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Forest Conservation Efforts in *Nugal* Agriculture by the Dayak Kuhin Community in Sapundu Hantu Village, Seruyan Regency, Central Kalimantan

Pelestarian Hutan dalam Budaya Pertanian Nugal oleh Masyarakat Adat Dayak Kuhin di Desa Sapundu Hantu, Kabupaten Seruyan, Kalimantan Tengah

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ABSTRACT

The Dayak Kuhin community, native to Central Kalimantan Province, had a traditional agricultural culture called *nugal*, which was carried out once a year. *Nugal* was considered an agricultural culture that involved opening fields in the forest, but it was often associated with causing forest fires. To clarify the realities of the practice, this research aimed to explore the *nugal* process and associated forest conservation efforts by taking a case study of the Sapundu Hantu Village, Seruyan Hulu District, Seruyan Regency, Central Kalimantan Province. This research employed an ethnographic method and a thick description approach, utilizing qualitative data collected through participatory observation, in-depth interviews, archival records, and literature reviews. The results revealed that the *nugal* agriculture embodied rich local knowledge about forest conservation efforts reflected in each process. The community practiced the *nugal* agriculture carefully with adherence to customary norms that regulated forest management. The findings of this study address the prevailing negative stigma associated with the *nugal* culture as practiced by the Dayak Kuhin community.

KATA KUNCI
pertanian, lingkungan, pelestarian, hutan, masyarakat adat Dayak Kuhin

INTISARI

Masyarakat adat Dayak Kuhin merupakan masyarakat asli Provinsi Kalimantan Tengah yang memiliki budaya pertanian tradisional yang disebut nugal yang dilakukan setiap setahun sekali. Nugal sebagai budaya pertanian membuka ladang di hutan, selama ini kerap kali dipersalahkan karena dianggap menyebabkan kebakaran hutan. Untuk menjelaskan realitas dari praktik nugal tersebut, penelitian ini bertujuan untuk mengeksplorasi proses nugal dan upaya konservasi hutan yang dilakukan dengan mengambil contoh dari Desa Sapundu Hantu, Kecamatan Seruyan Hulu, Kabupaten Seruyan, Provinsi Kalimantan Tengah. Penelitian ini menggunakan metode etnografi dengan pendekatan deskriptif mendalam (thick description) melalui pengumpulan data secara kualitatif yang berasal dari observasi partisipatoris, wawancara mendalam, sumber catatan, dan studi pustaka. Hasil dari penelitian menunjukkan bahwa dalam budaya pertanian nugal kaya akan berbagai pengetahuan lokal tentang upaya pelestarian hutan yang tecermin dari setiap prosesinya. Masyarakat melakukan praktik budaya pertanian nugal secara hati-hati dan mengikuti norma adat yang mengatur pengelolaan hutan. Hasil penelitian ini memberikan jawaban atas stigma negatif yang selama ini diasosiasikan dengan budaya pertanian nugal seperti yang dilakukan oleh masyarakat adat Dayak Kuhin.

Introduction

Indonesia is an archipelagic nation home to a diverse range of indigenous peoples, each with their histories and a deep-rooted connection to their traditional territories, which they have inhabited for generations (Dalidjo 2021). These indigenous communities possess sovereignty over their land and natural resources, which enables them to lead socio-cultural lives guided by customary laws, including the adoption of agricultural practices rooted in local wisdom. Unlike conventional agriculture, which prioritizes maximizing production through modern technological methods, such as chemical fertilizers and pesticides (Sardiana 2017), indigenous farming typically employs traditional methods and simple technologies following customary provisions (Kurniasari et al. 2018). Their agricultural practices are also governed by specific norms and regulations related to their implementation.

Agriculture practiced by indigenous communities is widespread across various regions in Indonesia. Among the Arfak indigenous people in West Papua, agricultural activities are guided by the principle of *Igya Ser Hanjob*, which translates to a deep affection for traditional land and a commitment to forest preservation (Ataribaba et al. 2020). This principle allows the community to implement a rotational land conservation system aimed at promoting biological sustainability and ecosystem balance. The land is organized into distinct categories: *bahamti, nimahanti, susti, and situmti* (Ataribaba et al. 2020). *Bahamti* refers to forest areas that are rigorously protected, where gardening is prohibited. *Nimahanti* consists of previously cultivated land that has been abandoned for over a decade, resulting in lush, forest-like growth. *Susti* is a designated management area actively used for cultivation as a field or garden, while *situmti* denotes an ex-garden area situated near the village. The rotation process occurs in all areas except *bahamti*, with the belief that unused lands can undergo ecological rehabilitation. For instance, as *susti* transitions to *situmti*, the previously cultivated land becomes overgrown with wild plants, marking a shift in its environmental state.

The Tolaki indigenous people, native to Konawe Regency, practice the *monda'u* tradition, an agricultural procession aimed at securing abundant rice production and invoking blessings from the Gods through rituals that incorporate spells or prayers (Lisyanti et al. 2022). The agricultural activities within this tradition include various stages: *monggiikii ando'olo* (selecting a farming location), *mohoto o wuta* (pre-farming ceremony), *mosalei* (cutting down small trees and roots), *mombodoi/monduehi* (cutting down large trees), *humunu* (burning), *mo'enggai* (cleaning up burning residue), *mewala* (constructing a fence), *motasu* (planting rice), *mosaira* (clearing weeds), *mete'ia* (tending to the plants), *mosawi* (harvesting), and *mowiso i ala* (storing rice in the barn). In addition to the ritual of seeking divine assistance for a smooth process during the *mohoto o wuta* ceremony, the Tolaki people begin each activity session with prayers. They believe that the use of mantras or prayers during these activities can yield better agricultural outcomes (Lisyanti et al. 2022).

The indigenous populations are confronted with significant stigma associated with agricultural practices, often perceived as complex and outdated. This negative perception extends to particular practices, such as slash-and-burn agriculture, commonly employed by these communities. Indigenous groups typically residing in proximity to forested areas frequently utilize fire as a means for land clearing, a practice that frequently results in conflicts with governmental authorities. The stipulations outlined in Law No. 32/2009 on Environmental Protection and Management, particularly Article 69, Paragraph 2, acknowledge the legitimacy of land clearing through burning, provided that the practices consider local wisdom in each region. Nonetheless, the indigenous communities practicing their traditional practices still experience a persistent trend of accusations and criminalization. Research conducted by YLBHI (Yayasan Lembaga Bantuan Hukum) indicates that indigenous peoples are often unjustly presumed to be responsible for forest fires, as noted by Sagita & Pramana (2022). In 2019 alone, significant numbers of indigenous individuals were charged with land burning offenses, including 27 residents from Wahoni Regency in Central Sulawesi and seven cultivators from Sintang Regency in West Kalimantan (Rato 2021). Such oblique accusations of forest and land fires, as well as the resultant haze, have

their roots in narratives dating back to the New Order Era, particularly since 1997, and are perpetuated by conflicting accounts from various stakeholders, including state officials (Candri 2020). Data from the Customary Territory Registration Agency (BRWA) highlights that out of a total of 6.8 million ha of customary territory, approximately 80%, or 5.4 million ha is situated within the state forest areas. These customary territories are predominantly inhabited by indigenous people who actively engage in the protection of their ancestral forests from fire-related threats (Aliansi Masyarakat Adat Indonesia 2016). Consequently, media portrayals that depict indigenous populations as culprits in fire events are inconsistent with empirical data. In reality, these communities often find themselves engulfed in smoke while striving to mitigate fire risks and safeguard their lives and livelihoods (Aliansi Masyarakat Adat Indonesia 2016).

Research indicates that the agricultural practices employed by indigenous peoples are often misunderstood and stigmatized, particularly regarding methods such as controlled burning. For example, the Kanayatn indigenous community in Kubu Raya Regency, West Kalimantan, utilizes local wisdom to prevent forest and land fires. They implement strategies like creating barriers and installing water pipes along the edges of the land designated for burning (Denius et al. 2023). Similarly, Yuniarti's research on land clearing by indigenous peoples in Tapin Regency revealed effective local practices for fire control. These include methods such as establishing fields, burning against the wind, and vigilant supervision during burning processes to prevent fires from spreading (Yuniarti et al. 2020). Moreover, Mandayu's investigation into forest fire mitigation strategies in Kalimantan highlights that the Dayak community is mindful of the consequences of traditional practices. This awareness is manifested in community cooperation at the onset of the farming season, which builds resilience against potential threats, particularly from palm oil companies attempting to take over Kalimantan's forests for plantation development (Mandayu et al. 2024). Customary norms and rules serve as crucial guidelines for indigenous communities in various activities, including agriculture. The stigma they face is largely unfounded, as these long-standing practices have had little to no significant impact on forest conservation. The survival of indigenous peoples is intricately linked to the existence of forests, as seen in the agricultural methods practiced by the Dayak Kuhin community in Central Kalimantan, primarily residing in Seruyan Regency.

The Dayak Kuhin community employs the burning method during a series of processions as part of their cultural practice known as *nugal*. This method is used thoughtfully and is guided by efforts aimed at fire mitigation. Throughout the *nugal* procession, the Dayak Kuhin community closely adheres to the values of forest conservation. Despite their rich traditions, these indigenous people have not garnered significant attention from researchers. For example, Efendi focused on the value of local wisdom in the *nugal* tradition of the Dayak Meratus people in South Kalimantan, contributing to environmental geography (Efendi et al. 2020). Similarly, Wulandari investigated the local wisdom associated with manugal in East Barito Regency (Wulandari et al. 2024). Yanarita also explored the traditional agricultural practices of the Dayak Ngaju indigenous community in Katingan Regency, Central Kalimantan, examining their impact on family income (Yanarita et al. 2024). While these three studies share a focus on Dayak indigenous communities, they lack a connection between this agricultural practice and forest conservation. Consequently, this research aims to describe the *nugal* procession and its significance for forest conservation efforts undertaken by the Dayak Kuhin community in Sapundu Hantu Village, Seruyan Hulu District. The community practiced the *nugal* dates back to colonial records, and they continue to uphold their various traditional customs.

Methods

Time and Location

This research was conducted in Sapundu Hantu Village, Seruyan Hulu District, Seruyan Regency, from March 2022 to March 2023, spanning more than 12 months. During that time, the research team lived together and interacted directly with the Dayak Kuhin community by playing a direct role as an

educational staff in elementary schools and blending into village life.

Data and Tools

This research employed qualitative data, which are characterized by non-numerical statements regarding the content, nature, characteristics, and conditions of various phenomena, or symptoms, as well as observations about the relationships between two entities. These entities may encompass physical objects, behavioral patterns, ideas, values, norms, or societal events (Ahimsa-Putra 2009). The data were gathered through participatory observation, in-depth interviews, archival records, and literature reviews.

Data Collection and Analysis

This research utilized ethnographic methods grounded in extensive fieldwork that was directly connected to the lives of the participants over a significant period (Davies 2008). A thick description approach was also employed to gain a deeper understanding of the cultural system, which necessitated prolonged engagement (Kleden-Probonegoro 2015). This method focused on providing vivid mental images of the observed events for those not present, thereby allowing others to grasp the context and significance of the experiences. By implementing the thick description technique, the research effectively captured insights shared by the informants from the Dayak Kuhin community. Consequently, the study refrained from using theoretical analysis and instead relied on qualitative data drawn from participatory observation, in-depth interviews, archival records, and literature reviews. Data collection was informed by the results of participatory observation throughout the entirety of community activities, particularly by directly engaging in cultural traditions, including agricultural practices, to minimize bias and convey the emic perspective. Emphasis was placed not only on the data from informants but also on actively participating in the daily routines of the research subjects. Furthermore, both participatory observation and in-depth interviews were quantitatively limited regarding the number of sources or actions. Ethnographic data tends to have an unlimited nature, serving as a platform for both the speaker and listener to share and convey experiences (Kleden-Probonegoro 2015).

To achieve the objective, this research made several adjustments to the concept of forest conservation efforts according to the Dayak Kuhin community. In addition, all discussions had passed the approval of all sources, including the elders and indigenous youth, who were very supportive. This support was made through immense engagement, including participation as educational staff in elementary schools. The integration fostered trust, enabling questions and information exploration. The indigenous people also recognized that negative stigmas associated with agricultural practices had, at times, led to unjust blame for ecosystem degradation and forest fires. Nevertheless, this research maintained objectivity by prioritizing the emic perspective of the Dayak Kuhin community. The results were expected to contribute to the agricultural culture that prioritizes the preservation of the environment. In particular, it could serve as a model for land use that ensures harmony between sustainable development and forest protection (Jung & Teunissen 2022).

Result and Discussion

Dayak Kuhin Community

The Dayak Kuhin community is indigenous to Seruyan Regency in Central Kalimantan, residing in various villages along the upper reaches of the Seruyan River, specifically within the Seruyan Tengah District and the Seruyan Hulu District. The predominant language spoken by this community is Kuhin, which shares lexical similarities with other Dayak languages: 69% with Katingan, 65% with Dohoi, and 62% with Ngaju (Poerwadi et al. 1998). This linguistic connection is influenced by the geographical proximity to Katingan Regency, located to the northeast of Seruyan Regency. Katingan Regency is home to other Dayak traditional communities, including the Dayak Ngaju, Dayak Katingan, and Dayak Dohoi, who historically interacted with one another. Evidence of this interaction is reflected in the collective memory of the Dayak Kuhin community, which retains narratives about the tradition of *ngayau*

(the practice of hunting enemy heads) that originated from Katingan Regency.

Many indigenous people continue to practice the original belief system known as Kaharingan, although some have embraced Catholicism, Protestantism, or Islam. Kaharingan is an ancestral faith rooted in the wisdom gained from the ancestors' journey through the natural environment (Hartatik 2020). This belief is still upheld through various traditions within the Dayak Kuhin community, including *potong pantan* (wedding traditions), *bebukung* (mask dancing), and *tiwah* (death ceremonies). During these traditional practices, indigenous people are expected to refrain from carelessly traveling through the village, demonstrating respect for those engaged in the ceremonies (Figure 1). Community members, regardless of their differing religious backgrounds, come together to assist one another during these cultural events.

Since ancient times, the Dayak Kuhin community has resided along riverbanks and near forests. This unique environment significantly shapes their way of life, intertwining them with nature. *Danum* (water) is regarded as a vital source of life, while *himba* (forest) represents a foundation for survival. Together, they function like nurturing parents, complementing and supporting their community, which relies on these natural resources for sustenance. The traditional practices of this community, developed over generations, reflect a deep connection to rivers and forests as essential sources for their daily needs. The norms and beliefs that govern their interaction with these environments reinforce a commitment to conservation, highlighting the Dayak community's enduring relationship with nature as a source of livelihood (Dormauli et al. 2023). Many of their traditions are closely tied to the elements of their surrounding ecosystem.

Traditionally, the Dayak Kuhin community would abandon their cemeteries, allowing them to be overrun by natural wild plants. This practice symbolizes the unification and acceptance of the natural environment concerning the deceased. According to their beliefs, the *lewu tatau (*afterlife) is akin to a journey along a river. The spirits of those who pass away must first dwell in the *lewu pasahan raung*

Figure 1. The Dayak Kuhin communities in the *tiwah* as Kaharingan tradition (Source: Personal archive 2022)

Figure 2. Sapundu and *tiwah* tradition (Source: Personal archive 2022)

(grave realm) before proceeding to the *tiwah (Figure 2)*, which is the refinement ceremony (Hartatik 2020). The post-death existence is not seen as fundamentally different from the living world. Instead, it is viewed as more beautiful and eternal. Thus, permitting plants to thrive around the grave is interpreted as an act of creating a comfortable home environment for the spirits residing in the *lewu pasahan raung*. This symbolism is further embodied in the *donik*, which represents a boat adorned with plant and vine motifs. In the Dayak Kuhin culture, boats are regarded as vehicles that transport spirits to the afterlife, similar to how they serve as the primary means of navigating the rivers for the Dayak Kuhin people. Ultimately, the natural world in the afterlife is deeply influenced by the community's relationship with their surrounding environment, particularly in terms of forests and rivers.

Since ancient times, the Dayak Kuhin community has engaged with their natural environment, which serves as both their living space and a source of wisdom. The elements of forest and river are fundamental to their cultural framework and traditional practices. For indigenous people, every object in nature is believed to possess an individual spirit, a notion reflected in various traditional customs that emphasize the importance of honoring the natural world. This is evident in practices such as *minang ulin* (the selection of ulin wood), *kawal himba* (rules for animal hunting), and *nugal* (procedures for rice farming).

Sapundu Hantu Village

The Dayak Kuhin community resides in Sapundu Hantu Village, situated within the Seruyan Hulu District of Seruyan Regency, Central Kalimantan Province. Geographically, this village lies near the border with West Kalimantan Province and can be reached from Kuala Pembuang, the capital of Seruyan Regency, in three days via land transportation. Interestingly, during the colonial period, the population of the village in 1846 was recorded at 200 people, making it the most densely populated village in the area (Pijnappel 1854). Sapundu Hantu Village is positioned on the edge of the Manjul River basin and is enveloped by dense tropical rainforest. The village features an elongated morphology, stretching approximately 600 m along the riverbanks, with a total area of 62 km^2 that includes both customary forest and settlements (Pemdes Sapundu Hantu 2022). In terms of administrative boundaries, to the east and north, the village borders Tumbang Kubang and Tumbang

Laku Villages, respectively. To the west, it adjoins Tumbang Magin and Tumbang Setoli Village, while Tumbang Gugup lies to the south (Figure 3).

The name of this distinctive village is deeply rooted in local folklore, which continues to be a widely upheld tradition. According to the community, Sapundu Hantu Village was formerly known as Tumbang Kanoi, a name derived from its location near the *tumbang*, meaning "estuary" in the Kuhin language, at the downstream of the Kanoi River. The name evolved due to the presence of numerous *Sapundu*, which are pole-shaped statues used for tying sacrificial animals during the *tiwah* ceremony observed by Kaharingan adherents (see Figure 2). It is believed that *Sapundu* possesses magical powers that can manifest in various forms, including ghosts.

Sapundu Hantu Village, situated deep within the forest, is renowned for its stunning environmental conditions (see Figure 3). The majority of the villagers rely on farming, cultivating fields located within the forest area. Additionally, some residents engage in logging and the sale of ulin wood, also known as ironwood, whose scientific name is *Eusideroxylon zwageri* Teijsm. & Binn., or belian, a native tree species of Kalimantan (Fadhlullah et al. 2020). Ironwood is notably resistant to termite and insect borer infestations, allowing it to endure for decades or even centuries (Ningsih et al. 2020). Ulin wood can be found in the forested area of Sekajang Hill, located to the northeast of the village settlement. Beyond its natural resource value, Sekajang Hill holds significant cultural importance (Figure 4). According to the beliefs of the local community, it is regarded as the center of spiritual civilization. An 1854 account by J. Pijnappel indicates that the hill was associated with prayer or worship, a practice referred to as *sembajang* at that time (Pijnappel 1854). The hill was believed to serve as a resting place for the spirits of the surrounding region.

According to the indigenous narrative of Sapundu Hantu Village, Sekajang Hill was once an agricultural field owned by their ancestors, who migrated west across the Manjul River after enduring various attacks from the Dayaks of Katingan Regency (Veth & Alphen

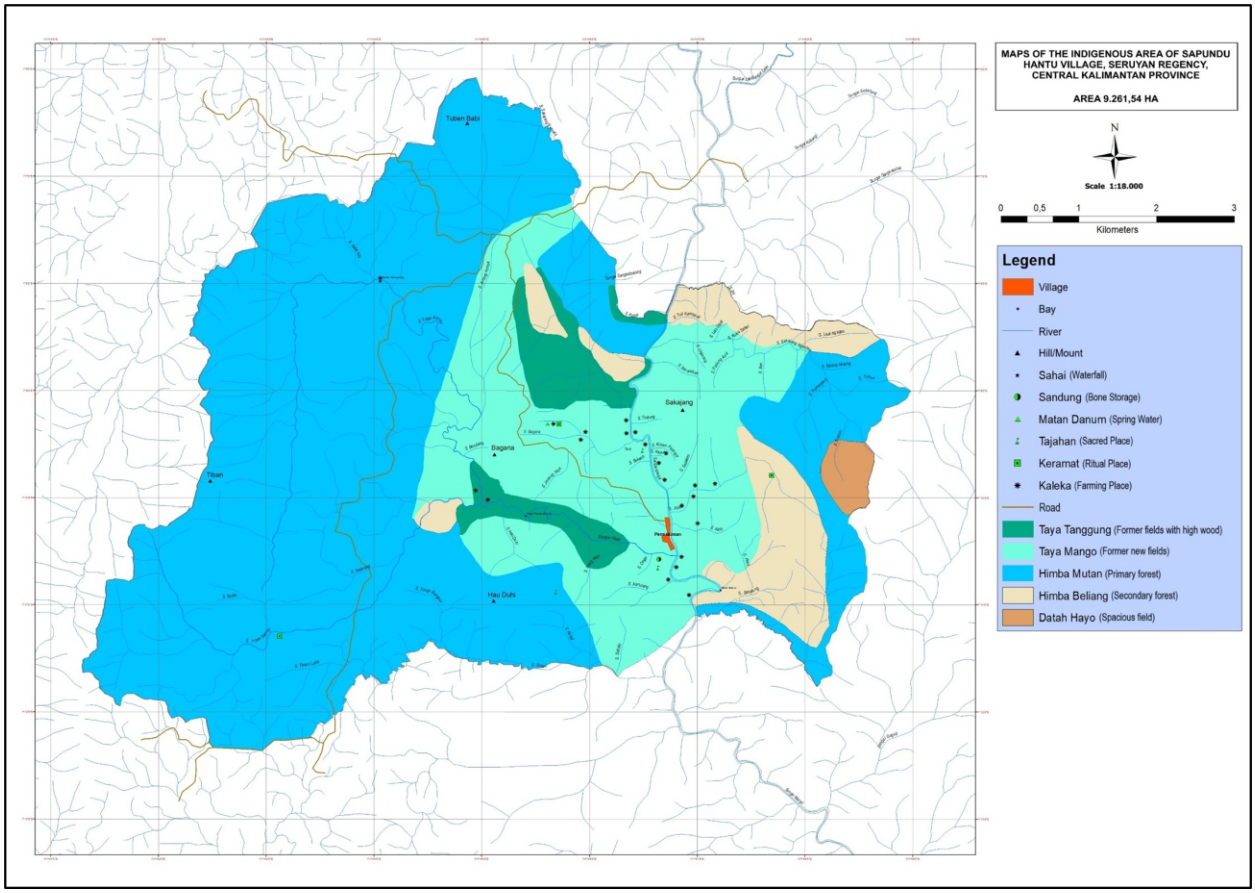

Figure 3. Sapundu Hantu Village map (Source: Pemdes Sapundu Hantu 2022)

Figure 4. Sekajang Hill (Source: Personal archive 2022)

1965). The remnants of these agricultural lands are evident in the toponymic of the forested area known as *Himba Beliang*, which refers to former fields that have since become overgrown with forest (see Figure 3). The *Himba Beliang* region on Sekajang Hill is home to numerous large durian trees that are hundreds of years old. During the durian harvest season, many villagers flock to the hill carrying *lanjung*, which are traditional rattan backpacks. The durians collected in the *lanjung* are then brought back to the village for personal consumption, transformed into *tempoyak* (a fermented durian sauce), or sold to collectors who typically transport them to the city.

The traditional community in Sapundu Hantu Village continues to preserve its potential natural and cultural resources. They have historically managed and utilized their environment sustainably through a local knowledge management system grounded in customary practices. Currently, the indigenous people of the village are making strides to map their customary territories. Establishing clear and legally recognized boundaries for these territories empowers the community with rights to their living space. These rights not only bolster economic interests, such as the sustainable use of natural resources, but also play a crucial role in protecting traditional culture. This cultural heritage embodies local wisdom specific to the area and includes the preservation of conservation traditions and beliefs held by the indigenous population concerning the natural environment.

Nugal Agriculture

Nugal is a traditional rice farming practice by the Dayak Kuhin community. The term "*nugal*" derives from the Kuhin language, meaning to dig or create a hole in the ground for planting (Figure 5). This practice typically takes place once a year, either before or during the rainy season. The harvested rice serves as the community's food supply for the entire year until the next harvest. *Nugal* is usually conducted between September and October, as the Dayak Kuhin community believes that the rainy season has not yet reached its peak during these months. Moreover, during this time, the forest provides an abundance of fruits, serving as natural sustenance for pests, particularly mice, which helps mitigate interference with plant growth. The timing of *nugal* is determined by the community's observation of the availability of fruits and plants favored by animals, rather than adhering to a specific calendar date each year.

Figure 5. *Nugal* hole (Source: Personal archive 2022)

Choosing the wrong time can adversely impact future results, leading to insufficient harvests and the risk of crop failure.

The *nugal* procession is a collective effort undertaken in rotation by all the villagers. Those whose fields will host the tradition typically visit each household to request assistance. In addition, these individuals are responsible for preparing food supplies for the gathering in the fields. Each family is required to send at least one representative to contribute. Conversely, when the family of the individual who received assistance conducts their own *nugal* procession, that person must also participate in the tradition. The procession begins with a *nebas* (cleaning) session on the fields designated for agricultural use. The bushes and grass in these fields are cleared by a group of families who own the land, alongside invited community members, using an *ambang* (a type of machete). When the procession involves new fields or those that have been abandoned for a long time, a larger number of participants may be necessary, as the overgrowth can be as dense as a forest.

The Dayak Kuhin community practices agriculture exclusively on fields that their families have owned for generations. In instances where a family possesses multiple fields, these should be cultivated alternately every four to five years. Cultivating an entire field simultaneously is prohibited, and only one field may be actively farmed at any given time. Families looking to establish a new field must do so in proximity to existing settlements or rivers, and clearing land is not permitted in forested areas or too close to customary boundaries. Additionally, access to certain sacred places within the forest is restricted. Careful management of forest land is essential, particularly for *nugal* (a form of traditional agriculture). While each family typically has a field size of more than one ha, the land they utilize generally ranges from one ha to less than half of that area. Should a family need to open a new field due to an increase in household size, the new plot must be adjacent to the existing family or ancestral field that remains fallow. Importantly, this new field must not encroach upon the boundaries of indigenous forests or the *himba mutan* (primary forest). For the Dayak Kuhin community, the area designated for planting food crops is determined by the anticipated harvest yield, ensuring it meets the family's needs for an entire year. However, it is common for the harvest to exceed those needs significantly.

Figure 6. Burning of fields (Source: Personal archive 2022)

Figure 7. Planting in fields (Source: Personal archive 2022)

After thoroughly clearing the field, the next step involves burning it to eliminate any remaining wild plants from the *nebas* procession. Before the burning takes place, a group prayer is typically held to ensure that the procession proceeds smoothly and without risk of danger. During the burning process, care is taken to manage the fire carefully. A small trench is dug between the forest and the land to be cultivated, serving as a firebreak to prevent the fire from spreading further into the forest. Throughout the burning, the fire is closely monitored, and efforts are made to limit its impact to the designated area of the

field. If the fire is deemed to be becoming too intense or potentially hazardous, it is promptly extinguished with water. After the burning is completed, the field is left undisturbed for several days to a week, allowing the ash and charcoal to permeate the soil. Unlike the *nebas* or cleaning procession, the burning of fields does not necessarily require the involvement of the entire village community.

The final stage of the procession involves planting food crops, which begins with creating a small hole in the ground using a medium-sized wooden stick as a tool (Figure 6). By thrusting or stamping the stick into the ground, a small cavity is formed once it is removed. This hole is then filled with seeds of food plants, such as rice and sticky rice. In the Dayak Kuhin community, it is customary to mix the rice or sticky rice with seeds of other plants, including cucumber, pumpkin, *lehung* (a type of sour eggplant), and *lempoi* (a type of loofah).

Similar to *nebas*, the planting procession involves a large number of people, each assigned specific tasks. Typically, men create holes using sticks, while women are responsible for placing seeds into these holes (Figure 7). This process is carried out alternately: a hole is first made, followed by the filling of that hole with plant seeds. Once the seeds are sown, the holes are left open to allow the plants to grow naturally. After completing the planting process, all participants are taken to the home of the family who conducted the *nugal*. Those who did not go to the fields usually assist with cooking and preparing everything needed for the banquet. This banquet serves as a gesture of appreciation for the participants, as well as a way to express gratitude and offer prayers for a bountiful future harvest.

Forest Conservation Efforts

The existence of the forest was vital for the Dayak Kuhin community, as reflected in their preserved cultural customs and traditions, including *nugal* farming. The *nugal* procession highlighted the community's efforts to utilize the forest in a manner that upholds conservation values rooted in local wisdom. During the initial stages of land preparation, the specific area designated for *nugal* was identified. This area was chosen based on estimates of the land's capacity to yield sufficient harvests for the entire year. As articulated by an informant, there cannot be a lot of *nugal*, just enough for a family for a year, including not being allowed to go into the forest.

Clearing fields involved converting forests into agricultural land. However, when this process was conducted without clear guidelines, it could harm the surrounding ecosystem. This highlighted the significance of preserving the balance within the forest ecosystem while utilizing its resources responsibly. A traditional elder from Sapundu Hantu Village remarked that if many of the plants that produce food for animals are cut down and destroyed, then various animals will become pests and attack the growth of plants in the fields due to a lack of food. Therefore, cutting down too many trees is not allowed.

The Dayak Kuhin community conducted the burning process with great care, demonstrating responsible forest management rather than recklessness. This practice served not only as a final step in preparing the fields but also aimed to transform the resulting ash and charcoal into natural fertilizers that enrich the soil in the fields and their surrounding areas. This method was a conscious choice against the use of synthetic chemical fertilizers, which could degrade soil quality over time. The primary goal of burning was to convert the cut plants into ash, which acted as a valuable nutrient source for the soil (Fera et al. 2024). The selection of fields located near rivers and settlements demonstrated the community's understanding of practical fire management. Rivers provide a plentiful water source, essential for irrigation and extinguishing fires. Additionally, choosing fields close to residential areas allowed for a quicker response to any unforeseen events that might arise during the *nugal* procession, particularly those involving fire. A resident involved in the practice noted that after slashing, it is mandatory to burn the field. Because without burning, the plants will not grow. The field must also be near a river so the fire can be doused with water.

The practice of rotating fields every four to five years allowed fallow plots to regenerate naturally. When fields were left uncultivated, they gradually became overgrown with dense wild vegetation and, over time, reverted to forested conditions. The edges of these fields and surrounding areas were often planted with various fruit-bearing trees (Figure 8), which would grow and produce fruits during the

fallow period. This practice was particularly noticeable in several locations associated with the *Himba Beliang* within the traditional forest of Sapundu Hantu Village. The term "Himba Beliang" refers to the former fields of ancient peoples that have since transformed into forested areas. Indirectly, the field management practices of the Dayak Kuhin community served as a means of preserving the environmental ecosystem. After sufficient use, the forest gradually returned to its original state.

The Dayak Kuhin community practiced the mixing of food plant seeds during the planting process to ensure a plentiful harvest. Harvest times for these other plants were generally quicker than those of rice. As a result, the indigenous people not only observed the growth of the rice plants but also anticipated the harvest of the additional crops. The harvesting of *lehung*, a type of sour eggplant, signified the approaching rice harvest. This planting method, akin to an intercropping system, demonstrated a form of local knowledge regarding the effective utilization of land with limited space. Although the Dayak Kuhin community typically possessed large fields, the *nugal* tradition dictated that they did not utilize all of the land. They adjusted the cultivated area according to the estimated crop yield needed, which underscored the importance of making the most efficient use of the available land. As one resident noted, field cucumbers, *lehung*, *lempoi*, and pumpkins must go into the *nugal* hole so they can be picked in turn before the rice harvest.

The terms "multiple cropping" or "intercropping" refer to planting systems that involve cultivating more than one type of plant on a given area of land simultaneously (Mulu et al. 2020). In contemporary practices, intercropping is typically implemented by sowing seeds in separate planting holes, often in an alternating pattern. This approach contrasts with the method used by the Dayak Kuhin community, where seeds of various food crops and other plants are mixed and placed into the same hole. Despite these differences in technique, both methods shared a common goal of growing multiple types of plants at the same time and on the same land (Figure 9). Employing this strategy could optimize agricultural productivity and reduce the need to clear adjacent forests for field expansion.

Figure 8. The field with various fruit trees (Source: Personal archive 2022)

Figure 9. Various types of plants in the fields (Source: Personal archive 2022)

Conclusion

In conclusion, the *nugal* agriculture practice of the Dayak Kuhin community in Sapundu Hantu Village, Seruyan Regency, Central Kalimantan, constitutes an annual tradition that begins with land clearing (*nebas*), controlled burning, and the implementation of a multiple cropping system. This approach not only addresses food security but also embodies forest conservation efforts rooted in local wisdom. The community engages in land rotation every four to five years to facilitate forest regeneration, restricts land use to only what is necessary, and prohibits the clearing of primary forests. Controlled burning occurs under strict supervision, which includes the establishment of fire trenches and strategic location selection near rivers to mitigate the risk of forest fires. Additionally, the multiple cropping system optimizes land use efficiency without the need for expansion that could harm the ecosystem. For the Dayak Kuhin community, forests represent more than mere resources; they are integral to their lives and spiritual identity, providing a vital source of sustenance. The *nugal* culture exemplifies the harmony between traditional agricultural practices and environmental conservation, while simulta-neously challenging the negative perceptions that indigenous methods are detrimental to the forest. It serves as a testament to how local knowledge can significantly contribute to sustainable ecosystem conservation.

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