The Protection of Water and Livelihood in Two Communities in Sarawak

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ABSTRACT—The Penan and Lun Bawang communities practice sustainable management of natural resources in Sarawak. Both communities have a vocabulary which expresses simultaneously their claims to the usage of natural resources of the forests and rivers and their responsibility to conserve them for the future. Both communities pay special attention to the cleanliness of water which is vital for the production of their staple foods of sago and rice respectively. The arrival of logging companies since the late 1980s has resulted in contamination of the water. The Penan attempted to blockade logging roads and petition government while the Lun Bawang erected signage warning the loggers to stay away. These community lands merit definition as areas of High Conservation Value.

Introduction

No indigenous community in Borneo underestimates the importance of rivers and streams; this extends beyond the essential ecosystem services. They manage water resources to meet current and future needs of their communities. Here I explore this topic among nineteen Penan settlements that lie between Mulu and Pulong Tau national parks in the upper Tutoh River, Baram District, Sarawak. The Penan were traditionally hunter-gatherers who depended on pure fresh water to process their staple, sago (*Eugeissona utilis*). I also draw comparison with the Lun Bawang who practice a form of wet or pond rice cultivation. This form of agriculture, like the Penan processing of their staple, is dependent on the availability of pure mountain streams. I also explore the sustainable management of water resources in seven villages in the Long Semado and eight villages in the Ba Kelalan cluster, both localities found in the upper Trusan River in Lawas District, Sarawak (see Figure 1).

Lifeway: Penan of the upper Tutoh River, between Mulu and Pulong Tau

The Penan of the upper Tutoh, between Mulu and Pulong Tau national parks, comprise nineteen settlements with an approximate population of two thousand people (Langub 2011).¹ They were the last to abandon the nomadic way of life, with some

¹ Information provided to me by Ezra Uda of the State Planning Unit, a government development planning agency of the Malaysian state of Sarawak, in July 2020. He indicated there were 21,367 Penan in Sarawak, largely found in the upper Rejang and Baram, two largest rivers in Sarawak. There were approximately 5,000



Figure 1. Map of the upper Tutoh and Trusan showing the locations of the Penan and Lun Bawang settlements.

groups adopting the settled way of life as recently as ten years ago.

As nomads they stake claims $(molong)^2$ to resources and establish stewardship and management over them. As nomads they live in lean-tos, which they call *lamin tana*' (forest hut or dwelling). When resources in the area are exhausted, they move to a new area and build new *lamin tana*' (Langub 2011). The former campsite is now referred to as *la*'a (old campsite). *La*'a are not forgotten; they are frequently visited in a somewhat circular movement within a specific area of the landscape they traditionally occupied by a nomadic group. A new *lamin tana*' may be built at a former campsite (*la*'a) or close to it. The term nomadic is in some ways misleading as the groups move through the same territory in a cyclical fashion, returning to previously harvested areas that have

Penan living in the Lurah River, tributary of the Bahau River, in North Kalimantan, Indonesian Borneo.

 $^{^{2}}$ The idea of *molong* incorporates the claim to a resource, its conservation for the future, their stewardship ethos, and sustainable utilization and management, to be discussed below.

regenerated. In other words, the same campsite may be occupied by a group more than once in the life of an individual or the group itself.

Penan refer to the numerous *la'a* scattered across their river system territory as their *uban*, marks or footprints. When they refer to *la'a* as *uban*, they are talking about its cultural significance, past events, connections, relationship, sustainable management, customary rights to the area and all that it encompasses. A nomadic Penan group moves within its home territory that normally has hills or river systems that act as boundaries with other groups. As a group moves around, it leaves traces of *la'a* behind. Through years of constant movements within its territory, a group establishes numerous *la'a* over its "territorial landscape."

The geographical area where the group moves is referred to as *tana' pengurip*,³ the land area that provides the essentials of life, such as food and other resources that they collect to trade or convert into handicrafts for domestic use or for sale. In the *tana' pengurip*, Penan lay claims to all sorts of resources such as wild sago, especially *Eugeissona utilis*, rattan, fruit trees, *getipe* (a type of wild rubber for gumming), trees to make blowpipes, and *tajem* trees that produce poison for blowpipe darts used in hunting game. The concept of claiming resources or *molong* does not simply mean a claim to a resource, but also the conservation of that resource for future sustainable use.

When an individual *molong* a wild sago, he or she harvests the mature trunk and leaves the young plants and the buds for the future (Brosius 1986, 1990 and 1991; Langub 1988, 1989, and 2011). Sago palms grow on aerial roots, and the mature sago is cut above the aerial roots so this does not kill the sago cluster, but lets it regenerate for the future. The Penan also rotate their harvest of sago from one clump to another to allow the regeneration of previously harvested clumps. The same harvesting strategy is applied to other resources, such as rattan. When the Penan harvest rattan, they cut the mature vines and conserve (*molong*) the young vines for the future.

Another concept unique to Penan that guides them in their management of resources in the forest is *mihau*, which means to protect, preserve, or take care of. *Mihau* is a fundamental ethical principle that not only instructs Penan to take only what they need from the forest, but to respect (*mengadet* or *seva*) creation It is an ethically powerful principle shared by all Penan of *kua kenin* ("one feeling" or "one heart"). While *mihau* guides the way Penan conduct their activities sustainably in the forest, *molong* is a system of preserving and fostering (sustainable management) resources in the surrounding areas.

A conspicuous feature of the Penan landscape is the presence of rivers, big and small. Rivers provide the Penan with a framework for organizing their knowledge of the geography of the landscape. Weaving their way through the forest, Penan use the river system to determine their precise location relative to hills and other landmarks.

A place in the river system where one was born or where one's parents or grandparents were born is referred to as *oko' bu'un* (place of origin), conferring one with an identity and rights to the place as well as access to its resources, and the responsibility for ethical

³ *Tana*' is land that encompasses the forest itself; *pengurip* comes from the root word *urip*, meaning life; hence, forested land area that provides livelihood.

stewardship of these resources. Villages or settlements are identified with confluence of rivers, for example the Penan village of Long Siang is named after the confluence of Siang and Tutoh rivers. The river itself can identify the name of a village such as Ba Bareh located on the bank of the river of the same name, a tributary of the Magoh.

Rivers and streams are an important source of fish protein. Penan communities between the two national parks of Mulu and Pulong Tau also apply the *molong* management system to rivers, especially sizeable pools or *levahau* which have a large population of fish. The word *molong* carries the idea of respect and adherence.

To process wild sago, the palm trunk is cut into sections and the pith is removed (Figure 2). The pith is transferred to a mat and clear water is added to separate the starch from the pith (Figure 3). This is left for 30 minutes while the water drains through the rattan mat, leaving behind the starch residue. Clear water is essential to ensure that impurities are not left behind in the starch that is the Penan's staple food.



Figure 2. Splitting the sago palm Figure 3. Trampling the sago fiber to separate the starch (photo: Henry Chan) trunk and chipping the pith out of the trunk (photo: Henry Chan)

Companies logging the upland dipterocarp rainforest reached the Penan communities in the late 1980s and through the 1990s. Prior to this, the isolated Penan communities lived in balance with the resource-rich forest. The arrival of logging companies brought with them numerous problems, particularly soil erosion and pollution of rivers and streams which made it difficult to process sago because mud particles contaminated the finished sago starch. The affected Penan settlements in the area barricaded logging roads to draw the attention of the outside world (Figures 4, 5), especially owners of timber companies and government authorities to the importance of clear, clean river water to process their staple food, wild sago.

Lati'Ba': wet rice cultivation

The Lun Bawang of Ba Kelalan and Long Semado together with their cousins, the Lundayeh of Sabah, Malaysia and Krayan district of North Kalimantan, and the Kelabit of the Kelabit Highlands in Sarawak, cultivate wet rice as their main occupation (see Padoch 1981, 1983; Langub 1984; Janowski 1988; and Crain and Pearson-Rounds 1996). The farming system is better known as *lati' ba'*, where *lati'* means farm and *ba'* means wet, hence a wet rice farm. It is an efficient farming system involving the interaction among several elements, man, stream water, animal and the environment. Water is an important element in the system, and farmers take particular care of rivers and streams that bring water to the fields to provide nutrients to the rice plants.



Figure 4. A barricade erected by the Penan community to prevent logging in the area they claim (photo: anonymous)



Figure 5. The Penan community presenting their case against logging to government officials (photo Jayl Langub)

The Lun Bawang word that describes the way farmers take care of the river or stream or any other resource is *ngasa'*. *Ngasa'* encompasses the idea of taking care, ministering, nursing, or raising. A person who raises buffaloes is known as *lun ngasa'*.



Figure 6. Blocks of rice fields are carved out of the deep alluvial soils (photo: Ibrahim Komo)



Figure 7. Conduit made of bamboo to transfer water from one block of a field to another block (photo: Jayl Langub)

kerubau; similarly, a person who looks after a garden or orchard is known as *lun ngasa' kebun.* Like the Penan *mihau, ngasa'* is a powerful principle of sustainable management which incorporates the idea of respect for nature.

Blocks of rice fields are carved on the deeper alluvial soils of the flood plains of the highland valleys (Figure 6). This is done after careful consideration of soil quality based on indicator plants, slope, drainage and availability of water. Bunds (*ibpeng*) are created around each section of the rice field. The flow of water into the cultivated area of the valley is done through irrigation, which involves damming (*ngelaleng*) the mountain streams and guiding the water into the rice field through a system of small canals (*abang*)



Figure 8. Clear running water supplied to the field pond (photo: Daniel Chew)



Figure 9. Immediately after harvest buffaloes are released into the field to eat the straw (photo: Daniel Chew)

abpa). Small water gates (*laleng*) are constructed at strategic points to regulate the flow of water into the fields. Conduits (*tabu*) made of bamboo are constructed to transfer water from one section of the field to another (Figure 7). Distribution of water to different parts of the field is controlled by opening and closing the conduit.

In the wet rice fields of highland Borneo, clear clean water is found in field ponds (Figure 8). The continuous flow of fresh water brings micronutrients that fertilize the field, gradually increasing the fertility of even infertile soils. Where different sources of water are available, farmers avoid "tea-colored" or black water as it is poor in nutrients and low in pH (Padoch 1981: 23).



Figure 10. The buffaloes are returned to the gazing ground once the rice fields have been planted (photo: Daniel Chew)



Figure 11. Bamboos hold the soil of the rice bunds, streams and riverbanks in place (photo: Ibrahim Komo)

Buffaloes are an important part of Borneo highland wet rice cultivation. Immediately after harvest, around the middle of January, buffaloes are released into the fields to eat the rice straw (Figure 9). As the buffaloes move about in sections of the field, they soften the soil. They also defecate on the fields and increase the fertility of the soil.

When farmers prepare the fields for planting around the middle of June, the buffaloes are taken out of the fields and put into grazing grounds (Figure 10). By this time the grass in the grazing grounds has recovered and multiplied from previous grazing.



Figure 12. A sign indicating that the river has been adopted to stop logging in the area (photo: Jayl Langub)

The rice fields are then flooded with water to kill off the remaining weeds and grass. While this is done, a nursery plot (*samai*) is prepared for germinating rice seeds around the beginning of July. When rice seedlings are ready for planting, the flow of water into the field is controlled, and the buffaloes are taken out of the rice fields and released into the grazing ground.

As the buffaloes have worked the soil so well, almost no weeding is required. Rice is ready for harvesting at the end of December or in early January. Immediately after harvesting, the system is repeated, and the buffaloes are released into the rice fields.

The system is beneficial to both the rice fields and buffaloes. From January to June, the buffaloes graze and fertilize the rice fields, and the grazing ground is allowed to rest to let the grass grow. From July to December, the buffaloes are put into the grazing ground to feed on the lush field of grass. By the end of the next harvest season, the rice fields are ready for replenishment of fertilizer from buffalo dung.

Bamboo also plays a variety of roles in Borneo highland wet rice cultivation. It is planted between the grazing ground and the rice fields as well as along banks of streams and rivers (Figure 11). First, the roots of the bamboo hold the soil of the rice bunds and banks of streams and rivers in place. Second, the stems are used for constructing fences to keep buffaloes and other animals out of the rice fields to protect the crops from destruction. Third, the bamboo stems are used as conduits to transfer water from one section of a field to another. Fourth, the bamboo plants enhance the beauty of the landscape.

Logging activities, which potentially pollute rivers and streams that feed into the rice fields, have also penetrated the highland area of the upper Trusan. Farmers in the Long Semado area decided to focus special attention on seventy-one small rivers and streams that feed into the rice fields along the alluvial plain of the upper Trusan valley. To inform loggers not to log the area, they put signage on each river and stream (Figure

12) with the message: "*Abpa' ini inasuh Kampung* (name of the village) *pad ngebaku' ulun pulong* which translates as "this river has been adopted by the people of (this named village) to keep the forest healthy."

Although this is not a traditional method of conserving or utilizing water resources in a sustainable method, it is in line with the concept of *ngasa*'. The streams are identified as an area that requires protection in the same way that an adopted child needs to be protected and cared for. It also corresponds to the current concept of High Conservation Value (HCV) areas.⁴ This is a mechanism that attempts to balance economics with the conservation of the natural environment. According to the six HCV principles, natural ecosystems can be identified as having unique features that need to be conserved. Broadly the principles are (Brown 2013):

HCV 1 Species diversity HCV 2 Landscape-level ecosystems and mosaics HCV 3 Ecosystems and habitats HCV 4 Ecosystem services HCV 5 Community needs HCV 6 Cultural values

The streams and the forests through which the streams flow may be classed as HCV 4 and 5 as pure water is needed not only for the *lati 'ba* 'rice fields but also for household use. Rice and in particular the *lati 'ba*' system is an intricate part of the cultural identity of the Lun Bawang people in Long Semado. As the streams are required to ensure the continuation of this form of agriculture, it could be argued that the streams and the surrounding forest ensure cultural identity.

Concluding remarks

Water is a vital resource for the Penan and the Lun Bawang, not only a necessity of life but also a much-needed element to produce their staple foods of sago flour and rice respectively. Although the linguistic terminology differs between the two groups, the concepts are similar.

Among the Penan, sustainable utilization of resources is expressed as *mihau* and *molong*. *Mihau* is the fundamental ethical principle that not only instructs Penan to take what they need from the forest, but to respect (*mengadet* or *seva*) creation or nature. While *mihau* guides the way Penan conduct their activities sustainably in the forest, *molong* is a practical system of preserving and fostering resources for the future and this concept is applicable to water.

The Penan communities blockaded logging roads to stop logging in the areas that are their homelands. They wrote letters and visited various government officers but with no result. The blockades could not be ignored as they were evident for all to see as an

⁴ HCV is a designation introduced by the Forest Stewardship Council, an international non-profit organization dedicated to responsible management of forests.

open invitation to the interested parties to the negotiating table. Was this an effective tool to protect the land? That is open to discussion, but it did enable some negotiations to take place and did bring the issue to the world stage.

The Lun Bawang concept of *ngasa*', taking care of or adopting a resource, has been integrated with High Conservation Value areas. Both ideas are linked to preservation and sustainable management. The Lun Bawang community used the visual signage to indicate that the streams had been protected by the community and the areas under protection of the community remained intact.

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