important for restoring degraded forests. In addition, conserving Indonesian peat swamp forest would significantly reduce potential carbon emissions that can be released from degraded peat lands. Indonesia’s peat rainforests are located close to coastal areas where an accumulation of carbon-rich decayed vegetation may have build up to a depth of 10 meters or more over thousands of years [1]. With at least 90% of its carbon stored below ground, the peat forests can store up to 20 times as much carbon as tropical rainforests on normal mineral soils [2]. Deforestation and forest degradation can release carbon
emissions as the peat decomposes or is burnt [1]. Indonesia has the largest area of tropical peat lands in the world holding about 57 billion tonnes (Giga tonnes or Gt) of carbon [3], a globally significant terrestrial carbon pool. Most of the Indonesian peat lands are located in Sumatra, Kalimantan and Papua islands. Unfortunately, the peat lands in Sumatra and Kalimantan have been heavily degraded, raising the need for immediate action to save the remaining areas and to restore the degraded ones.

The Sebangau National Park in Central Kalimantan was established in 2004 in an effort to rehabilitate degraded peat swamp forests as well as to conserve the remaining good peat land areas. However, saving the environment by stopping the deforestation and forest degradation may lead to social and economic problems related to the utilisation of forest resources by local communities. There are 50 villages surrounding the national park and most of the villagers have depended on the utilisation of Sebangau Forest for decades. Furthermore, about 6-7% of the people in these communities live in poverty. This has created a conflict of interest between protecting the forest from further degradation and keeping or improving local communities’ livelihoods for more prosperous community [4].

The linkage between natural resource degradation and poverty has been studied by many parties since the World Commission on Environment and Development provided an initial view of the issue by stating that ‘poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more uncertain and difficult’ [5]. Since then, numerous studies have been conducted by scholars, international organisations, and other parties to explore the relationship between poverty and resource degradation (see, for examples, [6][7][8][9][10][11][12][13][14][15]). However, while scholars and international organisations agree about the correlation between poverty and resource degradation, the type and strength of the linkage is very case-specific and cannot be generalized between sites. A study conducted by the World Bank on “poverty-environment nexus” in Cambodia, the Lao PDR, and Vietnam found that the link is very strong but quite different in each country [9].

Further, studies show that the nexus between poverty and environment can be explained as either a one way or a two way relationship [7][16][11][17][18][4][15]). A one way causal relationship was found in a study by [13] where evidence from six studies in Latin America, South Asia, and sub-Saharan Africa was examined. The study underscores the role of poor people as agents of forest degradation, whether in a struggle to subsist, an effort to prosper, or in response to temporary misfortune. On the other hand, the more common view of the poverty-environment nexus is of a two-way relationship, where poor people are both agents and victims of natural resources degradation ([7][11][15]). In this case, the poor may exploit natural resources to fulfil their needs and safeguard their welfare, although they may also be affected by natural disasters or soil degradation.

Conserving natural resources in developing countries such as Indonesia needs to consider the linkage between natural resource degradation and poverty, since most natural resources such as forests have been surrounded or inhabited by local communities, most of them are poor people, for long time [19]. One of the methods in conserving natural resources is by establishing a protected area. The World Conservation Union (IUCN) defines a protected area as a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values [20]. However, access limitation is a common problem in the development of protected areas in developing countries because protected areas often directly limit local community activities to utilize natural resources for their economic needs [21]. Furthermore, even is access is allowed, utilisation of protected area resources, especially through extractive activities, is limited. Hence, it usually affects the livelihoods of local communities surrounding the protected area. In Indonesia, according to regulations, extracting forest/marine products such as timber and coral within a protected area is prohibited, unless permitted by the protected area authority. However, utilising forest/marine environmental services such as landscape beauty are allowed with some limitation [22].

This study examines the impacts of protecting a forest area that is used to be the source of community income on the livelihood strategies of the community, given that the usual immediate consequence of the establishment of a protected area is the limitation of access to the forest resources. Assessing the
impacts of access limitation to the community livelihoods is an important stage before providing alternatives for sustaining and improving the local livelihoods. Since improving livelihoods and conserving natural resources are often two competing interests, it needs to look for activities that provide economic and social benefits, but environmentally friendly [23][24].

2. Methodology
The aims of this study are to identify and understand the impacts of the establishment of national parks and to evaluate activities within the parks that can maintain the livelihoods of local communities, yet can still conserve the forest resources. To answer the research question, this study has been conducted in a structured, organized, and systematic process based on theories and knowledge with focuses on forest-dependent communities in the study site. The focus of this study is the changes in forest-dependent communities' livelihoods, particularly on socio-economic aspects, due to the establishment of a national park. This study also looks for the forest-dependent communities' preference on the alternative activities ‘allowed’ within the national park that can still support their needs.

2.1. Study site
This study uses Sebangau National Park and surrounding villages as case study site. Sebangau forest was declared as Sebangau National Park (SNP) in 2004, after more than 30 years being managed as a production forest. SNP is categorized as a degraded area with 45% of 568,700 ha needing to be rehabilitated. Just after the declaration, SNP was managed by the Natural Resource Conservation Agency (BKSDA) for Central Kalimantan Province until the establishment of SNP Authority in 2006. The establishment of SNP is based on the Forestry Ministerial Decree No 423/II/Kpts/2004 issued on October 19, 2004 covering an area of 568,700 ha. Sebangau National Park is administratively located in Central Kalimantan Province, Indonesia. It is surrounded by 2 districts and a municipality, namely Palangkaraya Municipality, Katingan District, and Pulang Pisau District, with 7 sub-districts, and 50 villages. Moreover, there are 15,176 households living in these areas around the park and some of these depend on the park resources for their livelihoods.

Three sample villages have been purposively selected based on the village selection determinants to represent the need of research purposes. Those determinants are: (1) variety of local community’s livelihood based on forest-based resources; (2) village location; and (3) type of village, whether it is a traditional village dominated by the native Dayak people of Kalimantan, or a transmigrant village dominated by migrants from Java who came in the 1980s as a result of an Indonesian government program to distribute people from islands with high population density to islands with low population density. In seeking such ethnic diversity, the assumption is that there will be various livelihoods adopted and varying dependence on the natural resources of the forest. These village samples are: (1) Kereng Bangkirai/KB (Sebangau Sub-District, Palangkaraya District); (2) Baun Bango/BB (Kamipang Sub-District, Katingan District); and (3) Mekar Tani/MT (Mendawai Sub-District, Katingan District). KB and BB are traditional villages with population of Dayak people 55% and 94% respectively. Meanwhile, MT is a transmigrant village with population of Dayak people only 13%, the dominant ethnicity is Javanese 71% and the rest of it (16%) is Banjar people. Figure 1 shows the location of this study.

2.2. Data collection and analysis
Data collection techniques employed in this study include: (1) household survey; (2) focus group discussion; (3) in-depth interview; (4) content analysis of secondary data; and (5) observations. The household survey is conducted to: (i) obtain data of current socio-economic (income, expenses, employment, housing, education, health, and culture) conditions of forest-dependent communities; (ii) understand the nature, magnitude, and direction of the socio-economic changes; (iii) explore the role of local communities on the establishment and operation of the national park; and (iv) identify the local communities' preference to the alternative activities in the national park since the limitation of forest resource utilisation. The survey covered 93 households in three villages comprising: (1) 31 respondents from Kereng Bangkirai Village; (2) 32 respondents from Baun Bango Village; and (3) 30 respondents
from Mekar Tan Village. This study uses in-depth interviews to obtain data/information related to: (1) the nature, magnitude, and direction of the forest-dependent communities' livelihoods' changes due to the establishment of the national park; (2) the purposes, process, and achievement of the national park, including the contribution of local communities to the establishment of the park and the role of the park to improve local communities' livelihood; and (3) the alternatives to utilise SNP resources for communities. Fifty four people were interviewed comprising government officers from national and regional level, park manager and park officers, national and local NGO staffs, local communities' leaders and members. Five times focus group discussions were conducted in the three sample villages with the total 68 participants.

As well, secondary data sources including government regulations, park management plans, academic reports and popular media (newspapers, magazines, websites) were collected and analysed to understand the purpose of the establishment of the SNP, socio-economic conditions and livelihoods of neighbouring communities before and after establishment of the park, and community engagement in park development and management.

This study employs various quantitative and qualitative analytical tools, including: (1) descriptive and non-parametric statistics; and (2) description and thematic text. Qualitative data was analysed using NVivo 9.0, while quantitative data was analysed using descriptive statistics.

3. Results and Discussion

3.1. Sebangau National Park and the Multiple Goals of Protected Area Development

Sebangau tropical peat swamp forest is one of the remaining peat swamp forest in Central Kalimantan Province. Its condition is relatively good compared to the surrounding area. Sebangau area provides ecological and economic benefits that are very important for community livelihoods. Furthermore, Sebangau peat land plays a very important role for carbon storage and water management regulation for surrounding areas. Natural peat lands have an important role in balancing regional water supply through its function as water catchment and reservoir. It has a large storage capacity, between 80-90% of peat volume will be a reservoir of water in the rainy season and release it gradually during the dry season [25]. Tropical peatlands are also a reservoir of biodiversity and habitat for endangered species, especially primates such as the orang-utan (Pongo pygmaeus). Some fish species found are also endemic to this ecosystem. The main goals of the establishment of Sebangau National Park (SNP) are to: (1) conserve peat swamp ecosystem; (2) maintain biodiversity and unique landscape; and (3) utilise natural resources and ecosystem sustainably.

Area uncertainty is the major problem for SNP and it is the common problem in Indonesian park establishment within the process of its inauguration, known in Indonesian as pengukuhan kawasan. According to the Ministry of Forestry (MoF) Decree No 423/II/Kpts/2004, SNP covered 568,700 ha. However, in 2011, the MoF issued Forestry Ministerial Decree No 292/Menhut-I/2011 on the changes of forest area in Central Kalimantan Province. It changed the area of SNP to 596,884 ha. In 2012, Park Manager issued a letter to Directorate General of Forest Protection and Nature Conservation MoF proposing the new calculation for the area of SNP to become 539,884 ha. The latest decree issued by MoF is No 529/Menhut-II/2012 stated that the area of SNP is 595,636 ha. The area differences show the dynamics of state forest establishment, especially in the mapping stage since there is always gap between satellite imagery analysis and ground-checking results. Furthermore, negotiation between parties in determining forest boundaries could also result in the revision of the previous calculation. Hence, having an established protected area where the boundaries are agreed and respected by all relevant stakeholders needs a long process. This also applies in the case of SNP establishment, reflected by the issuance of several decrees to revise the size of the protected area.
Regardless of the uncertainty in the area and rules, in the process to stabilize and protect the park, park authority imposes Government Regulation No 24/2004 on Forest Protection and Law No 5/1990 on Bio-Natural Resource Conservation. There are three stages to protect the park from disturbances, namely preventive, persuasive, and repressive actions. Preventive actions were conducted by World Wildlife Fund (WWF)-Indonesia before SNP establishment in 2004. Regarding interviews with community leaders in three sample villages, local communities attended and participated in the dissemination meeting with WWF-Indonesia staffs in the early stage of SNP establishment. Persuasive actions have been conducted in the village with low level of refusal. In these villages, park authority uses local community empowerment programs as a pilot project as a lesson to be learned by other villages. In the village where the rejection of the park was very strong, park authority was taken repressive actions through forest police patrols and raids. Local community’s refusal is mainly caused by their main livelihood sources are forest resources extraction, particularly timber harvesting.

Some local community members, particularly community leaders, admitted that they have been asked to be involved in the discussion and decision making process related to the management of SNP. Two topics are being discussed between SNP Authority and local community and are facilitated by WWF, namely park boundary and park zoning. Zoning is a process of dividing a national park into zones that include preparation activities, data collection and analysis, preparation of draft zoning plan, public consultation, design, and boundary determination by considering studies of ecological, social, economic and cultural aspects.

Community empowerment programs have been conducted in 14 villages surrounding the park by SNP Authority in cooperation with WWF Palangkaraya from 2007 to 2011. Those programs were aimed to provide alternative sources of income by increasing local community’s skills. Types of programs were determined based on local community’s desire and needs. Those programs were training programs for tourist guides and crackers’ making technique; cultivation and processing programs for aloe vera,
rattan, fish pond, and fish farming; and seedlings aid including rubber and jelutung trees, calf, fingerlings and ducklings.

WWF have played a very important role in the establishment of SNP and community empowerments in the villages surrounding SNP. It operates in 23 villages surrounding SNP, including 1 village in Palangkaraya, 4 villages in Pulang Pisau, and 18 villages in Katingan. It formed Formas to facilitate communication between SNP Authority and local community. It also invited various parties to join in the reforestation program in SNP. It developed many program for empowering local community such as aquaculture, financial management training, and tourist guide training (English course).

Local economic development for villages surround SNP is not only the obligation that is held by SNP Authority as the representatives of the central government, but also the responsibility of local government in the level of provincial and district or municipality. Therefore, various government agencies conducted programs in some villages surround the park. Since 2008 Central Kalimantan Province has developed poverty alleviation program called Program Mambangun dan Mahaga Lewu (PM2L). This program is intended for the construction of basic infrastructures such as electricity, clean water, and telecommunication. Several villages surrounding the park have been involved in this program. In addition, the provincial tourism and culture office provided technical assistance to local communities who are interested in tourism and aquaculture in Baun Bango, Kereng Bangkirai, and Jahanjang. The office provided trainings for tourist guides and fish cultivation. These programs were developed in collaboration with National Program for Community Empowerment (PNPM) Mandiri, SNP Authority, and WWF. The provincial forestry office provided capital assistance for local community’s activities related to forest rehabilitation such as financial capital, seedling, etc. The Head of Provincial Forestry Office explained that local community empowerment program to provide alternative livelihoods for forest-dependent communities is a collective responsibility of provincial, district, and sub-district level of government.

3.2. Livelihood Implications of the Establishment of Sebangau National Park

The analysis of quantitative data showed that the establishment of SNP in 2004 changed local community livelihood sources from forestry and forest-based industry to non-forest-based activities. The analysis of data from Village Potential Statistics of Indonesia (VPSI) in 2003 and 2011 [26] covering 41 villages surround the park, showed the changing in livelihood sources of the local community from forestry and forest-based industry to farming and aquaculture. In the meantime, population in the 41 villages decreased 10% from 54,440 people in 2003 to 49,076 people in 2011.

In relation to land-based activities, 11 villages experienced changes from forestry and forest-based industry as their dominant livelihood sources to paddy farming, aquaculture, and rubber plantation. Only one village with forestry as the dominant livelihood source in 2003 did not change in 2011. In this village, most villagers shifted their forestry activity from logging to rattan cultivation in their forest gardens. Twenty five villages with aquaculture and farming (paddy and crop) as the dominant livelihood sources did not experienced changes between 2003 and 2011 or they only shifted within the three livelihood sources namely aquaculture, paddy farming, and plantation. Crop farming, aquaculture, and plantation also became an option for villagers in 5 villages with mining and fishing as the dominant livelihood sources in 2003. The data shows that in 2011 farming (paddy and crop) and aquaculture became the most important livelihood sources for villagers in the 41 villages. Table 1 shows the complete data of the dominant livelihood sources in the 41 villages and how the livelihood sources changed.
### Table 1. The classification of dominant livelihood source shifts for 41 villages

| Classification                              | The Pattern of Shift               | Number of village |
|---------------------------------------------|------------------------------------|-------------------|
| 1 Forestry and forest-based industry       | Forestry                           | 11                |
|                                            | Aquaculture                        |                   |
|                                            | Paddy farming                      |                   |
|                                            | Plantation                         |                   |
| 2 Aquaculture and farming (paddy and crop) | Aquaculture                        | 25                |
|                                            | Paddy farming                      |                   |
|                                            | Plantation                         |                   |
| 3 Mining, fishing, other                    | Aquaculture                        | 5                 |
|                                            | Farming (paddy and crop)           |                   |
|                                            | Plantation                         |                   |
| **Total**                                   |                                    | **41**            |

Source: Village Potential Statistics of Indonesia (VPSI) in 2003 and 2011 [26]

The finding revealed the changing in livelihood strategies taken by local communities in responding to the changes of situation in their localities. The changing status of Sebangau Forest from production to conservation forest was a significant change since it implied a change in the rules of forest resources extraction by the local community. Local community perceived that limited access to the forest is the main impact they had experienced since the establishment of SNP, although the establishment of SNP is not the only event that has limited their activities within the forest. Even, when the status of Sebangau Forest was a production forest, the benefits that could be reaped from the forests were also limited since the logging companies operating in the forests was the party who got the largest portions of the benefits.

#### 3.3. The historical background of Sebangau Forest utilisation: the evidence of access limitation

The changing status of Sebangau Forest implied to local community’s access to extract forest resources. Local community had the freedom to utilise forest resources in any part of the forest before its status was changed to production forest. This freedom was reduced during the production forest where local community’s unlimited activities must be conducted in certain area devoted for local community and be determined by concession companies. In addition, during the production forest status, local community also had an opportunity to have a better economy by working as loggers, sawmill workers, rattan farmers, NTFP’s gatherers, canal owners, and daily labourers. Local community’s access on the forest had been completely banned since the establishment of the park. The status of Sebangau Forest as conservation forest does not allow local community to have any activities in any part of the park. Park management applied very strict rules at the beginning of the establishment of the park, but the rules are slowly loosened with the negotiations between SNP Authority and local communities discussing the utilisation zone where local community needs will be accommodated. Table 2 presents the summary of the impacts of the changing status of Sebangau Forest to local community’s access on forest resources extraction.
Table 2. Local community’s access to forest resources before, during, and after the changing status of the Sebangau Forest

| Table 2. Local community’s access to forest resources before, during, and after the changing status of the Sebangau Forest |
|-------------------------------------------------------------|
| **Sebangau Forest (before 1970s)** | **Production Forest (1970s-2006)** | **Conservation Forest (after 2006)** |
| Unlimited area and activities of forest resource extraction | Limited area of forest resource extraction | Limited area and activities of forest resource extraction |
| Traditional usage by Dayak people | Traditional usage by Dayak people | Traditional usage by Dayak people |
| **1. Source of logs – firewood, housing, boats** | **1. Source of logs – firewood, housing, boats** | **1. Limited firewood** |
| **2. Source of medicinal plants** | **2. Source of medicinal plants** | **2. Source of medicinal plants** |
| - Shifting cultivation to plant rice | - Rice farming at the river banks (slash and burn) | - Hunting (pigs and deer) |
| - Hunting (pigs and deer), meat, Fishing | - Fishing | - Fishing |
| - Fruits & vegetables | - Fruits & vegetables | - Fruits & vegetables |
| **Commercial usage** | **Commercial usage** | **Commercial usage** |
| **Source of income:** | **Source of income:** | **Source of income:** |
| - Fishing | - Fishing | - Fishing |
| - Crocodile | - Rattan farming | - Gathering NTFPs (tree barks, jelutung/resin, birds, tortoises, bats) |
| | - Gathering NTFPs (gemor/tree bark, jelutung/resin, birds, tortoises, bats) | |
| | - Canal business | - Canal business |
| | - Daily labourers (logging, sawmill, canal digging) | - Swallow bird nests |

Source: Secondary data from [27] and primary data from interviews and household surveys

3.4. The Impacts of Sebangau National Park Establishment on Community Livelihoods

The greatest impact experienced by local community in the three sample villages is the prohibition to harvest timber. The new rule that was applied due to the changing status of Sebangau Forest from production to conservation forest eliminated local community’s livelihood source associated with logging activities. Those livelihood sources were daily labourers for logging, sawmilling, and canal digging. Some other livelihood sources were also affected including canal business and non-timber forest products gathering such as rattan, gemor (tree bark), jelutung (resin), tortoises, crocodiles, and bats gatherings. The latter livelihood sources were also prohibited in the early formation of the park, but local community resumed those activities when SNP Authority no longer performed repressive actions.

Almost all participants in the five focus group discussions admitted their involvement in the logging activities, legally and illegally, and they livelihood sources must be changed due to the establishment of the park. An ex-logger in KB expressed his misery as a result of the establishment of the park, as “painful”, a local community member in BB stated it as “hard life”, and a mother of two children in MT found it as “a shocking decision”. Even though local community recognized the ecological benefits of the park, they placed their economic loss as the most important disadvantage from the existence of the park.
Since the establishment of SNP Authority, the status of protected area has become more legitimate and the direction of the management has become clearer. However, local communities think that the limitation of community access to forest resources has become stricter compared to the previous situation where SNP had been managed by BKSDA. Local community complained that they could not harvest timber for housing and boat materials (for building or maintaining). They could only collect a certain amount of timber for firewood. They also complained that they could not collect tree barks, since the bark collection has to be done by cutting the trees. Furthermore, SNP Authority does not consistently apply the rules across the area of SNP. As an example, local community in BB in particular and Kamipang Sub-district in general, are prohibited to gather gemor (tree bark) since they could not peel the tree bark without cut the log. Meanwhile, local community in KB in particular and Sebangau Sub-district in general, are allowed to undertake it although they also cut the log. It created envy and unfair feelings within local communities.

Local community perceived that the limitation of community access to SNP has made their daily life difficult since their income has decreased. They compared their income in cash as loggers with fishermen or farmers. The decreasing income in cash and inflation led to declining in the purchasing power of local community. In a focus group discussion in BB, an ex-logger expressed his opinion:

“Now, our life is really difficult. We earn money just to be spent in a day. In the past, we earned money to be spent in a week. Now, the price of rice is very expensive. We used to eat 2 plateful of rice, now we could only afford one fourth of a plate. We have to be satisfied with this one fourth of a plate although it feels totally different between 2 plateful of rice and one fourth of a plate of rice.” (An ex-logger and an owner of a kiosk in BB)

Local community with Dayak ethnicity claimed to suffer more than other ethnicities. Their livelihoods are highly depended on forest resources. They cut wood to build houses and make boats, grow crops to get rice, hunting and fishing to get protein in their diet, gather vegetables and fruits, collect animals and plants to have some cash, and many other forest-based activities. Dayak people depended on forest resources for years and their only have skills related with forest extraction. The access limitation to the forest is believed will create poverty within Dayak people. A Dayak customary leader in KB stated that:

“If local communities’ activities in the forest should be banned or limited, they can’t live anymore, or at least they will become poor. This is going to kill them slowly, because they are not used to live in the city, but they used to live in the forest. Furthermore, we only support the changing status of Sebangau forest to conservation area or national park if it benefits local communities. If it does not benefit them, then local communities will become poor. If we are poor, we don’t want this forest to be changed to a national park.” (A customary leader in KB)

Local community with Javanese ethnicity inhabiting MT have a low dependency on forest resources. They used to cultivate for their subsistence life. They grow paddy, vegetables, and fruits, and they also breed cows, goats, and chickens, for their daily food. They sell some of them to get cash. They only use timber from the forest to fix their wooden houses. Javanese people do not have sufficient skills to extract forest resources and they also feel that they are not entitled to do so regarding their status as migrants. A community leader in KB stated that:

“We were not really depended on forest resources. We were loggers and working for sawmill companies in neighbouring villages, but now we only use timber for firewood and fixing our houses and boats. We do not know how to collect tree bark or find jelutung tree to be tapped. We also understand that we are migrants here and the forest does not belong to us. It belongs to local people, Dayak people. If they said it is theirs then it is better for us to stay away from it.” (An old farmer in MT)
The access limitation to the forest and the closing of logging businesses and their related industries constrained local community to change their livelihood sources. Local community must change their livelihood sources from forest and forest based industries to fishing or farming. Dayak people changed their livelihood sources to fishing and non-timber forest products such as tree bark and jelutung resin, while Javanese people changed their livelihood to farming and animal husbandry. The changing of livelihood sources is based on local community’s skills and the availability of natural resources in their area.

3.5. Strategies to Improve Local Community Livelihoods due to Access Limitation to Sebangau National Park

A strategy to improve local livelihoods amid restrictions in the management of SNP is regulating the collection of non-timber forest products so that it would not threaten the ecological balance of the forests including cultivating activities and agroforestry system within traditional utilisation zone. From the interviews and focus group in KB, several parties believed that cultivation system in the traditional utilisation zone is an alternative to prevent overexploitation of some resources. Local community proposed to cultivate jelutung, gemor, fish, and birds. The Chairman of KB’s Community Forum suggested that cultivation system in traditional utilisation zone is an alternative to the collection of non-timber forest products within the core or forest zones of SNP. Furthermore, the cultivating activities would localise the activities of local communities in the park. Cultivating jelutung tree and fish are the most wanted cultivation systems. The Chairman of KB’s Community Forum added that aquaculture is also needed because local communities’ activities related to fishing have shifted from sustaining to overexploiting the fish stocks since the demand has increased while the stock tends to decrease. People started to catch small fish by using tighter fishing nets. Related to this issue, the Chairman of KB’s Community Forum said that:

“We need to cultivate fish. I am worried about fish preservation since this time so many people catch fish. If this situation continues, one day we will run out fish. However, we had not succeeded yet to cultivate fish. I do not know why. It may be because we are too ignorant.”

Nevertheless, local community involvement in the management of SNP has gradually increased. Local community received information about the changing status of Sebangau Forest and its impacts to their livelihood sources in the early stage of SNP establishment. According to a park officer, local community also participated in securing SNP from illegal logging activities and forest fires. Nowadays, local community joined in several programs provided by SNP Authority and WWF to improve their welfare. An old farmer in Mekar Tani said that:

“We are grateful to SNP Authority. They conducted many programs in this village. I am an old person, only know that I am aided and we will thank to the continuation of the aids.” (An old farmer in MT in a FGD)

Another strategy to improve local livelihoods is involving local communities in rehabilitation program. The rehabilitation of SNP can create commercial activities such as nursery, planting, and maintaining the plants that would benefit local people. Along the supply chains of rehabilitation program, local communities can take part in an activity and be financially benefited. There are about 39,970 hectares of rehabilitation zone within SNP that need to be restored or replanted [28]. Rehabilitation activities in SNP could be in the forms of canal blockage, vegetation analysis for monitoring forest cover, and replanting. In 2011, SNP in collaboration with Indonesian Army and local communities have conducted replanting activity in Mekar Tani Village covering an area of 2,000 hectares [28].

Another strategy to improve local communities’ livelihoods surrounding SNP is by developing ecotourism. SNP Authority plans to develop three sites for nature-based tourism comprising: (1) Kereng
Bangkirai Village (Koran River and SSI Research Station) and Mekar Tani Village (Kaki Hill) for one
day semi-mass educational or recreational tourism; (2) Baun Bango Village (Lake Jalan Pangen) and
Jahanjang Villages (Lake Bulat) for cultural tourism; and (3) Keruing Village (Lake Punggu Alas) for
special-interest tourism. SNP Authority has developed two guest houses in SSI Research Station and
Lake Punggu Alas as the number of visitors in those two sites relatively high; tour guide and English
trainings in Kereng Bangkirai and Baun Bango; and tourism link in Baun Bango, Jahanjang, and Keruing
that involves local communities in tourism activities, such as guides, boat hires, art performances,
hosteys, and food and beverages. In addition to the SNP Nature-based Tourism Development Plan,
the park manager mentions that SNP can develop religious tourism related to the traditional belief of
Dayak tribe called Hindu Kaharingan. However, the plan could only be implemented after boundary and
zoning issues have completed. The park manager is confident that tourism development in the park will
be accelerated with the approval of zoning issue and the existence of investors.

WWF suggested that tourism in SNP is still underdeveloped because lack of tourists or visitors and
lack of local communities' awareness about tourism. Less number of tourists made local communities
put high price for their services. They also have no standardisation on prices and services. Sometimes
local communities treat tourists improperly such as stopping the boat and asking more money for petrol.
WWF and SNP authority have been trying to discuss about it with local communities and explaining
about their services. Tourists usually come to these villages as a result of cooperation with Kalimantan
Tour Destinations (KTD), Barama travel, WWF, or make a direct contact with SNP staffs. WWF also
often mediates local communities and tour operators.

Local communities show various responses on tourism development in SNP. Local communities
found that income from tourism business in SNP is very low. About 25 local community members in
Baun Bango involved in cultural tourism performance admitted that for each performance they only get
Rp25-40 thousand (about AU$ 2.5-4) per person. They only perform 3 to 4 times a year, although they
must practice several times before the performance. However, they do not mind with it because the
whole community could enjoy their performance while they preserve their own traditional culture. They
are very happy and optimistic that tourism in Baun Bango will succeed.

Local communities in Kereng Bangkirai are disappointed with tourism management run by SNP
Authority. They accused SNP has been unfair because only a few people have been chosen to serve the
tourists. They also think that SNP Authority is not serious in developing tourism in Kereng Bangkirai.
A community member in Kereng Bangkirai suggested that:

“If they are serious, they should tell us about what we have to do, how to serve tourists, what they
like and do not like, teach us English so we can communicate with tourists.” (A fisherman in KB).

Nevertheless, based on focus group discussions in the three villages, local communities in general
are fairly enthusiastic with tourism development in SNP, although they realise that the development of
tourism remains slow. They believe more tourists will bring more income. However, they will make it
as a side job. Furthermore, they believe that tourists will be interested in their activities for livelihoods,
including farming, fishing, and resin collection. Tourism is considered to be a preferred development
option with some requirements, such as level of income and local communities' involvement.

Another opportunity to involve local communities in the management of SNP is through reducing
emissions from deforestation and forest degradation (REDD+) program prepared by SNP Authority.
The program is focused on rewetting degraded peatland in SNP. Lessons that can be learned from
Kalimantan Forests and Climate Partnerships (KFCP) for designing PES for REDD+ at the community
level are: (1) the initial payments to communities are based on management inputs while developing
performance-based payment mechanisms; (2) the creation of new institutions is based on village
governance; and (3) the establishment of a trust fund as a part of financing mechanisms. Input-based
payments, such as payments for canal or tatas blockage, will also contribute to the improvement of
property rights based on ‘bundles of rights’ since the community may be granted the rights over the
blockage (Muttaqin, 2012).
As a village government is usually more recognised than other institutional arrangements, such as customary governance, the development of new institutions to implement REDD+ at SNP will be relatively easier when it is based on the village government. Hence, the involvement of villages surrounding SNP is essential. Furthermore, communities need to be trained for carbon monitoring system to ensure the permanence of the emission reduction program. A lesson that can be learned from Community-Based Monitoring (CBM) in Oddar Meanchey (OM) Community Forestry (CF) in Cambodia shows that the CBM has played an important role in the OM CF REDD+ Project, and the monitoring framework and Work Plan that have been developed for the project have placed important emphasis on the role communities will play in MRV during REDD+ implementation (Brewster, Bradley, & Yeang, n.d.).

Hence, communities can help rehabilitate peatland by avoiding peatland decomposition and fires that, in turn, will reduce carbon emissions, while obtain benefit from the ‘property rights’ over canal blockage and even additional payment for their involvement in monitoring activities. This is an example of balancing the livelihoods and ecological sustainability of a protected area (Nurrochmat et al., 2017).

4. Conclusions
The findings of this study show that the access limitation due to the establishment of SNP has negatively affected the livelihoods of forest-dependent people. However, most of forest dependent people are aware of the ecological benefits of the SNP establishment. The dynamic relationship between local communities and resource uses has been influenced by historical background of access limitation in Sebangau Forest. Related to this, local communities think that they have never obtained appropriate benefits since most benefits enjoyed by outsiders.

Communities perceived that one of benefit provided by SNP is preventing outsiders to exploit Sebangau forest resources. Hence, they think that they should deal with current restrictions in utilising Sebangau forest for their own benefits. Negotiation between local communities and SNP Authority to look for the best strategies in involving local communities in the management of SNP is conducted through zoning system as well as community empowerment programs.

Some strategies to maintain and improve the livelihoods of local communities within the restrictive regulations of SNP management include: (1) regulating the collection of non-timber forest products so that it would not threaten the ecological balance of the forests; (2) developing agroforestry system; (3) involving local communities in the rehabilitation programs within rehabilitation zone; (4) developing ecotourism; and (5) involving in communities in the REDD+ program prepared by SNP.

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