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REGULAR RESEARCH ARTICLE

The Pagoda of the Gods: A case for Indigenous Karen sacred sites as Special Cultural Zones along Thailand's borders

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ABSTRACT

Burgeoning recognition of Indigenous traditional ecological knowledge and livelihood practices have led to 'Special Cultural Zone' designations for some traditionally Indigenous lands in Thailand. Simultaneously, the Thai government has designated 10 Special Economic Zones (SEZs) to bolster trade and investments along its borders without acknowledging the pre-existence of Indigenous peoples. SEZs intersect with sites of notable cultural significance, such as Kho Pho Lu (Pagoda of the Gods), a sacred site for Indigenous Karen near Mae Sot in Tak province. Detailed ethnographic and interview findings show the resilience of these sacred sites and embedded ritualistic place-making practices that persist despite a legacy of Indigenous displacement. Ethnobotanical findings of 39 sampled taxa in the sacred forest of Kho Pho Lu indicate that cultural and spiritual practices support local biodiversity conservation. Potential biocultural conservation approaches include the adoption of 'Special Cultural Zones' to promote Indigenous well-being and the preservation of biocultural diversity in Thailand.

KEYWORDS

Biocultural conservation; biocultural diversity; Indigenous knowledge; Indigenous rights; Special Economic Zones; exclusionary forest policy; fortress protection; spiritual ontology; sacred grove

1. INTRODUCTION

Nature conservation and economic development are important for achieving national targets and objectives. However, many national development programs and conservation measures adversely affect Indigenous populations living in the targeted areas of such campaigns. Indigenous peoples and ethnic minorities in Thailand face eviction and displacement from protected areas, as well as economic marginalization and land dispossession from economic policies and land designations (Mulder & Coppolillo, 2005; Phongchiewboon, Farrelly, Hytten, & Holland, 2020).

Thailand's recent efforts to bolster trade along its borders has culminated in the designation of 10 Special Economic Zones (SEZs) in border regions that overlap with traditional Indigenous lands and sacred sites. Protected areas within SEZs further marginalize Indigenous peoples and often lead to land dispossession and displacement (Buergin, 2003; Phongchiewboon, Farrelly, Hytten, & Holland, 2020). An emerging opportunity are 'Special Cultural Zone' (SCZs) land designations issued by Thailand's Ministry of Culture for the preservation of cultural heritage and traditional ways of life of Indigenous Karen people. Adopting a biocultural framework for conservation using SCZs could potentially reconcile tensions between the demands of nature conservation and economic growth with social sustainability and Indigenous cultural revitalization.

The case study of the Indigenous Karen sacred site, Kho Pho Lu (The Pagoda of the Gods), in the Mae Sot SEZ of Tak Province distills the intensifying pressures on Indigenous peoples and their cultures. Despite the resilience of this sacred site, many drivers continue to threaten its existence. This paper compiles qualitative and quantitative data to support a new SCZ designation to preserve the sacred site of Kho

Pho Lu for future generations. This paper also acts as a vehicle through which to share the intimate spiritual connections between Indigenous Karen and Kho Po Lu with a broader audience. By dissolving nature-culture binaries, Karen spiritual-relational ontologies invite us to re-envision nature-culture relationships and challenge the dualistic view of nature and culture that underpin fortress protection models of conservation.

2. BACKGROUND

2.1 Special Economic Zones

Thailand has been a beacon of economic development for the Southeast Asian region. The nation was foundational in establishing ASEAN in 1967, widely heralded as a boon for economic growth and regional development. Seeking to bolster border trade and investments, Thailand instituted 'Special Economic Zones' along its borders in 2015. Businesses in target industries that choose to operate in SEZs benefit from a variety of tax and non-tax incentives, including 8-year corporate income tax exemptions (Rastogi, 2018). SEZs have boosted economic growth and capital investments in Thailand's border regions, garnering 1.3 trillion baht in 2017 (Rastogi, 2018).

Neglected in this economic narrative are the cascading impacts on Indigenous cultures and local communities in the region. Thailand is rich in biocultural diversity and home to over 13 different ethnic groups; many of whom live in highland border regions. Despite this diversity, the siting of SEZs is determined exclusively by economic objectives; cultural considerations, such as Indigenous homelands, are omitted. This oversight could result in greater precarity and risk of dispossession for Thailand's Indigenous populations. SEZs face stiff opposition from local communities as industrial development threatens the environment on which local people depend (R. Chandran, 2020b, 2020a).

2.2 A Brief History of Indigenous-State Relations

Indigenous-state relations are often in a state of tension, characterized by disputes and conflicting claims over land, resources and rights with fundamentally differing understandings of property ownership, customary law and the environment (Maybury-Lewis, 1997). Conservation and development policies that create enabling environments for dispossession of Indigenous lands for protected areas (Phongchiewboon et al., 2020; Tauli-Corpuz, Alcorn, Molnar, Healy, & Barrow, 2020; West, Igoe, & Brockington, 2006) or more gradually through incremental processes of economic and agricultural development (Murray Li, 2010) may further strain Indigenous-state relations and erode place-based cultures. New government initiatives shaped by a global movement of activists are spearheading efforts to integrate Indigenous actors into state activities and land use decision-making through co-management strategies and recognition of Indigenous rights and territories (Berkes, 2009b). State-Indigenous relations are thereby transitioning from a state of opposition towards cooperation in some countries.

Thailand is at the cusp of this uneasy transition. Highland ethnic groups in Thailand, glossed as "hill tribes" in nationalist narratives, have long been blamed for forest degradation by state actors (Delang, 2005). Government concessions to industry and incentives for settler expansion into the forest frontier were, historically, the primary causes of deforestation, not Indigenous land management practices (Buergin, 2015; Delang, 2005; Lohmann, 1999). Nevertheless, the Thai government instituted policies of fortress protectionism through the 1941 Forest Act and 1989 logging ban that evicted Indigenous peoples and local communities from newly designated forest reserves and protected areas (Buergin, 2003, 2015). Indigenous agriculture and Karen rotational farming were banned, despite evidence of their environmental benefits (Hayami, 1997;

Kunstadter, 1983; Schmidt-Vogt, 1998). An uneasy history with communism in the highlands and opium cultivation further soured the public image of Indigenous and highland ethnic populations as communist trouble-makers, drug producers and forest destroyers; the extent of these allegations have not been supported by evidence of Indigenous Karen land use (Buergin, 2015; Delang, 2005).

Globally, a backlash from the social justice issues associated with fortress protection have propelled a social conservation movement and push towards community-based conservation approaches (Mulder & Coppolillo, 2005). Within this global context, Thailand instituted a community forestry bill, enabling communities located within forest reserves to access and utilize some forest resources. Despite this progress, traditional farming methods, such as rotational farming, remain banned, and most national parks continue to follow fortress protection models. National parks (NP) within SEZs, such as Pha Charoen National Park near Kho Pho Lu, compound the threat of dispossession through both conservation and economic development. SCZs, by contrast, offer a legal wedge for Indigenous communities to continue to reside within their traditional homelands now within the confines of an NP or SEZ.

2.3 New Opportunities: Special Cultural Zones (SCZs)

Thailand is a signatory of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), but does not yet officially recognize any Indigenous peoples at the national level (Baird, Leepreecha, & Yangcheepsutjarit, 2017). The cabinet resolution of August 3rd, 2010, however, laid the legal foundation for Thailand's Ministry of Culture to designate the first 'Special Cultural Zones' (SCZs). SCZs are delineated geographic areas where Indigenous Karen and *chao ley* coastal ethnic groups can maintain traditional livelihoods and cultural practices. Otherwise banned practices, such as rotational farming, are allowed in SCZs for the preservation of cultural heritage. There are now 16 SCZs in Thailand that began with four pilot projects (Hin Lad Nai, Mae Yod, Nong Montha, Mae Um Pai) under the oversight of the Ministry of Culture. Importantly, SCZs may coincide with protected areas and offer a promising legal alternative to eviction and dispossession from Indigenous homelands. Indeed, the threat of displacement lies at the origin of the first SCZ in Hin Lad Nai Village when its residents mobilized against threatened expulsion from the then newly designated Khun Jae National Park. SCZs support implementation of Article 70 of the 2017 Thai Constitution that protects the right of ethnic groups to "*have the right to live in the society according to the traditional culture, custom, and ways of life on a voluntary basis, peacefully and without interference*." Designating Karen sacred sites as SCZs would help achieve the objectives of the 2010 Cabinet Resolution, as well as uphold Article 70 of the 2017 Constitution on the rights of ethnic groups, to preserve Thailand's rich biocultural heritage.

3. LITERATURE REVIEW

3.1 A Biocultural Framework for Conservation

New understandings on the interrelatedness of biological and cultural diversity have shifted discourses, research and policy on nature conservation, signaling a 'biocultural turn' (Buergin, 2015). This 'new-generation conservation' recognizes that integrated and coupled social-ecological systems are made up of processes, pathways and procedures of feedback that bind biological and cultural diversity to form the 'bio- and ethno-sphere' (Robson & Berkes, 2010).

Moreover, both biological and cultural diversity are being lost at alarming rates and are in need of protection (FAO, 2019; IPBES, 2018; Pretty et al., 2009). Biodiversity and cultural diversity conservation is not a zero-sum game but can be mutually reinforcing.

Approximately, 80% of the world's biodiversity coincides with Indigenous lands (Sobrevila, 2008). Indigenous territories comprise a quarter of the Earth's surface area, of which 40% overlap with protected areas (Garnett et al., 2018). Indigenous people are intimately familiar with local biodiversity and ecologies and are thus well positioned to manage biodiversity and natural resources (Kuhnlein, 1996).

Biocultural approaches to conservation transcend the conflicting debates of nature conservation and human livelihoods, while offering a 'powerful tool' to stem the rapid loss of both biological and cultural diversity (Gavin et al., 2015). Biocultural conservation models include community-based conservation (Buergin, 2015; Gavin et al., 2015), community forest management (Buergin, 2015), Indigenous and Community Conserved Areas (ICCAs) (Berkes, 2009a; IUCN, 2009; Robson & Berkes, 2010; Smyth, 2015),[1] Indigenous Protected Areas (IPAs) (Smyth, 2015), Integrated Conservation & Development Programs (Gavin et al., 2015) and Indigenous adaptive co-management (Berkes, 2009b).

3.2 Traditional Ecological Knowledge

A core component of biocultural conservation is traditional ecological knowledge (TEK). TEK is frequently misunderstood as limited to specific knowledge and skill sets when it is better understood as a knowledge-practice-belief complex that is culturally and historically embedded in peoples' relationships to the land and their environment (Berkes, 1999). Contextualized and site-specific knowledge-praxis-belief systems can benefit biodiversity conservation through deep place-based knowledge and informal environmental management institutions (Dudgeon & Berkes, 2003). TEK systems are usually based on a view of nature and ecosystems as 'fully alive' that contrast with technocratic and mechanical views that underpin conventional conservation and environmental management. For instance, Karen spiritual worldviews approach nature as a composite of spirits, ancestors, fields, forests, rocks and rivers, with which humans actively participate and engage but do not dominate (Buergin, 2015). Karen relational spiritual ontologies underlie the traditional ecological management of Kho Pho Lu.

3.3 Significance of Sacred sites for Indigenous Peoples

Sacred sites and places are deeply bound to Indigenous cultures and well-being around the world (Carmichael, Hubert, Reeves, & Schanche, 1994) and simultaneously support conservation outcomes.[2] Research worldwide shows that sacred forest groves can serve as biodiversity reservoirs (Bhagwat & Rutte, 2006; Kailash & Yogesh, 2001; Khan, Khumbongmayum, & Tripathi, 2008), habitats for rare or threatened species (Khan et al., 2008; Nair, 1981; Sukumaran & Raj, 2007) and old-growth forest sanctuaries (Salick et al., 2007). Sacred groves maintain similarly high levels of biodiversity as protected areas (Bhagwat, Kushalappa, Williams, & Brown, 2005) and can be integrated into existing conservation area networks (Bhagwat & Rutte, 2006; Mgumia & Oba, 2003; Robson & Berkes, 2010). Importantly, sacred groves conserve high biodiversity levels under local management without government interference (Bhagwat & Rutte, 2006; Robson & Berkes, 2010; Vipat & Bharucha, 2014). Protecting local management of Indigenous sacred sites through ICCAs or SCZs serves the purpose of biocultural

[1] The IUCN defines ICCAs as: "natural and/or modified ecosystems containing significant biodiversity values, ecological services and cultural values, voluntarily conserved by indigenous peoples and local communities, both sedentary and mobile, through laws or other effective means" (IUCN, 2009).

[2] According to the IUCN, sacred natural sites are: *"natural areas of special spiritual significance to peoples and communities. They include natural areas recognized as sacred by indigenous and traditional peoples, as well as natural areas recognized by institutionalized religions or faiths as places for worship and remembrance"* (Oviedo, Jeanrenaud, & Otegui, 2005).

conservation (Kailash & Yogesh, 2001; Mgumia & Oba, 2003; Robson & Berkes, 2010; Vipat & Bharucha, 2014).

4. STUDY AREA

Our study site is the Indigenous Karen (Pgaz k'Nyau) village of Baan Putoe in the Moei watershed (officially reclassified as "village #4" of the Maeku sub-district, Mae Sot district, Tak Province). Baan Putoe is located 17 km from the urban center of Mae Sot (see Fig. 1). The population in 2018 was 1,032 people. Most residents subsist as farmers. Mae Sot has a tropical savanna climate (Köppen climate classification Aw).

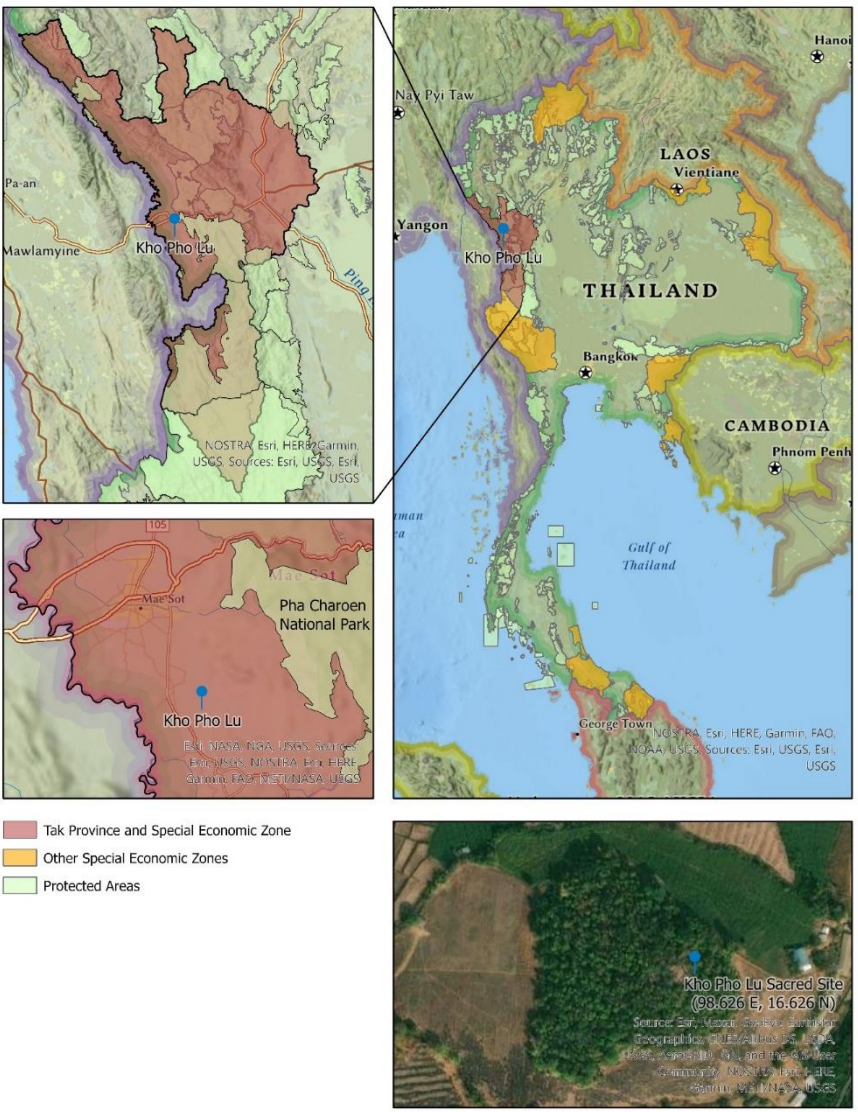

Figure 1. Protected areas and Special Economic Zones in Thailand and satellite image of the Kho Pho Lu study area.

5. METHODS

Qualitative data were collected using ethnographic research methods with the lead author immersing himself in the local community. The community invited the lead author to study the sacred site to support its preservation. As a member of the Karen ethnic group, his integration and participant observation of the community and their spiritual activities at Kho Pho Lu was unintrusive and welcomed. Participant observation was conducted over a 3-month period in 2019. Observations were recorded using photos, videos and field notes.

The lead author initially conducted participatory mapping exercises with youth in the community to produce maps of Kho Pho Lu. Maps were used as interview prompts and visual aids for interviewees to discuss the ceremonies and rituals at the sacred site.

The lead author conducted semi-structured and in-depth interviews with 20 informants who possess extensive knowledge of local history, culture, and drivers of change. Purposive sampling was used to identify specialist and generalist knowledge holders, such as elders, community leaders, ritual ceremony leaders, as well as women in the community for a differentiated gender perspective. Interviews were conducted with the following groups in the community: (i) community leaders who practice both Buddhism and Animism, including the village leader (*phu-yay baan*) and the animist spiritual leader (*tabakho* or *hi-kho*) (5 interviewees), and (ii) villagers, including 5 female participants and interestingly, the local government administrative official (*nayok oh-bo-to*) who has little authority in spiritual matters and was therefore categorized as 'villager' rather than community leader (15 interviewees).

Interview questions were tailored to each of these groups. Questions for the spiritual animist leader focused on the functions, meanings and processes of the spiritual ceremonies for the community and sacred forest, as well as the components of the sacred site. Community leaders were interviewed on the drivers of change affecting the community, as well as the functions of the sacred site for the community. Villagers were interviewed on the preparations and tasks for the ceremonies, use of natural resources, ritual taboos and regulations, and plant uses. Elders were also invited to share their life histories and oral histories of place.

Sets of interviews occurred over half day periods. Interviews were conducted in informal settings, often accompanying interviewees as they performed household tasks or chores. In some cases, the researcher assisted interviewees with their tasks, such as spinning yarn. By teaching the researcher to perform these tasks, participants were given the opportunity to equalize the uneven power dynamics of the researcher-subject relationship.

Interviews were recorded with participants' consent and transcribed manually. Transcription accuracy was verified with interviewees in follow-up meetings. Transcribed interview data were reorganized using Microsoft Word into the following categories: a) drivers of change in the community, b) components of the sacred site, c) preparations for the ceremonies and rituals, d) processes, rituals and taboos of the ceremonies, e) spiritual significance and meaning of the ceremonies, and f) natural resources used in the ceremonies and other plant uses. Interview data were analyzed to compile a characterization of the sacred site, the drivers of change threatening the persistence of the sacred site and insights on the significance of the rituals and ceremonies for spiritual beliefs and local biodiversity.

Biodiversity was assessed using transect walks (10 meters in 8 directions) to produce surveys of the forested areas of Kho Pho Lu. Youth from the community were invited to participate in plant collection. Plants and their uses were identified by community members and verified by elders. Species were recorded using local Karen folk taxonomies and scientific nomenclature.

Results were returned to the community during a meeting to facilitate knowledge sharing and to serve the needs of the community.

6. RESULTS

Quantitative biodiversity sampling and qualitative interview data on the displacement history of Putoe village, drivers of change, sacred site components, ritual preparations and ceremonies, and taboos were analyzed to assess the significance of the sacred site for biocultural diversity (see sections 6.1 to 6.5).

6.1 Origins & Displacement History

The Karen people have long-standing ties to the Mae Sot region. The original Pgaz k'Nyau name for Putoe village means "Land of the Karen" (*Baewkla*). Putoe was established over 200 years ago (~5 generations) in 1817 by the Karen leader, Phuephatoe. According to oral histories of the elder, Phuephajae (Phuephatoe's last living descendant), Phuephatoe originally came from the Salaween River by the Thai-Burmese border. Relocating to the Moei River area to avoid conflict, Phuephatoe and his family established a settlement that later became Mae Sot. Trade opportunities attracted many new residents to the area, including Yonok people from Lanna (Chiang Mai Kingdom), and settlers from India and China. Crowded out by newcomers, Phuephatoe left the lowland settlement and established Huafai village in Phrathatuphadeng sub-district. As the population of Huafai grew, Phuephatoe and other families relocated to establish Pinakha village. Pinakha village became devastated by disease outbreaks, and many perished. Survivors relocated to present-day Putoe village. Phuephatoe became the *tabakho* (spiritual leader), which following Pgaz k'Nyau tradition is the highest position in the village and for whom the village is named.

This pattern of movement through displacement reoccurs throughout northern Thailand and in the history of the Maeku area. Lowland settlers began moving into Karen settlements around 1866. The Pgaz k'Nyau moved from Mae Sot to establish newer settlements due to the encroachment of people from Lamphun and Lampang. There is a saying: 'the lowlanders drive out the Pgaz K'nyau, the Pgaz k'Nyau drive out the tigers, the tigers drive out the monkeys' (*Mueang lai Yaang. Yaang lai suea. Suea lai ling.*). Oral histories confirm the truth behind this saying that the Pgaz K'Nau pre-dated the other groups in the Moei area. Reflected in these stories are a history of Karen displacement driven by lowland settler expansion.

6.2 Drivers of biocultural change

The Putoe community originally engaged in rotational farming methods guided by traditional ecological knowledge.[3] According to interviewees, sustainable natural resource management was compromised by the following drivers of change: exclusionary forest policies, agricultural transitions, religious conversions and economic development.

6.2.1. Exclusionary Forest Policy and Agricultural Transitions

On April 6, 1968, the Royal Forestry Department (RFD) declared the Maeku area as a protected national teak forest. This declaration criminalized traditional Indigenous practices, such as hunting, gathering, and rotational farming. The government granted

[3] This method included planting highland rice (not paddy) as the main crop, intercropped with diverse plants, including chili, eggplant, black sesame, green squash, pumpkins, gourds, green beans, black beans, corn, melons and 40-50 local varieties of rice. Fields would be cleared and burned to prepare the soil. Once crops were harvested, the fields would be left fallow for seven years to restore soil fertility and enable natural succession.

the Phop Phra Forest Industry Organization (FIO) teak forest concessions on the periphery of the protected area in 1980, which further restricted Pgaz k'Nyau communities' access to traditional lands. In 1997, the Pgaz k'Nyau settlement was incorporated into the Pha Charoen National Park, banning livestock (cattle and buffalo) husbandry. Successive government decrees further consolidated centralized state power and ownership over land and resources. Indigenous inhabitants were forced to forsake their traditional agricultural practices and livelihoods, as traditional rotational farming methods with 7-year fallow periods were banned. As lands were reclassified and restricted, farmers turned to cash crop monocultures with chemical inputs and pesticides to make up for lost productivity on smaller parcels of land.

As agricultural areas became increasingly limited, subsistence farming was no longer viable, and smallholders entered the market economy. Forests were cleared to meet the high solar demands of corn crops. An influx of foreign agrochemical firms introduced credit-based systems of commodified agriculture. Farmers bought 'technology packets' (seeds and agrochemicals) on credit, which were deducted from any profitable harvest sales.[4] With low profit margins and increased living costs, agricultural expansion became necessary to maintain economic viability within a marketized agricultural reality, even at the risk of being prosecuted and jailed for trespassing in protected forests.

6.2.2. Denigration of Indigenous cultures: Communism, Religious Conversions & Development

The Thai government became deeply concerned with the perceived threat of a communist insurgency in 1958, and the political influence and potential recruitment activities of communists in highland regions. As a response, the government enacted cultural assimilation programs under the guise of rural development, which included a central school curriculum taught in the central Thai language (Hayami, 1996). Buddhist monks were sent to rural temples constructed by the Ministry of the Interior. Special preference for higher education scholarships was granted to young boys who became novice monks, incentivizing conversions to Buddhism for educational advancement. During the years of the 'communist threat,' religion and education were wielded with aim of assimilating and 'civilizing' highland populations. Though this policy may have been primarily aimed at erasing communism, it also contributed to Indigenous erasure. When a community turns from ancestral practices to a new religious system with different rituals and beliefs, many of the old ways are discontinued (Tapp, 1989). Rituals paying respect to and at the rivers were replaced by rituals at the temple. The role of elders, once the spiritual and ritual leaders of the community, was transferred to monks who were not from the area. Where traditional funeral customs prescribed that the deceased would be buried in the sacred forest, now corpses were cremated according to Hindu-Buddhist custom, reducing the role of the sacred forest. Sacred ritual language also shifted from Pgaz k'Nyau to Pali. Changing customs altered interpersonal relations, relationships between humans and nature, and between humans and the supernatural.

[4] The community could plant corn for 6 months (May through October) and earn enough to pay for seed, fertilizer, pesticide and manual labor (planting, harvesting, transport to market). One rai of land required 3,350 Thai baht of investment, and with a sale price of 3.5 baht per kilogram, a return of 5,600 baht was possible. After deducting input costs, the profit margins from one rai of land amounted to 2,250 baht. Since average annual family expenses amounted to 100,000 baht, a family unit would have to utilize no less than 44 rai of land to sustain themselves.

6.2.3. Economic transitions: Special Economic Zones

Economic development further obstructed Indigenous cultural practices. When Thailand joined the Asian Economic Community (AEC) of ASEAN, the potential and promise of regional growth and investment garnered increasing attention. Mae Sot was an especially important location as a trade center with projected growth and expansion potential. Tak province is rich in natural resources and strategically located as the primary entry point for cross-border trade with Burma. The Thai government classified the area as a Special Economic Zone (SEZ) in 2014 to attract businesses, laborers and investments to the region. Special bilateral trade agreements between Thailand and Myanmar facilitated freer flow of industrial goods and labor. The Board of Investment of Thailand (BOI) encouraged investment, granting privileges and 3-8 year tax exemptions to import-export industries; allowing foreign nationals with special skills to reside in the SEZ; granting land ownership to industrial park developers; allowing Burmese laborers to cross the border with special work permits (as day laborers or with 7-day passes); exempting industries from revenue taxes; granting special access to raw materials, among other measures. The government also designated 2,182 rai (~350 ha) of land for the Treasury Department to lease to private companies for industrial development.

Such economic development policies have had their intended effect, resulting in increased investments, large-scale infrastructure projects, housing developments, condominiums, malls, large factories, warehouses and silos. Ethanol factories require sugarcane and cassava, so agricultural producers respond by converting and expanding monoculture fields. In the current prevailing models of economic development, local communities and farmers are viewed as a source of labor and agrochemical consumption, or as hindrances to industrialization.

6.3 Characterization of Kho Pho Lu from Participant Observation

Despite the aforementioned drivers of change in the Mae Sot SEZ, a site exists where spiritual traditions and relations between humans and the forest are preserved: the sacred site of Kho Pho Lu, translated as 'the Pagoda of the Gods.' [5] The forest of Kho Pho Lu is respected as a sacred commons. Here, the spirit of the Pgaz k'Nyau is reflected in ritual and the forest is preserved despite rapidly changing surroundings.

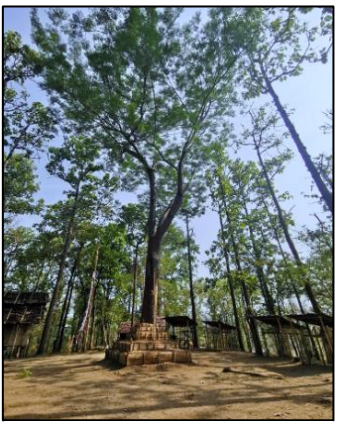

Image 1. The Chedi Pagoda. *Photo courtesy of S. Phatthanaphraiwan.*

6.3.1. Dimensions and Characteristics of the area

Local knowledge of sacred forest maintenance is preserved through traditional religious practices, customs, and rituals at Kho Pho Lu. The sacred site sits on a hilltop to the north of the Putoe settlement, surrounded by agricultural fields. An earthen staircase allows villagers and visitors to ascend to the summit for ritual ceremonies. There are seven components of the sacred site:

[5] Translation is never an easy task. The *kho* in question here, translated as "pagoda," refers to the traditional Karen notion of sacred communion, gathering, of coalescence (a pile of sand or a gathering of people both visually turn a flat plane into an emergent mound, or *kho*). Thus, referring to *kho* as pagoda, chedi, Meru, stupa, or other similar references to a mandala or religious structure with Indic implications of a conduit (see Tambiah 1973) are appropriate for the purpose of relaying the sacredness of the site specifically to Thai administrators.

1. Forest: The preserved forest begins halfway up the hill to the peak. Sampled species include 39 plant taxa and 24 tree varieties (see plant list in the Appendix).

2. The Clearing: The clearing at the center of the site is reserved for rituals and is swept daily. Before one enters the space, protocol must be observed. Water is provided for ritual purification. Shoes are removed. Menstruating women are not allowed into the space. Excessive noise is forbidden.

3. The Chedi (Pagoda): Special occasions require participants to bring a handful of soil or sand with them, which they add to a pile that gradually takes on the appearance of a sand chedi in the middle of the clearing. About 40 years ago, a crepe-myrtle tree (*Lagerstroemia floribunda* Jack) sprouted from the mound. The tree today towers over the chedi area, providing shade and offering an auspicious sign of tranquility and prosperity. The ancestral spirit of Phupatoe is believed to dwell in the tree and chedi.

Image 2. Blessing request space.
Photo courtesy of S. Phatthanaphraiwan.

4. Blessing-request space: A small shrine, with four pillars, a roof, and a shelf for offerings is located on the eastern side of the clearing. The shrines are made of natural materials (bamboo and white teak leaves). The shrine has four stations to request blessings for: 1) a good harvest, 2) health, 3) business or education success, and 4) female matters. The fourth station is reserved for women, and men may not access this space.

Image 3. Tung flags and meditation space.
Photo courtesy of S. Phatthanaphraiwan.

5. Flags: East of the chedi are two *tung* poles (a type of ceremonial flag or hanging banner common in Lanna and other northern Thai religious practices). The first is for the people of the community and is bigger and taller than the second pole, which is for visitors. Each pole is made of a single bamboo stalk. The flags consist of cotton woven into a bamboo frame. The length of the flag is decided by the women who weave while the men are tasked with cutting, forming, and hanging the bamboo forms.

6. Meditation Space: Built like a typical Pgaz k'Nyau home (wooden stilted frame, bamboo flooring and walls, thatched leaf roof—all sourced from Kho Pho Lu), the meditation structure is constructed entirely without nails or any other manufactured, imported, or unnatural materials, in accordance with the taboos that govern Kho Pho Lu.

7. Ritual leadership: The ceremonial leader must be a descendant of Phuephatoe, and must meet other requirements as well:

- They must never have converted to another religion, such as Buddhism or Christianity.
- They must not consume meat.
- They are forbidden from killing animals.
- They must not consume alcohol or any drugs.
- They must look after the Kho Pho Lu area.

Image 4. Tabakho ritual and spiritual leadership. *Photo courtesy of S. Phatthanaphraiwan.*

The Pgaz k'Nyau of Putoe call their spiritual leader the *tabakho*. Anyone wishing to meditate or make an offering must inform the *tabakho*. The *tabakho* comes to Kho Pho Lu daily to care for the area and to meditate. No compensation is attached to the position. The *tabakho* has one assistant, who will most likely become an apprentice and eventually the future *tabakho*.

6.3.2. Prohibitions and Taboo within Kho Pho Lu

Prohibitions and taboos to participate in rituals and ceremonies at Kho Pho Lu include:

1. All who participate must wear Pgaz k'Nyau traditional dress.
2. Whoever wants to ascend to the top of Kho Pho Lu must refrain from eating meat or taking the life of any animal on that day.
3. Any participant must refrain from consuming alcohol on that day.
4. Participants must refrain from vulgar, obscene, or condemning language.
5. No outside construction materials are allowed (only natural products).
6. No shoes or socks are to be worn in the clearing.

6.3.3. Ritual practices

Any community member may meditate or ask for blessings at Kho Pho Lu. Blessings are often requested on the full moon or the 15th night of the waning moon. In addition to these daily and periodic rituals, special occasions occur throughout year with associated rituals. A major annual ceremony at Kho Pho Lu takes place at the beginning of the planting season (near the end of April) on a day chosen by the *tabakho.* On this occasion, the community comes to replace the flag poles with the following ritual proceedings.

Preparations

Preparatory tasks are allocated according to gender. Women weave the flags under the supervision of a master weaver. The day before the ritual, women prepare jasmine flowers and incense offerings (rolled into cones made of banana leaf) for blessing requests. Men are tasked with preparing ritual turmeric water and the vessels for carrying the water. Men harvest bamboo for the flag poles, sizing them according to the length of the flags woven by women. Men dig the holes for the flagpoles the day before the ceremony. Everyone helps to clear and clean the ritual space.

The Ceremony

Image 5. Ceremonial raising of the tung poles. *Photo courtesy of S. Phatthanaphraiwan.*

The day of the ceremony begins with a procession. All participants don traditional clothing and assemble at the base of the mountain in two gender-segregated lines. Musicians accompany the procession, playing long drum, gong, and cymbals. Upon reaching the edge of the forest and before entering the clearing of Kho Pho Lu, everyone receives a turmeric water anointing from the elders, removes their shoes, and takes two banana leaf cone offerings. Barefoot, they enter the clearing as the musicians continue playing, circling clockwise. The assembly follows the musicians, making three circumambulations before kneeling in front of the sand chedi to ask blessings from *Phuephatoe*, the community's ancestral spirit. While offering their silent prayers, each person lays one of the banana cone offerings at the chedi. From there they proceed to the shrine to request blessings, starting with the first of four stations for success in planting. Men remove the old flagpoles and begin digging new holes. Guests and visitors are asked to raise their flagpole first before the pole designated for the villagers is raised. The lifting of the new flags includes everyone of all ages and genders. Boisterous music accompanies the people cheering to welcome the new ceremonial poles. Once the flags are raised, musicians lead the procession around the chedi for another two or three circumambulations before ceasing to play. Then everyone squats, presses their palms together, and receives a blessing from the *tabakho*, who thanks the elders for participating, blesses their children and grandchildren, and prays for year-round good fortune for all. The *tabakho* then dips a palm leaf into the turmeric water and sprinkles it over the crowd. The musicians begin playing again, leading the crowd around the mound three more times, after which they kneel again, asking for blessings and presenting the second banana leaf cone offering. Participants can then exit the clearing, collect their shoes, and prepare to descend, after an elder sprinkles turmeric water over them one more time. This marks the formal end of the ceremony. Musicians remain at the clearing, as some participants continue circumambulating the chedi to ask for blessings for the remainder of the day.

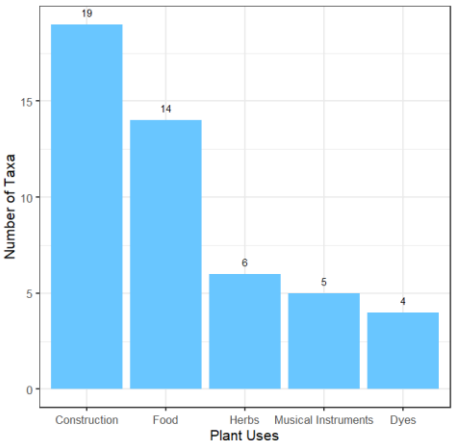

Figure 2. Local plant uses of identified taxa at Kho Pho Lu.

6.4 Quantitative biodiversity results

The reported plant uses support cultural and spiritual practices, such as construction of meditation and blessing spaces using Indigenous building methods, natural dyes for the prayer flags and ceremonial

clothing, and natural materials for the musical instruments that are integral to the rituals and ceremonies of Kho Pho Lu.

Biodiversity sampling across transects with key informants resulted in identification of 39 different taxa, including 24 tree, 12 herbaceous and 3 bamboo species and genera (see Table A in the Appendix for a species list) that are categorized into various cultural uses (see Fig. 2).

6.5 Function for the community

The sacred site performs the following functions for the immediate and wider community:

1. Biodiversity Conservation: The space protects and conserves biodiversity, including at least 39 plant varieties over 18 rai (~3 ha). The traditional beliefs and taboos that govern and regulate Kho Pho Lu foster biodiversity conservation and environmental sustainability. Indigenous and endemic varieties thrive, in stark contrast to surrounding monoculture fields.

2. Spiritual Conservation: Despite multiple drivers of change, Kho Pho Lu maintains traditional Pgaz k'Nyau spiritual beliefs and offers a cultural sanctuary for traditional animist and ancestral worship. A spiritual reservoir in an industrializing area, Kho Pho Lu helps preserve Thailand's rich biocultural heritage.

3. Traditional Skills and Knowledge Sharing: Kho Pho Lu fosters Indigenous knowledge preservation through customs and traditions. For instance, the custom of wearing traditional Pgaz k'Nyau dress for ceremonies enables traditional weaving and design to persist. The taboo on external building materials ensures that Indigenous building methods are maintained and preserved through inter-generational knowledge transmission.

4. Community Cohesion: Kho Pho Lu is a gathering place that builds strong networks connecting the Pgaz k'Nyau of Thailand and Burma. The annual planting ceremony offers an opportunity for Pgaz k'Nyau to celebrate together and build relationships founded on ethnic unity and cultural cooperation. Youth also gather and form relationships. Some of these relationships blossom into marriages that further link communities and families to build goodwill among the Pgaz k'Nyau.

7. DISCUSSION

7.1 General overview of the results

Despite a history of Indigenous displacement, dispossession and cultural erasure, Indigenous Karen in the Mae Sot district have maintained the Kho Pho Lu sacred site through generations. Although Indigenous agricultural practices have diminished due to agricultural development and conservation policies, Indigenous Karen spiritual practices have persisted. Rituals that emphasize oneness with the natural world and relational ontologies with forest and ancestral spirits serve as an important vehicle for cultural preservation within contexts of widespread dispossession. The persistence of Karen culture at Kho Pho Lu indicates that the sacred site is important for preserving Thailand's diverse biocultural heritage – the primary objective of the cabinet resolution supporting SCZs.

7.2 Significance of Sacred Sites for Nature Conservation

For the Karen, as in many Indigenous and traditional cultures, elements of the natural world are viewed as sentient and 'willful' (Hayami, 2011; Hubert, 1994, p. 6). Powerful spirits must be respected, appeased and assuaged through ritual offerings and respecting codes of behavior and restrictive taboos. Sacred sites are often spatially distinct and maintained in a space separated from everyday life and objects, so that

rules governing the sacred site can be fully observed (Hubert, 1994; p. 11). In the study site, Kho Pho Lu is on a hilltop, above the everyday activities of village life and agriculture, with special rules and taboos governing management and use within the sacred space. These locally enforced regulations carry positive implications for natural resource conservation.

7.2.1. Implications for Natural Resource Management

Sacred sites are not merely a piece of land or spatial location; rather, meanings, beliefs and rules are ascribed to spiritually salient spaces (Hubert, 1994; p. 3). Restrictive rules and sets of taboos typically govern these sacred spaces in ways that help conserve the natural environment (Bhagwat & Rutte, 2006; Ntiamoa-Baidu, 2008). Social taboos, thereby, act as "invisible" systems of resource management (Colding & Folke, 2001). Resource and habitat taboos frequently serve as social mechanisms to monitor and enforce natural resource use with comparable efficacy to formal conservation institutions and offer additional advantages, namely low cost and voluntary compliance (Colding & Folke, 2001). Kho Pho Lu is regulated by resource and habitat taboos, as the entire sacred forest is protected by social taboos limiting and prohibiting resource use. Commercial hunting and felling prohibitions ensure that local species are conserved. The ban on external building materials protects the site from pollution and destructive development.

Indigenous natural resource management pivots on the spiritual relational ontologies binding people to forests, plants, animals and ancestors. The relationships between sacred sites and ancestor worship underlies the care that many Indigenous peoples practice for maintaining sacred sites: caring for the sacred site is to care for and respect one's ancestors; thus, the natural environment in sacred spaces is frequently better conserved than outside the sacred space (M. D. S. Chandran, Gadgil, & Hughes, 1998).[6] This caring, spiritual relationality with the environment is demonstrated by the well conserved forest at the sacred summit of Kho Pho Lu where ancestral spirits are believed to reside, as compared to the agricultural encroachment on the lower hillslopes.

7.3 Indigenous and traditional ecological knowledge

TEK management practices may overlap with some conventional conservation approaches, for instance, by monitoring changes in resource abundance, species-specific protections, habitat protections and temporal restrictions (Berkes, Colding, & Folke, 2000; Berkes & Folke, 1998; Dudgeon & Berkes, 2003). The taboos that regulate Kho Pho Lu fall under TEK natural resource management systems in ways that overlap with conventional conservation through habitat protection and resource monitoring. TEK serves the following functions: (i) supporting complex landscape dynamics, such as landscape mosaics and patchiness; (ii) enabling management of ecological processes at multiple scales; (iii) facilitating adaptation to shocks and disturbances; and (iv) helping renew resources and manage watersheds (Berkes et al., 2000; Berkes & Folke, 1998; Dudgeon & Berkes, 2003). Kho Pho Lu is managed using these complex TEK system approaches by maintaining a sacred clearing (landscape patchiness), maintaining a sacred forest on the summit (resource renewal and watershed management) and banning the commercial felling of trees or collection of seedlings (nurturing resource renewal).

TEK is also composed of social processes and institutions that relate to

[6] Ancestor worship is commonly misunderstood as involving 'objects of worship,' whilst ancestors are usually the intermediaries between supernatural spirits and people (Carmichael et al., 1994).

intergenerational knowledge transmission, institutional structures and dynamism, processes of cultural internalization through ceremonies and rituals, and worldviews and environmental ethics that foster cultural values of respect, sharing, reciprocity and humility (Berkes et al., 2000; Berkes & Folke, 1998; Dudgeon & Berkes, 2003). Social processes that undergird TEK management practices at Kho Pho Lu are the tabakho leadership and intergenerational knowledge transmission, social taboos, religious sanctions, rituals and ceremonies, cultural frameworks for resource management, and cultural values of respectful and reciprocal relationships with the environment. These indicators demonstrate that Kho Pho Lu is sustainably managed within a TEK knowledge-praxis-belief complex system.

7.4 Indigenous worldviews, nature-based ontologies and environmental ethics

Our worldviews, values and institutions shape our attitudes, beliefs and behaviors towards the environment (Berkes & Folke, 1994). Importantly, the way that nature is conceived and perceived is culture-specific (Berkes & Folke, 1994). Culture can thus drive positive feedback loops for either enhancing or degrading natural capital (Berkes & Folke, 1994). While modern society pits culture against nature, these logics cannot be applied universally to all cultures, especially those based on spiritual relationality with the natural environment. In sacred forests like Kho Pho Lu, culture does not threaten biodiversity; rather, it is integral to its conservation.

Indigenous and local religions are oftentimes cosmotheistic with spiritual beliefs that the natural world may be embodied with a life force of spirits (Hubert, 1994; p. 6). The Pgaz k'Nyau believe that people are members of a 'community of beings' that include plants, animals, rocks, rivers, fields, forests, spirits and ancestors (Buergin, 2015). Pgaz k'Nyau pantheistic ontologies fundamentally differ from the techno-managerial conceptualizations of nature by the Thai state. Consequently, opposing ontologies can lead to resource conflicts and conflicting views on environmental management and (formal *versus* informal) institutions but can also illuminate alternative pathways to sustainable resource management that function outside the logics of industrial societies (Berkes & Folke, 1994).

7.5 Future Opportunities for Development and Governance

7.5.1. Alternative Models of Governance

Indigenous and local natural resource management can be integrated into existing legal frameworks through alternative polycentric and multi-level governance models. Case studies of polycentric governance around the world show that local communities can sustainably and effectively manage local resources, and oftentimes more efficiently and with better compliance than centralized government schemes (Ostrom, 2015). Such nested governance structures enable a more flexible integration of informal, local institutions than rigid, top-down bureaucracies (Ostrom, 2015).

Biocultural conservation approaches require integration from the bottom-up into existing governance structures at multiple levels with both vertical (hierarchical) and horizontal (same level) linkages or generation of new multi-level institutions where appropriate (Young, King, & Schroeder, 2010). Importantly, the success of new institutional approaches for conservation requires building trust through long-standing partnerships with local and Indigenous communities. Recognizing and legitimizing traditional ecological knowledge and non-dualistic Indigenous worldviews is an important first step towards building equitable relations for power and responsibility sharing (Armitage, Berkes, Dale, Kocho-Schellenberg, & Patton, 2011; Dudgeon & Berkes, 2003). Collective land rights, co-management schemes and local TEK management can offer a cost-effective and efficient solution for regulating natural and

common pool resources at the local level while conserving administrative resources (Colding & Folke, 2001; Ostrom, 2015).

7.5.2. Integration with Existing legal frameworks

Sacred Site Protections

Legal frameworks and protections for Indigenous sacred natural sites exist in the national legislations of many countries and falls under the 'cultural landscape' designations of UNESCO. The IUCN acknowledges that the informal management and conservation of sacred natural areas by Indigenous peoples and local communities often precedes the establishment of protected areas (IUCN, 2009). Yet, they remain underrecognized or ignored in many national-level conservation plans and agendas, or may even be threatened by state-sponsored conservation and development programs (IUCN, 2009). For this reason, sacred area protections need to be enshrined in national legislations before these invaluable cultural heritage sites are irreparably damaged or forever lost.

International treaties and legislation

Biocultural diversity conservation upholds Thailand's obligations under international treaties and agreements, including the Convention on Biological Diversity (CBD), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the United Nations Declaration of Human Rights (UNDHR). Rights enshrined in these agreements include the right to self-determination, property, territories and resources, traditional lands, freedom from forcible eviction from traditional lands, and participation in decision-making processes (Gavin et al., 2015).

Sacred site protections may be needed to fulfill constitutional and UNDHR obligations on the rights to religious voluntarism, i.e. the ability to practice one's religion freely (Barclay & Steele, 2021). Thailand was one of the first 48 nations to sign the UNDHR in 1948. Later conventions were also signed by Thailand: the CBD in 2004 and UNDRIP in 2007. Article 8j of the CBD requires that parties *'respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity.'* Thailand is obliged to preserve sites of biocultural significance, such as Kho Pho Lu, under its international commitments.

Though Thailand is signatory to UNDRIP, vagaries persist in the definitions of 'Indigenous' and 'peoples.'[7] Ethnic minorities are not recognized as 'Indigenous' under Thai law or the constitution, rendering UNDRIP a weak instrument in the Thai context. This has not served Thailand's public image and international standing with reports of human rights abuses of Indigenous peoples in protected areas. Embracing 'new' biocultural conservation approaches with Indigenous partners would enable Thailand to develop a more positive public image by promoting Indigenous rights.

7.6 Even Development

Despite Thailand's official sufficiency economy pioneered by King Bhumibol Adulyadej (1927-2016), Thailand's economic development trajectories follow the principles of neoliberalism. Though neoliberal economics can enhance living standards, neoliberal capitalism has been heavily criticized for depleting the natural resource base and eroding Indigenous cultures and traditional ways of life. In the case of Thailand,

[7] Indigenous leaders in Thailand follow the definition of Indigenous outlined in Chapter V of the Martínez Cobo Study of the Department of Economic and Social Affairs of the United Nations.

neoliberal economic and industrial zoning have led to further land dispossession of local communities, ethnic minorities and Indigenous peoples (R. Chandran, 2020a; Post, 2021). Indeed, neoliberal models of development tend to 'leave some behind.' In response, organizations, such as the World Bank, have called for models of 'ethnodevelopment' or 'development with identity' (Uquillas & Nieuwkoop, 2006). Global efforts towards inclusion, diversity, multiculturalism and pluralism, have replaced the culturally homogenizing nation-building practices of the previous century in most developed nations. Paving a prosperous future for Thailand's diverse peoples and fostering even development will require rethinking current top-down, culturally-homogenizing development models to include local perspectives, knowledge systems and nature-based ontologies.

7.7 Limitations & Critiques

7.7.1. Limits of Recognition

Indigenous assimilation into settler societies has long been a source of concern for Indigenous activists and communities. The limits of recognition in a multicultural society have been explored in great depth (Povinelli, 2002). While recognizing the philosophical concerns, this paper opts for a pragmatic approach, given the particularities of the Thai context. It is difficult to discuss the limits of recognition in contexts like Thailand where Indigenous peoples are not recognized. Given the limited legal options for Thailand's Indigenous peoples to secure rights to land and resources, SCZs provide a toehold for Indigenous peoples to continue practicing traditional livelihoods from which more trusting relations with the Thai government can grow into potentially greater opportunities.

7.7.2. Limitations of the SCZ Approach

It would be a disservice, however, to not explicitly comment on the limitations of SCZs. SCZs have been criticized for not realizing the aspirations of Indigenous peoples with no ownership over land, no land titles, no self-determination or autonomy (Cultural Survival & Network of Indigenous Peoples in Thailand & the Asia Indigenous Peoples Pact, 2016). Insecure land tenure in SCZs is an issue faced by many ICCAs (Grazia Borrini-Feyerabend, Farvar, Renard, & Renard, 2005; Kothari, 2006). SCZs are also limited to Karen and coastal (*chao ley*) ethnic groups, which could form asymmetric power relations between ethnic groups. Moreover, pinning Indigeneity as 'traditional,' as outlined in the Cabinet Resolution for the SCZs, risks further marginalizing Indigenous persons who seek market integration and no longer practice traditional Indigenous lifestyles (Walker, 2001). In short, the intra-heterogeneity of Indigenous groups is not recognized (Walker, 2001). Worth reiterating is that the protection of traditionally Indigenous ways of life proffered by SCZs is not prescriptive for all Karen; only for those who wish to continue traditional practices in their homelands and who have received an SCZ designation. Though SCZs may be limited in realizing the long-term aspirations of Indigenous peoples, in very practical terms, SCZs offer an alternative future to the immediate realities of eviction and dispossession. This paper, therefore, advocates for an SCZ designation for the unique sacred site of Kho Pho Lu, given its immeasurable cultural value.

8. CONCLUSION

Kho Pho Lu is a sacred site of unique spiritual significance for Indigenous Karen people. This dwelling place of an ancestral spirit where animist ceremonies and celebrations remain intact is deserving of national recognition and protection. The findings

underscore the interconnectedness of local biodiversity conservation with cultural and spiritual practices. Rather than threatening biodiversity, culture can play an integral role for biodiversity conservation. Biocultural conservation frameworks recognize the interrelatedness of cultural and biological diversity. Future studies could compare the biodiversity of Kho Pho Lu to nearby national parks and assess potential integration of small-scale, community-based conservation of sacred groves into national conservation networks. Small-scale conservation by local and Indigenous communities offer valuable contributions to national objectives for nature and cultural heritage conservation. A Special Cultural Zone designation for Kho Pho Lu offers a promising legal avenue to protect a sacred site of significant biocultural value at risk of being irrevocably lost.

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Appendix

Table A. List of identified plants with their scientific, Pgaz K'Nyau and Thai names.

Scientific Name	Pgaz k'Nyau Name ชื่อภาษาปกาเกอะญอ	Thai Name ภาษาไทย
Dipterocarpus tuberculatus Roxb. (Dipterocarpaceae)	หล่าเธอ	ไม้ดึง
Dipterocarpus tuberculatus Roxb. (Dipterocapaceae)	เส่	ไม้พลวง
Shorea obtusa Wall. Ex Blume (Dipterocarpaceae)	หล่าเบาะ	ไม้เต็ง
Shorea siamensis Miq (Dipterocarpaceae)	หล่านิ	ไม้แงะ
Shorea siamensis Miq (Dipterocarpaceae)	เฆาะหล่าเธอ	ไม้รัง
Syzygium cumini (L.) Keels (Myrtaceae)	เส่อมี	ไม้เกี๋ยง
Phyllanthus emblica Linn.	เส่ญา	มะขามป้อม
Tectona grandis L.f.	เป่อฮี่	ไม้สัก
Xylia xylocarpa (Roxb.) Taub. var. kerrii (Craib ex Hutch.) Nielsen (Leguminosae-Caesalpinioideae)	เพว	ไม้แดง
Pterocarpus indicus Willd (Leguminosae)	ชุ	ไม้ประดู่
Afzelia xylocarpa (Kurz) Craib (Phyllosiphonaceae)	เก่อเลอ	ไม้มะค่าโมง
Spondias mombin L. (Anacardiaceae)	เส่อพี	มะกอก
Erythrina subumbrans Merr. (Leguminosae)	เชอ	ทองหลางป่า

Scientific Name	Pgaz k'Nyau Name ชื่อภาษาปกาเกอะญอ	Thai Name ภาษาไทย
Bauhinia purpurea L. (Leguminosae-Caesalpinioideae)	เก่อเสอ	ค้นเสี้ยว
Duabanga grandiflora Walp. (Lythraceae)	โกะ	ลำพูป่า
Mangifera caloneura Kurz (Anacardiaceae)	เส่อเคาะ	มะม่วงป่า
Calotropis gigantea (L.) W.T. Aiton (Apocynaceae)	ซู	ต้นรัก
Lagerstroemia floribunda Jack (Lythraceae)	ยอ	ตะแบก
Heterophragma sulfureum Kurz. (Bignoniaceae)	แขว่	แครกฟ้า
Vitex pinnata L. (Verbenaceae)	ซะเตอ	ตีนนก
Hoya nummularioides Costantin (Apocynaceae)	พอกา	มะลิป่า
Oroxylum indicum (L.) Kurz (Bignoniaceae)	คอกา	เพกา
Firmiana colorata (Roxb.) R.Br. (Malvaceae)	แบ	ปอฝ้าย
Dendrocalamus strictus (Roxb.) Nees (Poaceae)	หว่ามี	ไผ่ซาง
Bambusa nutans Wall.ex Munro (Poaceae)	หว่าซึ	ไผ่บง
Bambusa bambos (L.) Voss (Poaceae)	หว่าชฉื่อ	ไผ่หนาม
Eupatorium odoratum L. (Asteraceae)	ชิโพเกว	สาบเสือ
Thunbergia laurifolia Lindl. (Acanthaceae)	จอลอคิเคอ	รังจืด

Scientific Name	Pgaz k'Nyau Name ชื่อภาษาปกาเกอะญอ	Thai Name ภาษาไทย
Amomum krervanh Pierre ex Gagnep. (Zingiberaceae)	เพอะโดะ	กระวาน
Indigofera tinctoria L. (Fabaceae)	เส่อญ่า	คราม
Cycas revoluta Thunb. (Cycadaceae)	แฆะหล่า	ต้นปรง
Alpinia galanga (L.) Willd. (Zingiberaceae)	เส่อเอเช	ข่า
Amorphophallus campanulatus Blume.,A. rex Hook.f. (Araceae)	บุ๊แกละ	ดอกก้าน
Aeginetia indica L. (Orobanchaceae)	เพาะกอ	ดอกดินสีแดง
Aeginetia indica L. (Orobanchaceae)	เพาะวา	ดอกดินสีขาว
Curcuma sessilis Gage. (Zingiberaceae)	เพาะพอ	ดอกกระเจียว
Amorphophallus campanulatus Bl.ex Dence.(A.paeoniifolius (Dennst.) Nicolson (Araceae)	เคอะ	บุก
Orchidaceae *spp.*	พอโมลา	กล้วยไม้